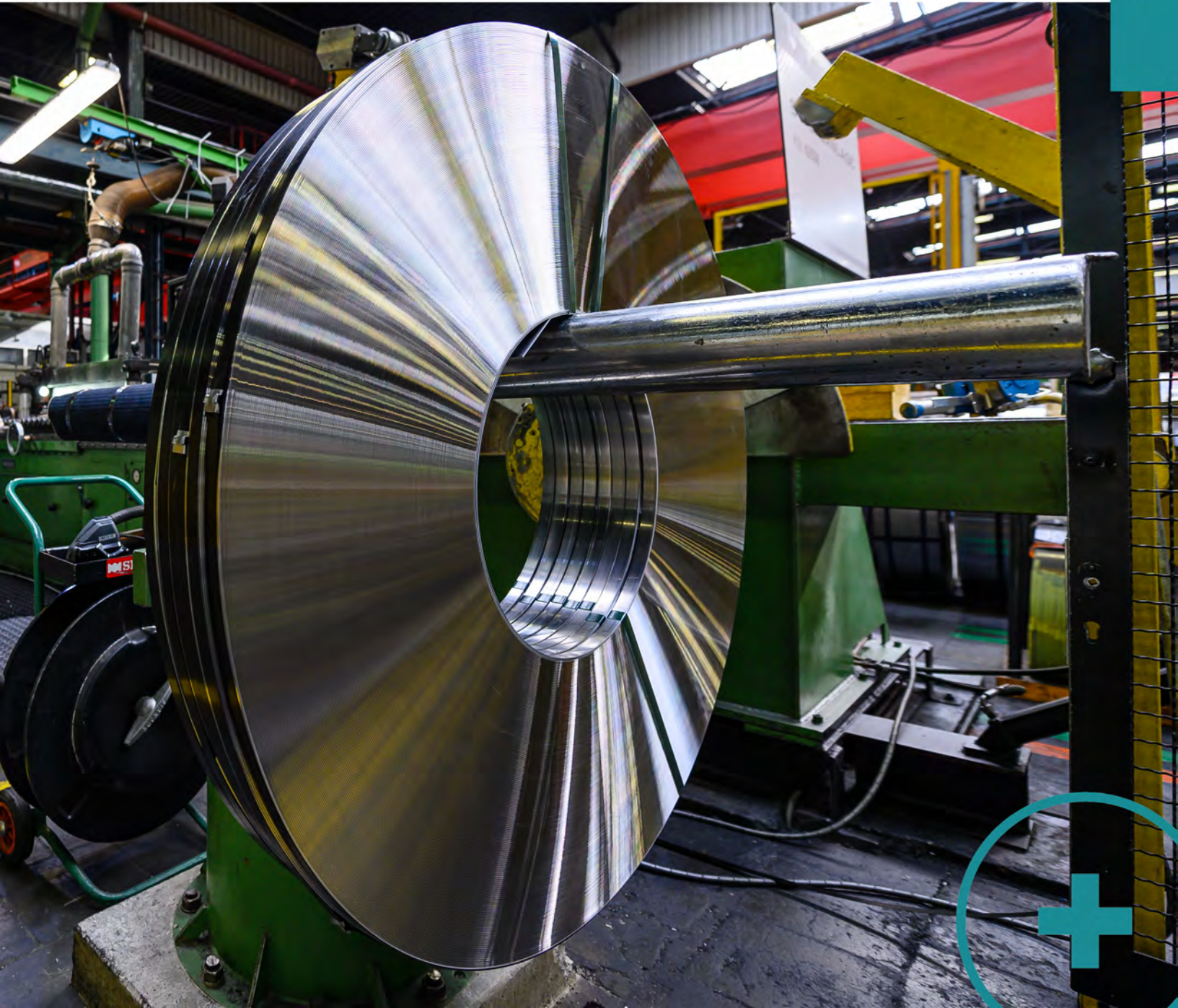




PRODUCTS 

04.2023







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\* The latest edition of standards; All chemical cast analysis in weight %







