

Uddeholm

UHB 11[®]

UDDEHOLM UHB 11®

A bolster steel with medium high carbon content. Narrow composition limits give very consistent properties.

PROPERTY PROFILE

Uddeholm's tool steel UHB 11 is an easily machinable carbon steel characterized by

- Good machinability
- Good mechanical strength.

UHB 11 is primarily intended to be used in the as delivered condition. It is only to be heat treated for special applications.

APPLICATIONS

The property profile of Uddeholm UHB 11 combine to give a steel suitable for bolsters, top and bottom plates and higher strength support plates.

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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty for fitness for a particular purpose.

Classified according to EU Directive 1999/45/EC
For further information see our "Material Safety Data Sheets".

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GENERAL

Uddeholm's tool steel UHB 11 is an easily machinable carbon steel characterized by

- Good machinability
- Good mechanical strength.

UHB 11 is primarily intended to be used in the as-delivered condition. It is only to be heat treated for special applications.

Typical analysis %	C 0,46	Si 0,2	Mn 0,7
Standard specification	W.-Nr. 1.1730		
Delivery condition	As rolled. Hardness approx. 200 HB		
Colour code	White		

APPLICATIONS

Applications

- Punch holders
- Die holders
- Guide plates
- Backing plates
- Jigs
- Fixtures
- Simple bending dies
- Simple structural components.

PROPERTIES

Approximate values at room temperature.
Hardness 200 HB.

Tensile strength, R _m	640 MPa
Yield strength, R _{p0,2}	340 N/mm ² 35 kp/mm ²
Reduction of area, Z	40 %
Elongation, A ₅	20 %

Note: The given figures are typical values and shall not be considered as guaranteed values.

HEAT TREATMENT

UHB 11 is intended to be used untreated, i.e. in the as-delivered condition.

For applications where the material must be hardened to a higher hardness, the following instructions should be followed.

SOFT ANNEALING

Temperature approx. 700°C (1290°F).
Protect the steel and heat through to 700°C (1290°F). Cool in furnace 25°C/h (78°F/h) to 600°C (1110°F) and subsequently freely in air. Hardness after soft annealing approx. 170 HB.

NORMALIZING

Normalizing temperature 840–870°C (1545–1066°F). Cooling in air.

STRESS RELIEVING

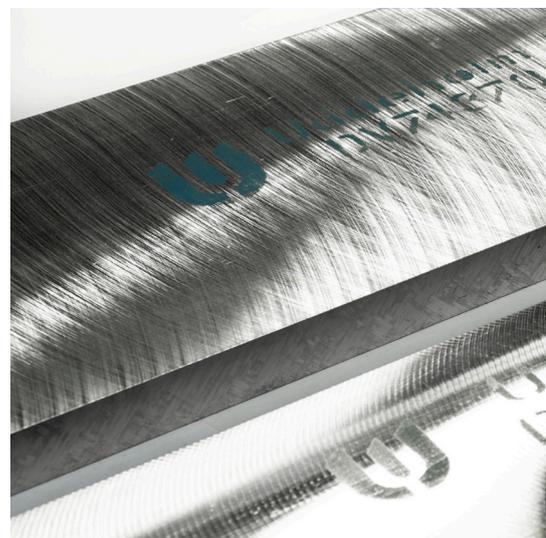
Temperature approx. 650°C (1200°F). After rough machining with chip-cutting tools, stress relieving may be advisable to minimize distortion if the tool is to be hardened. Holding time: 2 h after the entire piece has attained a temperature of approx. 650°C (1200°F). Cooling in furnace to approx. 500°C (930°F), followed by cooling in air.

HARDENING

Preheating temperature: 650°C (1200°F).
Austenitizing temperature: 820–870°C (1510–1600°F).
Holding time: 30 min. Protect against decarburization.

QUENCHING MEDIA

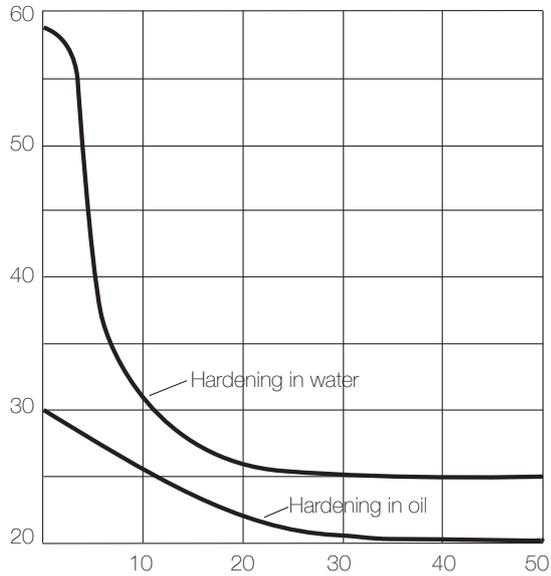
- Water
- Oil.



UHB 11 fine machined ready for delivery.

Hardness as a function of depth under surface.

Dimension Ø 100 mm
Hardness, HRC



Depth below surface, mm

TEMPERING

Tempering temperature and hardness.

