

INTRODUCING

Uddeholm Formvar® - Uddeholm Formvar is a high performance hot work tool steel which offers a very good resistance to hot wear and plastic deformation. Uddeholm Formvar is characterized by good temper resistance, good high-temperature strength, excellent hardenability and good dimensional stability throughout heat treatment and coating operations.

VILLARES VEX® - Villares VEX is a unique new hot work tool steel, specifically developed for extrusion dies, and other hot work tooling applications that are nitrided for added wear resistance. This conventionally produced grade is specially formulated to enhance the nitriding characteristics of a hot work tool steel, giving a harder, and deeper nitride case. In addition the hot properties of this alloy exceed that of a conventional H13 steel.

WORLD CLASS STEEL FOR EXTRUSION

BOHLER-UDDEHOLM P20 MODIFIED - A prehardened Cr-Mo steel supplied at ~310 Brinell. Suitable for containers, bolster, sub-bolsters.

BOHLER-UDDEHOLM H13 - A versatile standard H13 hot work steel with good high temperature strength. Recommended in most cases for tooling components and dies in aluminum extrusion which come into direct contact with the hot billet.

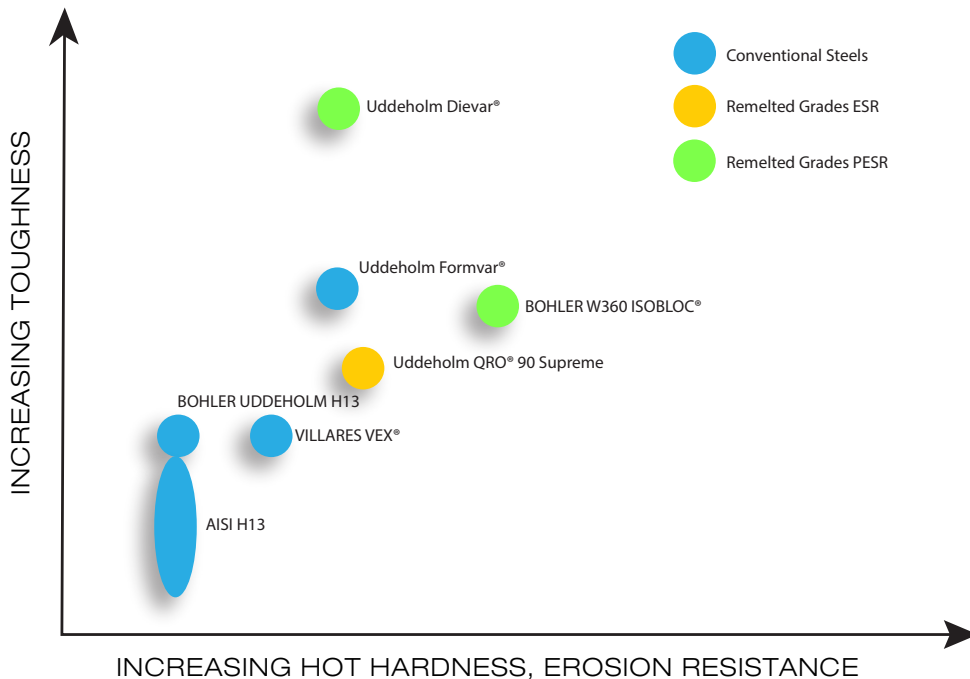
Uddeholm Dievar®¹⁾ - A premium Cr-Mo-V hot work steel with good high temperature strength and excellent toughness and ductility in all directions. Recommended in dies and extrusion components where the demands on toughness and ductility are the highest.

Uddeholm QRO® 90 Supreme¹⁾ - A patented hot work steel with very good strength and hot hardness at elevated temperatures. Recommended for all types of extrusion tooling subjected to high loads and elevated working temperatures.

BOHLER W360 ISOBLOC® - Premium hot work steel with very good high temperature properties. Can be hardened and tempered to 58 HRC, giving an outstanding hot wear resistance. Recommended for dies which are not to be nitrided.

