SPECIAL™
STEEL
The stars of Tool Steel

DATA SHEET

ALTAIR™
Hot Work
Tool Steel

SPECIAL STEEL™
The stars of Tool Steel

ABOUT US

RR Special Steel combines the experience & know-how of two specialists in their respective fields, Steel Making and Remelting (Rubiera Special Steel) and Forging and Heat Treatment (Ringmill).

RUBIERA SPECIAL STEEL
Since 1965 supplying high integrity ingots with superb homogeneity and cleanliness and since 2009 top quality large size ESR and VAR ingots to the market.

RINGMILL
Since 1978 supplying top quality forgings to the most demanding markets using the latest state of the art technologies and machinery.

With RR Special Steel the ownership family, with a centenary experience in the steel and forging industry, has created the stars of tool steel.

RR SPECIAL STEEL UNIQUENESS

VAR: The largest top-quality Vacuum Arc Remelted materials on the market.

ESR: The largest single electrode static Electro Slag Remelted materials on the market.

	Conventional material	ESR material	VAR material
Cleanliness	● ● ●	● ● ● ●	● ● ● ● ●
Homogeneity	● ● ●	● ● ● ● ●	● ● ● ● ●
Isotropy of toughness	● ●	● ● ● ●	● ● ● ● ●
Manufacturing complexity	● ● ●	● ● ● ●	● ● ● ● ●

CERTIFICATE QUALITY

Manufacturing parameters and material properties are monitored and controlled by RR´s quality management system.
The results of cleanliness, microstructure, and toughness for example are available for internal- and external certification at any time.

RR ALTAIR / 1.2340MOD.

REFERENCE COMPOSITION OF STEEL GRADE RR ALTAIR / 1.2340MOD.

C	Si	Cr	Mo	V
0.35 %	0.3 %	5.0 %	1.3 %	0.45 %

Comparable tool steel grades: NADCA #207 type E

MATERIAL PROPERTIES

- Excellent hardenability and toughness
- Great polishability
- Excellent thermal fatigue resistance
- Low sensitivity to thermal shock
- Excellent high temperature strength
- Very high dimensional stability
- High resistance to hot wear
- High resistance to hot oxidation
- High level of micro cleanliness
- Very low level of segregation
- Excellent structural homogeneity
- The steel can be nitrided

APPLICATIONS

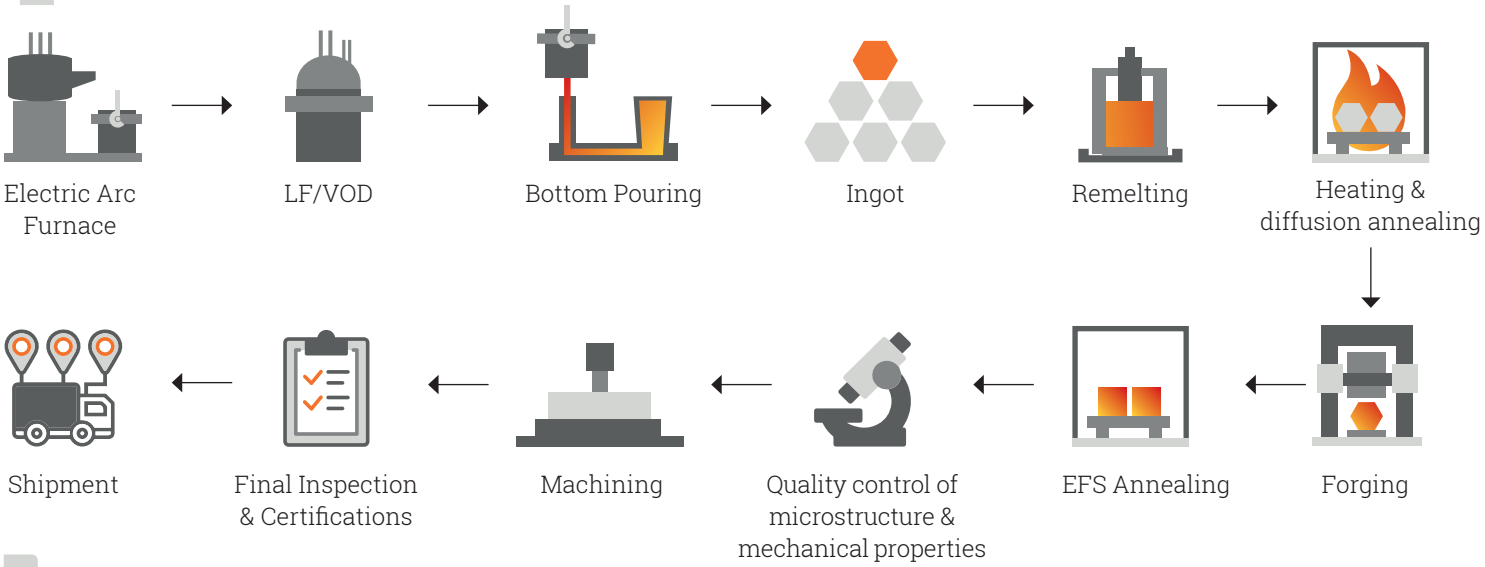
- Large dies for pressure casting of light metals
- Molds for abrasive and transparent plastic materials
- Material is recommended for a high polishing applications (optical polish, specular ...)
- Extrusion dies for aluminium processing
- Dies for friction and mechanical presses for hot forging of steel, brass, aluminum and its alloys
- Hot work shear blades
- Glassware molds

