

ASSAB Tool Steel Performance Comparison Chart



	ASSAB Grade	Uddeholm Grade	Reference Standard			Hardness Supplied	Chemical Composition %								Austenising Temp °C	Range of Hardness	Characteristics	Applications		
			AISI	W.Nr.	JIS		C	Si	Mn	Cr	Mo	W	V	Others						
COLD WORK	ASSAB DF-3	ARNE	O1	1.2510	SKS 3	HB 230 (max)	0.95	0.3	1.1	0.6	-	0.6	0.1	-	790-850	56-62	General purpose oil hardening tool steel with good surface hardness and wear resistance.	Cutting : blanking, punching, shearing, trimming. Forming : bending, drawing, rim rolling, spinning, flow forming. Gauges and measuring tools.		
	ASSAB XW-10	RIGOR	A2	1.2363	SKD 12	HB 215	1.0	0.3	0.6	5.3	1.1	-	0.2	-	925-970	56-62	Good hardenability, wear resistance and excellent size stability for medium runs.	Blanking, punching, piercing, cropping, shearing, trimming and moulds for abrasive plastics.		
	ASSAB XW-42	SVERKER 21	D2	1.2379	SKD 11	HB 240	1.55	0.3	0.3	11.6	0.8	-	0.8	-	990-1080	58-63	A 12% Cr tool steel with high wear resistance and strength.	Blanking, fine blanking, punching, cropping, shearing, trimming and clipping.		
	CALMAX	CALMAX		1.2358		HB 200	0.6	0.35	0.8	4.5	0.5	-	0.2	-	950-970	52-59	A general steel with high toughness, good wear resistance and polishability.	Moulds for the production of electrical components. Typical for blanking dies with high demands on toughness.		
	CALDIE	CALDIE				HB 215 (max)	0.7	0.2	0.5	5.0	2.3	-	0.5	-	1000-1050	56-61	Very good chipping and cracking resistance with high compressive strength. Suitable for PVD coating to maximise wear resistance.	Cold forging, forming dies, fine blanking and heavy duty blanking, thread rolling dies and coining dies. Suitable for AHSS automotive parts.		
	ASSAB 88	SLEIPNER				HB 235	0.9	0.9	0.5	7.8	2.5	-	0.5	-	950-1080	58-64	Mixed-abrasive profile, good resistance to chipping, good machining and VEDM properties.	Blanking, fine blanking, shearing, forming, coining, cold forging, cold extrusion, thread rolling, drawing, deep drawing and powder pressing.		
PLASTIC MOULD	ASSAB 618 HH		(P20)	1.2738		HB 340-380	0.37	0.3	1.4	2.0	0.2	-	-	Ni 1.0	Pre-hardened, no hardening is needed.	Pre-hardened plastic mould steel with good polishability and machinability.	Injection moulds and extrusion dies for thermoplastics, blow moulds, forming tools, machine components, structural components and shafts.			
	ASSAB 618 T		(P20)	(1.2738)		HB 310-355	0.26	0.1	1.45	1.25	0.6	-	0.12	Ni 1.05	Pre-hardened, no hardening is needed.	Pre-hardened mould steel with exceptional through hardening properties, good polishability and etching properties combined with good machinability.	Suitable for large and very large moulds where there is high demand on surface finish.			
	ASSAB 718 HH	IMPAX HH	(P20)	1.2738		HB 340-380	0.37	0.3	1.4	2.0	0.2	-	-	Ni 1.0	Pre-hardened, no hardening is needed.	Pre-hardened plastic mould steel with very good polishability.	Injection moulds and extrusion dies for thermoplastics, blow moulds, forming tools, machine components, structural components and shafts.			
	NIMAX	NIMAX				HB 360-400	0.1	0.3	2.5	3.0	0.3	-	-	Ni 1.0	Pre-hardened, no hardening is needed.	Pre-hardened mould steel with best toughness, good machinability and very good polishability.	Mould for plastic injection (e.g. packaging containers, automotive interior parts, reflectors, panels and handles for appliances), holder material for forging, die-casting dies, cutting tools, hot runner manifolds and structural components.			
	NIMAX ESR	NIMAX ESR				HB 360-400	0.1	0.3	2.5	3.0	0.3	-	-	Ni 1.0	Pre-hardened, no hardening is needed.	Pre-hardened mould steel with best toughness, good machinability and excellent polishability.	Main applications are transparent, high gloss polished or textured moulds for use mainly within automotive, white goods, packaging and electronic industry.			
