

General Specification

SS 12 R5 – 17-4 DBLH1150

Material should conform to all requirements of the listed specifications, except as further modified by the more stringent or restrictive requirements listed in this document.

Surface/Finish Condition: Must be free of rust stains, grease and dirt.

- ≤ 1/2" annealed and bright drawn
- > 1/2" to 3" centerless ground or smooth turned and burnished/polished. 50 RMS or better.
- > 3" Pickled, blast cleaned, descaled or rough turned, and machine straightened. 140 RMS max.

Heat Treatment:

- Solution anneal at 1875-1925F (1026C-1054C) for at least 1 hour per inch of diameter, (minimum one hour total) and air cool or suitable liquid quench to below 90F (32C).

Harden (first age) at 1125F-1175F (604C-634C) for 30 minutes/inch of diameter, plus 4 hours minimum. Cool in air to below 90F (32C) before the second hardening step.

Harden (second age) at 1125-1175F (604-634C) for 30 minutes/inch of diameter, plus 4 hours minimum. Air cool to room temperature.

The time at temperature is measured from when the furnace atmosphere reaches the set point temperature.

- Unless the cross section thickness of the test coupon is equal to the production components it represents, the test coupon shall be heat-treated separately using the same procedure as the production components and for the same time per inch of cross section thickness.

Heat-treat charts to be available upon request.

Non Destructive Testing: <<<<

100% Ultrasonic Inspection must be preformed after heat treatment and prior to machining operations. The material shall be inspected using the following method:

- **Straight Beam Examination** method using FBH reference blocks per ASTM A388.
 - Flat Bottom Hole (FBH) reference standards shall contain the following reflectors:

Section Thickness	FBH
▪ Up to 1-1/2" (38mm)	– 1/16" (1.6mm)
▪ Over 1-1/2 through 6" (150mm)	– 1/8" (3.2mm)
▪ Over 6 - 1/4"	(6.4mm)

Tolerance:

Rough Turned Bar shipped to ENERGY STEEL PRODUCTS should typically have the following diameter tolerance to allow clean-up to size.

3"	to 3-1/2"	+ .020 /+ .035
Over	3-1/2" to 4-1/2"	+ .030 /+ .045
Over	4-1/2" to 5-1/2"	+ .040 /+ .060

Over 5-1/2" to 6-1/2"	+ .080 /+ .100
Over 6-1/2" to 8"	+ .090 /+ .120
Over 8" to 10"	+ .100 /+ .140
Over 10" to 12"	+ .100 /+ .140
Over 12" to 15"	+ .125 /+ .185
Over 15" to 22"	+ .125 /+ .200

Marking:

Waive continuous line marking. Each bundle must be tagged with E.S.P. PO#, bundle#, grade, size, heat#, net weight, and country of origin. For 1" and over stamp heat number on both ends of bar. No center holes on ends of bars.

Color Code:

Blue/White (both ends of each bar).

Length:

12' – 14' R/L unless otherwise specified.

Packing and Shipping Requirements:**BUNDLES:**

- Tagged with Size, Grade, Heat Number and Net weight, Purchase Order Number, piece count and Country of Origin.
- Maximum one heat per size per bundle.
- Flat bed trailers only.
- Material on 4 x 4 runners for quick unloading.
- 2000 - 2200 LB bundle weights, 1000 - 1200 LB bundle weights also accepted. 10% allowance for other bundle weights maximum 2500 lb. Houston
- Houston maximum weight allowance for single bars is 17,000 lb
- Atlanta maximum weight allowance for single bars is 7,000 lb
- Chicago maximum weight allowance for single bars is 10,000 lb

DELIVERY ALLOWANCE

± 10% of total weight ordered - overages are subject to return or price re-negotiation.

Minimum Acceptable Packaging - Bundles to be fully wrapped and metal strapped in a manner to prevent damage from handling or rust contamination during transportation. Strapping must not make direct contact with bars.

Bars shipped on a Less than container load(LCL) bars must be boxed if less than 1" in cross-section.

Maximum box height – 10"

DOCUMENTATION:

Each shipment requires a detailed Packing Slip and Mill Test Certificate. The detailed Packing Slip must state the Purchase Order Number, full product description, individual bundle quantities, in Lbs. Heat Number per bundle and preferably the ENERGY STEEL product code. The Mill Test Certificate must be written in English, stating the ENERGY STEEL Purchase Order Number, full description, Heat Number, quantity, Specifications and Requirements as listed in SS1Rev.4. Only legible ORIGINAL Mill Test Certificates are acceptable. Mill Test Certificates must be signed and Dated by an authorized person, including title.

Offshore Shipments - Packing slip and Mill Test Certificates must be issued immediately upon shipment to ensure receipt well before delivery.

Local Shipments - Packing Slip and LEGIBLE Mill Test Certificate must accompany shipment.

SHIPPING:

Off-shore Shipments – Containers must be properly blocked and braced to prevent shifting. Full container loads can be received in all locations except 40' containers in Houston. Load to be as close to container doors as possible to facilitate quick unloading. All 40' containers to Houston and Less than container loads to all locations must be received on a flat bed.

Local Shipments - Shipments to all locations must be on a flat bed unless prior approved.

All Loads to be packed on 4 X 4 runners and properly braced to avoid shifting.

SHIPPING ADVICE:

Offshore shipments - a copy of the packing slip must be faxed directly to the Receiving Branch within seven (7) days of shipping. Faxed copy must indicate date of sailing. Twenty-four hours delivery notice must be given on F.O.B. delivered shipments. Forwarding company to contact Receiving Branch.

Local Shipments - 24 hour delivery notice and copy of the packing slip are required by the Receiving Department for shipping approval. Shipments without prior notice are subject to refusal at the Vendor's cost.

ORDER ACKNOWLEDGEMENT:

Acknowledgement of Purchase Orders must be returned within fourteen (14) days.

EXPEDITING:

Deliveries must be confirmed within fourteen(14) days of order placement. Monthly updates of all outstanding orders must be issued directly to each branch with copy to purchasing. Updates must include items shipped but not yet received. Correspondence to be sent by fax or e-mail.

ENERGY STEEL PRODUCTS HOLDS THE RIGHT:

- To access the Vendor's premises for the purpose of performing audits, surveys, inspections and verification of Vendor's procedures, as well as compliance with contract.
- To have the same accessibility for Energy Steel Products customers relevant to the work performed.
- To reject material that does not meet all Specifications and Requirements. All costs associated to material rejection, including any inbound costs will be at the Vendor's account.
- To charge back to Vendor all costs associated to the rework of substandard material
- To refuse damaged shipments that were shipped F.O.B. delivered.
- Shipments received thirty (30) days before or after the required delivery date are subject to refusal or re-negotiation at Energy Steel Products option.

QUALITY RECORDS:

Vendor must maintain all quality records that relate to work or services performed for seven (7) years or for a retention period mutual agreed upon. Quality records must be readily available upon request.

EXCEPTIONS:

Requests for exceptions to material specification SS12 Rev. 5 must be submitted in writing and allowance given prior approval by Energy Steel Products

DIRECTOR OF PURCHASING

DATE

QUALITY ASSURANCE MANAGER

DATE

**VICE-PRESIDENT OF U.S. OPERATIONS,
ENERGY STEEL PRODUCTS**

DATE