

DETERMINATION OF CASE DEPTH - THROUGH HARDENED GEARED PARTS**Application**

This test method defines two alternative procedures for visual case depth determination of carburized/carbonitrided gears made from through hardening steels.

Apparatus Required**Cut-off Machine****Mounting Press and Mounting Media or Steel Clamps****Metallurgical Grinders**

With coolant supply or equivalent.

Polishing Papers

Grades 240 - 600

Polishing Machine**2 % Nital Etch Solution**

Concentrated nitric acid in alcohol.

Dry Air Blast**Metallurgical Microscope**

100X magnification with optical measuring device

Procedure A

Low Powered Optical Measuring Device 8X or 10X

Procedure B

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Date	Action	Revisions
2000 08 30	Revised	Editorial – no technical change A. Cockman
2000 05 22		Editorial – no technical change A. Cockman
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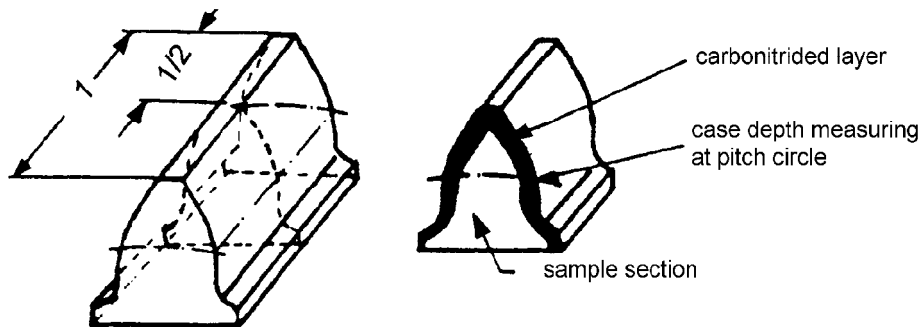
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Procedure A

The case depth should be measured only on stress relieved parts. Items in the as quenched condition should be stress relieved to the specified hardness prior to testing.

1. Cut a sample from one tooth of the gear as shown in the following sketch (unless otherwise specified on the blueprint).



Note: If no coolant is applied during the abrasive cutting operation, care must be taken to ensure that the temperature of the sample does not exceed 100 °C.

2. Clamp or mount the sample.
3. Prepare sample using the conventional metallographic grinding and polishing methods.
4. Immerse in the 2 % nital etching solution for 10 seconds. (23 +/- 2 °C)
5. Rinse immediately with water, and then alcohol and finally dry with hot air.
6. Examine microstructure of the case under the microscope at 100X magnification using the eyepiece.

Procedure B

This can be used for non stress relieved items.

Prepare sample as for Procedure A, up to and including Step 3. Then:

4. Temper the prepared sample at approx 260 °C.

A bunsen flame or hotplate can be used. When an overall blue temper colour is achieved, the sample is immediately quenched in water.