Steel Dynamics®
Roanoke Bar Division

Operating Procedure
Title: Inspection of Scrap

ATTACHMENT 1 - GENERAL SCRAP SPECIFICATIONS

General Information:

Mill Receiving Address – 20 30th St. NW Roanoke, VA 24017

Required Equipment – CB radio, hardhat, safety glasses with side shields, sleeved shirts, long pants, close-toed shoes

Failure to adhere to equipment requirements could result in denial of entry.

Safety Rules –

Adhere to all posted speed limits, stop signs, and railroad crossings.

Maximum capacity for a truck load is 84,000 lbs.

Drivers will remain in the vehicle while the trailer bed is in the air.

Trucks with dangerous side loads will not be accepted.

Trucks with mechanical dumping problems will not be accepted.

Failure to adhere to any safety requirements can result in suspension or being banned from SDI property.

Definitions:

“Downgrade” – When a particular grade of scrap is found to not conform to its represented grade, it may be, by agreement by SDI-RBD and supplier, accepted as an inferior grade of scrap.

“Decrement” – When scrap is found to have undesirable characteristics as outlined in the following specification, and the price of the material is reduced accordingly.

“Free of” – When specified to be “Free of”, the grade shall not contain any amount of prohibited material in any amount greater than that which is deemed harmful to the steelmaking process.

“Grade” – A classification of scrap type based upon Institute of Scrap Recycling Industries (ISRI) ferrous scrap classification or SDI-RBD/vendor description.

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The following specifications apply to all the scrap purchased by Steel Dynamics® Roanoke Bar Division (SD-RBD). All material is to be suitable and acceptable to SD-RBD based on inspection.

1. All grades of scrap shall not contain significant amounts of high-carbon or high-alloy steel (e.g. alloy steel, chrome plated steel, stainless steel, cast iron material, high manganese scrap, high silicon scrap); nonferrous metals (e.g. aluminum, copper, brass, lead,); non-metallics (e.g. dirt, wood, concrete, insulation, rubber, plastic, cloth, paper, oil, grease, or any other non metallic materials); or any other scrap deemed detrimental to our steel making processes.

2. All cut grades must fit into a 4’ x 2’ x 2’ space. Material outside of these values can face rejection due to being oversized.

3. Material containing lead will not be accepted (e.g. batteries, lead-based paints, gas tanks, metal guttering, other terne plated material, mufflers, tail pipes, motor blocks, wheel weights, babbitt, radiators, lead joints).

4. Loads having potentially explosive material (e.g. tanks, cylinders, aerosol cans, shocks, transmissions, torque converters, air conditioning units, gear boxes, metal guttering radiators, electric motors, any item likely to hold oil) will not be accepted.

5. Sealed units cannot be accepted. If a load contains sealed units, two 5 in. holes must be cut on each end before the load can be accepted. Sealed units should be situated in the load such that they are visible for inspection at SD-RBD. Cylinders can be accepted if they are cut in half through the barrel.

6. In the specifications, unless noted otherwise, the following maximum chemistry limits will apply.

0.45% max Cu (copper)	0.06% max Mo (molybdenum)
0.20% max Cr (chromium)	0.50% max Si (silicon)
1.65% max Mn (manganese)	0.05% max P (phosphorous)
0.25% max Ni (nickel)	0.05% max S (sulfur)
0.03% max Sn (tin)	

7. Material bought as "special low residual" scrap must not exceed the following maximum chemistry limits.

0.10% max Cu	0.02% max Mo	0.08% max Cr
0.25% max Si	0.90% max Mn	0.015% max P
0.08% max Ni	0.01% max S	0.01% max Sn

8. A car must not be top-dressed with material that does not constitute a major portion of the material in the car and precludes visual inspection of the car.

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9. #1 and #2 Bundles must be free of dirt and non-metallics at the center of the bundle.

10. SD-RBD must approve any exceptions to these specifications. On normal grades, SD-RBD may, at times, test other materials that may exceed the above chemistry on controlled usage. (Material will be rejected if delivered in a frameless trailer.)

11. All grades shall be free of hazardous materials, including, but limited to, asbestos, electronic waste (to the extent practicable), explosives, flammable material, hazardous waste, military scrap, oil-filled devices, radioactive material, or refrigerants.

12. All scrap must be depleted to the extent practicable of chlorinated plastics. Materials that may contain chlorinated plastics include, but are not limited to, consumer products, containers, or plastic motor vehicle components.

