



PRODUCT STANDARD

GT 10145

GAS TURBINES

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Form No.

TD -106 --1 REV.-2

Ref Doc.

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HIGH TEMPERATURE SPRINGS - PROCESSING**1.0 SCOPE:**

1.1 These instructions cover the processing of materials for high temperature springs.

1.2 This specification contains the following classes.

A - Inconel X - 705°C Age

B - Inconel X - 1150°C soln. + 843°C Stabilise + 705 C° Age.

C - Inconel W - 705°C.

D - L-605 20% Cold reduced - 705°C

1.3 Existing drawings referencing this spec which do not carry class designations imply GT10145-A for Inconel-X or GT10145-C for Inconel-W. Drawings issued subsequent to the present revision of this spec must include Class designations.

2.0 APPLICABLE DOCUMENTS:

2.1 The following documents shall form a part of this spec to the extent specified herein. Unless a specific issue is specified, the latest revision shall apply.

HY12764 - INCON EL X 750 SHEET AND WIRE

INCON EL W SHEET

HY12461 - L 605 SHEET & STRIP

3.0 DEFINITIONS

None

4.0 ENGINEERING REQUIREMENTS**4.1 Shearing:**

When using sheet stock, the material must be sheared so that the "GRAIN" of the metal (direction of rolling) is parallel to the length of the spring.

4.2 Burring:

Shearing nicks & burrs shall be removed as required.

Revision

01

Date

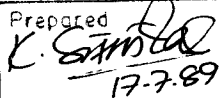
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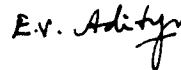
GAS TURBINES

HYDERABAD-500 032 (INDIA)

Prepared


17-7-89

Approved


E.V. Adityan

Date

2.3.90

STANDARDS

Prepared:





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4.3 Heat treatment

REV 01

4.3.1 All material shall be chemically clean and free from foreign material such as scale, dirt grease, and oil. Material shall be cleaned immediately prior to heat treatment and shall then be handled in a manner to prevent contamination by grease, oil, dirt, chlorides and other foreign material.

4.3.2 It is imperative that the heat treating be done in a sulphur free atmosphere, therefore, all heat treating should be done in an electrically heated furnace.

4.3.3 If it is necessary to keep the flatness within tolerances, the springs shall be heat treated while stocked in a fixture under pressure.

4.3.4 Class A, C, D.

Heat treat the formed springs at 705 Deg.C for 20 hours in vacuum, argon or helium. Gas cool in argon or helium. See 7.0. for H.T Cycle details. (SEE SH.4)

4.3.5 Class B:

Heat treat the formed springs in Vacuum at 1150 Deg.C for 2 hours. Argon or helium cool. Stabilise heat treat at 840 Deg.C for 24 hours. Gas cool in Argon or Helium. Age at 705 Deg.C for 20 hours. Gas cool in argon or helium.

4.3.6 All temperatures are ± 15 Deg.C

4.3.7 All times are metal time at temperature.

4.4. HARDNESS:

4.4.1 Hardness requirements of finished parts shall be as follows.

Inconel X - Rockwell A (minimum) 65.5

Inconel W - Rockwell A (Minimum) 62.0

L - 605 Rockwell A (minimum) 71.5

5.0 QUALITY ASSURANCE REQUIREMENTS

5.1 Hardness



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REV 01

5.1.1 Each heat treating lot shall be checked for hardness. Testing may be preferred on actual parts or on test material of same thickness which has been heat treated with the lot.

5.1.2 Hardness tests on actual parts may only be performed in areas set forth on the applicable drawing or as specifically approved by Gas Turbine Designs Department.

5.2 Intergranular Attack:

5.2.1 Each heat treating lot shall be examined for IGA. Testing shall be performed on material from actual parts within the lot.

5.2.2 Inspection for IGA shall be performed on the cross section of the specimen at 500X magnification in the *unetched* condition.

5.2.3 There shall be no indication of the IGA, finger type attack at surface grain boundaries. Any lot showing IGA of this type shall be scrapped.

5.3 All springs shall be inspected for burrs and any other surface defects.

5.4 Indentification:

Each spring must be identified by a permanent marking on one end as follows.

5.4.1 "X" to denote Inconel X (HY 12764)

5.4.2 "W" to denote Inconel W

5.4.3 "L" to denote L-605 (HY 12461)

This requirement does not apply when the size of the spring does not permit marking.

6.0 NOTES

Not applicable



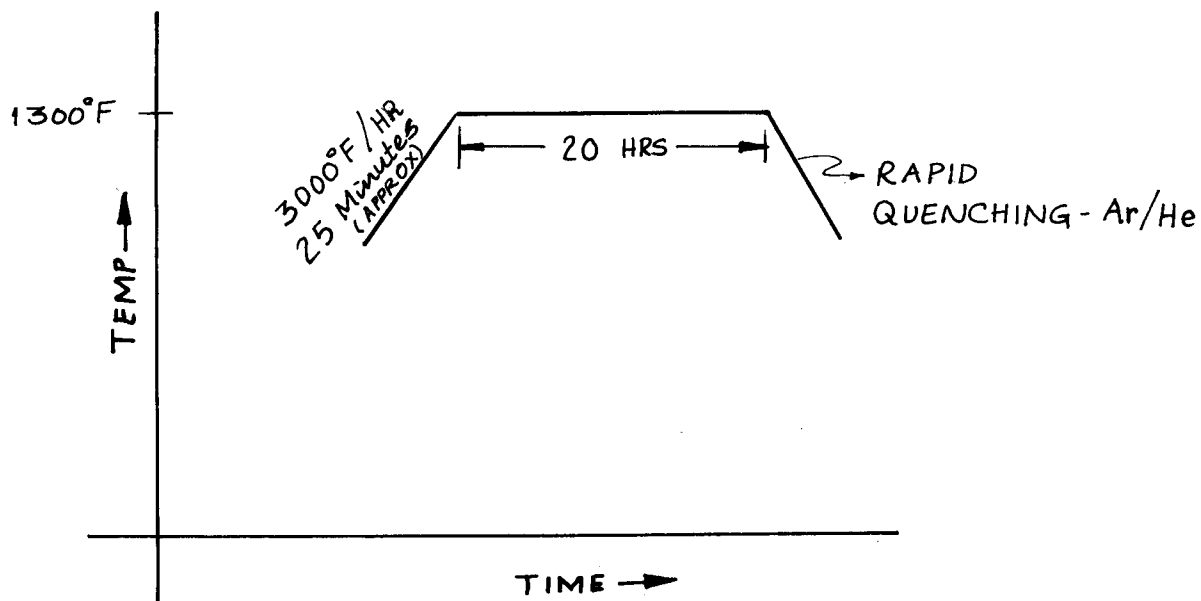
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7.0 HEAT TREATMENT CYCLE :



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FORM No.

TD-106-2 REV. 2

Ref:

P3C-A611

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		Rev. No.	Date	Revision Details	Revised	Approved
		00	02.03.90	First Made	KS	EVA
		01	06.04.21	REVISION SHEET ADDED	CNK	KDG