# Quenched and tempered steels



Standard	DIN EN 10132		
Grades	Tempering steels: C22E - C60E, 25CrMo4 - 50CrMo4 Boron-alloyed steels: 27MnCrB5-2 and similar Spring steels: C55S - C100S, 75Cr1 - 95Cr1, 51CrV4 - 80CrV2, 68CrNiMo33, 75Ni8, 102Cr6		
Chemical cast analysis	Based on DIN EN 10132 and also special analysis		
Strip thicknesses [mm] <sup>(1)</sup>	Martensite: 0.30 - 5.10		
Strip widths [mm] <sup>(2) (3)</sup>	Martensite: 35 - 720		
Delivery conditions	QT - martensitic quenched and tempered		
Mechanical properties <sup>(1)</sup>	Martensite:	Spring steels	Hardness 30 - 54 HRC
Hardness range		Tempering steels	Hardness 30 - 48 HRC
		Boron-alloyed steels	Hardness 30 - 44 HRC
Surfaces (appearance + finish)	Bright, grey-blue, polished and yellow tempered, brush-polished		
Edge conditions	GK - slit edges, SK - special edges (machined or edge-rolled)		
Dimensional tolerances	General tolerances:	acc. to DIN EN 10140 and special agreement	
	Strip width tolerances:	acc. to special agreement only	
Flatness	Max. 1.0 µm/mm width for martensitic tempered spring steels with C-contents of 0.67 - 1.00 %, Max. 1.5 - 2.0 µm/mm width for boron-alloyed grades and tempering steels.		
Delivery forms	Coils and cut to lengths		
Cut to length dimensions <sup>(2)</sup>	Width 80 - 720 mm	Length: 400 - 4000 mm	
Specialities	Hardening of low carbon steel with very good flatness values. Hardening of extreme cross-sections with especially wide and thick dimensions. Hardening in lead free process upon agreement.		

<sup>(1)</sup> Variations depending on grade and dimension to be taken into account <sup>(2)</sup> Further dimensions upon agreement

<sup>(3)</sup> Strip width < 35 mm only available in slit-after-hardening condition in strip thickness ≤ 0.80 mm





Standard	DIN EN 10132
Grades	C55S - C100S, 51CrV4, 58CrV4, 75Cr1, 68CrNiMo33, 75Ni8, 80CrV2, 102Cr6 and similar
Chemical cast analysis	Based on DIN EN 10132 and special analysis
Strip thicknesses [mm]	0.20 - 5.20
Strip widths [mm]	4 - 810 <sup>(2)</sup>
Delivery conditions	LC; A; AC; CR; QT
Mechanical properties:	Standard values for Rm, Re, A80; Hardness acc. to DIN EN 10132 Special agreements for particular working- and forming properties after consultation.
Surfaces (appearance + finish)	MA with finish RR, RM, RL acc. to DIN EN 10139 MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement
Delivery forms	Coils and cut to lengths
Specialities	Best formability, very good fine blanking properties attainable through selective production processes.
<sup>(1)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK	







# Micro-alloyed cold rolled steel strip



Standard		DIN EN 10268						
Grades		HC260LA	HC300LA	HC340LA	HC380LA	HC420LA	HC460LA	HC500LA
Chemical cast analysis	C (max)	0.100	0,120	0,120	0,120	0,140	0,140	0,140
	Si (max)	0.500	0,500	0,500	0,500	0,500	0,600	0,600
	Mn (max)	1,000	1,400	1,500	1,600	1,600	1,800	1,800
	P (max)	0,030	0,030	0,030	0,030	0,030	0,030	0,030
	S (max)	0,025	0,025	0,025	0,025	0,025	0,025	0,025
	Al (min)	0,015	0,015	0,015	0,015	0,015	0,015	0,015
	Ti (max)	0,150	0,150	0,150	0,150	0,150	0,150	0,150
	Nb (max)	0,090	0,090	0,090	0,090	0,090	0,090	0,090
Strip thicknesses [mm]		0.20 - 5.20						
Strip widths [mm]		4 - 810 <sup>(2)</sup>						
Mechanical properties in LC								
Tensile strength R <sub>m</sub> [MPa]	Longitudinal testing	340 - 420	370 - 470	400 - 500	430 - 550	460 - 580	480 - 630	520 - 690
Yield strength R <sub>p0,2</sub> [MPa]		240 - 310	280 - 360	320 - 410	350 - 450	390 - 500	420 - 560	460 - 600
Elongation A <sub>80</sub> [%]		min. 27	min. 24	min. 22	min. 20	min. 18	min. 14	min. 13
Surfaces (appearance + finish)	MA with finish RR, RM, RL acc. to DIN EN 10139 MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139							
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement							
Delivery forms	Coils and cut to lengths							
Specialities	Tolerance range for mechanical properties can be reduced further if necessary. Measuring on longitudinal test specimen preferred, transverse testing by agreement.							
<sup>(1)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK								