PROPERTIES	STEEL GRADE*	1	2	3	4	5	
Toughness & Ductility	**ALTAIR**	●	●	●	●	●	Very good toughness and ductility due to homogeneity and isotropy. According to NADCA #207 Charpy-V is guaranteed. Standard Charpy-V toughness is about 24J at 44-46 HRC and room temperature.
	1.2343	●	●	●	●		
	1.2344	●	●	●			
	1.2367	●	●				
Tempering Resistance	**ALTAIR**	●	●	●			Very good high-temperatures properties. High resistance againts softening improves life time.
	1.2343	●	●				
	1.2344	●	●	●			
	1.2367	●	●	●	●	●	
Heat Checking Resistance	**ALTAIR**	●	●	●	●		High toughness gives better crack resistance under thermal shock conditions during operations.
	1.2343	●	●	●			
	1.2344	●	●				
	1.2367	●	●	●			
Erosion & Hot Wear Resistance	**ALTAIR**	●	●	●			Tempering resistance helps against wear and erosion. Optimizing of design and process parameter and nitriding/ coating may be decisive factors as well.
	1.2343	●	●				
	1.2344	●	●	●			
	1.2367	●	●	●	●	●	
Resistance to Al sticking (Soldering)	**ALTAIR**	●	●	●			Sticking means that the temperature is high at that region. Try to decrease temperature or/and use nitriding or coating.
	1.2343	●	●	●			
	1.2344	●	●	●			
	1.2367	●	●	●			
Machinability	**ALTAIR**	●	●	●	●		Tough material can be even more tough in machining - optimize machining parameters.
	1.2343	●	●	●	●		
	1.2344	●	●	●	●		
	1.2367	●	●	●			
Polishability	**ALTAIR**	●	●	●	●	●	ISO/SPI: NO/A-1 at 48-52 HRC: "lense quality". Keep attention on right polishing steps.
	1.2343	●	●	●	●		
	1.2344	●	●	●			
	1.2367	●	●				
Weldability	**ALTAIR**	●	●	●	●		CET= 0.85% acc. DIN EN 1011-2: pre- and after-heating necessary.
	1.2343	●	●	●			
	1.2344	●	●	●			
	1.2367	●	●				
Texturability	**ALTAIR**	●	●	●	●	●	Hardened and homogeneous material is excellent for texturing.
	1.2343	●	●	●	●		
	1.2344	●	●	●			
	1.2367	●	●	●			
Nitridability	**ALTAIR**	●	●	●	●		Hardness of nitrided surface 900-1250 HV1: avoid brittle surface layer.
	1.2343	●	●	●			
	1.2344	●	●	●	●		
	1.2367	●	●	●	●		
Chrome Plating Ability	**ALTAIR**	●	●	●	●		High cleanliness improves Cr plating ability.
	1.2343	●	●	●	●		
	1.2344	●	●	●			
	1.2367	●	●	●			

*All grades in the remelted condition

RR ALTAIR / 1.2340MOD.