	MIRRAX 40	MIRRAX 40	(420)			HB 360-400	0.21	0.9	0.45	13.5	0.2	-	0.25	Ni 0.6 +N	Pre-hardened, no hardening is needed.	Pre-hardened corrosion-resistant mould steel. It has very good machinability, toughness and polishing properties.	Injection moulds and blow moulding for corrosive plastics. Plastic moulding of high surface finish parts (e.g. Bezels and casings for LED/LCD). PET bottles and construction parts.			
	MIRRAX ESR	MIRRAX ESR	(420)			HB 250	0.25	0.3	0.5	13.3	0.3	-	0.3	Ni 1.3 +N		1000-1025	44-52	Stainless mould steel with a unique combination of toughness, corrosion resistance and through-hardening properties.	For all types of moulds, especially suited for larger tools where corrosion in production is unacceptable and where high surface finish is required.	
	STAVAX ESR	STAVAX ESR	(420)	(1.2083)	(SUS 420J2)	HB 190	0.38	0.9	0.5	13.6	-	-	0.3	-		1000-1050	44-52	Stainless plastic mould steel with superb polishability and corrosion resistance.	Injection moulds for highly polished parts and for moulding corrosive plastics.	
	TYRAX ESR	TYRAX ESR				HB 190	0.4	0.2	0.5	12.0	2.3	-	0.5	+N		1050-1080	55-58	A tough and corrosion resistant plastic mould steel with excellent polishability, good machinability and wear resistance.	Suitable for long run production moulds for reinforced plastics, compression moulding and corrosive plastics. It is good for making complex moulds. Tyrax ESR is also suitable when high gloss surface finish is required.	
	VIDAR 1 ESR	VIDAR 1 ESR	H11	1.2343	SKD 6	HB 185	0.38	1.0	0.4	5.0	1.3	-	0.4	-		990-1010	44-52	Suitable for both hot work and plastic mould applications, especially large plastic moulds that require good toughness in combination with high surface finish obtained by polishing or texturing.	For general hot work and plastic moulds. Specifically used where high toughness and high surface requirements are needed in large plastic moulds, such as lens, extension and reflector moulds for Automotive lighting systems.	
	UNIMAX	UNIMAX				HB 185	0.5	0.2	0.5	5.0	2.3	-	0.5	-		1000-1025	52-58	High hardness and very good toughness. ESR for excellent polishability. Suitable for coating and nitriding.	Plastic moulds for abrasive plastics. Suitable for heavy blanking, powder compacting as well as for warm forging.	
	ROYALLOY	ROYALLOY	(420 F)			HB 290-330	0.05	0.4	1.2	12.6	-	-	-	S 0.12 +N +Cu	Pre-hardened, no hardening is required.		1000-1050	46-52	Stainless steel for holder blocks with excellent machinability and corrosion resistance.	Holders/bolsters for plastic moulds, plastic and rubber moulds with low requirements on polishability, dies for plastic extrusion and for constructional parts.
	POLMAX	POLMAX	(420)	(1.2083)	(SUS 420J2)	HB 200	0.38	0.9	0.5	13.6	-	-	0.3	-		1000-1050	46-52	Excellent polishability, good machinability and good resistance to corrosion and wear.	Recommended where extreme surface finishes are required, such as lens moulds and CD moulds.	
	CORRAX	CORRAX				HRC 34	0.03	0.3	0.3	12.0	1.4	-	-	Ni 9.2 Al 1.6	Age hardening to HRC 40-51			Age hardening stainless steel with superior corrosion resistance.	Injection moulds for corrosive plastics, rubber, medical and food industry, extrusion dies, and engineering parts.	
HOT WORK	DIEVAR	DIEVAR				HB 160	0.35	0.2	0.5	5.0	2.3	-	0.6	-	1000-1030	44-52	High performance hot work tool steel with very good resistance to heat checking, gross cracking, hot wear and plastic deformation.	Excellent choice for die casting of aluminium and magnesium, hot stamping, forging, and aluminium extrusion.		
