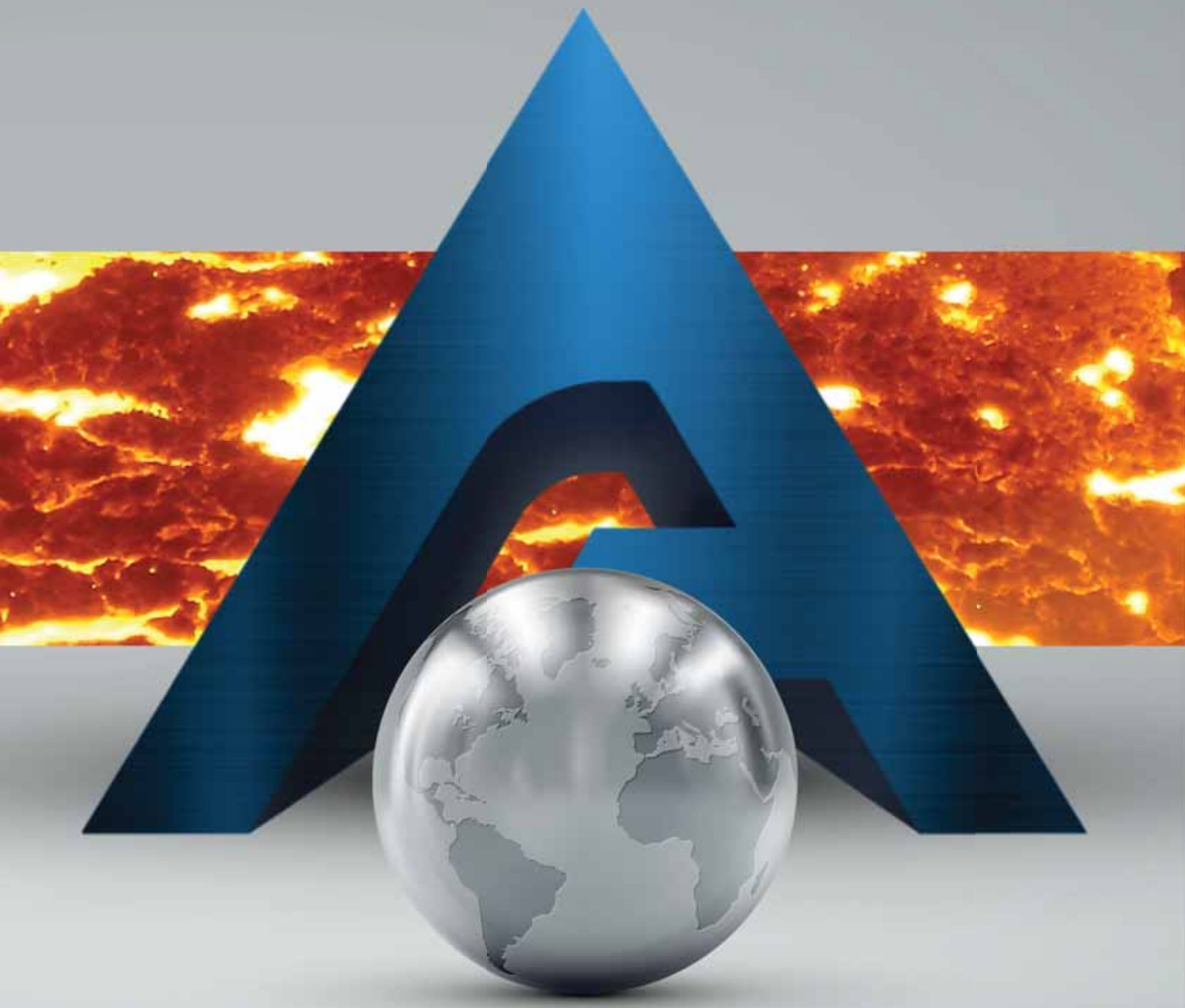
ASİL ÇELİK

TOOL STEELS



www.asilcelik.com.tr

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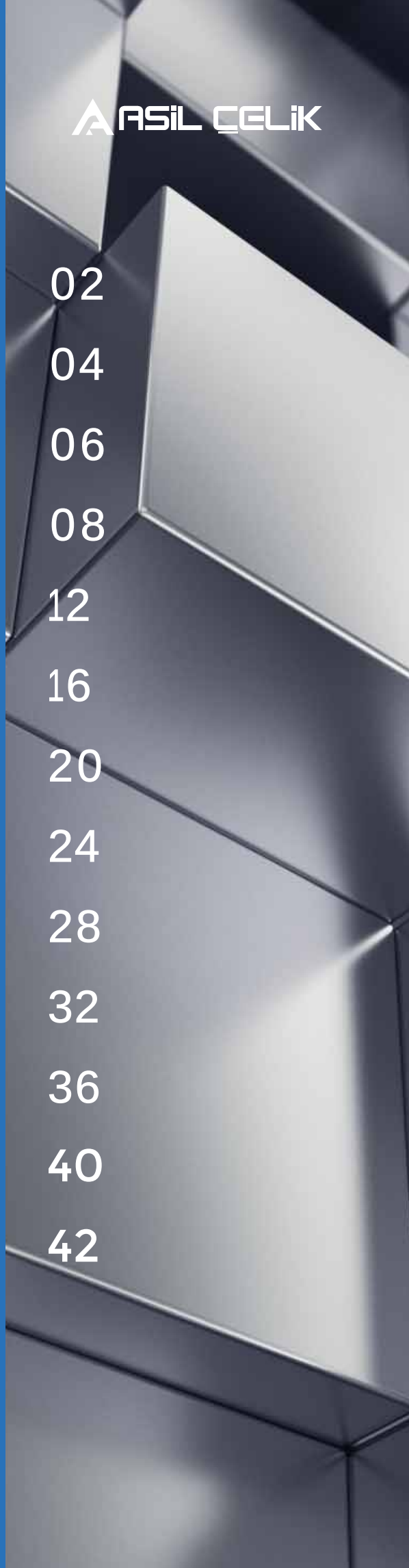


ASİL ÇELİK

With our first domestic tool steel production in Turkey, we provide raw materials with high quality and technology for moulding industry.

As the first and foremost producer of engineering and stainless steel bars and billets in Turkey, Asil Çelik has had a major influence in the development of various industries across the country.

In the course of more than 45 years of steel making, we have obtained numerous approvals from major original equipment manufacturers in various sectors such as automotive, defence, machinery, mining and energy. Our consistent quality and attentive service have enabled us to become a preferred raw material supplier to a prestigious customer portfolio worldwide.

In a changing world, we remain committed to constantly upgrading our production process in order to provide the best service to our partners and meet their individual needs going forward.

COMPANY HISTORY

1974 — Asil Çelik founded by Koç Group to meet the special steel needs of the nascent Turkish automotive, machinery and defence industries.

1979 — Production started.

1984 — Asil Çelik became a government company.

1998 — Continuous Casting Machine investment.

2000 — Privatization. Two major holding groups purchased over 99 % of Asil Celik in equal shares.

DİLER HOLDİNG

GÜRİŞ

2005 — New Electric Arc Furnace installed.

2007 — Second set of Ladle Furnace and Vacuum Degassing Units added.

2008 — Two Continuous Type Quenching and Tempering Furnaces installed with a capacity of 70.000 tons/year.

2010 — Asil Çelik Deutschland established in Germany.
&
Medium Section Rolling Mill modernization completed.

(11 stands continuous rolling mill added.)

2012

Continuous Casting Machine revision and addition of new sections.

∅ 300
⍁ 280x300

2015

Jumbo Continuous Casting Machine added to the existing continuous casting facilities.

(ø310, ø406, ø500 and ø600 mm)

2016

AC Americas Inc. established in Chicago.

Modernization of Large Section Rolling Mill.

Peeling facility started to operate.

Modernization of Medium Section Rolling Mill.

