MATERIALS SERVICES
Materials Processing Europe

Product and service range

engineering.tomorrow.together.

thyssenkrupp

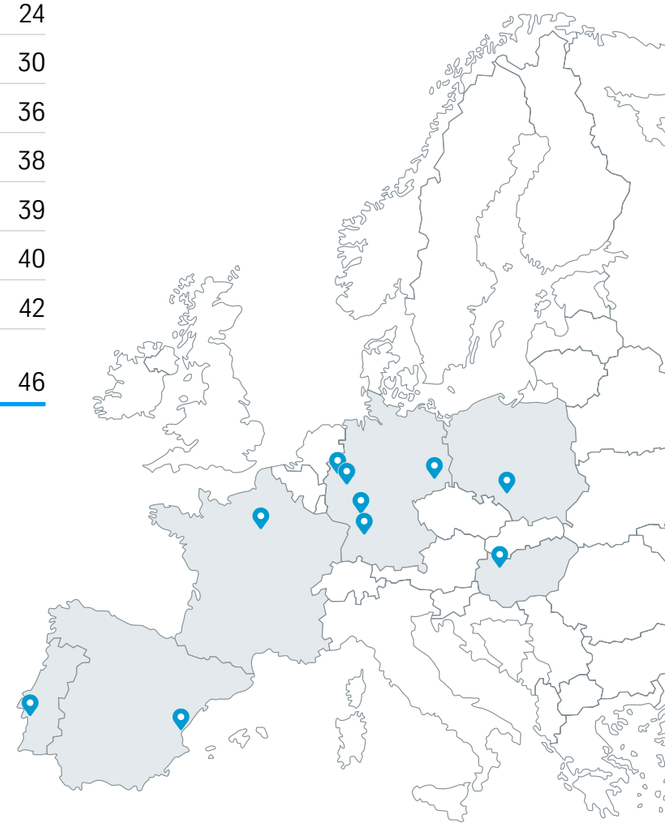
Content

Competences

Products

There for you across Europe.

As one of Europe's leading steel and aluminum service centres, we are a preferred value-adding partner for companies in the automotive, electrical, construction and solar industries, among others.
Thanks to our many years of expertise in procurement, consulting and prefabrication, we supply a diverse range of customers throughout Europe with tailored services and digital solutions for flat steel made of carbon steel, electrical steel, stainless steel and aluminum.



Quality and diversity.

Thanks to our access to numerous supply sources and global sourcing, we can offer the right material and supply our customers with additional quantities, even for short-term project business. Our comprehensive delivery programme meets the highest standards and we are able to meet any individual processing requirement, whether it be slit strip or blanks.

Numerous opportunities for your material.

- Slitting
- Cutting to length
- Precision blanks
- Job processing
- Recoiling
- Cleaning and oiling
- Film coating
- Material testing
- Quality assurance

Our material fulfils a wide range of different tasks in your company. With our tailored service, we supply you with the perfect and optimally processed product for each of these tasks – whether it is carbon steel including electrical steel, stainless steel or aluminum.

First-class processing

NEW
Electrical steel strip + processing from 0.2 mm thickness

Precisely aligned

Our most modern slitting and cut-to-length lines at our many locations offer impressive processing options. We supply slit strip and blanks that precisely meet your requirements.

Carbon steel

Blanks

Thickness:	0.4–16.0 mm
Width:	35–2,100 mm
Length:	300–12,000 mm
Shearing angle max.:	± 35° (± 1.5°)[1]
Tensile strength max.:	1,200 N/mm²
Entry weight max.:	36 t
Exit weight max.:	10 t

Slit strip

Thickness:	0.2–16.0 mm
Entry width:	1,850 mm
Entry width:	7–1,850 mm
Exit coil ID:	400/508/610 mm
Exit coil OD:	2,300 mm
Tensile strength max.:	1,400 N/mm²

Combined/Jumbo coiling

Thickness:	0.3–3.0 mm
Slit width:	7–60 mm
Exit coil ID:	400/508 mm[2]
Exit coil OD:	1,520 mm

