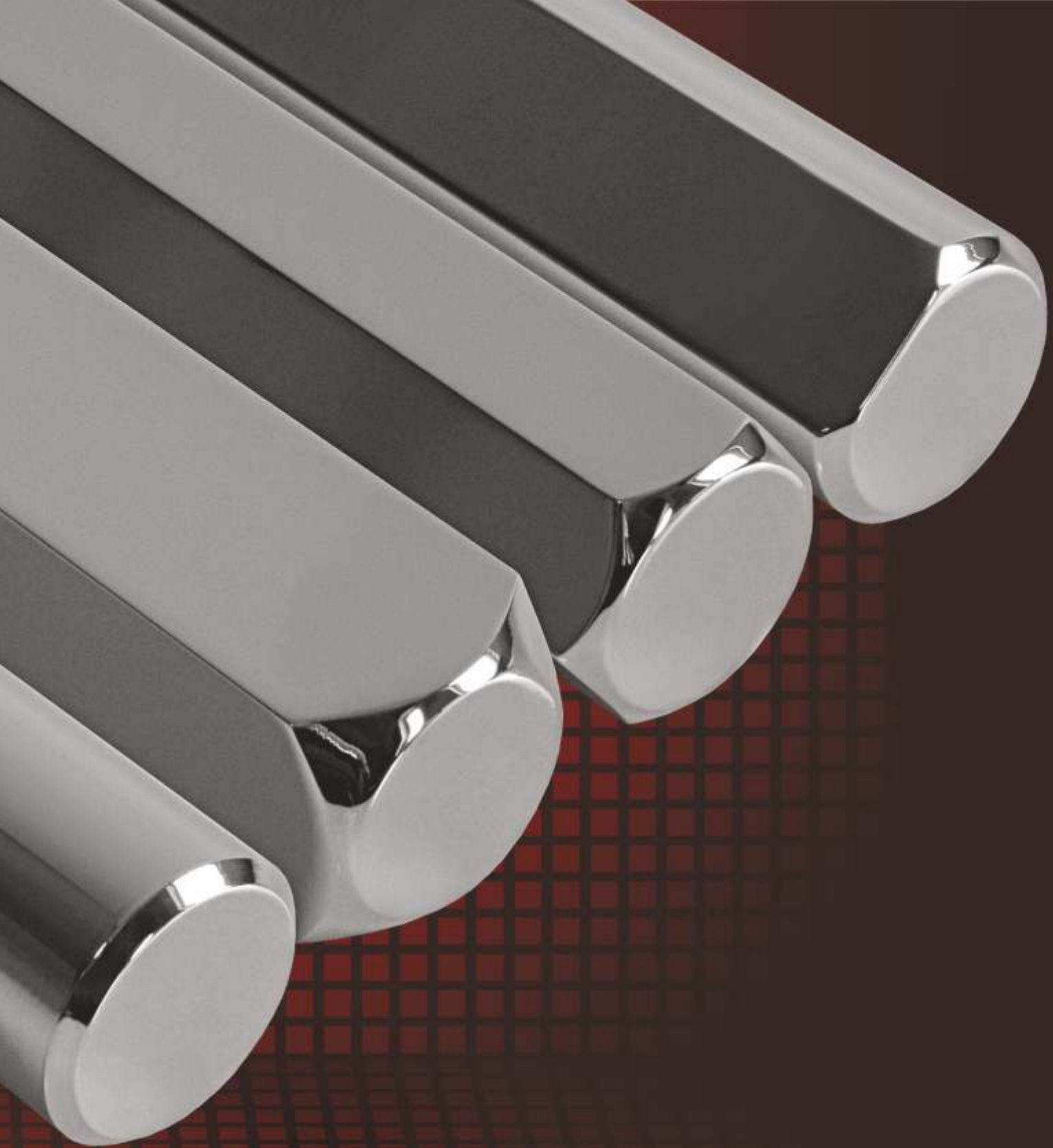
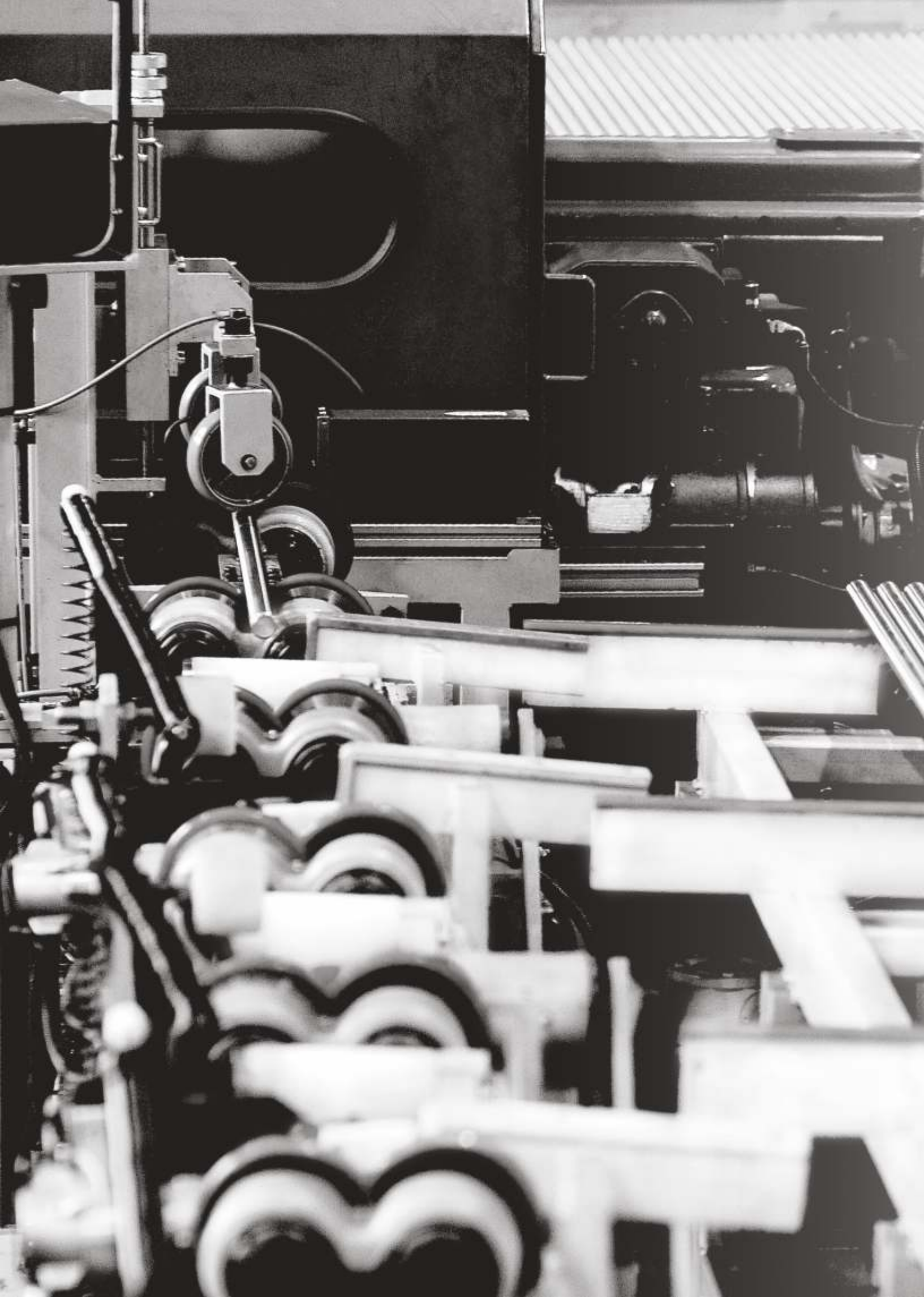




