

SINGLE-BILL SERVICE OFFER MANUAL



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This issue supersedes all previous issues

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INTRODUCTION TO STEELSCAPE

Welcome to Steelscape. To make doing business with us easy and hassle-free, we developed this manual as a resource. It will explain our product and service offers, highlighting all available options. You can reference how to most effectively place an order with Steelscape, selecting the appropriate packaging, shipping and storage options. You can also reference our billing and claims policies, as necessary. We have documented product capabilities and ASTM specifications.

This manual is not all-encompassing and is subject to amendment. However, your basic questions should be answered fully and accurately. Any information not addressed can be quickly answered by contacting the appropriate Steelscape Customer Service Representative by calling 1-888-285-7717.

Please distribute the information presented within this manual to appropriate departments and people within your company. For example, section 7 should be forwarded to your accounting or payables area and so on.

Steelscape's Single-Bill Service Offer Manual will be updated as the information found within is refined and developed. The updated manual will be released once per year - during the 2nd Quarter. To ensure your version of this manual is as current as possible please reference the footer information at the bottom of the page. The footer will display the version number and release date of the Service Offer Manual in your possession. Should your version be outdated, please contact your Steelscape Sales Representative or our Marketing Department for the most up-to-date version.

We hope this information proves useful in answering your questions. We welcome any feedback you may have on the layout or content.

We know you have many options when selecting your suppliers and we appreciate your business. All of us at Steelscape look forward to working with you to fulfill your coated steel needs.

STEELSCAPE'S VISION, MISSION & VALUES

Our Shared Vision is...

"To be our customers' preferred supplier of pre-painted products known for our quality, reliability, customer service, and ease of doing business."

Our Shared Mission is...

To use our assets to maximize shareholders value while ensuring customer and employee engagement.

Speed • Accuracy • Synergy • Response

Our Shared Values are...

Integrity: Doing what we say we'll do.

High Performance: Achieving superior results and stretching our capabilities.

Courage to Lead Change: Inspiring and delivering change even in the face of adversity.

Respect for Each Other: Valuing diversity and recognizing our interdependencies.

Safety and the Environment: Commitment to safety, health & environmental responsibilities.

OUR BOND

We and our customers proudly bring inspiration, strength and color to communities with Steelscape steel.

Our customers are our partners.

Our success depends on our customers and suppliers choosing us. Our strength lies in working closely with them to create value and trust, together with superior products, service and ideas.

Our people are our strength.

Our success comes from our people. We work in a safe and satisfying environment. We choose to treat each other with trust and respect and maintain a healthy balance between work and family life. Our experience, teamwork and ability to deliver steel inspired solutions are our most valued and rewarded strengths.

Our shareholders are our foundations.

Our success is made possible by the shareholders and lenders who choose to invest in us. In return, we commit to continuing profitability and growth in value, which together, make us all stronger.

Our communities are our homes.

Our success relies on communities supporting our business and products. In turn, we care for the environment, create wealth, respect local values and encourage involvement. Our strength is in choosing to do what is right.

STEELSCAPE CONTACT LIST

To ensure you have the best possible access to our staff, we ask that you to reference our website at www.steelscape.com. Most departments and contacts associated with your account will be listed under the Contacts page of our website.

Name	Title	Telephone	Cellular	Email
SALES ADMINISTRATION				
Scott Cooley	VP Sales	(360) 673-8324	(214) 415-6597	scott.cooley@steelscape.com
Mary Wardle	Sales Manager West Region	(925) 937-8818	(925) 330-8818	mary.wardle@steelscape.com
Marc Fullem	Sales Manager East Region		(630) 853-1994	marc.fullem@steelscape.com
Edgar Tomlin	Sales Analyst	(360) 673-8664		edgar.tomlin@steelscape.com
Stan Randolph	Sales Analyst	(360) 673-8235		stan.randolph@steelscape.com
Shelby Courtney	Architectural Coordinator	(360) 673-8660		shelby.courtney@steelscape.com
ACCOUNT MANAGERS				
Mark Hector	Account Manager	(360) 673-8330	(360) 430-5037	mark.hector@steelscape.com
Dale Webb	Account Manager	(360) 673-8649	(360) 430-6147	dale.webb@steelscape.com
Eugene Saez	Account Manager	(310) 541-3747	(213) 924-5888	eugene.saez@steelscape.com
Robert Grimes	Account Manager	(360) 673-8252	(360) 430-8539	robert.grimes@steelscape.com
Mark Zefeldt	Account Manager	(714) 992-5843	(714) 319-0472	mark.zefeldt@steelscape.com
CUSTOMER SERVICE				
Penny Shepherd	Cust. Service Team Leader	(360) 673-8603		penny.shepherd@steelscape.com
Dennis Herron	Cust. Service Rep.	(360) 673-8464		dennis.herron@steelscape.com
Maggie Destromp	Cust. Service Rep.	(360) 673-8314		maggie.destromp@steelscape.com
Andrea Wernex-Dennis	Cust. Service Rep.	(360) 673-8210		andrea.wernex-dennis@steelscape.com
Anne Poremba	Senior Cust. Service Rep.	(909) 484-4611		anne.poremba@steelscape.com
Julie Lopez	Cust. Service Rep.	(909) 484-4606		julie.lopez@steelscape.com
Alicia Eyer	Cust. Service Rep.	(360) 673-8410		alicia.eyer@steelscape.com
Brian Eyer	Cust. Service Rep.	(360) 673-8296		brian.eyer@steelscape.com
QUALITY SYSTEMS & TECHNICAL SERVICE				
Michelle Vondran	Technical Manager	(909) 484-4623	(909) 286-6470	michelle.vondran@bluescope.us
Sean McKean	Technical Services	(909) 484-4666	(909) 213-7084	sean.mckean@steelscape.com
Dan Hall	Technical Services	(360) 673-8428	(360) 431-0431	dan.hall@steelscape.com
Gary Preisendorfer	Technical Services		(360) 431-8761	gary.preisendorfer@steelscape.com
Betsy Hoppe	Quality Systems Manager	(360) 673-8286	(360) 607-1649	betsy.hoppe@steelscape.com
SHIPPING & DISPATCH				
Allen LaTourrette	Transportation Manager	(360) 673-8285	(360) 431-6466	allen.latourrette@bluescope.us
Ken Taylor	Transportation Coordinator	(360) 673-8217		kenneth.taylor@bluescope.us
Tyler Petterson	Dispatcher	(360) 673-8427		tyler.petterson@steelscape.com
Terra Luff	Dispatcher	(360) 673-8281		terra.luff@bluescope.us
ACCOUNTS RECEIVABLE				
Connie Woodward-Hass	Credit Manager	(360) 673-8234		connie.woodward@steelscape.com
Annamae Bryan	Credit Assoc.	(360) 673-8239		annamae.bryan@bluescope.us
KALAMA, WASHINGTON FACILITY				
Reception		(360) 673-8200		
Norman Ross	Plant Manager	(360) 673-8292	(360) 430-2066	norman.ross@steelscape.com
RANCHO CUCAMONGA, CALIFORNIA FACILITY				
Reception		(909) 987-4711		
Brendan Brophy	Plant Manager	(360) 673-8280	(419) 508-1652	brendan.brophy@steelscape.com

ORDER PROCESSING

Purchase Order Requirements*

To process your order more efficiently, we require the following information when receiving your order:

Criteria	Options (If Applicable)
Ship-to Address	NA if customer will call
Mode of Transportation	(Truck or Rail)
Customer Purchase Order No.	
Total Quantity Ordered	(Pounds and/or Lineal Feet)
Metallic-Coating Type	(ZINCALUME® or TruZinc® Steel)**
Resin Coating	(Yes/No)
Metal Grade	(33, 37, 40, 50CL1, 50CL2, 50CL4, 57, 80CL1, CSA, CSB)
Coating Weight	(G30, G40, G60, G90, G100, AZ35, AZ50, AZ55)
Thickness	(Base Metal Thickness or Total Coated Thickness)
Thickness Tolerance	(Full Thickness Tolerance - See Section 4.5)
Width Tolerance	(Standard or Slit Tolerance)
Output Width	(Min)
Skin Passed	(Yes/No)
End Use	
Chem. Treat	(Yes/No)
RoHS Compliant	(Yes/No)
Oil	(None/Light/Medium) (Heavy upon request & approval)
Branding	(Yes/No and Type)
Coil Inside Diameter (ID)	(20")
Coil Weight Minimum	
Coil Weight Maximum	
Skid Weight Maximum	
Packaging Preference	
Steelscape to Paint	(Yes/No)
Steelscape to Slit	(Yes/No)
Steelscape to Emboss	(Yes/No)
Emboss Type & Depth	(Stucco/.005 or .007)
Steelscape to CTL	(Yes/No)
Flat Sheet Length	
Flat Sheet Plastic Film Required	(Yes/No)
Customer to Paint	(Yes/No)
Requested Ship Date	
Paint Details-Top & Bottom Primer/Backer	(Mils Primer/Mils Backer)
Paint Details-Top & Bottom Paint Color	(Paint Code with Color Description and Paint System)
Unit Pricing	(Per CWT or Pounds and TWM or Actual) (Note: Freight always calculated on actual weight)
Quote Number Used for Pricing	

* If your order needs to comply with any special building requirements, you will need to include that information on your purchase order provided to Steelscape. This includes requirements to meet the Buy American Act (BAA), Surface Transportation Assistance Act (STAA), American Recovery and Reinvestment Act (ARRA), various Buy America requirements, domestic and/or melted and poured requirements, or recycled-content requirements.

** If you are ordering any of Steelscape's custom, branded products, you will need to include that information on your purchase order as well. This includes Vintage®, ReziBond®, TruzGuard™, Spectrascape® and Steelscape Prints®.

Lead Times & Releases

Steelscape will make every attempt to satisfy the customer order request date. Availability of materials - substrate and paint - in addition to line time availability will determine Steelscape's ability to meet the request date. Every order will reflect the customer order requested ship date as well as the Steelscape Acknowledged Date.

To help our customers better understand Steelscape's order entry process as it relates to lead times we offer the following order practices:

1. Steelscape commits to shipping orders within the agreed lead times.
2. Steelscape does require orders be processed with a release date already provided or the orders to be released at least one week prior to the Acknowledged Date. This will enable us to rapidly package the orders, schedule appropriate transportation and have them shipped on or before the date we have indicated.
3. Steelscape requires 48 hours to arrange trucking. Orders requiring shipment should be released a minimum of 48 hours prior to the required shipping date.
4. In the absence of a customer order release received at least one week before the Acknowledged Date, Steelscape will produce and package for shipment all orders by the agreed date.

NOTE: Our delivery time is measured by the Acknowledged Production Date of the order and does not include the transportation time or mode used to deliver the product from our facility to the customer's final destination. Providing a release date when placing an order will help ensure the added time for transportation is minimal.

Order Acknowledgments

Upon receipt and entry of an order into the Steelscape production system, the customer will be provided an Order Acknowledgement. The acknowledgement will contain all specifications related to the order and should be reviewed to ensure accuracy. Any discrepancies must be brought to your Customer Service Representative's attention immediately. Order Acknowledgements will be sent for all orders unless requested otherwise in writing from the customer to the appropriate Steelscape Customer Service Representative.

Change Requests

We realize sometimes an initial order will need to be altered. Recognizing that potential need, we have established the following guidelines to help customers understand our change policy for existing orders.

1. Any changes to an existing order must be submitted in writing to the Customer Service Representative (CSR).
2. The CSR will initiate the change in Steelscape's system by obtaining approval from all appropriate departments, as

determined by the type of change requested. Each request will be reviewed within twenty-four (24) hours. However, it may take up to one (1) business day to determine acceptance or refusal of the requested change.

3. Approval of changes will depend on the type of change requested and the status of order (i.e. where the order is in-process, lead time guarantee, etc.)
4. Orders approved for change will be revised per the customer request.
4. Customers will be notified of the outcomes for all changes requested.

Allowable changes include:

- Substrate
- Coating Weight
- Width
- Quantity*
- Lead Time
- Price
- Purchase Order No.
- Customer Part No.(s)
- Min/Max Coil Weights
- Packaging Instructions
- Paint Color*
- Paint Thickness*
- Grade*
- Decimal Thickness*
- End-Use
- Ship-To
- Ship Mode
- Slitting/Embossing Instructions

* Some restrictions apply to amending these items. Consult Steelscape Customer Service with any questions or concerns.

Amending an order may result in resetting of the Acknowledged Date. Upon amendment approval, a revised order acknowledgement will be reprinted and be sent to the customer.

Any further questions regarding Steelscape's order change policy can be directed to the Customer Service Department.

Thickness Tolerances

Full Restricted Tolerances - 1" Minimum Edge Distance

Width (Inches)	Thickness (Inches)	
	.010 - .023	>.023 - .045
MINIMUM	Minimum Tolerances - All Plus	
> 0 - 32	0.003	0.004
> 32 - 40	0.003	0.004
> 40 - 54	0.003	0.004
NOMINAL	Nominal Tolerances - Plus and Minus	
> 0 - 32	0.002	0.002
> 32 - 40	0.002	0.002
> 40 - 54	0.002	0.002

Thickness is measured on the coated sheet and includes the metallic-coating thickness. Thickness is measured at any point on the sheet not less than 1 inch from a side edge, per ASTM 924-16a, Table 2.

Customers should inquire about any application requiring improved (tighter) tolerances for performance reasons.

STEELSCAPE TERMS & CONDITIONS OF SALE

1. Acceptance. No terms or conditions other than those stated herein, and no agreement or understanding, oral or written, purporting to modify these terms or conditions, whether contained in Purchaser's purchase order or shipping release forms or elsewhere, shall be binding on STEELSCAPE, LLC ("Seller") unless signed by its authorized representative. No proposals, negotiations and representations, if any, made prior and with reference hereto shall have any effect unless expressed herein. Notwithstanding the above, this order shall be subject to acceptance by Seller. Acknowledgement of an order by Seller does not constitute acceptance of the order unless expressly so stated. Upon acceptance, Seller shall have the right to begin performance. Purchaser shall not have the right to cancel this order after it has been accepted without paying a Cancellation Charge. The amount of the Cancellation Charge shall be based upon costs incurred with respect to the canceled order, as determined by Seller.

2. Price. (a) The prices in this order are based upon circumstances existing on the date Seller accepted the order. All charges for (and all subsequent increases in or impositions of) insurance, freight or transportation rates, demurrages, storage costs, port charges (wharfages, re-handling, and other charges), customs or import duties, dumping duties and countervailing duties, surcharges, border taxes, governmental tariffs, and any other charges, taxes, duties, assessments, imposts or other levies of any nature whatsoever, imposed by any private, public, governmental or quasi-governmental agency whether national, state or local, foreign or domestic, whether caused by change in duty classifications, valuations or for any other reason whatsoever, shall be added to and become a part of the order price and paid by Purchaser hereunder. (b) Freight and insurance charges from Seller's facility or Seller's supply point and Seller's freight handling charges shall be borne by the Purchaser unless otherwise agreed. The freight and handling charges shown on the invoice may include an additional handling charge and/or may not reflect the actual cost of shipping the goods delivered hereunder. (c) Purchaser shall pay all applicable sales, purchase, use, consumption and excise taxes. If Purchaser's purchases of the goods are exempt from sales or use tax, Purchaser must furnish the appropriate resale certificates or sales tax exemption numbers. Except as otherwise specifically provided in this order, all import permits and licenses and the payment of all United States import duties and customs fees shall be the sole responsibility of Purchaser. (d) Where metal is supplied by Purchaser, the weight billed is the weight of coated metal shipped. (e) The pre-painted acknowledgement price covers a specific quantity. If less metal is supplied by Purchaser for painting in one production run than quoted, Seller will adjust the order price to the appropriate quantity bracket without notifying Purchaser. (f) Orders are subject to re-pricing upon written notice by Seller to Purchaser.

3. Payment. (a) Payment shall be made in compliance with Seller's payment terms and such payment shall not be subject to retainage of any description. Seller may suspend production, shipments, and delivery and retake possession of any materials furnished until all such payments as are due are paid in full. All payments not made when due shall bear interest at the rate of 18% per annum from the due date (or the maximum interest rate allowed by the state in which the sale is made whichever is less). If suit is brought by Seller to enforce this agreement, Purchaser shall pay a reasonable attorney's fee to Seller as fixed by the Court, plus other reasonable costs of collection. Failure to pay invoices when due shall make all other outstanding invoices immediately due and payable. The receipt by Seller of part payment of the full amount then due and payable shall not be a waiver of any of Seller's rights set forth herein or provided by law. (b) If, in the sole judgment of Seller, it appears that Purchaser may not be able to make payment when due, or if Purchaser otherwise has not made payment to Seller as required under a different order, Seller shall have the right to suspend manufacture, shipment, or delivery of materials and seek reasonable assurances of Purchaser's ability to make payments. Seller shall resume suspended performance at the time that in its sole judgment adequate assurances have been provided. (c) All deliveries shall be subject to the approval of Seller's Credit Department. Seller reserves the right before making any delivery to require payment in cash or additional security for payment; and if Purchaser fails to comply with such requirements, Seller may terminate this order.

4. Shipment and Claims. (a) Unless otherwise specified in writing, Seller's delivery obligation shall be at Seller's facility. The goods shall be made available to Purchaser for receipt at Seller's facility during normal business hours after notification is given to Purchaser by Seller that the goods are ready for pick up. Where warehouse storage is provided by Seller for Purchaser's goods, Seller is not liable for any metal deterioration. (b) All shipping dates are estimates and are based upon prompt receipt by Seller of all information necessary for completion of the order and are subject to delays should Seller suspend

production, shipments and delivery pursuant to Sections 3(a) or (b) above, or otherwise. (c) Seller shall not be liable, and Purchaser agrees to forego making claims against Seller, for delays in manufacture, shipping, or delivery caused in whole or in part by: delays in receipt of or unavailability of materials, fuel, power or transportation; breakdown of equipment; strikes, lockouts or other differences with employees; local labor shortages; accidents, war, riots, fire, floods, storms, epidemic, acts of God or other casualties; acts of the Purchaser; government action, embargo, allocation, regulation or requirement; any act or neglect of the carrier or any other person not employed by Seller, including without limitation subcontractors, manufacturers, or suppliers of Seller; or other causes beyond Seller's reasonable control whether of a similar or dissimilar nature than those enumerated. (d) If Purchaser does not schedule pick up or unloading at the delivery site within a reasonable time, Seller may assess the costs of delay and shall not be responsible for any additional costs incurred as a result of such a delay. In addition, if, for any reason, this order is placed on ship hold, (i) Seller shall not be responsible for defects in the primer or finish coat of paint that may be caused by weather conditions, (ii) the order will be subject to storage charges as billed by Seller, and (iii) Purchaser shall be responsible to make payment for such materials. (e) Purchaser shall accept or reject the goods by written notice to Seller given promptly upon delivery of the goods. All claims of any kind or nature must be made within 48 hours of receipt by Purchaser of the goods. Purchaser is familiar with the nature of the goods furnished by Seller and agrees that the time period set forth herein for notice of nonconformity is reasonable. All claims must be supported by coil identification and must be in its original size unless otherwise agreed to by Seller. Seller reserves the right to inspect such material upon notification from Purchaser. Inspection and testing by Seller is final and conclusive and shall be binding upon Purchaser. No returns will be accepted or allowances made unless authorized in writing by Seller. Seller shall have satisfactorily performed its obligations hereunder if it supplies an amount with ten percent (10%) more or less than the amount ordered unless otherwise specified. (f) Seller shall not be responsible for spoilage caused by defective metal supplied by Purchaser whether such spoilage occurs at Seller's plant or at Purchaser's plant. Similarly, Seller will not be responsible for deviations in the physical dimensions of Purchaser's material. Although it is the policy of Seller to advise Purchaser should Seller determine that any of Purchaser's material is not suitable for coating, if Seller for any reason runs a portion of Purchaser's material before a defect is detected, Purchaser agrees to pay to Seller for Seller's time and the coatings used. (g) Purchaser acknowledges that the production of pre-painted metal on high-speed coil coating lines and other production equipment has hazards which are caused by imperfections in metal as well as technical problems associated with continuous high-speed coil coating. Purchaser agrees to absorb, without claim, up to three percent (3%) of the coating material shipped per order. (h) Purchaser acknowledges that the inside and outside laps of coils may have a defective finish due to necessary handling and that there may be test marks necessary to maintain quality in each coil. Purchaser agrees that neither of these conditions are cause for rejection.

5. Risk of Loss, Title, and Security Interest. Risk of loss and title for the goods shall pass to Purchaser, subject to any applicable lien rights of Seller at the time of shipment to Purchaser of the goods. Purchaser must obtain adequate insurance to cover the goods from the time of risk of loss has passed from Seller. To the extent this order is for Seller to provide metal painting service only, Purchaser hereby grants to Seller a security interest in the goods as described more particularly elsewhere in this order, in all accounts, chattel paper, general intangibles, documents, instruments and causes of action related thereto, and in all proceeds of all of the foregoing in order to secure Purchaser's timely payment of the purchase price hereunder. Cumulative with all other remedies available to Seller in law, at equity, or otherwise, Seller (a) may require Purchaser to assemble the collateral and make it available to Seller at a place designated by it which is reasonably convenient to both parties; (b) shall be entitled to recover all reasonable legal fees and costs incurred by it; and (c) shall have the right to notify customers, account debtors or other obligors of Purchaser that Seller has been granted a security interest in Purchaser's accounts, and to collect such accounts directly. Any notification under this paragraph to Purchaser's customers, account debtors or other obligors by Seller shall constitute and be deemed for all purposes and instruction by Purchaser to said customers, account debtors or other obligors to make payment directly to Seller. In any case where such instruction by Purchaser may be required, Purchaser hereby irrevocably makes, constitutes and appoints Seller and its officers and employees as its true and lawful attorneys in fact, with power to endorse Purchaser's name upon checks, notes, account drafts and other instruments and evidences of payment that may come into Seller's possession in connection herewith. Amounts collected by Seller directly from Purchaser's customers, account debtors or

Steelscape Terms & Conditions of Sale Continued

other obligors after notification hereunder shall be applied against the secured obligations. Purchaser shall remain liable for any deficiency remaining unpaid after such application.

6. **Warranty.** Seller warrants that Seller's goods will comply with the coating manufacturers specifications set out in this order. If this order is for metal painting, Seller warrants that the painted metal will meet the specifications set out in this order and that the coating system and method of application of the coating system will be adequate within established tolerances. Purchaser shall assume all risk and liability resulting from the use of the goods, including the use of the goods in manufacturing, construction, or processing, and the use of the goods in combination with other materials or substances. If goods sold hereunder are not as warranted, Seller shall, at its option, refund the purchase price for the nonconforming component, or repair or replace such goods provided Purchaser has given timely written notice of the nonconformity and has given Seller an opportunity to investigate. Seller shall incur no liability for damage, shortages, or other cause alleged to have occurred or existed at or prior to delivery to the carrier unless Purchaser shall have entered full details thereof on its receipt to the carrier and given Seller timely written notice of said nonconformity as detailed above. This warranty shall not apply to goods that have been subject to mishandling, misuse, neglect, improper assembly, alteration, or repair by Purchaser or the customer of the Purchaser. The goods sold hereunder shall be subject to Seller's standard manufacturing variations, tolerances and classifications which are published by Seller and will be made available to Purchaser upon request. All painted materials shall be sold subject to tolerances recognized by industry standards. EXCEPT FOR THE FOREGOING EXPRESS WARRANTY, THERE ARE NO OTHER WARRANTIES, WHETHER ORAL OR IN WRITING OR WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

7. **LIMITATION OF LIABILITY.** IN THE EVENT OF SELLER'S LIABILITY ARISING FROM CLAIMS RELATING TO THE DESIGN, SALE, HANDLING OR USE OF GOODS PURCHASED HEREUNDER AND WHETHER BASED ON CONTRACT, TORT (INCLUDING BUT NOT LIMITED TO NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE, SUCH LIABILITY WILL BE LIMITED TO \$25,000.00 OR THE PURCHASE PRICE OF THE SPECIFIC NONCONFORMING COMPONENT(S), WHICHEVER AMOUNT IS GREATER. NOTWITHSTANDING ANY STATEMENTS CONTAINED HEREIN TO THE CONTRARY, IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR DELAY, LOSS OF EFFICIENCY, IMPACT, LOSS OF PRODUCTION OR ANTICIPATED PROFITS) OR LIABILITY INCURRED BY PURCHASER WITH RESPECT TO ANY GOODS OR SERVICES FURNISHED OR TO BE FURNISHED HEREUNDER BY SELLER. IN NO EVENT, REGARDLESS OF THE LEGAL THEORY ON WHICH A REMEDY IS SOUGHT, SHALL SELLER'S LIABILITY EXCEED THE PURCHASE PRICE OF THE GOODS IN QUESTION. IN THE EVENT PURCHASER DESIRES SELLER TO ASSUME GREATER LIABILITY FOR THE PURCHASED GOODS, A CHOICE IS HEREBY GIVEN OF OBTAINING FULL OR LIMITED LIABILITY BY PAYING AN ADDITIONAL NEGOTIATED AMOUNT PROPORTIONED TO THE RESPONSIBILITY, AND AN ADDITIONAL WRITTEN RIDER SHALL BE ATTACHED TO THIS AGREEMENT SETTING FORTH THE ADDITIONAL LIABILITY OF SELLER AND THE ADDITIONAL CHARGE. THIS CHARGE IS NOT TO BE CONSIDERED AS BEING A CHARGE FOR INSURANCE OF ANY TYPE, BUT IS INCREASED CONSIDERATION FOR THE GREATER LIABILITY INVOLVED.

8. **Indemnification.** Purchaser agrees to indemnify, defend, and hold harmless, Seller, its affiliates, and their officers, directors, employees and representatives from and against any and all claims and liability for injuries or loss to persons or property, or fines, or other damages, including all costs, expenses, legal and otherwise, arising from or relating to in whole or in part the goods sold hereunder, any use or possession of the goods sold hereunder, or any fraud, misrepresentation, negligent act, negligent failure to act (including the failure to properly store or handle material), gross negligence, or violation of statute or government regulation, by the Purchaser.

9. **Limitation Period.** No claim, cause of action, or suit relating to this order shall be brought by Purchaser against Seller after the expiration of one year from the date of delivery of materials. This provision shall not be construed reciprocally against Seller in any action or suit brought by Seller against Purchaser.

10. **Severance, Assignment, No Agency Relationship and No Third Party Beneficiaries.** In the event that any provision of these terms and conditions shall be deemed illegal, unenforceable, or null and void, all remaining provisions shall remain in full force and effect. Purchaser may not assign its rights or interest or delegate its duties under this order without the prior written consent of Seller. It is understood that Purchaser is an independent contractor and that no agency relationship at law or in fact exists between Purchaser and Seller. It is further understood that neither Seller nor Purchaser intend for this order to benefit any third party or class of persons and there are no intended third party beneficiaries to this order.

11. **Non-Waiver.** If at any time during its performance of its obligations under this purchase order Seller fails to assert any rights or remedies available under the terms of this order, or waiver of the rights or remedies available to a party by a course of dealing or otherwise, Seller's failure shall not be deemed to be a waiver of Seller's ability to assert those rights or remedies at any other time during its performance under this order and shall not be deemed to be a waiver of any other right or remedy under this order. Seller's remedies shall all be cumulative and in addition to any other or further remedies available in law, at equity or otherwise.

12. **Applicable Law.** The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the State of Washington without regard to its choice of law principles.

13. **Intellectual Property.** Seller agrees that Purchaser has a limited license to use Seller's trademarks for any goods purchased from Seller in marketing and labeling associated with those same goods. Purchaser agrees that all of its uses of Seller trademarks shall be in strict compliance with any and all instructions Seller provides Purchaser regarding use of the trademarks, including any instruction to cease use of the trademark(s).

I have read and understood and, as an authorized representative of Purchaser, agree to the above Terms & Conditions of Sale for all transactions with Steelscape LLC.

Purchasing Company: _____

Authorized Company Representative (print name): _____
 Title: _____

Authorized Company Representative (signature): _____
 Date: _____

PRICING

All pricing is per current (most recent) quote and is price in effect at the time of acknowledgement*, including all add-ons and deductions. All applicable price changes will be communicated to the customer by the Account Manager and/or Customer Service Representative.

Any pricing disputes or discrepancies should be reported to the Steelscape Account Manager or Customer Service Representative for resolution upon receipt of Order Acknowledgement. Shipments are F.O.B. the Steelscape facility. Steelscape is not liable for any transportation costs unless mutually agreed to in writing prior to the material shipment.

Actual weight pricing will be applied on the finished material weight and will include applied coating weight. TMW pricing is available upon approval.

Price quotations are subject to change and will be communicated to the customer by their Steelscape Account Manager.

* Pricing may be based on shipment date if agreed upon and noted on final quote for the order.

CREDIT & PAYMENT TERMS

Steelscape is happy to accept payments on a net 30 day basis. However, Steelscape also offers a 0.5% discount for prompt payment of invoices. The discount is applicable to materials value only and does not include freight. Your invoice will clearly indicate the correct amount to discount on each page and as a total for the entire invoice. This offer is consistent with industry payment terms.

Customer invoices may be discounted 0.5% if paid within 10 days of the invoice date. Steelscape will permit discount if payment is postmarked on or before the 10th day, as appropriate. In the event that the discount dates fall on a weekend or national holiday the next working day will be allowed. Full payment of invoices is expected within 30 days of the invoice date.

Steelscape is prepared to receive payments by ACH or wire transfer. The Steelscape Credit/AR Department can provide details and bank routing information.

Steelscape charges for late payments on invoices not paid within terms. The late payment charge is described on the credit application and on the Steelscape Terms and Conditions of Sale. Allowing a grace period of 30 days, Steelscape will assess a 1.5% charge each month to all unpaid invoices 60 days from invoice date and beyond.

The customer will not delay payment or withhold (short-pay) for claims or related problems until the issue is resolved to the satisfaction of both parties.

All shipments are subject to prior approval by the Steelscape Credit Department.



Credit Application and Agreement (Please include most recent financial statements)		
LEGAL NAME OF BUSINESS		DATE
STREET ADDRESS		
CITY	STATE	ZIP
TELEPHONE	DATE BUSINESS COMMENCED	DIVISION OF...