	ASSAB 8407 SUPREME	ORVAR SUPREME	H13 Premium	1.2344	SKD 61	HB 180	0.39	1.0	0.4	5.2	1.4	-	0.9	-	1020-1050	44-52	Meets and exceeds NADCA 207-2011 specification for premium die casting materials.	Suitable for high pressure die casting, hot extrusion, press forging tools and moulds for plastics.		
	ASSAB 8407 2M	ORVAR 2M	H13	1.2344	SKD 61	HB 185	0.39	1.0	0.4	5.3	1.3	-	0.9	-	1020-1050	42-52	Hot work tool steel with overall good ductility, toughness, wear resistance, hardenability and machinability.	Tools for extrusion, hot forging and pressing and moulds for plastics.		
	QRO 90 SUPREME	QRO 90 SUPREME				HB 180	0.38	0.3	0.8	2.6	2.3	-	0.9	-	1020-1050	42-52	Highest temperature strength and very good thermal fatigue resistance.	Die casting dies and associated tooling, extrusion dies and extrusion tooling, forging dies, especially for copper and brass and hot stamping dies.		
POWDER METALLURGY	FORMVAR	FORMVAR				HB 230 (max)	0.35	0.2	0.5	5.0	2.3	-	0.6	-	1000-1030	44-52	Good temper resistance and higher temperature strength than H13 type steel.	Tools for hot forging and extrusion.		
	ASSAB PM 23*	VANADIS 23*	(M3:2)	1.3395	(SKH 53)	HB 260 (max)	1.28	-	-	4.2	5.0	6.4	3.1	-	1050-1180	60-65	Powder high speed steel with excellent wear resistance and toughness. Suitable for very long runs.	Blanking of medium to high carbon steel, blanking of harder materials. Moulds for very abrasive plastics and IC moulds.		
	ASSAB PM 30*	VANADIS 30*	(M3:2 + Co)	1.3294	SKH 40	HB 300 (max)	1.28	-	-	4.2	5.0	6.4	3.1	Co 8.5	1050-1180	60-66	Powder high speed steel for cutting tools with excellent wear resistance, toughness and good hot hardness.	Suitable for chip forming multi-edge cutting tools, single-edge cutting tools, cold work applications with high demands on wear resistance and IC moulds.		
	ASSAB PM 60*	VANADIS 60*		(1.3292)		HB 340 (max)	2.3	-	-	4.2	7.0	6.5	6.5	Co 10.5	1100-1180	60-68	Powder high speed steel for cutting tools with excellent wear resistance, toughness and excellent hot hardness.	Suitable for chip forming multi-edge cutting tools, single-edge cutting tools and cold work applications with high demands on wear resistance.		
	VANADIS 4 EXTRA*	VANADIS 4 EXTRA*				HB 230	1.4	0.4	0.4	4.7	3.5	-	3.7	-	950-1150	58-64	Powder tool steel for long run tooling, where high demands on adhesive wear and chipping resistance is required.	Blanking, fine blanking, forming of thicker work material, esp. austenitic stainless steel, mild carbon steel, AHSS, copper and aluminium.		
	VANADIS 8*	VANADIS 8*				HB 270	2.3	0.4	0.4	4.8	3.6	-	8.0	-	1020-1180	60-65	Powder tool steel for very long run tooling, where abrasive wear resistance and good toughness is required.	Blanking, forming, fine blanking, deep drawing, cold forging and powder compacting.		
	VANCRON*	VANCRON*				HB 300	1.3	0.5	0.4	4.5	1.8	-	10	N 1.8	950-1150	58-65	A nitrided powder tool steel for the very best resistance to galling and adhesive wear. Normally no coating is necessary.	Blanking, fine blanking, deep drawing, bending powder compacting of soft and adhesive metals.		
	ELMAX*	ELMAX*				HB 280	1.7	0.8	0.3	18.0	1.0	-	3.0	-	1050-1100	56-60	Powder tool steel and stainless plastic mould steel with high wear and corrosion resistance.	Electronics industry: connectors, plugs, switches, resistors and integrated circuits.		
	VANAX*	VANAX*				HB 260	0.36	0.3	0.3	18.2	1.1	-	3.5	N 1.55	1080	60	A high nitrogen powder tool steel produced with unique property combinations of hardness, wear resistance, ductility and corrosion resistance.	Plastic mould requiring high corrosion resistance, fretting resistance and/or mould release properties, hand knives, components and knives in food processing, wear parts in sliding and rolling engineering, highly stressed machine parts.		

