



ŠTORGSTEEL

STEEL PRODUCER SINCE 1851

production programme

PRODUCTION PROGRAMME



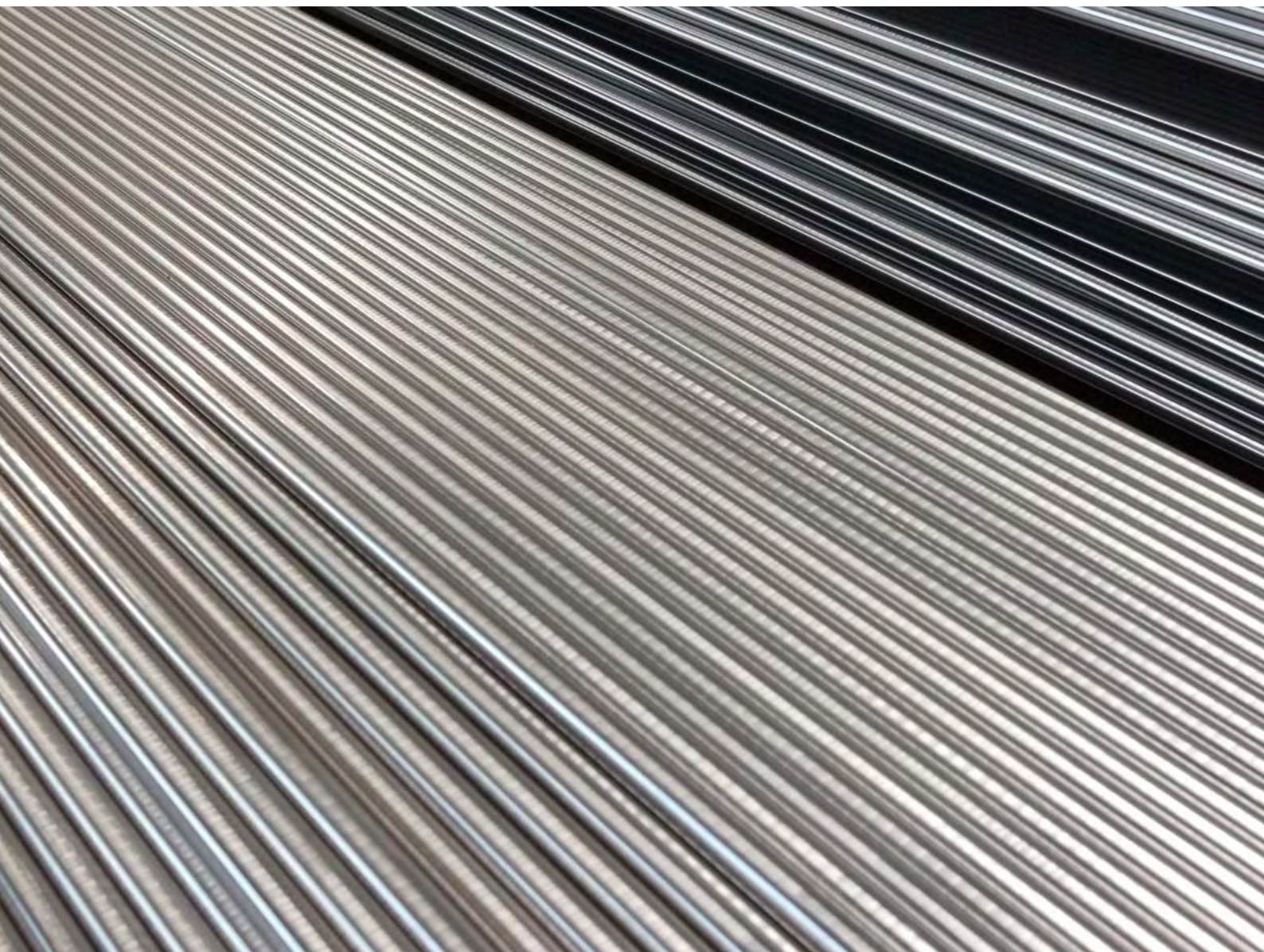
Štore Steel supplies steel bars for applications in forging, spring and engineering industries. The basic products are hot rolled and cold finished bars.

brands

BRANDS



Quality steel for applications in forging, spring and engineering industry is branded as ŠTÖRE STEEL.
Steel, treated with calcium to improve its machining properties is branded as EXEM STEEL.
Steel produced from scrap is branded as RECYCLED STEEL.



