



AIRDI® 150 (AISI D2)

CRUCIBLE DATA

AIRDI 150 is a high carbon, high chromium heat treatable tool steel intended for applications requiring high wear resistance.

Typical Chemistry

Carbon	1.55%
Manganese	0.35%
Silicon	0.45%
Chromium	11.50%
Molybdenum	0.90%
Vanadium	0.80%

Typical Applications

Blanking Dies & Punches
 Thread Roll Dies Draw Dies
 Trim Dies Mold Inserts
 Forming Rolls & Gages
 Dies
 Injection Screw Components

Hardening

Preheat: 1100/1200F (595/650C), equalize, 1400/1450F (769/790C), equalize.

High Heat: 1825/1875F (995/1025C), hold 30/45 minutes at temperature

Quench: Air or positive pressure vacuum. Cool to 150F(65C).

Temper: 400/1000F(205/540C), hold one hour per inch of thickness (two hours minimum) air room temperature. Temper twice.

Cryogenic Treating: Refrigeration treatments may improve long term dimensional stability by transformation of retained austenite. Refrigeration treatments should generally be performed after the first temper, and must be followed by a temper.

Hardness and Impact Toughness Data

Air cooled from 1850F(1010C)

Tempering Temp.		Hardness HRC	Toughness, Charpy C-notch	
°F	°C		ft-lbs	Joules
AS QUENCHED		63	–	–
300	150	62	17	23
400	205	61	21	29
500	260	60	23	31
600	315	59	22	30
700	379	58	22	30
800	425	58	21	29
900	480	58	21	29
1000	595	55	19	26

Size Change During Hardening

The amount of retained austenite present has a significant effect on size change during hardening.

Hardening Temp.		Tempering Temp.		HRC	Longitudinal Size Change %
°F	°C	°F	°C		
1850	1010	400	205	61	0/+.03
1850	1010	600	315	59	0/+.02
1850	1010	800	425	58	0/+.02
1850	1010	950	510	56	+ .05

Surface Treatments

AIRDI 150 can be given standard surface treatments such as nitriding, titanium-nitride coating, hard chrome plating if desired. Prior to nitriding or PVD treatment, double temper at or above process temperature.

Annealing

A. Heat to 1600F(870C), hold 2 hours, cool slowly (25F(15C)/hr maximum) to 1000F(540C), then cool.

Or

B. Heat to 1600F(870C), hold 2 hours, cool to 1425F(775C), hold 6 hours, air cool.

Typical annealed hardness: 221/225 BHN

Stress Relieving

Annealed Material: Heat to 1200/1250F(650/675C), hold 2 hours, cool in still air.

Hardened Material: Heat to 25/50F(15/30C) below tempering temperature, hold 2 hours, cool in still air.

Welding

Use air hardening tool steel filler material

Annealed Material: Preheat 700/900F(370/485C), maintain over 700F(370C) during welding. Reanneal or temper 1425F(775C) 6 hours after welding.

Hardened Material: Preheat 25/50F(15/30C) below tempering temperature (350F(175C) minimum). Maintain above 350F(175C) during welding. Cool to 150F(65C) after welding. Temper 25F(15C) below original tempering temperature 350F(175C) minimum).

Physical Properties

Modulus of Elasticity30 psi x 10⁶ (207 GPa)

Density0.278 lb/in³ (7695 kg/m³)

Thermal Expansion

Temperature Range		Coefficient of Thermal Expansion	
°F	°C	in/in/°F x 10 ⁻⁶	mm/mm/°C x 10 ⁻⁶
RT/400	RT/205	5.7	10.3
RT/800	RT/425	6.6	11.9
RT/1000	RT/540	6.8	12.2

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