

REVISED MARCH 1963

NONFERROUS ALLOYS

1 GENERAL
This heat treatable nickel base alloy is the columbium free variety of Inconel Alloy X 750. It is used primarily in form of sheet, but the alloy is available in the same variety of forms as Inconel Alloy X 750. Only a limited amount of information relating specifically to this alloy is available and it is assembled below. In other respects the properties of Inconel Alloy 722 are nearly the same as those of Inconel Alloy X 750, which has replaced the former in most applications.

1.01 Commercial Designation. Inconel Alloy 722

1.02 Alternate Designations. Inconel "W" alloy.

1.03 Specifications. Table 1.03.

AMS	Form	Military
5541A	Sheet	

1.04 Composition. Table 1.04.

Source	AMS (1)	
	Min	Max
Carbon	-	0.08
Manganese	-	1.00
Silicon	-	0.7
Sulfur	-	0.01
Iron	5.0	9.0
Copper	-	0.50
Chromium	14.0	17.0
Aluminum	0.40	1.0
Cobalt (if determined)	-	1.0
Titanium	2.00	2.75
Nickel	Balance	

1.05 Heat Treatment

1.051 Stress relief. 1625 to 1675 F, 10 hr, air cool.
1.052 Anneal or solution treat. 1925 to 1975 F, 30 min, air cool.
1.053 Age annealed condition. 1300 to 1450 F. Recommended aging treatments are 1275 or 1325 F, 16 hr, air cool. (1) to 20 hr or 1375 F to 1425 F, 1 hr.

1.09 Special Considerations

1.091 Solution treating of this alloy at high temperatures (2100 F) should be avoided because subsequent small deformations reduce the high temperature properties.
1.092 Slow heating of welded parts may result in cracking.

2. PHYSICAL AND CHEMICAL PROPERTIES

2.01 Thermal Properties

2.014 Thermal expansion, Fig. 2.014.

2.02 Other Physical Properties

2.021 Density. 0.301 lb per cu in. 8.32 gr per cu cm.(3).
2.022 Electrical properties.
2.023 Magnetic properties. Alloy is nonmagnetic at room and elevated temperatures. Permeability at room temperature and 200 oersteds, 1.0021. Curie temperature, -125 F.

3. MECHANICAL PROPERTIES

3.01 Specified Mechanical Properties

3.011 AMS specified mechanical properties, Table 3.011.

Source	AMS (1)	
	Inconel W	
Alloy	Inconel W	
Form	0.025 to 0.25 in sheet	
Condition	Ann	Aged
F _{tu} , min	- ksi	140
max	- ksi	125
F _{ty} , min	- ksi	90
e, min	-percent	40
Hardness		
RC, min	-	23

3.03 Mechanical Properties at Various Temperatures

3.031 Short time tension properties

3.0311 Effect of test temperature on tensile properties of sheet, Fig. 3.0311.

3.04 Creep and Creep Rupture Properties

3.041 Creep rupture curves for sheet at 1000 to 1800 F, Fig. 3.041.

3.042 Master curves for 0.2 percent creep and creep rupture of aged sheet, Fig. 3.042.

3.06 Elastic Properties

3.061 Modulus of elasticity at room and elevated temperatures, Fig. 3.061.

Ni
15 Cr
7 Fe
2.5 Ti
0.7 Al

INCONEL
ALLOY 722

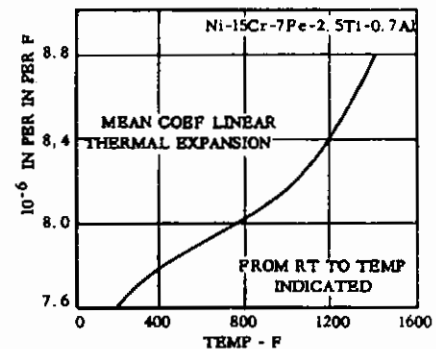


FIG. 2.014 THERMAL EXPANSION

(2, A4-157)