PRODUCTION TECHNOLOGY



PRODUCT RANGE

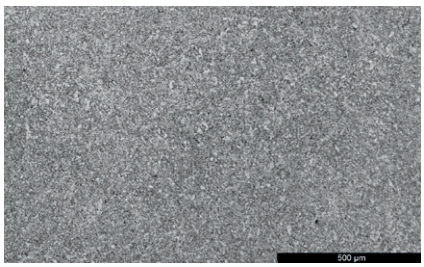
	Form	Thickness (mm)	Width (mm)	Length (mm)	Weight (Kg)
RR ALTAIR	Square/Rectangular Bar	max. 550	max. 1,150	max. 6,000	max. 20,000
	Round Bar	max. 600	N/A	max. 6,000	max. 20,000

DELIVERY CONDITIONS

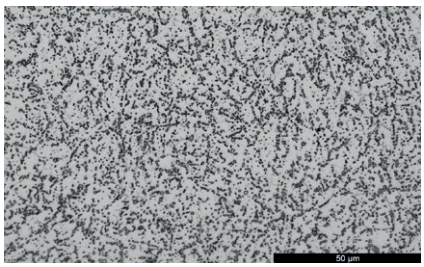
Heat treatment: EFS Annealing
Hardness: ≤ 220 HBW
Surface: machined

PHYSICAL PROPERTIES

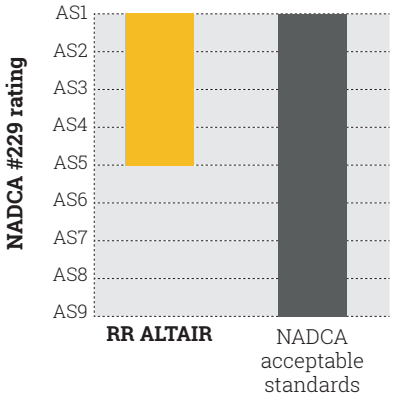
MICROGRAPHIC EXAMINATION IN EXTRA FINE ANNEALED CONDITION (EFS)



EFS macrostructure at 50X: very low microsegregation of VAR material



EFS microstructure at 500X: AS1-2 rating



* The examined surface is parallel to the principal direction of deformation

	20°C	400°C	500°C
Elastic Modulus [kN/mm²]	205,000	--	190,000
Thermal Expansion Coefficient [10⁻6/K]	--	12.4	13.2
Thermal Conductivity [W/mK]	21	30	32

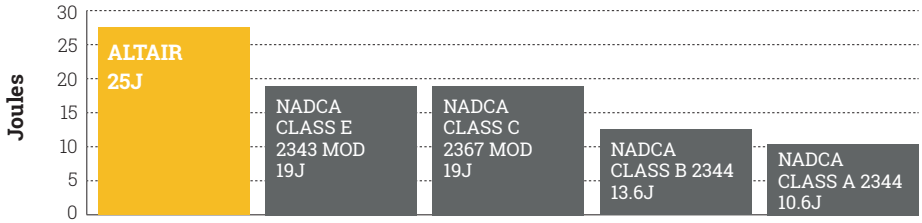
HEAT TREATMENT	TEMPERATURE
Soft Annealing	780-830°C
Stress Relieving (before Q+T)	600-650°C
Hardening (Vacuum)	980-1010°C
Tempering (2-3X)	580-630°C

MECHANICAL PROPERTIES AFTER QT

HARDNESS	44 HRC	48 HRC	50 HRC
Yield Strength Rp02 [N/mm²]	~ 1,200	~ 1,400	~ 1,500
Tensile Strength, Rm [N/mm²]	~ 1,500	~ 1,680	~ 1,800