SPRING STEEL:



EN 10089: 51CrV4, 52CrMoV4, 56SiCr7, 56Si7, 61SiCr7, 55Cr3
WNr.:1.5025: 51Si7
WNr.:1.7792: 58CrMoV4

ENGINEERING STEEL:



Forging steel:

EN 10025-2: S355J2, S235JR
EN 10083-2: od C22R, C35R, C40R, C45R, C50R, C55R, C60R
EN 10084: 16MnCr[S]5, 20MoCr[S]5, 20MnCr[S]5
EN 10083-3: 30MnB5, 25CrMo[S]4, 34CrMo[S]4, 42CrMo[S]4,
DIN 17350: 31CrV3, 51CrV4

Carbon steel - for case - hardening

EN 10084: C10E, C15E, C10R, C15R

Alloyed steel - for case - hardening

EN 10084: 17Cr3, 16MnCr5, 20MnCr5, 18CrMo4, 20MoCr4,
17CrNi6-6, 20NiCrMo2-2, 18CrNiMo7-6

Carbon steel - for hardening and tempering

EN 10083-2: C22E, C35E, C45E, C55E, C50E, C60E

Alloyed steel - for hardening and tempering

EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34Cr4, 41Cr4, 25CrMo4,
34CrMo4, 42CrMo4, 50CrMo4, 51CrV4

Structural steel

EN 10025-2: S235JR, S275JR, S355J2, E295, E335, E360

Steel for welded chains

DIN 17115: 27MnSi5, 20NiCrMo2, 23MnNiMoCr54, 30CrMoV8

Steel for cold forging

EN 10263: C4C, 17Cr3, 17CrNi6-6, 18CrMoS4, 34CrNiMo4,
20NiCrMoS2-2, 38Cr2, 34Cr4, 37Cr4, 41Cr4, 16MnCrS5, 20MnCrS5,
25CrMo4, 34CrMo4, 22B2

Alloyed steel

WNr.:1.5231: 38Cr4

EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34CrS4, 37CrS4, 41CrS4,
25CrMoS4, 34CrMoS4, 42CrMoS4, 50CrMo4, 51CrV4

EN 10085: 31CrMoV9

Structural steel for housings of bearings

DIN EN ISO 683-17: 100Cr6, 100CrMnSi6-4

Steel for heavy duty automotive parts

WNr.:1.5231: 38MnVS5

VW-TL 1427: 27MnSiVS6, 27MnSiVS6+Ti, 30MnSiVS6

VW-500-30: 36MnVS4, 70MnVS4, 46MnVS5

EXEM STEEL WITH IMPROVED MACHINABILITY



Wnr.: 20MnV6 EXEM, 38MnVS6 EXEM, 30MnB4+Ti EXEM
EN 10084: C15R EXEM, 16MnCrS5 EXEM, 20NiCrMoS2-2 EXEM,
20MnCrS5 EXEM,
EN 10084 in UNI 7846: 16CrNi4 EXEM,
EN 10025-2: S235JR EXEM, S355J2 EXEM,
EN 10083-2: C22R EXEM, C35R EXEM, C40R EXEM, C45R EXEM,
EN 10083-3: 25CrMo4 EXEM, 41CrS4 EXEM, 42CrMoS4 EXEM
UNI 7845: 39NiCrMo3 EXEM,
UNI 7846: 18NiCrMo5 EXEM.

