

# Comparison of standards

Technical Terms of Delivery

# Designation systems for steels

## Excerpt from EN 10027-1

Snnn	<b>Steels for general steel construction</b>
Pnnn	Steels for pressure vessel construction
Lnnn	Steels for pipeline construction
Ennn	Engineering steels
Bnnn	Reinforcing steels
Yzzz	Prestressing steel
Rzzz	Steels for rails or in the form of rails
<b>Cold-rolled flat products in higher-strength drawing grades</b>	
Hnnn.. ..=	<p><b>P</b> Phosphorus-alloyed steels</p> <p><b>B</b> Bake-hardening steels</p> <p><b>LA</b> Micro-alloyed steels</p> <p><b>Y</b> High-strength IF steels</p> <p><b>I</b> Isotropic steels</p>
HTzzz.. ..=	<p><b>X</b> Dual-phase steels</p> <p><b>T</b> TRIP steels</p> <p><b>C</b> Complex-phase steels</p>
<b>Flat products made of mild steels for cold forming</b>	
D..from ..=	<p><b>C</b> For cold-rolled flat products</p> <p><b>D</b> Or flat hot-rolled products designated for direct cold forming</p> <p><b>X</b> For flat products with no indicated method of rolling</p>
T(H or nnn)	Ultra-thin and tin sheet and strip as well as specially chromed sheet and strip
<b>Electrical steel strip</b>	
Mmmm-dd ..=	<p><b>A</b> For non-grain oriented</p> <p><b>D</b> For unalloyed, non-final annealed</p> <p><b>E</b> For alloyed, non-final annealed</p> <p><b>N</b> For grain-oriented</p> <p><b>S</b> For grain-oriented with unlimited core losses</p> <p><b>P</b> For grain-oriented with low core losses</p>

### Legend

nnn	Minimum yield strength
zzz	Minimum tensile strength (with code letter T)
from	Figures
H	Hardness data
mmm	Hundred-fold maximum permitted loss of magnetization
dd	Hundred-fold nominal thickness

Bolded steel grades relevant to these Technical Terms of Delivery

# Comparison of European material standardizations

## Surface

Uncoated/electrolytically treated steel strip		Hot-dip-galvanized steel strip	
		Coating: Z (Zinc)	ZF (Galvannealed)
03	A	NA, MA	RA
05	B	MB	RB
DIN 1623 DIN 17163	EN 10130 EN 10152 EN 10271 EN 10268	MC	RC
		EN 10346	

# Comparison of European material standardizations for cold-rolled flat products

## Mild steels for cold forming

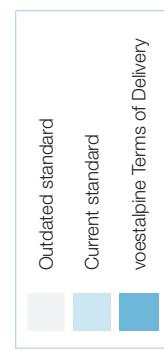
Uncoated							Electrolytically treated		
UNI 5866 1977 Edition	DIN 1623/ Part 1 1983 Edition	NF A 36 401 1983 Edition	BS 1449-1.1 1991 Edition	EN 10130 2007 Edition	EN 10130 2007 Edition	Material number	Terms of Delivery voestalpine Stahl 2011	EN 10152 2009 Edition	EN 10152 2009 Edition
<b>Designation of steel grades</b>									
Fe P01	St 12	C	CR 4	Fe P01	DC01	1.0330	DC01	DC01+ZE	DC01+ZE
-	Ust 13	-	CR 3	-	-	1.0333	-	-	-
Fe P02	RRSt 13	E	CR 2	Fe P03	DC03	1.0347	DC03	DC03+ZE	DC03+ZE
Fe P04	ST 14	ES	CR 1	Fe P04	DC04	1.0338	DC04	DC04+ZE	DC04+ZE
-	-	-	-	Fe P05	DC05	1.0312	DC05	DC05+ZE	DC05+ZE
-	- <sup>1)</sup>	-	-	Fe P06	DC06	1.0873	DC06	DC06+ZE	DC06+ZE
-	-	-	-	-	DC07	1.0898	DC07	DC07+ZE	DC07+ZE

## Designation of surface types

MA	O3	X	GP	A	A	A	A	A	A
MB	O5	Z	FF	B	B	B	B	B	B

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.