STALMA

CATALOGUE







Dear Customers,

Stalma is the company with established market position in production of cold-drawn, peeled and ground bright steel bars.

We work with leading European steel manufacturers.

Stalma offers products of the highest quality parameters, high precision performance and maximum cross sectional extent of surface finish.

On account of quick order realization, attractive prices, own transport fleet along with integrity and reliability of our employees we have earned the trust of our customers in Poland and abroad.

We invite you to cooperation.

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ADDITIONAL PARAMETERS				



Drawn bars

ROUND	4 to 8 mm	> 8 to 40 mm	> 40 to 80 mm
Tolerance:	h9 h10 h11	h9 h10 h11	h9 h10 h11
Length (mm):	3000	3000 to 6000	3000 or 6000
Length tolerances (mm):	+100	+100, +200	+200, +500

HEXAGONAL	4 to 8 mm	> 8 to 35 mm	> 35 to 60 mm
Tolerance:	h11	h11	h11
Length (mm):	3000	3000 to 6000	3000 or 6000
Length tolerances (mm):	+100	+100	+200

SQUARE	4 to 8 mm	> 8 to 30 mm	> 30 to 50 mm
Tolerance:	h11	h11	h11
Length (mm):	3000	3000 to 6000	3000 or 6000
Length tolerances (mm):	+100	+100	+200

Peeled bars

ROUND	15 to 80 mm
Tolerance:	h9 h10
Length (mm):	3000 or 6000
Length tolerances (mm):	+100, +200

Ground bars

ROUND	10 to 60 mm
Tolerance:	h6 h7 h8
Length (mm):	3000 or 6000
Length tolerances (mm):	+100, +200

Drawn wire

ROUND	4 to 12 mm
Tolerance:	h9 h10 h11

HEXAGONAL	4 to 10 mm
Tolerance:	h11

SQUARE	4 to 10 mm
Tolerance:	h11

Size of coils:

Inner diameter min: ~ 650 mm
Outer diameter max: ~ 1200 mm
Weight: 100 ÷ 250 kg





SURFACE

Bar surfaces: *

- drawn - Class 1
- peeled - Class 3
- ground - Class 4

The surface can be inspected by the eddy current testing – scope and conditions of the inspection are to be agreed on ordering.

*) Acc. to EN 10277, scale removal before drawing by shot blasting, manufacture to a higher class requires prior coordination

DELIVERY STATE

As standard bars are supplied as:

- DRAWN, as hardened by drawing +C
- PEELED raw after rolling +SH
- GROUND after drawing +C+SL or after peeling +SH+SL

Delivery of bars in other manufacturing types and heat treatment statuses can be agreed, e.g.:

- drawn: +A+C; +N+C
- peeled: +N+SH; +QT+SH
- ground: +N+SL; +QT+SL

BAR ENDS

Bar ends:

- cut on a cutting machine
- one or two-sided cut on a saw
- chamfered and faced ends

Bars of cross-section dimensions from 10mm to 72mm can have chamfered ends and be faced on ends. Size of chamfering ~2/45°.*)

Bars made of free-cutting steel, of diameters over 10,0 mm have chamfered ends as standard.

Colour marking of ends requires coordination.

*) other chamfers to be agreed

ANTI-CORROSION PROTECTION

Bar surface is covered with anticorrosive oil, protecting it during transport in closed vehicles and storage in covered warehouses throughout the normal storage period.

Any special anticorrosive protections require coordination.

PACKING – BUNDLE WEIGHT

Bars are packed in bundles, weighing 1000 to 2000kg, tied with steel bands at several points of the bundle length.