# High strength micro-alloyed fine-grain steels



Page 04

Standard	Based on DIN EN 10268							
Grades	Possible grades: RiWi 600 - RiWi 1400							
Chemical cast analysis	Based on DIN EN 10268 with modifications							
Strip thicknesses [mm]	0.80 - 5.50 <sup>(1)</sup>							
Strip widths [mm]	4 - 810 <sup>(2)</sup>							
Grades	RiWi 600	RiWi 700	RiWi 800	RiWi 900	RiWi 1000	RiWi 1100	RiWi 1400	
Mechanical properties:	Longitudinal testing							
Tensile strength R <sub>m</sub> [MPa]		630 - 780	730 - 880	830 - 980	920 - 1070	1020 - 1170	1110 - 1260	1410 - 1560
Yield strength R <sub>p0.2</sub> [MPa]		600 - 720	700 - 820	800 - 920	900 - 1020	1000 - 1150	1100 - 1250	1400 - 1550
Elongation A <sub>80</sub> [%] <sup>(4)</sup>		min. 10	min. 10	min. 9	min. 7	min. 5	min. 3	
Surfaces (appearance + finish)	MA, MB <sup>(3)</sup> with finish RL; (RM) acc. to DIN EN 10139							
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement							
Delivery forms	Coils and cut to lengths							
Specialities	Intermediary grades on request, measuring on longitudinal test specimen preferred.							
<sup>(1)</sup> Other thicknesses on request <sup>(2)</sup> Maximum width only for NK								
<sup>(3)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request <sup>(4)</sup> Elongation on request								







# Tempering steels, boron-alloyed steels



Standard	DIN EN 10132
Grades	Tempering steels: C40E, C45E, C50E, C55E, C60E, 25Mn4, 25CrMo4, 34CrMo4, 42CrMo4, 50CrMo4 and similar Boron-alloyed steels: 20MnB5, 27MnCrB5-2 and similar; 30MnB5
Chemical cast analysis	Based on DIN EN 10132 and special analysis
Strip thicknesses [mm]	0.20 - 5.20
Strip widths [mm]	4 - 810 <sup>(2)</sup>
Delivery conditions	LC; A; AC; CR; QT
Mechanical properties:	Tempering steels: Standard values for Rm, Re, A80; Hardness acc. to DIN EN 10132, Special agreements for particular working- and forming properties after consultation. Boron-alloyed steels: Mechanical properties upon agreement
Surfaces (appearance + finish)	MA with finish RR, RM, RL acc. to DIN EN 10139 MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement
Delivery forms	Coils and cut to lengths
Specialities	Also available in special deep drawing condition.
<sup>(1)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK	





# Classic cold rolled strip and special deep drawing grades



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Standard	DIN EN 10139						
Grades <sup>(1)</sup>		DC 01	DC 03	DC 04	DC 05	DC 06	DC 07
Chemical cast analysis	C (max)	0.120	0.100	0.080	0.060	0.020	0.010
	Mn (max)	0.600	0.450	0.400	0.350	0.250	0.200
	P (max)	0.045	0.035	0.030	0.025	0.020	0.020
	S (max)	0.045	0.035	0.030	0.025	0.020	0.020
	Ti (max)					0.300	0.200
Strip thicknesses [mm] Delivery conditions	A, LC - C290	0.20 - 5.20				0.20 - 2.00	
	C340	0.20 - 5.00					
	C390 - C440	0.20 - 5.80					
	C490	0.20 - 5.40					
	C590	0.20 - 4.00					
	C690	0.20 - 2.80					
Strip widths (mm) Delivery conditions	LC - C340				4 - 810 <sup>(2)</sup>		
	C390 - C690	4 - 810 <sup>(2)</sup>					
Mechanical properties	Acc. to DIN EN 10139						
Surfaces (appearance + finish)	MA with finish RR, RM, RL						
	MB <sup>(3)</sup> with finish RL, RM						
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement						
Delivery forms	Coils and cut to lengths						
Specialities	With little earing on request						

<sup>(1)</sup> Special analysis on request <sup>(2)</sup> Maximum width only for NK <sup>(3)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request