2017

3rd Medium Section Conditioning Line

Air Separation Plant

2018

Slag Crushing Handling and Recycling Plant

2019

3rd Dust Collecting System

2020

Bloom & Billet Grinding Station

ESR Unit

2021

Open Die Forging Plant

Lab Scale VIM Unit for R&D

2022

EAF upgrade

WORLD WIDE PRESENCE WITH MAJOR OEM APPROVALS

BOSCH Automotive · CATERPILLAR · DAIMLER · DANA · DELPHI · JOHN DEERE · MAN · RENAULT

FAG

FEDERAL MOGUL

FIAT

Ford

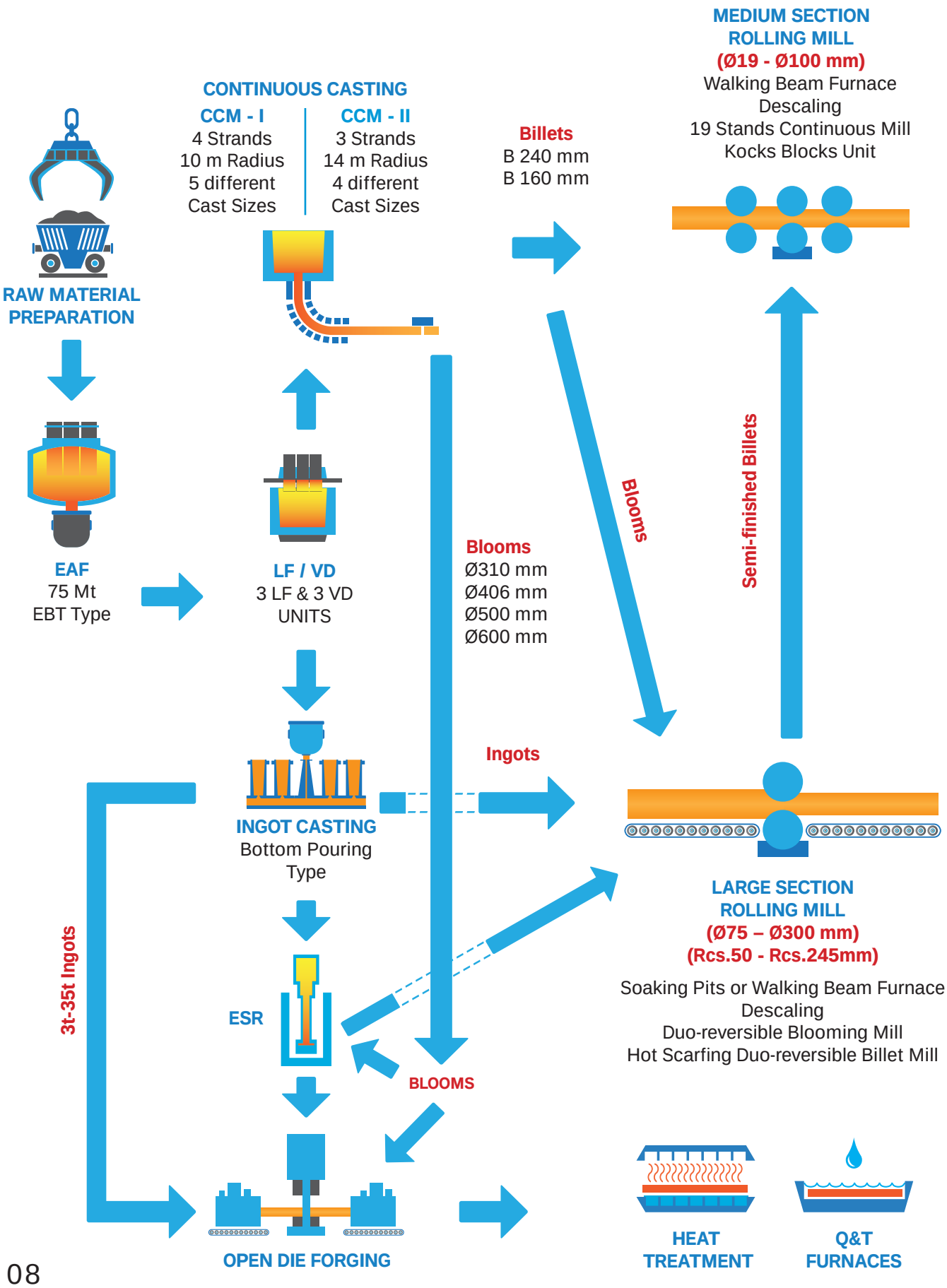
HALLIBURTON

SCANIA

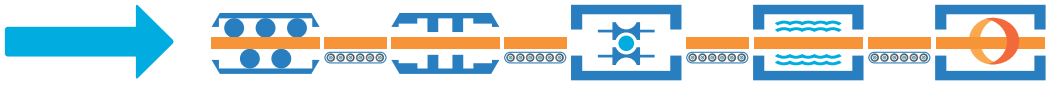
VOLVO

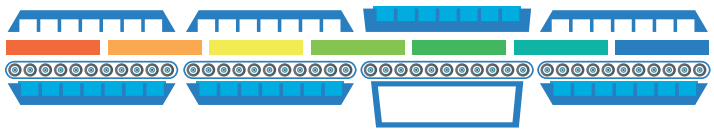
ZF

PRODUCTION LINE



MEDIUM SECTION CONDITIONING LINES
Straightening
Shot Blasting
Ultrasonic and Surface Crack Tests

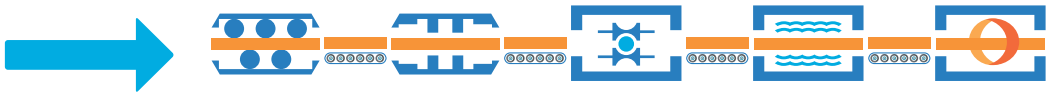




HEAT TREATMENT LINES
3 Quenching and Tempering Lines
2 Furnaces for Various Heat Treatments

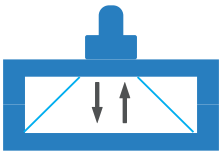
PEELING FACILITY
Peeling Line
Surface Polishing
Chamfering
Ultrasonic and Surface Crack Test

