



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

This specification has been superseded by CNH Material Specification MAT1067 (87021644), Cold Drawn Stress Relieved, or Elevated Temperature Drawn Medium Carbon Steel Free Machining Bar. CNH MAT1067 Grade A shall be specified on all applicable new and updated drawings. For information about superseded specifications refer to ENS0050 (87523699).

Superseded Specification and Material Form		CNH Material Specification / Grade
MS-395, 1144	Bar	CNH MAT1067, Grade A

The controlled versions of CNH specifications and standards are published on the CNH Intranet site.

The documents are also available on the CNH electronic viewing system (e.g. eViewer). Suppliers are able to access these documents on CSCN (CNH Supplier Communications Network).

For existing drawings the superseded specification is available for viewing following this page and remains applicable until a drawing is updated to the new specification. See CNH MAT1003 (86979049) Metallic Material Designations on Engineering Drawings for additional information regarding updating specified materials.

Supersedes Issue:	Dated:
MS-395	MAR96

Page:
1 of 6



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

1. SCOPE

- 1.1 This specification covers Case Corporation requirements for cold drawn stress relieved steel commodities.
- 1.2 Steels are called out in this specification by AISI/SAE designations. Each designation describes a different combination of physical and mechanical property requirements. Steels with identical physical and mechanical properties may be named differently in other parts of the world, such as by AFNOR designation in France, DIN designation in Germany or BS designation in Great Britain. Any steel meeting all requirements of the AISI/SAE designation specified on a Case drawing, regardless of its local name in that particular area of the world, is acceptable for use on that part. No additional material notes on the drawing, or requests to use that local steel are necessary.
- 1.3 Commodities covered by this specification are produced as rounds and hexagons.
- 1.4 Where applicable, requirements are stated in both metric (SI) and US customary (pound, inch, etc.) units. Values in one system are not exact equivalents of values in the other. Therefore, each system must be used independently and each set of values regarded as a separate set of requirements. In determining conformance to this specification, no mixing of specification values is permissible.
- 1.5 This specification may involve hazardous materials, apparatus, and procedures. This specification does not claim to address all of the safety issues associated with its use and application. Specification users bear responsibility for consulting appropriate safety or health practices and determining the applicability of regulatory limitations prior to use.

2. REQUIREMENTS

2.1 Chemical Analysis

Requirements shown are for cast or heat analysis; permissible variations from these limits, for check or product analysis, are given in ASTM A29 or SAE J409. Although limits are not specified for titanium and columbium, the amounts of these elements shall be reported; if the analysis of any of these elements is less than 0.008%, it may be reported as <0.008%. Small quantities of other elements, which are not specified or required, may be found in these steels; these are acceptable in the following maximum amounts (cast or heat analysis): 0.35% copper, 0.25% nickel, 0.20% chromium, 0.06% molybdenum, and 0.0005% boron.

Supersedes Issue:	Dated:
MS-395	MAR96

Page:
2 of 6



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

2.1 Chemical Analysis (continued)

Grade	Cast or Heat Analysis, mass %					
	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Aluminum
1045	0.43 - 0.50	0.60 - 0.90	0.030 max	0.050 max	0.15 - 0.35	0.015 - 0.060*
1050	0.48 - 0.55	0.60 - 0.90	0.030 max	0.050 max	0.15 - 0.35	0.015 - 0.060*
1141	0.37 - 0.45	1.35 - 1.65	0.030 max	0.08 - 0.13	0.10 max	---
1144	0.40 - 0.48	1.35 - 1.65	0.030 max	0.24 - 0.33	0.15 - 0.35	---

* This requirement is waived if grain refinement is accomplished using 0.050% minimum vanadium.

2.2 Mechanical Properties

All grades of steel in all commodity sizes supplied to this specification shall exhibit 690 MPa (100000 psi) minimum yield strength.

2.3 Metallurgy

2.3.1 Steel for commodities supplied to this specification shall be cold drawn and stress relieved from hot rolled product made by open hearth, electric furnace, or oxygen steel making practice.

2.3.2 Steel for Grades 1045 and 1050 shall be fully deoxidized with silicon, aluminum, or both and treated with aluminum or vanadium, as specified, to produce an average austenitic grain size of ASTM 5 or finer. Steel exhibiting duplex grain structure is unacceptable. Steel for Grades 1141 and 1144 may be semi-killed and coarse grained.

2.3.3 Strand cast product may be supplied provided it receives a 7 to 1 minimum reduction from cast size to final size, meets all other requirements of this specification, and is produced at a facility that has been approved by Case Materials Engineering; see the Case Qualified Sources and Products List.

2.3.4 For Grades 1045 and 1050, steel cleanliness shall meet the following requirements. No sulfide or silicate inclusion shall exceed 30 microns (0.0012 inches) in width and no alumina or globular oxide inclusion shall exceed 30 microns (0.0012 inches) in any dimension. Oxygen content shall not exceed 60 parts per million (0.006%) by weight.

Type A Sulfides		Type B Alumina		Type C Silicates		Type D Globular Oxides	
Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
3.5	3.0	3.0	2.5	3.0	2.5	2.5	2.0

Supersedes Issue: MS-395
Dated: MAR96

Page: 3 of 6



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

2.3 Metallurgy (continued)

2.3.5 Cold drawn stress relieved commodities shall be produced from special quality hot rolled steel. Special quality hot rolled steel is homogeneous, free of visible pipe, and conditioned as needed to remove any injurious surface imperfections. After cold drawing, bars shall be stress relieved at 150°C (300°F) minimum.

