

TITLE: UBC Product Quality Specification

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Prime and RSI Specification

Rev 2

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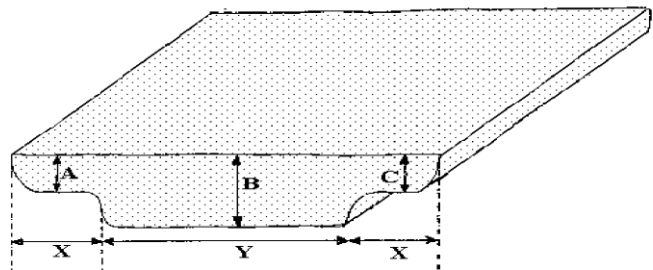
1.0 PURPOSE:

Novelis is a supplier to discerning customers of a wide variety of rolled aluminum products. Novelis' visibility in these markets depends on its' ability to consistently supply aluminum of the highest quality. A major impact on our ability to meet this requirement is the raw material we purchase for our processes. A key raw material in our can sheet production is primary aluminum.

It is for this reason that we have developed this manual, the major purpose being to communicate as clearly as possible, the Novelis requirements for prime. The philosophy of Novelis is to work with all of its suppliers to enable them to continuously improve the quality of materials delivered.

2.0 RSI (Sow)

- Must be low profile, minimum weight of 1500 lbs/piece
- All sows must be single pour and skimmed
- Must be free of excessive shrinkage cavities and large cracks
- Must be clean and free of dirt, dross, excessive mold agents, oxides, pot room bath, non-aluminum contaminants, salts and excessive corrosion
- Each sow must be clearly marked with the 4 digit AA alloy. Alloy labeling must be DISTINCT from heat number or weight. This can be accomplished by using thicker lines, different color, circled, different media than other markings
- Must be indelible and legible after preheating to 250C
- Must be on **at least** 2 adjacent sides and at least 3" high
- Certificates of analysis and buttons must accompany all shipments.
- Sows must be marked with heat, cast number and iron level.
 - Novelis prefers stickers with the full analysis on each sow



To determine if a sow is low profile, take the width of the sow and divide it by the average depth. This value should be greater than or equal to 4.

$$\text{Width} = X + Y + X$$

$$\text{Avg. Depth} = \frac{[(A) * (X)] + [(B) * (Y)] + [(C) * (X)]}{X + Y + X}$$

$$\frac{\text{Width}}{\text{Avg. Depth}} \geq 4$$

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Scrap Type	Sow
Label Location	Adj. Sides
Paint	X
Sticker	X
Marker	X
Packing Slip	
Wired Tag	
Crayon	X

- 3.1 Double poured or sows showing non-continuous pouring will be rejected.** Double poured non-continuously poured sows will not be accepted at Novelis. Some examples of double poured sows follow:



3.2 Foreign Materials/Contamination

All shipments of material to be charged into Novelis furnaces and/or in contact with molten metal are inspected prior to accepting the material. Process materials, shipping containers and delivery vehicle (truck, railcars) are inspected for contamination. Foreign materials or contamination examples are listed below.

- Residual fertilizers, dry fire extinguishing powders, reactive chemicals (nitrates, sulfates, oxidizing material, etc.) are found on the metal and/or delivery vehicle Any powdery material shall be a suspect. A thorough evaluation of any powdery material is made before the shipment is received.
- Use of mold release agents
- Water of other volatile substances (liquid or solid)
- Heavy grease or oil
- Loads containing any types of desiccant (i.e. Silica gel)
- Garbage and trash that may contain cans, bottles or other objects that can trap moisture
- Salt fluxes that contain nitrates, sulfates, and oxidizing chemicals
- Corroded or oxidized material
- Crimped or closed end pieces of tubing, extrusions or containers that may contain water

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- Scrap contaminated with hazardous or toxic materials (PCB's, selenium, lead, cadmium, and radioactive materials)
- Miscellaneous contaminants such as batteries, butane lighters, live ammunition, medical waste, and aerosol cans

Steel Pin left in corner of sow



Potroom bath imbedded in sow



Rotary Furnace Flux Salt Contamination



Dirt and Gravel



Severely corroded/oxidized sow



Bone ash contamination on RSI sows



Mold Release Agent

Definition: Material used to allow easy removal of ingot from casting mold.

