



**High quality  
hard chrome plated  
steel bar**



**pacoma**  
Hydraulic Technology

As a well known hydraulic cylinder manufacturer we have extended our product range by chrome plated bars from our new production location in Fenghua, China. The highest quality combined with high efficient production is based on ultra-modern machinery and the Know-how from long experience time. A convenient range of materials from local market and sizes covers almost every demand. Continuous improvement and development in our production guarantees a market advantage over your competitors.

## Typical characteristics

### Straightness

After the induction hardening, the piston rods will be straightened and achieve above average customary good straightness. The max. deviation is 0,2 mm/1,0 m.

### Roundness

The roundness is maximised at 50% of the diameter tolerance.

### Surface roughness

After chrome plating, the piston rods subjected to polishing with a special paste and achieve roughness values between 0,05 µm and 0,2 mm Ra.

### Diameter tolerance

Diameter	ISO f8 [µm]	
	upper	lower
d [mm]		
> 45 - 50	-25	-64
> 50 - 80	-30	-76
> 80 - 120	-36	-90
> 120 - 150	-43	-106

### Diameter tolerances

The standard tolerance is ISO f8. Other tolerances can be supplied on demands. The f7 tolerance is reachable.

## Induction hardening

The piston rods are induction hardened to protect against the external force and achieve the following hardness values.

### Induction hardening

steel grade	Diameter	Hardening depth	Surface hardness
	D [mm]	[mm]	HRC min.
for all available materials	45 - 75	1,5 - 2,5	52
	80 - 150	2,0 - 3,0	

## Chrome layer

The piston rods are chromium plated in a continuous process. The specificity of this method is the multi-layer structure of the chromium layer. This allows excellent values for corrosion resistance.

### Corrosion resistance acc. ISO 9227 NSS

duration [h]	Rating*
120	10
240	9

\* Evaluation of the results acc. to specification ISO 10289

The thickness of the chrome layer is minimum 25 µm. The chrome layer hardness is minimum 850 HV 0,1.

## Typical available dimensions

Piston rods are manufactured in typical lengths between 5800 mm and 6200 mm. Fixed, cut lengths can be supplied on customer demands. Available diameters range is between 45 mm and 150 mm.

# High quality hard chrome plated steel bar



### Material designation

Standard	steel grade	Treatment	similar to EU, US and JP standard
GB/T 15712	38MnVS6		38MnVS6 (EN10267)
GB/T 15712	38MnVS6	+QT	quenched and tempered 38MnVS6 (EN10267)
GB/T 699	35	+QT	quenched and tempered C35E (EN10083); SAE1035
GB/T 699	45	+N	normalized C45E (EN10083); SAE1045
GB/T 3077	42CrMo	+QT	quenched and tempered 42CrMo4 (EN10083); SAE4140; SCM440

### Available steel grade

Following material grades are available as standard from the factory. These materials fulfil as well low-stress as highly-stress demands.

The materials are mainly available according Chinese Standard (GB). On special demand and higher volumes it is possible to supply steel qualities according to customer specifications.

### Mechanical Properties

steel grade	Diameter	Yield strength	Tensile strength	Breaking elongation	Reduction in area	Notch impact work
	d	R <sub>e</sub>	R <sub>m</sub>	A <sub>5</sub>	Z	at -20°C
	[mm]	[N/mm <sup>2</sup> ] min.	[N/mm <sup>2</sup> ] min.	[%] min.	[%] min.	[J] min.
38MnVS6	45 < d ≤ 100	580	780 to 1000	14	25	10
	100 < d ≤ 150	560	750 to 1000	15		
38MnVS6+QT	45 < d ≤ 100	690	880 to 1100	13	40	15
	100 < d ≤ 150	580	780 to 1000	14		
35	45 < d ≤ 150	360	550	21	-	10
45	45 < d ≤ 150	360	550	21	-	10
42CrMo4 +QT	45 < d ≤ 100	650	900 to 1100	12	-	15
	100 < d ≤ 150	550	800 to 950	13		