# Soft magnetic steels



Standard		Based on DIN EN 17405				
Grades		RFe 40	RFe 60	RFe 80	RFe 100	RFe 120
Chemical cast analysis	C			max. 0.050		
	Si			max. 0.100		
	Mn			max. 0.350		
	P			max. 0.030		
	S			max. 0.035		
	Al			max. 0.100		
Strip thicknesses [mm]		0.30 - 4.70				
Strip widths [mm]		4 - 620 <sup>(2)</sup>				
Delivery conditions		CR				
Magnetic properties:						
Coercive field strenght $H_c$ [A/m]		max. 40	max. 60	max. 80	max. 100	max. 120
Surfaces (appearance + finish)		MA with finish RR, RM, RL acc. to DIN EN 10139 MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139				
Dimensional tolerances		Acc. to DIN EN 10140 and special agreement				
Delivery forms		Coils and cut to lengths				
Specialities		No minimum Al-content demanded RFe 20 available on special agreement				
<sup>(1)</sup> MB for thicknesses 0.3 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK						







Standard	DIN EN 10132 and special analysis					
Grades	C10E	C15E	16MnCr5	17Cr3		
Chemical cast analysis	C	0.070 - 0.130	0.120 - 0.180	0.140 - 0.190	0.140 - 0.200	
	Si	max. 0.400	max. 0.400	max. 0.400	max. 0.400	
	Mn	0.300 - 0.600	0.300 - 0.600	1.000 - 1.300	0.600 - 0.900	
	P	max. 0.025	max. 0.025	max. 0.025	max. 0.025	
	S	max. 0.035	max. 0.035	max. 0.035	max. 0.035	
	Cr	max. 0.400	max. 0.400	0.800 - 1.100	0.700 - 1.250	
	Mo	max. 0.100	max. 0.100			
	Ni	max. 0.400	max. 0.400			
	Cu	max. 0.300	max. 0.300	max. 0.400	max. 0.400	
	Strip thicknesses [mm]	Delivery condition LC, (A): 0.20 - 5.20; Delivery condition CR: 0.20 - 5.50				
Strip widths [mm]	4 - 810 <sup>(2)</sup>					
Delivery conditions	LC; A; AC; CR					
Mechanical properties for delivery condition LC and longitudinal testing:						
Tensile strength R <sub>m</sub> [MPa]	max. 430	max. 450	max. 550	max. 550		
Yield strength R <sub>p0,2</sub> [MPa]	max. 345	max. 360	max. 420	max. 420		
Elongation A <sub>80</sub> [%]	min. 26	min. 25	min. 21	min. 21		
Hardness [HV]	max. 135	max. 140	max. 170	max. 170		
Surfaces (appearance + finish)	MA with finish RR, RM, RL acc. to DIN EN 10139					
	MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139					
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement					
Delivery forms	Coils and cut to lengths					

<sup>(1)</sup> MB for thicknesses 0.2 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK







Standard

Based on DIN EN ISO 683-4

Grades

11SMn30, AMn / Ancora W I

Chemical cast analysis	C	max. 0.15
	Si	max. 0.05
	Mn	0.90 - 1.30
	P	max. 0.11
	S	0.22 - 0.33

Strip thicknesses [mm] 0.50 - 5.00

Strip widths [mm] 4 - 420

Delivery conditions LC; CR

Mechanical properties: Typically with tensile strengths around 600 Mpa; Further characteristics and tolerances feasible by agreement.

Surfaces (appearance + finish) MA with finish RR, RM, RL acc. to DIN EN 10139

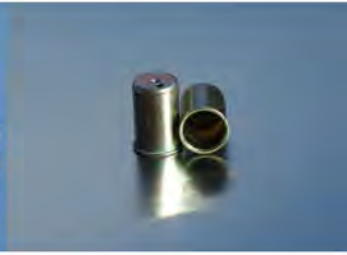
Dimensional tolerances Acc. to DIN EN 10140 and special agreement

Delivery forms Coils and cut to lengths

Specialities These steels are characterised by very good milling and stamping properties, with short chip-formation and high torsional strength.







