





# ASSAB 518

	 <small>a voestalpine company</small>	REFERENCE STANDARD		
		AISI	Wnr.	JIS
ASSAB DF-3	ARNE	O1	1.2510	SKS 3
ASSAB XW-10	RIGOR	A2	1.2363	SKD 12
ASSAB XW-42	SVERKER 21	D2	1.2379	(SKD 11)
CALMAX / CARMO	CALMAX / CARMO		1.2358	
VIKING	VIKING / CHIPPER		(1.2631)	
CALDIE	CALDIE			
ASSAB 88	SLEIPNER			
ASSAB PM 23 SUPERCLEAN	VANADIS 23 SUPERCLEAN	(M3:2)	1.3395	(SKH 53)
ASSAB PM 30 SUPERCLEAN	VANADIS 30 SUPERCLEAN	(M3:2 + Co)	1.3294	SKH 40
ASSAB PM 60 SUPERCLEAN	VANADIS 60 SUPERCLEAN		(1.3292)	
VANADIS 4 EXTRA SUPERCLEAN	VANADIS 4 EXTRA SUPERCLEAN			
VANADIS 8 SUPERCLEAN	VANADIS 8 SUPERCLEAN			
VANCRON SUPERCLEAN	VANCRON SUPERCLEAN			
ELMAX SUPERCLEAN	ELMAX SUPERCLEAN			
VANAX SUPERCLEAN	VANAX SUPERCLEAN			
ASSAB 518		P20	1.2311	
ASSAB 618 T		(P20)	(1.2738)	
ASSAB 618 / 618 HH		(P20)	1.2738	
ASSAB 718 SUPREME / 718 HH	IMPAX SUPREME / IMPAX HH	(P20)	1.2738	
NIMAX / NIMAX ESR	NIMAX / NIMAX ESR			
VIDAR 1 ESR	VIDAR 1 ESR	H11	1.2343	SKD 6
UNIMAX	UNIMAX			
CORRAX	CORRAX			
ASSAB 2083		420	1.2083	SUS 420J2
STAVAX ESR	STAVAX ESR	(420)	(1.2083)	(SUS 420J2)
MIRRAX ESR	MIRRAX ESR	(420)		
MIRRAX 40	MIRRAX 40	(420)		
TYRAX ESR	TYRAX ESR			
POLMAX	POLMAX	(420)	(1.2083)	(SUS 420J2)
ROYALLOY	ROYALLOY	(420 F)		
COOLMOULD	COOLMOULD			
ASSAB 2714			1.2714	SKT 4
ASSAB 2344		H13	1.2344	SKD 61
ASSAB 8407 2M	ORVAR 2M	H13	1.2344	SKD 61
ASSAB 8407 SUPREME	ORVAR SUPREME	H13 Premium	1.2344	SKD 61
DIEVAR	DIEVAR			
QRO 90 SUPREME	QRO 90 SUPREME			
FORMVAR	FORMVAR			

( ) - modified grade

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Edition 20200418

## GENERAL

ASSAB 518 is a vacuum-degassed Cr-Mo alloy steel, supplied in prehardened condition and normally does not require further heat treatment.

This eliminates the risks, cost and waiting time of heat treatment and avoids the associated possibility of distortion or even cracking. Subsequent modifications can easily be carried out.

Typical analysis %	C 0.4	Si 0.3	Mn 1.4	Cr 1.9	Mo 0.2
Standard specification	AISI P20, WNr. 1.2311, DIN 40CrMnMo7				
Delivery condition	Hardened and tempered to 290 - 330 HB				
Colour code	Blue / Pink				

ASSAB 518 is manufactured to high-quality standards with the following characteristics:

- Good homogeneity and uniform hardness
- Good machinability
- Good polishing and photo-etching properties
- Good weldability
- Suitable for all nitriding processes, hard-chromium plating, PVD coating as well as case hardening (e.g., carburising)
- 100% ultrasonic tested

## APPLICATIONS

- Injection moulds for thermoplastics
- Extrusion dies for thermoplastics
- Blow moulds
- Mould / die frames and holders
- Machine and structural components (e.g. shafts, gears, hammers, etc.)

## PROPERTIES

### PHYSICAL DATA

Unless otherwise specified, the data are approximate values in the as-delivered condition at ambient temperature.