If the casting molds are in poor condition it often necessitates the excessive

use of mold release materials. Depending on the chemistry of the mold release agent there could be potential for explosion at Novelis or, calcium bearing mold release agents may contribute to elevated Calcium in the casting process which must be removed with expensive salt fluxes. Mold release agent residues are not permitted. Affected ingots are subject to rejection. Possible Remedy: Casting plant to replace worn molds and/or use less mold release material. Wash mold release agent from ingots before shipment to Novelis. RSI suppliers have had success using graphite as a mold release agent.



High profile sows will be instantly rejected.

All ingots must be skimmed. Un-skimmed or poorly skimmed ingots are unacceptable. A photo of a well-skimmed ingot is shown below in Figure 6.4a. Figure 6.4b shows a poorly skimmed ingot. Also see Figure 4a for a well-skimmed ingot example. Placing dross and skim in the bottom of a mold to be filled is also not acceptable. Packing dross against the mold wall of solidifying ingots is unacceptable. Pouring molten aluminum onto dross or skim is a potential safety issue for the sow casting plant as well as for Novelis. Un-skimmed ingots will be rejected. Poorly skimmed ingots and ingots with imbedded skim may be rejected.

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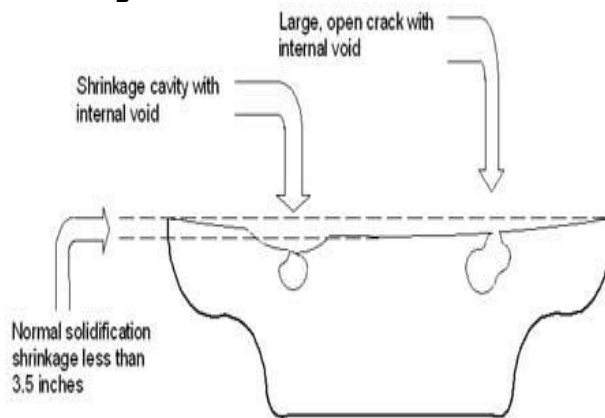


Ideally skimmed sow



Dross skim cast into ingot

4.0 Shrinkage Cavities and Voids



It is recommended not to top cool sows with water which are not 100% solidified. Top cooling produces larger shrinkage cavities which make it more difficult to eliminate moisture during preheat. Cooling from the bottom and sides of an ingot helps reduce the size of shrinkage cavities.

6.0 Prime

- Each piece to be marked with purity, Fe and Si content. It should be indelible and legible after preheating to 250C. Marking must be a minimum of 3" high.



Scrap Type	Tri - Lok
Label Location	Scrap Surface
Paint	X
Sticker	X
Marker	X
Packing Slip	X
Wired Tag	
Crayon	X



Scrap Type	T - Bar
Label Location	Scrap Surface
Paint	X
Sticker	X
Marker	X
Packing Slip	X
Wired Tag	
Crayon	X

6.1 Billet Prime

- Billet is to be palletized or on runners.
- Dimensions: (of pallet with scrap)
 - Width = 36" to 60"
 - Length = 36" to 60"



Scrap Type	Billet
Label Location	Scrap Surface
Paint	X
Sticker	X
Marker	X
Packing Slip	X
Wired Tag	
Crayon	X

7.0 Prime or RSI Documentation Policy

- Bill of lading (BOL, manifest) must reference the following information:
 - SRA / Authorization Number
 - PO Number
 - Supplier's name
 - Shipper's name and address
 - Number of pieces of each alloy
 - Description and alloy identification of product
 - Gross, tare, and net weight for each alloy