PACKAGING & DISPATCH

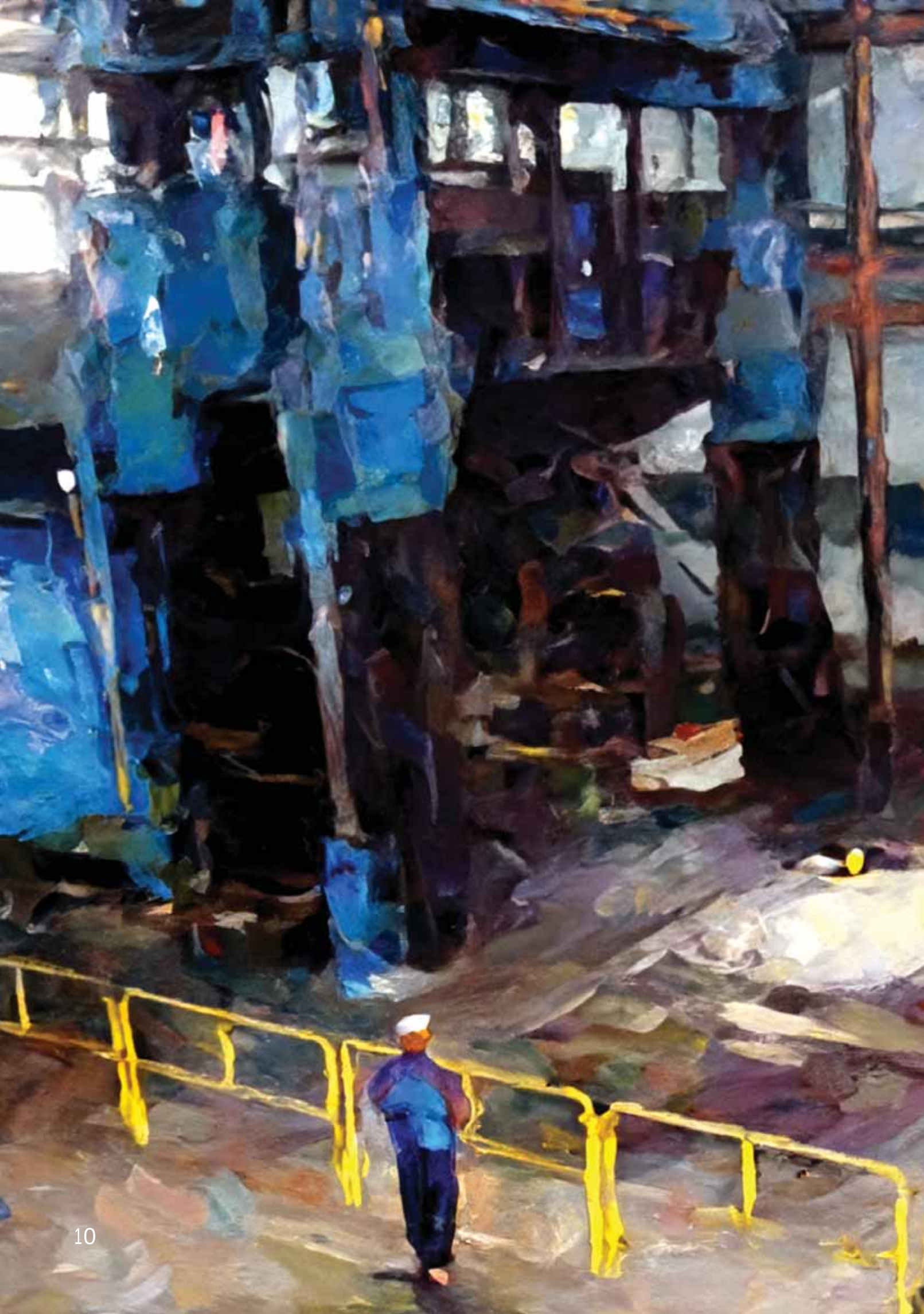


LARGE SECTION CONDITIONING LINES
Straightening
Shot Blasting
Ultrasonic and Surface Crack Tests

MACHINING FACILITY
Turning - Milling



CONDITIONING LINE
Ultrasonic Test



1.2343 (X37CrMoV5-1) / ESR**


BVS
50T

1.2343 (X37CrMoV5-1) / ESR**

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%)*

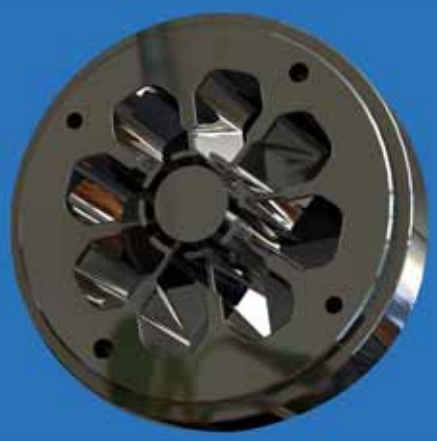
C	Si	Mn	Cr	Mo	V
0.37	1.00	0.38	5.15	1.30	0.40

3. Physical Properties

Modulus of Elasticity (10^3 N/mm^2)	210						
Density (g/cm^3)	7.75						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	18.68		20.91		24.88		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.51		0.92		1.08		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.45		0.53		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	24.58	25.79	28.94	33.35	34.53	35.93	37.62

4. Specific Properties

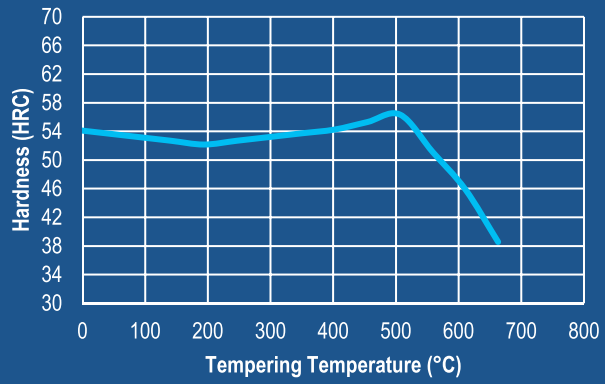
- Hot-work tool steel containing Cr, Mo and V.
- Excellent toughness combined with high thermal stability.
- Good wear resistance.
- Very good impact strength and high machinability.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.



5. Recomended Conditions and Hardness*

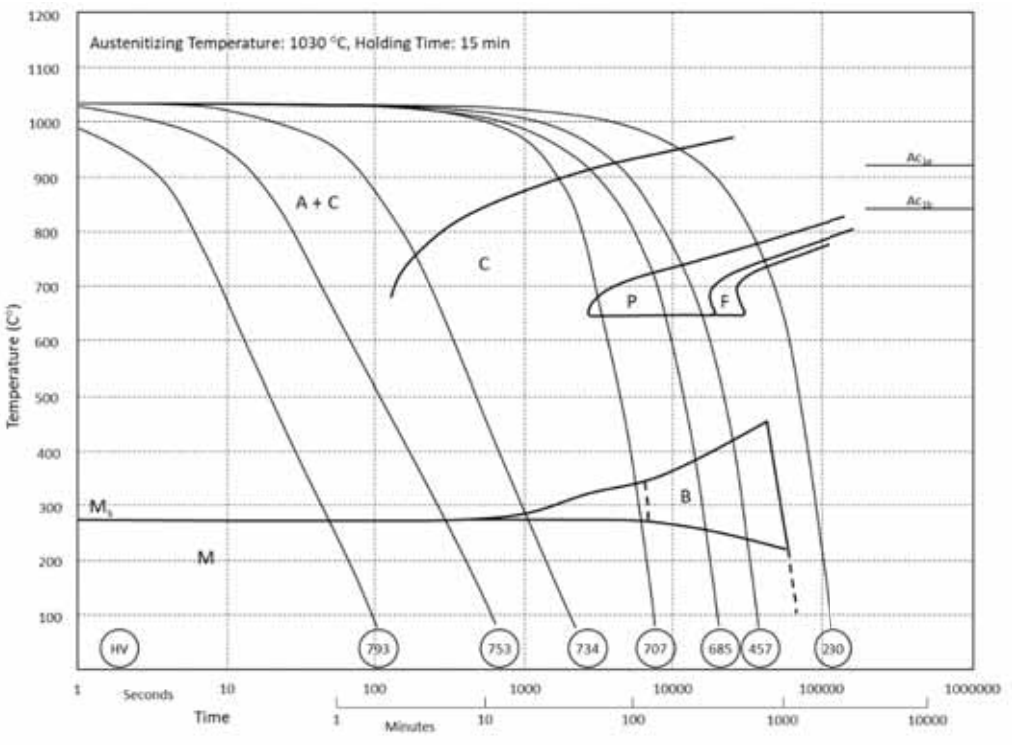
	Hardness +A HBW Max.	229
Hardening Test	Austenitizing Temperature (± 10 °C)	1020
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	550
	Hardness HRC Min.	48

Tempering Diagram



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

High Pressure Die Casting Tools, Forging (Hot/Semi-Hot) Dies, Hot Extrusion Tools, Cylinders and Screws For Plastic Processing, Hot Shear Knives, Hydro Forming Tools, Turbochargers, Piston Rings, Sensors.