Anticipated monthly credit requirements \$

Business Type: (Tax exemption certificate required in applicable states)		
I hold a State Resale Certificate- <input type="checkbox"/> Yes <input type="checkbox"/> No	S&U Exemption No.	Fed Tax ID
<input type="checkbox"/> PROPRIETORSHIP	<input type="checkbox"/> PARTNERSHIP	<input type="checkbox"/> CORPORATION
<input type="checkbox"/> LLC	DIVISION OF... (REFER BELOW)	

Organizational Structure & Key Contacts		
OWNER/PRESIDENT NAME/MEMBER	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP
CO-OWNER/VICE PRESIDENT NAME	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP
PRIMARY CONTACT NAME & TITLE	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP

Other Officers, Members and Key Contacts		
NAME & TITLE	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP
NAME & TITLE	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP
NAME & TITLE	PHONE#	AUTHORIZED TO SIGN PO'S <input type="checkbox"/> Yes <input type="checkbox"/> No
EMAIL	CELL PHONE	% OWNERSHIP

LLC Dissolution: (Events which will cause dissolution of LLC)			
<input type="checkbox"/> Withdrawal of Member	<input type="checkbox"/> Death of Member	<input type="checkbox"/> Resignation of Member	Other (explain):
<input type="checkbox"/> Expulsion of Member	<input type="checkbox"/> Member bankruptcy	<input type="checkbox"/> Addition of New Member	

References (Principle Suppliers-Steel & Bank)			
FIRM NAME (1)		TELEPHONE	FAX
STREET ADDRESS	CITY	STATE	ZIP
FIRM NAME (2)		TELEPHONE	FAX
STREET ADDRESS	CITY	STATE	ZIP

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FIRM NAME (3)		TELEPHONE	FAX
STREET ADDRESS	CITY	STATE	ZIP
FIRM NAME (4)		TELEPHONE	FAX
STREET ADDRESS	CITY	STATE	ZIP
BANK NAME		TELEPHONE	FAX
STREET ADDRESS	CITY	STATE	ZIP
OFFICER	ACCOUNT#	TELEPHONE	FAX

Applicant hereby agrees to pay late payment charges of 1.5% per month or as allowed by law on all overdue accounts. All charges are payable according to the terms of our invoices unless otherwise pre-arranged with the credit department. Should it become necessary for Steelscape LLC to file suit to enforce payment of any charges, applicant agrees hereby that such suit may be brought in the State of Washington. Seller shall be entitled to court costs, attorney's fees and interest at the rate of 18% per annum (or maximum interest rate allowed by the state in which the sale is made).

All information furnished on this application is true to the best of my knowledge. I have read, understand and agree to the Terms and Conditions of Sale attached to this application and understand that those Terms and Conditions of Sale will govern all transactions between applicant and Steelscape LLC. I further understand and agree that Steelscape LLC may amend or modify the Terms and Conditions of Sale by submitting the amended or modified Terms and Conditions of Sale to applicant. Applicant's subsequent submittal to Steelscape LLC of a purchase order or applicant's acceptance of goods will operate as applicant's acceptance of Steelscape LLC's amended or modified Terms and Conditions of Sale.

Line 1. Dated _____, 20____
 _____ (Signature of Applicant) _____ (Title)

For valuable consideration given or to be given, the undersigned hereby guarantees to pay all indebtedness or liability incurred in the name of the applicant firm without qualification or limitation. This guarantee shall inure to the benefit of and bind the heirs, administrators, executors, successors and assigns of the parties hereto.

Line 2. Dated _____, 20____
 The applicant hereby authorizes their bank to release information regarding their account to Steelscape LLC. This information will be held in the strictest of confidence and be used solely to establish and maintain an open line of credit with Steelscape LLC.

BANK NAME _____ ACCOUNT # _____ CONTACT PERSON _____

DATED _____ SIGNATURE _____ TITLE _____

THE FEDERAL EQUAL CREDIT OPPORTUNITY ACT PROHIBITS CREDITORS FROM DISCRIMINATING AGAINST CREDIT APPLICANTS ON THE BASIS OF RACE, COLOR, RELIGION, NATIONAL ORIGIN, SEX, MARITAL STATUS; AGE; (PROVIDED THE APPLICANT HAS THE CAPACITY TO ENTER INTO A BINDING CONTRACT); BECAUSE ALL OR PART OF THE APPLICANT'S INCOME DERIVES FROM ANY PUBLIC ASSISTANCE PROGRAM; OR BECAUSE THE APPLICANT HAS IN GOOD FAITH EXERCISED ANY RIGHT UNDER THE CONSUMER CREDIT PROTECTION ACT. THE FEDERAL AGENCY THAT ADMINISTERS COMPLIANCE WITH THIS LAW CONCERNING THIS CREDITOR IS FEDERAL TRADE COMMISSION, EQUAL CREDIT OPPORTUNITY; WASHINGTON, D.C. 20580.

If your application for business credit is denied, you have the right to a written statement of the specific reasons for the denial. To obtain the statement, please contact Connie Woodward-Haas, 222 W. Kalama River Rd., Kalama, WA within 60 days from the date you are notified of our decision. We will send you a written statement of reasons for the denial within 30 days of receiving your request for the statement.

The undersigned is either a sole proprietor, a partner in a partnership, or an individual who may be executing a personal guarantee in connection with the extension of credit to Applicant, or one of the principal stockholders of a corporation. I give permission to Steelscape to obtain and utilize an individual credit report on me personally to determine my creditworthiness.

Dated: _____ Signature: _____
 _____ Social Security No.: _____

STEELSCAPE TERMS & CONDITIONS OF SALE

1. **Acceptance.** No terms or conditions other than those stated herein, and no agreement or understanding, oral or written, purporting to modify these terms or conditions, whether contained in Purchaser's purchase order or shipping release forms or elsewhere, shall be binding on STEELSCAPE, LLC ("Seller") unless signed by its authorized representative. No proposals, negotiations and representations, if any, made prior and with reference hereto shall have any effect unless expressed herein. Notwithstanding the above, this order shall be subject to acceptance by Seller. Acknowledgement of an order by Seller does not constitute acceptance of the order unless expressly so stated. Upon acceptance, Seller shall have the right to begin performance. Purchaser shall not have the right to cancel this order after it has been accepted without paying a Cancellation Charge. The amount of the Cancellation Charge shall be based upon costs incurred with respect to the canceled order, as determined by Seller.
2. **Price.** (a) The prices in this order are based upon circumstances existing on the date Seller accepted the order. All charges for (and all subsequent increases in or impositions of) insurance, freight or transportation rates, demurrages, storage costs, port charges (wharfages, re-handling, and other charges), customs or import duties, dumping duties and countervailing duties, surcharges, border taxes, governmental tariffs, and any other charges, taxes, duties, assessments, imposts or other levies of any nature whatsoever, imposed by any private, public, governmental or quasi-governmental agency whether national, state or local, foreign or domestic, whether caused by change in duty classifications, valuations or for any other reason whatsoever, shall be added to and become a part of the order price and paid by Purchaser hereunder. (b) Freight and insurance charges from Seller's facility or Seller's supply point and Seller's freight handling charges shall be borne by the Purchaser unless otherwise agreed. The freight and handling charges shown on the invoice may include an additional handling charge and/or may not reflect the actual cost of shipping the goods delivered hereunder. (c) Purchaser shall pay all applicable sales, purchase, use, consumption and excise taxes. If Purchaser's purchases of the goods are exempt from sales or use tax, Purchaser must furnish the appropriate resale certificates or sales tax exemption numbers. Except as otherwise specifically provided in this order, all import permits and licenses and the payment of all United States import duties and customs fees shall be the sole responsibility of Purchaser. (d) Where metal is supplied by Purchaser, the weight billed is the weight of coated metal shipped. (e) The pre-painted acknowledgement price covers a specific quantity. If less metal is supplied by Purchaser for painting in one production run than quoted, Seller will adjust the order price to the appropriate quantity bracket without notifying Purchaser. (f) Orders are subject to re-pricing upon written notice by Seller to Purchaser.
3. **Payment.** (a) Payment shall be made in compliance with Seller's payment terms and such payment shall not be subject to retainage of any description. Seller may suspend production, shipments, and delivery and retake possession of any materials furnished until all such payments as are due are paid in full. All payments not made when due shall bear interest at the rate of 18% per annum from the due date (or the maximum interest rate allowed by the state in which the sale is made whichever is less). If suit is brought by Seller to enforce this agreement, Purchaser shall pay a reasonable attorney's fee to Seller as fixed by the Court, plus other reasonable costs of collection. Failure to pay invoices when due shall make all other outstanding invoices immediately due and payable. The receipt by Seller of part payment of the full amount then due and payable shall not be a waiver of any of Seller's rights set forth herein or provided by law. (b) If, in the sole judgment of Seller, it appears that Purchaser may not be able to make payment when due, or if Purchaser otherwise has not made payment to Seller as required under a different order, Seller shall have the right to suspend manufacture, shipment, or delivery of materials and seek reasonable assurances of Purchaser's ability to make payments. Seller shall resume suspended performance at the time that in its sole judgment adequate assurances have been provided. (c) All deliveries shall be subject to the approval of Seller's Credit Department. Seller reserves the right before making any delivery to require payment in cash or additional security for payment; and if Purchaser fails to comply with such requirements, Seller may terminate this order.
4. **Shipment and Claims.** (a) Unless otherwise specified in writing, Seller's delivery obligation shall be at Seller's facility. The goods shall be made available to Purchaser for receipt at Seller's facility during normal business hours after notification is given to Purchaser by Seller that the goods are ready for pick up. Where warehouse storage is provided by Seller for Purchaser's goods, Seller is not liable for any metal deterioration. (b) All shipping dates are estimates and are based upon prompt receipt by Seller of all information necessary for completion of the order and are subject to delays should Seller suspend production, shipments and delivery pursuant to Sections 3(a) or (b) above, or otherwise. (c) Seller shall not be liable, and Purchaser agrees to forego making claims against Seller, for delays in manufacture, shipping, or delivery caused in whole or in part by: delays in receipt of or unavailability of materials, fuel, power or transportation; breakdown of equipment; strikes, lockouts or other differences with employees; local labor shortages; accidents, war, riots, fire, floods, storms, epidemic, acts of God or other casualties; acts of the Purchaser; government action, embargo, allocation, regulation or requirement; any act or neglect of the carrier or any other person not employed by Seller, including without limitation subcontractors, manufacturers, or suppliers of Seller; or other causes beyond Seller's reasonable control whether of a similar or dissimilar nature than those enumerated. (d) If Purchaser does not schedule pick up or unloading at the delivery site within a reasonable time, Seller may assess the costs of delay and shall not be responsible for any additional costs incurred as a result of such a delay. In addition, if, for any reason, this order is placed on ship hold, (i) Seller shall not be responsible for defects in the primer or finish coat of paint that may be caused by weather conditions, (ii) the order will be subject to storage charges as billed by Seller, and (iii) Purchaser shall be responsible to make payment for such materials. (e) Purchaser shall accept or reject the goods by written notice to Seller given promptly upon delivery of the goods. All claims of any kind or nature must be made within 48 hours of receipt by Purchaser of the goods. Purchaser is familiar with the nature of the goods furnished by Seller and agrees that the time period set forth herein for notice of nonconformity is reasonable. All claims must be supported by coil identification and must be in its original size unless otherwise agreed to by Seller. Seller reserves the right to inspect such material upon notification from Purchaser. Inspection and testing by Seller is final and conclusive and shall be binding upon Purchaser. No returns will be accepted or allowances made unless authorized in writing by Seller. Seller shall have satisfactorily performed its obligations hereunder if it supplies an amount with ten percent (10%) more or less than the amount ordered unless otherwise specified. (f) Seller shall not be responsible for spoilage caused by defective metal supplied by Purchaser whether such spoilage occurs at Seller's plant or at Purchaser's plant. Similarly, Seller will not be responsible for deviations in the physical dimensions of Purchaser's material. Although it is the policy of Seller to advise Purchaser should Seller determine that any of Purchaser's material is not suitable for coating, if Seller for any reason runs a portion of Purchaser's material before a defect is detected, Purchaser agrees to pay to Seller for Seller's time and the coatings used. (g) Purchaser acknowledges that the production of pre-painted metal on high-speed coil coating lines and other production equipment has hazards which are caused by imperfections in metal as well as technical problems associated with continuous high-speed coil coating. Purchaser agrees to absorb, without claim, up to three percent (3%) of the coating material shipped per order. (h) Purchaser acknowledges that the inside and outside laps of coils may have a defective finish due to necessary handling and that there may be test marks necessary to maintain quality in each coil. Purchaser agrees that neither of these conditions are cause for rejection.
5. **Risk of Loss, Title, and Security Interest.** Risk of loss and title for the goods shall pass to Purchaser, subject to any applicable lien rights of Seller at the time of shipment to Purchaser of the goods. Purchaser must obtain adequate insurance to cover the goods from the time of risk of loss has passed from Seller. To the extent this order is for Seller to provide metal painting service only, Purchaser hereby grants to Seller a security interest in the goods as described more particularly elsewhere in this order, in all accounts, chattel paper, general intangibles, documents, instruments and causes of action related thereto, and in all proceeds of all of the foregoing in order to secure Purchaser's timely payment of the purchase price hereunder. Cumulative with all other remedies available to Seller in law, at equity, or otherwise, Seller (a) may require Purchaser to assemble the collateral and make it available to Seller at a place designated by it which is reasonably convenient to both parties; (b) shall be entitled to recover all reasonable legal fees and costs incurred by it; and (c) shall have the right to notify customers, account debtors or other obligors of Purchaser that Seller has been granted a security interest in Purchaser's accounts, and to collect such accounts directly. Any notification under this paragraph to Purchaser's customers, account debtors or other obligors by Seller shall constitute and be deemed for all purposes and instruction by Purchaser to said customers, account debtors or other obligors to make payment directly to Seller. In any case where such instruction by Purchaser may be required, Purchaser hereby irrevocably makes, constitutes and appoints Seller and its officers and employees as its true and lawful attorneys in fact, with power to endorse Purchaser's name

March 29, 2017

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upon checks, notes, account drafts and other instruments and evidences of payment that may come into Seller's possession in connection herewith. Amounts collected by Seller directly from Purchaser's customers, account debtors or other obligors after notification hereunder shall be applied against the secured obligations. Purchaser shall remain liable for any deficiency remaining unpaid after such application.

6. Warranty. Seller warrants that Seller's goods will comply with the coating manufacturers specifications set out in this order. If this order is for metal painting, Seller warrants that the painted metal will meet the specifications set out in this order and that the coating system and method of application of the coating system will be adequate within established tolerances. Purchaser shall assume all risk and liability resulting from the use of the goods, including the use of the goods in manufacturing, construction, or processing, and the use of the goods in combination with other materials or substances. If goods sold hereunder are not as warranted, Seller shall, at its option, refund the purchase price for the nonconforming component, or repair or replace such goods provided Purchaser has given timely written notice of the nonconformity and has given Seller an opportunity to investigate. Seller shall incur no liability for damage, shortages, or other cause alleged to have occurred or existed at or prior to delivery to the carrier unless Purchaser shall have entered full details thereof on its receipt to the carrier and given Seller timely written notice of said nonconformity as detailed above. This warranty shall not apply to goods that have been subject to mishandling, misuse, neglect, improper assembly, alteration, or repair by Purchaser or the customer of the Purchaser. The goods sold hereunder shall be subject to Seller's standard manufacturing variations, tolerances and classifications which are published by Seller and will be made available to Purchaser upon request. All painted materials shall be sold subject to tolerances recognized by industry standards. EXCEPT FOR THE FOREGOING EXPRESS WARRANTY, THERE ARE NO OTHER WARRANTIES, WHETHER ORAL OR IN WRITING OR WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

7. LIMITATION OF LIABILITY. IN THE EVENT OF SELLER'S LIABILITY ARISING FROM CLAIMS RELATING TO THE DESIGN, SALE, HANDLING OR USE OF GOODS PURCHASED HEREUNDER AND WHETHER BASED ON CONTRACT, TORT (INCLUDING BUT NOT LIMITED TO NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE, SUCH LIABILITY WILL BE LIMITED TO \$25,000.00 OR THE PURCHASE PRICE OF THE SPECIFIC NONCONFORMING COMPONENT(S), WHICHEVER AMOUNT IS GREATER. NOTWITHSTANDING ANY STATEMENTS CONTAINED HEREIN TO THE CONTRARY, IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR DELAY, LOSS OF EFFICIENCY, IMPACT, LOSS OF PRODUCTION OR ANTICIPATED PROFITS) OR LIABILITY INCURRED BY PURCHASER WITH RESPECT TO ANY GOODS OR SERVICES FURNISHED OR TO BE FURNISHED HEREUNDER BY SELLER. IN NO EVENT, REGARDLESS OF THE LEGAL THEORY ON WHICH A REMEDY IS SOUGHT, SHALL SELLER'S LIABILITY EXCEED THE PURCHASE PRICE OF THE GOODS IN QUESTION. IN THE EVENT PURCHASER DESIRES SELLER TO ASSUME GREATER LIABILITY FOR THE PURCHASED GOODS, A CHOICE IS HEREBY GIVEN OF OBTAINING FULL OR LIMITED LIABILITY BY PAYING AN ADDITIONAL NEGOTIATED AMOUNT PROPORTIONED TO THE RESPONSIBILITY, AND AN ADDITIONAL WRITTEN RIDER SHALL BE ATTACHED TO THIS AGREEMENT SETTING FORTH THE ADDITIONAL LIABILITY OF SELLER AND THE ADDITIONAL CHARGE. THIS CHARGE IS NOT TO BE CONSIDERED AS BEING A CHARGE FOR INSURANCE OF ANY TYPE, BUT IS INCREASED CONSIDERATION FOR THE GREATER LIABILITY INVOLVED.

8. Indemnification. Purchaser agrees to indemnify, defend, and hold harmless, Seller, its affiliates, and their officers, directors, employees and representatives from and against any and all claims and liability for injuries or loss to persons or property, or fines, or other damages, including all costs, expenses, legal and otherwise, arising from or relating to in whole or in part the goods sold hereunder, any use or possession of the goods sold hereunder, or any fraud, misrepresentation, negligent act, negligent failure to act (including the failure to properly store or handle material), gross negligence, or violation of statute or government regulation, by the Purchaser.

9. Limitation Period. No claim, cause of action, or suit relating to this order shall be brought by Purchaser against Seller after the expiration of one year from the date of delivery of materials. This provision shall not be construed reciprocally against Seller in any action or suit brought by Seller against Purchaser.

10. Severance, Assignment, No Agency Relationship and No Third Party Beneficiaries. In the event that any provision of these terms and conditions shall be deemed illegal, unenforceable, or null and void, all remaining provisions shall remain in full force and effect. Purchaser may not assign its rights or interest or delegate its duties under this order without the prior written consent of Seller. It is understood that Purchaser is an independent contractor and that no agency relationship at law or in fact exists between Purchaser and Seller. It is further understood that neither Seller nor Purchaser intend for this order to benefit any third party or class of persons and there are no intended third party beneficiaries to this order.

11. Non-Waiver. If at any time during its performance of its obligations under this purchase order Seller fails to assert any rights or remedies available under the terms of this order, or waiver of the rights or remedies available to a party by a course of dealing or otherwise, Seller's failure shall not be deemed to be a waiver of Seller's ability to assert those rights or remedies at any other time during its performance under this order and shall not be deemed to be a waiver of any other right or remedy under this order. Seller's remedies shall all be cumulative and in addition to any other or further remedies available in law, at equity or otherwise.

12. Applicable Law. The construction, interpretation and performance of this order and all transactions hereunder shall be governed by the laws of the State of Washington without regard to its choice of law principles.

13. Intellectual Property. Seller agrees that Purchaser has a limited license to use Seller's trademarks for any goods purchased from Seller in marketing and labeling associated with those same goods. Purchaser agrees that all of its uses of Seller trademarks shall be in strict compliance with any and all instructions Seller provides Purchaser regarding use of the trademarks, including any instruction to cease use of the trademark(s).

I have read and understood and, as an authorized representative of Purchaser, agree to the above Terms & Conditions of Sale for all transactions with Steelscape LLC.

Purchasing Company: _____

Authorized Company Representative (print name): _____ Title _____

Authorized Company Representative (signature): _____

Date: _____

ZINCALUME® STEEL

The following pages describe Steelscape's ZINCALUME® Steel product, including ZINCALUME production capabilities, Grade Data Sheets, Safety Data Sheets (SDS), Technical Bulletins and sample ZINCALUME warranties. These documents will serve as references when deciding fit-for-purpose applications using our products.

The Grade Data Sheets describe in detail each of our products' performance and composition characteristics. Typical dimensions, mechanical properties and supply conditions are described for each product by steel grade and metal type.

There is an SDS for both the bare and resin-coated versions of our ZINCALUME Steel product. Each SDS addresses potential health concerns and effects of prolonged exposure to our products. Ingredients, physical and chemical characteristics, potential physical hazards and special protection information is provided. Spill, leak, fire-fighting and emergency contact information is disclosed.

The Technical Bulletins provide helpful information regarding efficient and safe practice for application of ZINCALUME Steel products. There are currently thirteen bulletins detailing important installation, application, and maintenance guidelines and recommendations. The fit-for-purpose tips are also an excellent technical reference. These bulletins serve as an invaluable tool to both the veteran user and/or first time buyer of ZINCALUME.

ZINCALUME® Steel Processing Capabilities

The matrix below was designed to help you determine the ZINCALUME® Steel products Steelscape is capable of producing on a consistent basis. These capabilities grow and change with each new successful trial order we process to completion. As we become more proficient in producing product outside the stated capacity limits we will expand this matrix accordingly.

	Rancho
Max Input Coil Wt	55,000 #
Max Output Coil Wt	44,000 #
Thickness	0.012" - 0.0356" ^
Width	26" - 50"
Coatings	ZINCALUME®/Resin/Oil/ Passivant (Standard or RoHS Compliant)
Entry OD/ID	79" max/20" +/- 0.25"
Delivery OD/ID	76" max/20" +/- 0.25"
Cores	Not Available
Coatings	AZ35, AZ50, AZ55, AZ60*

^ 0.300" thickness and greater is considered non-surface critical for some product grades and end-uses, both bare and painted. Inquire with a Steelscape Sales Representative for additional information.

* For heavier coating weights inquire with a Steelscape Sales Representative.

Steelscape is happy to evaluate requests for ZINCALUME® Steel products not shown on the capability matrix above. Equipment capabilities and hot band supply may impact our production capabilities. Questions regarding ZINCALUME Steel processing capabilities should be directed to a Steelscape Sales Representative.

ZINCALUME® Steel Grade 33 Grade Data Sheet

General Description

ZINCALUME® Steel Grade 33 - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 33 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .035"	Typical width	Maximum 48.9"	
	Minimum .013"		Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	33	40-56	Carbon (C)	0.20
Tensile strength, ksi	45	53-64	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	20	25-35	Manganese (Mn)	1.15
Hardness, HRB		50-70	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated		Roll-forming	5
			Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0329"

ZINCALUME® Steel Grade 37 Grade Data Sheet

General Description

ZINCALUME® Steel Grade 37 - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 37 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .035"	Typical width	Maximum 48.9"	
	Minimum .013"		Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	37	39-59	Carbon (C)	0.20
Tensile strength, ksi	52	54-67	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	18	20-40	Manganese (Mn)	1.15
Hardness, HRB		50-70	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
			Roll-forming	5
Chemical treatment	Passivated		Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0329"

ZINCALUME® Steel Grade 40 Grade Data Sheet

General Description

ZINCALUME® Steel Grade 40 - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 40 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .035"	Typical width	Maximum 48.9"	
	Minimum .013"		Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	40	44-55	Carbon (C)	0.20
Tensile strength, ksi	55	55-68	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	16	26-35	Manganese (Mn)	1.15
Hardness, HRB		50-70	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
			Roll-forming	5
Chemical treatment	Passivated		Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0329"

ZINCALUME® Steel Grade 50 (Class 1) Grade Data Sheet

General Description

ZINCALUME® Steel Grade 50 (Class 1) - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 50 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .0296" Minimum .018"	Typical width	Maximum 48.9" Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	50	50-65	Carbon (C)	0.20
Tensile strength, ksi	65	65-75	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	12	24-34	Manganese (Mn)	1.15
Hardness, HRB		60-75	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	3
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated		Roll-forming	5
			Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0228"

ZINCALUME® Steel Grade 50 (Class 2) Grade Data Sheet

General Description

ZINCALUME® Steel Grade 50 (Class II) - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 50 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .0228" Minimum .019"	Typical width	Maximum 48.9" Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	50	50-65	Carbon (C)	0.40
Tensile strength, ksi	-	65-75	Phosphorus (P)	0.20
Elongation in 2 inch, minimum %	12	24-34	Manganese (Mn)	1.15
Hardness, HRB		65-80	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	3
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated		Roll-forming	5
			Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0228"

ZINCALUME® Steel Grade 80 (Class 1) Grade Data Sheet

General Description

ZINCALUME® Steel Grade 80 - hot-dip zinc/aluminum alloy-coated structural steel with a spangled surface and guaranteed minimum yield strength of 80 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions				
Typical Thickness (Inches)	Maximum .0236"	Typical width	Maximum 48.9"	
	Minimum .012"		Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	80	80-120	Carbon (C)	0.20
Tensile strength, ksi	82	90-120	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	-	0-10	Manganese (Mn)	1.15
Hardness, HRB		84-99	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	2
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated		Roll-forming	4
			Welding *	5
			Painting **	5
ZINCALUME® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0239"

ZINCALUME® Steel Grade CS (Type A) Grade Data Sheet

General Description

ZINCALUME® Steel Grade CS (Type A) - hot-dip zinc/aluminum alloy-coated profiling steel with a spangled surface and with good ductility. Suitable for bending and moderate forming.

Typical Uses

Roll-formed roofing, rainwater goods and general manufacturing.

Dimensions				
Typical Thickness (Inches)	Maximum .035" Minimum .013"	Typical width	Maximum 48.9" Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	-	40-60	Carbon (C)	0.20
Tensile strength, ksi	-	50-70	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	-	20-45	Manganese (Mn)	1.15
Hardness, HRB	-	50-70	Sulfur (S)	0.035
Longitudinal tensile	-	0t		
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	2
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated		Roll-forming	4
			Welding *	5
ZINCALUME® Plus	Resin Coated		Painting **	5
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0329"

ZINCALUME® Steel Grade CS (Type B) Grade Data Sheet

General Description

ZINCALUME® Steel Grade CS (Type B) - hot-dip zinc/aluminum alloy-coated profiling steel with a spangled surface and with good ductility. Suitable for bending and moderate forming.

Typical Uses

Roll-formed roofing, rainwater goods and general manufacturing.

Dimensions				
Typical Thickness (Inches)	Maximum .035"	Typical width	Maximum 48.9"	
	Minimum .013"		Minimum 26"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	-	40-60	Carbon (C)	0.02-0.15
Tensile strength, ksi	-	50-70	Phosphorus (P)	0.03
Elongation in 2 inch, minimum %	-	20-45	Manganese (Mn)	0.60
Hardness, HRB	-	50-70	Sulfur (S)	0.035
Longitudinal tensile	-	0t		
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	AZ50	AZ55	Bending	5
Tension leveling	Leveled		Drawing	2
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	2
			Pittsburgh Lock Seam	5
Chemical treatment	Passivated		Roll-forming	5
			Welding *	5
ZINCALUME® Plus	Resin Coated		Painting **	5
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Maximum thickness suitable for organic coil coating is 0.0329"

Safety Data Sheet

ZINCALUME® Steel

Section 1 - Chemical Product and Company Identification

Product name	ZINCALUME® Steel
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	06/01/2015
Reference No.	200000000001
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and manganese pneumonia. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with

unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6	Balance	99.00
Carbon	7440-44-0		0.30
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.1
Note: Base Steel may contain the following trace or residual elements: Chromium(0.10% max), Copper(0.12% max), Molybdenum (0.10% max), Nickel (0.12% max), Columbium (0.06% max), Tin (0.03% max), Titanium (0.06% max), and Vanadium (0.08% max).			
Metallic Coating			
Aluminum	7429-90-5	51.00	58.00
Zinc (Reportable as a fume or dust)	7440-66-6	40.00	48.00
Silicon	7440-21-3	1.30	1.90
Iron	7439-89-6		0.02

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: Silver, bright crystalline appearance.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index:

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate:

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m³) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)

Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

Safety Data Sheet

ZINCALUME® Plus Steel

Section 1 - Chemical Product and Company Identification

Product name	ZINCALUME® Plus Steel
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	06/01/2015
Reference No.	200000000004
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and manganese pneumonia. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with

unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6		99.00
Carbon	7440-44-0		0.30
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.10
Metallic Coating			
Aluminum	7429-90-5	51.00	58.00
Zinc (Reportable as a fume or dust)	7440-66-6	40.00	48.00
Silicon	7440-21-3	1.30	1.90
Iron	7439-89-6	0.01	0.02
Surface Coating			
Styrene	100-42-5	45.00	47.00
Water	7732-18-5	40.00	48.00
Styrene Monomer			0.20
Acrylate Monomers			0.20
Cyclic Biocide Halogenated			0.20
The weight percentages of this compound may be below the levels for which reporting of exact percentages is required in Section 313 of SARA 40CFR Part 372.38.			

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: Silver, bright crystalline appearance.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index: N/A

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate:

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m3) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)
Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Surface Coating			
Styrene	No Information	Not Established	Not Established
Water	No Information	Not Established	Not Established
Styrene Monomer	No Information	Not Established	21350 ppm
Acrylate Monomers	No Information	Not Established	525 ppm
Cyclic Biocide Halogenated	No Information	Not Established	Not Established

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

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For more information or other questions not addressed by these bulletins please contact Steelscape's Technical Service Department or your Steelscape Account Manager.

ZINCALUME® Steel

General Guide to Good Practice in the Use of ZINCALUME® Steel for Roofing and Siding Products

INTRODUCTION

Panels fabricated from ZINCALUME® Steel will provide many years of trouble-free service when properly designed, installed and maintained. The key to obtaining all of the benefits of the corrosion resistant coatings applied to steel used in roofing, siding and rainwater items lies in correct material selection, good handling and installation practice, and sensible maintenance.

Few roofing or siding products are replaced because of an overall breakdown or general corrosion. Replacement is generally due to isolated component failure which could have been avoided by following a few simple rules. This Technical Bulletin sets out the general principles to follow. Attention to the following factors should ensure satisfactory performance and good service life. Manufacturers' specific recommendations about their particular products should be followed.

Correct Selection of Materials

The correct selection of roofing and siding materials is the first step to ensuring a building's long life. The range of products manufactured by Steelscape is designed to provide good performance under normal environments from benign rural areas to corrosive industrial or salt-laden coastal atmospheres. Correct selection is a matter of choosing the right product for its intended use.

A roofing installation in a coastal environment has a completely different demand upon it than one in a benign rural location. Our experienced sales and technical personnel should be consulted if there is any doubt as to the correct metallic coated or painted

product for a specific structure. This is especially true for the special requirements of severe coastal and industrial as well as animal confinement environments.

Designs for Durability

There are many factors that should be considered in the design phase of any building to ensure the maximum trouble-free service life. The following factors are some of the primary considerations.

Minimum Roof Pitch

The pitch must be designated/designed so that standing water conditions are not created. Water or condensate must freely drain from the roof panels. Where a roof includes several slopes, a valley gutter or other device should be installed to ensure adequate drainage. Specified minimum pitch will vary according to the depth of the roof profile and the means of fastening. Many standing seam roofing systems with deep profiles (i.e. panel seams ranging from 2-3 inches), fastened with concealed clips which do not penetrate the steel weathering membrane, may be installed down to a minimum slope.

Regardless of roof pitch, the cut ends of panels should be burr down, or designed with a rolled, or hemmed edge to prevent moisture from being held at the edge.

A properly installed standing seam roofing system will allow the roof to drain effectively without "flooding" the laps. The concealed clips ensure the drainage part of the panel membrane is not breached by fastening holes through which water may leak. Perimeter detailing and flashing is also an important component of such a system.