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- Failure to include tare weight on the BOL will result in deduction of 100 lbs per piece count
 - Customer's name and shipping date
 - Carrier's name, vehicle number/rail car number and seal numbers
 - Certificate of analysis must accompany the BOL
- The driver will be responsible for presenting the BOL
- All rail car shipments must have a copy of the BOL in an envelope attached to the "left" inside wall of the rail car, adjacent to the door
- Novelis will not be responsible for any detention or re-weighing charges resulting from improper documentation

8.0 Scrap Delivery and Unloading Policy

Please contact

- **Rear loaded trailers:**
 - Van style trucks should be loaded for rear unloading at all times. All rear loaded flatbeds must have sides and have a tarp
- **Side loaded trailers:**
 - Flat bed trailers should be loaded from the side. Anytime a trailer is loaded front to back that does not contain rigid sides, the truck will be subject to rejection of material cannot be offloaded safely.
- **Secured Loads:**
 - All material must be secured to prevent shifting during transit. If the load shifts and is unsafe or would require twice (or more) the amount of time than is allotted to that load, the load will be rejected. Consistent demonstration of poor loading practices will result in disqualification. Please consult your buyer if there are any questions about the allotted unloading time.
- **Delivery Schedule:**
 - In the interest of both parties as well as the shipping companies involved, efficient and safe delivery of material is critical for keeping shipping costs down. As a result, ALL MATERIAL must have a delivery appointment. Novelis is not responsible for any costs that may be incurred because a load arrives **before** a scheduled delivery appointment. Unloading hrs are 24 hours/day 7 days/week, unless specified.
 - All Prime/Rsi deliveries as well as any material purchased from an outside supplier must log into MPS web system to create SRA# and delivery appointment

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9.0 Prime/RSI Radiation Policy and Indemnification

- Supplier warrants that **none** of the material purchased or delivered is or contains radioactive materials.
- Supplier agrees to defend, indemnify and hold Novelis and its subsidiaries and affiliates, and its and their directors, officers, employees, agents and representatives ("Novelis Indemnities") from any and all claims, demands, damages, liabilities, costs, expenses and fees (including reasonable attorney's fees), arising out of, resulting from or relating to, in whole or in part, a breach of the foregoing warranty.
- The supplier understands that its material will be tested before and after acceptance by Novelis and Novelis has the right to revoke the acceptance of the materials at any time. If radioactive material is discovered, Novelis may, option without prior notice or approval from the supplier to undertake handling/ disposal of and/or clean up the radioactive material. All costs, fees and expenses associated with the handling, disposal and cleanup, and the return of the shipment whether or not undertaken exclusively by Novelis but will be the responsibility of the supplier, and the supplier shall release, defend, indemnify and exempt Novelis from any and all claims, demands, damages, liabilities, costs, expenses, fees and penalties arising out of, resulting from, or relating to, in whole or in part of: handling/disposal, and cleanup. Supplier further agrees to waive any claims, rights and defenses which it might otherwise have against Novelis Indemnities arising out of, resulting from or relating to the handling, disposal of, and clean up of the radioactive material by Novelis.
- Each purchase order is contingent upon the supplier's acceptance of these terms. Supplier acknowledges that delivery of any material to the Novelis is considered acceptance of these terms, and agrees that any terms and conditions contained in a proposal, quotation, acknowledgement, acceptance, invoice or other document of supplier which are different from or in addition to these terms and conditions shall not constitute a part of the purchase order and are hereby expressly rejected, and that no employee of the Novelis is authorized to or may waive or modify these terms.

10.0 Prime/RSI Rejection Policy

- Scrap Champion or Crew Leader determines if any part of the load is unacceptable for any of the preceding reasons involving safety, quality of material, signed purchase order or delivery.
- The Buyer will then notify supplier in regard to the rejection. The supplier is responsible for all freight and reloading costs to ship the rejected load from Novelis. Photos showing the cause for rejection will be sent to supplier.
- Rejected material must be removed promptly. If the rejected material is not removed within 5 business days, the rejected material will be sent collect to the vendor or location of the vendor's choice. This purchase order shall remain open subject to the original terms and conditions.