



SURFACE VEHICLE RECOMMENDED PRACTICE

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Cleanliness Rating of Steels by the Magnetic Particle Method

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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1. Scope—This SAE Recommended Practice provides a rating procedure for the cleanliness rating of steels by the magnetic particle method. The procedure is based on counting the number of indications (frequency) and employs a weighted value to obtain a severity factor. The method outlined is similar to that described in SAE Aerospace Material Specification AMS 2301.

2. References

2.1 Applicable Document—The following publication forms a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE AMS 2301F—Aircraft Quality Steel Cleanliness, Magnetic Particle Inspection Procedure (1978)

2.2 Related Publication—The following publication is provided for information purposes only and is not a required part of this document.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

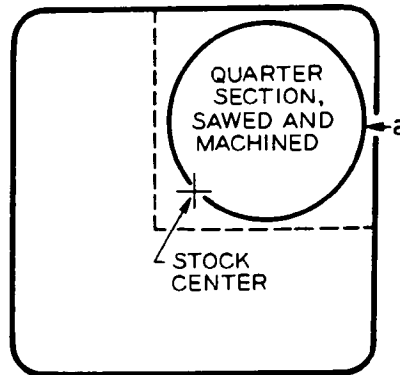
SAE J420—Magnetic Particle Inspection

3. Sampling—Experience has shown that sampling of steel is primarily a matter of agreement between producer and consumer. For heat qualification, unless otherwise agreed, a sample shall be taken from product representing the top and bottom of the first ingot and last usable ingot from heats having not over 10 ingots or not over 27 000 kg (30 tons) or from portions of heats within these limits; and from the top and bottom of the first ingot, middle ingot, and last usable ingot of heats having more than 10 ingots or over 27 000 kg (30 tons). Where ingot identity has not been maintained, specimens are taken from not less than 10% of the steel to be evaluated.

4. Test Specimens

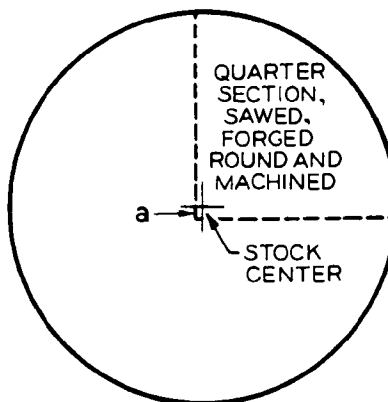
4.1 The specimens shall be prepared in accordance with the details given in 4.2. The recommended procedure for developing the specimens from blooms, billets, and bars, in round or square sections is as follows:

4.1.1 CROSS SECTION OVER 230 cm² (36 in²)—Cut a quarter section as shown in Figure 1 or 2 and develop the specimen by machining, or forging and machining, to a straight cylinder of a diameter between 6.4 and 15 cm (2-1/2 and 6 in). An alternative method is to forge or roll the full section to 15 cm (6 in) square or round and machine the quarter section in accordance with 3.1.2.



a — DENOTES DISTANCE EQUAL TO SURFACE REMOVAL
NOTE: METHOD ALSO APPLICABLE TO SQUARE SECTIONS

FIGURE 1—QUARTER SECTION SPECIMEN FROM SQUARE SECTION
FOR MAGNETIC PARTICLE TEST, MACHINE ONLY



a — DENOTES SURFACE REMOVAL
NOTE: THIS METHOD IS ALSO APPLICABLE TO ROUND SECTIONS

FIGURE 2—QUARTER SECTION SPECIMEN FROM ROUND SECTION
FOR MAGNETIC PARTICLE TEST, FORGING AND MACHINING

4.1.2 CROSS SECTION 100 TO 230 cm² (16 TO 36 in²) INCLUSIVE—Cut a quarter section as shown in Figure 1 or 2 and develop the specimen by machining, or forging and machining, to a straight cylinder of the largest possible diameter.