Stainless steel

Blanks

Thickness:	0.4–3.0 mm
Width:	80–1,600 mm
Length:	200–6,000 mm
Exit weight:	max. 4 t

Narrow strip/Slit strip

Thickness:	0.3–4.0 mm
Width:	7–1,850 mm
Exit coil ID:	508/610 mm
Exit coil OD:	max. 2,000 mm

Combined/Jumbo coiling

Thickness:	0.3–3.0 mm
Width:	7–60 mm
Exit coil ID:	400/508 mm
Exit coil OD:	max. 1,520 mm

Aluminum

Blanks

Thickness:	0.4–5.0 mm
Width:	270–1,600 mm
Length:	350–6,000 mm

Slit strip

Thickness:	0.4–4.0 mm
Slit width:	11–1,850 mm

1) On request
2) Optionally also with cardboard or steel sleeves

Individual services

Technical customer service | Individual product development

Our technological know-how accompanies you from product development to series production.

- Material testing
- Technical application consulting
- Support with material selection

Innovation dialogue

By exchanging information with our experts, we jointly develop needs-based innovations and process optimisations.

- Consultation with expert teams
- Tour of your production sites
- Process optimisation

Europe-wide key account management

Our key account teams are always close to you as system partners with a holistic approach – throughout Europe.

- Teams across Europe
- Professional support and consulting

Digital solutions

Sophisticated digital solutions such as customised EDI connections and 2D barcodes provide optimal support for your supply chain.

- mpe connect
- mpe easy entry
- EDI | edi deluxe
- Vendor Managed Inventory
- Knife-assembly software

Supply chain control

Our solutions help you coordinate your supply flows to reduce your transaction and storage costs.

- Inventory management & logistics solutions
- mpe control tower
- Service-level-agreements
- smart supply services

Sustainable services

We support you with numerous services on the road to decarbonisation towards a sustainable supply chain.

- Emission management
- Emission proof
- Scrap disposal
- Pallet return

Download service booklet here

Detailed information and the benefits of our services for you can be found in our **service booklet.**

Or scan the **QR-Code**

Certified

Certified according to quality management standard
ISO 9001

Certified according to the environmental management system
DIN EN ISO 14001

TISAX®-Label for information security according to
VDA ISA 5.1

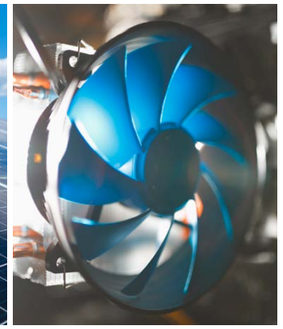
Certified according to occupational health and safety management system
DIN ISO 45001

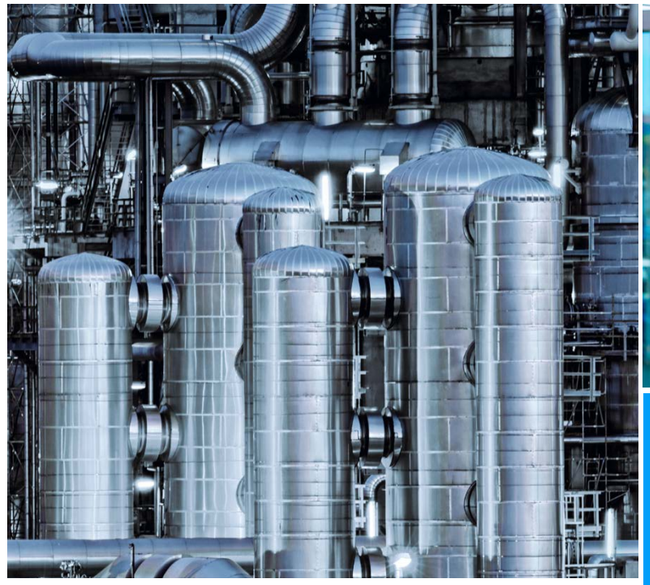
Certified according to the international automotive standard
IATF 16949

Certified according to the environmental management system
ISO 50001

The certification according to IATF is an important element for us to fulfil your expectations and to continuously develop ourselves further. With us, you can rely on a structured and systematic approach with sustainably effective processes.