Ground bars can be packed in a special way – in crepe paper – wrapped individually or in bundles, protected by cardboard tubes or packed in wooden boxes.

Special methods of packing require coordination .

STRAIGHTNESS

Bars are made as straightened, deviation value from straightness: max 1,0 mm/m.

Higher straightness requires coordination.

QUALITY DOCUMENTS

Inspection Certificate 3.1 or 2.2 acc. to EN 10204

TOLERANCES OF CROSS-SECTIONS acc. to EN 10278

Nominal dimension	Tolerance acc. to ISO 286-2					
	h6	h7	h8	h9	h10	h11
[mm]						
from 3 to 6	-0,008	-0,012	-0,018	-0,030	-0,048	-0,075
over 6 to 10	-0,009	-0,015	-0,022	-0,036	-0,058	-0,090
over 10 to 18	-0,011	-0,018	-0,027	-0,043	-0,070	-0,110
over 18 to 30	-0,013	-0,021	-0,033	-0,052	-0,084	-0,130
over 30 to 50	-0,016	-0,025	-0,039	-0,062	-0,100	-0,160
over 50 to 80	-0,019	-0,030	-0,046	-0,074	-0,120	-0,190

TECHNICAL SPECIFICATIONS OF CHOSEN STEEL QUALITIES

Description – applies to all the tables with references:

- 1) acc. to melt analysis
- 2) „As rolled + peeled“ for non-alloy steels. „Annealed + peeled“ for alloy steels.
- 3) Approximate value from calculation
- 4) Values in the table are for information only
- 5) increased carbon content applies to products with diameter exceeding 40mm

I. NON-ALLOY STEELS FOR GENERAL ENGINEERING PURPOSES

I.1 CHEMICAL COMPOSITION¹⁾

Standards	Steel designation	Steel No.	C	Mn	Si	P	S	N	Others
EN 10025-2 EN 10277-2	S235JR	1.0038	≤ 0,17/ 0,20 ⁵⁾	≤ 1,40	-	max 0,040	max 0,040	≤ 0,012	Cu max 0,55
	S235J0	1.0114	≤ 0,17	≤ 1,40	-	max 0,035	max 0,035	≤ 0,012	Cu max 0,55
	S235J2	1.0117	≤ 0,17	≤ 1,40	-	max 0,030	max 0,030	-	Cu max 0,55
	S355JR	1.0045	≤ 0,24	≤ 1,60	≤ 0,55	max 0,040	max 0,040	≤ 0,012	Cu max 0,55
	S355J0	1.0553	≤ 0,20/ 0,22 ⁵⁾	≤ 1,60	≤ 0,55	max 0,035	max 0,035	≤ 0,012	Cu max 0,55
	S355J2	1.0577	≤ 0,20/ 0,22 ⁵⁾	≤ 1,60	≤ 0,55	max 0,030	max 0,030	-	Cu max 0,55
	E295	1.0050				max 0,045	max 0,045	≤ 0,012	
	E335	1.0060				max 0,045	max 0,045	≤ 0,012	
	E360	1.0070				max 0,045	max 0,045	≤ 0,012	

I.2 MECHANICAL PROPERTIES – IMPACT TEST VALUE KV

Standard	Grade	Steel No.	Test temperature [°C]	Minimal impact test [J]
EN 10025-2	S235JR	1.0038	20	27
	S235J0	1.0114	0	27
	S235J2	1.0117	-20	27
	S355JR	1.0045	20	27
	S355J0	1.0553	0	27
	S355J2	1.0577	-20	27



I.3 MECHANICAL PROPERTIES AFTER PEELING OR DRAWING

Steel grade		In a raw state after rolling and peeled (+SH) ²⁾					Drawn (+C)			
Designation	Steel No.	Size	R _{p0.2} min	R _m	A ₅ min	Hardness ⁴⁾	Size	R _{p0.2} min	R _m	A ₅ min
		[mm]	[N/mm ²]	[N/mm ²]	[%]	[HB]	[mm]	[N/mm ²]	[N/mm ²]	[%]
S235JR S235J0 S235J2	1.0038 1.0114 1.0117	≤ 16	235	360-510	26	-	> 5 ≤ 10	355	470-840	8
							> 10 ≤ 16	300	420-770	9
		> 16 ≤ 40	225	360-510	26	102-140	> 16 ≤ 40	260	390-730	10
		> 40 ≤ 63	215	360-510	25	102-140	> 40 ≤ 63	235	380-670	11
		> 63 ≤ 80	215	360-510	24	102-140	> 63 ≤ 80	215	340-640	11
S355JR S355J0 S355J2	1.0045 1.0553 1.0577	≤ 16	355	470-630	22	-	> 5 ≤ 10	520	630-950	6
							> 10 ≤ 16	450	580-880	7
		> 16 ≤ 40	345	470-630	22	146-187	> 16 ≤ 40	350	530-850	8
		> 40 ≤ 63	335	470-630	21	146-187	> 40 ≤ 63	335	500-770	9
		> 63 ≤ 80	325	470-630	20	146-187	> 63 ≤ 80	315	470-740	9
E295	1.0050	≤ 16	295	470-610	20	-	> 5 ≤ 10	510	650-950	6
							> 10 ≤ 16	420	600-900	7
		> 16 ≤ 40	285	470-610	20	140-181	> 16 ≤ 40	320	550-850	8
		> 40 ≤ 63	275	470-610	19	140-181	> 40 ≤ 63	300	520-770	9
		> 63 ≤ 80	265	470-610	18	140-181	> 63 ≤ 80	255	470-740	9
E335	1.0060	≤ 16	335	570-710	16	-	> 5 ≤ 10	540	700-1050	5
							> 10 ≤ 16	480	680-970	6
		> 16 ≤ 40	325	570-710	16	169-211	> 16 ≤ 40	390	640-930	7
		> 40 ≤ 63	315	570-710	15	169-211	> 40 ≤ 63	340	620-870	8
		> 63 ≤ 80	305		14	169-211	> 63 ≤ 80	295	570-810	8

