AEROSPACE RECOMMENDED PRACTICE

ARP1341™	REV. C

Issued 1974-12
Revised 2001-04
Reaffirmed 2018-08
Stabilized 2024-01

Superseding ARP1341B

Determining Decarburization and Carburization in Finished Parts of Carbon and Low-Alloy Steels

RATIONALE

ARP1341C has been declared "STABILIZED" by AMS Committee B. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because his document is no longer state of the art and other documents contain similar but not necessarily equivalent requirements.

NOTE: Previously this document was reaffirmed. The last technical update of this document occurred in April 2001. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification. In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

STABILIZED NOTICE

This document has been declared “STABILIZED” by SAE AMS B Finishes Processes and Fluids Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

AMS Committee B recommends that the following similar but not identical specification may be considered for future procurement. This listing does not constitute authority to substitute these specifications for the “STABILIZED” specification.

ARP1820 Chord Method of Evaluating Surface Microstructural Characteristics

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/ARP1341C/

1. SCOPE:

This document provides a recommended practice for determining decarburization and carburization in heat treated carbon and low-alloy steel parts other than case hardened parts. It is not applicable to raw materials.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 3	Preparation of Metallographic Specimens
ASTM E 384	Microhardness of Materials
ASTM E 407	Microetching Metals and Alloys

3. PROCEDURE:

3.1 Test Specimens:

3.1.1 Integral Specimens: A metallographic specimen shall be removed from the part after the part has been completely heat treated. Care should be taken in removing the specimen to avoid overheating the specimen.

3.1.2 Specimens from Separate Samples: A metallographic specimen shall be taken from a sample processed with the part. The sample shall be of the same grade of steel as the part, have the same surface condition as the part, and preferably be from the same heat of steel as the part. The sample shall be hardened and tempered with the part represented, using the specified procedure, except that, when specified, the sample shall be hardened but not tempered (See 5.1).

3.2 Preparation of Test Samples:

The metallographic specimen shall be taken transverse to the surface of the part of sample and shall be at least 0.250 inch (6.35 mm) thick. The specimen shall be prepared in accordance with ASTM E 3 and E 407.

3.3 Examination:

3.3.1 Visual: The etched specimen shall be examined under a microscope at 100X magnification, using a calibrated eyepiece.

3.3.2 Microhardness Survey: A microhardness traverse shall be made with a Knoop indenter and 200 grams load in accordance with ASTM E 384. A minimum of three hardness readings shall be taken to establish the specimen base hardness in an area at least 0.125 inch (3.18 mm) from the outside surface or at midradius or midthickness, whichever is less. Readings shall be taken at 0.001 inch (0.03 mm) intervals starting at 0.002 inch (0.05 mm) from the outside surface in a staggered pattern until the preestablished base hardness is reached. The hardness readings shall be plotted versus distance from the outside surface as shown in Figure 1.

4. DECARBURIZATION AND CARBURIZATION DETERMINATION:

4.1 Complete Decarburization (Free Ferrite):

Shall be determined by visual examination as in 3.3.1. The maximum and average depths shall be reported.

4.2 Total Decarburization (Complete plus partial):

Shall be determined by microhardness survey as in 3.3.2. The depth of total decarburization shall be as follows:

4.2.1 Hardened and Tempered Specimens: That depth below the surface at which the hardness is no more than 20 units on the Knoop scale lower than the base hardness, as illustrated in Figure 1.

4.2.2 Hardened Specimens: That depth below the surface at which the hardness is no more than 30 units on the Knoop scale lower than the base hardness.

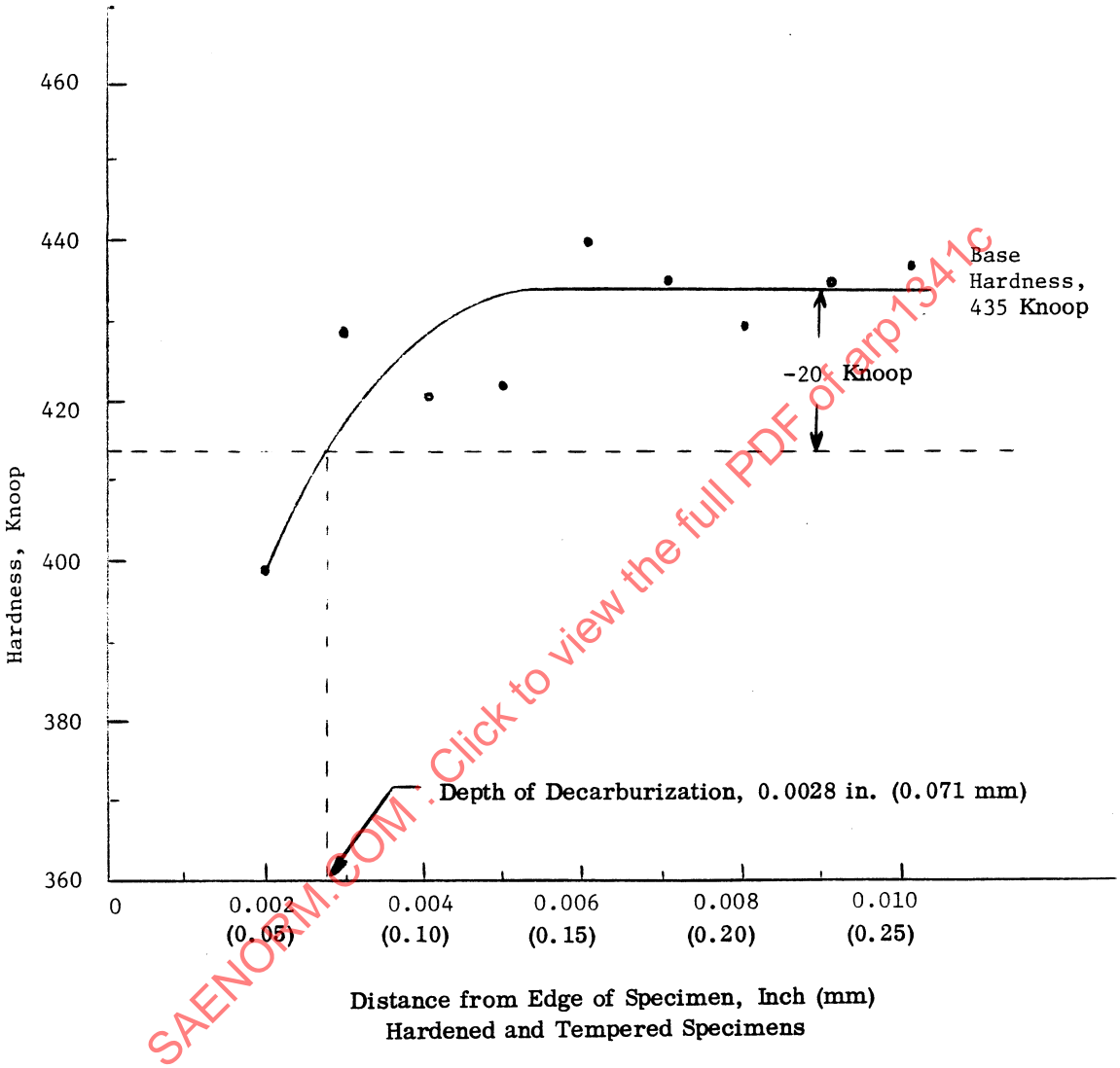

FIGURE 1 - Typical Microhardness Survey