Impressive results





Our products turn into yours.

And there are quite a lot of them.

Hot strip

Thanks to its outstanding properties, hot-rolled strip meets even the most stringent requirements in terms of technological characteristics, surface condition, and dimensional accuracy. These properties make hot strip ideal for downstream processing and numerous end products such as stampings and drawn parts, tubes, car wheels or even agricultural implements and shelf systems.

Surface finishes
pickled/unpickled

Surface treatments
oiled/unoiled

Edge finishes
mill edge
cut edge

Tolerances
Dimensional and shape tolerances to DIN EN 10 051. Closer tolerances by arrangement.

Mild non-alloy steel for cold forming · DIN EN 10 111

Steel type			Mechanical properties, transverse							Chemical composition, heat analysis			
Short designation	VDA239-100*	Material number	Lower yield strength R_{eL}[1] MPa		Tensile strength R_m MPa max.	Elongation at fracture A_{80} % min.			Elongation at fracture $A^{2)}$ % min.	Percentage by weight % max.			
			1.0 mm ≤ e < 2 mm	2 mm ≤ e ≤ 11 mm		1.0 mm ≤ e < 1.5 mm	1.5 mm ≤ e < 2 mm	2 mm ≤ e < 3 mm	3 mm ≤ e ≤ 11 mm	C	Mn	P	S
DD11	–	1.0332	170–360	170–340	440	22	23	24	28	0.12	0.60	0.045	0.045
DD12	–	1.0398	170–340	170–320	420	24	25	26	30	0.10	0.45	0.035	0.035
DD13	–	1.0335	170–330	170–310	400	27	28	29	33	0.08	0.40	0.030	0.030
DD14	HR2	1.0389	170–310	170–290	380	30	31	32	36	0.08	0.35	0.025	0.025

1) Where the upper yield strength is not defined, $R_{p0.2}$ shall be applicable instead of R_{eL}.
2) Percentage elongation after fracture using a proportional specimen with $L_o = 5.65 \sqrt{S_o}$ for sheet thicknesses ≥ 3.0 mm

Non-alloy/general structural steel · DIN EN 10 025-2

Steel type			Mechanical properties, transverse[1]									
Short designation	VDA239-100*	Material number	Upper yield strength R_{eH} MPa min.	Tensile strength R_m MPa		Elongation at fracture A_{80} % min.						Elongation at fracture $A^{2)}$ % min.
			e ≤ 16 mm	e < 3 mm	3 mm ≤ e ≤ 16 mm	e ≤ 1 mm	1 mm < e ≤ 1.5 mm	1.5 mm < e ≤ 2 mm	2 mm < e ≤ 2.5 mm	2.5 mm < e < 3 mm	3 mm ≤ e ≤ 16 mm	
S235JR	–	1.0038	235	360–510	360–510	15	16	17	18	19	24	
S235J0	–	1.0114	235	360–510	360–510	15	16	17	18	19	24	
S235J2	–	1.0117	235	360–510	360–510	15	16	17	18	19	24	
S275JR	–	1.0044	275	430–580	410–560	13	14	15	16	17	21	
S275J0	–	1.0143	275	430–580	410–560	13	14	15	16	17	21	
S275J2	–	1.0145	275	430–580	410–560	13	14	15	16	17	21	
S355JR	–	1.0045	355	510–680	470–630	12	13	14	15	16	20	
S355J0	–	1.0553	355	510–680	470–630	12	13	14	15	16	20	
S355J2	–	1.0577	355	510–680	470–630	12	13	14	15	16	20	
S355K2	–	1.0596	355	510–680	470–630	12	13	14	15	16	20	