steel
grades



CROSS-SECTION SHAPES	STANDARD	DIMENSIONS / mm
	FLAT BARS WITH SHARP EDGES EN 10058	50-200 x 8-62
	FLAT BARS EN 10092-1-A	60-150 x 8-36
	FLAT BARS EN 10092-1-B	50-200 x 8-35
	FLAT BARS EN 10092-1-C	60-120 x 14-67
	FLAT BARS EN 10092-2	120 x 12-20
	FLAT BARS BS EN 10089	60-120 x 27-42
	SQUARE BARS WITH ROUND EDGES EN 10059	40 x 40 / R=6 45 x 45 / R=6 50 x 50 / R=6 55 x 55 / R=8 60 x 60 / R=10 65 x 65 / R=10 70 x 70 / R=10 80 x 80 / R=12
	ROLLED ROUND BARS EN 10060	20-50.5 (step: 0.5 mm), 51-58 (step: 1 mm), 60, 62.5, 65, 68.5, 70, 72, 75, 77.5, 80, 83, 85, 90, 95, 100, 105 mm / rolled
	PEELED ROUND BARS EN 10278 (h 11)	18-105 mm / peeled
	PEELED ROUND BARS EN 10278 (h 9)	18-100 mm / peeled

ADDITIONAL TREATMENT

[MADE TO ORDER]

ROLLED BARS

Cut-to-length cutting:

- flat: lengths 750 - 7200 mm,

tolerances -0+5mm

- round: lengths: 2900 - 4200 mm, 5600 - 8300 mm, tolerances ± 10mm

Cutting of edges:

lengths 750-9200 mm,

tolerances -0+20 mm

Annealing:

softening, spheroidization, stress relieve, normalizing and annealing for ferrite perlite structure

100% inspection of material mix, surface and internal defects of rolled round bars:

diameter 20-100 mm,

minimum defect depth 0,2 mm,

test speed 0,2-2 m/sek

PEELED BARS

Cut-to-length cutting:

lengths 10-300 mm, tolerance ± 0,5 mm

lengths 300-2000 mm, tolerance ± 1 mm

Chamfering:

lengths 3000-6500 mm,

diameter 18-90 mm,

angles 30° - 45° - 60°

100% inspection of surface defects of peeled round bars:

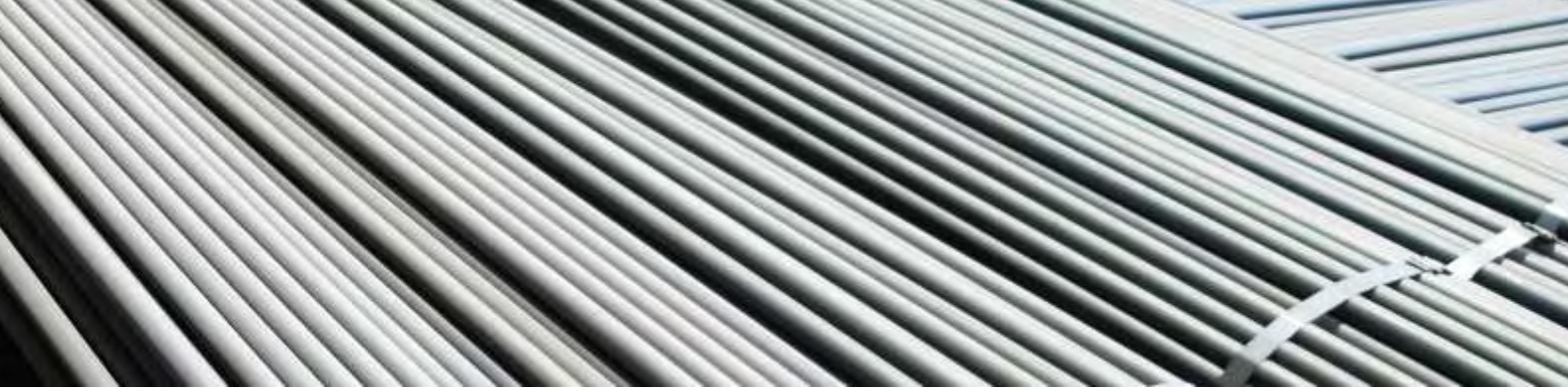
diameter 18-90 mm,

bar length 3-8 m,

minimum defect depth 0,1 mm,

test speed 0,2-2 m/sek,

testing of carbon, low and high alloyed steel



MATERIAL INSPECTION

Our most advanced laboratory is equipped for variety of tests:

chemical analysis:

spectral
burning [C+S]
extraction [O₂+H₂]

mechanical testings:

tension load
impact toughness
bending load
hardness [HB, HV, HRC]
hardenability [Jominy test]
machinability [V15 test]

metallographic testings:

sulphure print
macro etching
micro structure
non-mettallic inclusions
grain size
decarburization
microhardness
micro and macrography

metrology:

measuring and calibrating
inspection and testing of
equipment and tools

FINISHING INSPECTION

**size and shape inspection,
surface inspection:**

visual
upsetting samples
magnetic test -feroflux
magnetic test -cyrcoflux
cycrograph

core inspection:

mobile ultrasonic devices
inspection-line built-in US head

material mix inspection:

spark test
spectral test
magnatest

LENGTHS, TOLERANCES, PACKING

Rolled Profiles	Normal length	Maximum length	Normal tolerances	Minimum tolerances
Continuous rolling line	4-9 m	11,5 m	-0+200 mm	-0+50 mm
Rolling line 800	4-9 m	12 m	-0+200 mm	-0+50 mm
Soft annealed	4-6 m	7 m		
Straightened round	4-9 m	12 m		
Straightened flat	4-6 m	8 m		
Sawed [one side, both]	4-6 m	8 m	-0+5 mm	

Maximum lenght: by prior agreement

Straightness: after rolling according to DIN EN [2 mm/m or 4 mm/m]
after straightening: 2 mm/m [1 mm/m on special order]

Bundle weight: normal: 2-4 t, minimum: 1 t, maximum: 5 t
maximum bundle width [flat]: 400 mm

Bundling: wire, band

Minimum order: 12 t/position

Weight tolerance: ± 10%

Shipping marks: printed label

Color marks: according to order

Bar signs [round > 40 mm]: according to order - heat No./W.Nr.

Peeled Profiles	Normal length	Shorter length
Peeled [h9, h11]	3-8 m	10% short length or multiple length
Raw-peeled [h13]	3-6,3 [8 m]	10% short length or multiple length