II. FREE-CUTTING STEELS

II.1 CHEMICAL COMPOSITION¹⁾

Standards	Steel designation	Steel No.	C	Mn	Si	P	S	Others
FREE-CUTTING STEELS (no subject to heat-treatment) EN 10087 EN 10277-3	11SMn30	1.0715	≤ 0,14	0,90 1,30	≤ 0,05	max 0,11	0,27 0,33	
	11SMnPb30	1.0718	≤ 0,14	0,90 1,30	≤ 0,05	max 0,11	0,27 0,33	Pb 0,20-0,35
	11SMn37	1.0736	≤ 0,14	1,00 1,50	≤ 0,05	max 0,11	0,34 0,40	
	11SMnPb37	1.0737	≤ 0,14	1,00 1,50	≤ 0,05	max 0,11	0,34 0,40	Pb 0,20-0,35
FREE-CUTTING STEELS (subject to heat-treatment) EN 10087 EN 10277-3	35S20	1.0726	0,32 0,39	0,70 1,10	≤ 0,40	max 0,06	0,15 0,25	
	35SPb20	1.0756	0,32 0,39	0,70 1,10	≤ 0,40	max 0,06	0,15 0,25	Pb 0,15-0,35
	46S20	1.0727	0,42 0,50	0,70 1,10	≤ 0,40	max 0,06	0,15 0,25	
	46SPb20	1.0757	0,42 0,50	0,70 1,10	≤ 0,40	max 0,06	0,15 0,25	Pb 0,15-0,35

II.2 MECHANICAL PROPERTIES AFTER PEELING OR DRAWING

Steel grade		Size	In a raw state after rolling and peeled (+SH) ²⁾		Drawn (+C)		
Designation	Steel No.		R _{p 0,2} min	Hardness ⁴⁾	R _{p 0,2} min	R _m	A ₅ min
			[mm]	[N/mm ²]	[HB]	[N/mm ²]	[N/mm ²]
11SMn30 11SMnPb30 11SMn37 11SMnPb37	1.0715 1.0718 1.0736 1.0737	> 5 ≤ 10	380-570	-	440	510-810	6
		> 10 ≤ 16	380-570	-	410	490-760	7
		> 16 ≤ 40	380-570	112-169	375	460-710	8
		> 40 ≤ 63	370-570	112-169	305	400-650	9
		> 63 ≤ 80	360-520	107-154	245	360-630	9
35S20 35SPb20	1.0726 1.0756	> 5 ≤ 10	550-720	-	480	640-880	6
		> 10 ≤ 16	550-700	-	400	590-830	7
		> 16 ≤ 40	520-680	154-201	360	560-800	8
		> 40 ≤ 63	520-670	154-198	340	530-760	9
		> 63 ≤ 80	500-650	149-193	300	510-680	9
46S20 46SPb20	1.0727 1.0757	> 5 ≤ 10	590-800	-	570	740-980	5
		> 10 ≤ 16	590-780	-	470	690-930	6
		> 16 ≤ 40	590-760	175-225	400	640-880	7
		> 40 ≤ 63	580-730	172-216	380	610-850	8
		> 63 ≤ 80	560-710	166-211	340	580-820	8



II.3 MECHANICAL PROPERTIES AFTER HEAT-TREATMENT

Steel grade		Size	As quenched and tempered and peeled (+QT+SH)		
Designation	Steel No.		$R_{p0.2}$ min	R_m	A_5 min
		[mm]	[N/mm ²]	[N/mm ²]	[%]
35S20 35SPb20	1.0726 1.0756	> 5 ≤ 10	430	630-780	15
		> 10 ≤ 16	430	630-780	15
		> 16 ≤ 40	380	600-750	16
		> 40 ≤ 63	320	550-700	17
		> 63 ≤ 80	320	550-700	17
46S20 46SPb20	1.0727 1.0757	> 5 ≤ 10	490	700-850	12
		> 10 ≤ 16	490	700-850	12
		> 16 ≤ 40	430	650-800	13
		> 40 ≤ 63	370	630-780	14
		> 63 ≤ 80	370	630-780	14

III. NON-ALLOY TOUGHENING STEELS



III.1 CHEMICAL COMPOSITION¹⁾

Standards	Steel designation	Steel No.	C	Mn	Si	P	S	Cr	Ni	Mo	Others
NON-ALLOY TOUGHENING STEELS EN 10083-2 EN 10277-5	C35	1.0501	0,32 0,39	0,50 0,80	≤ 0,40	max 0,045	max 0,045	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C35E	1.1181	0,32 0,39	0,50 0,80	≤ 0,40	max 0,030	max 0,035	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C35R	1.1180	0,32 0,39	0,50 0,80	≤ 0,40	max 0,030	0,020 0,040	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C45	1.0503	0,42 0,50	0,50 0,80	≤ 0,40	max 0,045	max 0,045	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C45E	1.1191	0,42 0,50	0,50 0,80	≤ 0,40	max 0,030	max 0,035	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C45R	1.1201	0,42 0,50	0,50 0,80	≤ 0,40	max 0,030	0,020 0,040	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C50E	1.1206	0,47 0,55	0,60 0,90	≤ 0,40	max 0,030	max 0,035	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C50R	1.1241	0,47 0,55	0,60 0,90	≤ 0,40	max 0,030	0,020 0,040	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63
	C55	1.0535	0,52 0,60	0,60 0,90	≤ 0,40	max 0,045	max 0,045	≤ 0,40	≤ 0,40	≤ 0,10	Cr+Mo+Ni≤ 0,63