Steel type			Chemical composition, heat analysis						
Short designation	VDA239-100*	Material number	Percentage by weight % max.						
			C	Si	Mn	P	S	N	Cu
S235JR	–	1.0038	0.17	–	1.40	0.035	0.035	0.012	0.55
S235J0	–	1.0114	0.17	–	1.40	0.030	0.030	0.012	0.55
S235J2	–	1.0117	0.17	–	1.40	0.025	0.025	–	0.55
S275JR	–	1.0044	0.21	–	1.50	0.035	0.035	0.012	0.55
S275J0	–	1.0143	0.18	–	1.50	0.030	0.030	0.012	0.55
S275J2	–	1.0145	0.18	–	1.50	0.025	0.025	–	0.55
S355JR	–	1.0045	0.24	0.55	1.60	0.035	0.035	0.012	0.55
S355J0	–	1.0553	0.20	0.55	1.60	0.030	0.030	0.012	0.55
S355J2	–	1.0577	0.20	0.55	1.60	0.025	0.025	–	0.55
S355K2	–	1.0596	0.20	0.55	1.60	0.025	0.025	–	0.55

1) As rolling widths ≥ 600 mm are primarily used, transverse values generally apply, refer to DIN EN 10 025-2.
2) Percentage elongation after fracture using a proportional specimen with $L_o = 5.65 \sqrt{S_o}$ for sheet thicknesses ≥ 3.0 mm

* Comparative grade, therefore minor deviations from DIN EN values possible

Thermomechanically rolled steel for cold working · DIN EN 10 149-2

Steel type			Mechanical properties, longitudinal				Chemical composition, heat analysis										
							Percentage by weight % max.										
Short designation	VDA239-100*	Material number	Upper yield strength R_{eH} [1] MPa min.	Tensile strength R_m MPa	Elongation at fracture A_{80} % min.	Elongation at fracture $A^{3)}$ % min.	C	Mn	Si	P	S	Al_{total} min.	Nb	V	Ti	Mo	B
S315MC	HR300LA	1.0972	315	390–510	20	24	0.12	1.50	0.50	0.025	0.020	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S355MC	HR340LA	1.0976	355	430–550	19	23	0.12	1.50	0.50	0.025	0.020	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S420MC	HR420LA	1.0980	420	480–620	16	19	0.12	1.60	0.50	0.025	0.015	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S460MC	HR460LA	1.0982	460	520–670	14	17	0.12	1.60	0.50	0.025	0.015	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S500MC	HR500LA	1.0984	500	550–700	12	14	0.12	1.70	0.50	0.025	0.015	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S550MC	HR550LA	1.0986	550	600–760	12	14	0.12	1.80	0.50	0.025	0.015	0.015	0.09[2]	0.20[2]	0.15[2]	–	–
S600MC	–	1.8969	600	650–820	11	13	0.12	1.90	0.50	0.025	0.015	0.015	0.09[2]	0.20[2]	0.22[2]	0.50	0.005
S650MC	–	1.8976	650	700–880	10	12	0.12	2.00	0.60	0.025	0.015	0.015	0.09[2]	0.20[2]	0.22[2]	0.50	0.005
S700MC	HR700LA	1.8974	700	750–950	10	12	0.12	2.10	0.60	0.025	0.015	0.015	0.09[2]	0.20[2]	0.22[2]	0.50	0.005

1) For thicknesses > 8 mm the yield strength values may be 20 MPa lower.
2) The combined content of Nb, V and Ti must not exceed 0.22 %.
3) Percentage elongation after fracture using a proportional specimen with $L_o = 5.65 \sqrt{S_o}$ for sheet thicknesses ≥ 3.0 mm

Available with a narrower range of mechanical properties and increased elongation at fracture.

