

## General Specification

SS 11 R3 – 420 MOD

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.

### Heat Treatment: <<<<<<

Bars shall be furnished in the quenched and double tempered condition.

- Austenize at 1700°-1800° F.
  - Approximately ½ hr/in for austenitize
- Quench
  - Report quench medium used
- Temper at 1250°-1350° F.
- Second temper shall be at 1200°F minimum and at least 50° below first temper
  - Approximately 1 hr/in for tempering time shall be used as a guideline

All material shall be hot rotary straightened or stress relieved after cold straightening. When performed, stress relief temperature shall be at least 1200° F (650° C) minimum but below final tempering temperature.

Furnace and quench media temperatures shall comply with API-6A.

### MATERIAL SPECIFICATION - SS11 REV.3

### Non Destructive Testing <<<<

100% Ultrasonic Inspection must be performed after heat treatment and prior to machining operations. The material shall be inspected using **BOTH** of the following methods:

- **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)
- **Angle Beam Technique** per ASTM A388

### 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

## MATERIAL SPECIFICATION - SS11 REV.3

**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 heat treatment lot identification number should be stamped next to the heat/cast number on one end of each bar. No center holes on ends of bars.

**Color Code:** Black/Yellow (both ends of each bar).

**Length:** 16' – 24' R/L

### **Packing and Shipping Requirements:**

1. Tagged with Size, Grade, Heat Number and Net weight, Purchase Order Number, piece count and Country of Origin.
2. Maximum one heat per size per bundle.
3. Flat bed trailers only.
4. Material on 4 x 4 runners for quick unloading.
5. 2000 - 2200 LB bundle weights, 1000 - 1200 LB bundle weights also accepted. 10% allowance for other bundle weights maximum 2500 lb. Houston
6. Houston maximum weight allowance for single bars is 17,000 lb
7. Chicago maximum weight allowance for single bars is 10,000 lb

### **Documents:**

2 copies of MTR with shipments and 2 copies with invoice. Packing list to show country of origin, purchase order number, grade, color code, size, heat number, net weight in pounds.

MATERIAL SPECIFICATION - SS11 REV.3

\_\_\_\_\_  
DIRECTOR OF PURCHASING

\_\_\_\_\_  
DATE

\_\_\_\_\_  
QUALITY ASSURANCE MANAGER

\_\_\_\_\_  
DATE