<sup>1)</sup> St 15 was in common use.



# Comparison of European material standardizations for hot-dip-galvanized flat products

## Mild steels for cold forming

DIN 17162 Part 1 1977 Edition	UNI 5753 1984 Edition	NFA 36 321 Z 1985 Edition	EN 10142 1990 Edition	BS 2989 1992 Edition	EN 10142 2000 Edition	EN 10346 2009 Edition	Material number	Terms of Delivery voestalpine Stanl 2011
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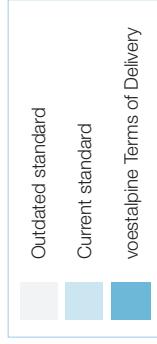
## Designation of steel grades

St 01 Z	Fe P01 G	-	-	Z 1	-	-	1.0022	-
St 02 Z	Fe P02 G	GC	FeP 02 G Z (ZF)	Z 2	DX51D+Z (ZF, ZA, AZ, AS)	DX51D+Z (ZF, ZA, AZ, AS)	1.0226	DX51D+Z (ZF)
St 03 Z	Fe P03 G	GE	FeP 03 G Z (ZF)	Z 3	DX52D+Z (ZF, ZA, AZ, AS)	DX52D+Z (ZF, ZA, AZ, AS)	1.0350	DX52D+Z (ZF)
St 04 Z	Fe P04 G	-	-	Z 4	-	-	-	-
St 05 Z	Fe P05 G	GES	FeP 05 G Z (ZF)	Z 5	DX53D+Z (ZF, ZA, AZ, AS)	DX53D+Z (ZF, ZA, AZ, AS)	1.0355	DX53D+Z (ZF)
-	-	-	FeP 06 G Z (ZF)	-	DX54D+Z (ZF, ZA, AZ, AS)	DX54D+Z (ZF, ZA, AZ, AS)	1.0306	DX54D+Z (ZF)
-	-	-	-	-	DX56D+Z (ZF, ZA, AS)	DX56D+Z (ZF, ZA, AS)	1.0322	DX56D+Z (ZF)
-	-	-	-	-	DX57D+Z (ZF, ZA, AS)	DX57D+Z (ZF, ZA, AS)	1.0853	DX57D+Z (ZF)

## Designation of surface types

NA, MA	NA, MA, RA	NA, MA, RA	NA, MA, RA	N, M, R	NA, MA, RA	NA, MA, RA, A	NA, MA, RA, A	NA, MA, RA
SB	SB, RB	MB, RB	MB, RB	S	MB, RB	MB, RB, B	MB, RB, B	MB, RB
SC	SC, RC	MC, RC	MC, RC	Xs	MC, RC	MC, RC, C	MC, RC	MC, RC

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.



# Mild steels in comparison with European material standardizations

## Mild steels in comparison with European material standardizations

Cold-rolled, uncoated or electrolytically treated	Hot-dip-galvanized
Designation of steel grades	
-	DX51 (+Z, ZF)
DC01 (+ZE)	DX52 (+Z, ZF)
DC03 (+ZE)	DX53 (+Z, ZF)
DC04 (+ZE)	DX54 (+Z, ZF)
DC05 (+ZE)	DX56 (+Z, ZF)
DC06 (+ZE)	DX56 (+Z, ZF)
DC07 (+ZE)	DX57 (+Z, ZF)
Designation of surface types	
-	NA, MA, RA
A	MB, RB
B	MC, RC

This comparison of standards provides a standard value for the selection of reference grades.

Other mechanical values are defined on the basis of differing manufacturing processes.

