

#### General product description

The quenched and tempered steel 42CrMo(S)4 is versatile and mainly used in automotive and vehicle construction. High strength combined with high toughness allows for use in highly stressed components such as transmission shafts, gears, tooling, and expansion screws. Additionally, this steel can be used universally in mechanical engineering in both quenched and tempered as well as surface-hardened conditions.

#### Individual bar hardening - homogeneity makes the difference

In comparison to conventionally heat-treated products, the individual bar hardening process significantly improves the microstructure, strength, toughness, straightness, and residual stress state. Furthermore, this process operates with low decarburization and reduced scale formation, and drastically reduces hardness deviations. The dimension range for individual bar hardening is  $\varnothing$  15-80 mm.

#### International designation

Steel number	EU/DE	ASTM	JIS	AFNOR	B.S.	AISI
					708M40	
					709M40	
					708A42	
					708H37	
		A331	SCM4	40CD4	EN19	
1.7225	42CrMo4	A505	SCM4H	42CD4	EN19A	
		A519	SCM440	40CD4u	EN19B	4137
1.7727	42CrMoS4	A640	SCM440H	42CD4u	EN19C	4140

#### Chemical composition (cast analysis by mass-%)

Element	C	Si	Mn	P	S	Cr	Mo
min.	0,38	0,10	0,60	–	(0,020)	0,90	0,15
max.	0,45	0,40	0,90	0,025	0,035 (0,040)	1,20	0,30

Deviation of piece analysis from melt analysis according to DIN EN 683-2:2018 table 4.  
Customer-specific analyses are possible upon consultation.

#### Mechanical properties at room temperature in condition +QT +SH.

Characteristic d [mm]	R <sub>p0,2</sub> [MPa] min.	R <sub>m</sub> [MPa]	A <sub>5</sub> [%]	KV <sub>2</sub> [J] min.
16 < d ≤ 40	750	1000 – 1200	12	35
40 < d ≤ 80	650	900 – 1100	11	35

- According to DIN EN 10277:2018
- Customized mechanical properties and other dimensions are possible upon request.
- The material can be heat-treated considering strength classes 8.8, 10.9, and 12.9. Please contact us for more information.

#### Dynamic properties

42CrMoS4 +HH +QT +SH	Bending fatigue strength $\sigma_{bw}$ [MPa]	Tensile strength $R_m$ [MPa]
Ø 32 mm	520	1130

Smooth samples from the core

#### Physical properties

properties	approx. value
Density in kg/dm <sup>3</sup>	7,72
E-Module in GPa	210
Electrical resistance at 20 °C in $\Omega$ mm <sup>2</sup> /m	0,19
Thermal conductivity at 20 °C in W / (m K)	42,6
Specific heat capacity at 20 °C in J / (kg K)	470

#### Microstructure

The heat-treated structure consists of approximately 90% for the quality 42CrMo(S)4 +HH. Surface hardness is a minimum of 53 HRC according to EN ISO 683-2:2018. The microscopic oxide purity grade according to DIN 50602 can be agreed upon. The grain size according to ASTM E 112 is > 5.

#### Condition of delivery

Peeled, quenched, and tempered bright steel

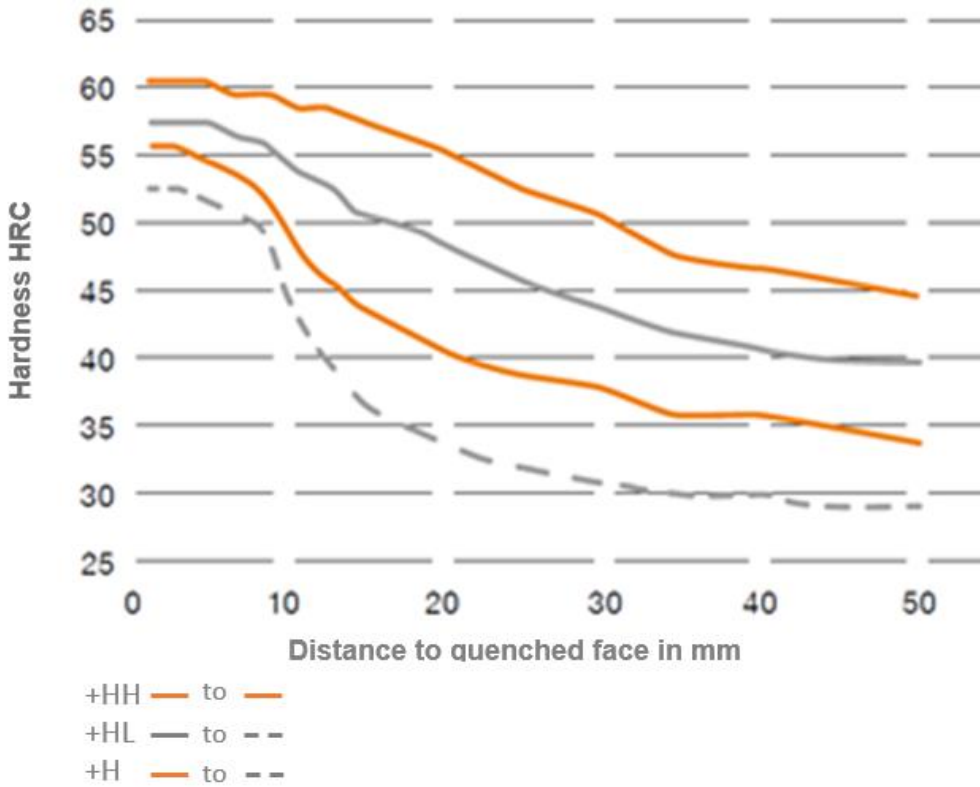
#### Miscellaneous

Other agreements according to order.

#### Surface finish

The surface finish complies with the requirements of EN 10277. Full volume ultrasonic testing is possible. In the standard version, the rod ends up to 50 mm are not tested.

**Hardenability**  
**42CrMo(S)4**



Without further specifications, we use the quality +HH according to DIN EN 683-2:2018.

For further info on our product range of tool steel, stainless steel and Engineering steel please visit [www.swisssteelgroup.com](http://www.swisssteelgroup.com)

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