Density, kg/m <sup>3</sup>	7 800
Modulus of elasticity, N/mm <sup>2</sup>	205 000
Tensile strength, R <sub>m</sub> , N/mm <sup>2</sup>	1 050
Yield strength, R <sub>p0.2</sub> , N/mm <sup>2</sup>	900
Compressive yield strength, R <sub>c0.2</sub>	950

Temperature	20 °C	200 °C	400 °C
Coefficient of thermal expansion, per °C from 20°C	-	13.1 × 10 <sup>-6</sup>	14.0 × 10 <sup>-6</sup>
Thermal conductivity W/m °C	34.0	33.6	29.5

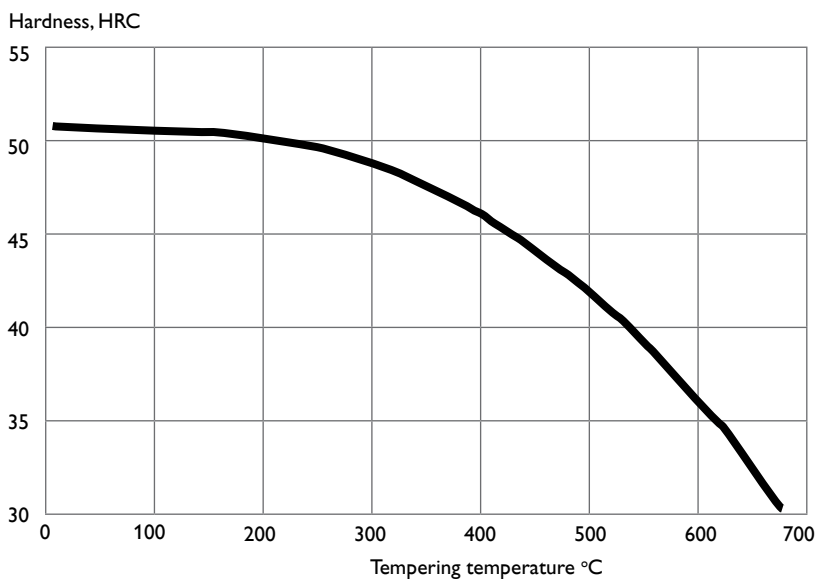
# HEAT TREATMENT

Process	Temperature	Soaking time *	Cooling	Hardness
Stress relieving	-550 °C	120 min	Furnace cooling	-
Soft annealing	-720 °C	60 - 120 min	Slow cooling in furnace	-
Hardening	840 - 880 °C	30 - 60 min	Oil, hot bath (180 - 220 °C)	Max. 52 HRC
Tempering (Ø25mm, 850°C, oil quenched)	200 °C	400 °C	500 °C	600 °C
	50 HRC	46 HRC	42 HRC	36 HRC

\* Soaking time = Time at temperature after the tool is fully heated through.

## TEMPERING GRAPH

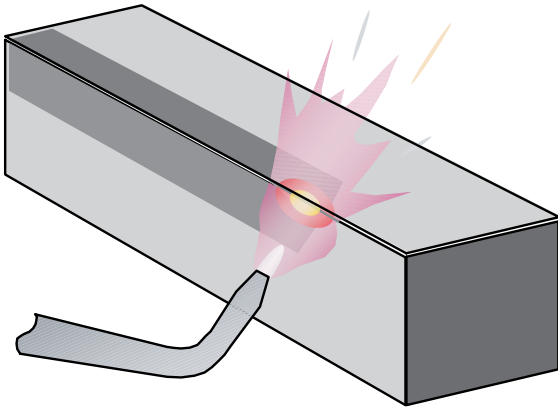
The curve shown in the tempering graph is valid for Ø25 mm samples, austenitised at 850°C and quenched in oil.



# SURFACE TREATMENT

## FLAME AND INDUCTION HARDENING

ASSAB 518 can be flame or induction hardened to a hardness of approx. 50 HRC. Cooling in air is preferable. Smaller pieces may however require forced cooling. Hardening should be immediately followed by tempering.



## NITRIDING

Mould machined from ASSAB 518 may be nitrided to give a hard surface which is very resistant to wear and erosion. A nitrided surface also increases the corrosion resistance. The surface hardness after gas nitriding at 525°C in ammonia gas will be approximately 650 HV with the following case depth:

### DEPTH OF NITRIDING

Temperature °C	Time h	Depth* mm
525	20	0.30
525	30	0.35
525	60	0.50

\* Nitriding depth is the distance from the surface where hardness is 50 HV higher than the matrix hardness.