A roof fixed to its minimum pitch must observe all of the criteria for correct installation. Supports must be carefully aligned to avoid creating low spots in the roof where ponding will occur, leading ultimately to reduce service life.

Correct Support Spacing

Correct spacing of supports is important. Not only do the purlins, battens, etc., support the weight of the roof and the weight of the roofer during installation, they must be strong enough to prevent the sheets of decking from blowing away in high winds.

Support spacing near the eaves and the ridge is usually less than the intermediate spacings. This allows the roof to handle the increased lift and forces created by wind turbulence. The supports hold the roof down and they must themselves be restrained. It is possible for a roof to be blown off with the purlins or pieces of poor quality lumber battens attached to the sheets.

Steel Thickness - Base Metal

To protect steel sheet from the corrosive effects of the elements, a layer of metallic aluminum/zinc alloy is applied to the steel base in the hot-dip process. To enhance this protection as well as provide an attractive appearance, a pre-painted steel finish is also an option. These protective finishes are the major determinants of long service life and lasting good looks. The structural strength of the roofing or siding profile is derived entirely from the steel base and the profile of the particular steel panel.

An important consideration in the spanning capacity of a steel profile is its base metal thickness, which is used to determine support spacings. The total thickness of pre-painted steel sheet (the base metal steel plus an aluminum/zinc hot-dipped coating, plus pre-painted finish) is, at best, a very imprecise indicator of the base metal thickness which provides the strength of the roof sheeting.

The ability of the roof sheeting to span recommended distances without severe deflection, to support the installer, and to resist tearing away from fixing clips or screws largely depends on the base metal strength. Always ensure that the base metal thickness specified

is according to recommendations. Most metal panel manufacturers provide load tables to assist in the selection of an appropriate profile for spanning conditions.

Fume Extractors & Vents

Corrosive dust and particles can be released through roof vents and discharged onto the roof surface. The immediate area of the roof adjacent to the vent is then at increased risk of corrosion. The following design guidelines should be considered to avoid problems.

- Locate vents on the corner of the windward side of the building.
- Install filter elements to trap hazardous material.
- Specify pre-painted product or apply a protective coating to the affected area of the roof.
- Maintain coal or oil fired boilers or incinerators so they do not discharge sulfur compounds over the roof surface.
- Avoid condensate from copper tubing.

Foot Traffic

Repeated foot traffic and the dragging of maintenance or cleaning equipment over the roof surface may damage the roof which will reduce its life expectancy. Catwalks and platforms should be designed and installed where necessary.

Roof Structures

Equipment such as air conditioning units are often secured to uncoated steel channels. Uncoated steel used on a ZINCALUME Steel roof should be cleaned, primed and given a suitable finish coating. If left unprotected the rust may bleed onto the ZINCALUME Steel panels and stain the surface. For guidelines on the installation of photovoltaic panels see **Technical Bulletin #12 "Guidelines for the Use of Photovoltaic Panels with ZINCALUME® Steel"**.

Site Storage Before Erection

Where possible do not leave uncovered coils or stacks of sheets lying in the open. Install finished material as quickly as possible. Store materials indoors and away from openings to the outside. On arrival at site, ensure the steel sheets are dry. If wet, open the pack

immediately, separate the sheets and allow them to dry.

If it is absolutely necessary to store ZINCALUME Steel outdoors please follow the following guidelines:

- Erect simple scaffolding around the material and cover it with a waterproof sheet or tarp. Ensure space is allowed between the cover and the material to allow air to circulate.
- Store material off the ground and on an incline so that if rain should penetrate the covering, water will drain away.
- Use only dry, untreated lumber spacers for block stacking.
- The storage site should be inspected regularly to ensure moisture has not penetrated the stack. If moisture has gotten between panels they should be separated and dried immediately. ZINCALUME Steel must not come in contact with wet cement or concrete. If contact occurs remove immediately.

INSTALLATION GUIDELINES

Allowance for Expansion

All roofing and cladding will expand and contract with changes in temperature. Fastening/Fastener attachment systems used must accommodate the expansion to avoid problems of “canning”, ponding or roof noise. Expansion tables are usually available from the panel manufacturer.

Handling

Handle panels carefully. Do not drag or slide sheets over other products or rough surfaces. Equipment and materials placed on to the roof should be clean and care taken to prevent damage to the surface.

Long panels are best lifted with the aid of a lifting boom. Flat, rubber soled footwear should be worn when walking on a roof. Shoes should be cleaned before going on the roof.

Bare ZINCALUME Steel is prone to fingerprinting and hand printing. ZINCALUME Plus Steel, which has a clear acrylic resin applied, is recommended for unpainted applications. The clear resin prevents

finger and hand prints and aids in forming. If bare ZINCALUME Steel is utilized, clean gloves should be worn when handling.

Laying

Pierced sheets should be installed with overlaps away from the weather. End laps in profiled metal roofing should be avoided where possible. The end lap of ZINCALUME Steel and painted profiles should be sealed with a double bead of sealant.

Marking, Cutting & Drilling

Black lead pencils should never be used for marking ZINCALUME Steel products as the carbon in the pencil will promote corrosion which will etch the surface leaving a permanent mark. Use any other color pencil but black. Cut and drill pre-painted steel with care to avoid marking the high quality surface. Use a hand shear or nibbler instead of a friction blade to avoid damaging the ZINCALUME Steel or paint coating. Remove all debris and metal filings as soon as possible.

Fasteners - Placement, Size, Type, Life Expectancy & Compatibility

The security of a roof is no better than its fasteners. Correct choice and placement ensures fasteners are placed in effective positions. The use of nails is not advised for roofing and siding profiles. Screw type fasteners with washers are recommended and have been proven to have 2 to 3 times the holding power of nails. Care should be taken not to under-drive, or over-drive screws. Large washers are necessary when hurricane conditions apply to the location. This prevents screws being pulled through sheeting under high lift forces.

Fasteners used for external fixing of roofing and siding products must be compatible with ZINCALUME Steel and have a life expectancy comparable with the ZINCALUME Steel panel.

Our recommendations on type and compatibility of fasteners are published in **Technical Bulletin #3 “Fastener Selection for ZINCALUME Steel Roof & Siding Products”**.

There are some fasteners on the market with only minimal corrosion protection. These will quickly rust

and present an unsightly appearance. Fasteners made of some alloy materials are highly corrosion resistant in their own right but a galvanic couple may occur when they are in contact with ZINCALUME Steel. This may cause an increased rate of corrosion of the steel around the fasteners. Screw manufacturers/suppliers should be consulted to ensure correct usage.

Clean-up

After erection has been completed the roof panels and gutters should be swept to remove dirt and debris such as unused fasteners, metal filings, pop-riev stems, and pieces of flashing. The shank of a fastener left lying on a roof will rust very quickly and will run down onto the panel causing an unsightly stain. The process of cutting roof and wall sheeting to size with discs, or drilling to fix with fasteners, can create debris which is unsightly and can create localized corrosion and shorten the service life. **Technical Bulletin #4 “Prevention of Damage to Steel Roof & Siding Products from Metal Filings”** covers this in greater detail.

Mud and dirt tracked onto the roof panels, and greasy hand and footprints, can be removed by washing with a cleaner consisting of 1/3 cup mild detergent in one gallon of water applied with a mop or soft broom. The roof should then be thoroughly rinsed with water. High pressure spray applications and strong alkaline detergents should not be used. If washing with a detergent solution is found to be inadequate, solvents such as mineral spirits can be used to remove more stubborn stains. More aggressive and highly volatile solvents such as acetone or toluene should be avoided for safety reasons, as well as their incompatibility with many paint systems used on building panels. The compatibility of any solvent on paint should be tested or known prior to its use. Tri-sodium phosphate (TSP) cleaners should not be used.

Compatibility of Accessories Including

Flashing & Sealants

There are basic facts regarding compatibility of metal products that are usually predictable and well documented. These have been summarized into a few simple rules for roof installers in **Technical Bulletin #2 “Flashing Materials for Bare & Pre-painted ZINCALUME Steel”** which covers this topic in much more detail. The mix of incompatible metals or materials with dissimilar service life is poor practice and will significantly affect service life. Correct choice of sealants to suit materials and location is important. Sealants containing amine or acidic acid should never be used. High quality sealants, such as neutral cure silicones, provide good performance in most applications. They may cost a little extra but are a good investment. Recommendations on sealant selection are covered in **Technical Bulletin #5 “Sealants for ZINCALUME Steel.”**

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ZINCALUME® Steel

Flashing Materials for Bare & Pre-painted ZINCALUME® Steel

INTRODUCTION

The preferred flashing material for ZINCALUME® Steel is either bare or painted ZINCALUME Steel. The following guidelines have been provided to assist in the informed use of other materials where necessary.

COMPATIBILITY

Galvanic Corrosion

Due to a phenomenon known as galvanic or bi-metallic corrosion, some commonly used metals can cause accelerated corrosion when used with ZINCALUME Steel zinc/aluminum alloy-coated and pre-painted sheet. The field of corrosion study has defined an “activity” scale shown in Table 1 which shows zinc and aluminum more active than copper, lead or stainless steel. The farther apart on the scale, the more dissimilar and the stronger the potential for reaction between the metals. When a galvanic “couple” is formed by electrical contact the more active metal will sacrifice itself (or dissolve) to protect the less active component of the couple.

ZINCALUME Steel will experience accelerated corrosion when in contact with copper (including copper treated lumber) or lead. Leeching from copper will result in especially high levels of corrosion. The protective oxide film which naturally forms on aluminum surfaces is broken down by copper or lead in localized areas. Pitting corrosion ensues which is a highly accelerated form of attack. Zinc coatings are not generally subject to pitting when in contact with the same materials.

Rainwater Runoff

The galvanic scale in Table 1 is also important when considering runoff from one material to another. If any two of these materials are in damp contact or a runoff situation, the metal higher on the table will sacrifice

itself to protect the lower. A simple guideline to follow is to remember that water can flow downhill but not uphill. Zinc to copper is acceptable but copper to zinc is not.

Catchment (Caution When Combining Different Roofing Systems)

Care should be taken when combining products on a roof system. If products are combined incorrectly severe localized corrosion may occur as a result of “inert catchment.”

The zinc coating on galvanized steel products develops a protective surface film as a result of natural weathering. This provides the longevity of performance which is typically known of galvanized products. When flowing over galvanized roofing rainwater dissolves small amounts of minerals and salts from the zinc surface. These minerals and salts promote and maintain the protective film and enhance the corrosion resistance of other galvanized steel products such as gutters and valleys.

When rainwater flows over or is collected from roofing materials which do not promote this protective film (inert materials) accelerated corrosion of unpainted galvanized steel roofs and gutters can occur. Examples of inert materials include ZINCALUME Steel, pre-painted steel, acrylic, glazed tiles, aluminum, fiberglass and PVC.

- Unpainted galvanized steel must not be used for roofing or rainwater goods (including valleys and gutters) to collect water runoff from ZINCALUME Steel or any other inert material.
- ZINCALUME Steel and painted ZINCALUME Steel can be used to collect water from galvanized or

any inert catchment material. ZINCALUME Steel gutters will typically give a longer service life than traditional galvanized steel.

Standing Water

New applications for standing seam metal roofing have required roof slopes be minimized to as low as 1/4:12. An area of a roof can be almost flat depending on the particular building. These conditions can create areas where water can collect and remain for extended periods of time with possibility of accelerated corrosion. Where an unfavorable galvanic couple exists, the presence of standing water for prolonged periods will allow the corrosion reaction to continue for a longer time than it normally would. In cases where an adverse couple does not exist, enough water can complete the necessary electrical contact and corrosion will proceed as long as the water maintains the circuit.

The appearance of roofing panels can suffer even when all materials within a water-ponding area are compatible. Aluminum-coated steel panels are not as resistant to standing water as ZINCALUME Steel. When the aluminum-coated panel begins to rust, the standing water can disperse and deposit rust particles on an adjacent ZINCALUME Steel sheet panel, resulting in an unsightly stain.

Table 1- The Electromotive (Galvanic) Series of Metallic Activity

More Active Metals	Zinc
	ZINCALUME® Steel
	Aluminum
	Steel
	Lead
	Copper
More Noble Metals	Stainless Steel

COMPATIBILITY of COMMONLY USED FLASHING MATERIALS

Copper

Copper is incompatible with both bare and pre-painted ZINCALUME Steel, either in contact with or where water can flow from it, such as is often experienced with hot water system overflows. Painting the outside of the copper pipe is recommended. ZINCALUME

Steel must should not come in either direct contact with or water runoff from copper treated lumber. Hot water discharge pipes should be extended beyond the roof, preferably to ground. Every effort must be made to prevent the overflow of water from copper pipes onto the roof and gutter material.

Lead

Lead is the only metal generally considered to be compatible with zinc-coated steel but not with bare or pre-painted ZINCALUME Steel. ZINCALUME Steel, in contact with or receiving run-off water from lead is prone to corrosion. In the event of roof retrofit where lead already exists and its re-use is desirable, the ZINCALUME Steel must be insulated from the lead by a suitable barrier. This can be achieved by painting the underside of the lead or preferably both surfaces to ensure complete electrical separation. Plastic film can also be used provided it is robust enough and will not tear, e.g., polyethylene damp course placed between the lead and ZINCALUME Steel sheet (with paint on top), is a better alternative.

Lead in the water run-off should be avoided by painting the top surface of the lead flashing. The lead supplier should be contacted for advice as to a suitable finish coat barrier system and the ongoing maintenance requirements. Applying two or three coats of water-based acrylic is generally suitable but any painting must be maintained so it will not break down and expose any of the lead surfaces.

Galvanized Steel

Galvanized flashing materials and accessories may be used with bare and pre-painted ZINCALUME Steel. However, galvanized products may have a shorter life span and thus eventually makes them impractical in the long term. Conditions detailed above with unpainted galvanized subject to water runoff from ZINCALUME Steel panels should be avoided.

Aluminum Coated Type II

Flashings fabricated from this material may be used although inferior resistance of aluminum coated steel to standing water and cut edge corrosion may result in rust staining of adjacent bare and pre-painted ZINCALUME Steel.

Graphite

All materials containing graphite should not be used with or adjacent to ZINCALUME Steel. This includes washers and also graphite from pencils used to mark ZINCALUME Steel components.

Stainless Steel

300 series grades are suitable, 400 series grades with >1.0 mil. zinc or cadmium coating may be used. Other grades should be avoided. Our sales and technical personnel should be consulted where any questions exist.

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ZINCALUME® Steel

Fastener Selection for ZINCALUME® Steel Roof & Siding Products

INTRODUCTION

Roofing, siding and accessory products manufactured from ZINCALUME® Steel will give long, trouble-free service when exposed to the atmosphere in environments ranging from benign to severe in terms of corrosive effect. The selection of the appropriate form of fastener is a task, however, which should not be solely influenced by cost. Fastener costs are minimal relative to the overall cost of a project and there is little benefit gained through the use of inferior fasteners.

Guidelines for Appropriate Fasteners

The expected service life of the fastener should meet or exceed that of the ZINCALUME Steel components used in the construction. The severity of environmental conditions and the corrosion resistance of the fastener should be considered.

The fastener must be compatible with the ZINCALUME Steel components. When a more active metal is placed in direct electrical contact with another less active material the more active component will sacrifice itself to prevent the other from corroding. This is known as dissimilar metal contact or galvanic corrosion and can be extremely aggressive under certain conditions. Galvanic corrosion can be much faster in corrosive environments such as acid rain due to the increased conductivity of the electrolyte or rainwater. **For this reason lead, copper and copper containing alloys (such as Monel) should not be used in conjunction with ZINCALUME Steel.** Stainless steel should not be used in severe environments as the ZINCALUME Steel alloy coating can corrode sacrificially. Refer to Table 3 to ensure the fastener of your choice is compatible and has sufficient durability.

Careful consideration should be given not only to the expected performance of the head of the fastener, but the shank as well. This applies particularly if the shank of the fastener could be subject to the effects of aggressive substances, such as acid or chemical fumes or to prolonged humidity and condensation for example, within the confines of a building.

Fastener size, strength and correct fastening pattern are critical and are recommended by the panel manufacturer.

Guidelines for Installation of Fasteners

Do not overdrive screws or drive at an angle. This can result in the washer piercing the steel panel or no longer mating with the area around the hole. The ZINCALUME Steel coating will protect the damaged area for some time; however, rust may prematurely occur depending on how much steel is exposed and on the local environment. Overdriving a fastener can also cause a depression in the panel which can collect water and create localized ponding. Driving tools equipped with depth sensing nose pieces and suitable RPM speeds can assist in avoiding these problems. Impact type tools should not be used.

Washers - The rubber washer component of self-drilling screws must be manufactured from materials compatible with the roofing material. Washers containing significant levels of conductive carbon black fillers should not be used with ZINCALUME Steel products. The use of carbon or graphite washers may lead to galvanic corrosion, especially in corrosive atmospheres. Black neoprene rubber is not recommended in any environment as they contain carbon pigmentation which can also cause galvanic corrosion. Neoprene rubber other than black is acceptable.

TABLE 1 Fastener Performance Rating

A	Provides Excellent Long-term Durability and Compatibility
B	Provides Good Long-term Durability and Compatibility
C	Provides Acceptable Durability and Compatibility
NR	Not Recommended

TABLE 2 Guide to Atmospheric Exposure Conditions & Distance From Corrosive Source

Atmosphere	Typical Exterior Atmosphere	Marine	Industrial
Benign	Outer Urban, Semi Rural, Rural	More than 3/4 Mile	More than 1/2 Mile
Moderate	No Obvious Marine/Indust. Influence	1/2 Mile – 3/4 Mile	1/3 Mile - 1/2 Mile
Severe/Very	Surf, Indust. Pollution & Fumes	Up to 1/2 Mile	Up to 1/3 Mile

Note: Marine as a corrosive source is characterized by salt laden, moist air. Industrial as a corrosive source is characterized by fallout, acid laden air. Some commercial or agricultural applications may create internal environments in which the buildup of pollutants, fumes or humidity is a potential source of corrosion. Fastener selection in such cases should be made after careful evaluation of building design, nature of corrosive source.

TABLE 3 Fastener Guidelines for use with ZINCALUME Steel

Fastener Type and External Atmosphere	Benign	Moderate	Severe - Very Severe (Coastal/Industrial)
300 series stainless (self-drill screws not available in this alloy)	A	A	Not Recommended in very severe environments – the ZINCALUME Steel coating around fastener head may corrode sacrificially.
Zinc/Aluminum Alloy Cast Head (ZAC)	A	A	A
Solid Plastic/Nylon Molded Head ²	A	A	A
Aluminum	A	A	A
Electroplated Zinc/Mechanically Coated Zinc (5.0 mil min.)	B	C	NR
Baked-On Organic Polymer Barrier Coat Over 5.0 Mil Plated Zinc Coating	A	A	B
400 Series Stainless Steel (1.0 mil Zinc coating)	A	A	C
Lead Head Nails and Washers	NR	NR	NR

1. Internal atmosphere should also be considered.
 2. Subject to breakdown due to U.V. and heat; may fade at a different rate than pre-painted steel panel.
- Note:** Push or crimped-on caps can allow moisture to collect beneath them, causing corrosion of the head.

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ZINCALUME® Steel

Prevention of Damage to ZINCALUME® Steel Roofing & Siding Products from Metal Filings

INTRODUCTION

Steel filings, or swarf, are typically created from cutting or piercing operations when using friction saws, abrasive discs, drills etc., on steel roofing and siding products. This debris in addition to other discarded steel objects such as rivet shanks, nails, screws and nuts, which may come in contact with coated products; (i.e. pre-painted steel, ZINCALUME® Steel) are the subject of this bulletin.

These particles, if left on the surface, will corrode and cause rust stains which will detract from the finished appearance of a project. These stains are often mistaken for early deterioration of the roofing or siding itself. Prevention of such staining is the responsibility of the installer and it is strongly suggested that the recommendations contained in this bulletin be followed.

Metal debris will come in contact with coated steel sheet products in three ways.

- Loose particles left after cutting, drilling and riveting operations.
- Hot metal filings from disc cutting or drilling operations which may adhere to the finished surface.
- Loose particles which may be ground in underfoot or become embedded in the surface film of pre-painted products under pressure from adjacent equipment or materials.

PREVENTION

Cutting

Use of a power saw with a metal cutting steel blade is the best way to cut sheets on site. This method generates larger and cooler particles than abrasive discs.

Where possible, cutting should be minimized by using factory supplied cut-to-length sheets.

Sheets cut on site should, where practical, be cut on the ground, with the exterior color finish of pre-painted sheet facing down. Care should be taken to ensure hot filings do not come into contact with nearby pre-paint steel sheets. Do not cut over the top of other coated products, where debris may fall onto other sheets. Where cutting must be carried out near sheets already installed, the area around the cut must be covered and the stream of hot particles directed away from completed work. Field cut edges should be concealed under ridge caps or gable flashings whenever possible.

Drilling

The area around the hole should be covered to shield the product from hot metal filings.

Installation

Smooth soled shoes should be worn when working on a roof; avoid the ribbed type which will carry metal filings and other objects.

Clean Up

Metal debris/filings should be swept or hosed from the job progressively and certainly at the end of each day. This action will remove loose particles. Maximum care should be taken when attempting to detach filings which have become stuck; this can be done, but no action which is likely to remove paint or metal coatings should be attempted. Any damage to these coatings will lead to reduced life of the material. When sweeping or hosing into a gutter, clean out the gutter before leaving the job in order to prevent premature corrosion.

On completion of the job give a final wash or sweep down. For critical applications, inspection of the job should be made after two weeks when rain or condensation will have caused any remaining filings or debris to rust, and will highlight affected areas.

Note: *Many staining problems arise not from installers, but from other contractors working in the vicinity. Architects and builders need to be aware of this possibility and warn contractors accordingly.*

Identification

Fresh stains are characterized by small red-brown colored areas with a central dark spot (the remains of the steel particles). The surface will feel like sandpaper, and the particle may be lifted with a fingernail. An old stain will appear as a localized red-brown stain, the steel particle having corroded away, and the surface will be smoother.

Effect on Performance

The effect of staining itself on Steelscape prefinished products is generally aesthetic, and may not be detrimental to the performance of the product. The product life will be severely affected where attached metal particles have penetrated the pre-painted film and are in contact with the protective metallic coating, although this only occurs in severe cases. This is because on pre-painted surfaces red oxides of iron are normally inert substances and do not attack the finish; the stain is merely absorbed by the finish. Red oxides of iron are insoluble in water and the stain will take considerable time to weather away.

On metallic coatings, concentrated corrosion can occur over a small area as the zinc in the coating sacrifices itself to prevent oxidation of both the debris and, if allowed to continue, exposed areas of the steel base.

Repair of ZINCALUME Steel Sheet

Brush the surface with a stiff bristle (not metallic wire) brush to dislodge particles which must then be completely removed. Wire brushing will mar the appearance of the sheet if brushing is not followed by painting. If the coating is severely damaged by corrosion, the area should be painted. Please contact Steelscape to discuss the correct coating to repair the damaged area.

REPAIR OF PRE-PAINTED SHEET

Mild Staining

A household cream cleanser, used according to directions, will remove most mild staining from metal debris (one cup of mild, common detergent which contain less than 0.5% phosphate, dissolved in warm water are usually effective). Avoid the use of aggressive cleaners such as TSP.

Severe Staining

- Clean the surface by washing with a nonionic industrial or household detergent and water in proportions as recommended by the detergent manufacturer. Wash well with clean water.
- Remove the corrosion product by using a stiff nylon brush and washing off completely. More heavily affected areas may need a light rub with a Scotch guard tape pad (not steel wool). Abrasive papers should only be used if repainting is to be carried out.
- Great care must be taken not to cause damage to the paint film.
- Hose down the affected area completely after treatment.
- This treatment will normally leave only very mild stains.

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ZINCALUME® Steel

Sealants for ZINCALUME® Steel

INTRODUCTION

This bulletin provides background information relating to sealants and their application when used in conjunction with the range of exterior ZINCALUME® Steel products produced by Steelscape. The sealant industry in the US produces a wide variety of building sealants which together embrace a multitude of end user applications and an even greater range of specific conditions.

Sealant Selection

The decision on which sealant is the most effective for ZINCALUME Steel products in a specific application should be based on several performance characteristics.

Neutral cure silicone rubber sealants will typically meet the performance characteristics outlined above for most applications. Other generic types of sealant such as polyurethane and butyl elastomers are readily available in tape, hot melt and cartridge forms. Once again the performance of these systems should be evaluated with your sealant supplier based on service condition and performance characteristics. The use of sealants means fastening, whether by integral forming or by individual fasteners is necessary where metal to metal joining is involved. For more information on fasteners and **ZINCALUME Steel, please refer to Technical Bulletin #3, “Fastener Selection for ZINCALUME Steel Roof & Siding Products.”**

Physical Property of Sealant	Performance Characteristic
Adhesion	Good adhesion to bare and pre-painted ZINCALUME Steel, without pre-priming except in extreme service conditions.
Flexibility	No cracking or loss of adhesion during required bending at specified service temps.
Weatherability	No cracking, chalking, bleeding or loss of rubber characteristics after exposure to the damaging effects of ultra-violet rays (sunlight) and humidity.
Water Resistance	Adhesion to metal surface will not deteriorate after immersion in water.
Chemical Resistance	Good resistance to water, ozone, water vapor, and other chemicals that may be exposed to the sealant in service.
Non Corrosive*	Will not deteriorate, darken, etch or salt deposit bare or pre-painted ZINCALUME steel.
Staining	No contact or migratory staining of the bare or pre-painted ZINCALUME steel surface.
Non Sagging	Will retain original shape within the joint at specified service temperatures w/o sagging.
Printability	Over paintable if required.

***Note:** Sealants containing acetic acid or amines should not be used on ZINCALUME Steel; wet conditions during early stages of sealant cure can liberate by-products potentially corrosive towards protective coatings. These often smell of vinegar or ammonia.

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ZINCALUME® Steel

Cut Edge Protection of ZINCALUME® Steel

INTRODUCTION

The single aspect most frequently vexing prospective users of zinc-coated and zinc/aluminum alloy-coated steel sheet is cut edge performance. It is an established fact the sacrificial protection afforded to the steel at cut edges will delay corrosion while there is zinc or zinc/aluminum alloy left in the vicinity of the edges. Almost every metal coated steel product has cut edges and when piercing occurs within the area of the sheet a further “cut” edge is generated.

Prime examples of such products are roofing, guttering and spouting. These items are first slit-to-width then cut-to-length. Holes are often pierced to accommodate fasteners; however corrosion in these areas has never constituted a problem. Regardless of the environment, when more metallic coating is present, the steel has more protection both on flat unmarked surfaces and at cut edges.

Measure of Protection

Zinc/aluminum alloy hot dip metallic coated steel sheet is produced by passing continuous steel strip through a bath of molten metal. As the strip emerges from the bath the thickness of the coating is precisely adjusted according to the coating class required. The coating class is a designation describing the coating type and amount of coating applied.

The coating type is generally described by the capital letter of the chemical symbols of the metals in the coating. The amount of coating is indicated by the minimum “coating mass” measured by the triple spot test specified in ASTM A792/A792M–06.

The severity of the intended application should dictate the coating class specified. Heavier coating thicknesses should be used in more severe environments.

Two Way Protection

The zinc/aluminum alloy metallic coating performs in two ways:

- The aluminum acts as a barrier when the steel base is completely enclosed by the coating. Protection is afforded by the corrosion resistance of the coating itself.
- As a sacrificial coating at edges when the barrier is broken by slitting, shearing, piercing or scratching. The barrier effect is universally recognized. However, it is the sacrificial protection this bulletin addresses.

Protection is Automatic

Complete coating of steel sheet products is not practical, economical or generally necessary. It is normal practice and has been since zinc-coated sheet has been produced, to have slit, sheared, drilled or sawn edges.

In service, galvanic action causes zinc compounds to automatically build up at cut edges and scratches by an electrolytic reaction when water or moisture is present. These slow the rate at which the surrounding coating is consumed around damaged areas. This effect is sometimes referred to as the “self-healing” property of coatings containing zinc.

Examples: Coating Classes AZ50 AZ = Aluminum/Zinc
50 = Minimum of .50oz./ft², the total on both sides.

Comparison of Zinc and Zinc/Aluminum Coatings

It is natural with the wide spread use of ZINCALUME® Steel sheet in traditional zinc-coated building applications, the question of comparative cut edge performance should be raised. Unpainted ZINCALUME Steel will perform in a very similar manner to zinc-coated sheet in the relatively thin range of thickness associated with roofing, wall cladding, gutters and down-pipes.

This has been tested by removing coating of similar thickness from ZINCALUME Steel and galvanized sheet down to the steel base, using scribe marks ranging from .016" to .16" in width. When exposed to the atmosphere, the differences in the samples are slight, particularly at the thinner scribe marks.

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ZINCALUME® Steel

Guidelines for Welding ZINCALUME® Steel

INTRODUCTION

ZINCALUME® Steel can be readily welded using resistance and arc welding techniques. Utilizing conventional welding techniques along with the guidelines given below, ZINCALUME Steel can be as easily welded as other coated sheet products. In general, the Al/Zn coating is soft and conductive compared to uncoated sheet steel and, therefore, requires higher welding currents, welding times and electrode forces for resistance welding. The parameters used for successfully welding ZINCALUME Steel sheet are very similar to those for galvanized sheet.

Spot Welding

The optimum tip geometry which provides the longest electrode tip life when spot welding ZINCALUME Steel sheet is the truncated cone with either a 90° or 120° included angle. Pointed, domed or radius electrodes should be used only where necessary for reasons of access or alignment.

Testing has shown that a dispersion-strengthened copper alloy electrode will provide superior electrode life and welding characteristics when compared to RWMA Class 2 Cu-Cr or Cu-Zr alloys. Typical spot welding schedules for ZINCALUME Steel sheet are given below:

Electrode maintenance is also important in spot welding coated sheet steels. The parameters given above will cause gradual deformation of the contact surfaces as

well as the coating alloying with the electrode material. These factors require the electrodes be redressed more frequently than is the case with uncoated steel. The electrode tips should be redressed periodically, but the time between re-dressings depends on the sheet thickness and conditions of use. Additional factors influencing electrode life are proper tip alignment and sufficient water cooling (minimum 2 gal/min) to the electrode.

The peel test, which is commonly used as a measure of nugget size and weld soundness, can be used to test the quality of spot welds on ZINCALUME Steel sheet. Test specifications vary among manufacturers, but in general, two coupons are welded together and then peeled apart. Under proper welding conditions, failure should occur around the weld, not through the weld. The nugget diameter should approximate the diameter of the electrodes.

Seam Welding

The conditions for seam welding ZINCALUME Steel sheet are similar to those for galvanized steel in that higher currents and closer control of welding schedules are required than for uncoated sheet steel. Intermittent current feed is preferred over continuous current and 0.5-inch radius faced electrodes can be used for all sheet thicknesses if desired.

Schedules for seam welding ZINCALUME Steel sheet are

Material Thickness (in.)	Welding Current (amperes)	Electrode Force (lb)	Welding Time, Cycles (1/60 second)	Electrode Face Diameter (in.)
0.028	11,300	400	12	0.187
0.036	12,500	500	14	0.250
0.040	12,800	500	14	0.250
0.053	13,000	550	14	0.250
0.065	13,400	650	18	0.250

Actual requirements will vary depending on the job conditions.