Multiphase steel · DIN EN 10 338

Steel type			Mechanical properties, longitudinal				Chemical composition, heat analysis									
							Percentage by weight % max.									
Short designation	VDA239-100*	Material number	Proof stress $R_{p0.2}$ MPa	Tensile strength R_m MPa min.	Elongation at fracture A_{80} % min.	Elongation at fracture $A^{1)}$ % min.	C	Si	Mn	P	S	$Al_{total\ (span)}$	Cr + Mo	Nb + Ti	V	B
Ferrite-bainite-phase steel																
HDT450F	HR300Y450T-FB	1.0961	300–420	450	24	27	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.005
HDT580F	HR440Y580T-FB	1.0994	460–620	580	15	17	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.010
Dual-phase steel																
HDT580X	HR330Y580T-DP	1.0936	330–450	580	19	23	0.14	1.00	2.20	0.085	0.015	0.015–0.1	1.40	0.15	0.20	0.005
Complex-phase steel																
HDT760C	HR660Y760T-CP	1.0998	660–830	760	10	12	0.18	1.00	2.50	0.080	0.015	0.015–2.0	1.00	0.25	0.20	0.005
Martensitic steel																
HDT1180G1	HR900Y1180T-MS	1.0960	900–1,200	1,180	4	5	0.25	0.80	2.50	0.060	0.015	0.015–2.0	1.20	0.25	0.22	0.005

1) Percentage elongation after fracture using a proportional specimen with $L_o = 5.65 \sqrt{S_o}$ for sheet thicknesses ≥ 3.0 mm

Other grades on request.

* Comparative grade, therefore minor deviations from DIN EN values possible

Case-hardened steel - DIN EN ISO 683-3 (previously DIN EN 10084)

Steel type	Chemical composition (heat analysis)										
	Percentage by weight % max.										
Short designation	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Cr+Mo+Ni	B
C10E	0.07–0.13	0.15–0.40	0.30–0.60	0.025	0.035	0.40	0.10	0.40	0.30	–	–
C15E	0.12–0.18	0.15–0.40	0.30–0.60	0.025	0.035	0.40	0.10	0.40	0.30	–	–
16MnCr5	0.14–0.19	0.15–0.40	1.00–1.30	0.025	0.035	0.80–1.10	–	–	0.40	–	–

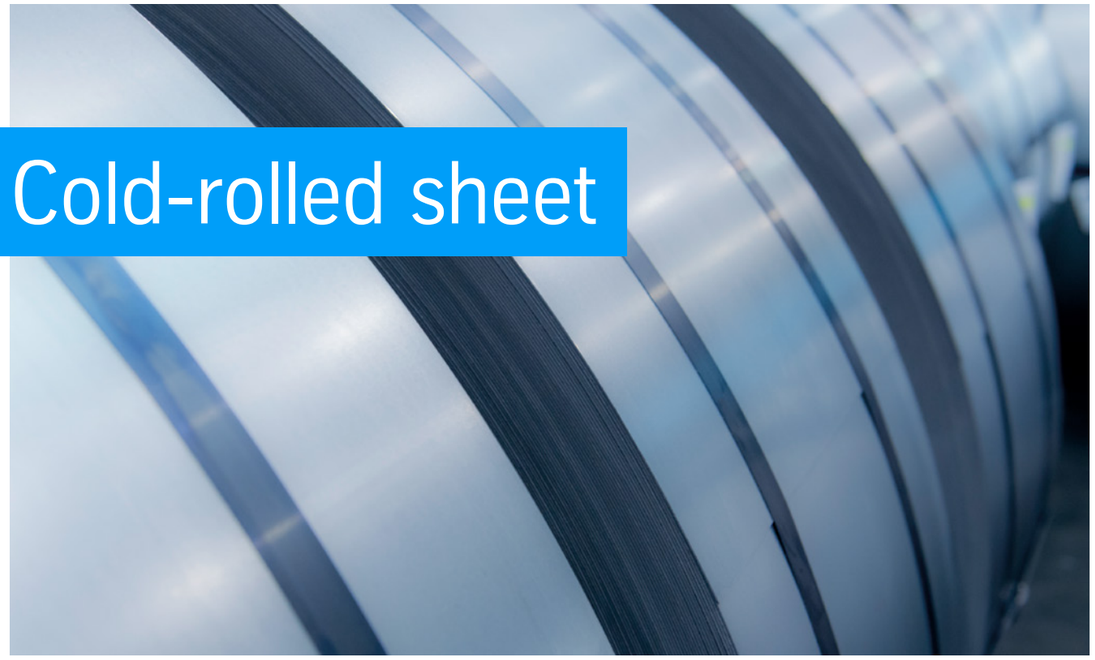
Unalloyed tempered steel - DIN EN ISO 683-1 (previously DIN EN 10083-2)