1) Welding consumables are available for these grades.

Steel for Hot Extrusion Applications



This document is intended to provide a general guideline on material selection.
For optimal performance, consult with a Bohler-Uddeholm representative.

03-28-16

Tooling component*	Products	Aluminum/ Magnesium	HRC/HB Copper Alloys	Steel
Support Tools	Bohler-Uddeholm Premium P20 Modified	~310 HB	~310 HB	~310 HB
Wedge Block	Bohler-Uddeholm Premium P20 Modified Bohler-Uddeholm H13	~310 HB 30-42 HRC	~310 HB 30-42 HRC	~310 HB 30-42 HRC
Bolster	Bohler-Uddeholm H13	~45 HRC	~45 HRC	~45 HRC
Die ring	Bohler-Uddeholm H13 Uddeholm Formvar® Uddeholm QRO® 90 Supreme	40-44 HRC 40-44 HRC -	- - 40-44 HRC	- - 40-44 HRC
Die	Bohler-Uddeholm H13 Uddeholm Formvar® Uddeholm QRO® 90 Supreme Uddeholm Dievar® BOHLER W360 ISOBLOC® Villares VEX®	46-50 HRC 46-50 HRC 45-50 HRC 46-52 HRC 52-58 HRC 46-50 HRC	- - 46-48 HRC - - 46-50 HRC	- - 44-46 HRC - - -
Mantle	Bohler-Uddeholm Premium P20 Modified Bohler-Uddeholm H13	~310 HB 37-43 HRC	~310 HB	~310 HB 37-43 HRC
Intermediate liner	Bohler-Uddeholm Premium P20 Modified Bohler-Uddeholm H13 Uddeholm Formvar®	~310 HB 37-43 HRC 38-44 HRC	~310 HB 37-43 HRC 38-44 HRC	~310 HB 37-43 HRC 38-44 HRC
Liner	Bohler-Uddeholm H13 Uddeholm Formvar® Uddeholm QRO® 90 Supreme Uddeholm Dievar® BOHLER W360 ISOBLOC®	44-48 HRC 44-50 HRC 44-48 HRC 44-50 HRC 50-56 HRC	- - 44-48 HRC - -	44-48 HRC 44-48 HRC - - -
Dummy block	Uddeholm QRO® 90 Supreme Uddeholm Dievar® BOHLER W360 ISOBLOC® Uddeholm Formvar®	44-48 HRC 46-52 HRC 50-56 HRC 44-50 HRC	44-48 HRC - - 44-50 HRC	44-48 HRC - - -
Fasteners for fixed dummy block	Bohler-Uddeholm P20 Modified	~310 HB	-	-
Stem	Bohler-Uddeholm H13	46-50 HRC	46-50 HRC	46-50 HRC
Mandrel	Bohler-Uddeholm H13 Uddeholm QRO® 90 Supreme Uddeholm Dievar® Uddeholm Formvar®	46-50 HRC 46-49 HRC 46-52 HRC 46-50 HRC	- 45-49 HRC 46-52 HRC 46-50 HRC	- 45-49 HRC - -

*For fully finished and specialized extrusion tooling components, contact us about the Bohler Open Die Forging Group.

Resistance to some common extrusion failure mechanisms

	Resistance to				
	Hot Wear	Plastic Deformation	Premature Cracking	Heat Checking	Nitriding Ability
BOHLER-UDDEHOLM H13	██████	████	████	██████	██████
VILLARES VEX®	██████████	████	████	██████	██████████
Uddeholm Formvar®	██████████	██████	██████████	██████████	██████████
Uddeholm Dievar®	██████████	██████	██████████	██████████	██████████
BOHLER W360 ISOBLOC®	██████████	██████	██████████	██████████	██████████
Uddeholm QRO® 90 Supreme	██████████	██████	████	██████████	██████████

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