Material Thickness (in.)	Electrode Face Type	Electrode Thickness (in.)	Electrode Force (lb.)	Welding Current (amperes)	Weld Time Cycles Heat	Weld Time Cycles Cool	Welding Speeds (in./min)
0.017	1/2" Radius	3/8	700	14,500	2	2	60
0.022	1/2" Radius	3/8	850	16,000	3	2	60
0.034	1/4" Flat	1/2	1,000	21,500	4	2	60
0.049	1/4" Flat	1/2	1,100	22,000	4	2	60
	1/4" Flat	1/2	1,100	23,000	4	1	90
0.083	5/16" Flat	5/8	1,600	27,000	10	6	30

suggested in the table above. As with the spot welding schedules, the conditions below may need alteration depending on the job.

Seam welding wheels should be RWMA Class 2 copper alloy. Knurled wheels are preferred because the knurled drive rollers continuously remove pick-up from the sheet coating and maintain a constant face width, thus eliminating the need for redressing. The electrode wheels in the weld area should be flushed with water during welding to provide adequate cooling.

High/Low-Frequency Welding

ZINCALUME Steel has been fabricated into products such as tubing using both high-frequency and low frequency welding techniques. Standard procedures similar to those employed for galvanized or aluminum coated steels are used. Since the coating may smear at sheared or slit edges, it may be necessary to scrape the sheet edges prior to welding.

Arc Welding

Gas tungsten-arc (TIG) welding of ZINCALUME Steel is not recommended because, as with galvanized sheet steel, fumes generated during welding tend to contaminate the tungsten electrode and cause instability of the arc. Shielded metal-arc welding is best accomplished using E60XX electrodes, such as E6010, E6011 or E6012. A whipping technique is often used to burn off the coating ahead of the puddle. For gas metal-arc (MIG)

welding, a mild steel wire should be used with Ar/1% O2 or Ar/CO2 shielding gas. Gas containing Ar provides a more stable arc resulting in better bead appearance and significantly less weld spatter. When a backup plate is used, the plate should be grooved under the weld to provide better penetration and venting of fumes from the underside of the weld.

Fuming

In arc welding, the total weight of evolved fumes per unit weld area for ZINCALUME Steel sheet is 25 percent of the amount for galvanized. The ratio of the amount of zinc oxide released from ZINCALUME Steel is only 20 percent of the amount released from galvanized sheet. The decreased fuming of ZINCALUME Steel represents a reduced fume hazard to welders, but the extent of fuming is still sufficient to require the use of fume hoods and/or forced exhaust systems. Fuming during resistance welding is very slight and special exhaust systems should not be needed.

Corrosion Resistance of Welds

As is the case with other coated sheet steels, spot and seam welding may remove the coating from ZINCALUME Steel sheet exposing the base steel. These areas may be too large to be galvanically protected by the adjacent coating and should be covered with metal-sprayed zinc or aluminum, zinc-rich paint or organic coating. Covering the weld area of arc welds is especially important because the damage to the coating is even more severe.

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ZINCALUME® Steel

Unsuitable Applications for ZINCALUME® Steel

INTRODUCTION

ZINCALUME® Steel has proven to exhibit superior corrosion resistance in a diverse range of environments including those in rural, industrial, marine and severe marine regions of the country.

Atmospheric corrosion testing for more than 30 years has clearly shown that ZINCALUME Steel has at least 2-4 times the life span of galvanized G90 in these environments. However, with even the most revolutionary materials there are specific end user applications into which ZINCALUME Steel should not be placed without careful consideration as to the ultimate performance.

These applications, and issues to be considered within these applications, are summarized in this Technical Bulletin to assist in the correct selection of materials.

Animal Confinement

Structures erected to house the intensive farming activities of pigs, cattle, turkeys and chickens can present problems for ZINCALUME Steel. This form of animal confinement can result in the creation of animal waste and waste decomposition by-products which can be extremely aggressive towards ZINCALUME Steel, creating significant corrosion problems.

Waste decomposition gases such as methane, hydrogen sulfate and ammonia can combine with water vapor to form a highly corrosive compound which condenses on the bottom side of the steel roof panel, resulting in an extremely corrosive attack. Direct contact with animal wastes should be avoided regardless of the type of material employed in the construction of the building. Good panel insulation, ventilation and frequent waste removal will assist in maintaining the longevity of such

a structure; however we recommend the following guidelines

- ZINCALUME Steel (bare or painted) should not be used for cattle, pig or poultry confinement due to the risk of the corrosive process outlined above. Heavy zinc coated galvanized or aluminum products should be used for these applications.
- ZINCALUME Steel will perform favorably in the majority of other agricultural applications. Such structures include storage sheds, silos, grain bins and other utility farm buildings.

Concrete

ZINCALUME Steel is not suitable for use with wet concrete mixtures (including mortar or stucco). It is not recommended for use in framework and floor deck applications. The aluminum in the ZINCALUME Steel coating will react with the wet concrete leaving the coating porous and prone to corrosion. Adhesion between the concrete and ZINCALUME Steel is poor and the concrete itself can expand and lose strength. Small splashes of concrete onto ZINCALUME Steel are damaging, and should be removed when wet.

Culverts

ZINCALUME Steel is not recommended for applications involving burial in the earth or soil. Soils vary widely in moisture content, acidity or alkalinity. Objects buried in the soil can be subject to bacterial activity and oxygen levels can be highly variable. ZINCALUME Steel is more sensitive to low oxygen levels and lack of passivity than galvanized products, hence heavy coating mass galvanized would be the recommended product under these conditions.

Miscellaneous Sources of Aggressive Substances

The following specific applications should also be treated with caution. Contact Steelscape to seek advice on the correct material to use in these instances.

- Some chemical, food processing and acid pickling plants where chemicals, acids and alkalis are present such that when combined with water vapor and dew point effect.
- Direct contact with or runoff from green lumber or chemically treated lumber containing copper. A white paper on ZINCALUME Steel contact with pressure-treated wood is available upon request. **Where copper/chrome/arsenate treated lumber is specified it must be well dried after treatment and insulated from the roof.**
- Copper containing mildew inhibitors, such as copper oxychlorate, should not come in contact with ZINCALUME Steel. Rinse immediately if contact occurs.
- Dirt, leaves and build-up of organic matter.
- Avoid direct contact with the ground/soil, foundations or sills.
- Food or beverage container or contact should be avoided. The surface treatments used in ZINCALUME Steel can become soluble when in contact with food acids.
- Sustained or frequent temperatures in excess of 390°F should be avoided with ZINCALUME Plus Steel (acrylic coated).

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ZINCALUME® Steel

Guidelines to the Effective Use of ZINCALUME® Plus Steel

INTRODUCTION

The standard ZINCALUME Plus Steel coating is a specially formulated water-based resin film, which is factory applied over the ZINCALUME Steel surface. In the cured state the coating is colorless, odorless and imparts a satin finish to the surface of the product. It aids in the roll forming process often eliminating the need for lubricants and also prevents fingerprinting.

The clear resin film is applied wet, using state-of-the-art roll coaters installed between the chromate application station and the delivery section. The roll coaters are similar in design and operation to those used on a coil coating line. The film is cured using computer controlled ovens. This ensures that optimum coating properties are achieved prior to rewinding and shipping.

The resin film has excellent adhesion to the substrate with very good impact resistance and flexibility. When it is used without post painting, the natural weathering process will gradually erode the clear coating from the surface over a period of 12-18 months, without powdering, peeling or cracking. No significant changes in surface appearance will be evident.

In addition to the standard ZINCALUME Plus coating, we also offer a resin film designed specifically for end-use applications that involve adhesives such as plywood sandwich panels and foam insulation. A Steelscape Sales Representatives can help to determine which resin film is right for any specific end-use application.

FIELD PAINTING GUIDELINES

Wet Painting

Both ZINCALUME Steel and ZINCALUME Plus Steel are readily over painted provided paint manufacturer's

recommendations are followed and appropriate consideration is given to environmental conditions, end use, location and product application. Traditionally ZINCALUME Steel requires the surface to be painted also be washed with a suitable solvent to remove traces of residual roll forming lubricant, and suitable metal primer be applied before the application of a decorative topcoat.

ZINCALUME Plus Steel removes the requirement to use solvent to clean up surfaces. A simple detergent wash is satisfactory, and eliminates the need to prime the surface. Solvents or harsh chemical cleaners should not be used. ZINCALUME Plus Steel can be readily over-painted with a high quality water based acrylic topcoat without priming, provided a lubricant has not been used in the forming process and the surface is clean and dry.

Solvent based finish coat systems may be used, however, these must be applied after the material has been primed with a water based, solvent resistant primer. If the material is correctly primed a number of coats may be applied. Surface preparation and priming must be in accordance with the paint manufacturer's instructions.

Additional cleaning recommendations and field painting guidelines can be found in **Technical Bulletin #11 "Guidelines for General Field Maintenance of ZINCALUME Steel Roofing and Siding"**

Powder Coating

ZINCALUME Plus Steel is suitable for direct powder coating, provided the surface to be coated is clean and powders requiring a peak metal temperature in excess of 390°F are not used. It is recommended a brief

water wash serve as the only pretreatment step, rather than another form of solvent-based cleaning solution. Condensation can also occur on tightly bundled stacks of sheets or panels of ZINCALUME Steel. In its very early stages, it may appear as a white stain similar to the white oxide that can form on galvanized steel. Even pre-painted and roll formed ZINCALUME Steel sheet is not immune to this type of oxidation.

Roll forming Characteristics

Lubricants are rarely required during the roll forming of ZINCALUME Plus Steel because the clear resin film acts as a solid lubricant. The need for additional lubricant must be determined, however, on a case by case basis. Variables to be considered include roll former design, (number of stands and severity of each incremental shape change) speed, surface condition of rolls and general machine maintenance.

Most common roof and sidewall trapezoidal shapes do not require additional lubrication if the roll former is well maintained and correctly set up. Very severe profiles may require a small amount of spot lubricant at the heaviest worked points.

BENEFITS OF USING ZINCALUME PLUS STEEL:

- **No Pickup** - The reduction or absence of pickup during forming due to the resin film means the reduction or elimination of time-consuming cleanup.
- **Increased Tool Life** - Reduced pickup combined with the lubricating benefits of the resin film will contribute to improved tool life in manufacturing and roll forming applications.
- **Scheduling Flexibility** - ZINCALUME Plus Steel can typically be roll formed interchangeably with pre-painted feed avoiding the need for intermediate roll cleaning. This provides greater scheduling flexibility.
- **Removal of Hazardous Work Place Chemicals** - Hazardous substances such as kerosene and other lubricants can be removed from the work environment improving occupational health and safety practices.

- **Less Slippery** - The resin film is less slippery than a lubricated steel surface particularly with the absence of residual lubricant left over from roll forming. This will make the product safer to walk on while installing, particularly in wet conditions.
- **Improved Final Appearance** - Residual lubricants can often create a patchy visual appearance as the result of uneven drying off of the lubricant. This problem can usually be avoided with ZINCALUME Plus Steel.

Resistance to Marking

ZINCALUME Plus Steel resists marking and stains occurring during manufacturing, handling or fixing. The coating acts as a surface sealant, protecting the metal surface from hand and boot prints. **CAUTION** - during transportation of coil, sheets or formed panels, galling or abrasion of the resin coating can occur when one resin surface vibrates, or rubs, excessively against another resin surface. It will present as black marks, which are often mistaken for black rust, but it is not rust. Galling of the resin surface is strictly aesthetic in nature; the long term performance of the product is unaffected.

Wet Stack Storage Stain Resistance

The resin coating has an increased resistance to wet stack storage stain. Such stains appear black, and are caused when the material is packaged and subjected to moisture ingress between production and final use. The coating acts as a barrier coat, preventing any chemical action from occurring. Recommended storage should still be followed as outlined in **Technical Bulletin #1 “General Guide to Good Practice in the Use of ZINCALUME® Steel for Roofing & Siding Products”** and **Technical Bulletin #10 “Prevention of Oxide Formation (Black Rust) on ZINCALUME Steel During Transportation, Processing and Storage”**.

INSTALLATION OF ZINCALUME PLUS STEEL Flashings

The recommendations for flashing ZINCALUME Plus Steel are the same as for ZINCALUME Steel. Copper and lead are incompatible with ZINCALUME Steel and neither of these metals should be used in contact with

ZINCALUME Plus Steel. For further information refer to **Technical Bulletin #2 “Flashing Materials for Bare & Pre-painted ZINCALUME Steel.”**

Sealants

Tests show common neutral cure silicon sealants will adhere to the resin film. The adhesion properties of the resin film are the same as ZINCALUME Steel. Refer to **Technical Bulletin #5 for “Sealants for ZINCALUME Steel” for additional information.**

Fasteners

Recommended fasteners for ZINCALUME Plus Steel are the same as for ZINCALUME Steel. Refer to **Technical Bulletin #3 for further information on “Fastener Selection for ZINCALUME Steel Roof & Siding Products.”**

Slitting ZINCALUME Plus Steel

Where friction drag pads are used to maintain processing tension during slitting/recoiling, pickup of the resin can occur. Some chromate is present in this pickup, as it is with most ZINCALUME Steel, therefore, the following guidelines are recommended:

- Use minimal frictional forces on pads.
- Set minimum pad width 6" to minimize frictional forces if drag pads are used.
- Encourage use of an appropriate respiratory device for personnel working in close proximity (4-6 Feet) if dust is produced by the drag pad.
- Remove pickup from drag device and adjacent areas using appropriately designed apparatus.
- Dispose of drag pads in accordance with environmental or local regulations.

Welding

Spot, seam or gas metal arc welding can be carried out successfully on ZINCALUME Plus Steel. Fume generation may be slightly higher than ZINCALUME Steel without the coating. All welding should be carried out in well

ventilated areas.

High Temperatures

The maximum recommended continuous service temperature is 390°F. Service temperatures exceeding 390°F will be detrimental to the coating. Applications requiring operating temperatures up to the 600°F safe limit for ZINCALUME Steel should be specified without the resin film.

General Corrosion Characteristics

The ZINCALUME Plus coating does not improve the general corrosion characteristics of ZINCALUME Steel. As discussed in the introduction the coating degrades when exposed to ultra violet light. The resin film will not negatively impact the superior corrosion performance of ZINCALUME Steel.

Product Mixing

ZINCALUME Steel and ZINCALUME Plus Steel should not be mixed in adjacent areas on the same building. The different surface finishes, both in the new and weathered conditions, will result in a contrasting appearance which may be objectionable.

Visual Reflectivity

ZINCALUME Plus Steel is no more reflective than ZINCALUME Steel.

Electrical Conductivity

The resin film applied to ZINCALUME Plus Steel can potentially cause an insulating effect between panels in electrical appliance applications. The insulating effect would normally be overcome with welding or mechanical fastening of components. Manufacturers should be advised to ensure products are adequately grounded.

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ZINCALUME® Steel

Prevention of Oxide Formation (Black Rust) on ZINCALUME® Steel During Transportation, Processing and Storage

INTRODUCTION

ZINCALUME® Steel is a proven product exhibiting superior long-term corrosion resistance in a multitude of atmospheric environments. However, as with any steel product, there are precautions which must be observed during receiving, handling, processing, shipping, storage and assembly of ZINCALUME Steel products. If no precautions are taken, oxidation (i.e. black rust) can occur. This technical bulletin briefly describes the various sources of oxidation affecting the typical ZINCALUME Steel end user. This technical bulletin also provides guidelines to prevent the occurrence of oxidation and how to potentially remove an oxidation stain if it occurs.

SOURCES OF OXIDE FORMATION ON ZINCALUME STEEL

Oxide stains can occur on either coils or tightly bundled sheets of ZINCALUME Steel. Although oxidation of the metallic coating is usually superficial and confined to the extreme upper layer of the coating, it is aesthetically displeasing and can quickly become more severe if the cause of the stain is not removed. In the most severe instances, there can be a weight loss of metallic coating and a potential reduction of service life. When the cause of an oxidation stain is removed or (in the case of a formed panel) when affected panels are assembled at the job site, the oxidation stain will not worsen.

The basic cause of an oxide stain on ZINCALUME Steel is water or moisture interacting with the metallic coating in an oxygen-deficient environment. Under normal service conditions, ZINCALUME Steel has

excellent durability because of a protective oxide formed when the coating comes into contact with air. However, when moisture is in contact with the strip, and the strip is tightly stacked or wrapped into a coil, there is no exposure to air allowing the barrier oxide layer to form. As a result, accelerated corrosion is initiated. Oxide stain can occur in this type of oxygen-deficient environment in less than 48 hours.

Condensation

Oxidation can occur due to condensation when cold steel is moved from out of doors into a warmer building. The moisture in the air of the warmer building can condense on the colder steel surface. The presence of condensation-type oxide is typically identified as a dark gray oxidation condition which subsequently becomes darker. It is distributed on the material in a generalized pattern (rather than localized). A condensation-type oxide pattern occurs inward from both edges of the strip and is shallow in penetration from the edges.

Steel products must not be exposed to combinations of temperature and humidity which can result in condensation. Steel products should not be allowed to vary by more than 20°F from their surrounding environment. If an incoming shipment of ZINCALUME Steel appears to exceed 20°F difference from the storage environment, the product should be allowed to warm slowly in a cooler indoor area free from cold air drafts. All material storage areas must be properly ventilated with adequate circulation of air. Circulation of air, however, should not be defined as allowing doors to remain open where moist air from the outside can enter the building and increase the probability of condensation.

Condensation can also occur on tightly bundled stacks of sheets or panels of ZINCALUME Steel. In its very early stages, it may appear as a white stain similar to the white oxide that can form on galvanized steel. Even pre-painted and roll formed ZINCALUME Steel sheet is not immune to this type of oxidation.

Wet Storage

Oxidation can occur due to transport or storage of the steel in a wet environment. Oxidation frequently occurs when the material comes in direct contact with water during transportation to the end user facility or job site. In such a situation, the material will have evidence of water penetration by capillary action, from the side wall of the coil or the edge of a sheet (in the case of formed sheets). The oxide penetrates deeper into the metallic coating and becomes more difficult to remove than a condensation type condition. Oxide occurs as a more localized pattern than general across the entire surface. Oxidation also will occur within stacks of tightly bundled sheets when the stack comes into direct contact with water while the sheets are bundled at the end user facility or job site. In its very early stages, it can appear as a somewhat removable, white stain, similar to the oxidation stain that can form on galvanized steel. Even pre-painted ZINCALUME Steel is not immune to wet storage oxidation.

Other sources of oxidation could evolve during processing of the ZINCALUME Steel itself. Inadequately cured surface treatments or water-based remnants of forming lubricants allowed to remain on the surface during storage will provide entrapped moisture for oxide formation. The net effect would be a dark oxidation stain (rust) with a linear and blotchy pattern not necessarily associated with the edges.

PREVENTION OF OXIDE FORMATION ON ZINCALUME STEEL

The Steelscape ZINCALUME Steel production process incorporates surface passivation, resin coating and oiling capabilities to minimize the potential of oxide formation on the finished product during transportation and storage. Steelscape recommends, depending on what treatment an order has received, coils should be properly stored no longer than the periods listed below.

Product Ordered	Max. Storage Period after Ship Date
ZINCALUME Steel - Oiled/No Chem.-treat	3 months
ZINCALUME Steel - Chem.-treat/Dry	4 months
ZINCALUME Steel - Chem.-treat/Oil	6 months
ZINCALUME Plus Steel	6 months

Responsibility of the Steel Fabricator

To prevent the occurrence of an oxidation stain, the following precautions should be practiced by a fabricator.

- Order ZINCALUME Steel product with an optimum combination of surface treatment, oil and coil packaging.
- Verify any transit carriers adhere to shipping instructions and provide optimum protection to the steel coils during transit to the fabrication plant.
- Inspect ZINCALUME Steel coils for moisture upon arrival and stock ZINCALUME Steel coils indoors in a clean, dry area away from any sources of chemical pollution.
- Establish defined coil receiving inspection procedures which establish carrier responsibility.
- Document transit-related water damage on the manifest. Photos or video must be taken of any questionable condition.

Documentation should include the following elements:

- Weather conditions at time of delivery.
- Tarp or protective equipment conditions/exceptions.
- Equipment conditions/exceptions.
- Coil conditions, (i.e., wet, package damage, etc.).
- **Notify Steelscape as quickly as possible when oxidation of the surface is confirmed.**
- Store ZINCALUME Steel product at an even temperature above the dew point with adequate air circulation to prevent condensation problems.
- Remove plastic or paper packaging upon arrival, if the storage area is heated and dry. If the material

is wet, the sheets should be wiped dry. Wet coils should be scheduled into production as soon as possible.

- Inspect the storage site regularly to ensure standing moisture has not penetrated the ZINCALUME Steel coils.
- Stack the product on wood or metal skids so that the coils are not in contact with the ground and elevate one end of each bundle to allow any moisture to run off rather than puddle on the top of the bundle or between nested panels.
- Ensure ZINCALUME Steel roll formed sheets are paper-wrapped when the sheets are not scheduled for erection on the day of delivery.
- Avoid using plastic material for covering. Non-breathing materials should not be used to shroud bundles because they tend to trap moisture.
- Verify transit carriers adhere to shipping instructions and provide optimum protection to the steel sheets during transit to the job site.

Note: To correctly wrap a bundle of ZINCALUME Steel sheets, the bottom paper sheet is put in place first and the top laps are covered smoothly with the top covering sheet with the folds underneath the bundle. If folded improperly, the laps on top can create a catch for water and actually encourage accumulation of water in transit.

Responsibilities of the Erector at the Job Site

To prevent the occurrence of an oxidation stain, the following precautions should be practiced by an Erector at a job site:

- Inspect bundles on arrival at the building site and note on the delivery receipt any exceptions such as damage, corrosion or wet material.
- Store the bundles on racks at least one foot above ground level. Do not use uncured lumber.

- Use under-roof storage when possible. If the bundles must be stored in the open on bare ground, a plastic ground cover should be used under the bundles to minimize condensation on the sheets from moisture in the soil.
- Elevate one end of the bundle to allow moisture to run off rather than puddle on the top of the bundle or between nested panels. Water resistant paper will not keep out puddled moisture beyond its rated moisture vapor transmission time.

Removal of Oxide Stains on ZINCALUME Steel.

The oxide stain (black rust) that forms on ZINCALUME Steel sheet is primarily a hydrated aluminum oxide and can be very difficult to remove if progressed beyond the initial stages. In mild cases the oxide may be removed by using a solvent, such as mineral spirits, applied to a cloth. Mineral spirits would also be used to remove an oxide stain from pre-painted ZINCALUME Steel without damaging the paint. A mild, nonabrasive household cleanser may also be successful in removing the stain from a panel.

In more severe cases, industrial solvents may be used. However, as more aggressive chemicals are used to remove the stain, there is an increased possibility for damage to the coating itself. Harsh alkaline cleaning solutions should never be used. High pressure sprays should be avoided. Steel wool should never be used to remove an oxide stain from ZINCALUME Steel since it is too abrasive and it will leave embedded iron files causing a cosmetically displeasing red rust condition.

In all cases of oxide stain, removal of the stain will affect the appearance of the metallic coating under and near to the stain. The area near the stain will usually appear duller after the stain is removed.

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ZINCALUME® Steel

Guidelines for General Field Maintenance of ZINCALUME® Steel Roofing and Siding

INTRODUCTION

Minimum maintenance of ZINCALUME® Steel, whether bare or pre-painted, is required. Both are highly durable and simple maintenance by regular washing with clean water will enhance the service life of the product and maintain the appearance.

“Unwashed areas” are areas on a building that are sheltered from general rainfall and are therefore not naturally washed. Condensation can be absorbed by the dust and dirt that build up in these areas, leading to an increase in the time that the material is in contact with sufficient moisture to initiate corrosion. The associated affect is exacerbated in the vicinity of a salt marine influence, where the build-up includes marine salts and/or other pollutants. Regular cleaning of ZINCALUME Steel products in unwashed areas is required. Examples include, but are not limited to, fascia, wall cladding under eaves, garage doors, and the underside of eave gutters, carports and patios.

Washing should be done six monthly as a minimum. More frequent washing may be necessary in coastal areas or where high levels of industrial fallout/pollution occurs.

Cleaning

While factory-applied finishes for metal building panels are so durable that they will last many years longer than ordinary paints, it is desirable to clean them thoroughly on a routine basis whenever the finish is not washed by rain. Cleaning will generally restore the appearance of these buildings and render repainting unnecessary. An occasional light cleaning will also help maintain an aesthetically pleasing appearance.

In cases where regular maintenance using fresh water does not remove all dirt from the surface of the product the following procedure should be used;

- Wash the surface with a mild solution of pure soap or non-abrasive dish washing detergent in warm water. Washing should be conducted with a sponge, soft cloth or soft bristle nylon brush (no abrasive scourers, steel wool, etc). Care should be taken not to scuff the surface of the product.

Note: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning of building panels. **NEVER BLEND CLEANERS AND BLEACH.**

- As an alternative one cup of household ammonia dissolved into five gallons of water (room temperature) could also be used.
- Using either solution work from the top to the bottom of the panels, gently removing dirt and debris. A low pressure spray washer may aid in removing dirt deposits. Solvent-containing cleaners, such as Fantastic®, are effective and can be used without concern.
- If mildew or other fungal growth is a problem and cannot be removed, a mix of household bleach, one gallon to five gallons water, together with one cup of mild soap (Ivory® is recommended), can be used.
- The surface should be thoroughly rinsed with freshwater immediately after cleaning to remove traces of any detergent or cleaner.

Additional Maintenance

The long term performance of ZINCALUME Steel can at

times be impacted by the durability of the accessories which are in contact with the product. For example, the deterioration of the fasteners used can result in sacrificial corrosion of the product in the areas immediately adjacent to the fasteners. It is a good practice to;

- Ensure that fasteners used comply with **Technical Bulletin #3 “Fastener Selection for ZINCALUME Steel Roof and Siding Products”**
- Regularly inspect the fasteners and consider replacing any showing evidence of red rusting.

FIELD PAINTING

Pre-painted ZINCALUME Steel and ZINCALUME Plus Steel are both coated with factory applied, oven cured coatings. While both are intended to be installed as is and will have long term durability and performance, there may be instances when field painting over the factory finish is required. The guidelines presented here are also applicable to bare ZINCALUME Steel. The following should be considered;

- Air drying paints have different weathering characteristics to pre-painted ZINCALUME Steel and are typically not as durable. Areas field painted with air dry paints to match adjacent factory applied areas may weather different over time and therefore vary in appearance.
- The color and gloss of air dry paints may not exactly match that of the factory applied paint.
- Field painting over the factory applied finish voids any originally issued paint warranties.

Surface Preparation

It is normal practice to ensure that any surface to be painted is in a suitable condition for painting. The most appropriate preparation is dependent on the age and condition of the surface.

Any dirt, debris or mildew must be removed; follow the cleaning guidelines outlined above in this bulletin. Rinse the surface thoroughly as residual cleaners or detergent left on the surface could result in poor adhesion of the field applied coating.

Bare ZINCALUME Steel product should be cleaned with

solvent to remove any rolling oils or lubricants. Rinse thoroughly and allowed to dry completely.

Minor scratches which have not left the metal substrate exposed can be lightly sanded or buffed to create a smoother surface. Care must be taken to avoid exposing the substrate.

To prevent rust from forming on exposed metal, sand the general area lightly and use a high-quality primer to protect the exposed metal from corrosion. Allow sufficient time (normally 24 hours) for the primer to dry before applying the topcoat. If either red or white rust is evident, remove as much rust as possible with a wire brush, and then sand lightly to remove all rust. Wipe the exposed area with mineral spirits before priming.

Field Paint Types

The most suitable field paint type is generally water-based acrylic. However, in more corrosive salt marine locations, or for severely rusted material, it may be necessary to choose a paint system that has enhanced corrosion resistance such as a zinc-rich primer.

Due to ongoing improvements in paint technologies, at any given time there are numerous potentially suitable paint products available. It is therefore recommended that a reputable paint supplier or contractor be consulted to determine the most appropriate paint system for your particular applications and environment.

- Read manufacturer’s instructions and observe them explicitly. Thorough mixing is essential.
- It is not advisable to use different brands of primers and finishing coats in conjunction with one another. Do not over paint water-based paints with oil or organic solvent-type paints.
- At all times, avoid excessive paint film thickness such as may occur in the valleys of formed roofing panels.
- When extensive areas are to be covered, spray painting can lower cost while giving acceptable results. The paints used, however, must be formulated for this purpose.
- Work safely. Wear proper safety equipment; ensure good ventilation in paint handling; avoid unnecessary contamination of the skin.

TOUCH-UP PAINT

Scratches and very minor damage may occur during handling and installation of painted roofing and walling. In these instances, it may be desirable to use touch-up paint to repair the blemishes. Keep in mind touchup paints are quick fixes and when used properly will result in satisfactory appearance. Misuse or over-use can result in spoiling the overall appearance.

Small scratches that do not penetrate through the metallic coating of the ZINCALUME Steel and are not noticeable from 6ft. should be left alone as the metallic coating will protect against corrosion.

Surface Preparation

Edges of deep scratches should be lightly sanded or “feathered” with 400 grit sandpaper. If a scratch extends through the paint and the protective metal layer exposing raw steel, it should be treated with a zinc rich or similar primer before touch-up application. If feathering and/or priming are not necessary, areas to be touched-up should at least be wiped with mineral spirits to remove dirt, wax or other contaminants before colored touch-up is applied.

Paint Application

The recommended paint type for touch-ups is an acrylic silicone paint which can be found at local paint stores. Many panel fabricators have touch-up paint available in their standard colors as well.

Special attention should be paid to the manufacturer’s instructions, including direct skin or eye contact, ventilation and potential flammability. Aerosol or spray applications are not recommended for blemish or scratch repairs. The best tool for this type of repair is a good quality, 1/4-in. artist brush or a pen tip type applicator; only the narrow edge of the applicator should actually contact the scratch or blemish. Use touch-up paint sparingly and only to cover up those areas where paint has been removed. Excessive use of touch-up paint will result in a blotchy, uneven, appearance.

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ZINCALUME® Steel

Guidelines to Installation of Photovoltaic Panels on ZINCALUME Steel

INTRODUCTION

When installing photovoltaic (PV or solar) panels to roofing made from ZINCALUME Steel the following installation and maintenance practices will assist in maintaining the water tightness and durability of the roof. This technical bulletin relates to the installation of framed PV/solar panels mounted above ZINCALUME Steel roofing.

INSTALLATION CONSIDERATIONS

Clearance Between the Panels and the Roof

PV/solar panels installed on a ZINCALUME Steel roof shield the roof from the sun and prevent beneficial washing from rainfall. Areas on the roof directly beneath the panels are considered to be unwashed and may be subject to accelerated corrosion due the accumulation of dirt, salt and other airborne contaminants which may retain moisture for extended periods due to condensation or high humidity. The provision of adequate clearance between PV/solar panels and roofing will help to:

- Facilitate self-cleaning and limit the build-up of leaves and other debris.
- Provide sufficient access for the cleaning, inspection and maintenance of the roofing material, including removal of any accumulated contaminants, and fasteners beneath the panels.
- Allow air flow to quickly dry areas beneath the PV/solar panels. This may also be beneficial to the performance of the PV/solar panels as electrical output is usually temperature dependent.