# Comparison of European material standardizations for hot-dip-galvanized flat products

## Structural steels

DIN 17162 Part 2 1980 Edition	BS 2989 1982 Edition	NFA 36 3222 Z 1982 Edition	UNI 5753 1984 Edition	EN 10147 1991 Edition	EN 10326 2004 Edition	EN 10346 2009 Edition	Material number	Terms of Delivery voestalpine Stahl 2011
<b>Designation of steel grades</b>								
-	Z 22	C 230	FeE 220 G	FeE 220 G Z (ZF)	S220GD+Z (ZF, ZA, AZ, AS)	S220GD+Z (ZF, ZA, AZ)	1.0241	S220GD+Z (ZF)
StE 250-2Z	Z 25	C 250	FeE 250 G	FeE 250 G Z (ZF)	S250GD+Z (ZF, ZA, AZ, AS)	S250GD+Z (ZF, ZA, AZ, AS)	1.0242	S250GD+Z (ZF)
StE 280-2Z(3Z)	Z 28	C 280	FeE 280 G	FeE 280 G Z (ZF)	S280GD+Z (ZF, ZA, AZ, AS)	S280GD+Z (ZF, ZA, AZ, AS)	1.0244	S280GD+Z (ZF)
StE 320-3Z	-	C 320	FeE 320 G	FeE 320 G Z (ZF)	S320GD+Z (ZF, ZA, AZ, AS)	S320GD+Z (ZF, ZA, AZ, AS)	1.0250	S320GD+Z (ZF)
StE 350-3Z	Z 35	C 350	FeE 350 G	FeE 350 G Z (ZF)	S350GD+Z (ZF, ZA, AZ, AS)	S350GD+Z (ZF, ZA, AZ, AS)	1.0529	S350GD+Z (ZF)
-	Z 55	C 550	FeE 550 G	FeE 550 G Z (ZF)	S550GD+Z (ZF, ZA, AZ, AS)	S550GD+Z (ZF, ZA, AZ)	1.0531	-

## Designation of surface types

NA, MA	N, M, R	NA, MA, RA	NA, MA, RA	NA, MA, RA, A	NA, MA, RA, A	NA, MA, RA, A	NA, MA, RA
SB	S	MB, RB	SB, RB	MB, RB	MB, RB, B	MB, RB, B	MB, RB
SC	XS	MC, RC	SC, RC	MC, RC	MC, RC, C	MC, RC, C	MC, RC

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.

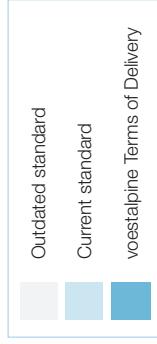


# Comparison of European material standardizations for steels with high yield stress for cold forming

## Micro-alloyed steels

		Cold-rolled, uncoated or electrolytically treated			Hot-dip-galvanized		
		EN 10268 2006 Edition	Material number	Terms of Delivery voestalpine Stahl 2011	EN 10292 2007 Edition	EN 10346 2009 Edition	Material number
<b>Designation of steel grades</b>							
ZSHE 260	E240C, E260C	HC260LA	1.0480	HC260LA	HX260LAD	HX260LAD+Z (ZF, ZA, AZ, AS)	1.0929
ZSHE 300	E280C, E315C	HC300LA	1.0489	HC300LA	HX300LAD	HX300LAD+Z (ZF, ZA, AZ, AS)	1.0932
ZSHE 340	E555C	HC340LA	1.0548	HC340LA	HX340LAD	HX340LAD+Z (ZF, ZA, AZ, AS)	1.0933
ZSHE 380	-	HC380LA	1.0550	HC380LA	HX380LAD	HX380LAD+Z (ZF, ZA, AZ, AS)	1.0934
ZSHE 420	-	HC420LA	1.0556	HC420LA	HX420LAD	HX420LAD+Z (ZF, ZA, AZ, AS)	1.0935
-	-	-	-	HC460LA	-	HX460LAD+Z (ZF, ZA, AZ, AS)	1.0990
-	-	-	-	HC500LA	-	HX500LAD+Z (ZF, ZA, AZ, AS)	1.0991
<b>Designation of surface types</b>							
-	-	-	-	-	-	NA, MA, RA	-
O3	A	A	-	A	MB, RB, B	MB, RB, B	MB, RB
O5	-	-	-	-	MC, RC, C	MC, RC, C	MC, RC, C

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.