() - modified grade

* - SuperClean range



ASSAB Tool Steel Performance Comparison Chart



	ASSAB Grade	Uddeholm Grade	Hardness/Resistance to plastic deformation	Machinability	Grindability	Dimension stability	Resistance to abrasive wear	Resistance to adhesive wear/Galling	Ductility/Resistance to chipping	Toughness/Gross cracking
COLD WORK	ASSAB DF-3	ARNE	●●●●●	●●●●●●●●●●	●●●●●●●●●●	●●	●●●	●●●	●●●●●	●●●●●●
	ASSAB XW-10	RIGOR	●●●●●	●●●●●●	●●●●●●	●●●●●	●●●●●	●●●	●●●●●	●●●●●●
	ASSAB XW-42	SVERKER 21	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●●●	●●	●●	●●●●●
	CALMAX	CALMAX	●●●	●●●●●●●●●●	●●●●●●●●●●	●●●●●	●●●	●●●●●	●●●●●●●●●●	●●●●●●●●●●
	CALDIE	CALDIE	●●●●●	●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●	●●●●●●●	●●●●●●●●●●	●●●●●●●●●●
	ASSAB 88	SLEIPNER	●●●●●●●	●●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●	●●●●●	●●●●●
POWDER METALLURGY	ASSAB PM 23 †	VANADIS 23 †	●●●●●●●●●●	●●●●●●	●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●	●●●●●
	ASSAB PM 30 †	VANADIS 30 †	●●●●●●●●●●	●●●●●●	●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●	●●●●●
	ASSAB PM 60 †	VANADIS 60 †	●●●●●●●●●●	●●●●●	●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●	●●●●●
	VANADIS 4 EXTRA †	VANADIS 4 EXTRA †	●●●●●●●●●●	●●●●●●	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●●●●●●	●●●●●●●●●●
	VANADIS 8 †	VANADIS 8 †	●●●●●●●●●●	●●●●●●	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●●●●●●	●●●●●●●●●●
	VANCRON †	VANCRON †	●●●●●●●●●●	●●●●●●	●●●●●●	●●●●●●●●●●	●●●●●●●	●●●●●●●	●●●●●●●●●●	●●●●●●●●●●

		Wear resistance	Toughness	Compressive strength	Corrosion resistance	Machinability **	Polishability	Weldability	Nitridability	Photoetchability
PLASTIC MOULD	ASSAB 618 HH	●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	ASSAB 618 T	●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	ASSAB 718 HH	●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	NIMAX	●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	NIMAX ESR	●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	MIRRAX 40	●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●● *
	MIRRAX ESR	●●●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●● *
	STAVAX ESR	●●●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●● *
	TYRAX ESR	●●●●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●●
	VIDAR 1 ESR	●●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	UNIMAX	●●●●	●●●●●●	●●●●●	●	●●●●	●●●●●	●●●●●●	●●●●●●	●●●●●●
	ROYALLOY	●	●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●
	POLMAX	●●●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●● *
	CORRAX	●●●	●●●●●●	●●●●●	●●●●●	●●●●	●●●●●	●●●●●●		●●●●●● *
	ELMAX †	●●●●●	●●●	●●●●●	●●●●●	●●●	●●●●●	●		●●●●●● *
VANAX †	●●●●●	●●●●	●●●●●	●●●●●	●●●●	●●●●●			●●●●●● *	

* Special process required

** Tested in delivery condition

† SuperClean range

		Hot wear	Plastic deformation	Premature cracking	Heat checking	Hardenability
HOT WORK	DIEVAR	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●●●●
	ASSAB 8407 SUPREME	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●
	ASSAB 8407 2M	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●
	QRO 90 SUPREME	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●●	●●●●●●●●●●	●●●●●●
	FORMVAR	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●