Compatibility of Materials with Roofing Made from ZINCALUME Steel

Dissimilar metals, such as stainless steel, lead, brass, copper and copper containing alloys should not be used in direct contact, or contact that could create an electrical connection, with roofing made from ZINCALUME Steel. This also includes conductive seals, washers and gaskets. Refer to **Technical Bulletin #2 “Flashing Materials for Bare and Pre-painted ZINCALUME Steel”** and **Technical Bulletin #3 “Fastener Selection for ZINCALUME Steel Roof and Siding Products”** for additional information on dissimilar metals and galvanic corrosion.

Avoid PV/solar panels, or any introduced flashings, which utilize materials such as copper and lead as these materials have the potential to create water runoff onto roofing made from ZINCALUME Steel resulting in galvanic corrosion.

Ensure any sealant in contact with ZINCALUME Steel is “neutral cure” silicone.

Timber used in direct contact with roofing made from ZINCALUME Steel that has the potential to become damp can result in accelerated corrosion of the roofing. Furthermore, treated lumber has the potential to leach and drip corrosive substances onto the roof. Use of lumber on the top surface of the roof should be avoided.

Avoiding Potential Damage to the Roof

Foot traffic can dent, scuff, or scratch the ZINCALUME Steel roof.

Dents may need to be rectified to avoid water ponding, which is more likely on low pitch roofs. Ponded water

exposes ZINCALUME Steel to an extended period of wetness which may increase the potential for corrosion or water ingress.

Scuffing is typically an aesthetic issue that is unlikely to have any detrimental effect on the performance of roofing made with ZINCALUME Steel.

Maintaining Water Tightness of the Existing Roof

The installation of PV/solar panels should allow for free drainage of moisture from all surfaces. Avoid ponding water.

Any penetrations through the roof should be placed in such a manner so as to minimize the risk of water ingress. Penetrations through the roofing should be properly sealed using appropriate flashings, sleeves and/or sealants. Non-penetrating attachment clamps are recommended if the design allows.

Avoid valley fixing or valley holes for electrical cables.

PV/solar panel fasteners and brackets should be installed away from sheet side laps as they may distort the profile and interfere with the specifically designed anti-capillary laps, leading to water ingress.

Rainwater Collection

If rainwater is collected from the roof, check with the PV/solar panel supplier to ensure it does not adversely affect water quality.

Fasteners and Brackets

Fasteners and brackets used in the installation of PV/solar panels should have a service life comparable to the expected performance of the ZINCALUME Steel. This includes the replacement of any corroded roofing fasteners that will be located beneath the new PV/solar panels.

Swarf

During installation swarf should be removed daily. Refer to **Technical Bulletin #4 “Prevention of Damage to ZINCALUME Steel Roof and Siding Products from Metal Filings”** for additional information.

Electrical Cables

Electrical cables should not sit directly on the roof panels as this may lead to the accumulation of dirt, salt and other contaminants. Cables should be affixed to the PV/solar panel support structure.

Grounding

Ensure appropriate grounding of the PV/solar system. Stray currents to the roof made with ZINCALUME Steel may accelerate corrosion.

MAINTENANCE

Unwashed areas have an increased risk of corrosion compared to washed areas, regular cleaning is recommended. Generally, unwashed areas should be cleaned with fresh, potable water, at least every 3 months for coastal or industrial areas, and at least every 6 months in other applications. This may coincide with periodic PV/solar panel cleaning. Maintenance should also include an inspection of the roofing fasteners, as well as the surface condition of the ZINCALUME Steel. For further guidance on maintenance refer for **Technical Bulletin #11 “Guidelines for General Field Maintenance of ZINCALUME Steel Roofing and Siding”**.

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ZINCALUME® Steel

Hawaiian Islands: Exceptions to Standard Limited Warranty, Cleaning and Panel Design Recommendations

INTRODUCTION

The volcanic activity on the big island of Hawaii is a unique but well understood natural feature. Two of the primary emissions from the vents located at Kilauea are hydrogen sulfide and sulfur dioxide. These particulates often result in the well known island haze called VOG. These two components when mixed with water droplets in the surrounding air can result in the formation of sulfuric acid which can become acid rain. Acid has long been known to cause corrosion on ZINCALUME® steel, both painted and bare, but historically the levels of sulfur on the island of Hawaii has been such that routine rainfall provided enough cleaning of roof panels to prevent any type of premature corrosion.

Unfortunately, the situation at the Kilauea summit has changed dramatically over recent years. The opening of a vent at the Halema`uma`u crater in December 2007 has resulted in a much higher level of sulfur dioxide being released into the environment, with a marked increase starting in March 2008. It is estimated that an additional 750-2,000 tons/day of sulfur dioxide is being released. Due to the increased corrosiveness on Hawaii, Steelscape is undertaking a large scale exposure study to determine the best substrate, paint and panel design to minimize premature corrosion. Until the results of this study are available, the following limited warranty exceptions and recommendations have been developed.

LIMITED WARRANTY GUIDELINES AND EXCEPTIONS

Big Island of Hawaii

For orders accepted after December 1, 2010, the below ZINCALUME® steel limited warranty durations

and distances will be in effect. All the standard and current ZINCALUME® steel limited warranty conditions and provisions will apply.

Distance from Halema`uma`u and/or Pu`u O`o Vents*	Limited Warranty Duration
0 – 10 miles	5 years
11 – 20 miles	10 years
21 – 30 miles	15 years
>30 miles	Standard 25 years

*Halema`uma`u Vent 19°24'24.19"N 155°17'01.02"W

Pu`u O`o Vent 19°23'21.47"N 155°06'20.51" W

Other Hawaiian Islands

The other Hawaiian Islands will be subject to the current standard ZINCALUME® steel limited warranty.

An exception to our limited warranty should be requested for any sites, Hawaiian or otherwise, located within one mile of the ocean as this zone is defined as aggressive marine. Failure to submit a limited warranty request for aggressive marine locations may result in a voided warranty.

RECOMMENDING CLEANING PRACTICES

Big Island

Roof panels should be washed down with fresh water for a period of time sufficient to remove any debris, dirt or pooled water from the surface. Fresh water for the purposes of this technical bulletin is defined as potable, or drinkable with a 6-9pH. It is especially important that no dirt or debris be left at the drip edges

of the roof panels. No cleaning solutions are necessary and panels should not be scrubbed. Recommended cleaning frequency is below.

Distance from Halema'uma'u and/or Pu'u O'o Vents*	Recommended Cleaning Frequency
0 – 10 miles	Monthly
11 – 20 miles	Every Two Months
21 – 30 miles	Every Four Months
>30 miles	Every Six months

*Halema'uma'u Vent 19°24'24.19"N 155°17'01.02"W
 Pu'u O'o Vent 19°23'21.47"N 155°06'20.51" W

PANEL DESIGN

Panel Design and Effect on Corrosion

Our field inspections conducted to date indicate that panel design may play a significant role in the rate of corrosion due to acid rainfall and VOG from the volcano. Panels with an exposed cut edge and corrugated profile tend to hold small amounts of water and debris at the very edge due to capillary



Silt accumulation on a panel without a drip edge. Blistering of the paint is an early sign of corrosion.

action. Over time this concentration of acidic water and particulate matter begins to corrode the paint and eventually the substrate.

Profiles with a hemmed drip edge allow water and debris to flow off the panel, thus providing better long-term corrosion performance.

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ZINCALUME® Steel Limited Warranty

Steelscape, LLC ("Steelscape") provides the following limited warranty to Purchaser for ZINCALUME Steel (the "Product").

Hot dipped ZINCALUME aluminum-zinc alloy coated steel sheet, sold for use as painted, unpainted or resin-coated roofing and siding panels or for use in rainwater applications, if erected within Continental North America or in another location **pre-approved** by Steelscape, will not rupture, fail structurally or perforate within a period of twenty-five (25) years and six (6) months after shipment from Steelscape due to exposure to normal atmospheric corrosion. This limited warranty excludes any accumulation of red rust which occurs at breaks for discontinuities in the surface.

This limited warranty applies to all categories of product with a metallic coating class of AZ50 or heavier as designated by ASTM specification A792/A792M.

THIS LIMITED WARRANTY IS SUBJECT TO THE FOLLOWING CONDITIONS AND LIMITATIONS. All of the following conditions and limitations constitute material terms of this limited warranty and failure to satisfy any one or more of the conditions by Purchaser, its agents, or representatives shall release Steelscape from its obligations hereunder.

Conditions and Limitations:

1. This limited warranty does not cover Product exposed to or contaminated with corrosive or aggressive atmospheric conditions, including but not limited to the following (a) Areas subject to saltwater marine atmospheres or to constant spraying of either salt or fresh water. (b) Areas subject to fallout or exposure to corrosive chemicals, fumes, ash, cement dust or animal waste. (c) Areas subject to water run-off from lead or copper flashings or areas in metallic contact with lead or copper. (d) Conditions or circumstances where corrosive fumes or condensates are generated or released inside the building. (e) Areas sheltered from periodic washing by natural rainfall or man-made fresh water rinse. (f) Areas subject to direct contact or run-off from CCA, AQC, CA -treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes, composite shingles or siding.
2. This limited warranty does not cover Product that has (a) Bends less than 2T for a sheet thickness of 0.0299" and thinner and bends less than 4T for a sheet thickness of 0.0300" and thicker. (b) Slopes of the roof, or any sections of the roof flatter than 1/4": 12." (c) Damage caused to the metallic coating or sheet by severe reverse bending, alternate compression and tension, improper roll forming, scouring or cleaning.
3. This limited warranty does not cover industrial applications such as steel mills, power generating stations, oil fields, oil refineries, ore mines, chemical plants, paper mills, or other unusual environmental exposure. Purchaser is required to consult with Steelscape before any installation takes place on industrial applications and Steelscape reserves the right to determine whether or not the Product will be covered by this limited warranty.
4. This limited warranty does not cover any Product installed 1 mile or less from a salt water environment.
5. Mechanical, chemical or other damage sustained during shipment, storage, forming, and fabrication or during and after installation is not covered by this limited warranty.
6. Corrosion due to failure to remove debris from or provide for free drainage of water, including internal condensation from overlaps and all other surfaces of the sheets or panels is not covered by this limited warranty.
7. Deterioration or corrosion caused by contact with green and/or wet lumber or wet storage stain caused by water damage and/or condensation is not covered by this limited warranty.
8. Corrosion or loss of paint adhesion as a result of perforating the Product is not covered by this limited warranty.
9. This limited warranty does not cover corrosion due to the presence of damp insulation and/or other corrosive materials in contact with or in close proximity to the panel.
10. The Product must not be cleaned with abrasive or chemical cleaners.
11. This limited warranty does not apply in the event of deterioration or corrosion to panels caused directly or indirectly by panel contact with fasteners and sealants, including galvanic corrosion. Responsibility for selection of suitable long-lasting fasteners and sealants to be used with ZINCALUME steel roofing and siding panels, or in rainwater applications rests solely with the Purchaser. Steelscape will have information available to the Purchaser to aid in selection of suitable products. However, the information will not constitute a warranty of performance under any conditions.
12. This limited warranty does not cover damages or conditions resulting from circumstances beyond Steelscape's control, including, without limitation, the following (a) Acts of God, falling objects, explosions, external forces or fire. (b) Failure to install Product in a way that allows for adequate circulation. (c) Condensation or other contamination or damage attributable to improper shipping, packaging, handling, storage, processing or installation. (d) Failures or damage resulting from edge corrosion. (e) Scratching or abrading during or after installation. (f) Prolonged contact with or removal of vegetation, dirt, gravel, ash or cement dust. (g) Sustained exposure to animals or animal waste. (h) Mishandling of the Product, including abuse, alteration, modification, improper use or storage and (i) Damages or conditions at the point(s) and adjacent areas where material has been attached or adhered to the Product, including snow guards or solar panels.
13. Steelscape's liability for breach of this warranty shall be limited exclusively to the cost of either repairing non-conforming panels or, at Steelscape's sole option, of furnishing sufficient sheet product, FOB Buyer's plant, to enable Buyer to fabricate replacement panels for the non-conforming panels.
14. Steelscape shall not in any event be liable for the cost of labor expended by others on any non-conforming sheet or for any special, indirect or consequential damages to anyone by reason of the fact that such panels shall have been non-conforming.
15. Claims must be promptly reported in writing to Steelscape by the Purchaser and Steelscape shall be given a reasonable opportunity to inspect the panels claimed to be non-conforming. Adequate identification of the material involved in the claim, including date of installation, Steelscape order number, coil number, invoice number and the Purchaser must establish date of shipment.
16. Purchaser shall exercise diligence in the inspection of sheets as received from Steelscape so as to mitigate repair or replacement.
17. Steelscape extends this warranty solely to the Purchaser. This warranty is non-transferable and non-assignable.
18. Steelscape reserves the right to terminate or amend this warranty at any time (except as to orders already accepted) upon giving 30 days written notice.
19. No terms or conditions other than those stated herein, and no agreement or understanding, oral or written, in any way purporting to modify this limited warranty shall be binding on Steelscape unless made in writing and signed by its authorized representative.
20. Any disputes arising under or pursuant to the matters contemplated by this limited warranty, at Steelscape's election, shall be resolved by arbitration or legal process governed by and interpreted in accordance with the laws of the State of California, and shall have exclusive jurisdiction over any such disputes, especially with respect to matters of validity, execution, interpretation, enforcement or compliance.

EXCEPT AS SET FORTH HEREIN, STEELSCAPE MAKES NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCT, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY OF QUALITY. ALL WARRANTIES OTHER THAN THIS LIMITED WARRANTY ARE EXPRESSLY EXCLUDED AND DISCLAIMED. TO THE EXTENT LOCAL LAW PROVIDES THAT IMPLIED WARRANTIES MAY NOT BE EXCLUDED OR DISCLAIMED, THOSE WARRANTIES ARE LIMITED IN DURATION OF THE EXPRESS WARRANTY PROVIDED IN THIS LIMITED WARRANTY OR THE SHORTEST DURATION REQUIRED BY LOCAL LAW.

IN NO CASE WILL STEELSCAPE BE LIABLE TO ANY PERSON OR ENTITY FOR PROPERTY DAMAGE OR PERSONAL INJURY IN TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY), CONTRACT, WARRANTY, OR OTHERWISE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, CONSEQUENTIAL OR OTHER DAMAGES OR LOSSES, INCLUDING BUT NOT LIMITED TO DAMAGE FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS TO THE BUILDING OR ITS CONTENTS OR ANY OTHER LOSS, REGARDLESS OF THE CAUSE OF SUCH DAMAGE AND WHETHER OR NOT CAUSED BY OR RESULTING FROM THE NEGLIGENCE OF STEELSCAPE, EVEN IF STEELSCAPE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSSES. STEELSCAPE'S TOTAL LIABILITY FOR ALL CLAIMS OF ANY KIND WILL NOT EXCEED THE PURCHASE PRICE PAID TO STEELSCAPE FOR THE PRODUCT IN QUESTION.

Effective Date: April 20, 2015



1-888-285-7717
www.steelscape.com

ZINCALUME® Steel Limited Warranty - Hawaii

Steelscape LLC ("Steelscape") provides the following limited warranty to Purchaser for ZINCALUME Steel (the "Product").

Hot dipped ZINCALUME aluminum-zinc alloy coated steel sheet, sold for use as painted, unpainted or resin-coated roofing and siding panels or for use in rainwater applications, if erected within the Hawaiian Islands, will not rupture, fail structurally or perforate within a period of twenty-five (25) years and six (6) months after shipment from Steelscape due to exposure to normal atmospheric corrosion. This limited warranty excludes any accumulation of red rust which occurs at breaks for discontinuities in the surface.

This limited warranty applies to all categories of product with a metallic coating class of AZ50 or heavier as designated by ASTM specification A792/A792M.

THIS LIMITED WARRANTY IS SUBJECT TO THE FOLLOWING CONDITIONS AND LIMITATIONS. All of the following conditions and limitations constitute material terms of this limited warranty and failure to satisfy any one or more of the conditions by Purchaser, its agents, or representatives shall release Steelscape from its obligations hereunder.

Conditions and Limitations:

- This limited warranty does not cover Product exposed to or contaminated with corrosive or aggressive atmospheric conditions, including but not limited to the following (a) Areas subject to saltwater marine atmospheres or to constant spraying of either salt or fresh water. (b) Areas subject to fallout or exposure to corrosive chemicals, fumes, ash, cement dust or animal waste. (c) Areas subject to water run-off from lead or copper flashings or areas in metallic contact with lead or copper. (d) Conditions or circumstances where corrosive fumes or condensates are generated or released inside the building. (e) Areas sheltered from periodic washing by natural rainfall or man-made fresh water rinse. (f) Areas subject to direct contact or run-off from CCA, AQC, CA-treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes, composite shingles or siding.
- This limited warranty does not cover Product located 30 miles or fewer from the Halema'uma'u or Pu'u O'o volcano vents. Purchaser is required to consult with Steelscape before any installation takes place near active volcano vents. Special maintenance recommendations for volcanic regions are available upon request.
- This limited warranty does not cover Product that has (a) Bends less than 2T for a sheet thickness of 0.0299" and thinner and bends less than 4T for a sheet thickness of 0.0300" and thicker. (b) Slopes of the roof, or any sections of the roof flatter than 1/4": 12." (c) Damage caused to the metallic coating or sheet by severe reverse bending, alternate compression and tension, improper roll forming, scouring or cleaning.
- This limited warranty does not cover industrial applications such as steel mills, power generating stations, oil fields, oil refineries, ore mines, chemical plants, paper mills, or other unusual environmental exposure. Purchaser is required to consult with Steelscape before any installation takes place on industrial applications and Steelscape reserves the right to determine whether or not the Product will be covered by this limited warranty.
- This limited warranty does not cover any Product installed 1 mile or less from a salt water environment.
- Mechanical, chemical or other damage sustained during shipment, storage, forming, and fabrication or during and after installation is not covered by this limited warranty.
- Corrosion due to failure to remove debris from or provide for free drainage of water, including internal condensation from overlaps and all other surfaces of the sheets or panels is not covered by this limited warranty.
- Deterioration or corrosion caused by contact with green and/or wet lumber or wet storage stain caused by water damage and/or condensation is not covered by this limited warranty.
- Corrosion or loss of paint adhesion as a result of perforating the Product is not covered by this limited warranty.
- This limited warranty does not cover corrosion due to the presence of damp insulation and/or other corrosive materials in contact with or in close proximity to the panel.
- The Product must not be cleaned with abrasive or chemical cleaners.
- This limited warranty does not apply in the event of deterioration or corrosion to panels caused directly or indirectly by panel contact with fasteners and sealants, including galvanic corrosion. Responsibility for selection of suitable long-lasting fasteners and sealants to be used with ZINCALUME steel roofing and siding panels, or in rainwater applications rests solely with the Purchaser. Steelscape will have information available to the Purchaser to aid in selection of suitable products. However, the information will not constitute a warranty of performance under any conditions.
- This limited warranty does not cover damages or conditions resulting from circumstances beyond Steelscape's control, including, without limitation, the following (a) Acts of God, falling objects, explosions, external forces or fire. (b) Failure to install Product in a way that allows for adequate circulation. (c) Condensation or other contamination or damage attributable to improper shipping, packaging, handling, storage, processing or installation. (d) Failures or damage resulting from edge corrosion. (e) Scratching or abrading during or after installation. (f) Prolonged contact with or removal of vegetation, dirt, gravel, ash or cement dust. (g) Sustained exposure to animals or animal waste. (h) Mishandling of the Product, including abuse, alteration, modification, improper use or storage and (i) Damages or conditions at the point(s) and adjacent areas where material has been attached or adhered to the Product, including snow guards or solar panels.
- Steelscape's liability for breach of this warranty shall be limited exclusively to the cost of either repairing non-conforming panels or, at Steelscape's sole option, of furnishing sufficient sheet product, FOB Buyer's plant, to enable Buyer to fabricate replacement panels for the non-conforming panels.
- Steelscape shall not in any event be liable for the cost of labor expended by others on any non-conforming sheet or for any special, indirect or consequential damages to anyone by reason of the fact that such panels shall have been non-conforming.
- Claims must be promptly reported in writing to Steelscape by the Purchaser and Steelscape shall be given a reasonable opportunity to inspect the panels claimed to be non-conforming. Adequate identification of the material involved in the claim, including date of installation, Steelscape order number, coil number, invoice number and the Purchaser must establish date of shipment.
- Purchaser shall exercise diligence in the inspection of sheets as received from Steelscape so as to mitigate repair or replacement.
- Steelscape extends this warranty solely to the Purchaser. This warranty is non-transferable and non-assignable.
- Steelscape reserves the right to terminate or amend this warranty at any time (except as to orders already accepted) upon giving 30 days written notice.
- No terms or conditions other than those stated herein, and no agreement or understanding, oral or written, in any way purporting to modify this limited warranty shall be binding on Steelscape unless made in writing and signed by its authorized representative.
- Any disputes arising under or pursuant to the matters contemplated by this limited warranty, at Steelscape's election, shall be resolved by arbitration or legal process governed by and interpreted in accordance with the laws of the State of California, and shall have exclusive jurisdiction over any such disputes, especially with respect to matters of validity, execution, interpretation, enforcement or compliance.

EXCEPT AS SET FORTH HEREIN, STEELSCAPE MAKES NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCT, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PURPOSE OR ANY OTHER WARRANTY OF QUALITY. ALL WARRANTIES OTHER THAN THIS LIMITED WARRANTY ARE EXPRESSLY EXCLUDED AND DISCLAIMED. TO THE EXTENT LOCAL LAW PROVIDES THAT IMPLIED WARRANTIES MAY NOT BE EXCLUDED OR DISCLAIMED, THOSE WARRANTIES ARE LIMITED IN DURATION OF THE EXPRESS WARRANTY PROVIDED IN THIS LIMITED WARRANTY OR THE SHORTEST DURATION REQUIRED BY LOCAL LAW.

IN NO CASE WILL STEELSCAPE BE LIABLE TO ANY PERSON OR ENTITY FOR PROPERTY DAMAGE OR PERSONAL INJURY IN TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY), CONTRACT, WARRANTY, OR OTHERWISE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, CONSEQUENTIAL OR OTHER DAMAGES OR LOSSES, INCLUDING BUT NOT LIMITED TO DAMAGE FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS TO THE BUILDING OR ITS CONTENTS OR ANY OTHER LOSS, REGARDLESS OF THE CAUSE OF SUCH DAMAGE AND WHETHER OR NOT CAUSED BY OR RESULTING FROM THE NEGLIGENCE OF STEELSCAPE, EVEN IF STEELSCAPE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSSES. STEELSCAPE'S TOTAL LIABILITY FOR ALL CLAIMS OF ANY KIND WILL NOT EXCEED THE PURCHASE PRICE PAID TO STEELSCAPE FOR THE PRODUCT IN QUESTION.

Effective Date: April 20, 2015

TRUZINC® STEEL

The following pages describe Steelscape’s TruZinc® Steel product information. This Section contains the TruZinc capabilities, Grade Data Sheets, Safety Data Sheets (SDS) and a Technical Bulletin. These documents will serve as references when contemplating fit-for-purpose applications.

The Grade Data Sheets describe, in detail, each of our products’ performance and composition characteristics. Typical dimensions, mechanical properties and supply conditions are described for each product.

There is a SDS reference for both the bare bare, resin-coated version of our TruZinc Steel products. Each SDS addresses potential health concerns and effects of prolonged exposure to our products. Ingredients, physical and chemical characteristics, potential physical hazards and special protection information is provided. Spill, leak, fire-fighting and emergency contact information is disclosed.

The Technical Bulletin provides helpful information regarding the effective use of TruZinc Plus Steel. Important application and handling information is described in this bulletin. The fit-for-purpose tips are also an excellent technical reference.

This section will serve as an invaluable tool to both veteran users and first time buyers of TruZinc Steel.

TruZinc® Steel Processing Capabilities

The matrix below was designed to help you determine the TruZinc® Steel products Steelscape is capable of producing on a consistent basis. These capabilities grow and change with each new successful trial order we process to completion. As we become more proficient in producing product outside the stated capacity limits we will expand this matrix accordingly.

	Kalama
Max Input Coil Wt	56,000 #
Max Output Coil Wt	56,000 #
Thickness	0.0100" - 0.047" ^
Width	26" - 51"
Coatings	TruZinc/Resin/Oil/ Acrylic Single-Coat Paint/ Passivant (Standard or RoHS Compliant)
Entry OD/ID	79.5" max/20" +/- 0.5"
Delivery OD/ID	79.5" max/20" +/- 0.5"
Cores	Not Available
Coatings	G30, G40, G60, G90, G100, G115, G125

^ 0.300" thickness and greater is considered non-surface critical for some product grades and end-uses, both bare and painted. Inquire with a Steelscape Sales Representative for additional information.

* For heavier coating weights inquire with a Steelscape Sales Representative.

Steelscape is happy to evaluate requests for TruZinc® Steel products not shown on the capability matrix above. Equipment capabilities and hot band supply may impact our production capabilities. Questions regarding TruZinc Steel processing capabilities should be directed to a Steelscape Sales Representative.

TruZinc® Steel Grade 33 Grade Data Sheet

General Description

TruZinc® Steel Grade 33 - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 33 ksi with good ductility.

Typical Uses

Roll-formed roofing, siding and steel studs.

Dimensions				
Typical Thickness (Inches)	Maximum .039" Minimum .012"	Typical width	Maximum 48.9" Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties		Chemical Composition		
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	33	38-51	Carbon (C)	0.20
Tensile strength, ksi	45	54-64	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	20	27-37	Manganese (Mn)	1.35
Hardness, HRB		53-65	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated	Not Passivated	Roll-forming	5
			Welding *	5
			Painting **	5
TruZinc® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0359"

TruZinc® Steel Grade 37 Grade Data Sheet

General Description

TruZinc® Steel Grade 37 - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 37 ksi with good ductility.

Typical Uses

Roll-formed roofing, siding and steel studs.

Dimensions				
Typical Thickness (Inches)	Maximum .039"	Typical width	Maximum 48.9"	
	Minimum .012"		Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	37	39-54	Carbon (C)	0.20
Tensile strength, ksi	52	52-69	Phosphorus (P)	0.10
Elongation in 2 inch, minimum %	18	26-37	Manganese (Mn)	1.35
Hardness, HRB		50-70	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
			Roll-forming	5
Chemical treatment	Passivated	Not Passivated	Welding *	5
			Painting **	5
TruZinc® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0359"

TruZinc® Steel Grade 40 Grade Data Sheet

General Description

TruZinc® Steel Grade 40 - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 40 ksi with good ductility.

Typical Uses

Roll-formed roofing, siding and steel studs.

Dimensions				
Typical Thickness (Inches)	Maximum .039" Minimum .012"	Typical width	Maximum 48.9" Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties		Chemical Composition		
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	40	40-51	Carbon (C)	0.25
Tensile strength, ksi	55	55-63	Phosphorus (P)	0.10
Elongation in 2 inch, minimum %	16	27-37	Manganese (Mn)	1.35
Hardness, HRB		51-66	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90	Bending	5
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated	Not Passivated	Roll-forming	5
			Welding *	5
			Painting **	5
TruZinc® Plus	Resin Coated			
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0359"

TruZinc® Steel Grade 50 (Class 1) Grade Data Sheet

General Description

TruZinc® Steel Grade 50 (Class 1) - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 50 ksi with good ductility.

Typical Uses

Roll-formed roofing and decking.

Dimensions				
Typical Thickness (Inches)	Maximum .039" Minimum .019"	Typical width		Maximum 48.9" Minimum 28"
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical <.017" >.017" BMT BMT		Maximum Percent by Weight
Longitudinal tensile				
Yield strength, ksi	50	50-60	50-60	Carbon (C) 0.25
Tensile strength, ksi	65	65-70	67-73	Phosphorus (P) 0.20
Elongation in 2 inch, minimum %	12	23-36	25-31	Manganese (Mn) 1.35
Hardness, HRB		65-75	65-75	Sulfur (S) 0.04
Supply Condition	Standard	Optional		Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)
Coating class	G40, G60	G30, G90		Bending 3
Tension leveling	Leveled			Drawing NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)		Pressing NR
				Pittsburgh Lock Seam NR
				Roll-forming 5
Chemical treatment	Passivated	Not Passivated		Welding * 5
TruZinc Plus	Resin Coated			Painting ** 5
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0157" to 0.0359"

TruZinc® Steel Grade 50 (Class 2) Grade Data Sheet

General Description

TruZinc® Steel Grade 50 (Class 2) - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 50 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions					
Typical Thickness (Inches)	Maximum .039"	Typical width		Maximum 48.9"	
	Minimum .0157"			Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.					
Mechanical Properties			Chemical Composition		
Steel base	Guaranteed Minimum	Typical <.017" >.017" BMT BMT		Maximum Percent by Weight	
Longitudinal tensile					
Yield strength, ksi	50	50-60	50-61	Carbon (C)	0.20
Tensile strength, ksi	-	60-73	65-75	Phosphorus (P)	0.10
Elongation in 2 inch, minimum %	12	26-32	23-31	Manganese (Mn)	1.35
Hardness, HRB		56-70	64-75	Sulfur (S)	0.04
Supply Condition	Standard	Optional		Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90		Bending	3
Tension leveling	Leveled			Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)		Pressing	NR
				Pittsburgh Lock Seam	NR
				Roll-forming	5
Chemical treatment	Passivated	Not Passivated		Welding *	5
TruZinc Plus	Resin Coated			Painting **	5
Oiling	Not Oiled	Oiled			
Branding	Not Branded				

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0157" to 0.0359"

TruZinc® Steel Grade 50 (Class 4) Grade Data Sheet

General Description

TruZinc® Steel Grade 50 (Class 4) - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 50 ksi with good ductility.

Typical Uses

Roll-formed roofing and siding.

Dimensions					
Typical Thickness (Inches)	Maximum .039"	Typical width		Maximum 48.9"	
	Minimum .0157"			Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.					
Mechanical Properties			Chemical Composition		
Steel base	Guaranteed Minimum	Typical <.017" >.017" BMT BMT		Maximum Percent by Weight	
Longitudinal tensile					
Yield strength, ksi	50	50-60	50-61	Carbon (C)	0.25
Tensile strength, ksi	-	60-73	65-75	Phosphorus (P)	0.20
Elongation in 2 inch, minimum %	12	26-32	23-31	Manganese (Mn)	1.35
Hardness, HRB		56-70	64-75	Sulfur (S)	0.04
Supply Condition	Standard	Optional		Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90		Bending	3
Tension leveling	Leveled			Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)		Pressing	NR
				Pittsburgh Lock Seam	NR
				Roll-forming	5
Chemical treatment	Passivated	Not Passivated		Welding *	5
TruZinc Plus	Resin Coated			Painting **	5
Oiling	Not Oiled	Oiled			
Branding	Not Branded				

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0157" to 0.0359"

TruZinc® Steel Grade 57 Grade Data Sheet

General Description

TruZinc® Steel Grade 57 - hot-dip zinc coated commercial steel with a zero spangle surface and with good ductility. Suitable for bending and moderate forming.

