

Thermodur® 2367 Superclean

Technical Datasheet

Chemistry

Typical	C	Si	Cr	Mo	V	S
Analysis %	0.37	0.40	5.0	3.0	0.60	.003 max

Description

Thermodur® 2367 Superclean is an electro slag remelted (ESR) hot work die steel developed for applications where high temperature properties (tensile strength & thermal conductivity) are required to resist thermal fatigue and tempering.

Characteristics

Excellent resistance to heat checking
 Excellent resistance to wear (erosion & abrasion)
 Excellent high-temperature strength
 Good tempering resistance
 Good toughness

Applications

High pressure die casting dies Hot forging dies
 Hot extrusion tooling Forming dies
 Plastic molds Mandrels

Physical Properties

Density: 0.282 lbs/in³ (room temperature)
 Hardened to 46 HRC

Coefficient of Thermal Expansion	70°F - 200°F 6.6 x 10 ⁻⁶ /°F	70°F - 400°F 6.9 x 10 ⁻⁶ /°F	70°F - 750°F 7.0 x 10 ⁻⁶ /°F
Thermal Conductivity	70°F 206Btu/in/ft ² /hr/°F	650°F 235/in/ft ² /hr/°F	1300°F 245/in/ft ² /hr/°F

Mechanical Properties

Tensile Properties: (room temperature)

Hardness HRc	Y.S. (0.2%) KSI	T.S. KSI	EL (%)	RA (%)
52	225	267	12	35
48	193	234	13	38
44	171	203	12	40

Heat Treatment

Soft Annealing

Temperature	Cooling	Hardness
1345°F – 1435°F	Furnace 20°F/hour to 1200°F, then air cool.	235 HB Max.

Stress Relieving

Temperature	Cooling	Hardness
1200°F for 2 hours	Cool slowly to 920°F in air	230 HB Max.

Hardening (refer to TTT diagram on page 2)

Temperature	Cooling	Hardness
1875°F – 1920°F Hold at temperature for 30 minutes	Vacuum quench at 50°F/min. to 1000°F, then cool to below 150°F	55 HRc Max quenched

Tempering (See tempering diagram on page 2)

Temperature °F	752	932	1022	1112	1202	1292
Hardness HRc	52	55	55	52	45	36

Tempering hardness is approximate and based on two hours at temperature.

In order to achieve faster quench rates, generous radii and machining stock should be left on during rough machining.

Optimal heat treatment parameters should be followed to achieve maximum potential die life.

Please contact your Swiss Steel heat treat representative for more detailed information.

General Note

All statements regarding the properties or utilization of the materials or products mentioned are for the purpose of description only. Guarantees regarding the existence of certain properties or a certain utilization are only valid if agreed upon in writing.

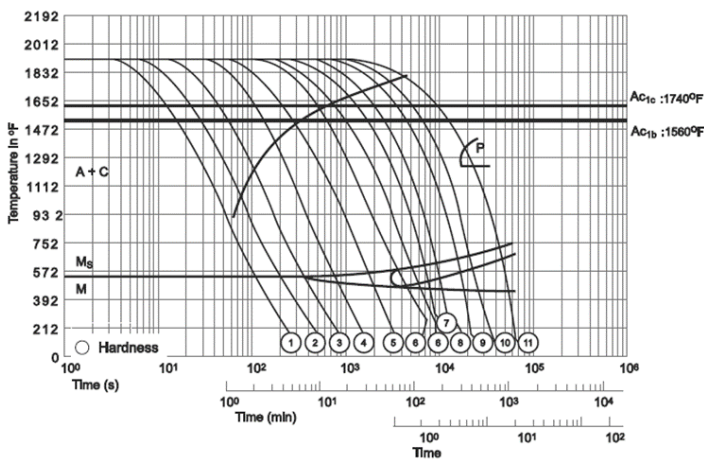
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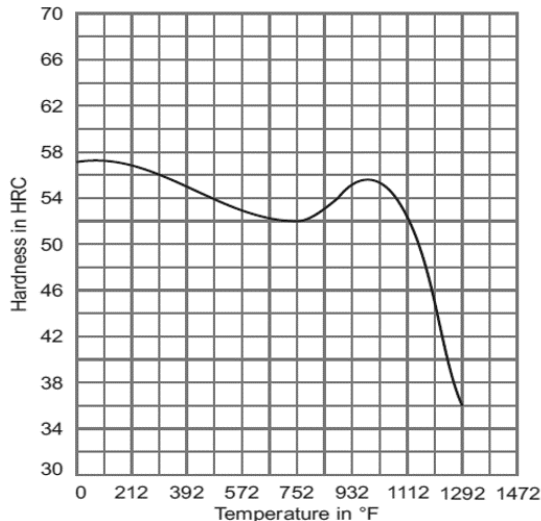
Cooling Curve Number	1	2	3	4	5	6	7	8	9	10	11	12
Hardness (HV 10)	690	673	665	627	620	620	634	606	606	554	548	525
Hardness (HRc approx.)	62	61	59	58	58	58	59	57	57	54	54	53

Time-Temperature-Transformation Diagram

Austenitizing temperature 1875°F - 1920°F



Tempering Diagram



Polishing

For highly cosmetic applications, the tool should be heat treated to the highest hardness possible. Size of the tool will determine the maximum hardness. A-1 polish is achievable when proper procedures are followed. A Swiss Steel representative should be consulted when determining the proper hardness.

Welding

Thermodur® 2367 Superclean can be welded in an annealed and hardened condition if machining errors, design changes or minor cracking have occurred. TIG (Tungsten Inert Gas) should preferably be used.

Welding Guidelines

Process	Tig/MMA
Current	D.C.
Amperage (A)	100-150
Electrode	Tungsten Thorium
Electrode Diameter	0.10 – 0.17
Protective Gas	Argon
Flow (L/mm)	10
Filler Rod	AlSi H-13

Welding Temperatures (Condition Annealed)

Preheat Temp.	Maintained Temperature during welding	Cool down to:	Stress Relieve
620°F - 900°F	Above 600°F	150°F	1050°F for 2 hours or 30°F – 50°F below previous tempering temperature

Industry Standards

Thermodur® 2367 Superclean meets or exceeds the following standards:

- North American Die Casting Association
- General Motors
- Ford Motor Company



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NORTH AMERICAN DISTRIBUTION

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