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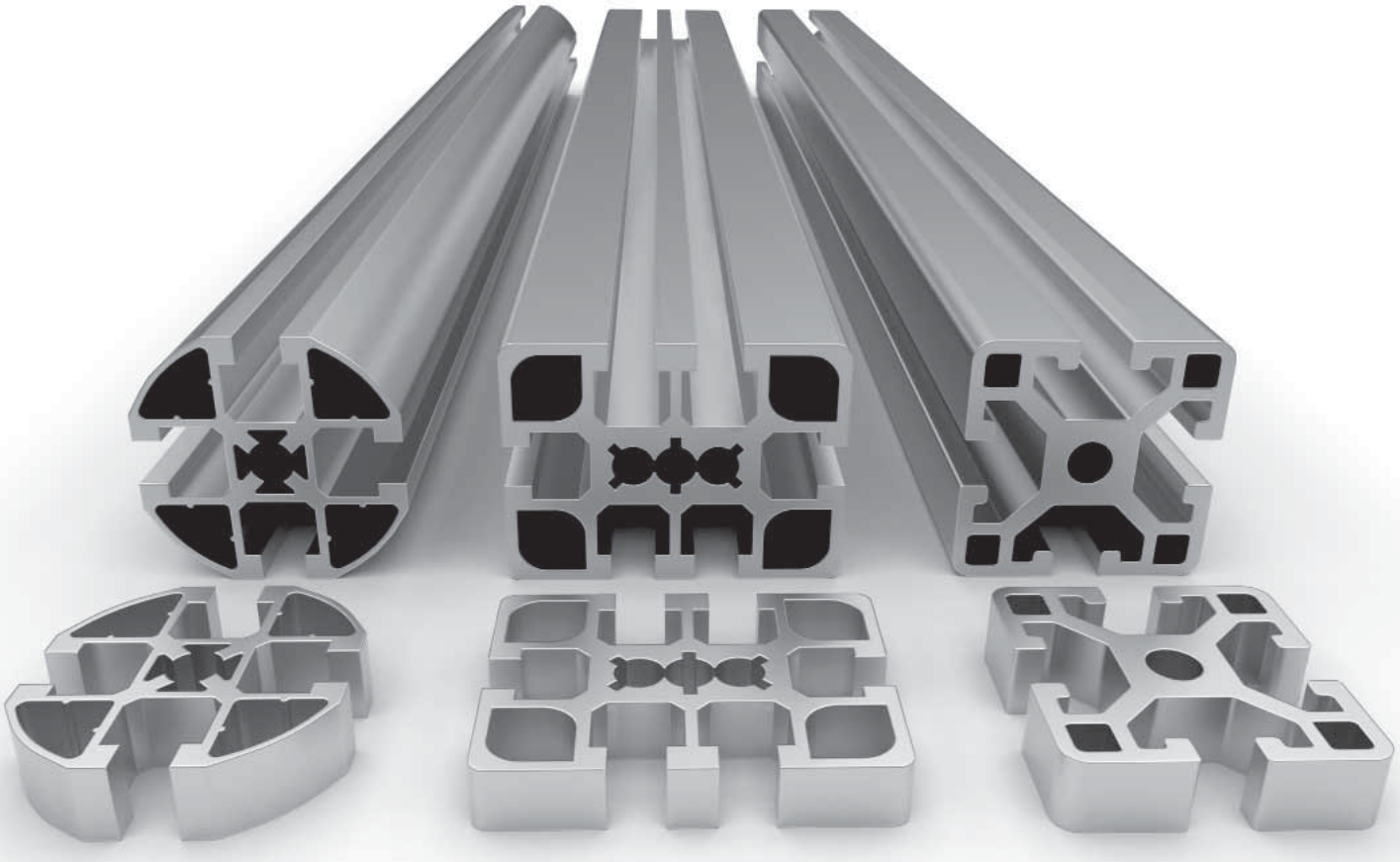


1.2344 (X40CrMoV5-1) / ESR**


HBE

1.2344 (X40CrMoV5-1) / ESR**

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%) *

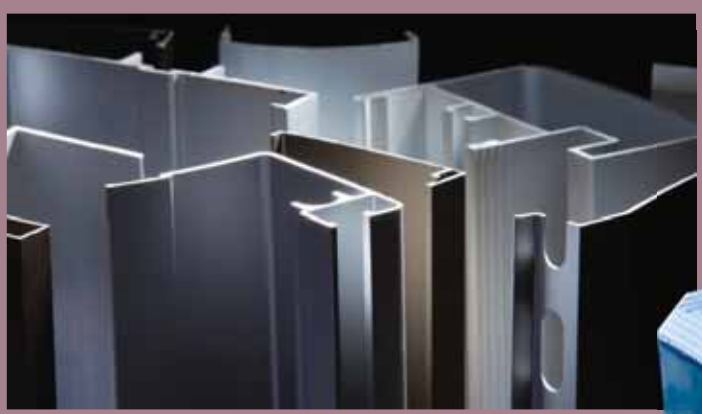
C	Si	Mn	Cr	Mo	V
0.40	1.00	0.35	5.15	1.35	1.00

3. Physical Properties

Modulus of Elasticity (10^3 N/mm^2)	211						
Density (g/cm^3)	7.73						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	18.25		20.98		24.96		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.52		0.91		1.08		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.45		0.53		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	24.54	25.8	29.32	33.38	34.58	36	37.71

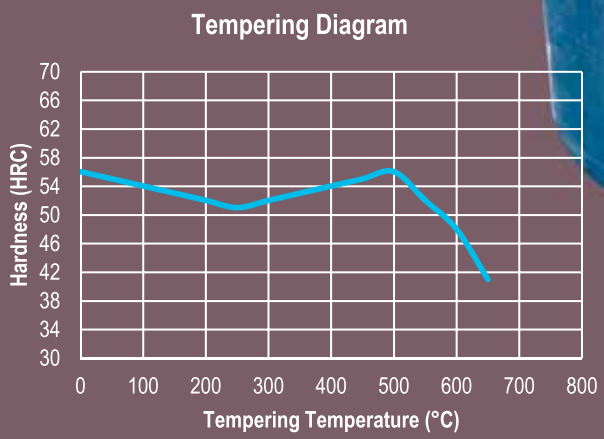
4. Specific Properties

- Suitable for quenching and tempering.
- High temperature strength and wear resistance.
- Good toughness and hardenability.
- Resistant to thermal shock and hot cracking.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.



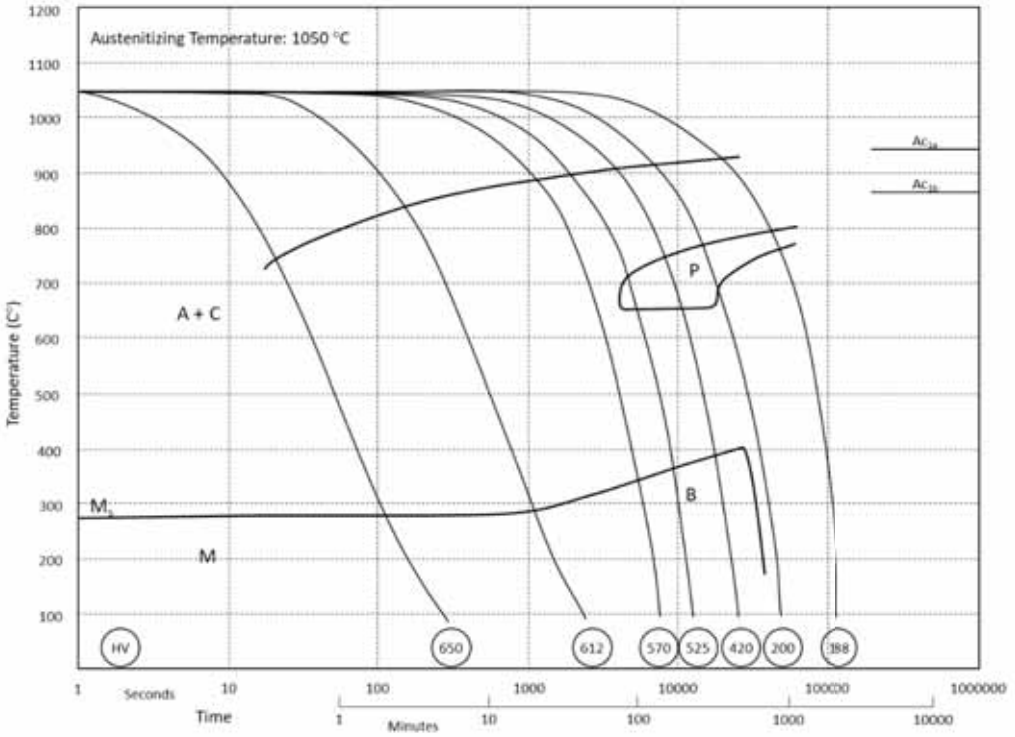
5. Recomended Conditions and Hardness*

	Hardness +A HBW Max.	229
Hardening Test	Austenitizing Temperature (± 10 °C)	1020
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	550
	Hardness HRC Min.	50



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

Hot Forging Dies, Hot Forming Dies, Plastic Molds, Hot Extrusion Tools, Hot Shear Knives.