Standard	DIN 1623			
Grades	S215G	S245G	S325G	
Chemical cast analysis	C	max. 0.180	max. 0.200	max. 0.200
	Si	-	-	max. 0.550
	Mn	max. 1.500	max. 1.600	max. 1.600
	P	max. 0.030	max. 0.030	max. 0.030
	S	max. 0.025	max. 0.025	max. 0.025
Strip thicknesses [mm]	0.20 - 5.20			
Strip widths [mm]	4 - 810 <sup>(2)</sup>			
Delivery conditions	LC; CR			
Mechanical properties for delivery condition LC and transverse testing <sup>(3)</sup> :				
Tensile strength R <sub>m</sub> [MPa]	360 - 510	430 - 580	510 - 680	
Yield strength R <sub>p0,2</sub> [MPa]	min. 215	min. 245	min. 325	
Elongation A <sub>80</sub> [%]	min. 20	min. 18	min. 16	
Surfaces (appearance + finish)	MA with finish RR, RM, RL acc. to DIN EN 10139			
	MB <sup>(1)</sup> with finish RL, RM acc. to DIN EN 10139			
Dimensional tolerances	Acc. to DIN EN 10140 and special agreement			
Delivery forms	Coils and cut to lengths			
Specialities	Roll hardened condition (CR) available on request			
<sup>(1)</sup> MB for thicknesses 0.5 - 2.0 mm, thicker dimensions on request <sup>(2)</sup> Maximum width only for NK				
<sup>(3)</sup> Longitudinal testing by agreement				





## Edge conditions:

Both edges machine-rounded



Both edges right-angled



Strip upper or lower side chamfered with defined angles of 5° to 90°



Both strip sides chamfered with different angles of 5° to 90°



One edge machine-rounded



One edge with chamfered upper and lower strip side with defined angles of 5° to 90°



One edge chamfered with defined angle of 5° to 90° and other edge right-angled







# Strip thickness tolerances



Strip thickness tolerances acc. to DIN EN 10140 and special tolerances

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Nominal widths [mm]	< 125			≥ 125 up to ≤ 650			> 650 up to ≤ 800		
Nominal thicknesses [mm]	A	B	C	A	B	C	A	B	C
	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-
> 0,15 ≤ 0,25 EN	0.015	0.012	0.008	0.020	0.015	0.010	0.025	0.015	0.012
* RWST			0.008			0.010			0.010
> 0,25 ≤ 0,40 EN	0.020	0.015	0.010	0.025	0.020	0.012	0.030	0.020	0.015
RWST			0.010			0.012			0.013
> 0,40 ≤ 0,60 EN	0.025	0.020	0.012	0.030	0.025	0.015	0.035	0.025	0.020
RWST			0.012			0.013			0.014
> 0,60 ≤ 1,00 EN	0.030	0.025	0.015	0.035	0.030	0.020	0.040	0.030	0.025
RWST			0.014			0.014			0.015
> 1,00 ≤ 1,50 EN	0.035	0.030	0.020	0.040	0.035	0.025	0.050	0.045	0.030
RWST			0.018			0.018			0.018
> 1,50 ≤ 2,50 EN	0.045	0.035	0.025	0.050	0.040	0.030	0.060	0.045	0.035
RWST			0.020			0.020			0.020
> 2,50 ≤ 4,00 EN	0.050	0.040	0.030	0.060	0.050	0.035	0.075	0.055	0.040
RWST			0.025			0.025			0.030
> 4,00 ≤ 6,00 EN	0.060	0.050	0.035	0.070	0.055	0.040	0.090	0.065	0.045
RWST			0.035			0.035			0.040
> 6,00 ≤ 8,00 EN	0.075	0.060	0.040	0.085	0.065	0.045	0.100	0.075	0.050

\* RWST = Risse + Wilke special tolerance

Minimum distance of the measuring points from the edge for strip thicknesses acc. to DIN EN 10140

Type of edge	Nominal widths W [mm]	Minimum distances of measuring points from the edge [mm] *
As rolled edges (NK)	W ≤ 30	0.5 W
	30 < W < 800	15
GK - slit edges	W ≤ 20	0.5 W
	30 < W ≤ 800	10
SK - special edges	Upon consultation	

\* Other measuring point distances possible by special agreement







## Strip widths tolerances (DIN EN 10140)

### Widths tolerances for products with as-rolled edges

Nominal widths [mm]	Widths tolerances [mm]
< 40	0/+ 1.6
≥ 40 < 80	0/+ 2.0
≥ 80 < 125	0/+ 2.4
≥ 125 < 250	0/+ 3.0
≥ 250 < 400	0/+ 3.6
≥ 400 < 500	0/+ 4.2
≥ 500 < 600	0/+ 4.5
≥ 600 < 800	0/+ 5.0 not standardised