Steel type	Chemical composition (heat analysis)										
	Percentage by weight % max.										
Short designation	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Cr+Mo+Ni	B
C25E	0.22–0.29	0.10–0.40	0.40–0.70	0.025	0.035	0.40	0.10	0.40	0.30	0.63	–
C30E	0.27–0.34	0.10–0.40	0.50–0.80	0.025	0.035	0.40	0.10	0.40	0.30	0.63	–
C35E	0.32–0.39	0.10–0.40	0.50–0.80	0.025	0.035	0.40	0.10	0.40	0.30	0.63	–
C40E	0.37–0.44	0.10–0.40	0.50–0.80	0.025	0.035	0.40	0.10	0.40	0.30	0.63	–
C45E	0.42–0.50	0.10–0.40	0.50–0.80	0.025	0.035	0.40	0.10	0.40	0.30	0.63	–

Alloyed tempered steel - DIN EN ISO 683-2 (previously DIN EN 10083-1, DIN EN 10083-3)

Steel type	Chemical composition (heat analysis)										
	Percentage by weight % max.										
Short designation	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Cr+Mo+Ni	B
42CrMo4	0.38–0.45	0.40	0.60–0.90	0.025	0.035	0.90–1.20	0.15–0.30	–	0.40	–	–
27MnCrB5-2	0.24–0.30	0.40	1.10–1.40	0.025	0.035	0.30–0.60	–	–	0.40	–	0.0008–0.0050

Compliance with mechanical values can be checked on request.



Cold-rolled sheet

Cold-rolled strip is superior to hot strip in terms of surface condition and formability. It also features closer tolerances and is available in smaller thicknesses. Cold-rolled flat products are extremely versatile and come in a host of varieties for a wide range of applications: in the automotive industry, enamelling operations, the manufacture of tubes and tube sections, drums and barrels, or in the construction industry and the sanitary sector.

Surface types to DIN EN 10 130

A	normal surface
B	improved surface

Surface types to VDA 239-100

E	Exposed parts
U	Non exposed parts

Surface finishes and center roughness values

b	extra smooth	$R_a \leq 0.4$ µm
g	smooth	$R_a \leq 0.9$ µm
m	matt	0.6 µm $< R_a \leq 1.9$ µm
r	rough	$R_a > 1.6$ µm

Tolerances

Dimensional and shape tolerances to DIN EN 10 131. Closer tolerances on request.

Surface treatments

O	oiled
U	unoiled

Mild low-carbon steel for cold forming · DIN EN 10 130

Steel type			Mechanical properties, transverse					Chemical composition, heat analysis				
Short designation	VDA239-100*	Material number	Yield strength R_e[1] MPa max.	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Anisotropy r_{90}[3][4] min.	Strain hardening exponent n_{90}[3] min.	Percentage by weight % max.				
								C	P	S	Mn	Ti
DC01	CR1	1.0330	280	270–410	28	–	–	0.12	0.045	0.045	0.60	–
DC03	CR2	1.0347	240	270–370	34	1.3	–	0.10	0.035	0.035	0.45	–
DC04	CR3	1.0338	210	270–350	38	1.6	0.180	0.08	0.030	0.030	0.40	–
DC05	CR4	1.0312	180	270–330	40	1.9	0.200	0.06	0.025	0.025	0.35	–
DC06	CR5	1.0873	170	270–330	41	2.1	0.220	0.02	0.020	0.020	0.25	0.3
DC07	–	1.0898	150	250–310	44	2.5	0.230	0.01	0.020	0.020	0.20	0.2