Quenching media	Hardness, HRC, after tempering Holdig time 1 h. Approx. value					
	200°C 390°F	250°C 480°F	300°C 570°F	400°C 750°F	500°C 930°F	600°C 1110°F
Water	58	56	53	45	37	27
Oil	31	30	29	27	25	20

Austenitizing temperature 830°C.

FLAME AND INDUCTION HARDENING

UHB 11 can be flame or induction hardened to a hardness of 57 ±3 HRC. Water is normally used for quenching during continuous hardening. Temper immediately after hardening.

CUTTING DATA RECOMMENDATIONS

The cutting data below are to be considered as guiding values which must be adapted to existing local conditions. More detailed information can be found in Uddeholm "Cutting Data Recommendations".

TURNING

Cutting data parameters	Turning with carbide		Turning with high speed steel
	Rough turning	Fine turning	Fine turning
Cutting speed (vc) m/min. f.p.m.	200–250 655–820	250–310 820–1017	25–30 82–98
Feed (f) mm/r i.p.r.	0,3–0,6 0,012–0,023	–0,3 –0,012	–0,3 –0,012
Depth of cut (ap) mm inch	2–6 0,08–0,20	–2 –0,08	–2 –0,08
Carbide designation ISO	P20–P30 Coated carbide	P10 Coated carbide or cemet	–

DRILLING

High speed steel twist drills

Drill diameter Ø		Cutting speed (vc)		Feed (f)	
mm	inch	m/min	f.p.m.	mm/r	i.p.r.
–5	–3/16	20–22*	65–72*	0,08–0,20	0,003–0,008
5–10	3/16–3/8	20–22*	65–72*	0,20–0,30	0,008–0,012
10–15	3/8–5/8	20–22*	65–72*	0,30–0,35	0,012–0,014
15–20	5/8–3/4	20–22*	65–72*	0,35–0,40	0,014–0,016

*For coated HSS drill vc = 34–36 m/min. (111–118 f.p.m.)

Carbide drills

Cutting data parameters	Type of drill		
	Indexable insert	Solid carbide	Brazed carbide ¹⁾
Cutting speed (vc) m/min. f.p.m.	240–260 790–850	100–130 330–425	80–100 260–330
Feed (f) mm/r i.p.r.	0,05–0,25 ²⁾ 0,002–0,010 ²⁾	0,10–0,25 ²⁾ 0,004–0,010 ²⁾	0,15–0,25 ²⁾ 0,006–0,010 ²⁾

¹⁾ Drill with internal cooling channels and brazed carbide tip

²⁾ Depending on drill diameter

MILLING

Face and square shoulder face milling

Cutting data parameters	Milling with carbide	
	Rough milling	Fine milling
Cutting speed (vc) m/min. f.p.m.	200–270 655–885	270–310 885–1017
Feed, (fz) mm/tooth inch/tooth	0,2–0,4 0,008–0,016	0,1–0,2 0,004–0,008
Depth of cut (ap) mm inch	2–5 0,08–0,2	–2 –0,08
Carbide designation ISO	P20–P40 Coated carbide	P10–P20 Coated carbide

End Milling

Cutting data parameters	Type of milling		
	Solid carbide	Carbide indexable insert	High speed steel
Cutting speed (vc) m/min. f.p.m.	160–200 525–655	190–230 625–755	35–40 ¹⁾ 115–130 ¹⁾
Feed, (fz) mm/tooth inch/tooth	0,03–0,20 ²⁾ 0,001–0,008 ²⁾	0,08–0,20 ²⁾ 0,003–0,008 ²⁾	0,05–0,35 ²⁾ 0,002–0,014 ²⁾
Carbide designation ISO	K10	P10–P20	–

¹⁾ For coated HSS end mill vc = 55–60 m/min. (180–200 f.p.m.).

²⁾ Depending on radial depth of cut and cutter diameter.

GRINDING

General grinding wheel recommendation is given below. More information can be found in the Uddeholm publication “Grinding of Tool Steel”.

Grinding operation	Soft annealed condition	Hardened condition
Face grinding straight wheel	A 46 HV	A 46 HV
Face grinding segment	A 24 GV	A 36 GV
Cylindrical grinding	A 46 LV	A 60 KV
Internal grinding	A 46 JV	A 60 JV
Profile grinding	A 100 KV	A 120 JV

WELDING

As is the case with most tool steels, the welding of UHB 11 is associated with a risk of cracking. In order to minimize the risk, welding should be carried out with preheating at 100–350°C (210– 660°F).

Electrode: Unalloyed basic electrode for welding of unalloyed structural steel.

Note: Always use well dried basic electrodes.

Welding can also be performed with an austenitic stainless electrode. The demand of preheating can be reduced but the filler metal does not reach the same hardness level as the base material when hardening.

FURTHER INFORMATION

Please contact your local Uddeholm office for further information on the selection, heat treatment, application and availability of Uddeholm tool steels.

Uddeholm is the world's leading supplier of tooling materials. This is a position we have reached by improving our customers' everyday business. Long tradition combined with research and product development equips Uddeholm to solve any tooling problem that may arise. It is a challenging process, but the goal is clear – to be your number one partner and tool steel provider.

Our presence on every continent guarantees you the same high quality wherever you are. We secure our position as the world's leading supplier of tooling materials. We act worldwide. For us it is all a matter of trust – in long-term partnerships as well as in developing new products.

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