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1.2367 (X38CrMoV5-3) / ESR**


MS2
MS2
ELEKTRİK ÇARPMA TEHLİKESİ
YETKİSİ OLMAYAN GİREMEZ !
PANO KAPAKLARINI KİLİTLİ TUT !

1.2367 (X38CrMoV5-3) / ESR**

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%) *

C	Si	Mn	Cr	Mo	V
0.38	0.40	0.40	5.00	2.95	0.50

3. Physical Properties

Modulus of Elasticity (10^3 N/mm^2)	215						
Density (g/cm^3)	7.81						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	19.23		21.45		25.18		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.49		0.89		1.07		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.45		2.25		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	24.06	25.19	27.88	32.74	33.90	35.28	36.95

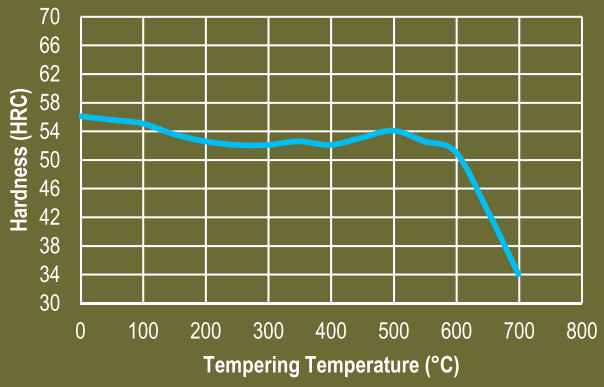
4. Specific Properties

- Cr-Mo-V Steel for hardening in oil and in air with very good hardenability.
- Developed instead of 1.2365 to provide high hardness and wear resistance.
- Very good toughness and physical properties at low and also elevated temperature.
- Very good resistance to tearing of thermal fatigue and low sensitivity to quick changes of temperature.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.

5. Recomended Conditions and Hardness*

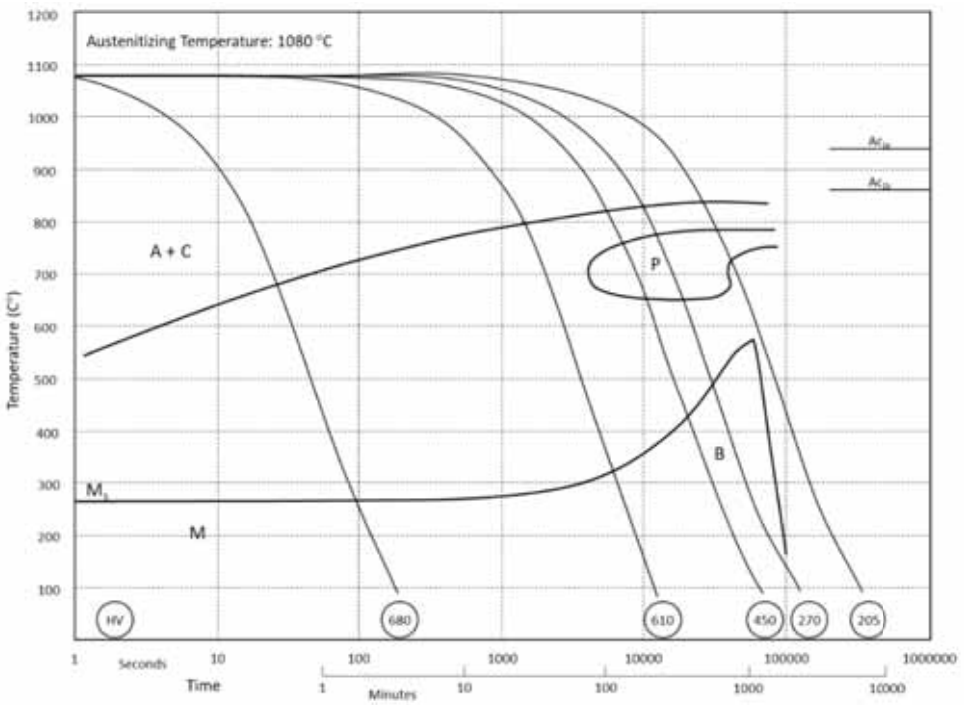
	Hardness +A HBW Max.	229
Hardening Test	Austenitizing Temperature (± 10 °C)	1040
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	550
	Hardness HRC Min.	50

Tempering Diagram



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

Large Die Casting Tools, Tools Needing High Strength at Elevated Temperatures, Hot Forging Dies, Mandrels, Extrusion Dies

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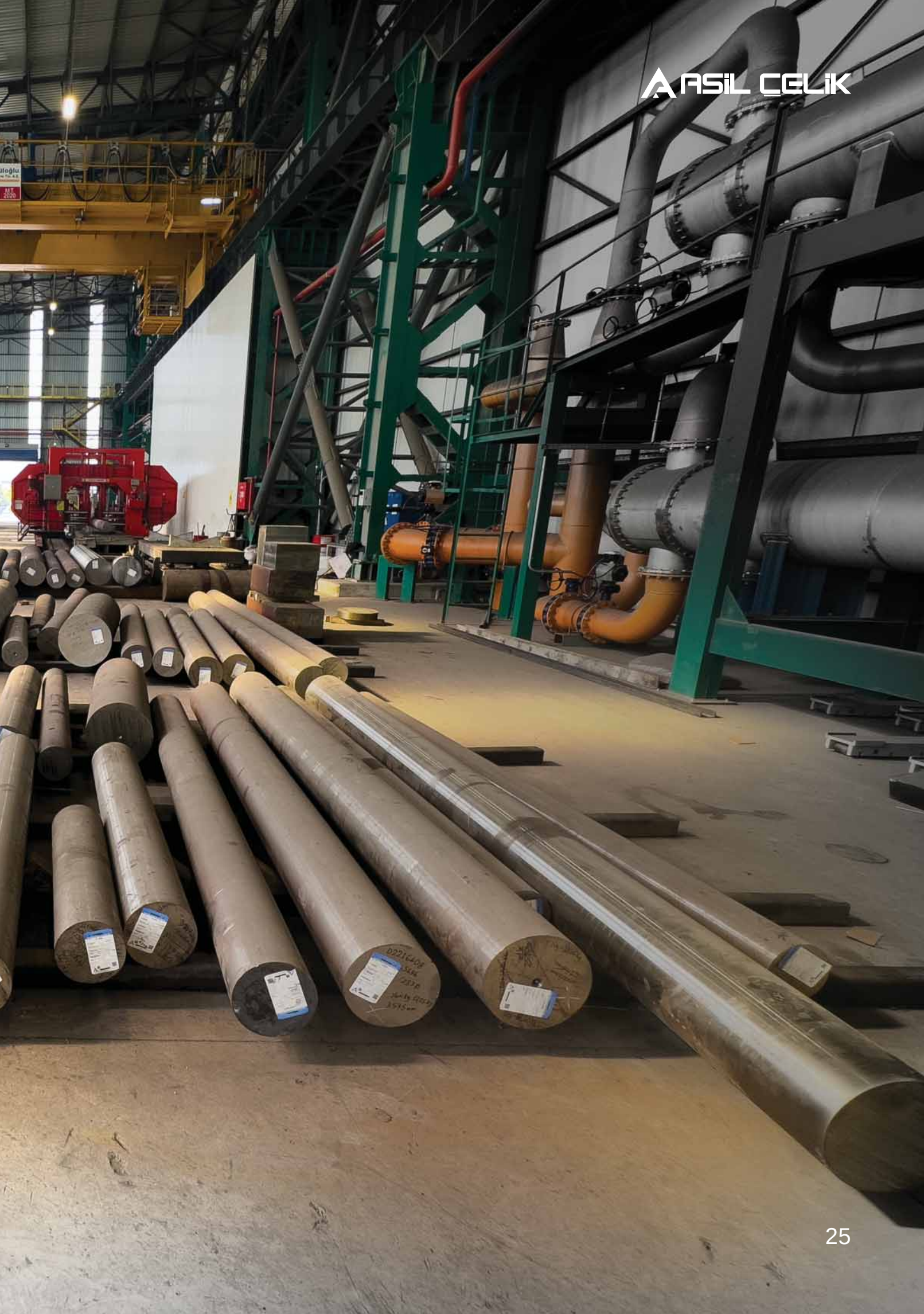
1.2367 MOD ESR**