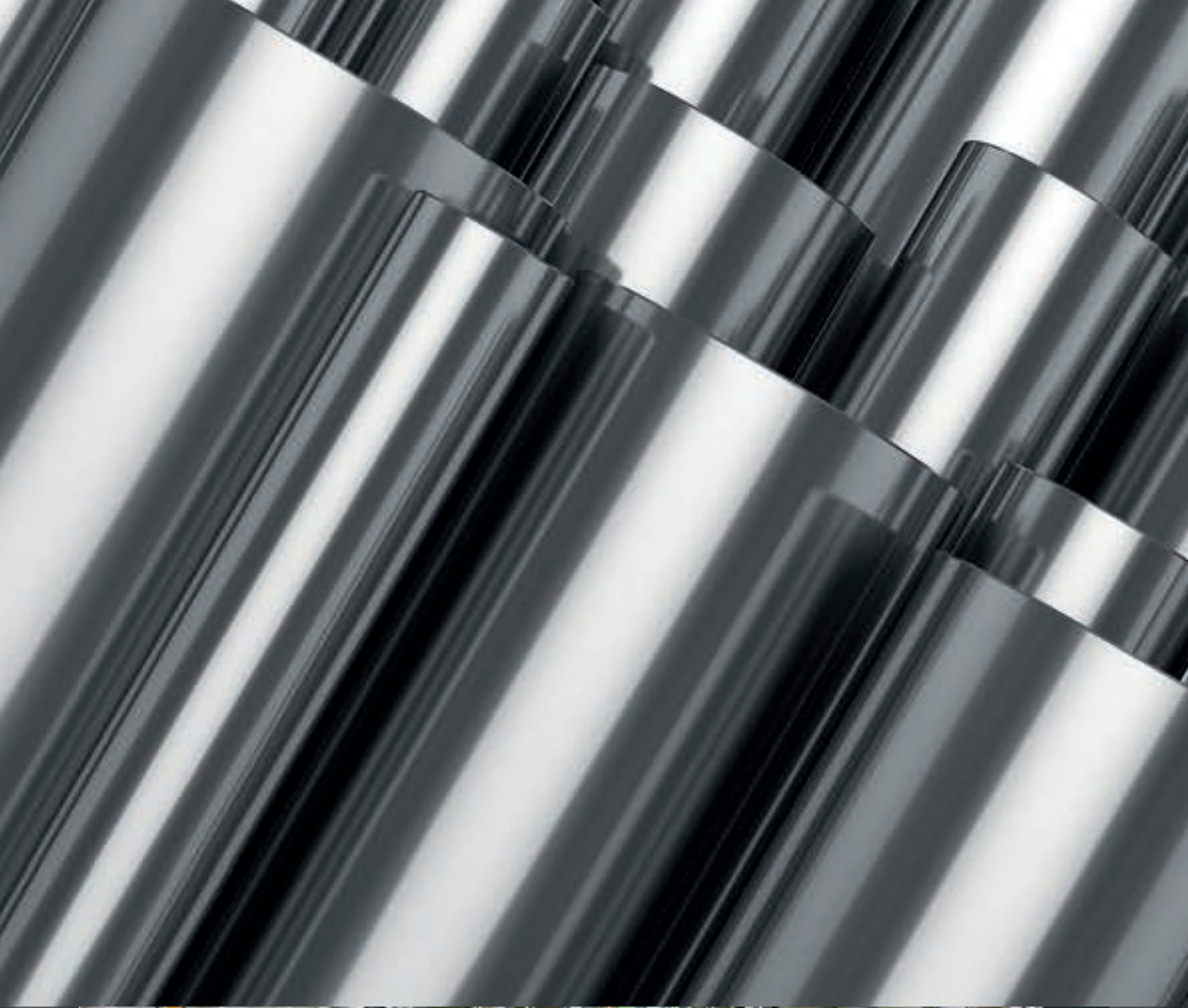
### Chemical composition

steel grade	C %	Si %	Mn %	P % max.	S %	N %	Cr %	Mo %	Ni % max.	V %	Cr+Mo+Ni %
38MnVS6	0,34 to 0,41	0,3 to 0,8	1,2 to 1,6	0,035	0,02 to 0,06	0,01 to 0,02	≤ 0,3	≤ 0,08		0,08 to 0,2	
35	0,32 to 0,39	0,17 to 0,37	0,5 to 0,8	0,035	≤ 0,035		≤ 0,25		0,3		≤ 0,63
45	0,42 to 0,5	0,17 to 0,37	0,5 to 0,8	0,035	≤ 0,035		≤ 0,25		0,3		
42CrMo	0,38 to 0,45	0,17 to 0,37	0,5 to 0,8	0,035	≤ 0,035		0,9 to 1,2	0,15 to 0,25	0,3		

### Chemical composition

To evaluate the weldability of each material, please use the following formula to calculate the carbon equivalent:

$$C.E. = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15.$$



**Pacoma** (China) Hydraulic Equipment Co., Ltd  
No. 18 Xiaowangmiao Section Jiang Ba Line  
Fenghua, Zhejiang Zip Code 315500  
Phone +86 (574) 888 90 999  
Fax +86 (574) 889 50 602  
E-Mail [info.cn@pacoma.com](mailto:info.cn@pacoma.com)

[www.pacoma.com](http://www.pacoma.com)

  
**Hydraulic Technology**