ENGINEERING HEAT TREATMENT SPECIFICATIONS
Carburizing Shallow Cases
(Superseded)

This specification has been superseded by CNH Material Specification MAT4020 (87346991) Gas Carbonitriding. CNH MAT4020 shall be specified on all applicable new and updated drawings.

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).

The superseded specification remains available for viewing following this page if needed.

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1. Scope

This specification covers the shallow case hardening of steel parts and includes the following operations:

1.1 Carbonitride, or cyanide.

1.2 Quench.

1.3 Temper 350° minimum (if specified)

2. Application

This specification is intended for producing a shallow case (not exceeding 0.020 inches) on steel parts by adding carbon and nitrogen to produce an extremely hard structure upon quenching for resistance to wear, scratching, nicking, etc.

3.0 Procedure

3.1 Parts shall be clean and dry prior to heat treatment.

3.2 Parts are to be heated in a carbonitriding atmosphere with a carbon potential of 0.80 to 2.0. In the case of salt baths, the concentration must be maintained at a level to produce this carbon potential. The resultant case composition will depend on atmosphere composition and temperature.

3.3 Parts shall be heated to the following temperatures:

3.3.1 Case depths up to 0.010 inches: 1400-1550°F.

3.3.2 Case depths over 0.010 inches: 1550-1650°F.

3.4 Parts shall be direct quenched into one of the following media:

3.4.1 Oil – well agitated and maintained between 90-150°F.

3.4.2 Hot Oil (Modified Marquenching) - well agitated oil maintained between 275-350°F.

3.4.3 Molten Salt (Marquenching) – well agitated salt maintained between 400-600°F. (Temperature of bath determined by steel specified).

3.4.4 Water – mildly agitated water, caustic or brine.

3.5 Tempering shall be done at 350°F minimum for at least one hour (if specified).

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4.0 Interpretation of Print Requirements

4.1 Case Depth

4.1.1 Case depth will be measured as total case. The specified case depth shall be measured on the finished surface.

4.1.2 Total case depth is defined as the distance (measured perpendicularly) from the surface of the hardened case to a point where differences in chemical and physical properties of the case and core no loner can be distinguished.

4.1.3 The case depth of 0.004 to 0.009 will not have any subsequent stock removal.

4.1.4 Case depth of 0.010 to 0.020 may have a maximum of 0.005 inches on a side removed.

5.0 Specify on Drawing

Drawing shall specify the following: (See Appendix for examples)

5.1 Carbonitiride per Specification P-2

5.2 Case depth and surface hardness will be specified as follows:

5.2.1 0.004 to 0.009 inches – file hard per SAE J864 File No. 58.

5.2.2 0.010 to 0.020 inches – HR15N 89-93. (If surface is not ground, file hard is permissible)

5.3 Core hardness will be specified when important

5.4 Significant will be indicated as “wear surfaces”.

5.5 Temper when required.