1.2367 MOD / ESR**

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%) *

C	Si	Mn	Cr	Mo	V
0.35	0.20	0.45	5.10	2.35	0.55

3. Physical Properties

Modulus of Elasticity (10^3 N/mm^2)	216						
Density (g/cm^3)	7.81						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	19.28		21.37		25.23		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.49		0.9		1.06		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.45		1.84		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	23.11	24.87	27.59	32.45	33.58	34.92	36.54

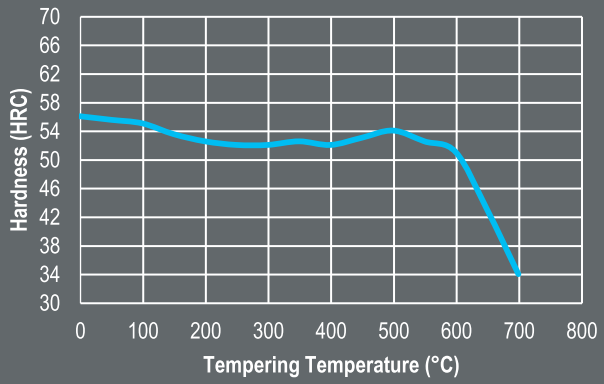
4. Specific Properties

- Cr-Mo-V alloyed hot work tool steel with very good hot wear and plastic deformation resistance.
- Good dimensional stability throughout heat treatment and coating operations.
- Excellent toughness, ductility and hardenability.
- Higher high-temperature strength and toughness than 1.2367.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.

5. Recomended Conditions and Hardness*

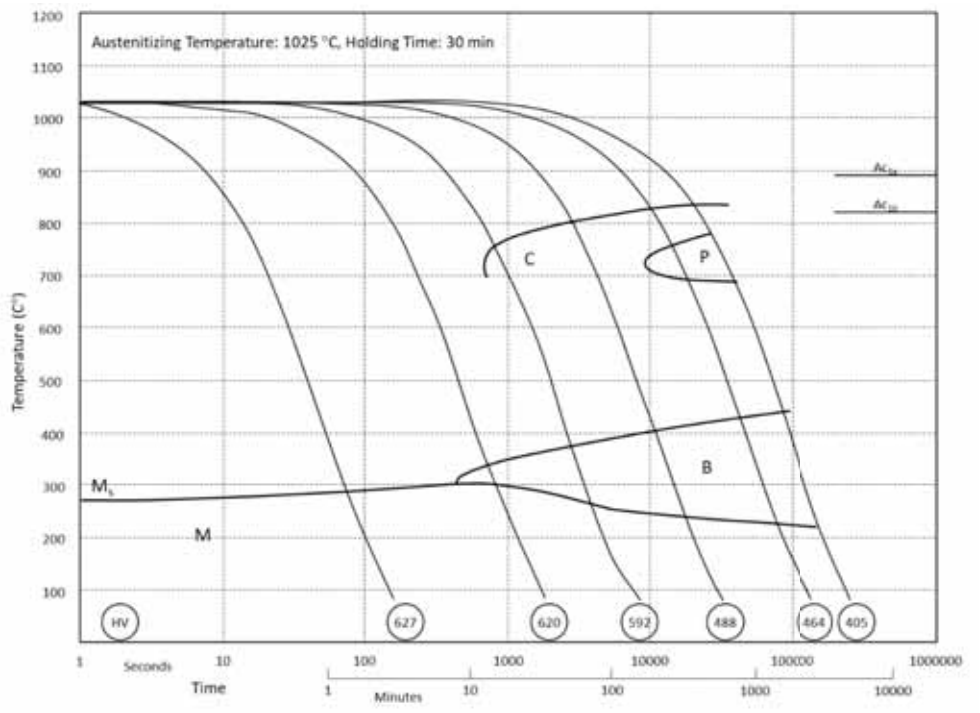
	Hardness +A HBW Max.	229
Hardening Test	Austenitizing Temperature (± 10 °C)	1040
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	550
	Hardness HRC Min.	50

Tempering Diagram



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

Large Die Casting Tools, Tools Needing High Strength at Elevated Temperatures, Hot Forging Dies, Mandrels, Extrusion Dies

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1.2714 (55NiCrMoV7)

1.2714 (55NiCrMoV7)

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%) *

C	Si	Mn	Cr	Mo	Ni	V
0.55	0.25	0.75	1.00	0.45	1.65	0.10

3. Physical Properties

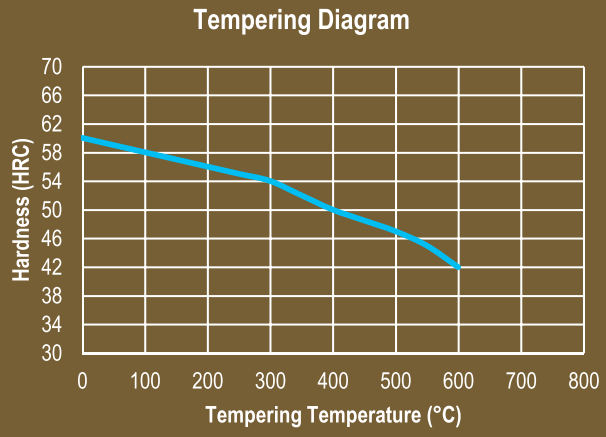
Modulus of Elasticity (10^3 N/mm^2)	211						
Density (g/cm^3)	7.78						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	30.40		20.37		24.65		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	3.2		1.07		0.92		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.47		0.53		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	24.55	26.81	31.84	32.79	33.90	35.23	36.86

4. Specific Properties

- Nickel hot work tool steel with good hardenability.
- Delivered both annealed or hardened (37-42 HRC).
- Uniform hardness over section also at large dimension.
- Very good strength and toughness.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.

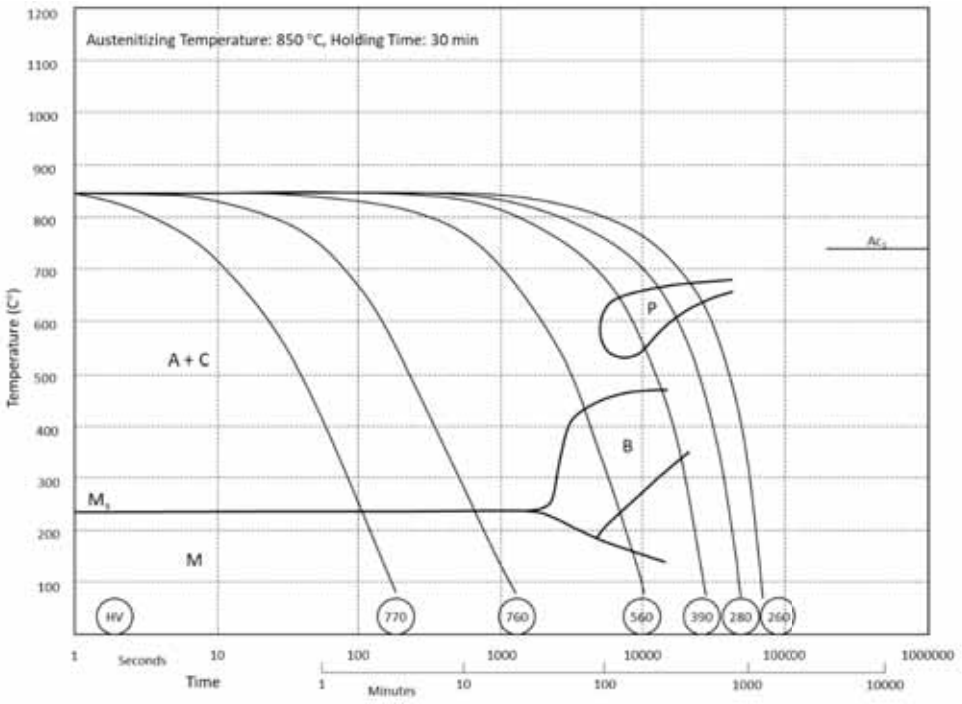
5. Recomended Conditions and Hardness*

	Hardness +A HBW Max.	248
Hardening Test	Austenitizing Temperature (± 10 °C)	850
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	550
	Hardness HRC Min.	42



