

ALLOY 7075 & 7175

TYPICAL APPLICATIONS

- Aircraft Structural Parts
- Rivets
- Bolts

GENERAL INFORMATION

- Heat treatable
- ISO designation: AlZn5.5MgCu
- Principle alloying elements: Copper, Magnesium, Chromium, Zinc
- Applicable specifications: ASTM B316, QQ-A-430

TYPICAL PROPERTIES

Melting range: 890 - 1175°F
Conductivity: 40% IACS (-T73)
33% IACS (-T6)
Density: 0.101 lbs./cu. in.

Resistance to corrosion: -T6 C(Gen) D(SCC)
-T73 C(Gen) A(SCC)
Anodize Color: White
Workability Rating: B(-O) D(-T6)

CHEMISTRY 7075

<u>SILICON</u>	<u>IRON</u>	<u>COPPER</u>	<u>MANGANESE</u>	<u>MAGNESIUM</u>	<u>CHROMIUM</u>	<u>ZINC</u>	<u>TITANIUM</u>	<u>OTHERS</u>		<u>ALUM</u>
<u>EACH</u>	<u>TOTAL</u>	<u>ALUM</u>	<u>REM</u>							
0.40	0.50	1.2-2.0	0.30	2.1-2.9	0.18-0.28	5.1-6.1	0.20	0.05	0.15	REM

CHEMISTRY 7175

<u>SILICON</u>	<u>IRON</u>	<u>COPPER</u>	<u>MANGANESE</u>	<u>MAGNESIUM</u>	<u>CHROMIUM</u>	<u>ZINC</u>	<u>TITANIUM</u>	<u>OTHERS</u>		<u>ALUM</u>
<u>EACH</u>	<u>TOTAL</u>	<u>ALUM</u>	<u>REM</u>							
0.15	0.20	1.2-2.0	0.10	2.1-2.9	0.18-0.28	5.1-6.1	0.10	0.05	0.15	REM

NOTE: SINGLE VALUES ARE MAXIMUM UNLESS OTHERWISE NOTED.

ALLOY CHARACTERISTICS

ALLOY 7075 WAS ORIGINALLY DEVELOPED IN 1943. THE HIGH STRENGTH OF THE 7XXX SERIES OF ALLOYS WAS DESIRABLE FOR AIRCRAFT APPLICATIONS, HOWEVER, IT WAS NOT UNTIL THE DEVELOPMENT OF THE -T73 TEMPER THAT THE ALLOY BECAME COMMERCIALY VIABLE. THE COMBINATION OF HIGH STRENGTH, RESISTANCE TO STRESS CORROSION CRACKING (SCC) AND HIGH FRACTURE TOUGHNESS HAS MADE THE ALLOY A MAJOR FACTOR IN THE AEROSPACE INDUSTRY. THE ALLOY IS OFTEN UTILIZED IN COMPRESSIVE LOAD DESIGN CONSIDERATIONS.

ALLOYS 7075 AND 7175 ARE NOT CONSIDERED TO BE WELDABLE DUE TO EUTECTIC MELTING AND INTERGRANULAR CORROSION PROBLEMS IN THE HAZ DURING SERVICE AFTER WELDING. CONTACT ALCOTEC WIRE CORPORATION TO ANSWER ANY QUESTIONS CONCERNING THE WELDING OF THESE ALLOYS.

ALLOY 7175 IS TYPICALLY UTILIZED IN APPLICATIONS WHERE IMPROVED FORMABILITY AND TOUGHNESS ARE DESIRED.

AlcoTec Wire Corporation

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ALLOY CHARACTERISTICS CONTINUED

THE -T6 TEMPER DEVELOPES THE HIGHEST STRENGTHS IN THESE ALLOYS. THE TEMPER IS, HOWEVER, SUSCEPTABLE TO STRESS CORROSION CRACKING (SCC). SCC FAILURES ARE CAUSED BY A COMPLEX INTERACTION OF SUSTAINED TENSION LOADING AND CORROSIVE ATTACK ON THE MATERIAL. THE TENSION LOADING CAN DEVELOP DURING FORMING OR STRAIGHTENING OPERATIONS ON HEAT TREATED PARTS, EXTENSIVE MACHING OF HEAT TREATED PARTS, MIS-ALIGNMENT STRESSES, ETC. SCC MAY BE PROMOTED BY THE PRESENCE OF MOISTURE OR OTHER CONTAMINATES SUCH AS CLORIDES.

THE T-73 TEMPER EFFECTIVELY ELIMINATES THE DEVELOPMENT OF STRESS CORRSION CRACKING.

TYPICAL MECHANICAL PROPERTIES

<u>Temper</u>	<u>TUS(KSI)</u>	<u>YUS(KSI)</u>	<u>ELONG(%)</u>	<u>BHN</u>	<u>Shear(KSI)</u>	<u>Fatigue</u>
-O	37	15	17	60	22	---
-T6	83	73	11	150	48	23
-T73	73	63	13	140	42	22

TYPICAL BEND RADII – 90° COLD BENDS

<u>Temper</u>	<u>Thickness</u>					
	<u>.062"</u>	<u>.125"</u>	<u>.187"</u>	<u>.250"</u>	<u>.375"</u>	<u>.500"</u>
-O	1T	1T	1-1/2T	2-1/2T	3-1/2T	4T
-T6	5T	6T	6T	8T	9T	9-1/2T

NOTE: EXPRESSED IN TERMS OF SHEET AND PLATE THICKNESS (T).

TYPICAL BEND RADII – 180° COLD BENDS

<u>Temper</u>	<u>Thickness</u>			
	<u>.062"</u>	<u>.125"</u>	<u>.250"</u>	<u>.500"</u>
-T6	1/2 to 1-1/2D	1 to 2D	1-1/2 to 2-1/2D	2 to 3D

NOTE: EXPRESSED IN TERMS OF WIRE DIAMETER (D).

TYPICAL THERMAL TREATMENT

	<u>Metal Temperature</u>	<u>Temper</u>
Solution Heat Treatment	915 °F	-W
Precipitation Heat Treatment ¹	24 Hours @ 250 °F	-T6
Precipitation Heat Treatment ¹	6-8 Hours @ 225 °F Plus 8-10 Hours @ 350 °F	-T73
Anneal Practice ²	775 °F	-O

NOTE: (1) CONTROLLED DELAY PRIOR TO PRECIPITATION HEAT TREATMENT
(2) PROCEDURE REQUIRES A CONTOLLED COOLING RATE TO 500 °F

THIS INFORMATION IS BASED ON DATA DEVELOPED UNDER LABORATORY CONDITIONS AND IS DESIGNED AS A GUIDELINE ONLY. INDIVIDUAL CONDITIONS, WELDING EQUIPMENT AND ENVIRONMENT CAN AFFECT SUGGESTED SETTINGS.

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