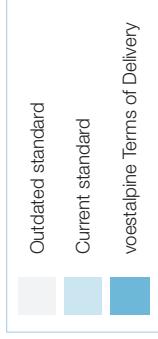


# Comparison of European material standardizations for steels with high yield stress for cold forming

## Bake-hardening steels

Cold-rolled, uncoated or electrolytically treated			Hot-dip-galvanized		
SEW 094 1987 Edition	EN 10268 2006 Edition	Material number	EN 10292 2007 Edition	EN 10346 2009 Edition	Material number
<b>Designation of steel grades</b>					
ZSHE 180 BH	HC180B	1.0395	HC180B	HX180BD	HX180BD+Z (ZF, ZA, AZ, AS)
ZSHE 220 BH	HC220B	1.0396	HC220B	HX220BD	HX220BD+Z (ZF, ZA, AZ, AS)
ZSHE 260 BH	HC260B	1.0400	HC260B	HX260BD	HX260BD+Z (ZF, ZA, AZ, AS)
ZSHE 300 BH	HC300B	1.0444	HC300B	HX300BD	HX300BD+Z (ZF, ZA, AZ, AS)
<b>Designation of surface types</b>					
-	-	-	-	NA, MA, RA, A	NA, MA, RA, A
O3	A	-	A	MB, RB, B	MB, RB, B
O5	B	-	B	MC, RC, C	MC, RC, C

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.

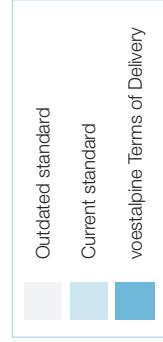


# Comparison of European material standardizations for steels with high yield stress for cold forming

## High-strength IF steels

Cold-rolled, uncoated or electrolytically treated			Hot-dip-galvanized		
EN 10268 2006 Edition	Material number	Terms of Delivery voestalpine Stahl 2011	EN 10292 2007 Edition	EN 10346 2009 Edition	Material number
<b>Designation of steel grades</b>					
HC180Y	1.0922	HC180Y	HX180YD	HX180YD+Z (ZF, ZA, AZ, AS)	1.0921
HC220Y	1.0925	HC220Y	HX220YD	HX220YD+Z (ZF, ZA, AZ, AS)	1.0923
HC260Y	1.0928	HC260Y	HX260YD	HX260YD+Z (ZF, ZA, AZ, AS)	1.0926
-	-	-	HX300YD	HX300YD+Z (ZF, ZA, AZ, AS)	1.0927
<b>Designation of surface types</b>					
-	-	-	NA, MA, RA, A	NA, MA, RA, A	NA, MA, RA
A	-	A	MB, RB, B	MB, RB, B	MB, RB
B	-	B	MC, RC, C	MC, RC, C	MC, RC

The comparison of standards provides helpful information on reference grades. Differences in defined values are possible.



# Comparison of standards final-annealed electrical steel strip

The indicated standards cannot be directly compared in every case. In such cases the overview refers to similar grades.

## Comparison of standards final-annealed electrical steel strip by voestalpine

Grade	DIN EN 10106 2008	IEC 60404-8-4 1998	JIC c 2552 2000	ASTM A 677 2007	Previous AISI designation
M 250-35 A	M 250-35 A	250-35 A5	35-A-250	36F320M	M-19
isovac 250-35 A					
M 270-35 A	M 270-35 A	270-35 A5	35-A-270	36F348M	M-22
isovac 270-35 A					
isovac 270-35 A high-perm					
M 300-35 A	M 300-35 A	300-35 A5	35-A-300	36F397M	M-27
isovac 300-35 A					
M 330-35 A	M 330-35 A	330-35 A5	35-A-330	36F419M	M-36
isovac 330-35 A					
isovac 400-35 A					
M 270-50 A	M 270-50 A	270-50 A5	50-A-270	47F370M	M-19
isovac 270-50 A					
M 290-50 A	M 290-50 A	290-50 A5	50-A-290	47F384M	M-22
isovac 290-50 A					
M 310-50 A	M 310-50 A	310-50 A5	50-A-310	47F408M	M-27
isovac 310-50 A					
M 330-50 A	M 330-50 A	330-50 A5	50-A-330	47F419M	M-36
isovac 330-50 A					
M 350-50A	M 350-50 A	350-50-A5	50-A-350	47F452M	M-43
M 400-50 A	M 400-50 A	400-50-A5	50-A-400	47F507M	
isovac 400-50 A					
isovac 400-50 A high-perm					
M 470-50 A	M 470-50 A	470-50-A5	50-A-470	47F617M	M-45
isovac 470-50 A					
M 530-50 A	M 530-50 A	530-50 A5	50-A-530		
isovac 530-50 A					
M 600-50 A	M 600-50 A	600-50-A5	50-A-600	47F672M	M-47
isovac 600-50 A					
isovac 600-50 A blue					
M 700-50 A	M 700-50 A	700-50-A5	50-A-700	47F882M	
isovac 700-50 A					
M 800-50 A	M 800-50 A	800-50-A5	50-A-800	47F992M	
isovac 800-50 A					
isovac 800-50 A blue					
M 940-50 A	M 940-50 A		50-A-1000		