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

Dies for Drop Forging Hammers and Mechanical Presses, Die Molds, Shoe Blocks, Die Holder, Cassettes, Piston Rods, Cranks, Boasters, Shearing Blades, Tools, Plastic Molds, Shafts.

1.2714 MOD


↑ 873,4°C

1.2714 MOD

1. Material Data Sheet

Material Class : Hot Work Tool Steel
Related Standard * : DIN EN ISO 4957 ~ 1.2367
Special Process ** : Available in ESR

2. Chemical Composition (typical analysis wt.%) *

C	Si	Mn	Cr	Mo	Ni	V
0.52	0.25	0.85	1.05	0.65	2.05	0.11

3. Physical Properties

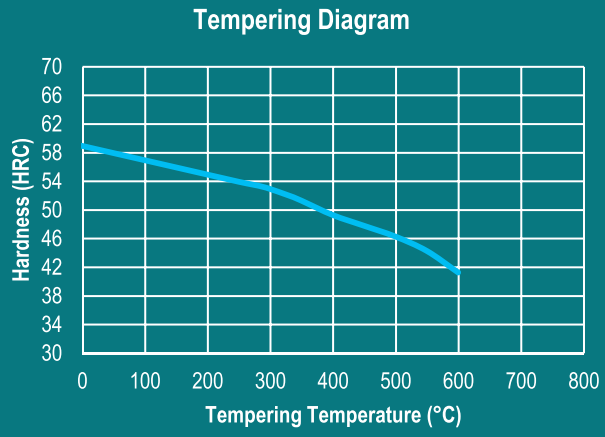
Modulus of Elasticity (10^3 N/mm^2)	211						
Density (g/cm^3)	7.79						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	27.96		20.14		24.47		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.34		0.95		1.1		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.47		0.53		0.58		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	24.54	26.67	31.78	32.73	33.84	35.16	36.78

4. Specific Properties

- Cr-Ni-Mo alloy hot work tool steel good hardenability.
- Very good strenght and toughness.
- Tools can be water or air cooled.
- Improved high temperature resistance properties and increased wear resistance compared to grade 1.2714.
- The Electroslag Remelting (ESR) process results in high performance hot work tool steels with enhanced quality due to highly homogeneous and clean microstructure.

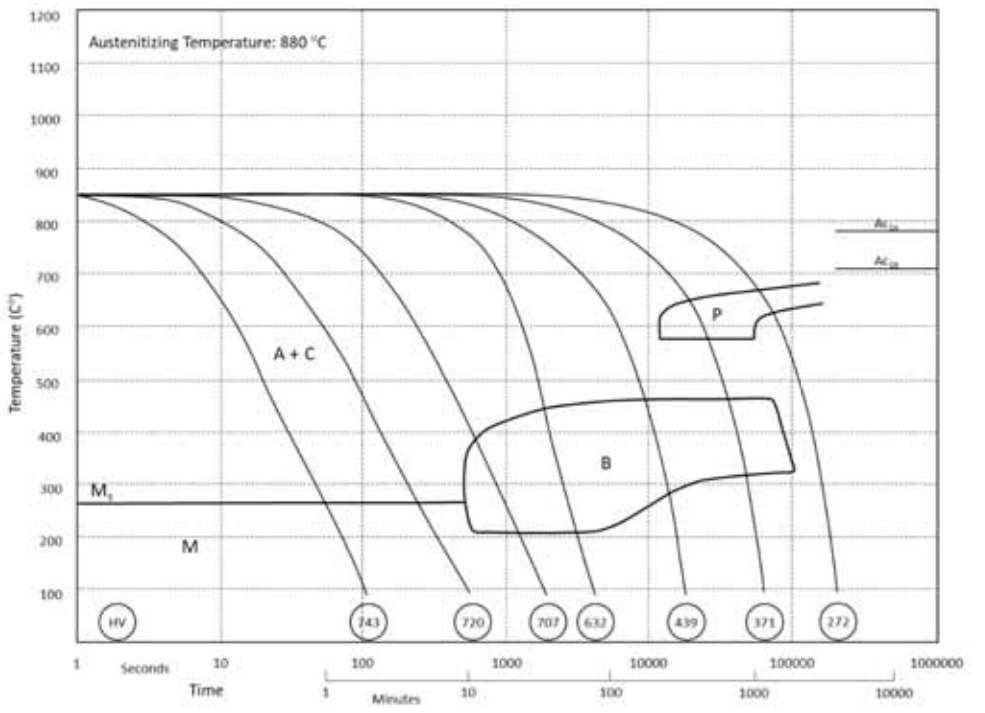
5. Recomended Conditions and Hardness*

	Hardness +A HBW Max.	248
Hardening Test	Austenitizing Temperature (± 10 °C)	850
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	500
	Hardness HRC Min.	42



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



7. Typical Applications

Dies for Drop Forging Hammers & Mechanical Presses, Die Molds, Shoe Blocks, Die Holder, Cassettes, Piston Rods, Cranks, Boasters, Shearing Blades, Tools, Plastic Molds, Shafts.

1.2083 (X40Cr14)

1.2083 (X40Cr14)

1. Material Data Sheet

Material Class	Plastic Mold Tool Steel
Related Standard *	: DIN EN ISO 4957
Special Process **	: Available in ESR

2. Chemical Composition (typical analysis wt.%) *

C	Si	Mn	Cr
0.39	<1.0	<1.0	13.5

3. Physical Properties

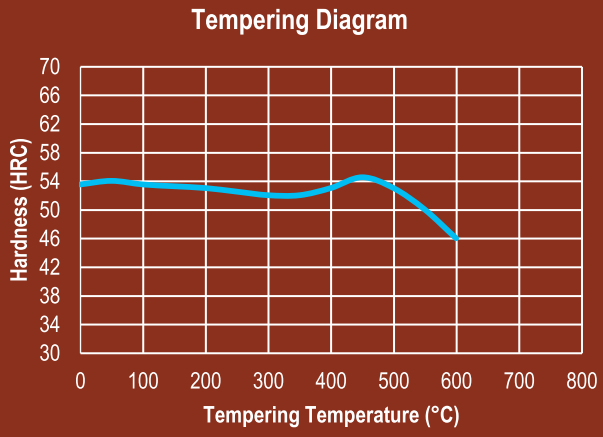
Modulus of Elasticity (10^3 N/mm^2)	217						
Density (g/cm^3)	7.71						
Thermal Conductivity (W/m.K)	**25°C**		**350°C**		**700°C**		
	17.50		21.64		25.72		
Electrical Resistivity (10^{-6} Ohm.m)	**25°C**		**350°C**		**700°C**		
	0.55		0.96		1.00		
Specific Heat Capacity (J/g.K)	**25°C**		**350°C**		**700°C**		
	0.43		0.52		0.53		
Average Expansion Coefficient (10^{-6} C^{-1})	**100 °C**	**200 °C**	**300 °C**	**400 °C**	**500 °C**	**600 °C**	**700 °C**
	22.96	24.26	28.52	31.89	33.08	34.48	36.15

4. Specific Properties

- Good corrosion resistant tool steel with high dissolved Cr-content in the steel matrix.
- Very high machinability and dimensional stability.
- Good toughness.
- Suitable for quenching and tempering.
- Good polishability.