Straightness: after peeling: 1 mm/m

after peeling and polishing: 0.5 mm/m

Bundle weight: normal: 2-3 t, minimum: 1 t,

Bundling: band

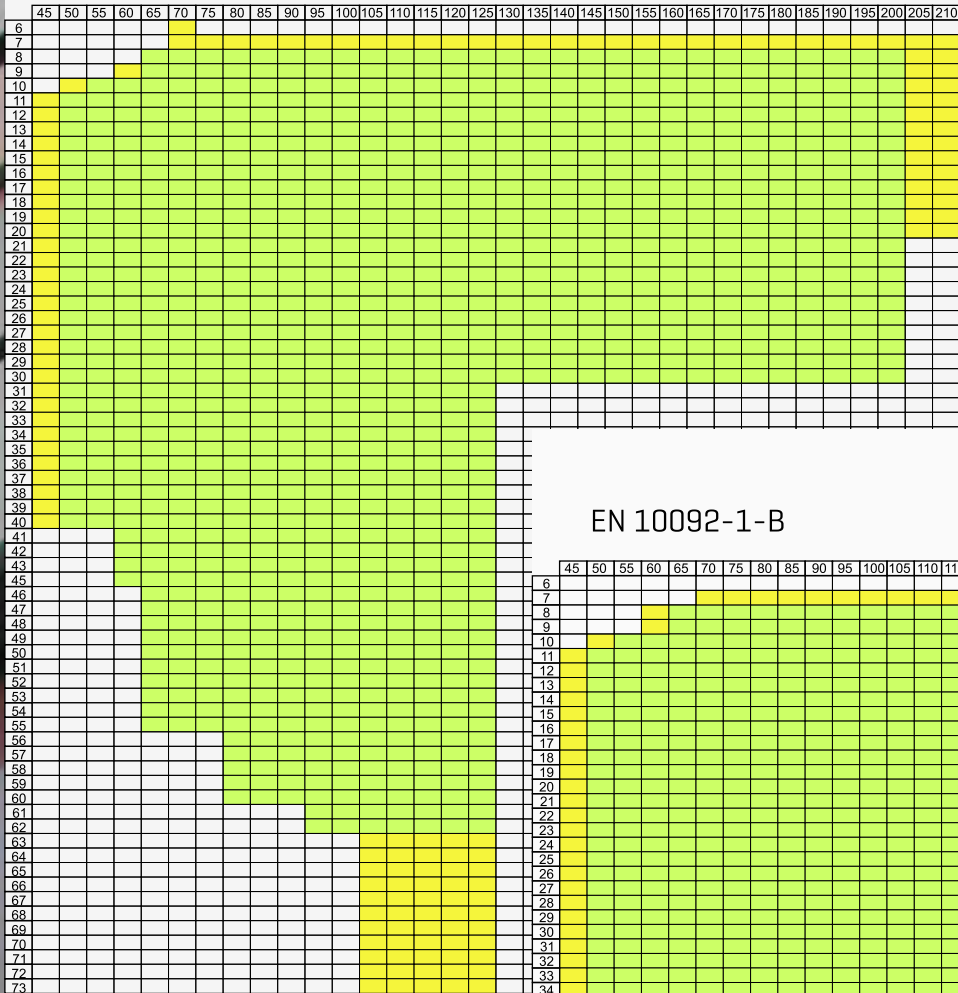
Minimum order: 8 t/position

Weight tolerance: ± 10%

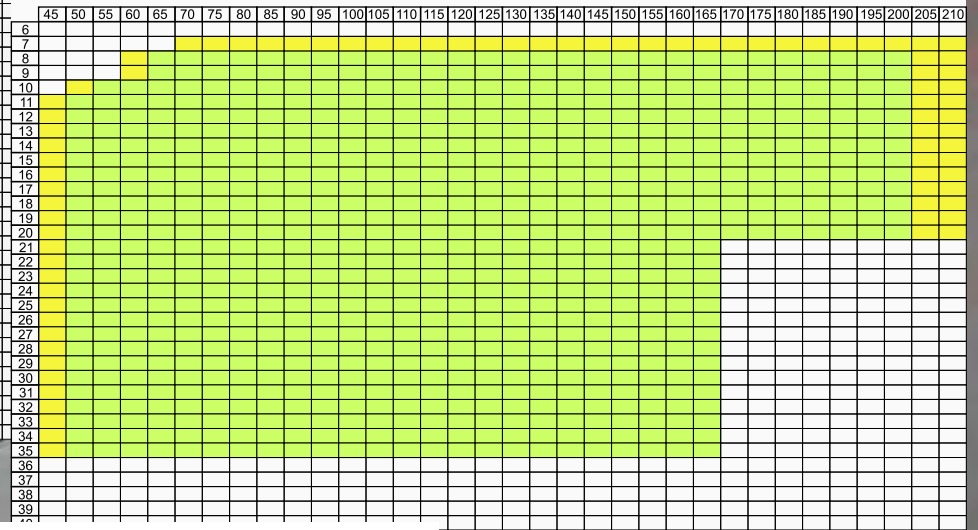
Shipping marks: printed label

Color marks: according to order

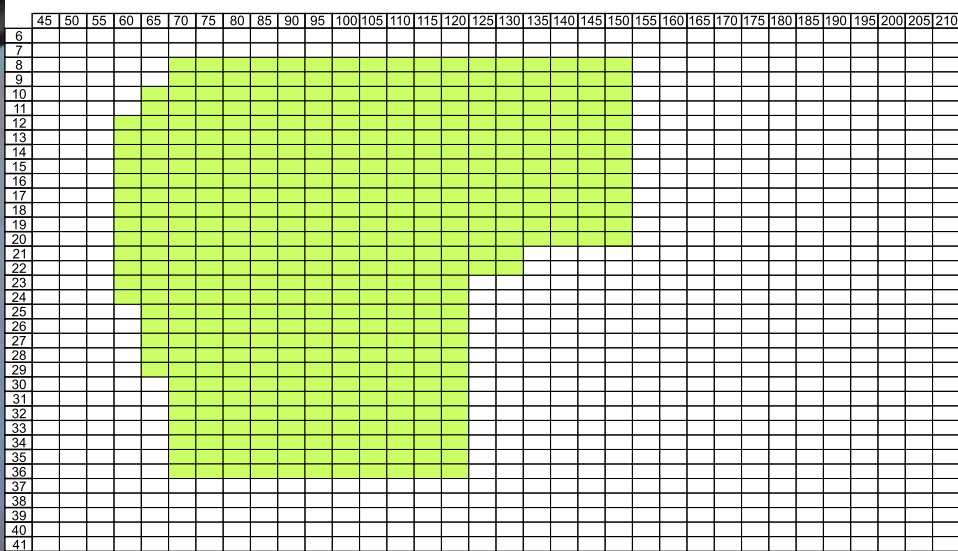
SHARP EDGES - EN 10058



EN 10092-1-B



EN 10092-1-A



spring steel



SPRING STEEL

In a close cooperation with our customers we have developed the knowledge how to choose the right technical specification for a particular shape and dimension of a spring to reach high durable dynamic strength.

DIMENSIONS AND TOLERANCES

dimensions and tolerances

SPRING STEEL ACCORDING TO STANDARD EN 10058

Width (mm)	Tolerances (mm)	Thickness (mm)		