1) Where no yield strength is defined, the respective values shall apply to the 0.2 % proof stress ($R_{p0.2}$) or to the lower yield strength (R_{eL}). For thicknesses ≤ 0.7 mm but > 0.5 mm, the maximum yield strength values may be 20 MPa higher. In case of thicknesses ≤ 0.5 mm, the maximum yield limits may be 40 MPa higher.
2) For thicknesses ≤ 0.7 mm but > 0.5 mm, the minimum elongation at fracture may be 2 units lower. For thicknesses ≤ 0.5 mm, the minimum elongation at fracture may be 4 units lower.
3) The r_{90} and n_{90} values apply to product thicknesses ≥ 0.5 mm only.
4) For thicknesses > 2 mm, the r_{90}-value is reduced by 0.2.

Mild low-carbon steel for vitreous enamelling · DIN EN 10 209

Steel type			Mechanical properties, transverse				Chemical composition, heat analysis				
Short designation	VDA239-100*	Material number	Yield strength R_e[1] MPa max.	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Anisotropy $\bar{r}$ [3][4] min.	Percentage by weight % max.				
							C	Ti	Mn	P	S
DC01EK	–	1.0390	270	270–390	30	–	0.08	–	0.60	0.045	0.050
DC04EK	–	1.0392	220	270–350	36	–	0.08	–	0.50	0.030	0.050
DC05EK	–	1.0386	220	270–350	36	1.5	0.08	–	0.50	0.025	0.050
DC06EK	–	1.0869	190	270–350	38	1.6	0.02	0.30	0.50	0.020	0.050
DC03ED	–	1.0399	240	270–370	34	–	[5]	–	0.40	0.035	0.050
DC04ED	–	1.0394	210[4]	270–350	38	–	[5]	–	0.40	0.030	0.050
DC06ED	–	1.0872	190	270–350	38	1.6	0.02	0.30	0.35	0.020	0.050

1) Where no yield strength is defined, the respective values shall apply to the 0.2 % proof stress ($R_{p0.2}$) or to the lower yield strength (R_{eL}). For thicknesses ≤ 0.7 mm but > 0.5 mm, the maximum yield strength values may be 20 MPa higher. In case of thicknesses ≤ 0.5 mm, the maximum yield limits may be 40 MPa higher.
2) For thicknesses ≤ 0.7 mm but > 0.5 mm, the minimum elongation at fracture may be 2 units lower. For thicknesses ≤ 0.5 mm, the minimum elongation at fracture may be 4 units lower.
3) The $\bar{r}$ values apply to product thicknesses ≥ 0.5 mm only. For thicknesses > 2 mm, the $\bar{r}$ value is reduced by 0.2.
4) For thicknesses ≥ 1.5 mm, the maximum permissible yield strength is 225 MPa.
5) Steel types DC03ED and DC04ED can be subjected to a decarburization treatment in the solid or liquid phase. The maximum permissible carbon content by check analysis is 0.004 %.