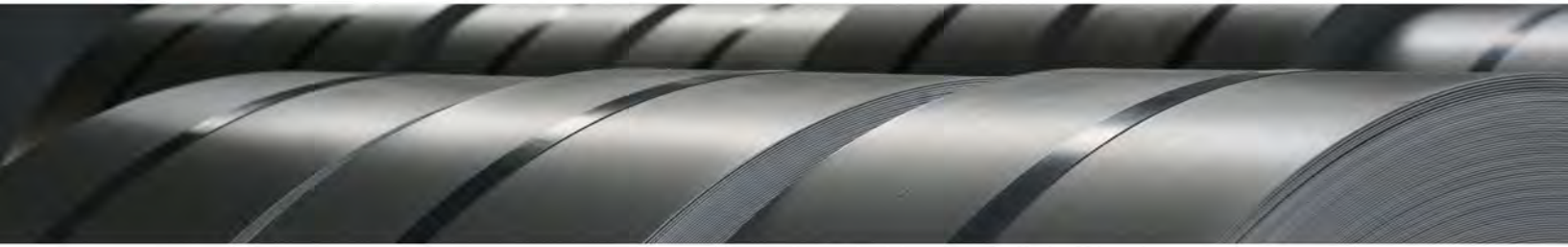
### Widths tolerances for products with slit edges

Widths tolerances EN 10140	Standardised production width [mm]						Not standardised [mm]	
	< 125		≥ 125 - < 250		≥ 250 - < 600		≥ 600 - < 800	
Nominal thicknesses [mm]	A +/-	B +/-	A +/-	B +/-	A +/-	B +/-	A +/-	B +/-
> 0.20 ≤ 0.60 EN	0.15	0.10	0.15	0.10	0.25	0.18	0.30	0.22
*RWST (Range)		0.10		0.10		0.15		0.20
> 0.60 ≤ 1.50 EN	0.20	0.13	0.20	0.13	0.30	0.20	0.35	0.24
*RWST (Range)		0.15		0.15		0.25		0.30
> 1.50 ≤ 2.50 EN	0.25	0.18	0.25	0.18	0.35	0.25	0.40	0.30
*RWST (Range)		0.20		0.20		0.35		0.40
> 2.50 ≤ 4.00 EN	0.30	0.20	0.30	0.20	0.40	0.30	0.45	0.35
*RWST (Range)		0.25		0.25		0.45		0.50
> 4.00 ≤ 6.00 EN	0.35	0.25	0.35	0.25	0.45	0.35	0.50	0.40
*RWST (Range)		0.30		0.30		0.50		0.60
> 6.00 ≤ 7.00 EN	0.45	0.45	0.45	0.45	0.55	0.55	0.55	0.55
*RWST (Range)								

\* RWST = Risse + Wilke special tolerance





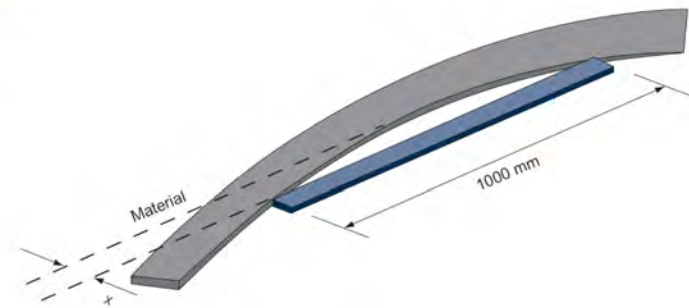


## Edge camber (DIN EN 10140)

Nominal width W [mm]	Tolerances on edge camber x for a length of 1.000 mm	
	Class A [mm]	Class B [mm]
10 < W < 25	5.00	2.00
25 < W < 40	3.50	1.50
40 < W < 125	2.50	1.25
125 < W < 800	2.00	1.00

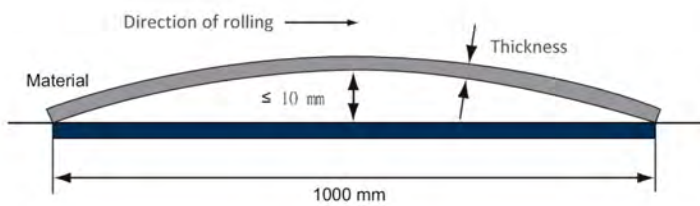
Tolerances for the edge camber are only applicable to cold rolled strip with a width of at least 10 times the thickness.