III.2 MECHANICAL PROPERTIES AFTER PEELING OR DRAWING

Steel grade		Size	Rolled and peeled (+SH) ²⁾		Drawn after annealing (+A+C)		
Designation	Steel No.		R _m	Hardness ⁴⁾	R _{p 0,2} min	R _m	A ₅ min
			[N/mm ²]	[HB]	[N/mm ²]	[N/mm ²]	[%]
C35 C35E C35R	1.0501 1.1181 1.1180	> 5 ≤ 10	-	-	510	650-1000	6
		> 10 ≤ 16	-	-	420	600-950	7
		> 16 ≤ 40	520-700	154-207	320	580-880	8
		> 40 ≤ 63	520-700	154-207	300	550-840	9
		> 63 ≤ 80	520-700	154-207	270	520-800	9
C45 C45E C45R	1.0503 1.1191 1.1201	> 5 ≤ 10	-	-	565	750-1050	5
		> 10 ≤ 16	-	-	500	710-1030	6
		> 16 ≤ 40	580-820	172-242	410	650-1000	7
		> 40 ≤ 63	580-820	172-242	360	630-900	8
		> 63 ≤ 80	580-820	172-242	310	580-850	8

III.3 MECHANICAL PROPERTIES AFTER HEAT-TREATMENT

Steel grade		Size	As quenched and tempered and peeled (+QT+SH)		
Designation	Steel No.		R _{p 0.2} min	R _m	A ₅ min
			[mm]	[N/mm ²]	[N/mm ²]
C35 C35E C35R	1.0501 1.1181 1.1180	> 16 ≤ 40	380	600-750	19
		> 40 ≤ 80	320	550-700	20
C45 C45E C45R	1.0503 1.1191 1.1201	> 16 ≤ 40	430	650-800	16
		> 40 ≤ 80	370	630-780	17

IV. ALLOY TOUGHENING STEELS



IV.1 CHEMICAL COMPOSITION¹⁾

Standards	Steel designation	Steel No.	C	Mn	Si	P	S	Cr	Ni	Mo	Others
ALLOY TOUGHENING STEELS EN 10083-3 EN 10277-5	41Cr4	1.7035	0,38 0,45	0,60 0,90	≤ 0,40	max 0,025	max 0,035	0,90 1,20	-	-	
	41CrS4	1.7039	0,38 0,45	0,60 0,90	≤ 0,40	max 0,025	0,020 0,040	0,90 1,20	-	-	
	42CrMo4	1.7225	0,38 0,45	0,60 0,90	≤ 0,40	max 0,025	max 0,035	0,90 1,20	-	0,15 0,30	
	42CrMoS4	1.7227	0,38 0,45	0,60 0,90	≤ 0,40	max 0,025	0,020 0,040	0,90 1,20	-	0,15 0,30	
	51CrV4	1.8159	0,47 0,55	0,70 1,10	≤ 0,40	max 0,025	max 0,025	0,90 1,20	-	-	V 0,10-0,25

IV.2 MECHANICAL PROPERTIES AFTER PEELING OR DRAWING

Steel grade		Size	Rolled and peeled (+SH) ²⁾	Drawn after annealing (+A+C)
Designation	Steel No.		Hardness max ³⁾	Hardness ³⁾
			[mm]	[HB]
41Cr4 41CrS4	1.7035 1.7039	> 5 ≤ 10	-	295
		> 10 ≤ 16	-	285
		> 16 ≤ 40	241	280
		> 40 ≤ 63	241	270
		> 63 ≤ 80	241	270
42CrMo4 42CrMoS4	1.7225 1.7227	> 5 ≤ 10	-	300
		> 10 ≤ 16	-	290
		> 16 ≤ 40	241	285
		> 40 ≤ 63	241	280
		> 63 ≤ 80	241	280
51CrV4	1.8159	≤ 16	248	311
		> 16 ≤ 40	248	293
		> 40 ≤ 80	248	287

IV.3 MECHANICAL PROPERTIES AFTER HEAT-TREATMENT

Steel grade		Size	As quenched and tempered and peeled (+QT+SH)		
Designation	Steel No.		R _{p 0,2} min	R _m	A ₅ min
			[mm]	[N/mm ²]	[N/mm ²]
41Cr4 41CrS4	1.7035 1.7039	> 16 ≤ 40	660	900-1100	12
		> 40 ≤ 80	560	800-950	14
42CrMo4 42CrMoS4	1.7225 1.7227	> 16 ≤ 40	750	1000-1200	11
		> 40 ≤ 80	650	900-1100	12
51CrV4	1.8159	> 16 ≤ 40	800	1000-1200	10
		> 40 ≤ 80	700	900-1100	12