Ni
15 Cr
7 Fe
2.5 Ti
0.7 Al

INCONEL
ALLOY 722

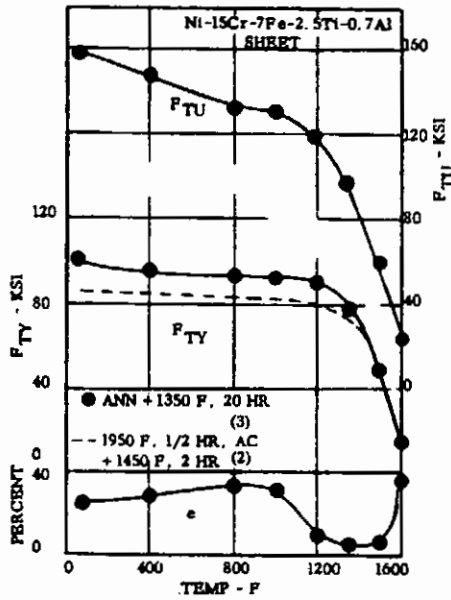


FIG. 3.0311 EFFECT OF TEST TEMPERATURE ON TENSILE PROPERTIES OF SHEET (2X3, p. 15, Fig. 6)

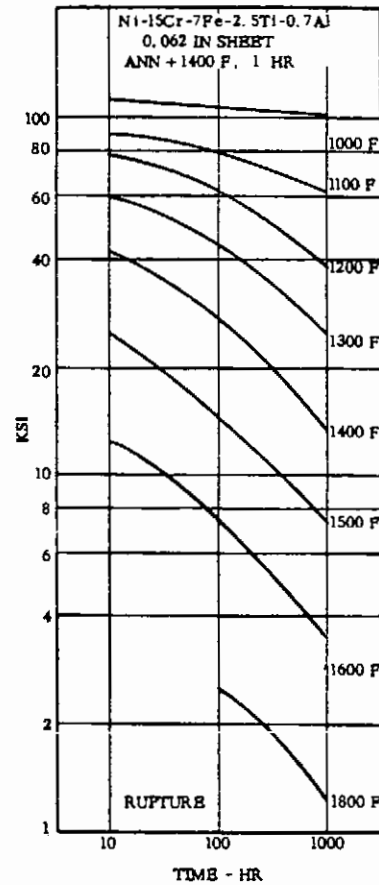


FIG. 3.041 CREEP RUPTURE CURVES FOR SHEET AT 1000 TO 1800 F (3, Fig. 3-5)

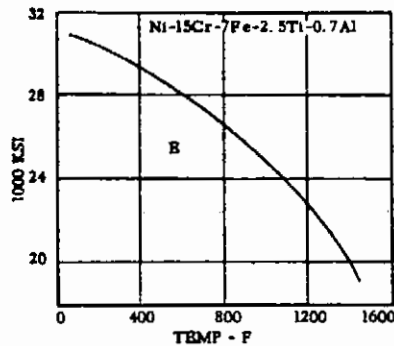


FIG. 3.061 MODULUS OF ELASTICITY AT ROOM AND ELEVATED TEMPERATURES (2, A4-157)

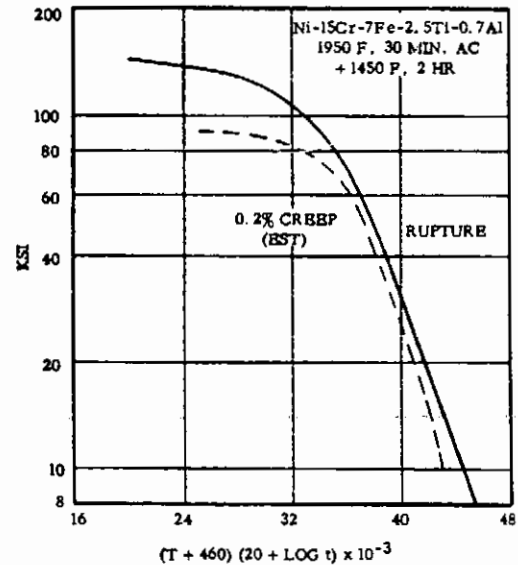


FIG. 3.042 MASTER CURVES FOR 0.2 PERCENT CREEP AND CREEP RUPTURE OF AGBD SHEET (2, A4-161, 162)

	Ni
15	Cr
7	Fe
2.5	Ti
0.7	Al

INCONEL
ALLOY 722

REFERENCES

- 1 AMS 5541, (1957)
- 2 General Electric Company, Technical Data, (Aug. 27, 1958)
- 3 International Nickel Company, Current Data Rep. No. 5, (Aug. 1957)