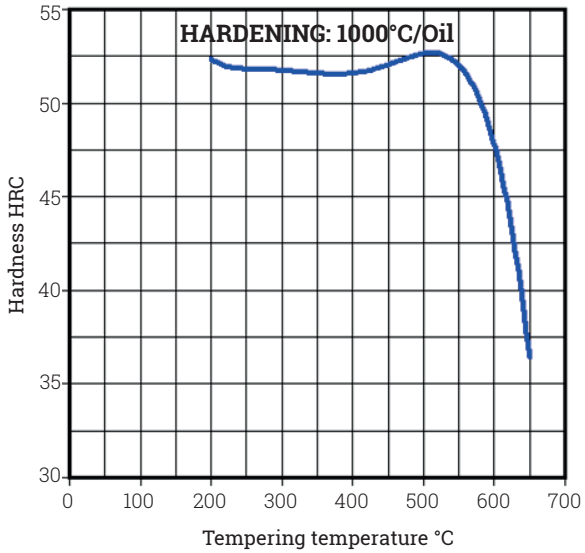
Toughness Properties

Chapy-V toughness on oil-hardened & double tempered samples, 44-46 HRC, transversal direction, 1/4T, 20°C.

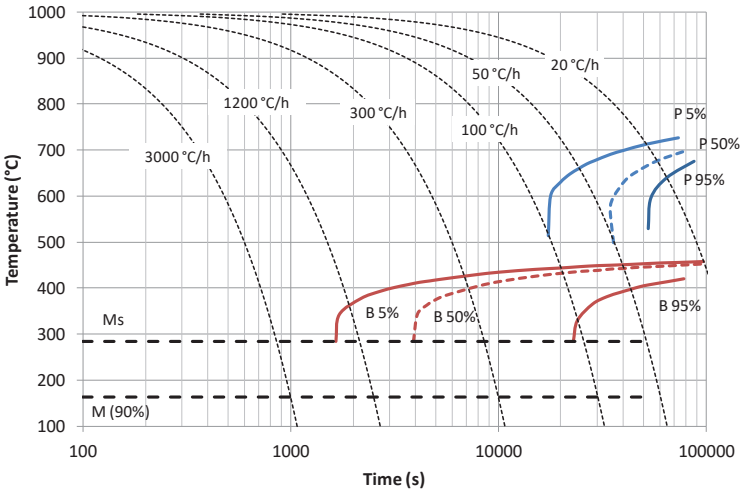


DIAGRAMS

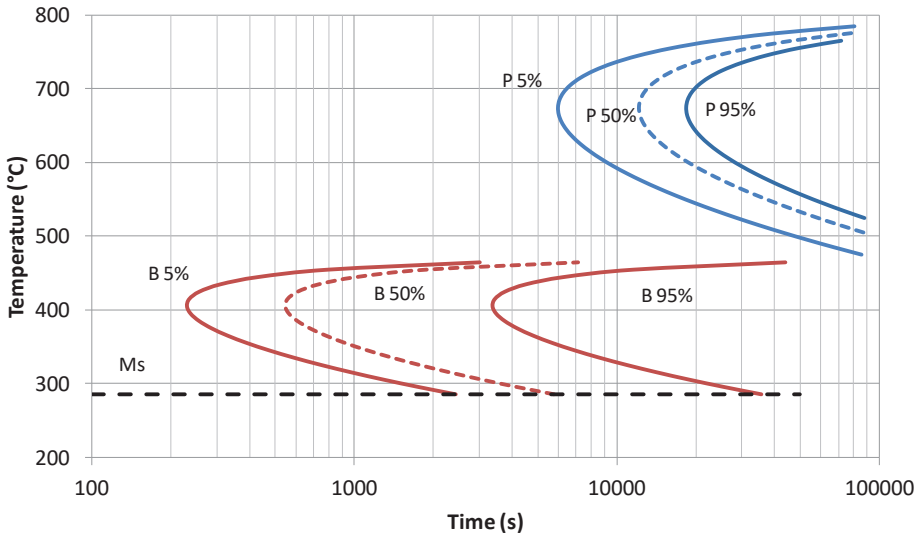
TEMPERING DIAGRAM



CCT DIAGRAM



TTT DIAGRAM



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V'STEELS

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