13. All scrap must be depleted to the extent practicable of mercury and mercury-containing materials. Materials that may contain mercury include but are not limited to mercury-wetted or -containing relays, switch gears, rectifiers, gauges, manometer, barometers, thermometers, and fluorescent lighting fixtures.

14. Any scrap received not meeting our scrap specification requirements will be subject to a downgrade or full rejection based on the severity of nonconforming material. If unloaded in a production area, immediate downgrade or rejection can occur with photographic documentation.

15. Supplier will be responsible for the cost of freight to return rejected scrap and for a downgrade that is not accepted by the supplier.

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SDI-RBD SCRAP SPECIFICATION REQUIREMENTS

Grade: #2 Shred	**Industry ID:** ISRI #s 210, 211, 212

Description:
- Iron and steel scrap, magnetically separated

Typical Appearance:



Typical Constituents:
- Automobiles
- Unprepared #1 heavy melt
- Unprepared #2 heavy melt
- Miscellaneous bailing and sheet scrap

Sizing	**Thickness (max)**	NA	**Minimum Density**	70 (lbs / ft^3)
	Length and Width (max)	4” x 10”		

Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	1.50	0.04	0.04	0.20	0.25	0.20	0.15	0.03	0.04

Prohibitions:
- Municipal scrap
- Incinerator scrap
- Lead coated
- Vitreous enameled materials
- Tin cans
- Excessive fluff
- Copper clad or plated steel
- Excessive copper wiring and motor winding
- Stampings
- Punchings
- Electrical material
- Free of dirt

Additional Notes:
- Cast iron content shall not exceed 2% by weight

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Grade: Plate and Structural	**Industry ID:** ISRI #s 231, 232, 236

Description:
- Clean cut structural and plate scrap, heavy gauge
- Clean cut structural shape crop ends, shearings, or broken steel wheels

Typical Appearance:



Typical Constituents:
- Structural Items
- Plates
- Large diameter pipe
- Heavy walled pipe

Sizing	**Thickness**			¼" - 8"		**Minimum Density**			50 (lbs / ft^3)
	Length and Width (max)			4' x 2'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	1.50	0.04	0.05	0.60	0.25	0.25	0.25	0.03	0.015

Prohibitions:
- Die blocks
- Cut up machinery
- Cam shafts
- Crank shafts
- Torque converters
- Cables and chains
- Springs
- Gears or gear boxes
- Transmissions
- Electrical panels
- Motors or motor blocks of any kind
- Counterweights
- Rebar
- Cast iron
- Free of dirt
- Galvanized

Additional Notes:
- Pipe and tubing with a diameter over 8" must be split

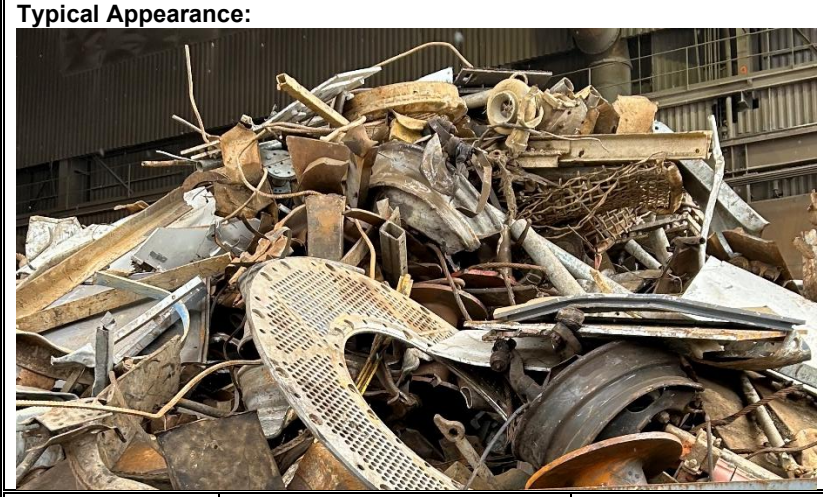
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Grade: #2 Heavy Melt | **Industry ID:** ISRI #s 203, 204, 205

Description:
- Steel scrap, black or galvanized 1/8” thickness and over
- May include automotive scrap if properly prepared
- Free of sheet iron and thin gage material

Typical Appearance:



Typical Constituents:
- Small diameter pipe
- Automotive wheel rims
- Reinforcing bar
- Prepared automotive parts
- Post-consumer steel goods
- Light-weight structural items
- Small machinery parts