		d ≤ 20	20 < d ≤ 40	40 < d ≤ 80
50-80	± 1	± 0,5	± 1	± 1,5
80-100	± 1.5	± 0,5	± 1	± 1,5
100-120	± 2	± 0,5	± 1	± 1,5
120-150	± 2.5	± 0,5	± 1	± 1,5
150-200 *	± 3	± 0,5	± 1	± 1,5

*non-standard

SPRING STEEL ACCORDING TO STANDARD EN 10092-1-A, B, C

Width (mm)	Tolerances (mm)	Thickness (mm)		
		d ≤ 20	20 < d ≤ 40	40 < d ≤ 80
50-80	± 0,5	± 0.25	± 0.30	± 0.50
80-100	± 0,6	± 0.25	± 0.30	± 0.50
100-120	± 0,7	± 0.25	± 0.30	± 0.50
120-150	± 0,8	± 0.25	± 0.30	± 0.50

SPRING STEEL ACCORDING TO STANDARD EN 10092-2

Width (mm)	Tolerances (mm)	Thickness (mm)	
		12 ≤ d ≤ 13	14 ≤ d ≤ 20
120	± 0,5	± 0,2	± 0,3

SPRING STEEL ACCORDING TO STANDARD BS EN 10089

Width (mm)	Tolerances (mm)	Thickness (mm)		
		27 ≤ d ≤ 30	30 < d ≤ 40	40 < d ≤ 42
60-75	± 0,5	± 0,2	± 0,3	± 0,4
75-100	± 0,5	± 0,3	± 0,4	± 0,5
100-120	± 0,7	± 0,3	± 0,4	± 0,5



