



# HOLDER

## Pre-hardened Free-machining Holder Steel

### General

**HOLDER** is a free-machining chromium-molybdenum alloyed steel which is supplied in the pre-hardened condition.

Delivery condition	Hardened and tempered to approximately 290 Brinell
Colour code	Yellow/blue

*Holder* is characterized by:

- Excellent machinability
- Good resistance to indentation
- Uniform hardness in all dimensions

### Properties

#### Tensile strength

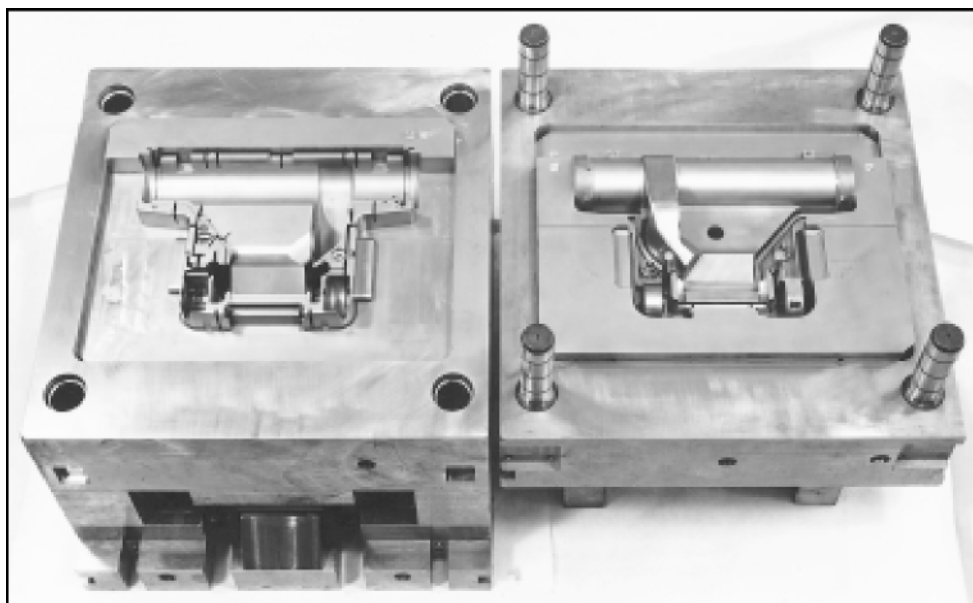
Approx. values. Samples taken from a round bar 1" (25 mm) diameter. Hardness: 310 HB.

Testing temperature	68°F (20°C)	390°F (200°C)	750°F (400°C)
Tensile strength Rm N/mm <sup>2</sup> psi	1010 146000	950 138000	790 115000
Yield strength Rp 0.2 N/mm <sup>2</sup> psi	800 116000	750 109000	630 91000

### Applications

- Holders/bolsters for plastic moulds and die-casting dies
- Plastics and rubber moulds with low requirements on polishability
- Support plates
- Constructional parts

*This product information is based upon 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 guaranteeing specific properties of the products described or their suitability for a particular application.*



*This mould, to produce a vacuum cleaner part, was made with STAVAX ESR inserts, housed in blocks of HOLDER steel.*

# Machining

## Milling

Carbide tools and high speed steel tools	Rough milling	Finish milling
Depth of cut (t) mm In	min. 2 min. 0.08	max. 2 max. 0.08
Feed (s) mm/tooth in/tooth	min. 0.2 min. 0.008	max. 0.2 max. 0.008
ISO machining group Cutting speed (v) m/min f.p.m.	Carbide tools	
	P30-P40 70-100 230-330	P10-P20 90-115 295-380
Cutting speed (v) m/min f.p.m.	High speed steel tools	
	15-30 50-100	20-35 65-115

## Drilling

Diameter mm / in	D e p t h o f H o l e							
	2 x D		6 X D		8 X D		10 X D	
	r p m / f e e d ( r e v . / m m / i n )							
4 / 0 . 1 6	1720	.08 .003	1435	.06 .003	1310	.05 .002	1190	.04 .002
8 / 0 . 3 2	1080	.14 .006	900	.11 .004	820	.08 .003	740	.07 .003
16 / 0 . 6 4	570	.25 .010	475	.19 .008	435	.15 .006	395	.12 .005
2 5 / 1 . 0	370	.29 .012	310	.22 .009	285	.17 .007	260	.15 .006

Chip removal is recommended when depth of hole > 4 x D.  
Flush cooling is to be used.

## Welding

The following procedure is recommended when welding *HOLDER*:

- Heat part to approx. 300-390°F (150-200°C)
- Weld part at approx. 300-390°F (150-200°C)
- Stress temper large repairs.

Electrode: Use chromium-nickel-molybdenum filler metal for welding *HOLDER*. For MMA (SMAW), use well dried basic electrodes. Austenitic stainless steel filler metal can also be used to weld *HOLDER*, but the weld metal will have lower strength (hardness) than the parent metal.

# Heat Treatment

*HOLDER* is intended for use in the hardened and tempered condition, i.e., the delivery condition.

## Stress Tempering

After rough machining, the tool should be heated through to 900°F, and held for a minimum of two hours once the entire tool is soaked through. Cool slowly to room temperature. Stress tempering temperatures in excess of 900°F may result in a permanent loss of strength, hardness, and/or dimensional tolerances.

## Flame and induction hardening

*HOLDER* 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

### Gasnitriding

Nitriding gives a hard surface which is very resistant to wear and erosion. A nitrided surface also increases the corrosion resistance. The surface hardness after nitriding at a temperature of 975°F (525°C) in ammonia gas will be approx. 650HV.

Nitriding Temperature °C	Nitriding Temperature °F	Nitriding Time Hours	Depth of Case (approx.)	
			mm	In.
525	975	20	0.30	0.012
525	975	30	0.35	0.014
525	975	60	0.50	0.020

## Nitrocarburizing

Nitrocarburizing at 1060°F (570°C) will give a surface hardness of approx. 700 HV. After 2 hours' treatment, the hard layer will be approx. 0.0004 in (0.01 mm).

## Additional Information

For further information about *HOLDER* please contact your local Uddeholm office.