V. CASE HARDENING STEELS

V.1 CHEMICAL COMPOSITION¹⁾

Standards	Steel designation	Steel No.	C	Mn	Si	P	S	Cr	Ni	Mo	Others
CASE HARDENING STEELS (non-alloy) EN 10084 EN 10277-4	C10E	1.1121	0,07 0,13	0,30 0,60	≤ 0,40	max 0,035	max 0,035	-	-	-	
	C10R	1.1207	0,07 0,13	0,30 0,60	≤ 0,40	max 0,035	0,020 0,040	-	-	-	
	C15E	1.1141	0,12 0,18	0,30 0,60	≤ 0,40	max 0,035	max 0,035	-	-	-	
	C15R	1.1140	0,12 0,18	0,30 0,60	≤ 0,40	max 0,035	0,020 0,040	-	-	-	
CASE HARDENING STEELS (alloy) EN 10084 EN 10277-4	16MnCr5	1.7131	0,14 0,19	1,00 1,30	≤ 0,40	max 0,025	max 0,035	0,80 1,10	-	-	
	16MnCrS5	1.7139	0,14 0,19	1,00 1,30	≤ 0,40	max 0,025	0,020 0,040	0,80 1,10	-	-	
	20MnCr5	1.7147	0,17 0,22	1,10 1,40	≤ 0,40	max 0,025	max 0,035	1,00 1,30	-	-	
	20MnCrS5	1.7149	0,17 0,22	1,10 1,40	≤ 0,40	max 0,025	0,020 0,040	1,00 1,30	-	-	

V.2 REQUIRED HARDNESS AFTER HEAT-TREATMENT⁴⁾

Steel grade		State			
Designation	Steel No.	Soft annealed (+A)	Treated to hardness range (+TH)	Treated to ferrite-pearlite structure and hardness range (+FP)	Normalized (+N)
		Hardness [HB]			
C10E	1.1121	max 131	-	-	85-140
C10R	1.1207	max 131	-	-	85-140
C15E	1.1141	max 143	-	-	95-150
C15R	1.1140	max 143	-	-	95-150
16MnCr5	1.7131	max 207	156-207	140-187	138-187
16MnCrS5	1.7139	max 207	156-207	140-187	138-187
20MnCr5	1.7147	max 217	170-217	152-201	140-201
20MnCrS5	1.7149	max 217	170-217	152-201	140-201



V.3 MECHANICAL PROPERTIES AFTER HEAT-TREATMENT AND AFTER PEELING OR DRAWING

(carbon steels)

Steel grade		Size	Rolled and peeled (+SH) ²⁾		Drawn (+C)			Peeled after annealing (+A+SH)	Drawn after annealing (+A+C)
Designation	Steel No.		Hardness ³⁾	R _m	R _{p 0,2} min	R _m	A ₅ min	Hardness ³⁾	Hardness ³⁾
			[HB]	[N/mm ²]	[N/mm ²]	[N/mm ²]	[%]	[HB]	[HB]
C10E C10R	1.1121 1.1207	> 5 ≤ 10	-	-	350	460-760	8	-	225
		> 10 ≤ 16	-	-	300	430-730	9	-	216
		> 16 ≤ 40	92-163	310-550	250	400-700	10	131	207
		> 40 ≤ 63	92-163	310-550	200	350-640	12	131	190
		> 63 ≤ 80	92-163	310-550	180	320-580	12	131	172
C15E C15R	1.1141 1.1140	> 5 ≤ 10	-	-	380	500-800	7	-	238
		> 10 ≤ 16	-	-	340	480-780	8	-	231
		> 16 ≤ 40	98-178	330-600	280	430-730	9	143	216
		> 40 ≤ 63	98-178	330-600	240	380-670	11	143	198
		> 63 ≤ 80	98-178	330-600	215	340-600	12	143	178

V.4 MECHANICAL PROPERTIES AFTER HEAT-TREATMENT AND AFTER PEELING OR DRAWING

(alloy steels)

Steel grade		Size	Mechanical properties			
			Soft annealed and peeled (+A+SH)	Drawn after annealing (+A+C)	Treated to ferrite-pearlite structure and peeled (+FP+SH)	Drawn after treating to ferrite-pearlite structure (+FP+C)
Designation	Steel No.	[mm]	Hardness [HB] max			
16MnCr5 16MnCrS5	1.7131 1.7139	> 5 ≤ 10	-	260	-	-
		> 10 ≤ 16	-	250	-	-
		> 16 ≤ 40	207	245	140-187	140-240
		> 40 ≤ 63	207	240	140-187	140-235
		> 63 ≤ 80	207	240	140-187	140-235
20MnCr5 20MnCrS5	1.7147 1.7149	> 5 ≤ 10	-	270	-	-
		> 10 ≤ 16	-	260	-	-
		> 16 ≤ 40	217	255	152-201	152-250
		> 40 ≤ 63	217	250	152-201	152-245
		> 63 ≤ 80	217	250	152-201	152-245



CLASSES OF CROSS-SECTION TOLERANCE AND SURFACE QUALITY OF BRIGHT STEEL PRODUCTS

Type of product		Tolerances of cross-sections						Surface quality class			
		IT11	IT10	IT9	IT8	IT7	IT6	1	2	3	4
DRAWN BARS		●	●	●				●	●	○	
		●						●	○		
		●						●	○		
PEELED BARS		●	●	●				●	●	●	○
GROUND BARS				●	●	●	●	●	●	●	●

● - means possibility to manufacture a product

○ - means possibility to agree on the implementation of selected assortments of products

STRAIGHTNESS DEVIATIONS¹⁾ acc. to EN10278

Product	Steel group	Nominal size [mm]	Max dimensional deviation [mm]
ROUND BARS	< 0,25% C		1,0
	≥ 0,25% C, Alloy and toughening steels		1,5
	Stainless, tool and bearing steels		1,0
SQUARE AND HEXAGONAL BARS	< 0,25% C	≤ 75 mm	1,0
	≥ 0,25% C, Alloy and toughening steels	≤ 75 mm	2,0
	Stainless, tool and bearing steels	≤ 75 mm	1,0

