



Brazing and Heat Treating

AS9100D & ISO 9001:2015 Certified

Heat Treating

- Nitriding
- Annealing
- Cryogenics
- Austempering
- Marquenching
- Stress Relieving
- Case Hardening
- Hardening and Tempering

Secondary Operations

- Straighten
- Blast (Sand, Bead)
- Degrease and Wash
- Helium Leak Detection
- Testing
- Staff Metallurgists
- Coordination with Others
- Turn-Key Manufacturing
- Thermal Fit

Joining

- Vacuum Braze
- Hydrogen Braze
- Partial Pressure Braze
- Torch Braze
- MIG and TIG Weld
- Silver Solder
- Low Temperature Soft Solder

Aluminum

- Heat Treating
- Soldering and Welding
- Secondary Operations

Temperature Conversion Chart

Temperature	Conversion
°C	°F
0	32
25	77
50	122
75	167
100	212
125	257
150	302
175	347
200	392
225	437
250	482
275	527
300	572
325	617
350	662
375	707
400	752
425	797
450	842
475	887
500	932
525	977
550	1022
575	1067
600	1112
625	1157
650	1202
675	1247
700	1292
725	1337
750	1382
775	1427
800	1472
825	1517
850	1562
875	1607
900	1652
925	1697
950	1742
975	1787
1000	1832
1025	1877
1050	1922
1075	1967
1100	2012

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Calculations

to convert °F to °C
 $(°F - 32) / 1.8 = °C$

to convert °C to °F
 $(°C \times 1.8) + 32 = °F$

Heat Treating

Case Hardening

- Carburizing
- Nitriding
- Ferritic Nitro Carburizing
- Carbonitriding
- Carbon Restoration

Hardening

- Austemper, Marquench
- Tool and Die
- Induction
- Cryogenic
- Neutral, Case
- Flame or Inert Gas
- Hydrogen, Vacuum
- Precipitation and Age

Annealing

- Full or Partial
- Stress Relief
- Flattening
- Magnetic
- Spherodize, Normalize
- Vacuum, Hydrogen
- Nitrogen, Argon, Air
- Plastic / Nylon / Delrin

Tempering

- Vacuum, Hydrogen
- Air or Inert Gas
- Cryogenic

Cryogenics

- Press Fit
- Quenching
- Harden, Temper
- Thermal Cycling

Additional Services

Secondary Services

- Straighten
- Blast (Bead, Sand)
- Degrease and Wash
- Helium Leak Detection
- Testing & Metallurgy
- Turn Key Manufacturing
- Thermal Fit

Joining and Brazing

- Vacuum, Hydrogen
- Atmosphere
- Partial Pressure
- Welding (MIG, TIG)
- Torch Braze & Solder
- Low Temperature Solder

Aluminum

Heat Treating

- Solution and Age
- Stress Relief, Harden
- Anneal to Condition "O", "W"
- Uphill Quench

Soldering and Welding

- Torch and Atmosphere
- Welding

Additional Services

- Straighten, Flatten
- Helium Leak Detection
- Testing
- Thermal Fit

HARDNESS vs YIELD STRENGTH

Rockwell "C" Scale, 150kg	Tensile Strength x1000psi*	Rockwell "C" Scale, 150kg	Tensile Strength x1000psi*	Rockwell "C" Scale, 150kg	Tensile Strength x1000psi*
55	301	43	200	31	140
54	291	42	194	30	136
53	282	41	188	29	132
52	273	40	182	28	129
51	264	39	177	27	126
50	255	38	171	26	123
49	246	37	166	25	120
48	237	36	162	24	117
47	229	35	157	23	115
46	221	34	153	22	112
45	214	33	148	21	110
44	207	32	144	20	108

*Approximate, Steel Only