Gas nitrocarburising at 570°C will give a surface hardness of approx. 700 HV. After 2 hours treatment, the case depth will be approx. 0.10 mm.

## HARD CHROME PLATING

After hard-chromium plating, the tool should be tempered for approx. 4 hours at 180°C within 4 hours of plating in order to avoid hydrogen embrittlement.

# WELDING

Welding method	TIG	MMA (SMAW)
Working temperature	200 - 250 °C	200 - 250 °C
Filler metals	ASSAB 718 TIG Weld	ASSAB 718 Weld
Hardness after welding	300 - 330 HB	300 - 330 HB
Post weld treatment	Temper at approx. 550°C for 2 hr	

## Further information

For further information, i.e., steel selection, heat treatment, application and availability, please contact our ASSAB office nearest to you.

# ASSAB

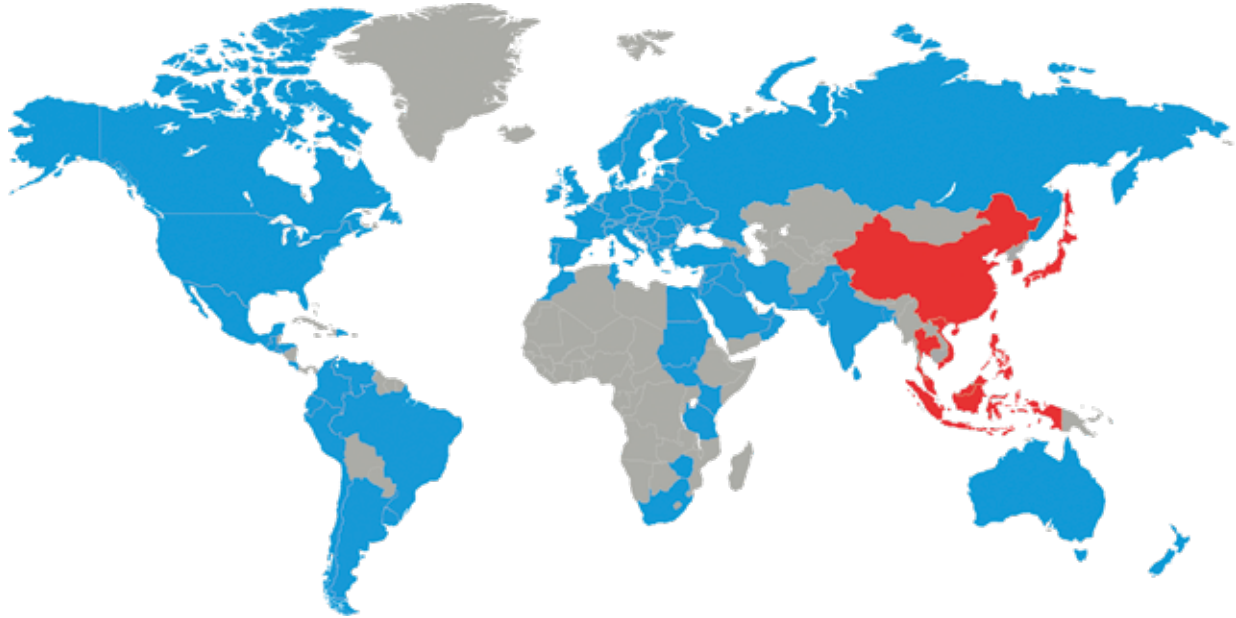
## SUPERIOR TOOLING SOLUTIONS

# A ONE-STOP SHOP



ASSAB is unmatched as a one-stop product and service provider that offers superior tooling solutions. In addition to the supply of tool steel and other special steel, our range of comprehensive value-added services, such as machining, heat treatment and coating services, span the entire supply chain to ensure convenience, accountability and optimal usage of steel for customers. We are committed to achieving solutions for our customers, with a constant eye on time-to-market and total tooling economy.





Choosing the right steel is of vital importance. ASSAB engineers and metallurgists are always ready to assist you in your choice of the optimum steel grade and the best treatment for each application. ASSAB not only supplies steel products with superior quality, we offer state-of-the-art machining, heat treatment and surface treatment services to enhance steel properties to meet your requirement in the shortest lead time. Using a holistic approach as a one-stop solution provider, we are more than just another tool steel supplier.

ASSAB and Uddeholm are present on every continent. This ensures you that high quality tool steel and local support are available wherever you are. Together we secure our position as the world's leading supplier of tooling materials.

For more information, please visit  
[www.assab.com](http://www.assab.com)

