26-744

GENERAL REQUIREMENT'S FOR RAW MATERIAL

1.0 PURPOSE

1.1. The purpose of this is to detail the requirements of inspection of raw materials.

2.0 RESPONSIBILITY

2.1. Manager Quality Assurance is responsible for inspection of raw materials.

3.0 REQUIREMENTS

3.1. **Chemical composition:** An analysis of each heat of steel shall be made by manufacturer, preferably from a ladle sample taken at or near the time of pouring. The listed elements shall be reported in weight percent. Reporting of residual elements is not required, but total residual must not exceed 1%. The elements hose quantities must be checked are Carbon, Manganese, Silicon, Sulphur, Phosphorus, Chromium, Molybdenum and Nickel.

3.2. **Mechanical Properties:** Each heat shall be tested and the listed mechanical properties shall be reported. Mechanical property tests required are Tensile strength, Yield strength, Elongation, Hardness.

3.3. **Hardenability:** The material shall meet the following Hardenability requirements when tested in accordance with ASTM A255 or ASE J 406 using an austenitizing temperature of 1700°F (925°C). A minimum of two specimens selected and identified to represent the maximum variation in hardenability throughout the heat, shall be reported. The actual austenitizing temperature used shall be reported.

3.4. **Grain Size:** The material shall be fine grained (5 or finer) when determined in accordance with ASTM E112.

3.5. **Inclusion Content:** The material shall have an average inclusion content not exceeding S3O2 when examined in accordance with ASTM E45, Method C, or SAE J422. Alternatively, the material shall have an average inclusion content not exceeding AT1.5AH1, BT1.5BH1, CT1.5CH1, DT1.5DH1 when examined in accordance with ASTM E45, Method A, or SAE J422. A sufficient number of specimens (preferably six or more) shall be examined and reported to establish conclusively that all material furnished meets the above requirement.

3.6. **Internal Soundness:** The material shall be sound, dense and free from injurious imperfections such as pipe, cracks, bursts, flakes, ruptures, porosity, segregation, spongy centre condition, excessive ingot pattern, and inclusion detrimental for forging and machining. A sufficient number of specimens, preferably six or more, shall be examined by macroetching in accordance with ASTM E381 to assure that all

material furnished meets the above requirement. Acceptance level shall be S2-R2-C3 or better. Rating shall be reported.

3.7. **Dimensions and Surface Quality:** Dimensional tolerances and surface quality shall be in accordance with the requirements of the ISS Steel Bar Product Guidelines.

3.8. **Ultrasonic Testing:** Ultrasonic testing of the raw material must be done in order to check internal faults present in the material. The report shall be submitted.

4.0 MARKING

4.1. Each piece shall be identified by the heat number and appropriate color coding must be done on it.

5.0 DOCUMENTATION REQUIRED

5.1. Mill Certificate of the raw material is required containing certificates of Composition Test, Heat Treatment, and Metallographic Test, Mechanical property Test, Hardenability Test, Inclusion Content Test, Internal Soundness Test, Dimensional and Surface Quality Test and Ultrasonic Test.

APPLICABLE DOCUMENTS

ISS-Steel-Bar	
SAE-J406	Method of Determining Hardenability of Steel
SAE-J422	Microscopic Determination of Inclusion in Steel
ASTM-A255	Test Method for End-Quench Test for Hardenability of Steel
ASTM-E112	Test Method for Determining Average Grain Size
ASTM-E45	Test Method for Determining the Inclusion Content of Steel
ASTM-E381	Method of Micro etch Testing Steel Bars, Billets, Blooms, and Forgings