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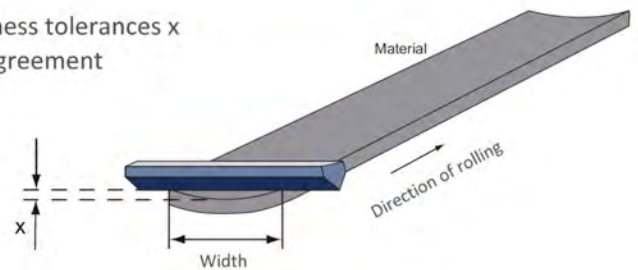


## Flatness of cut length (DIN EN 10140)

## Flatness/ Transversal Flatness

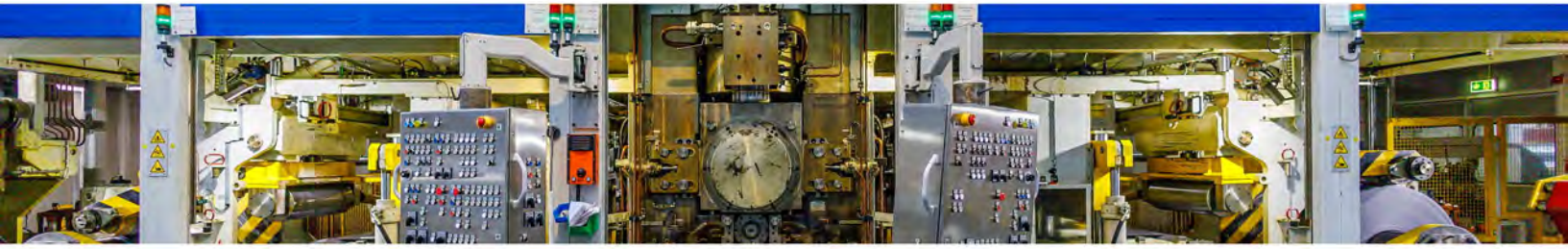


Flatness tolerances x by agreement





# Strip length tolerances



## Length tolerances (DIN EN 10140)

### Length tolerances for cold rolled strip in cut to length

Nominal length L [mm]	Length tolerances [mm]	
	Class A	Class B
L < 1.000	+ 10	+ 6
1.000 < L < 2.500	+ 0.01 L	+ 6
L > 2.500	+ 0.01 L	+ 0.003 L