**Comparison of standards final-annealed electrical steel strip by voestalpine (cont.)**

Grade	DIN EN 10106 2008	IEC 60404-8-4 1998	JIC c 2552 2000	ASTM A 677 2007	Previous AISI designation
M 350-65 A	M 350-65 A	350-65 A5	65-A-350	64F459M	M-22
isovac 350-65 A					
M 400-65 A	M 400-65 A	400-65 A5	65-A-400	64F496M	M-36
isovac 400-65 A					
M 470-65 A	M 470-65 A	470-65-A5	65-A-470	64F595M	M-43
isovac 470-65 A					
isovac 470-65 A high-perm					
M 530-65 A	M 530-65 A	530-65 A5	65-A-530	64F705M	
isovac 530-65 A					
M 600-65 A	M 600-65 A	600-65 A5	65-A-600		M-45
isovac 600-65 A					
M 700-65 A	M 700-65 A	700-65 A5	65-A-700	64F882M	
isovac 700-65 A blue					
M 800-65 A	M 800-65 A	800-65 A5	65-A-800	64F1102M	M-47
isovac 800-65 A blue					
isovac 850-65 A					
M 1000-65 A	M 1000-65 A		65-A-1000		
isovac 1000-65 A					
isovac 600-80 A					
M 700-100 A	M 700-100 A	700-100 A5			
M 800-100 A	M 800-100 A	800-100 A5			
isovac 940-100 A					
M 1300-100 A	M 1300-100 A	1300-100 A5			
isovac 1400-100 A high-perm					

# Comparison of standards

## non-final-annealed electrical steel strip

The indicated standards cannot be directly compared in every case. In such cases the overview refers to similar grades.

### Comparison of standards non-final-annealed electrical steel strip by voestalpine

Grade	DIN EN 10341 1996	IEC 60404-8-2&3 1998	ASTM A 683M 1999
isovac 310-50 K high-perm			
M 340-50 K	M 340-50 K	340-50-K5	47S155M
isovac 340-50 K high-perm			
M 390-50 K	M 390-50 K	390-50-K5	47S165M
isovac 420-50 K high-perm			
M 450-50 K	M 450-50 K	450-50-K5	47S175M
isovac 450-50 K high-perm			
M 660-50 K	M 660-50 K	660-50-K5	
M 890-50 K	M 890-50 K	890-50-K5	
M 390-65 K	M 390-65 K	390-65-K5	64S200M
isovac 390-65 K high-perm			
M 450-65 K	M 450-65 K	450-65-K5	64S210M
isovac 470-65 K high-perm			
M 520-65 K	M 520-65 K	520-65-K5	64S220M
isovac 520-65 K high-perm			
isovac 570-65 K high-perm			
M 800-65 K	M 800-65 K	800-65-K5	
M 1000-65 K	M 1000-65 K	1000-65-K5	

## Technically more advanced. Successful together.

**voestalpine Steel Division – the partner you can trust.**

High-quality materials are the basis for our products. We strive to be the best partner for our customers and want to provide them with the best-possible solution. We focus our expertise on two aspects:

The personal aspect, with dedicated and highly competent employees  
The technical aspect, with high-quality methods, products and services.

The companies in the voestalpine Steel Division and their employees understand partnership to be the following:

- Understanding for their customers' business
- Expertise and reliability
- Responsibility for satisfactory project completion
- Partnerships based on trust

Many years of successful partnerships with our customers prove our point.

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ONE STEP AHEAD.