Typical Uses

Roll-formed roofing, rainwater goods, HVAC and general manufacturing.

Dimensions				
Typical Thickness (Inches)	Maximum .0237" Minimum .0150"	Typical width	Maximum 48.0000" Minimum 40.5500"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	57	57-67	Carbon (C)	0.10-0.20
Tensile strength, ksi	65	68-78	Phosphorus (P)	0.025
Elongation in 2 inch, minimum %	12	20-34	Manganese (Mn)	1.20
Hardness, HRB	-	66-80	Sulfur (S)	0.030
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40	G30, G60, G90	Bending	2
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
			Roll-forming	3
Chemical treatment	Passivated	Not Passivated	Welding *	4
TruZinc Plus	Resin Coated		Painting **	5
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0359"



TruZinc® Steel Grade 80 (Class 1) Grade Data Sheet

General Description

TruZinc® Steel Grade 80 (Class1) - hot-dip zinc coated structural steel with a zero spangle surface and guaranteed minimum yield strength of 80 ksi with good ductility.

Typical Uses

Roll-formed roofing and decking.

Dimensions				
Typical Thickness (Inches)	Maximum .0249" Minimum .012"	Typical width	Maximum 48.9" Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	80	91-117	Carbon (C)	0.20
Tensile strength, ksi	82	95-120	Phosphorus (P)	0.04
Elongation in 2 inch, minimum %	-	-	Manganese (Mn)	1.35
Hardness, HRB		85-99	Sulfur (S)	0.04
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90	Bending	2
Tension leveling	Leveled		Drawing	NR
Surface conditioning	Not Skin-passed	Skin passed, (paint line feed)	Pressing	NR
			Pittsburgh Lock Seam	NR
Chemical treatment	Passivated	Not Passivated	Roll-forming	4
			Welding *	5
TruZinc Plus	Resin Coated		Painting **	5
Oiling	Not Oiled	Oiled		
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0249"

TruZinc® Steel Grade CS (Type A) Grade Data Sheet

General Description

TruZinc® Steel Grade CS (Type A) - hot-dip zinc coated commercial steel with a zero spangle surface and with good ductility. Suitable for bending and moderate forming.

Typical Uses

Roll-formed roofing, rainwater goods, HVAC and general manufacturing.

Dimensions				
Typical Thickness (Inches)	Maximum .039"	Typical width	Maximum 48.9"	
	Minimum .012"		Minimum 28"	
Maximum and minimum thicknesses outside the typical range stated above may be supplied on an inquiry basis only.				
Mechanical Properties			Chemical Composition	
Steel base	Guaranteed Minimum	Typical	Maximum Percent by Weight	
Longitudinal tensile				
Yield strength, ksi	-	35-57	Carbon (C)	0.10
Tensile strength, ksi	-	53-65	Phosphorus (P)	0.030
Elongation in 2 inch, minimum %	-	25-40	Manganese (Mn)	0.60
Hardness, HRB	-	50-67	Sulfur (S)	0.035
Supply Condition	Standard	Optional	Fabricating Performance (1-Limited to 5-Excellent, NR-Not Recommended)	
Coating class	G40, G60	G30, G90	Bending	5
Tension leveling	Leveled		Drawing	2
Surface conditioning	Not Skin-passed	Skin passed,	Pressing	2
		(paint line feed)	Pittsburgh Lock Seam	5
Chemical treatment	Passivated	Not Passivated	Roll-forming	5
TruZinc Plus	Resin Coated		Welding *	5
Oiling	Not Oiled	Oiled	Painting **	5
Branding	Not Branded			

Optional supply conditions and coating classes may be subject to dimensional restriction.

* Design must allow for some strength reduction near welds.

** Thickness range suitable for organic coil coating is 0.0140" to 0.0359"

Safety Data Sheet

TruZinc® Steel

Section 1 - Chemical Product and Company Identification

Product name	TruZinc® Steel
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	06/01/2015
Reference No.	200000000002
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and manganese pneumonia. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with

unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6	Balance	99.00
Carbon	7440-44-0		0.3
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.1
Base metal will vary.			
Metallic Coating			
Aluminum	7429-90-5	0.10	0.50
Zinc (Reportable as a fume or dust)	7440-66-6	99.20	99.5
Antimony & Compounds (as Sb)	7440-36-0	0.01	0.05
Iron	7439-89-6		0.02

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: N/A

Appearance: Silver, bright crystalline appearance.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000N/A

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index: N/A

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate:

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m³) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)

Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Antimony & Compounds (as Sb)	No Information	.5 TWA	.5 TWA
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

Safety Data Sheet

TruZinc® Plus Steel, ReziBond®

Section 1 - Chemical Product and Company Identification

Product name	TruZinc® Plus Steel, ReziBond®
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	07/07/2015
Reference No.	200000000005
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and manganese pneumonia. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with

unprotected skin may result in skin irritation. Torchng or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6	Balance	99.00
Carbon	7440-44-0		0.03
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.10
Note: Base Steel may contain the following trace or residual elements: Chromium(0.10% max), Copper(0.12% max), Molybdenum (0.10% max), Nickel (0.12% max), Columbium (0.06% max), Tin (0.03% max), Titanium (0.06% max), and Vanadium (0.08% max).			
Metallic Coating			
Aluminum	7429-90-5	0.10	0.50
Zinc (Reportable as a fume or dust)	7440-66-6	99.2	99.5
Antimony & Compounds (as Sb)	7440-36-0	0.01	0.05
Iron	7439-89-6		0.02
Surface Coating			
Chromium Phosphate	7789-04-0	0.72	3.61
Chromic Acid	1333-82-0	2.78	5.56
Zinc Phosphate	13598-37-3	3.50	12.78
Non-Hazardous			
The weight percentages of this compound may be below the levels for which reporting of exact percentages is required in Section 313 of SARA 40CFR Part 372.38.			

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: Silver, bright crystalline appearance.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000N/A

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index: N/A

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate:

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m3) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)
Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Antimony & Compounds (as Sb)	No Information	.5 TWA	.5 TWA
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Surface Coating			
Chromium Phosphate	No Information		
Chromic Acid	No Information	.01	.05
Zinc Phosphate	No Information		
Non-Hazardous			

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

TruZinc® Plus Steel

Guidelines for the Effective Use of TruZinc® Plus Steel

1.0 Properties of TruZinc Plus Steel.

The TruZinc Plus Steel coating is a specially formulated water-based resin-chrome film, which is factory applied over a bare TruZinc Steel surface. In the cured state, the coating is colorless and odorless.

The resin film has excellent adhesion to the substrate with very good impact resistance, flexibility, roll formability, storage stain corrosion resistance (far superior to conventional passivation), and anti-fingerprinting properties. When it is used without post painting, the natural weathering process will typically not affect the surface appearance for at least 12 months.

1.0.1 Factory Production of TruZinc Plus Steel.

The clear resin film is applied wet, using state-of-the-art roll coaters. The roll coaters are similar in design and operation to those used on a coil coating line. The film is cured using computer-controlled ovens. This ensures that optimum coating properties are achieved prior to rewinding and shipping.

1.1 Field Painting Guidelines.

1.1.1 Wet Painting.

TruZinc Plus Steel can typically be painted, provided paint manufacturers recommendations are followed and appropriate consideration is given to environmental conditions, end use, location and product application. Given the wide variety of available paint systems and applications, testing for specific compatibility is highly recommended. Traditionally, TruZinc Steel requires the surface to be painted also be washed with a suitable solvent to remove traces of residual roll forming lubricant, and suitable metal primer is applied before the application of a decorative topcoat.

TruZinc Plus Steel removes the requirement to use solvent to clean up surfaces. A simple detergent wash is satisfactory, and generally eliminates the need to prime the surface. TruZinc Plus Steel can typically be over-painted with a high quality water based acrylic topcoat without priming, provided a lubricant has not been used in the forming process and the surface is

clean and dry. Again, given the wide variety of available paint systems and applications, testing for specific compatibility is highly recommended.

Solvent based finish coat systems may be used, however, these must be applied after the material has been primed with a compatible water based, solvent resistant primer. If the material is correctly primed a number of coats may be applied. Surface preparation and priming must be in accordance with the paint manufacturer's instructions.

1.1.2 Powder Coating.

TruZinc Plus Steel is suitable for direct powder coating, provided the surface to be coated is clean and powders requiring a peak metal temperature in excess of 390°F are not used. It is recommended that a brief water wash serve as the only pretreatment step, rather than another form of solvent-based cleaning solution. Please contact our Sales Department to discuss a program to trial TruZinc Plus Steel for these applications.

1.2 Roll forming Characteristics.

Lubricants are rarely required during the roll forming of TruZinc Plus Steel because the clear resin film acts as a solid lubricant. The need for additional lubricant must be determined, however, on a case-by-case basis. Variables that should be considered include roll former design, (number of stands and severity of each incremental shape change) speed, surface condition of rolls and general machine maintenance. Most common roof and sidewall trapezoidal shapes do not require additional lubrication if the roll former is well maintained and correctly set up. Very severe profiles may require a small amount of spot lubricant at the heaviest worked points.

The Benefits of Using TruZinc Plus Steel Include:

- No Pickup - The reduction or absence of pickup during forming due to the resin film means the reduction or elimination of time-consuming cleanup.
- Increased Tool Life - Reduced pickup combined

with the lubricating benefits of the resin film will contribute to improved tool life in manufacturing and roll forming applications.

- **Scheduling Flexibility** - TruZinc Plus Steel can typically be roll formed interchangeably with pre-painted feed, avoiding the need for intermediate roll cleaning. This provides greater scheduling flexibility.
- **Removal of Hazardous Work Place Chemicals** - Hazardous substances such as kerosene and other lubricants can be removed from the work environment, improving occupational health and safety practices.
- **Less Slippery** - The resin film is less slippery than a lubricated steel surface particularly with the absence of residual lubricant left over from roll forming. This will make the product safer to walk on while installing, particularly in wet conditions.
- **Improved Final Appearance** - Residual lubricants can often create a patchy visual appearance as the result of uneven drying off of the lubricant. This problem can usually be avoided with TruZinc Plus Steel.

1.3 Resistance to Marking.

TruZinc Plus Steel resists marking and stains occurring during manufacturing, handling or fixing. The coating acts as a surface sealant, increasing protection of the metal surface from hand and boot marking.

1.4 Wet Stack Storage Stain Resistance.

The resin coating provides an increased resistance to wet stack storage stain. Such stains appear white, gray or black, and are caused when the material is packaged and subjected to moisture ingress between production and final use. The coating acts as a barrier coat, minimizing aesthetic degradation.

1.5 Installation of TruZinc Plus Steel

1.5.1 Flashings.

The recommendations for flashing TruZinc Plus Steel are the same as for TruZinc Steel. Using TruZinc Plus Steel or TruZinc Steel in areas subject to water runoff from ZINCALUME®, Pre-painted ZINCALUME, Pre-painted TruZinc Steel or aluminum coated steel should be avoided. TruZinc Plus Steel and TruZinc

Steel are not subject to pitting corrosion when used alongside lead or copper components. Similar to other metallic building materials, TruZinc Plus Steel and TruZinc Steel should not be used in direct contact with green, wet or chemically treated wood products.

1.5.2 Sealants.

Experience shows that TruZinc Plus Steel is compatible with polyurethane, PVC, and polypropylene, and therefore would likely be compatible with common neutral cure silicone sealants. The adhesion properties of the resin film should be similar to TruZinc Steel.

1.5.3 Fasteners.

Recommended fasteners for TruZinc Plus Steel are the same as for TruZinc Steel.

1.6 Slitting TruZinc Plus Steel.

Where friction drag pads are used to maintain processing tension during slitting/recoiling, pickup of chrome passivant can occur. Some chromate is present in this pickup, as it is with most TruZinc Steel, therefore, the following guidelines are recommended:

1. Use minimal frictional forces on pads.
2. Set minimum pad width 6" to minimize frictional forces if drag pads are used.
3. Encourage use of an appropriate respiratory device for personnel working in close proximity (4-6 Feet) if dust is produced by the drag pad.
4. Remove pickup from drag device and adjacent areas using appropriately designed apparatus.
5. Dispose of drag pads in accordance with environmental or local regulations.

1.7 Welding.

Spot, seam or gas metal arc welding can be carried out successfully on TruZinc Plus Steel with typical resin coating weights. Fume generation may be slightly higher than TruZinc Steel without the coating. All welding should be carried out in well-ventilated areas.

1.8 High Temperatures.

The maximum recommended continuous service temperature is 390°F. Service temperatures exceeding 390°F will be detrimental to the coating. Applications

requiring operating temperatures up to the 500°F safe limit for TruZinc Steel should be specified without the resin film.

1.9 General Corrosion Characteristics.

The TruZinc Plus coating does not improve the general corrosion characteristics of TruZinc Steel except as described in section 1.0. The resin coating has been tested to 1000 hours of UV exposure with no effect on appearance.

1.10 Product Mixing.

TruZinc Steel and TruZinc Plus Steel should not be mixed in adjacent areas on the same building. The different surface finishes, both in the new and weathered conditions, will result in a contrasting appearance, which may be objectionable.

1.11 Visual Reflectivity.

TruZinc Plus Steel reflectivity is similar to standard TruZinc Steel.

1.12 Electrical Conductivity.

The resin film applied to TruZinc Steel can potentially cause an insulating effect between panels in electrical appliance applications. The insulating effect would normally be overcome with welding or mechanical fastening of components. Manufacturers should be advised to ensure products are adequately grounded.

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The information and advice contained in this Technical Bulletin ("Bulletin") is of a general nature only and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.

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PAINTED STEEL

Steelscape is able to paint a wide variety of paint systems. Like the TruZinc® and ZINCALUME® Steel sections, the following pages describe Steelscape's organic coated (painted) steel product. This section contains the Steelscape paint capabilities, the SDS for painted products, and Pre-Painted Technical Bulletin. These documents serve as references when contemplating fit-for-purpose painted applications using our products.

The SDS references the paint systems for both Steelscape metal types and addresses potential health concerns and effects of prolonged exposure to our painted products, or the paint alone. Ingredients, physical and chemical characteristics, potential physical hazards and special protection information is provided. Spill, leak, fire-fighting and emergency contact information is disclosed.

The Pre-Painted Technical Bulletin addresses batch and directionally sensitive paint systems and how best to manage inventory of these products.

Details about our branded, painted steel products including Steelscape Prints®, Rawhide, Vintage® and TruzGuard™ can be found at www.steelscapedesignsolutions.com. Steelscape Design Solutions™ is a portfolio of uniquely painted products offering a multitude of creative design options. Don't be limited to a single color.

Steelscape also offers a standard painted product line called Spectrascape®, available on both ZINCALUME and TruZinc substrate. Spectrascape is available in polyester, silicone polyester and PVDF technology. For more details and warranty information please contact a Steelscape Sales Representative.

PRE-PAINTED STEEL PROCESSING CAPABILITIES

The capability matrix below was designed to help illustrate the painted steel products Steelscape is capable of producing on a consistent basis. These capabilities grow and change with each new successful trial order we process to completion. As we become more proficient in producing product outside the stated capacity limits we will expand this matrix accordingly.

	Kalama	Rancho
Max Entry Coil Wt	58,000 #	ZINCALUME® 44,000 #, TruZinc® 37,000 #, External supplied 20,000 #
Max Output Coil Wt*	33,000 #	20,000 #
Minimum Lineal Footage**	1,600 ft.	1,600 ft.
Thickness***	0.0115" - 0.039"	Steel: 0.0115" - 0.046" Al: 0.021" - 0.063"
Width***	26" - 51" (22" trial only)	24" - 58"
Pretreatment	Chemetall 1500	Chemetall 1500
Substrates	TruZinc (galvanized), ZINCALUME (Galvalume®), Cold-Rolled	TruZinc (galvanized), ZINCALUME (Galvalume), Cold-Rolled, Aluminum, Stainless, TMBP, EG
Finish Coatings	Acrylic, Polyester, SMP Fluorocarbon, Plastisol	Acrylic, Polyester, SMP Fluorocarbon, Plastisol
Primer Coatings	Urethane, Epoxy, Polyester	Urethane, Epoxy, Polyester
Other Coatings	Resin/Passivant (standard or RoHS) by rare exception	Resin/Passivant (standard or RoHS) by rare exception
Entry OD/ID	81.5" max/20"	79"/20" or 24" +/- 0.50"
Delivery OD/ID	72" max/20"	64" max/20"
Cores	Available	Available
Reverse Wrap	Available	Available****
Branding Ink	UV	Black or UV
Branding Characters	275 Standard Text <small>(Steelscape, KA_CPL, Date/Time)</small>	250 Standard Text <small>(Steelscape, RA_CPL, Date/Time)</small>
Branding Size	½"	½" max
Branding Location	Bottom - 4" in from edge	Bottom - front, center, back

- * If vertical, skidded max weight is 12,500# in Rancho, and 15,000# in Kalama.
- ** Refer to your Steelscape Sales Representative for minimum lineal footage restrictions.
- *** Dimensions are substrate/thickness/width combination dependent.
- **** Requires additional processing to reverse wrap (slitter/embosser).

Steelscape is happy to evaluate requests for steel products not on the current capability matrix. Equipment capacities and hot band supply constraints may impact production capability. Questions regarding our painted steel capabilities should be directed to a Steelscape Sales Representative.

Safety Data Sheet

Painted TruZinc® Steel, Steelscape Prints®, Dazzle®, Vintage®, Steelscape Textures®

Section 1 - Chemical Product and Company Identification

Product name	Painted TruZinc® Steel, Steelscape Prints®, Dazzle®, Vintage®, Steelscape Textures®
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	06/01/2015
Reference No.	200000000009
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and .manganese pneumonia.. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to

aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6	Balance	99.00
Carbon	7440-44-0		0.30
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.10
Note: Base Steel may contain the following trace or residual elements: Chromium(0.10% max), Copper(0.12% max), Molybdenum (0.10% max), Nickel (0.12% max), Columbium (0.06% max), Tin (0.03% max), Titanium (0.06% max), and Vanadium (0.08% max).			
Metallic Coating			
Aluminum	7429-90-5	0.1	0.5
Zinc (Reportable as a fume or dust)	7440-66-6	40.00	48.00
Antimony & Compounds (as Sb)	7440-36-0	0.01	0.05
Iron	7439-89-6		0.02
Surface Coating			
Polyester, siliconized polyester, alkyd, fluorocarbon(PVDJ), epoxy, urethane, latex or acrylic paints and primers			0.01
Polyvinyl Chloride	9002-86-2		0.01
Polyethylene film	9002-88-4		0.01
Strontium Chromate-7789-06-2	7789-06-2		0.10
The weight percentages of these compounds are below the levels for which reporting of exact percentages is required in Section 313 of SARA 40CFR Part 372.38			

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: Thin sheet metal color, varies w/ topcoat used.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000N/A

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index: N/A

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate: N/A

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m3) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)
Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Antimony & Compounds (as Sb)	No Information	.5 TWA	.5 TWA
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Surface Coating			
Polyester, siliconized polyester, alkyd, fluorocarbon(PVDJ),e poxy, urethane, latex or acrylic paints and primers	No Information	Not Established	Not Established
Polyvinyl Chloride	No Information		
Polyethylene film	No Information	Not Established	Not Established
Strontium Chromate- 7789-06-2	No Information	Not Established	Not Established

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

Safety Data Sheet

Painted ZINCALUME® Steel, Steelscape Prints®, Steelscape Textures®

Section 1 - Chemical Product and Company Identification

Product name	Painted ZINCALUME® Steel, Steelscape Prints®, Steelscape Textures®
Manufacturer	Steelscape, LLC 222 West Kalama River Road Kalama, WA 98625
Revision Date	06/01/2015
Reference No.	200000000008
Emergency Contact:	CHEMTREC (24 hours) 1-800-424-9300

Section 2 - Hazards Identification

GHS Label Elements:

Hazard Pictograms:



Signal Word:

Warning

Hazard Statement:

Does not pose a health hazard in its normal form. Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user. A non-metallic passivation treatment is normally applied based upon customer/end use criteria. These non-metallic coatings may contain hazardous substances of varying amounts. During processing, substances of varying chemical composition and quantity may be generated by the surface passivant. MSDS information regarding the surface passivant shall be supplied to the user upon request.

Carcinogenicity:

Certain chromium and nickel compounds as well as organic compounds found in various coating materials have been listed as carcinogens by the NTP, IARC, or OSHA.

Medical Conditions Aggravated by Long Term Exposure:

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Chronic Effects:

Chronic inhalation concentrations of iron oxide fumes or dusts may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Chronic inhalation concentrations of aluminum fumes or dusts may lead to a fibrotic lung condition known as Shaver's disease; however, evidence for this is not conclusive since affected workers were exposed to other substances (silica) as well. The inhalation of high concentrations of dust from manganese, copper, lead and/or zinc in the respirable particle size range can cause an influenza-like illness termed metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in mouth, dryness and irritation of the throat, followed by weakness, muscle pain, fever and chills. Continuous exposures to high concentrations of manganese can cause central nervous system disorders and .manganese pneumonia.. Fibrosis of lung tissue from manganese exposure has also been reported for products containing manganese only. Overexposure to

aluminum dust can cause shortness of breath. Long term inhalation exposure to high concentrations (overexposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects. Prolonged or repeated contact with unprotected skin may result in skin irritation. Torching or burning operations on steel products with oil or organic coating may produce emissions which can be irritating to the eyes and respiratory tract.

Precautionary Statement:

Inhalation of metal dust and fume may result from further processing by the user, particularly during welding, burning, grinding and machining activities. These potential health hazards should be evaluated by the user.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS-No.	Weight%	
		Min	Max
Base Metal			
Iron	7439-89-6	Balance	99.00
Carbon	7440-44-0		0.30
Manganese Compounds (as Mn)	7439-96-5		1.2
Phosphorus	7723-14-0		0.15
Sulfur	7704-34-9		0.05
Silicon	7440-21-3		0.05
Aluminum	7429-90-5		0.10
Note: Base Steel may contain the following trace or residual elements: Chromium(0.10% max), Copper(0.12% max), Molybdenum (0.10% max), Nickel (0.12% max), Columbium (0.06% max), Tin (0.03% max), Titanium (0.06% max), and Vanadium (0.08% max).			
Metallic Coating			
Aluminum	7429-90-5	51.00	58.00
Zinc (Reportable as a fume or dust)	7440-66-6	40.00	48.00
Silicon	7440-21-3	1.30	1.90
Iron	7439-89-6		0.02
Surface Coating			
Polyester, siliconized polyester, alkyd, fluorocarbon(PVDJ), epoxy, urethane, latex or acrylic paints and primers			0.01
Polyvinyl Chloride	9002-86-2		0.01
Polyethylene film	9002-88-4		0.01
Strontium Chromate-7789-06-2	7789-06-2		0.10
The weight percentages of these compounds are below the levels for which reporting of exact percentages is required in Section 313 of SARA 40CFR Part 372.38			

Section 4 - First Aid Measures

Eye contact:

Treat any foreign body in eye by flushing with large amounts of water. Seek medical attention immediately.

Skin contact:

Skin hazards are not expected. However, should dermatitis develop, affected area should be washed with mild soap and water. If irritation or other symptoms develop, seek medical attention. Precautions should be taken to protect against sharp steel edges. If the skin is abraded by handling, seek medical attention.

Ingestion:

Ingestion hazards are not expected.

Inhalation:

For treatment of overexposure to fumes and/or particulates, remove exposed individual to fresh air and seek medical attention. Administer artificial respiration or oxygen if breathing is difficult or has stopped.

Section 5 - Fire-Fighting Measures

Not flammable or combustible. Steel products in the solid state present no fire or explosion hazard and do not contribute to the combustion of other materials.

Section 6 - Accidental Release Measures

Not applicable to this metal in its solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Section 7 - Handling and Storage

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing fumes and/or dust.

Section 8 - Exposure Controls / Personal Protection

Respiratory protection:

NIOSH/MSHA approved dust and fume respirators should be used to avoid excessive inhalation of particulates. Appropriate respirator selection depends on the magnitude of exposure.

Hand protection:

Protective gloves should be worn as required for welding, burning or handling operations. If material is supplied with oil or other organic coating, wear protective gloves. However, do not continue to use gloves or work clothing that have become saturated with oil. Wash hands and any additional contact areas with soap and water or waterless hand cleaner.

Eye protection:

Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.

Engineering measures:

Local exhaust ventilation should be provided when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.

Personal protection equipment:

Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Avoid breathing fumes and/or dust.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: Thin sheet metal color, varies w/ topcoat used.

Odor: None

Vapor Pressure (mm Hg): N/A

Vapor Density (air = 1): N/A

Formula Weight: N/A

Density: N/A

Sp. Gravity(H₂O = 1): 7.8000N/A

pH: N/A

Water Solubility: Insoluble

Other Solubilities: N/A

Boiling point/range: N/A

Freezing/Melting Point: N/A

Viscosity: N/A

Refractive Index: N/A

Surface Tension: N/A

% Volatile: N/A

Evaporation Rate: N/A

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal conditions of use, storage and transport.

Hazardous Conditions to Avoid:

Will react with strong acid to liberate hydrogen. Finely divided material may react with water, strong oxidizers, alkaline, and hydrogenated compounds. At temperatures exceeding the melting point of the metallic coating, fumes may be liberated which contain oxides of the metallic coating constituents. At temperatures exceeding the melting point of the base metal, fumes may be liberated which contain oxides of iron and other steel alloying elements.

Section 11 - Toxicological Information

Ingredient Name	LD50 or LC50 Species /Route	OSHA PEL	ACGIH TLV(mg/m3) (TWA unless specified)
Base Metal			
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Carbon	No Information	Not Established	Not Established
Manganese Compounds (as Mn)	rat/oral 9 mg/kg	5 ceiling as Mn	5 Dust as Mn 1 Fume as Mn 3 Fume as Mn (STEL)
Phosphorus	No Information	.1 Total	Not Established
Sulfur	No Information	15 Total Dust	13 as SO ₂
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Metallic Coating			
Aluminum	No Information	10 Total Dust 5 Respirable Fraction	10 Metal Dust as Al
Zinc (Reportable as a fume or dust)	No Information	5 Fume as ZnO	5 Fume as ZnO
Silicon	No Information	15 Total Dust 5 Respirable Fraction	10 Total
Iron	mouse/oral 5.4 mg/kg	10 Iron Oxide Fume	5 Iron Oxide Fume as Fe
Surface Coating			
Polyester, siliconized polyester, alkyd, fluorocarbon(PVDJ),e poxy, urethane, latex or acrylic paints and primers	No Information	Not Established	Not Established
Polyvinyl Chloride	No Information		
Polyethylene film	No Information	Not Established	Not Established
Strontium Chromate- 7789-06-2	No Information	Not Established	Not Established

Section 12 - Ecological Information

No data available for product as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Section 13 - Disposal Consideration

Scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Section 14 - Transport Information

Not listed as a hazardous substance under 49 CFR 172.101.

Section 15 - Regulatory Information

SARA 311/312 Codes (40CFR370): Immediate (acute) health hazard and delayed (chronic) health hazard. SARA 313 (40CFR372.65): Manganese and Lead are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed. OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

Section 16 - Other Information

Proposition 65 Statement:

WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This Safety Data Sheet (SDS) has been prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. This SDS represents products which may contain toxic chemicals.

The information contained in this SDS was obtained from sources which are believed to be reliable by the manufacturer. However, the information is provided without any responsibility or warranty, expressed or implied regarding its accuracy or correctness. The conditions or methods of handling, storage, use and disposal of this product are beyond the knowledge of the manufacturer. For this and other reasons, the manufacturer does not assume responsibility and expressly disclaims liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

Pre-Painted Product

Batch to Batch Variability: “Do Not Mix” and “Directional” Paint Systems

1.0 Introduction.

Due to the chemical and physical variability within certain paint systems and slight process equipment changes from one production run to another, there are some products whose appearance may not be the same from order to order. This technical bulletin describes those items Steelscape does not guarantee as reproducible and guidelines for avoiding mixed orders on jobsites.

1.1 Metallic/Mica Paints.

The metallic/mica family of paints is inherently variable in appearance due to not only the physical shape of the pigment particles but also their behavior during the application process. The individual pigment particles are flat in nature allowing for light to reflect off of them at various angles. They are also typically larger in size than non-metallic pigments. The specific orientation of these pigment particles affects how the final paint system appears visually to the human eye.

The exact size and orientation of these pigment particles cannot be completely controlled during the paint manufacturing process, thus each paint batch of metallic/mica paint, even though the same color may have a slight visual difference.

When the paint is applied during the coil coating process, the final directional orientation of these pigments cannot be controlled. This results in slight visual variations from one production run to another, even if the same batch of paint is used. This phenomenon is also responsible for the slight color shift observed when viewing a metallic/mica painted panel in the coil rolling direction versus perpendicular to coil rolling direction. Steelscape does not accept responsibility for material appearance when the architectural design requires panels to be offset (i.e. perpendicular) from adjoining panels, resulting in visual differential in color and or reflectivity.

It is important that the end user does not rotate panels in the cases of symmetrical roll form patterns to avoid obvious color and light differential within the structure. The use of directional arrow branding

on the bottomside of metallic material is highly recommended.

1.2 Printcoat Paint Systems (including Steelscape Prints®).

Printcoat paint systems consist of a base coat of color and then a pattern of a different color over the top, which allows multiple colors to be visible on the finished product. Order to order variability in this process originates from several sources.

Print Roll Speed: The patterned roll used to create the print effect must be moving as close to the same speed at the coil strip during production. Although every measure is taken to align these two speeds there are slight differences from one production run to another which may result in slight pattern differences.

Paint Viscosity: The viscosity of the paint being used for the print portion of the order will vary slightly from order to order and paint batch to paint batch. The viscosity of the paint on the print roll will affect the look of the final pattern; often resulting in a “lighter” or “heavier” pattern.

Print Roll Pressure: In order for the pattern to transfer from the print roll to the coil strip pressure is applied between the two. The amount of pressure controls the amount of paint film applied to the strip as well as the look of the pattern. This pressure will fluctuate slightly between production runs resulting in slightly different pattern appearances.

1.3 ReziBond®, Vintage® and TruzGuard™ Coatings.

The ReziBond, Vintage and TruzGuard coatings are inherently variable in appearance due to the coatings’ composition and application process. The make-up of these specialized coatings, while guaranteed within an approved color range, cannot be completely controlled during the paint manufacturing process. As such, each coating batch may have a slight visual difference.

These slight visual variations from one production run

to another can occur even if the same batch of the coating is used. This phenomenon is also responsible for the slight color shift observed when viewing a coated panel in the coil rolling direction versus perpendicular to coil rolling direction. Steelscape does not accept responsibility for material appearance when the architectural design requires panels to be offset (i.e. perpendicular) from adjoining panels, resulting in visual differential in color and or reflectivity.

It is important that the end user does not rotate panels in the cases of symmetrical roll form patterns to avoid obvious color and light differential within the structure.

