1.0 OBJECTIVE

To provide a general purpose low carbon steel bar stock and forging material which is suitable for case hardening and can be readily formed and welded.

2.0 CITED

See Master Index or attached Annex for a complete list of Citing & Cited Documents.

3.0 REQUIREMENTS

Standard Grade

AISI/SAE C1018

Chemical Composition (% Ladle Analysis)

Carbon	0.15 – 0.20
Manganese	0.60 – 0.90
Phosphorus	0.040 maximum
Sulfur	0.050 maximum

Alternate Specifications

Chinese: Grade 20 or Grade 15 or Grade 15Mn per GB/T 699-1999
Japanese: Grade S20CK per JIS G4051
European: Grade 15E per EN 10084

Quality

Bar Stock	Special Bar Quality
Forgings	Fully Killed, Fine Grain Practice as determined by ASTM E112

Condition

Bar Stock	As Rolled
Forgings	As Forged

Dimensional Tolerances

Bar Stock	As stated within ASTM A29/A29M
Forgings	Commercial forging tolerances unless otherwise specified

Certification

The supplier shall include with each material lot shipped to Hyster-Yale Group a statement certifying compliance with the HC-1 requirements signed by an authorized representative of the supplier.

4.0 ENGINEERING INFORMATION (Not Part of Requirement)

Application

This material has good machinability, formability, weldability, and can be case hardened for wear resistance. It is readily available in round, flat, square, and hexagon bar stock and forgings.

Typical mechanical properties of hot rolled bar stock which can be used as a design guideline are:

Tensile Strength, psi (MPa)	58,000 (400)
Yield Strength, psi (MPa)	32,000 (220)
Elongation, % in 2”	25
Reduction of area, %	50
Hardness, HB	115

Method of Specifying

HC-1

Annex

AISI/SAE C1018, Mild/Low Carbon Steel

ASTM A29/A29M, Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought

ASTM E112, Standard Test Methods for Determining Average Grain Size

EN 10084, Case Hardening Steels

GB/T 699, Quality Carbon Structural Steels

JIS G4051, Carbon Steel for Machine Structural Use