Sizing	**Thickness**			1/8” - 8”		**Minimum Density**			40 (lbs / ft^3)
	Length and Width (max)			4’ x 2’					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)		0.04	0.07		0.6	0.25	0.25	0.05	0.05

Prohibitions:
- Municipal scrap
- Turnings
- Cables and chains
- Loose Wire
- Powder metallurgy parts and non-metallics
- Electrical steels
- Stainless steels
- Metal coated, for example tin or lead-coated materials
- Vitreous enameled materials
- White goods
- Electric motors
- Free of dirt

Additional Notes:
- Heavy walled pipe is acceptable up to 10% of load; over 4” must be split
- Rear ends, torque converters, and transmissions must have a 5” hole cut on both ends and drained
- Can contain up to 25% galvanized
- Cast iron is not to exceed 2% by weight.
- Hydraulic cylinders must be cut in half through the barrel and drained
- Pipe and tubing with a diameter over 8” must be split
- Rebar must not exceed 10% of load
- Car rims must not exceed 10% of load

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Grade: #1 Heavy Melt | **Industry ID:** ISRI #s 200, 201, 202

Description:
- Clean steel scrap at least ¼" thickness

Typical Appearance:



Typical Constituents:
- Structural Items
- Plates
- Truck Parts
- Large machinery parts

Sizing	Thickness			¼" - 8"		Minimum Density			50 (lbs / ft^3)
	Length and Width (max)			4' x 2'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)		0.05	0.05	0.50	0.35	0.25	0.25	0.06	0.03

Prohibitions:
- No uncut and undrained liquid-containing automotive scrap
- Cables and chains
- Powder metallurgy parts and non-metallics
- Electrical steels
- Stainless steels
- Metal coated, for example tin or lead-coated materials
- Vitreous enameled materials
- White goods
- Free of dirt
- Cast iron

Additional Notes:
- Heavy walled pipe is acceptable; over 4" must be split
- Dies must be "by approval" only
- Pipe and tubing with a diameter over 8" must be split

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Grade: Busheling	**Industry ID:** ISRI #s 207

Description:
- Clean steel scrap, including new factory busheling

Typical Appearance:



Typical Constituents:
- Sheet clippings
- Stamping
- Flashings

Sizing	**Thickness**			20 Gauge -		**Minimum Density**			55 (lbs / ft^3)
	Length and Width (max)			3' x 3'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	0.80	0.03	0.05	0.40	0.10	0.10	0.10	0.03	0.02

Prohibitions:
- Old auto body or fender stock
- Metal coated, for example tin or lead-coated materials
- Limes, vitreous enameled materials
- Free of dirt

Additional Notes:
- Electrical steel over 0.50% Si is prohibited

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Grade: #1 Bundles	**Industry ID:** ISRI #s 208

Description:
- Clean steel scrap, busheling, clippings, sheet, or skeleton scrap compressed into a bundle

Typical Appearance:



Typical Constituents:

Hydraulically compressed bundles consisting of:
- Busheling
- Clippings
- Punches
- Sheet steel

Sizing	**Thickness**			NA		**Minimum Density**			75 (lbs / ft^3)
	Length and Width (max)			4' x 2' x 2'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	1.50	0.05	0.05	0.50	0.10	0.10	0.10	0.03	0.01

Prohibitions:
- Auto body or fender stock
- Metal coated, for example tin or lead-coated materials
- Limes, vitreous enameled materials
- De-tinned materials
- Free of dirt
- Free of cast iron

Additional Notes:
- Maximum for all dimensions is 48"(4'), but no two dimensions can be over 24"(2')
  - Example, 48" x 24" x 24" is acceptable, 48" x 36" x 24" and 60" x 24" x 24" are not
- A maximum of 10% galvanized is allowable
- Minimum density is 75 lbs / ft^3

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Grade: #2 Bundles	**Industry ID:** ISRI #s 209, 218

Description:
- Old black and galvanized sheet steel hydraulically compressed into rectangular cubes
- Unprepared #2 heavy melt hydraulically compressed into rectangular cubes for the purpose of increasing density

Typical Appearance:



Typical Constituents:
- "post consumer" goods
- "white goods" (appliance shells)
- Used sheet goods (siding, canning stock, etc)
- Low density #2 heavy melt