1.4 ZINCALUME® or TruZinc® Plus

The color of both the metallic coated substrate and acrylic resin can vary slightly between production runs. In addition, the spangle size on ZINCALUME varies slightly between orders. These visual differences can be even more apparent between suppliers.

2.0 Guidelines for Avoiding Mixed Orders on Jobs.

Inventory and order size are critical for ensuring that mixed batches of variable painted and/or coated product do not get used at a jobsite. If the paint system or specialized coating is a standard or stock item, order large quantities at a time; this will allow for fewer batches in inventory and reduce the risk of mixed orders on a job.

If the item is a custom color or print requiring established minimum linear feet, order slightly more linear feet than the job requires. This will allow any damaged or defective material to be replaced from the same production run.

If it is absolutely necessary to use more than one order of a metallic/mica, printcoat or specialized coating on a job compare the different available batches carefully; some batches may be a better match than others. Also, using different batches on trim, accessories or on separated portions of a building may not be visually objectionable.

If a project cannot be completed without ordering additional material, it is imperative that Steelscape be notified of the situation and told which previous order needs to be matched. Although Steelscape will not guarantee a match on metallics/micas, print-coats or specialized coatings, every effort will be made to duplicate the desired color as closely as possible.

Steelscape strongly recommends the use of branded, directional arrows on metallic, micas, Vintage and TruzGuard coated coils.

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The information and advice contained in this Technical Bulletin ("Bulletin") is of a general nature only and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.

Steelscape, LLC makes no warranty as to the accuracy, completeness or reliability of any estimates, opinions or other information contained in this Bulletin and to the maximum extent permitted by law, Steelscape, LLC disclaims all liability and responsibility for any loss or damage, direct or indirect, which may be suffered by any person acting in reliance on anything contained in or omitted from this Bulletin.

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	ZINCALUME® Bare	ZINCALUME® Painted‡	TruZinc® Bare	TruZinc® Painted‡
ORDER ENTRY (in 000's)				
Minimum Order Size~°	50	25	50	25
Order Increments~°	50	25	50	25
Minimum Coil Size	7	7	7	7
Maximum Coil Size	25	20^	50	20^
SURFACE TREATMENT				
Skin Passing	•	•	•	•
Passivation	•		•	
Oil	•		•	
Resin (clear & tinted)+	•		•	

° **BARE COIL:** Widths in the 26" - < 31" range must have a minimum order size of 35K lbs. with additional order increments of 35K lbs. Widths in the 31" - <35" range must have a minimum order size of 40K lbs. with additional order increments of 40K lbs. Widths in the 35" - 38" range must have a minimum order size of 45K lbs. with additional increments of 45K lbs. Please note that we do have significant quantities of steel sourced that have order increments smaller than this stated guideline. We will make every effort to match the quantity you require, but may need to make order quantity adjustments for items using this supply chain.

~ **PAINTED COIL:** Painted steel orders must utilize an entire hot roll coil, based on the bare product width ranges provided above (see the ° footnote). The minimum order size for painted steel is ½ the bare order size IF accompanied by a second order of painted product for the same specification using the remainder of the hot roll coil.

^ If vertical, skidded max weight is 12,500# in Rancho and 15,000# in Kalama.

* For TruZinc and ZINCALUME Steel, .0356 & > is considered non-surface critical. Consult your Steelscape Account Manager for details.

+ Resin coated and mill-applied coated product lead times may vary based on accumulation of a minimum tonnage requirement.

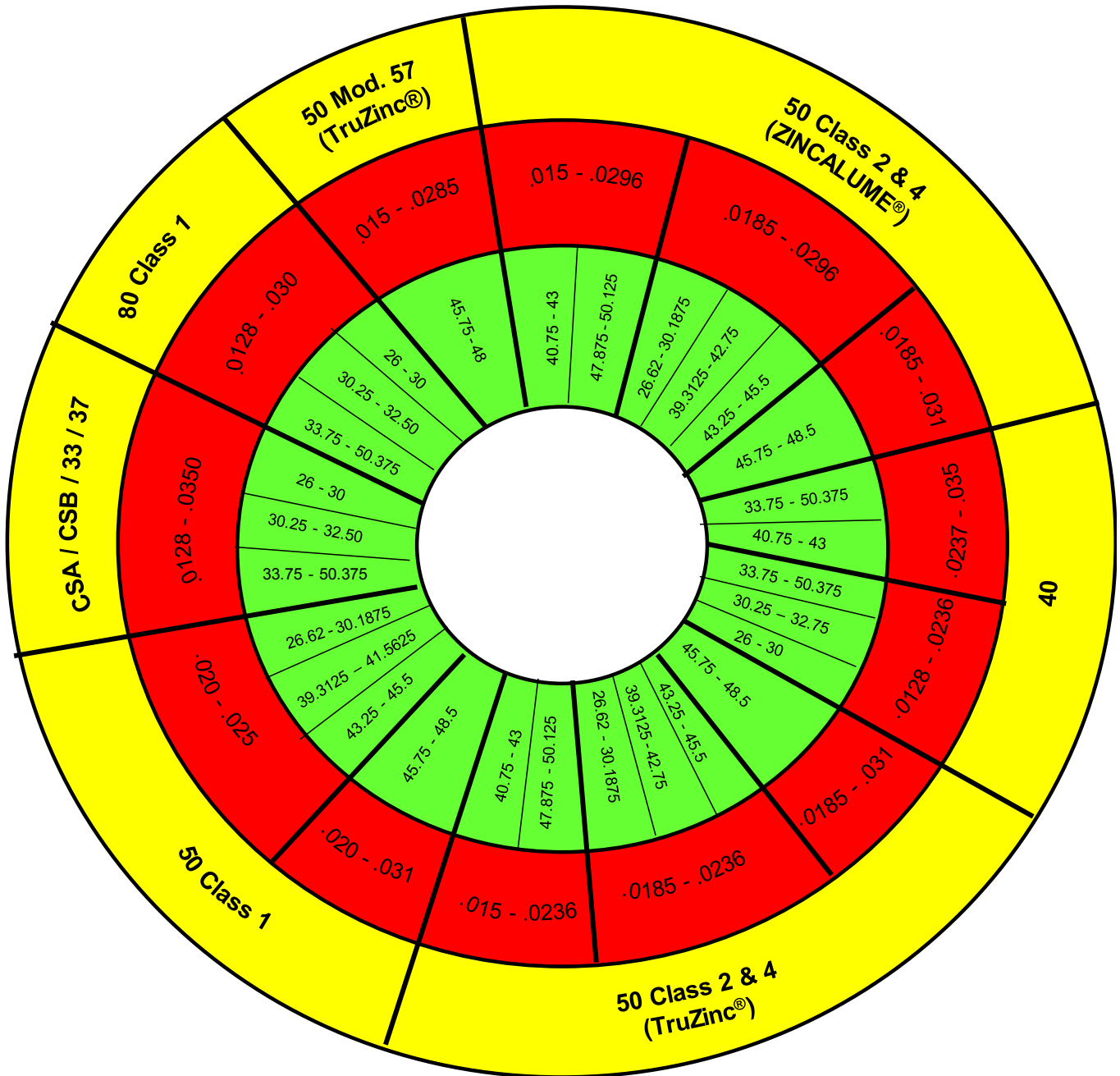
‡ For painted steel thickness >.030", consult your Steelscape Account Manager. Paint systems and color MUST be pre-approved by Steelscape Quality Systems prior to order.

Please reference Steelscape's website, www.steelscape.com, for full offer details on both bare and painted product.

STANDARD PRODUCT OFFER

Steelscape designed the Standard Product Offer to streamline and categorize our many products into frequently requested offerings. This offer maximizes Steelscape's ability to reliably and quickly process customer orders and deliver quality metallic-coated and painted steel products. The Standard Product Offer also allows Steelscape to effectively serve customer needs and deliver superior service.

The Product Offer groups products according to coil thickness, width, metal coating type and product grade. This grouping targets our customers' inventory management, product range and purchasing needs. The offer is a robust selection with very competitive lead-times. Please inquire for products not listed.



This diagram illustrates Steelscape's Standard Product Offer and is subject to change. Steelscape welcomes "trial orders" on a conditional basis.



STEELSCAPE VALUE-ADD PROCESSES

Steelscape values innovation and progress. In every industry, yes—even steel, there are vast opportunities for advancement, growth and overall improvement both in products and processes. However, in most cases, these opportunities do not come easily. It takes time, effort and dedication to find and develop these opportunities into something that is attainable and real. Steelscape, in an effort to lead the steel industry in this innovative quest, devotes resources to doing just that. And the result over the past several years has been a host of new products and processes that Steelscape is now offering to you.

The following pages outline some of the many additional processes that Steelscape has to offer. While not every new development is listed in the section, it should provide you with a brief look at some of the work Steelscape has been doing over the past few years. We highlight our value-add processes such as slitting, embossing, cut-to-length and mill applied coatings.

To learn more about Steelscape’s value-added processes, contact a Steelscape Sales Representative. And, as always, any suggestions for new products or processes are always welcome!

Cut-to-Length Sheet

Steelscape provides Cut-to-Length Sheet as a Value Add Service. The Cut-to-Length line is also capable of shearing material. The following matrix shows the Cut-to-Length capabilities for our only CTL line, located in Kalama, WA.

	Kalama
Max Entry Coil Weight	60,000 #
Max Shear Strength	50 KSI
Max Yield Strength	65 KSI (90 KSI up to .030" thick)
Thickness (T)	0.010" - 0.050"
Width	12" - 60"
Max Pallet Weight	15,000 #
Min. Cut Length	96"
Max. Cut Length	120" (up to 150" - trial only)
Entry OD/ID	84"/20" +/- 0.5"
Max Stack Height	24" with skid
Strippable Film**	48" (-0.25"/+0.375")

- * Maximum thickness is limited for fluorocarbon paint systems due to concern with scratching top surface upon stacking. Inquire with your Steelscape representative for painted product greater than 0.0236" ordered thickness.
- ** Standard width is 48", it can be made available in any width up to 60".

Slitting

Steelscape provides Slitting as a Value Add Service to all customers. The following matrix shows our slitting capabilities by facility. Should you have any questions regarding our slitting capabilities, please contact your Steelscape Sales Representative.

	Kalama	Rancho
Max Entry Coil Weight	55,000 #	20,000 #
Max Delivery Weight	55,000 #	20,000 #*
Thickness (T)	0.010" - 0.050"	0.008" - 0.074"
Width	16" - 52"	12" - 52"
Max number Mults	24	20 if .025"<T<.050" 40 if T<.025"
Maximum # sizes per setup	Depends on knives & size of mults	Depends on knives & size of mults
Minimum Slit Width (W)	1.25"	1.25"
Entry OD/ID	79" max**/20"	64" max/20"
Delivery OD/ID	79" max***/20"	64" max/20"
Cores**	W > 6", T < 0.030"	Inquire for minimal widths (W)
Min. Slit Drop	0.375"	0.375"

- * If vertical, skidded maximum weight is 12,500#.
- ** OD max depends on number of mults and crown in the coil.
- *** Cores are "all or nothing" for the whole arm of mults (i.e. if one mult on the arm is less than 6", then none of the mults on the arm can have cores). Please inquire for cores < 6" out of Kalama or < 10" out of Rancho due to safety issues.

Embossing

Steelscape provides Embossing as a Value Add Service to all customers. The following matrix shows our embossing capabilities at our Rancho Cucamonga, CA, facility. Should you have any questions regarding our embossing capabilities, please contact your Steelscape Sales Representative.

	Rancho
Pattern	Directional Stucco
Max Entry Coil Wt	40,000 #
Max Output Coil Wt	12,500 #
Thickness	0.0100" - 0.0239** 0.0240" - 0.0329***
Width	24" - 48"
Depth	.007" up to .012" thick
Substrates	TruZinc (HDG), ZINCALUME (Galvalume), CRS, ALUM****
Entry OD/ID	20"
Delivery OD/OD	OD 64"/ID 20"
Cores	Available
Reverse Wrap	Available
Packaging	Vertical Only****

- * For 24" - 48." widths only.
- ** For 24" - 40.99" widths only.
- *** Grade/hardness restrictions may apply to some substrates. Cannot process Grade 80 steel.
- **** Embossed material will collapse if packaged longitudinally.

PRODUCT OPTIONS

Skin Passing

Skin-passing is a critical step to achieving superior surface quality, especially for painted steel products. It is important to define whether a product should be skin-passed when placing an order.

Recommendations for skin-passing are as follows:

- All painted products must be skin-passed. Any question as to skin-passing necessity should be referred to our Sales or Technical Sales Dept. prior to placing an order.
- Resin coated products should not be skin-passed as it is very difficult to measure the resin coating thickness
- Skin-passing produces an extra smooth bare product and is especially beneficial for painted products.

Chemical-Treatment & Oiling

Chemical-treatment and oiling are also critical steps in the metallic coating process. Both processes lengthen finished product shelf life and help to prevent field rejections due to rust. Oil is important in cases where resin is not available and self-lubricating surface characteristics are desired. It is important to specify whether a product should be chemically-treated and/or oiled when placing an order.

Recommendations when chem-treating or oiling are as follows:

- Any questions regarding oiling or chemical-treatment necessity including RoHs compliances should be referred to our Technical Sales Department. We have several options available.
- All resin-coated products (TruZinc® Plus and ZINCALUME® Plus) should not be oiled. Oiling is unnecessary and makes the resin-coated surface too slick.
- Some bare, chemically-treated (non-resin) products require light to medium oiling so adequate lubricating properties are achieved for downstream processing.
- All other bare products should be chemically-treated.

Theoretical Minimum Weight

Steelscape provides ZINCALUME® and TruZinc® Steel products on both an actual weight and TMW (theoretical minimum weight) basis. Many of our customers sell their products on a lineal footage basis and it makes sense to purchase the same way. TMW pricing permits customers to pay for the lineal feet of coated steel in a particular coil (or order). If the steel is slightly thicker than the minimum dimensions ordered customers do not pay for the excess. Customers are charged only for the lineal feet received. There is a small extra charge for the added feature of TMW pricing and customers should contact your Steelscape Sales Representative for details.

For customers buying and selling steel on an actual weight basis our standard pricing uses the actual weight of each coil (or order) to calculate the invoiced price. Steelscape calculates the price of TMW products as follows:

TruZinc® Steel

$pst = \text{density of steel and zinc coating} = 0.2833 \text{ lb/in}^3$

$\chi = \text{ordered width of steel (inches)}$

$\tau = \text{ordered thickness of steel (inches)}$

$\delta = \text{actual lineal feet of steel (feet)}$

Theoretical Minimum Weight (lb) = $pst \cdot \chi \cdot \tau \cdot \delta \cdot 12$

Gauge x Width x 12 x .2833 = TMW

Example: ordered width = 48", ordered thickness = 0.019", actual lineal feet in coil = 5,500

TMW = $0.2833 \cdot 48 \cdot 0.019 \cdot 5500 \cdot 12 = 17,052.4 \text{ lb}$

ZINCALUME® Steel

$pst = \text{density of steel} = 0.2833 \text{ lb/in}^3$

$\rho\text{ZINCALUME} = \text{density of zinc-aluminum coating} = 0.1355 \text{ lb/in}^3$

$\beta = \text{thickness of ZINCALUME AZ50 coating} = 0.0016"$

$\chi = \text{ordered width of steel (inches)}$

$\tau = \text{ordered thickness of steel (inches)}$

$\delta = \text{actual lineal feet of steel (feet)}$

Theoretical Minimum Weight (lbs) = $[pst \cdot (\tau - \beta) + (\beta \cdot \rho\text{ZINCALUME})] \cdot \chi \cdot \delta \cdot 12$

example: ordered width = 48", ordered thickness = 0.019", actual lineal feet in coil = 5,500

TMW = $[0.2833 \cdot (0.019 - 0.0016) + (0.0016 \cdot 0.1355)] \cdot 48 \cdot 5500 \cdot 12 = 16,293 \text{ lb}$

Resin Coating

Steelscape offers a clear resin coating on ZINCALUME® Steel product called ZINCALUME® Plus Steel. We also offer a resin coated TruZinc® Steel, TruZinc® Plus. The resin coating is water-based and is 0.031 to 0.060 mils thick. The resin coating is applied in-line to both top and bottom surface. It is formulated to resist finger printing and scuffing during product handling in addition to improving resistance to wet-stack stains occurring during transport and storage. ZINCALUME Plus and TruZinc Plus Steel virtually eliminates the need for roll forming lubricants.

Steelscape requests that customers notify them if any adhesion properties are required of either ZINCALUME Plus or TruZinc Plus steel products at the time of placing an order. Depending on the adhesion properties required, a different resin system may need to be applied.

Several other, specialty resins are available, including tinted products. Please inquire with your Steelscape Sales Representative for additional information.

Fluting vs. Non-Fluting Steel

Guidelines for clarification on fluting vs. non-fluting steel

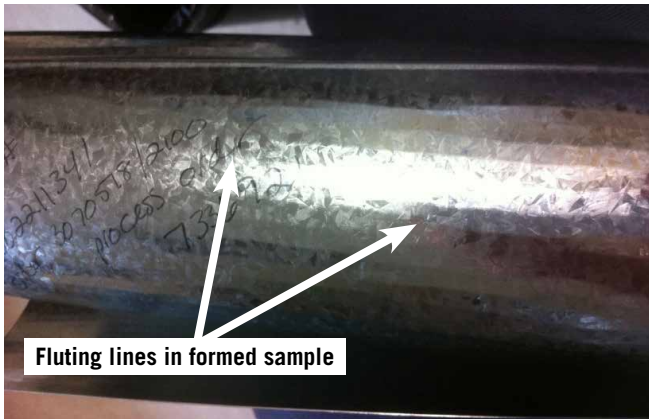
1.0 Introduction.

The terms fluting, non-fluting, or fluting hazard are properties often used when discussing steel sheet. This technical bulletin will define fluting and explain why it occurs and the processing capabilities of Steelscape.

1.1 Definition

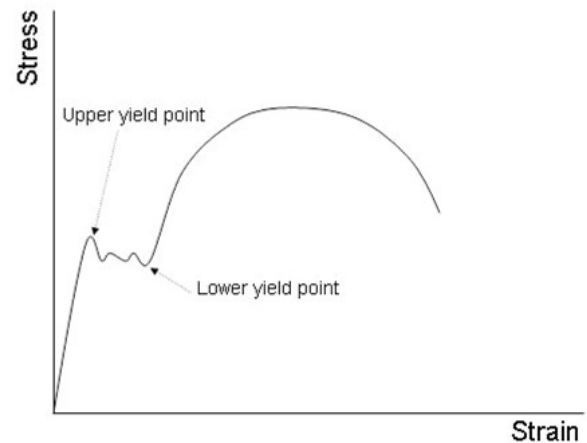
Fluting can be defined as follows:

Visible line markings that run perpendicular to the forming direction and sometimes appear on the surface of flat rolled low carbon steel products during forming of cylindrical parts:



Fluting lines in formed sample

It is a naturally occurring characteristic of annealed low-carbon steel and is influenced by the steel chemistry, cold-reduction practices and annealing cycles. It is associated with material that has an upper and lower yield point, or yield point elongation (YPE) and may also be referred to as Luder Lines, stretcher strain, or discontinuous/non-uniform yielding.



Product that does not exhibit these lines when formed is usually called non-fluting and is likely related to tension-leveling and/or temper passing practices after annealing.

1.2 Controlling Fluting During Coil Production

Fluting can be eliminated or minimized depending on steel chemistry and processing equipment capability. Production lines with high load temper rolling or stretcher/tension leveling capabilities can produce a non-fluting material. However, the elimination of fluting is often only temporary, and will re-appear as the steel ages.

Steelscape has the ability to skin pass product on both the TruZinc® and ZINCALUME® lines. If the skin pass mill is used the resulting product will be non-fluting for a period of time. All paint line feed coils are skin passed for surface smoothness, but the paint line process accelerates the aging of the steel and therefore fluting may return. For this reason, Steelscape CANNOT guarantee non-fluting on painted product. The only remedy available at Steelscape is to tension level the painted product after painting. However, like using the skin pass mill, the non-fluting characteristic is temporary.

1.3 How to Order Fluting/Non-Fluting Product

While skin passing of non-painted, bare material is not standard, it can be requested if non-fluting is required. There are several end uses that automatically trigger this process. It is important when non-fluting material is required for bare product that it be included on the purchase order and, where applicable, one of the end uses below be designated;

- HVAC
- Cornerbead-Bullnose
- Cornerbead
- Piping-Spiral
- Piping-Chimney
- Piping-Furnace
- Track-Garage Door
- Flashing-Bird stop (curved)
- Rainwater Goods
- Ductwork-Die stamped

As already mentioned, Steelscape cannot guarantee non-fluting on painted product without the additional tension leveling or extension process, which is only offered on the slitter at the Rancho Cucamonga, CA location. If painted, non-fluting material is required, the requirement **MUST** be included on the purchase order and reviewed with both the Steelscape Sales Representative and Technical Services. Additional processing charges may be incurred.

Bare product ordered as non-fluting or painted product subsequently tension leveled for non-fluting should be formed into final parts within 90 days of receipt.

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PACKAGING

Steelscape's products are packaged in a variety of ways. To be most effective we identified the most commonly requested package options and included them within our Standard Packaging Offer.

Standard Packaging - General Descriptions*	Code
Horizontal, Two Eye Bands	110
Horizontal, Paper Wrap, Two Eye Bands	120
Horizontal, Plastic (VCI) Wrap, Two Eye Bands, ID and OD Protection, Core. For painted only. Required for Rail Gondola	140
Vertical, Plastic (VCI) Wrap, Skid, Core	210
Vertical, Plastic (VCI) Wrap, Skid	220
Side Loaded Skid - CTL	807
Vertical, Wrap, Skid, Rubber Mat, Boxcar (3-run 4x4)	410
Vertical, Exhibit Wrap, Skid, Rubber Mat, Boxcar (3-run 4x6)	430

Steelscape will consider non-standard packaging requests on an inquiry basis. All Non-Standard Packaging may be subject to packaging extras. Please consult a Steelscape Sales Representative for more information.

* Wrap type depends upon the facility from which the product is shipped.

SHIPPING POLICY & PROCEDURES

Steelscape realizes the important role transportation plays in getting our product to customers. We have established the following policies and procedures to ensure the product shipped is received in the same condition as when it left our facilities.

Carrier Requirements

- The carrier must supply all necessary dunnage.
- The carrier must have tarps or curtain van.
- The carrier must have chains or straps, and appropriate edge protection.
- The carrier must pay for any dunnage Steelscape supplies to ensure safe and damage-free transit of our product.

NOTE: Steelscape reserves the right to refuse loading any carrier vehicle that arrives unprepared.

Preparing Coils for Transit

- All loads must be protected from weather and the elements before leaving the plant site.
- All coils must be appropriately secured in accordance with local and state laws before transit.

Proper loading protection is an important factor in getting products to customers safely and undamaged.

Drivers may be asked to lay tarp over coils and complete tying down outside the loading area if other trucks are waiting to load.

Required Paperwork

Drivers picking up coils at any Steelscape location will be given a bill of lading. The bill of lading must be received and signed by a representative of our customer. Steelscape requires a copy of this signed bill of lading be included with the carrier invoice. Some shipments will also be accompanied by Mill Test Certifications. The certifications must also arrive with the coils and be received by our customers.

Required Attire

All safety protection mentioned below must be supplied by the carrier and worn by the driver while on Steelscape property.

- **Hard hat**
- **Safety glasses**
- **High visibility vest**
- **Long sleeved shirt**
- **Long pants**
- **Closed-toed shoes**

NOTE: If Steelscape supplies required safety attire to an unprepared carrier, we ask that the supplies are returned prior to leaving our facility. Steelscape places both our safety and the safety of visitors to our facilities as the highest priority. We favor vendors and carriers who honor our safety requirements.

Safety

All drivers will be required to follow the **Exclusion Zone Policy** outlined by Steelscape during the driver safety briefing. Any minors or pets accompanying the driver must remain inside the vehicle cab while the truck is inside the loading area or at anytime the truck is being loaded or unloaded.

Loading Appointments

Customer must notify the Steelscape Dispatcher and acquire a loading appointment at least 24 hours in advance for customer to arrange pick-up. A Steelscape Customer Service Representative can provide the appropriate Steelscape facility's Dispatcher contact information.

Steelscape will attempt to service customer Will-Call shipments received prior to noon on the same day. Same day Will-Call shipments do require that all necessary information is provided to the Steelscape Customer Service Representative and Logistic Group. All Will-Call shipments called in after noon will be scheduled for the following day. An appointment is required for all Will-Calls.

Steelscape Shipping Hours

Kalama, WA – Monday - Sunday, 24 hrs/day.

Rancho Cucamonga, CA - Monday-Thursday, 24 hrs/day, Friday until 11pm.

Variance from these stated shipping hours will be communicated in advance through normal communication channels.

Standard Delivery & Pick-Up Lead Times

Local Deliveries: Next-day for Steelscape releases received by 11:00 AM. Local deliveries are < 150 miles from Steelscape's Point of Production.

Shipments Outside of Local Area: Shipment within two (2) working days for releases received by noon.

Shipments from Outside Warehouses: Same requirements as that of a Steelscape Point of Production.

Delivery/Load Changes: 6-hour notification required.

Requests outside of Steelscape's Shipping Service Offer will be addressed on a case by case basis and accommodated when schedule, workload and inventory accessibility allows.

Outgoing freight charges can be prepaid or collect as established on the order.

Steelscape will target a minimum load weight, based on released coil weights, for semi loads of no less than 45K lbs. and for maxi loads of no less than 58K lbs.

Should a coil not be available for a planned load, efforts will be made to fill the load with coils from another order or load for the same destination. This may require additional material/orders to be released for shipment.

Steelscape Transportation Incoterms

Incoterm	Text Description for Quote
Incoterm: EXW = EX Works " Carrier - Customer arranges " Freight Costs - Customer " Title - Transfers at Shipping Point	Collect, CUSTWC
Incoterm: FCA = Free Carrier " Carrier - Steelscape arranges " Freight Costs - Customer " Title - Transfers at Shipping Point	Collect, Ship Arrange Frt
Incoterm: CPT = Carriage Paid To " Carrier - Steelscape arranges " Freight Costs - Steelscape " Title - Transfers at Shipping Point	Prepay, Ship Arrange Frt

Storage Policy

Steelscape has a finished goods material storage policy for bare and painted, metallic-coated TruZinc® and ZINCALUME® Steel. This policy applies to finished goods of single-bill products only. Storage of toll-processing (customer-owned) product, please reference the Steelscape Toll Processing Offer.

Our policy ensures the reliability and efficiency of Steelscape is maximized through timely conversion of produced material into shipped products. Efficient use of warehouse space is also necessary for reduced Standard Product Offer lead times.

Details of the Steelscape material storage policy for single-bill orders are as follows:

- Finished goods inventory left in Steelscape's possession for more than thirty (>30) days from the order acknowledged Ship Date may be automatically transferred to an off-site warehouse for storage.
- Steelscape's storage fee will commence beginning thirty-one (31) days from the order acknowledged Ship Date.
- The storage fee, which consists of costs that Steelscape incurs in the transfer, storage and handling of each coil, will be \$7.50 per ton per month.
- Customers will receive a storage invoice for each thirty (30) day period in which their product remains in Steelscape's off-site warehouse facilities.

Steelscape Account Managers or Customer Service Representatives can address questions regarding Steelscape's finished goods material Storage Policy.

FINISHED MATERIAL - RECEIPT & INSPECTION

Once received, the customer is responsible for unloading all material delivered from Steelscape and inspecting the material for visible damage. The material needs to be stored in a covered/enclosed space to protect the metal from inclement weather, water damage and/or condensation.

Prior to unloading any material with visible damage, the customer must notify the carrier's representative of the damage and note the damage as such on the delivery receipt.

If the material received does not meet the specifications on the packing list, the customer must notify the Steelscape Customer Service Representative immediately. At such time, the issue can be investigated and remedied.

If the quantity of material received by the customer is less than the quantity invoiced or if material received appears damaged in transit, the customer shall give written notice to the agent of the delivering carrier for verification of the shortage or damage. The customer will send copy of the same to Steelscape in addition to the receiving records.

Should the customer fail to notify Steelscape promptly of any issues related to damage upon receipt and/or non-conformance of the material, the material will be considered to have been received in good condition and as ordered. The material will also be considered delivered in accordance with the packing list/shipping documents.

CLAIMS POLICY

Steelscape strives to consistently provide high quality products to meet or exceed our customers' needs. Unfortunately, perfection cannot always be attained and products may not fulfill the requirements. Though we prefer getting the job done right the first time, we strive to make doing business with Steelscape as easy as possible when we don't. To that end, we created a claims policy which delineates our procedures for resolving product quality claims in a timely and satisfactory manner.

Steelscape products will meet or exceed quality criteria as described in the most recent versions of the following standards:

ASTM A568/A568M	Steel Sheet, Carbon, High-Strength, Low-Alloy, Hot Rolled and Cold Rolled
ASTM A924/A924M	Steel Sheet, Metallic Coated by the Hot Dip Process
ASTM A653/A653M	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated by the Hot Dip Process
ASTM A792/A792M	Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process

Claims Policy

Steelscape reserves the right to review any defective coil, cut sheets or formed parts, for a value greater than \$2,500, to ensure fast and easy claim resolution, details of the claim should be forwarded to the customer's Technical Service

Engineer or Customer Service Representative as soon as possible. Claims may also be submitted online via XtraScape. Steelscape will accept any claim investigation and resolution where the following conditions are met:

Timing (For exceptions see Table 1)

- Twelve (12) months, or less, has transpired from coil dispatch date and submission of claim.

Claim Submission

- Must be in writing and include the following information at the time of submission:
 - ◇ Customer purchase order number
 - ◇ Steelscape sales order number
 - ◇ Steelscape coil number(s)
 - ◇ Thickness
 - ◇ Width
 - ◇ Original coil weight(s)
 - ◇ Rejected coil weight(s)
 - ◇ Rejected weight(s) - weight removed with defect
 - ◇ Description of cause for the rejection
 - ◇ Where in the coil(s) the defect is occurring (edge, middle, top, bottom).
 - ◇ When during the lifecycle of the coil (at receipt, before or after processing) defect was noticed.
 - ◇ Evidence of the defect, including a representative sample of the defective material and a clear photograph of the defective coil. The sample should clearly identify the direction of the coil, as well as the coil number.
 - ◇ The name of a representative within the customer's organization who is able to negotiate final claim resolution.

Some of this required information can be found on the Steelscape Coil Tag located on each coil. Coil identification and traceability is critical to a claim investigation if a coil tag needs to be removed for processing, reattach it to the bore of the coil or write the coil number on the side wall.

Confirmation

- Steelscape reserves the right to review any defective coil for a value greater than \$2,500.

Significance

- Value of claim must exceed \$500 or 5% (based on net coil weight) of any single coil shipped.
- Claims for accumulated losses on an order will be accepted for consideration if the mass of the claim exceeds 3% of the order mass.

Steelscape reserves the right to view a claimed coil for a period of up to forty-five (45) days from initiation of claim; 90 days for material sold to customers >1,500 miles from plant of material origin. Steelscape also reserves the right to conduct detailed analytical testing on any claimed material which may take greater than 45 days.