## Surface appearance and finish (DIN EN 10139)

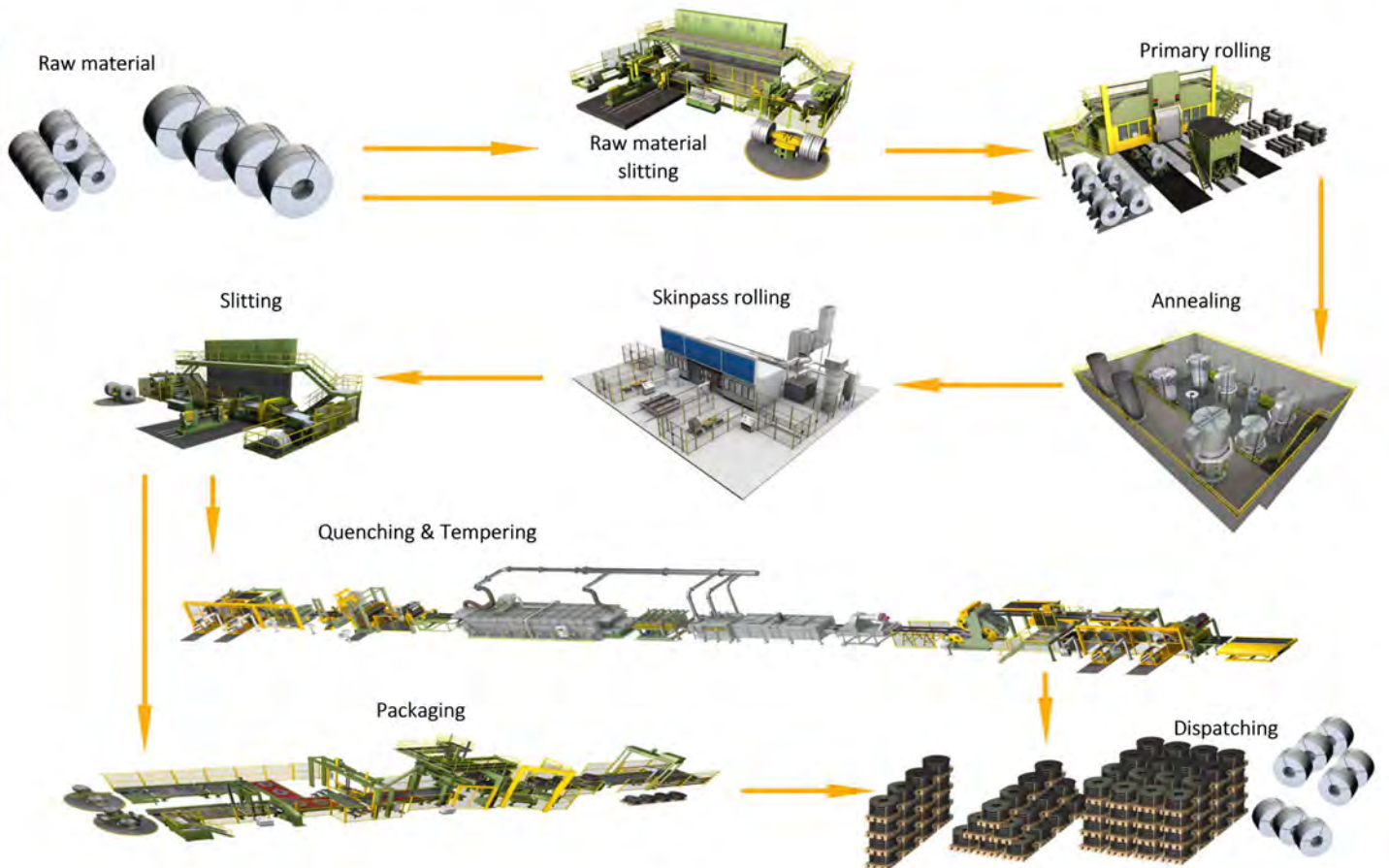
Surface appearance	Surface finish [ $\mu\text{m}$ ]
MA (RL, RM, RR)	RL: Ra < 0.6
MB (RL, RM)	RM: 0.6 < Ra < 1.8
	RR: Ra > 1.5

## Delivery condition

LC	Annealed, skin passed
A	Annealed
AC	Spheroidised annealed carbides
CR	Cold rolled
C290-C690	Work hardened
QT	Martensitic quenched and tempered











# GBS - Special steel for stone gang saw blades



Standard	DIN EN 10132
Grades	C75S; 75Cr1; 75Ni8 Risse + Wilke special grades: RiWistone 27 "no crack"; RiWistone 68 "high resistance, for thin dimensions"
Chemical cast analysis	Acc. to DIN 10132 and special agreement
Strip thicknesses [mm]	1.00 - 3.50
Strip widths [mm]	100 - 200
Transversal flatness [ $\mu\text{m}/\text{mm}$ strip width]	$\leq 1.0$ $\leq 0.5$ upon agreement

Member of the Risse + Wilke company group since 2017



Facts RiWistone - Risse + Wilke no crack technology:

- less brittle and unsusceptible to breakage
- higher brazing temperatures can be used
- better soldering joints by specifically, higher brazing temperatures
- less undesirable hard spots at the strip edges on the saw blade and during the subsequent use of the saw blades

With RiWistone in addition to the well known standard grades C75S, 75Cr1 and 75Ni8 R + W also offers a carbon-reduced special grade for the application of stone gang saws.

This grade is unsusceptible to overheating when brazing the segments. This means no undesirable hard spots at the strip edges on the saw blade and no premature breakage.







## CONTACT

Risse + Wilke Kaltband GmbH & Co. KG  
Stenglingser Weg 46  
D - 58642 Iserlohn

Sales: +49 2374 935-482  
Technical customer support: +49 2374 935-113

+49 2374 935-0  
[info@risse-wilke.de](mailto:info@risse-wilke.de)  
[www.risse-wilke.de](http://www.risse-wilke.de)