Sizing	**Thickness**			NA		**Minimum Density**			60 (lbs / ft^3)
	Length and Width (max)			4' x 2' x 2'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	Maximum chemistries are difficult to determine due to large content variety from bundle to bundle								

Prohibitions:
- Metal coated, for example tin or lead-coated materials
- Limes, vitreous enameled materials
- De-tinned materials
- Motor blocks
- Transmissions
- Electrical motors
- Shock absorbers
- Tin cans
- Electrical materials
- Non-metallics within bundles
- Free of dirt
- Free of cast iron

Additional Notes:
- Maximum for all dimensions is 48"(4'), but no two dimensions can be over 24"(2')
  - Example, 48" x 24" x 24" is acceptable, 48" x 36" x 24" and 60" x 24" x 24" are not
- A maximum of 40% galvanized is allowable

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Grade: Turnings	**Industry ID:** ISRI #s 219, 220, 221, 222, 223

Description:
- Machine shop and/or short shoveling turnings.

Typical Appearance:



Typical Constituents:

Byproduct due to:
- Lathing
- Drilling
- Boring
- Machining
- Etc.

Sizing	**Thickness**			NA		**Minimum Density**			60 (lbs / ft^3)
	Length and Width (max)			NA					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)		0.10	0.08	0.20	0.40	0.70	0.80	0.03	0.03

Prohibitions:
- Must be less than 2 wt% oil
- Must be less than 3 wt% rust
- Must be less than 1 wt% water
- Scale
- Over-Oxidized
- Springy material
- Tangled material
- Matted material
- Free of cast iron
- Free of dirt

Additional Notes:

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Grade: A Scrap	**Industry ID:**

Description:
- Reprocessed slag and skulls

Typical Appearance:



Typical Constituents:
- EAF Slag
- LMF Slag
- Tundish Skulls
- EAF and LMF Skulls

Sizing	**Thickness**			NA		**Minimum Density**			40 (lbs / ft^3)
	Length and Width			4” x 4” - 4’ x 4’					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	Steel chemistry will be that of RBD product steel and slag chemistry will be that of RBD slag.								

Prohibitions:
- Must be at least 65 wt% steel (less than 40 wt% slag and dirt)
- Free of dirt

Additional Notes:

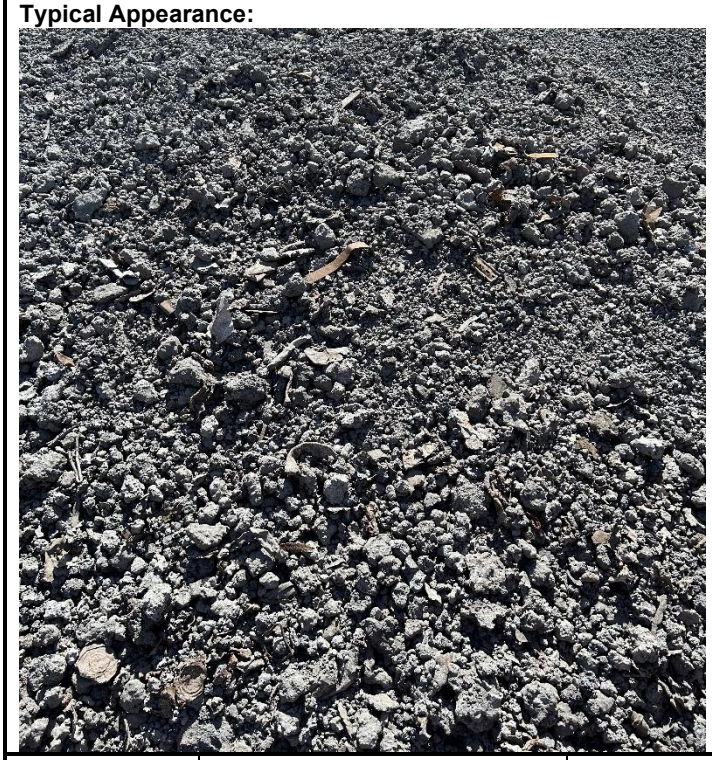
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Grade: B Scrap | **Industry ID:**

Description:
- Reprocessed slag and skulls

Typical Appearance:



Typical Constituents:
- EAF Slag
- LMF Slag
- Tundish Skulls
- EAF and LMF Skulls

Sizing	Thickness	NA	Minimum Density	90 (lbs / ft^3)
	Length and Width	¾" x ¾" - 4" x 4"		

Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	Steel chemistry will be that of RBD product steel and slag chemistry will be that of RBD slag.								