¹⁾ higher straightness of bars requires coordination

SURFACE QUALITY CLASSES acc. to EN 10277

	Accuracy class ¹⁾			
	1	2	3	4
Permissible defect depth	max 0,3mm for d≤15mm max 0,02 x d for 15<d≤100mm	max 0,3mm for d≤15mm max 0,02 x d for 15<d≤75mm max 1,5mm for d>75mm	max 0,2mm for d≤20mm max 0,01 x d for 20<d≤75mm max 0,75mm for d>75mm	without cracks formed in manufacturing process
Max. percentage of delivery with defect rate higher than agreed	4%	1%	1%	0,2%
Product ²⁾				
Round bars	+	+	+	+
Square bars	+	+ (for d≤20 mm) ³⁾	-	-
Hexagonal bars	+	+ (for d≤50 mm) ³⁾	-	-

d - nominal bar diameter or distance between parallel sides of square and hexagonal bars

¹⁾ if no agreements have been made in tender and on ordering, production in class 1 is to be assumed

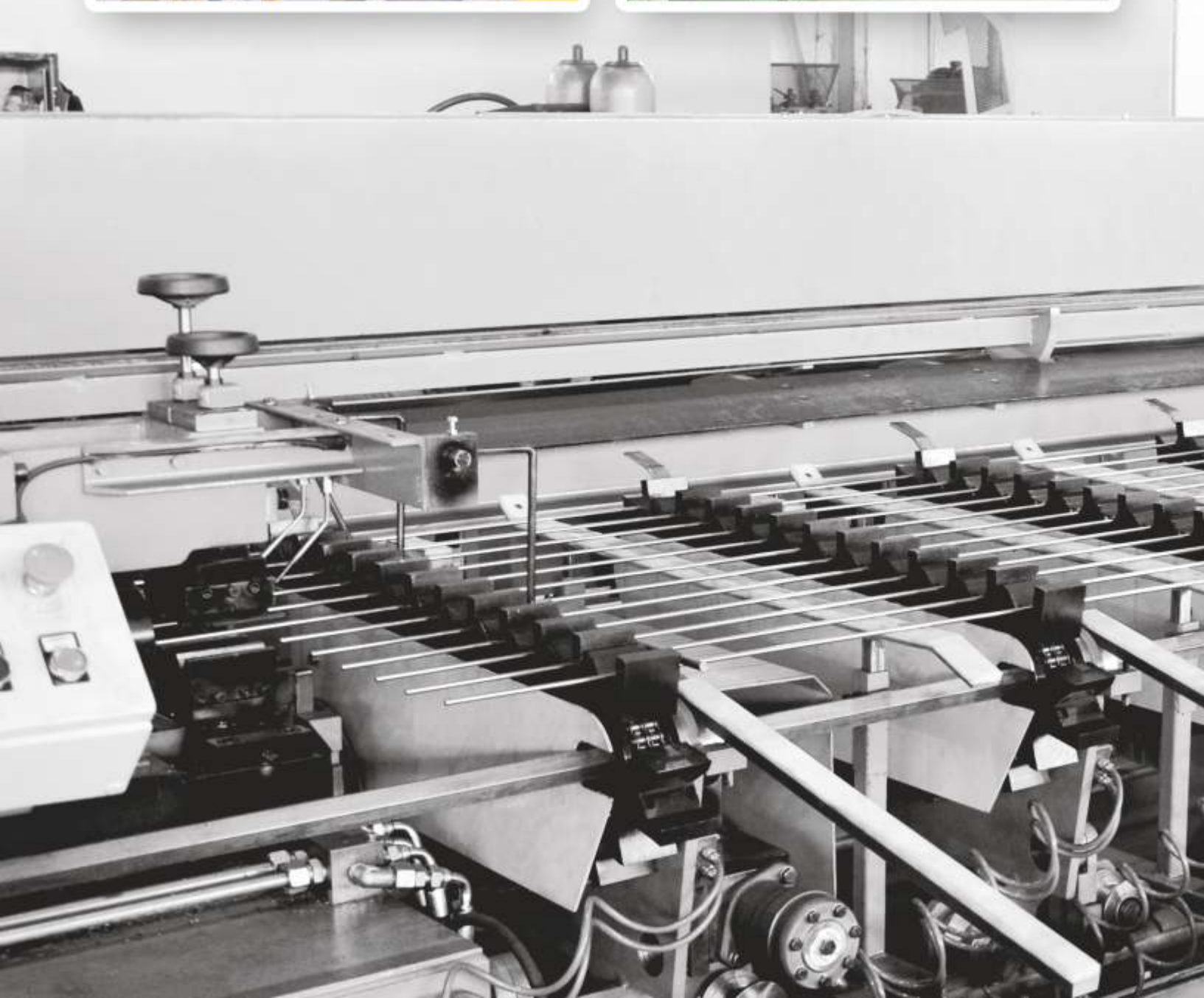
²⁾ "+" indicates available in these classes, "-" indicates not available in these classes