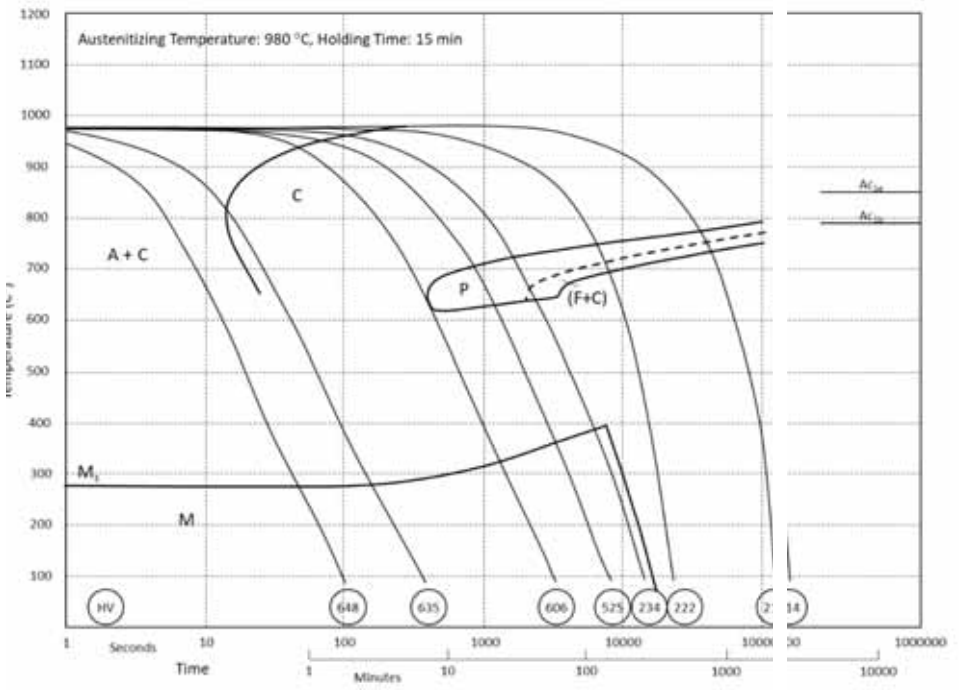
5. Recomended Conditions and Hardness*

	Hardness +A HBW Max.	241
Hardening Test	Austenitizing Temperature (± 10 °C)	1010
	Quenching Medium	Oil
	Tempering Temperature (± 10 °C)	180
	Hardness HRC Min.	52



TECHNICAL DATA

6. Continuous Cooling Transformation Diagram (CCT)



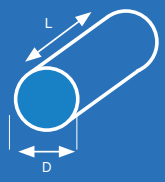
7. Typical Applications

Plastic Injection Molds, Extrusion Dies, Medical and Optical Industry Parts such as Spectacles and Lenses.

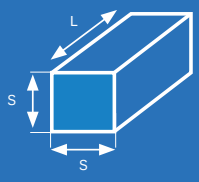
Disclaimer

This specification is for information only, Asil Çelik takes no responsibility for the suitability of the steels referred to in this specification to a given product or end use, We reserve the right to change the data in this specification without prior notification, Asil Çelik takes no responsibility for any errors in the information, or for any consequences resulting from its use.

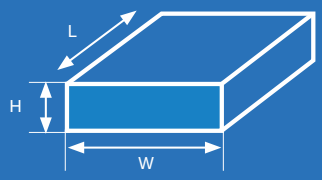
FORGED PRODUCTS



Forged Rounds			
		Min	Max
Diameter (D)	mm	200	800
Length (L)	mm	2.000	12.000
Forged Weight	kg	2.000	27.000



Forged Squares			
		Min	Max
Length (L)	mm	-	8.000
Square Size (S)	mm	200	8.000
Forged Weight	kg	2.000	27.000



Forged Blocks			
		Min	Max
Length (L)	mm	2.000	7.000
Width (W)	mm	400	800
Height (H)	mm	200	600
Forged Weight	kg	2.000	27.000

Discs			
		Min	Max
Diameter (D)	mm	500	1.600
Height (H)	mm	200	500
Forged Weight	kg	2.000	27.000

Roll Blanks			
		Min	Max
Diameter (D)	mm	300	1.000
Length (L)	mm	2.000	6.000
Forged Weight	kg	2.000	20.000

* Forging tolerances are according to DIN 7527 standard.

* Given product dimensions and shapes are nominal, exact dimensions are determined at the order stage.

INGOT DATA

Ingot Mould Section	Total Weight Head+Body (kg)
480 Square	2.250
550 Square	2.850
595 Square	3.650
630 Square	4.200
795 Square	7.700
1060 Square	12.350
720 Polygonal	4.600
945 Polygonal	9.300
980 Polygonal	12.900
P 18 Polygonal	16.200
P 25 Polygonal	22.700
P 35 Polygonal	31.700

ESR INGOTS

410 Round	2.200
550 Round	3.900
660 Round	6.100
800 Round	8.500
1000 Round	16.000

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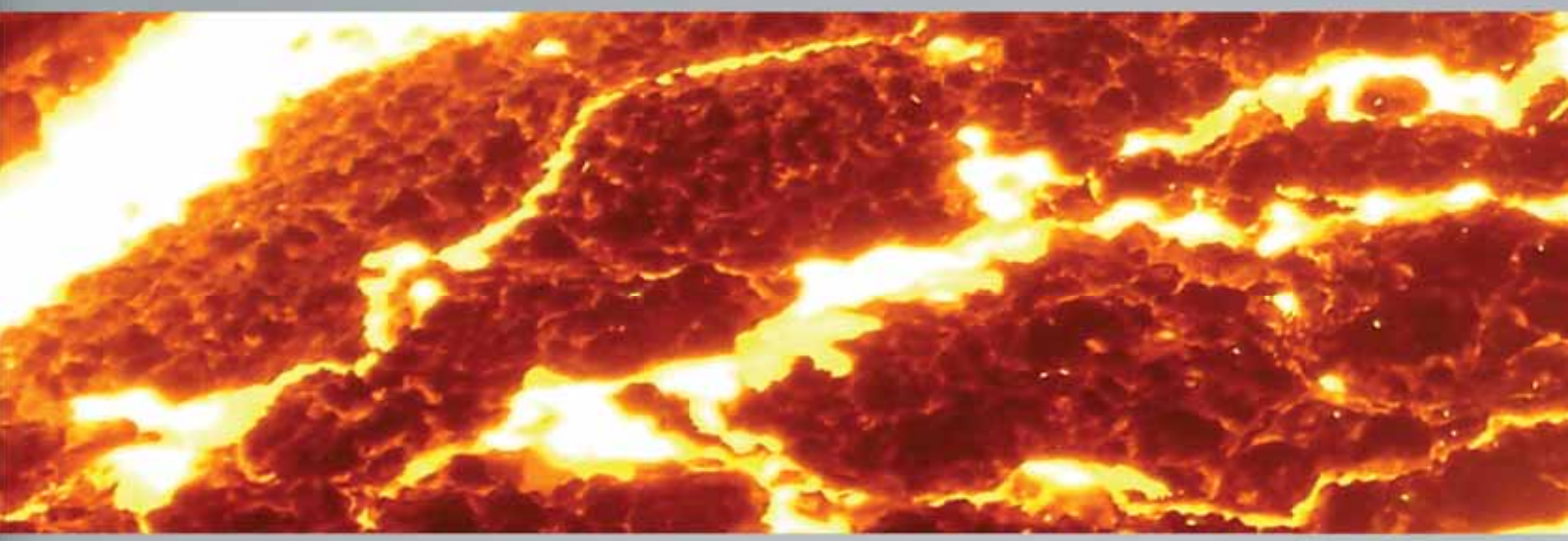

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