GRADES

grades

SPRING STEEL GRADES AND PROPERTIES

Grade	Chemical composition % [min - max]	Yield strength [N/mm ²]	Tensile strength [N/mm ²]	Elasticity [%]	Impact test min [J] Iso V +20 °C
56Si7 EN 56Si7 DIN 55Si7 UK 251A58 FRA 55S7	C=0,52-0,60 Si=1,50-1,80 Mn=0,50-0,80	1160	1350 - 1600	6	13
61SiCr7 EN 61SiCr7 DIN 60SiCr7 FRA 60SC7	C=0,57-0,64 Si=1,60-2,00 Mn=0,60-0,90 Cr=0,20-0,40	1250	1450 - 1700	5	10
55Cr3 EN 55Cr3 DIN 55Cr3 UK 525A60 FRA 55C3	C=0,52-0,59 Si=0,15-0,40 Mn=0,70-1,00 Cr=0,60-0,90	1180	1380 - 1630	6	12
52CrMoV4 EN 52CrMoV4 DIN 51CrMoV4 FRA 51CrMoV4	C=0,48-0,56 Si=0,20-0,40 Mn=0,75-0,85 Cr=0,90-1,00 Mo=0,15-0,25 V=0,08-0,15	1300	1450 - 1750	7	15
51CrV4 EN 51CrV4 DIN 50CrV4 UK 735A51 FRA 51CrV4	C=0,47-0,55 Si=0,15-0,40 Mn=0,70-1,00 Cr=0,90-1,20 V=0,10-0,20	1250	1350 - 1650	6	13

Conventional types of steel contain numerous inclusions which negatively impact the machinability. Our various grades of EXEM steel [extreme machinability steel] are produced in our steelwork in accordance with a special EX procedure which transforms hard aluminium oxides, which are the main cause of tool wear, into plastic calcium aluminates with an outer layer of calcium sulphide. The sulphide layer transforms itself during machining process into a lubricating layer between the cutting tool and the machined part what results in better machinability.

By replacing of conventional steel with our EXEM steel can be cutting speed increased **by 25 to 50 %** and at the same time is there also noticed longer lifetime of cutting tool. In case that the cutting speed remains unchanged increases lifetime of cutting tool **up to 4 times**.

But the fact is also that by increasing of the machining speed decreases lifetime of cutting tools.

With the aim to assure our customers always the same cutting properties are all types of EXEM steel before shipment machinability tested and the result reached [V15 value] is written in our test certificate.

The advantage of EXEM steel is that its good machinability is not deteriorated during process of hot forming [forging].

In the table are shown only some grades of steel with regard to purpose of use, but in practice it is possible to produce EXEM type of steel in accordance with chemical analyses required by our customers.

DIMENSIONS AND TOLERANCES

dimensions and tolerances

Straightness for diameter 25–80 mm:

Standard: $Q_{max} = 0,004 \times \text{lenght}$

On special order: $Q_{max} = 0,00125 \times \text{lenght}$

Straightness for diameter 82–105 mm:

Standard: $Q_{max} = 0,0025 \times \text{lenght}$

ROUND BARS ACCORDING TO STANDARD EN 10060

Diameter D (mm)	Diameter tolerances	Ovality (mm) D1-D2 max	Precise rolling* (mm)
20-25	± 0,5	0,75	± 0,20
26-35	± 0,6	0,9	± 0,25
36-51	± 0,8	1,2	± 0,27
52-85	± 1,0	1,5	± 0,34
86-100	± 1,3	1,95	± 0,65
105	± 1,5	2,25	± 0,75

* on special order

ROUND BARS ACCORDING TO STANDARD EN 10278

Diameter D (mm)	Raw peeled		Peeled [EN 10278]			
			h11		h9	
	Tolerances	Ovality (mm)	Tolerances	Ovality (mm)	Tolerances	Ovality (mm)
18	± 0,1	0,1	0,110	0,055	0,043	0,022
19-30	± 0,1	0,1	0,130	0,065	0,052	0,026
31-50	± 0,1	0,1	0,160	0,080	0,062	0,031
51-80	± 0,2	0,2	0,190	0,095	0,074	0,037
81-105	± 0,2	0,2	0,220	0,110	0,087	0,044

