

de Havilland Inc.

Material Specification

TITLE:	NATIONALLOY #7 STEEL
SPECIFICATION NUMBER:	DHMS M2.12
ISSUE:	Original
AMENDMENT:	1-1
DATE:	November 23, 1964
PAGE:	1 of 7

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1 SCOPE

- 1.1 This specification covers the requirements for Nationalloy #7 steel rod, bar and forgings.

2 INTRODUCTION

- 2.1 The clauses of this specification are written under the following headings:

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3 APPLICABLE SPECIFICATIONS

3.1 Standards

AMS 2251C - Tolerances (Bar Stock)

QCD/M/C8 - Ultrasonic Inspection - Wrought Metalsl

AMS 2300A - Magnetic particle inspection - premium aircraft quality steel cleanliness

AMS 2808 - Identification of Forgings

4 REQUIREMENTS

4.1 Composition

Nationalloy #7 steel shall be composed of the following elements in percentage (%) by weight:

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4.1 Composition (Continued)

Nickel	2.25 - 3.00
Molybdenum	.30 - .50
Chromium	.80 - 1.20
Carbon	.30 - .40
Manganese	.60 - .90
Phosphorous	0.025 max.
Sulphur	0.025 max.
Silicon	.15 - .40
Vanadium	.20 max.

4.2 Condition

4.2.1 Bars & Forgings - shall be available in the fully annealed condition unless otherwise specified.

4.2.2 All forms of this material may be furnished in one of the following conditions as specified:

1. As forged or rolled
2. Pickled or blast cleaned
3. Rough turned
4. Cold drawn
5. Centerless ground

4.3 Manufacturing Process

4.3.1 The steel shall be vacuum degassed.

4.3.2 All billets shall be forged prior to rolling or drawing.

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4.3.3 The grain size shall be 4 or finer for cross-sectional areas up to 25 sq.ins. Grain size on larger cross-sectional areas shall be negotiated.

4.3.4 The material shall be supplied in the heat treated condition as specified on the applicable drawings or purchase order.

4.3.5 Test pieces shall be selected as directed in paragraph 7.

4.4 Analysis

An analysis check shall be made on one sample taken from each melt conforming to AMS 2248.

4.5 Workmanship

The product shall be uniform in quality, free of alloy segregation, sound and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

4.6 Tolerances

Tolerances shall be in accordance with those laid down in AMS 2251C unless otherwise specified.

5 **REPORTS**

5.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment, three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each thickness from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number, thickness, size and quantity from each heat.

5.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment, three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number and quantity. When material for making parts is produced or purchased by the

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parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

- 5.3 If forgings are supplied the Part Number and size of stock used to make the forgings shall also be included.

6 IDENTIFICATION

- 6.1 Unless otherwise specified, individual pieces or bundles shall have attached a metal tag stamped with DHMS M2.12, the purchase order number, nominal size and heat number or shall be boxed and the box marked with the same information.

In addition to the above information, flats 2 in. and larger in both dimensions and other bars 2 in. and over in diameter or distance between parallel sides shall be stamped with heat number within 2 in. of one end.

The characters shall not be less than 3/8" in height, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance. The characters shall be sufficiently stable to withstand ordinary handling.

- 6.2 Forgings shall be identified in accordance with the latest issue of AMS 2808.

7 TESTING

- 7.1 Rectangles having one dimension greater than 3 in. and the other dimension less than 3 in. test specimens should be removed in the long transverse direction at the centre position. If both dimensions exceed 3 in. transverse test specimens shall be removed as in Fig. 1.

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NOTE: Mechanical test specimens for forgings shall be taken as indicated by drawing. Where the drawing does not specify the location of test specimens, samples shall be taken from a forging in the longitudinal direction and in a section where the least reduction takes place.

7.2 Magnetic Particle Inspection

Magnetic particle inspection shall be done by the supplier in accordance with AMS 2300A.

7.3 Ultrasonic Inspection

Ultrasonic inspection shall be done by the supplier in accordance with the requirements of QCD/M/C8. Ultrasonic quality shall comply with the standards for steel to AMS 2300.

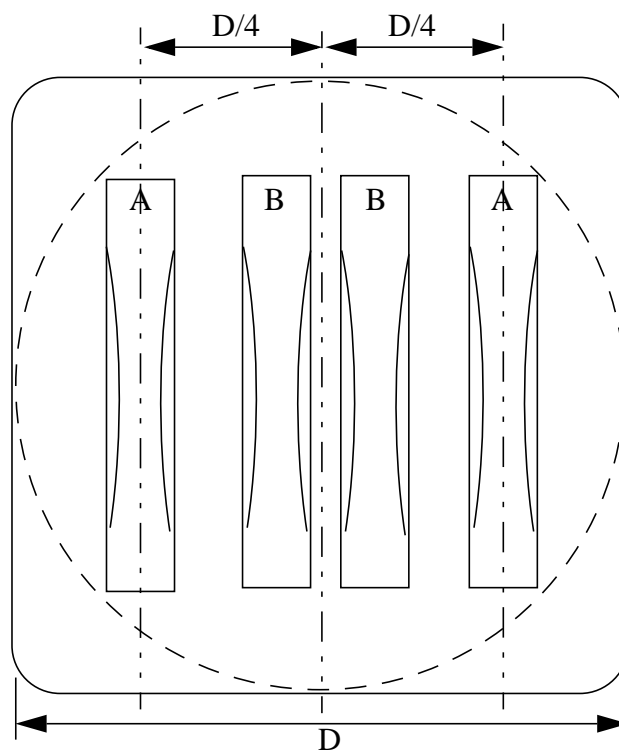
8 ORDERING DATA

8.1 Procurement documents should specify the following:

- Title, number and issue of this specification.
- Condition (4.2).
- Size and Shape.
- Exact lengths of length tolerances if manufacturer cannot comply with AMS 2251C.

9 REJECTIONS

9.1 Material not conforming to this specification or to authorized modifications will be subject to rejection.



A - Mid-radius

B - Center

Fig. 1 Location of transverse tensile specimens.

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