2.4 Dimensional Tolerances

2.4.1 Rounds

SI Units		U.S. Customary Units	
Bar Diameter, mm	Tolerance, mm	Bar Diameter, inches	Tolerance, inches
6 to 35, incl	+0, -0.10	1/4 to 1½, incl	+0, -0.004
over 35 to 60, incl	+0, -0.13	over 1½ to 2½, incl	+0, -0.005
over 60 to 100, incl	+0, -0.15	over 2½ to 4, incl	+0, -0.006
over 100 to 120, incl	+0, -0.18	over 4 to 4½, incl	+0, -0.007

2.4.2 Hexagons

SI Units		U.S. Customary Units	
Distance Between Opposite Sides, mm	Tolerance, Mm	Distance Between Opposite Sides, inches	Tolerance, inches
8 to 19, incl	+0, -0.10	1/4 to 3/4, incl	+0, -0.004
over 19 to 38, incl	+0, -0.13	over 3/4 to 1½, incl	+0, -0.005
over 38 to 50, incl	+0, -0.15	over 1½ to 2, incl	+0, -0.006

2.5 Material Condition Options

It is sometimes cost effective to use material with special conditions that are available from steel producers at an extra price. Material condition options are listed in Case MS 302. Case Manufacturing or part suppliers may, at their discretion, order and use material with any of these options, except where a particular option or options are specified on the drawing.

2.6 Identification

The supplier shall furnish the purchaser with a report identifying the supplier's name, steel grade, product size, lot number, cast or heat analysis, Case raw material code number if applicable, and this Case MS specification number. Shipments shall be appropriately identified with the same information.

Supersedes Issue:	Dated:
MS-395	MAR96

Page:
4 of 6



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

3. METHODS OF TEST

3.1 All test designations are latest issue unless otherwise specified. Suppliers are not required to perform the specific test procedures cited but must ascertain that their products will conform to the specification limits when tested by the specified methods. However, the specified methods will be used to reconcile disputed results.

3.2 Test methods are available from the following sources.

3.2.1 Case MT test methods are available through Case Purchasing in accordance with the provisions of Case Corporate Policy 4-318.

3.2.2 ASTM test methods are available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

3.2.3 SAE documents are available from SAE, 400 Commonwealth Drive, Warrendale, PA 19096-0001.

3.3 Mechanical Properties

Test according to ASTM A370. Test specimens shall be longitudinal. They may be full thickness specimens or specimens machined to reduced dimensions as shown in ASTM A370. If specimens machined to reduced dimensions are used, they shall be taken from a position midway between the center and the surface of the commodity. Machined surfaces of test specimens shall have a surface finish no rougher than 1.6 micrometers AA (63 micro inches AA) maximum.

3.4 Metallurgy

Measure austenitic grain size per Case MT 301, Austenitic Grain Size by Thermal Etch. Measure cleanliness per ASTM E45 Method A.

4. SOURCE APPROVAL

Source approval by Case Materials Engineering is required if the steel provided to this specification is strand cast. Approved strand cast sources are tabulated in the Case Qualified Sources and Products List. In accordance with Case Policy and Procedure 4-318, only Case Purchasing is authorized to distribute this information outside the Company.

5. NEW SOURCES

No shipments of strand cast steel shall be made by a new source until the producing facility has been approved by Case Materials Engineering. When requested by Case Materials Engineering, the supplier shall furnish steel samples for qualification. Strand cast steel samples submitted for qualification shall be accompanied by detailed test information and certification that the steel meets all the requirements of this specification.

Supersedes Issue:	Dated:
MS-395	MAR96

Page:
5 of 6



Material Specifications

Number:	MS-395
Date Issued:	A-OCT07

COLD DRAWN STRESS RELIEVED CARBON STEEL (Superseded)

6. INSPECTION AND REJECTION

Shipments of strand cast steel against contracts or purchase orders citing this specification shall be produced at the same facility using the same steel making practices approved by Case Materials Engineering. While the purchaser may test strand cast steel samples from incoming shipments for quality assurance purposes, the supplier is responsible for ensuring that shipments meet the stated requirements without depending upon purchaser's inspection. In this regard, suppliers are directed to the requirements of the latest revision of the Case Quality Assurance Manual available from Case Corporate Purchasing, Racine, WI 53403.

7. DESIGNATION ON DRAWINGS AND PURCHASE ORDERS

7.1 Drawings

Material designation on drawings shall include the generic name, this Case materials specification number, steel grade or grades, and any options required for Engineering reasons.

Example: Cold drawn stress relieved carbon steel, Case MS 395, 1045 or 1050

For all commodities, material dimensions shall be specified in the body of the drawing and not as part of the material note.

7.2 Purchase Orders

The purchase order shall indicate size, generic name, this specification number, the particular steel grade, and any additional requirements specified by Case Engineering and Case Manufacturing.

Example: 25 mm diameter cold drawn stress relieved carbon steel bar, Case MS 395, 1045

Supersedes Issue:	Dated:
MS-395	MAR96

Page:
6 of 6