TYPES OF EXEM STEEL GRADES AND PROPERTIES

Grade	Chemical composition % [min - max]	Remarks	Machinability V15 m/min conventionally/EXEM
Structural steel ranges from 0.1% to 0.6% in carbon contents and weldability is one of the most important requirements. It is mainly used in the "as rolled" condition, but occasionally it is quenched and tempered or case-hardened.	St52-3 EXEM EN S355J2 DIN St52-3N UK 50D FRA E36-4	C=max. 0,20 Si=max. 0,55 Mn=max.1,60 S=max.0,025 P=max. 0,025	Can be nitride or case hardened 330/450
	19MnVS6 EXEM EN DIN 19MnVS6 UK FRA	C=0,15-0,22 Si=0,15-0,80 Mn=1,20-1,60 V=0,08-0,20 S=0,020- 0,060 N=0,010-0,020	Can be nitride or case hardened 300/400
	38MnVS6 EXEM EN 10267 DIN 38MnVS6	C=0,34-0,41 Si=0,15-0,80 Mn=1,20-1,50 S=0,020-0,060 N=0,010-0,020 V=0,08-0,20	Can be nitride or case hardened 180/250
Machining steel is suitable especially for chip-cutting machining. It can also be used for forging. The steel is not usually included in its original form in a particular construction. Its carbon content is between 0.20% - 0.60%.	C22R EXEM EN C22 DIN C22 UK 070M20 FRA XC18	C=0,17-0,24 Si=max.0,40 Mn=0,40-0,70 S=0,020-0,040	+ QT 330/450
	C35R EXEM EN C35 DIN C35 UK 080M36 FRA XC38H1	C=0,32-0,39 Si= max. 0,40 Mn=0,50-0,80 S=0,020-0,040	+ QT 320/420
	C45R EXEM EN C45 DIN C45 UK 080M46 FRA XC48H1	C=0,42-0,50 Si= max. 0,40 Mn=0,50-0,80 S=0,020-0,040	+ QT Can be induction hardened 230/360
Quenched and tempered steel is used in cases where high strength and favourable toughness are required. Its carbon content is between 0.25 and 0.50%. These types of steel are supplied hot-rolled.	34CrNiMo6 EXEM EN 34CrNiMo6 DIN 34CrNiMo6 UK 817M40 FRA 34CrNiMo6	C=0,30-0,38 Mn=0,50-0,80 Cr=1,30-1,70 Ni=1,30-1,70 Mo=0,15-0,30 S= max. 0,035	[+ QT] 150/190
	42CrMoS4 EXEM EN 42CrMoS4 DIN 42CrMoS4 UK 42CrMoS4 FRA 42CD4	C=0,38-0,45 Mn=0,60-0,90 S=0,020-0,040 Cr=0,90-1,20 Mo=0,15-0,30	[+ QT] 160/210
Case hardening steel is a mild type of steel with a low carbon content and is frequently machined for a particular component before being case hardened and ground to final dimensions. Case hardening types of steel are ideal for components requiring a combination of properties such as abrasion resistance, toughness, resistance to impact and shock stress as well as fatigue strength.	16MnCrS5 EXEM EN 16MnCrS5 DIN 16MnCrS5 UK 590H17 FRA 16MC5	C=0,14-0,19 Si= max. 0,40 Mn=1,0-1,3 Cr= 0,8-1,10 S= 0,020-0,040	Can be induction hardened 300/410
	16NiCr4 EXEM EN 16CrNi4 DIN UK 637H17 FRA 16NC6	C=0,13-0,19 Si=max. 0,40 Mn=0,70-1,00 Cr=0,60-1,00 Ni=0,80-1,10 S=0,020-0,040	Can be induction hardened 300/450



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Our customers products