Table 1: Claims Reasons and Claim Limitations

Claim Reason	Deadline
Transit Damage	30 Days*
Water Damage	30 Days*
Handling Damage	30 Days*
Breakage, Strain or Cross-break	90 Days*

* See following details for specific limitations

Specific Claim Reasons:

Underweight coils – Steelscape’s definition of coil weights is as follows:

- **Underweight coils** shall not comprise more than 20% of an order without customer approval. If Steelscape ships underweight coils in excess of 20% of an order, a claim for underweight coils may be considered.
- **For Bare Product**, where no minimum coil weight is specified, underweight coils are those coils weighing less than 75% of the specified maximum coil weight. Coils weighing more than 75% of the specified maximum coil weight will be considered fit for purpose.
- **For Painted Product**, where no minimum coil weight is specified, underweight coils are those coils weighing less than 50% of the specified maximum coil weight. Coils weighing greater than 50% of the specified maximum coil weight will be considered fit for purpose.

Embossed Coils

Steelscape will not accept claims for embossed difference in appearance when material is mixed by customer.

Steelscape embossed stucco pattern creates peaks and valleys on the embossed strip. There will be difference in appearance in bare embossed panels when viewing two panels side by side, with opposite sides showing (peaks up vs. peaks down). Steelscape will not accept claims for this difference in the appearance when panels are processed or installed with panels’ peaks up vs. peaks down by customer.

Painted embossed material can show color variation in the panels if the directionality is reversed panel to panel. This is due to the way light reflects off the peaks and valleys of the embossed surface. This is especially common on higher gloss paint systems. Steelscape will not accept claims where the panels have been processed or installed reverse direction panel to panel by customer.

Steelscape guarantees all embossed product supplied will not have edge wave greater than fifteen (15) I units. When customer requirements are more stringent than fifteen (15) I units, Steelscape will provide product, as agreed. This agreement must be in writing and must be obtained prior to the order acceptance. When Steelscape provides a product that exhibits edge wave greater than either the agreed standard or (15) I units, and the product is unsuitable for the designated end use, Steelscape will consider claims for edge wave.

Water Damage

Steelscape will consider claims for water damage when the claims are submitted within thirty (30) days of receipt of product. Any material received wet upon delivery MUST be noted on the receiver documents and acknowledged by the delivering agent. This must be submitted immediately to Steelscape for review. Any material not noted as damaged or wet, will be considered accepted as prime. Examples of water damage may include; wet cores, visible water or condensation on the inside of packaging, positive moisture tag indicator, visible corrosion (white or black rust on bare product), raised or rough texture of painted surface, and water staining (including yellowish discoloration on resin product).

Storing coils or panels in a manner where they become unprotected from water ingress and condensation will negate Steelscape’s responsibility with respect to water damage claims. Where customers order packaging options that Steelscape considers inadequate for the product, and Steelscape forewarns said customer in writing to that end, Steelscape’s liability for water damage will be negated.

Surface Condition

The production of coil by the hot dip, metal coating process naturally leads to the formation of some surface imperfections on the product. These imperfections, while not adversely affecting product life, may cause problems when the material is to be post-painted on a coil coating line. Therefore, Steelscape does not recommend the use of non skin-passed product in coil painting applications.

Where skin-passed product is ordered, Steelscape will consider claims for surface imperfections that render the product unsuitable for organic coil coating processes. If coil is ordered as non skin-passed, and subsequently used in organic coil coating, Steelscape will not accept claims for surface imperfections that could reasonably be considered to be removed by the skin-passing operation.

Steelscape will not accept claim for bare or painted hot dip coils with light surface dross as this is a normal part of the metallic coating process.

Flatness

Steelscape will provide material conforming to ASTM standard A924/A924M. When customer requirements demand a product that exceeds these standards, Steelscape must agree, in writing, to provide the material to the customer requirements. Where product does not meet either the ASTM standard or the written undertaking of Steelscape, claims for shape defects will be considered.

Edge Wave

Steelscape guarantees all product supplied will have edge wave less than fifteen (15) I units as defined by ASTM standard A924/A924M. When customer requirements are more stringent than the aforementioned standard, Steelscape will provide product, as agreed. This agreement must be in writing and must be obtained prior to the order acceptance.

When Steelscape provides a product that exhibits edge wave greater than either the agreed standard or A924/A924M, and the product is unsuitable for the designated end use, Steelscape will consider claims for edge wave.

Transport Damage

Claims for transit damage on rail car shipments will only be considered if submitted within fourteen (14) days of the material being available for unloading. Full details of the damage and photographs of the material in the rail cars, along with the rail car number, must be provided with the claim submission. Claims for transit damage on material received by truck should be forwarded to Steelscape immediately upon receipt of the product. All other claims for transit damage will be accepted within thirty (30) days of receipt of the material.

Handling Damage

Claims for a product that exhibits handling damage will be accepted for up to thirty (30) days from receipt of the material. Claims must be accompanied by photographs of the damaged product with the Steelscape packaging in place.

Paint Attributes

Steelscape’s painted products will be supplied free from defects or imperfections that detract from the performance or aesthetic value of the product. Painted products will comply with the following standards:

Gloss	To paint vendor’s specification
Hardness	To paint vendor’s specification
Film Thickness	To paint vendor’s specification
Reverse impact	To paint vendor’s specification
Color	No more than ± 0.5 units on L, A, or B scales from the supplied standard.

Steelscape may supply product within tighter specifications, but only when there is prior written agreement from Steelscape to provide such a product. Claims regarding quality concerns with painted products will be accepted for consideration only when the product falls outside these parameters.

Width

Our products will be within width tolerances as defined in ASTM standard A924/A924M.

Thickness

Steelscape’s products will be within the ASTM Full Restricted Tolerances - 1" Minimum Edge Distance, as defined in ASTM standard A924/A924M (table shown below). However, Steelscape will provide our product to a tighter thickness tolerance if agreement to provide this product is acknowledged in writing prior to order acceptance by a Steelscape Technical Service Engineer.

	Thickness (Inches)	
Width (Inches)	.010 - .023	>.023 - .045
MINIMUM	Minimum Tolerances - All Plus	
> 0 - 32	0.003	0.004
> 32 - 40	0.003	0.004
> 40 - 54	0.003	0.004
NOMINAL	Nominal Tolerances - Plus and Minus	
> 0 - 32	0.002	0.002
> 32 - 40	0.002	0.002
> 40 - 54	0.002	0.002

Thickness is measured on the coated sheet and includes the metallic-coating thickness. Thickness is measured at any point on the sheet not less than 1 inch from a side edge, per ASTM 924-16a, Table 2.

Customers should inquire about any application requiring improved (tighter) tolerances for performance reasons.

Processing Charges

Steelscape’s liability shall be limited to the purchase price of the defective material. No other costs associated with the defect will be reimbursed by Steelscape.

Field Failure Claims

Steelscape will consider each field failure claim on an individual basis. Where the product failure is clearly caused by product defects, Steelscape will, at its own option, replace or repair defective product where failure occurs after installation. Replacement cost will be limited to the value of the material only. Any other costs or contingencies will not be considered. This includes, but is not limited to, transport fees, material forming, job installation, removal of defective product, late charges for the job, equipment rental, idle person-hours, or other installation or administrative costs.

Secondary Product

All secondary products sold by Steelscape are sold on an “as is” basis, with no warranty expressed or implied. No quality claims will be accepted on secondary product.

Other Claim Reasons

Steelscape will consider other reasons for quality concerns on an individual basis. Should these occur, the customer must contact either their Account Manager, Customer Service Representative or Technical Services.

Steelscape Claim Responses

Steelscape will respond to the customer within thirty (30) calendar days from the date complete claims information is provided by the customer to the Steelscape Technical Service Engineer. Steelscape’s response may include one of the following:

- Acceptance of the rejection and instructions for material disposition.
- Denial of the rejection with adequate explanation for the denial.

- Recommendations for further processing at the customer's facility for purposes of working through the defective material.
- Instructions for the return of the material in question to Steelscape. Some material may be usable with additional processing. Once the material has been reprocessed and the issue resolved, the material will be returned to the customer.
- Request for an extension if acceptance or denial cannot be determined within the thirty (30) calendar days. A request for extension will include a reason and the specific timeline for a final response.

The customer will have the opportunity to appeal any denied claim for fourteen (14) calendar days after written denial is provided by Steelscape. All accounting transactions related to the claim will be held until such time that the final disposition of the claim has been made and agreed to by both parties.

Tagged Defect

Steelscape's products may contain a tagged or marked defect. The tags define the start and end point of such a defect. Steelscape will not accept claims on this material when the defect falls within the boundaries of the tags. This defective material can be included in scrap reconciliation with Steelscape or reduced from the price of the coil prior to invoicing. Consideration will be given to any defects outside the tagged area.

Running Minimum Amount of Defect

Wherever possible and practical Steelscape requests that the customer try to process a minimum of 200 ft. of the product before filing a claim. This is due to the fact that some defects may clear up within 200 ft. However, where the defect is obviously evident throughout the coil, no such processing is required.

Segregation and Protection of Claim Coils

Steelscape requires customers to have the defective coils readily available for inspection at a mutually arranged time. The coils may require an inspection on a recoiler unit or rolled out in a safe manner to be inspected by Steelscape representatives. Steelscape requires customers to provide adequate protection of all claim coils to prevent generation of further defects. Steelscape may reduce the claim amount by the amount of any additional induced losses due to inadequate protection.

NOTE: Any unauthorized or unidentified deductions taken by a customer before a claim is disposed of, approved by Steelscape, and settled shall constitute nonpayment with subsequent consequences. Consequences may include, but not limited to, implementation by Steelscape of a credit hold, shipping hold, and/or loss of discount privileges.

STEELSCAPE WEBSITE & XTRASCAPE®

Steelscape has designed an external website that is simple and easy to use. Realizing how important real time information can be, our website strives to inform and assist everyone who logs onto the site. At www.steelscape.com customers can learn about everything from the Steelscape company culture to product specifications to current publications.

For information specific to Steelscape's Design Solutions products please utilize www.steelscapedesignsolutions.com.

Steelscape's website also contains our online transaction system - XtraScape. XtraScape provides a vast amount of data on Steelscape orders, coils, shipments and claims. In addition, customers are able to submit online claims submissions. XtraScape is currently available to all active Steelscape customers. To request access to XtraScape, click on the "Register Now" link on our website at www.steelscape.com. Customers can also request access by contacting their Steelscape Sales Representative.

CO-OP ADVERTISING POLICY

Steelscape, in support of partnering with customers, offers financial &/or marketing assistance when customers include reference to Steelscape's trade names and/or corporate brand in a promotional effort.

Steelscape trade names and/or brands include: ZINCALUME®, TruZinc®, Spectrascape®, ReziBond®, Vintage®, Steelscape Prints®, XtraScape®, TruzGuard™ and Steelscape®, Design Solutions™

Details of Steelscape's Co-Op Advertising Policy are listed below.

- Assistance can total up to \$0.50/ton per year, based on total volume (tons) shipped from Steelscape the previous calendar year.
- Assistance has a maximum value of \$5,000 per calendar year.
- The co-op funding provided by Steelscape will not exceed the total cost of the approved promotional effort.
- Promotional efforts supported by this policy may include advertising, special promotions, company brochures, meeting sponsorship and/or other effort as approved in advance by Steelscape.

To qualify for co-op funding support, the promotional effort MUST meet the following guidelines:

- In all cases, the Steelscape trade name and/or brand must be clearly referred to and properly identified with Steelscape as the owner of the brand and/or producer of the product. Steelscape will provide proper usage of all brand trade names and logos.
- All proposals for co-op funding MUST be provided to Steelscape's Marketing Representative in writing with the intent of the promotional effort, approximate costs, timing, and proposed usage of the Steelscape trade name and/or brand PRIOR to commencement.
- Steelscape's Marketing Representative MUST review and approve the final draft of any promotional effort utilizing a Steelscape trade name and/or brand PRIOR to launching the effort in order to ensure proper usage of the trade name, brand, and/or logo.
- Once final approval from Steelscape's Marketing Representative has been received, proof of the final promotional effort along with the accompanying invoice(s) for the promotional effort MUST be sent to Steelscape's Marketing Representative. Upon receipt of proof and invoice, a check will be issued to the customer for the approved funding amount. Reimbursement of co-op expenses via debit memos and/or short-pays on product sales are NOT permitted.

For any questions regarding Steelscape's Co-Op Policy please contact your Steelscape Account Manager.

Definitions

This section defines the technical terms used in the Service Offer Manual. Unless a term is defined in this section, the most widely-accepted definition appearing in an English dictionary will apply. If any of the following definitions are unclear or you require additional assistance, please contact your Steelscape Sales Representative. Should a term appear in the Service Offer Manual that is not adequately defined, please contact us and we will amend this section as appropriate.

Acknowledged Delivery Date: The date by which Steelscape commits to produce an order and pack it ready for shipment. For orders that are pre-released, this date represents the date by which the order will be produced, packed and shipped. This date is always a Saturday.

Acrylic Paint: Thermoset acrylic and acrylic coatings are based on resins prepared from acrylic and methacrylic esters, acrylic and methacrylic acids and/or styrene. Acrylics can be modified with other resins. Acrylic latex resins are designed to exceed the polyester resin systems in durability, color retention and outdoor exposure tests. Because they utilize waterborne technology, acrylics reduce toxic VOC (volatile organic compounds) when paint is cured. Acrylic paints are typically found on roll formed sections for commercial, agricultural and pre-engineered buildings.

Aged Material: Material that was ordered by a customer and remains in Steelscape's inventory for > 30 days from the order acknowledge date.

ASTM Standards: The American Society for Testing and Materials is an independent standards organization that regularly publishes testing and performance specifications for a wide variety of industrial products. Steel producers in North America provide most common steel products according to specifications laid out in the ASTM standards. Steelscape adheres to these standards.

ASTM Thickness Tolerance: Allowable variation in strip thickness as designated in the ASTM standards.

Auto Release: Pre-authorization has been given for shipment.

AZ35 Coating: 55% Aluminum/45% zinc coating applied at a minimum coating mass of 0.35 oz/ft² (total, both sides).

AZ50 Coating: ZINCALUME® coating applied at a minimum coating mass of 0.50 oz/ft² (total, both sides).

AZ55 Coating: ZINCALUME® coating applied at a minimum coating mass of 0.55 oz/ft² (total, both sides).

Bill of Lading: A document defining freight terms for a shipment, specifying when ownership of material transfers from seller to buyer, together with assignment of freight charges.

Bonderized: A thin layer of Zinc Phosphate on the surface of the sheet that it is a weldable product and that provides a surface

to which paint will readily adhere. This is typically used in rainwater goods.

Branding: A positive identification of product characteristics placed on the coil such as manufacturer, product name, grade, coating, thickness, width and production date. This information may be reproduced at frequent intervals on the bottom side of a coil.

Chromium Passivation (Also Chemical Treating): A surface treatment normally applied to metallic coatings to retard the formation of corrosion products (storage stain) during shipment and storage. It is applied to bare products in-line. Some continuous paint lines may not be able to paint over all types of chromium passivation.

Closed Order: An order which has been shipped complete (within +/- 10%) or has a reason of rejection defined. As noted above the delivery percentage listed can be changed, which will allow the orders to close prior to -10%.

Coil Hardness: The resistance of metallic material to plastic deformation by indentation or penetration.

Coil Number: A unique number, assigned by Steelscape, which identifies a finished coil.

Commercial Steel (CS): Steel sheet intended for applications where product is subjected to bending or moderate forming. Three types of commercial steel exist and are differentiated primarily based on carbon composition limits: Type A (or CSA) which must not contain more than a 0.1% carbon content, Type B (or CSB) which specifies a 0.02 to 0.15% carbon range, and Type C (or CSC) which must not contain more than a 0.08% carbon content.

Cores: A fiber tube located in the bore of a coil, designed to provide protection from handling and mandrel damage.

Credit Terms (.5% 10th, 25th, or Net 30 Days): Standard credit terms under which Steelscape completes commercial transactions. Invoices dated from the 1st to the 15th of the month may be discounted by .5 of 1% if paid by the 25th of the month, and invoices dated from the 16th to the last day of a month may be discounted .5 of 1% if paid by the 10th of the following month. If a discount date falls on a weekend or holiday, the next business day will be acceptable for discounts. As an option to discount, invoices may be paid in 30 days from date of invoice. Postmarks will be used to establish discount dates.

Cross-Break Damage (Also Coil Break or Mandrel Marks): Cross-break is a latitudinal crease extending across the width of the strip, usually found near the inside diameter of the coil.

Customer to arrange: Customer will arrange shipment to or from designated facility.

Cut-To-Length: Sheet steel that is pre-cut to the customers specified length.

CWT (Hundred Weight): Common unit of measure used for commercial transactions in the North American steel industry. Equal to 100 pounds or 1/20th of a short ton.

Drawing: Mechanical forming of steel by tension through or in a die (for example, sheet drawing) and usually carried out at temperatures below the re-crystallization temperature.

Drawing Steel: A grade of steel designated by ASTM as suitable for drawing and other forming applications where very high ductility is required.

Dross: Particles of zinc oxide and other impurities formed on the surface of the metallic coating line pot. Dross is regularly skimmed from the surface of the pot to prevent contact with the steel strip.

Ductility: Relative ability of a metal to deform from a flat condition to a more complex shape, without fracture. Also known as formability or workability.

Dunnage: Wood and other materials used to secure steel coils during transportation. Dunnage allows safe transport while preventing product damage.

Edge Wave: A condition whereby the material at the edge of the strip is slightly longer than the rest of the strip causing a ripple effect at the edge of the strip.

Embossing: The process of inducing a specific depth pattern into the steel base of a strip using textured rolls. Steelscape offers stucco embossing.

End Use: The final use or application of the coated steel product.

Epoxy Paint: Epoxies are known for excellent substrate adhesion and corrosion resistance and have been used in primer applications for years. Poor exterior durability, poor flexibility, and high cost have limited use of epoxies in coil coatings.

Exhibit Wrap: Allows easy and immediate viewing of steel coil color.

Eye-Horizontal: Orientation of a steel coil indicating that the bore or "eye" is positioned horizontal to the ground.

Eye-Vertical: Orientation of a steel coil indicating that the bore or "eye" is positioned vertical to the ground.

Fiber Core: A liner used inside coils to prevent excessive damage from normal handling.

Field Failure: A premature failure of an end product such as fading, corrosion, adherence, etc. while that product is in service.

Film Thickness: Film thickness or dry film thickness (DFT) refers to the thickness of paint film on the strip surface, once the paint has cured. Typical DFT's for painted steel range

from 0.0005" (0.5 mil) to 0.0015" (1.5 mil).

Fluorocarbon Paint: Also known as PVDF (Polyvinylidene Fluoride), KYNAR 500® and HYLAR 5000® coatings. The PVDF resin does not absorb UV radiation and therefore does not degrade, chalk or fade like other coatings. Fluorocarbon coatings are the product of choice for exterior durability and demanding end uses.

Forming Steel: Grade of steel designated by the ASTM as suitable for bending, forming and other applications where higher ductility is required.

G30 Coating: TruZinc® steel or hot dipped galvanized coating applied at a minimum coating weight of 0.30 oz/ft² (total, both sides).

G40 Coating: TruZinc® steel or hot dipped galvanized coating applied at a minimum coating weight of 0.40 oz/ft² (total, both sides).

G60 Coating: TruZinc® steel or hot dipped galvanized coating applied at a minimum coating weight of 0.60 oz/ft² (total, both sides).

G90 Coating: TruZinc® steel or hot dipped galvanized coating applied at a minimum coating weight of 0.90 oz/ft² (total, both sides).

G100 Coating: TruZinc® steel or hot dipped galvanized coating applied at a minimum coating weight of 1.0 oz/ft² (total, both sides).

Gloss: Gloss represents the luster or visually reflective properties of a surface. Painted steel surfaces are available in a wide variety of glosses

Grade 33 Steel: ASTM annealed structural grade steel with a minimum base metal yield strength of 33 ksi, minimum tensile strength of 45 ksi, and minimum elongation of 20%.

Grade 37 Steel: ASTM annealed structural grade steel with a minimum base metal yield strength of 37 ksi, minimum tensile strength of 52 ksi, and minimum elongation of 18%.

Grade 40 Steel: ASTM annealed structural grade steel with a minimum base metal yield strength of 40 ksi, minimum tensile strength of 55 ksi, and minimum elongation of 16% (based on Grade 40c11 specifications).

Grade 50 Steel: ASTM annealed structural grade steel with a minimum base metal yield strength of 50 ksi, minimum tensile strength of 65 ksi, and minimum elongation of 12% (based on Grade 50c11 specifications).

Grade 80 Steel: Stress relieved ASTM structural grade steel with a minimum base metal yield strength of 80 ksi, and a minimum tensile strength of 82 ksi (based on Grade 80c11 specifications).

Grade Data Sheet: An information sheet furnished on most

Steelscape products which provides a general description of the product, typical uses, coil dimension, capabilities, mechanical property specifications as well as typically produced mechanical properties, chemical composition specifications, supply conditions and fabricating performance ratings.

ID or Inside Diameter: A measurement of the inside diameter or bore diameter of a coil.

Incoterm: Is the agreement to freight terms, regarding transfer of ownership, responsibility of freight costs, from which point to where, and for whom bears the risk of damages.

ksi: Measurement typically used to express strength of a material or force per square area - thousand pounds per square inch. (1000 lb/in²).

Lead Time: A specified and mutually consenting period of time between order placement and order completion to acknowledged delivery date.

LTL (Less than Truck Load): A transit condition that results in less than efficient use of a trucks hauling capacity.

Maximum Coil Size: The maximum size of a finished coil, typically specified by the customer but sometimes limited by Steelscape. This quantity is related to both the physical constraints (e.g. cranes or fork lift carrying capacity) of the customer and Steelscape.

Maximum Order Size: The maximum quantity of a specific gauge, width, grade and paint color combination that Steelscape will accept on orders.

Maximum Skid Weight: The maximum size of a skidded coil, typically specified by the customer but sometimes limited by Steelscape. This quantity is related to both the physical constraints (e.g. cranes or fork lift carrying capacity) of the customer and Steelscape.

Mill Test Certification (MTC): A certification document issued with graded steel orders that includes the product specification & definition, the ship-to and sold-to addresses, the coil numbers, their relative heat chemistry numbers, any product test results pertaining to those coils listed and the heat chemistry analysis on the heat numbers listed.

Minimum Coil Size: The minimum size of a coil, typically specified by the customer but sometimes limited by Steelscape.

Minimum Yield: The minimum yield strength required to meet the mechanical property requirements for a particular grade of metallic coated sheet.

Non-Prime Product: Steelscape products that do not meet our quality standards for "prime" material. Our Secondary products are classified according to the severity of the defect that prevented the "prime" classification. (see "Secondary")

OD or Outside Diameter: A measurement of the outside diameter of coil.

Oiling: Oil is applied to metallic coated coils on the metallic coating lines when requested by our customers. It is supplied in "Light (L)", "Medium (M)" or "Heavy (H)" applications. It provides moderate corrosion resistance while coils move between internal processing lines as well as to customer's facilities.

Open Order: An approved order that has not been shipped complete (within +/- 10%). There are exceptions where coils are in pack and ship status but the order has been shipped complete, the order will appear on the report. Also, the delivery percentage listed above can be changed which will allow orders to stay "open".

Organisol Paint: A plastisol paint with solvents introduced to lower viscosity. These coatings have the same characteristics as plastisol coatings.

Output Width: The final or finished width of a coil as requested by a customer.

Paper Wrap: Coils enclosed with heavy-duty paper for protection during transit and storage.

Passivation: A treatment applied to the surface of bare metallic coated steel to provide greater resistance to corrosion; achieved by the formation of surface chromate, oxide or phosphate layers.

Pittsburgh Lock Seaming: Process used for joining metal sheet without the use of heat through an overlapping - bending process. Typically utilized for joining edges in HVAC and other sheet metal applications.

Plastic Wrap: Coils enclosed by a plastic, rust-inhibiting stretch wrap.

Plastisol Paint: Plastisol coatings are dispersions of finely divided higher molecular weight polyvinyl chloride resins in plasticizers. During the baking process, the finely divided resin particles dissolve in the plasticizers to create a tough plastic film upon cooling. This coating provides extra tough protection when surfaces are exposed to severe weathering or corrosive atmospheres. The main uses of this system are in building components and interior applications. Use in high UV areas is not recommended.

Polyester Paint: Polyester resins are the condensation products of polybasic acids and polyols. Polyesters are sometimes referred to as oil-free alkyds. They may also be modified by the additional reaction of other monomers, such as styrene or acrylic esters. Polyester resins are generally cross-linked with amino resins during baking.

Post-painted Steel: Steel painted after manufacturing or steel processing.

Preferred Coil Size: A coil size that is a direct multiple of Steelscape order increments.

Release: Customer authorization has been given for shipment.

Release Date: A customer-specified date which designates the shipment day for an order. More information on terms and conditions for release dates is provided in Section 4.20 of this manual.

Resin, Clear: A proprietary clear, odorless acrylic coating applied during the manufacturing process for ZINCALUME Plus steel and TruZinc Plus steel.

Reverse Impact Test: A test procedure used to determine coating adhesion to steel strip. A round-tipped, weighted cylinder is dropped from a specified height onto the test sample creating a round dent. The reverse side of the sample is examined for evidence of adhesion loss. This test is commonly used for both metallic and organic coated products.

Reverse Wrap: Processing a painted coil with the top-side or painted side facing the inside of the coil. This procedure protects the finish during certain down-stream processes.

Roll formed Steel: Sheet steel cold formed in a series of rolling stages.

Safety Data Sheet (SDS): SDS's are prepared in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Supplier Notification Requirements of SARA Title III, Section 313. An information sheet that provides detailed sections of information on products produced at Steelscape facilities.

Secondary Product: Steelscape products that do not meet our quality standards for "prime" material. Our Secondary products are classified according to the severity of the defect that prevented the "prime" classification. (see "Non-Prime")

Securing Coil, Tarping: A process of applying protective covering to shield finished product from dirt and moisture during transit.

Securing Coil, Chaining: A process of applying chains to secure coils to a truck bed according to department of transportation specifications. Chains are applied with edge protectors to prevent damage to coils during transit.

Ship-to Address: The physical location where a customer order is to be delivered. This location can be a final destination or another processing facility. Specification of ship-to addresses are subject to the terms and conditions identified in Section 4.20 of this manual.

Silicone Modified Polyester (SMP): Silicon modified polyesters were developed to improve the exterior durability of early polyester resin paint systems. Early silicon modified polyester contained up to 50% silicon resin, however current versions contain less silicon as resin technology improves.

Skin Passing (Also Surface Conditioning): An in-line rolling process on both ZINCALUME® and TruZinc® steel processing lines that provides an extra smooth surface on the metallic coating. Skin passing is a must for painted products.

Slitting: Dividing a master coil into several narrower multiples.

Spangle: A term describing the finished appearance of TruZinc and ZINCALUME steels, produced with the hot-dipped process. Spangle is often referred to as minimized, regular or spangle-free. In order to provide the best surface for subsequent painting, both TruZinc and ZINCALUME steel have minimized spangle appearances.

Strain Damage: Aging which occurs subsequent to the cold working of an alloy. Strain damage in steel is predominantly due to the presence of uncombined nitrogen and results in a marked decrease in ductility.

Strip Thickness: The total coated thickness (includes metallic coating) of a strip or coil.

Strip Width: The width of the strip as measured edge to edge, perpendicular to the rolling direction of a strip or coil.

Structural Steel: Steel grades specified to meet certain ASTM load requirements ranging from 33-80ksi.

Surface Conditioning: See Skin Passing.

Tagged Defect: A small defect found in the middle of a coil and identified with a specific tag.

Technical Service: Group of metallurgical and organic coating specialists within the Steelscape Sales Department responsible for supporting customer's technical needs including product performance, end-use applications, claims investigation and resolution, together with technical training.

Tension Leveling: An in-line process on both Steelscape metallic coating lines and the Kalama Pickle Line, which induces tension into the strip in excess of the yield strength. Tension leveling results in a flatter product with improved properties for subsequent forming.

TMW (Theoretical Minimum Weight): Pricing practice that effectively charges per square or lineal foot of material as opposed to by weight. This practice is particularly useful for customers that sell products by the lineal foot and are concerned about yield loss due to variation in the gauge (thickness) of purchased steel. Refer to the SOM section for a complete commercial definition of Steelscape's TMW price policy.

Toll Processed Steel (Also Customer-Owned or Double Bill): Steel that is provided by customers to Steelscape for processing. Offer includes painting, slitting, embossing or cut-to-length. This is a core business for Steelscape.

Transit Damage: Damage incurred to a coil during loading, unloading, and/or transport.

Underweight Coil: A coil that fails to meet the customer's minimum weight requirements.

Urethane Paint: Urethane is the term for the chemical linkage between an isocyanate and a hydroxyl group. A urethane can be a polyester urethane (polyurethane), an acrylic urethane or an epoxy urethane. Most coil urethanes are polyester urethanes usually used in primer applications. Urethanes are characterized by having a good flexibility to hardness ratio and a good chemical resistance.

Ultimate Tensile Strength: Typically, the breaking strength or highest strength achieved for materials.

Yield Strength: Yield strength represents the stress at which materials transition from elastic to plastic deformation. Once a material has been loaded past its yield point, it is permanently deformed.

Water Damage: Corrosion of the product due to the ingress of water or moisture.

ASTM SPECIFICATIONS

Organized in 1898, ASTM has grown into one of the largest voluntary standards development systems in the world. ASTM is a not-for-profit organization which provides a forum for producers, users, ultimate consumers, and those having a general interest (representatives of government and academia) to meet on common ground and write standards for materials, products, systems and services.

ASTM standards are developed and used voluntarily. Standards become legally binding only when a government body references them in regulations, or when they are cited in a contract. Any item that is produced and marked as conforming to an ASTM standard must meet all applicable requirements of that standard.

ASTM standards are used by thousands of individuals, companies and agencies. Purchasers and sellers incorporate standards into contracts architects and designers use them in plans; government agencies reference them in codes, regulations and laws; and many others refer to the standards for guidance. Steelscape products are manufactured in accordance with the most recent versions of the respective ASTM standards as listed below:

ZINCALUME® products ASTM A792
 TruZinc® products ASTM A653
 Cold Rolled ASTM A568
 Metallic Coated Steel Sheet ASTM A924

Steelscape produces to many other ASTM standards as required by end use or customer request. For more information, please contact your Steelscape Sales Representative.

Due to ASTM membership requirements and copyright law, Steelscape may not provide copies of ASTM standards.

REGULATIONS AND SUSTAINABILITY

Steelscape strives to stay current on all regulatory and sustainability initiatives and programs within the construction industry. These programs are vast and ever changing, but Steelscape has prepared guidelines and customer letters for the more common items. These documents can be found on our website, www.steelscape.com, and cover the topics listed below;

USGBC LEED Program
 Buy American Act/Surface Transportation Assistance Act/
 State Buy American
 Recycled Content
 ENERGY STAR
 Cool Roof Rating Council
 Zinc Run Off

If you need additional information on these programs, or any not listed, please contact your Steelscape Sales Representative.