Prohibitions:
- Must be at least 45 wt% steel (less than 60 wt% slag and dirt)
- Free of dirt

Additional Notes:
- Only up to contractual maximum will B scrap be accepted

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For the following, a meltshop metallurgist should be contacted in order to resume the inspection:

Grade: Railroad rail and OTM	**Industry ID:** ISRI #s 4, 5, 6, 17, 18, 18A, 24, 27, 28A, 28B, 28C, 29

Description:
- Cropped railroad rail and other track material

Typical Appearance:



Typical Constituents:
- Railroad track
- Railroad spikes
- Fastening plates

Sizing	**Thickness**	NA	**Minimum Density**	50 (lbs / ft^3)
	Length and Width (max)	4’ x 4’		

Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	1.50	0.05	0.05	0.6	0.20	0.30	0.15	0.03	0.10

Prohibitions:
- OTM must be 3’ and under
- Railroad timbers
- Free of dirt

Additional Notes:
- Rail that is heavier than 80 lbs per yard will be cut to 4’ and below
- Rail that is lighter than 80 lbs per yard will be cut to 3’ and below

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Grade: Flashing | **Industry ID:**

Description:
- Shredded steel flashing and siding

Typical Appearance:



Typical Constituents:
- Flashing
- Siding

Sizing	Thickness (min)	1/8”	Minimum Density	50 (lbs / ft^3)
	Length and Width (max)	3’ x 3’		

Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)		0.02	0.02	0.30	0.10				

Prohibitions:
- Springy material
- Gushy material
- Tangled material
- Matted material
- Free of dirt

Additional Notes:
- Suitable for magnetic handling

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Grade: Galvanized #1 Busheling | **Industry ID:**

Description:
- Clean steel scrap, including new factory busheling

Typical Appearance:



Typical Constituents:
- sheet clippings
- stamping
- flashing

Sizing	**Thickness (min)**			20 gauge		**Minimum Density**			55 (lbs / ft^3)
	Length and Width (max)			3' x 3'					
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	0.60	0.02	0.02	0.30	0.10	0.08	0.08	0.02	0.02

Prohibitions:
- Old auto body or fender stock
- Tin or lead-coated materials
- Limes, vitreous enameled materials
- Free of dirt

Additional Notes:

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Grade: #1 Railroad Steel	**Industry ID:** ISRI #s 2, 2A, 3, 3A, 45, 45A

Description:
- Rail cars cut to length

Typical Appearance:



Typical Constituents:
- Bolsters
- Truck sides
- Frames
- Car sides

Sizing	**Thickness (min)**	3/16”	**Minimum Density**	50 (lbs / ft^3)
	Length and Width (max)	3’ x 2’		

Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)					0.5				

Prohibitions:
- Car sides may only be a maximum of 20 wt% of total load
- 3% rust
- Free of dirt

Additional Notes:

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Grade: Cast Iron | **Industry ID:** ISRI #s 12, 13, 14

Description:
- Automotive and other cast iron

Typical Appearance:



Typical Constituents:
- Automotive
- Machinery
- Wear components

Sizing	**Thickness**				NA		**Minimum Density**		55 (lbs / ft^3)
	Length and Width (max)				4' x 2'				
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)		0.03	0.07		0.4	0.15	0.20	0.04	0.03

Prohibitions:
- Oil exceeding 2 wt%
- Rust exceeding 2 wt%
- Free of dirt
- Scale
- Nonferrous metals

Additional Notes:
- Cast iron contains 2-3% Si and 2-4% C

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Grade: Railroad Wheels | **Industry ID:** ISRI # 42

Description:
- Railroad car wheels

Typical Appearance:



Typical Constituents:
- Railroad car wheels

Sizing									
	Thickness				NA			**Minimum Density**	65 (lbs / ft^3)
	Length and Width (max)				NA				
Chemistry	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn
Maximum (wt%)	1.50	0.04	0.04	0.30	0.25	0.30	0.20	0.03	0.02

Prohibitions:
- Oil exceeding 1 wt%
- Rust exceeding 2 wt%
- Free of dirt

Additional Notes:

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Appendix A: Examples of Non-Conformances

Low Density


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Copper, Lead, Aluminum


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Dirt and Concrete





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Sealed Containers





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Non-Metallics





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Rust and Oxidized Steel



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