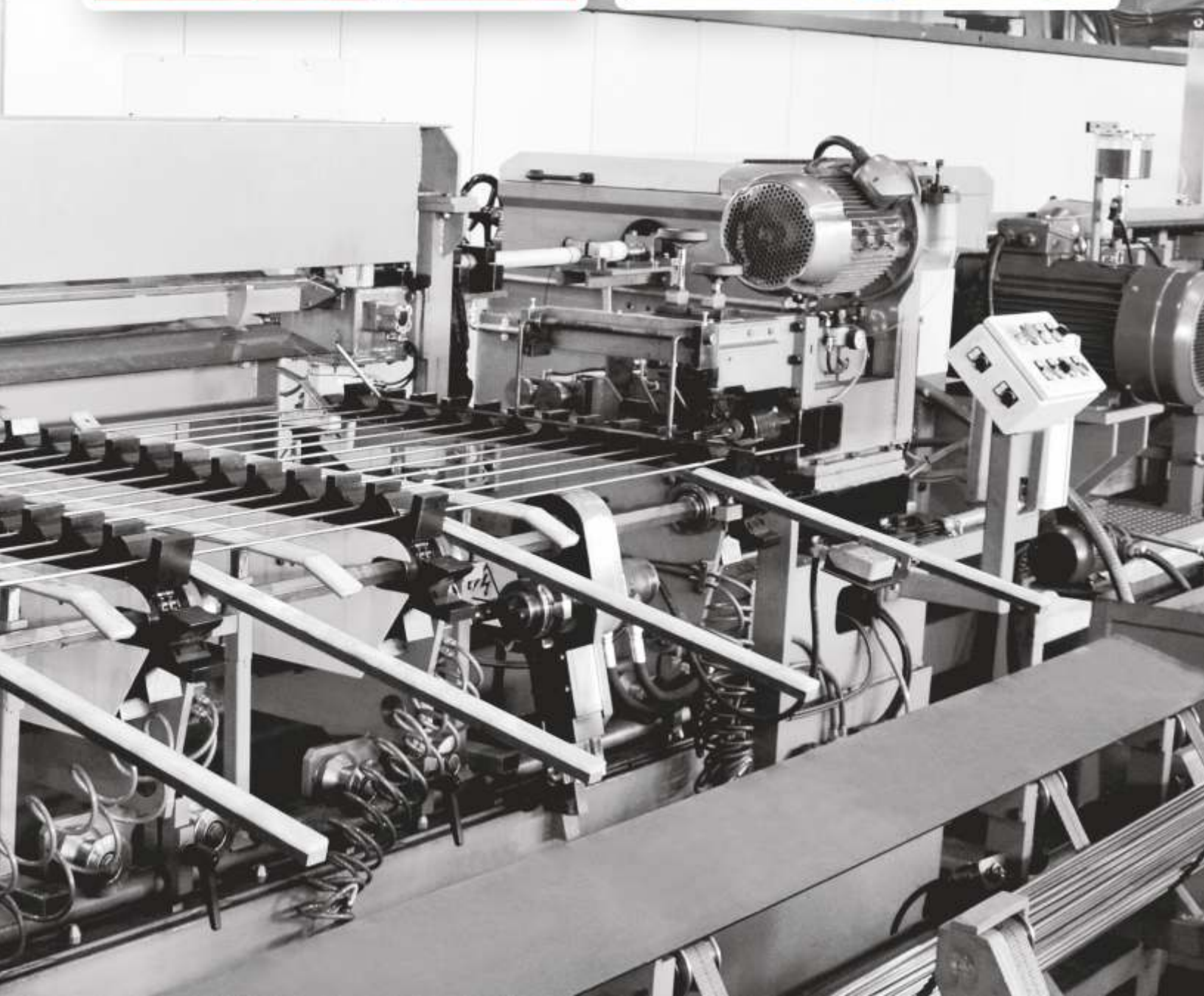
³⁾ crack detection with eddy current device not possible respectively for d 20 mm or d 50 mm



WEIGHT of 1m LONG BAR

Size	Cross-section			Size	Cross-section		
[mm]				[mm]			
4	0,10	0,11	0,13	40	9,86	10,88	12,56
5	0,15	0,17	0,20	41	10,35	11,43	13,20
6	0,22	0,24	0,28	42	10,87	12,00	13,85
7	0,30	0,33	0,38	43	11,39	12,57	14,51
8	0,39	0,44	0,50	44	11,93	13,16	15,20
9	0,50	0,55	0,64	45	12,47	13,77	15,90
10	0,62	0,68	0,79	46	13,03	14,39	16,61
11	0,75	0,82	0,95	47	13,61	15,02	17,34
12	0,89	0,98	1,13	48	14,19	15,67	18,09
13	1,04	1,15	1,33	49	14,79	16,33	18,85
14	1,21	1,33	1,54	50	15,40	17,00	19,63
15	1,39	1,53	1,77	51	16,02	17,69	20,42
16	1,58	1,74	2,01	52	16,66	18,39	21,23
17	1,78	1,97	2,27	53	17,30	19,10	22,05
18	2,00	2,20	2,54	54	17,96	19,83	22,89
19	2,22	2,45	2,83	55	18,63	20,57	23,75
20	2,46	2,72	3,15	56	19,32	21,32	24,62
21	2,72	3,00	3,46	57	20,01	22,09	25,50
22	2,98	3,29	3,80	58	20,72	22,88	26,41
23	3,26	3,60	4,15	60	22,18	24,48	28,26
24	3,55	3,92	4,52	61	22,92	25,30	29,21
25	3,85	4,25	4,91	62	23,68	26,14	30,18
26	4,16	4,60	5,31	63	24,45	26,99	31,16
27	4,49	4,96	5,72	64	25,23	27,85	32,15
28	4,83	5,33	6,15	65	26,03	28,73	33,17
29	5,18	5,72	6,60	66	26,83	29,62	34,19
30	5,54	6,12	7,07	67	27,65	30,53	35,24
31	5,92	6,53	7,54	68	28,48	31,44	36,30
32	6,31	6,96	8,04	69	29,33	32,37	37,37
33	6,71	7,41	8,55	70	30,18	33,32	38,47
34	7,12	7,86	9,07	71	31,05	34,28	39,57
35	7,55	8,33	9,62	72	31,93	35,25	40,69
36	7,98	8,81	10,17	73	32,83	36,24	41,83
37	8,43	9,31	10,75	74	33,73	37,24	42,99
38	8,90	9,82	11,34	75	34,65	38,25	44,16
39	9,37	10,34	11,94	80	39,46	43,51	50,24





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