* Minor deviations from DIN EN values possible

High and higher strength steel for cold forming · DIN EN 10 268

Steel type			Mechanical properties, transverse					
Short designation	VDA239-100*	Material number	Proof stress $R_{p0.2}$[1] MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Anisotropy r_{90}[3][4]	Strain hardening exponent n_{90}[3] min.	Bake hardening index BH_2[5] min.
High-strength IF steel						min.		
HC180Y	CR180IF	1.0922	180–230	330–400	35	1.7	0.19	–
HC220Y	CR210IF	1.0925	220–270	340–420	33	1.6	0.18	–
HC260Y	CR240IF	1.0928	260–320	380–440	31	1.4	0.17	–
Isotropic steel						max.		
HC220I	–	1.0346	220–270	300–380	34	1.4	0.18	–
HC260I	–	1.0349	260–310	320–400	32	1.4	0.17	–
HC300I	–	1.0447	300–350	340–440	30	1.4	0.16	–
Bake hardening steel						min.		
HC180B	CR180BH	1.0395	180–230	290–360	34	1.6	0.17	35
HC220B	CR210BH	1.0396	220–270	320–400	32	1.5	0.16	35
HC260B	CR240BH	1.0400	260–320	360–440	29	–	–	35
HC300B	–	1.0444	300–360	390–480	26	–	–	35
Micro-alloyed steel								
HC260LA	CR240LA	1.0480	260–330	350–430	26	–	–	–
HC300LA	CR270LA	1.0489	300–380	380–480	23	–	–	–
HC340LA	CR300LA	1.0548	340–420	410–510	21	–	–	–
HC380LA	CR340LA	1.0550	380–480	440–580	19	–	–	–
HC420LA	CR380LA	1.0556	420–520	470–600	17	–	–	–
HC460LA	CR420LA	1.0574	460–580	510–660	13	–	–	–
HC500LA	–	1.0573	500–620	550–710	12	–	–	–

Steel type			Chemical composition, heat analysis							
Short designation	VDA239-100*	Material number	Percentage by weight % max.							
			C	Si	Mn	P	S	Al min.	Ti[6]	Nb[6]
High-strength IF steel										
HC180Y	CR180IF	1.0922	0.01	0.3	0.7	0.06	0.025	0.01	0.12	0.09
HC220Y	CR210IF	1.0925	0.01	0.3	0.9	0.08	0.025	0.01	0.12	0.09
HC260Y	CR240IF	1.0928	0.01	0.3	1.6	0.1	0.025	0.01	0.12	0.09
Isotropic steel										
HC220I	–	1.0346	0.07	0.5	0.6	0.05	0.025	0.015	0.05	–
HC260I	–	1.0349	0.07	0.5	1.2	0.05	0.025	0.015	0.05	–
HC300I	–	1.0447	0.08	0.5	0.7	0.08	0.025	0.015	0.05	–
Bake hardening steel										
HC180B	CR180BH	1.0395	0.06	0.5	0.7	0.06	0.030	0.015	–	–
HC220B	CR210BH	1.0396	0.08	0.5	0.7	0.085	0.030	0.015	–	–
HC260B	CR240BH	1.0400	0.1	0.5	1.0	0.1	0.030	0.015	–	–
HC300B	–	1.0444	0.1	0.5	1.0	0.12	0.030	0.015	–	–
Micro-alloyed steel										
HC260LA	CR240LA	1.0480	0.1	0.5	1.0	0.03	0.025	0.015	0.15	0.09
HC300LA	CR270LA	1.0489	0.12	0.5	1.4	0.03	0.025	0.015	0.15	0.09
HC340LA	CR300LA	1.0548	0.12	0.5	1.5	0.03	0.025	0.015	0.15	0.09
HC380LA	CR340LA	1.0550	0.12	0.5	1.6	0.03	0.025	0.015	0.15	0.09
HC420LA	CR380LA	1.0556	0.14	0.5	1.6	0.03	0.025	0.015	0.15	0.09
HC460LA	CR420LA	1.0574	0.14	0.6	1.8	0.03	0.025	0.015	0.15	0.09
HC500LA	–	1.0573	0.14	0.6	1.8	0.03	0.025	0.015	0.15	0.09

1) Where no yield strength is defined, the respective values shall apply to the lower yield strength (R_{eL})
2) For thicknesses ≤ 0.7 mm but > 0.5 mm, the minimum elongation at fracture may be 2 units lower. For thicknesses ≤ 0.5 mm, the minimum elongation at fracture may be 4 units lower.
3) The r_{90} and n_{90} minimum values apply to product thicknesses ≥ 0.5 mm only.
4) For thicknesses > 2 mm, the r_{90} value is reduced by 0.2.
5) For thicknesses > 1.2 mm, special arrangements are required.
6) Additions of vanadium and boron are also permissible. The total content of all four elements must not exceed 0.22 % .

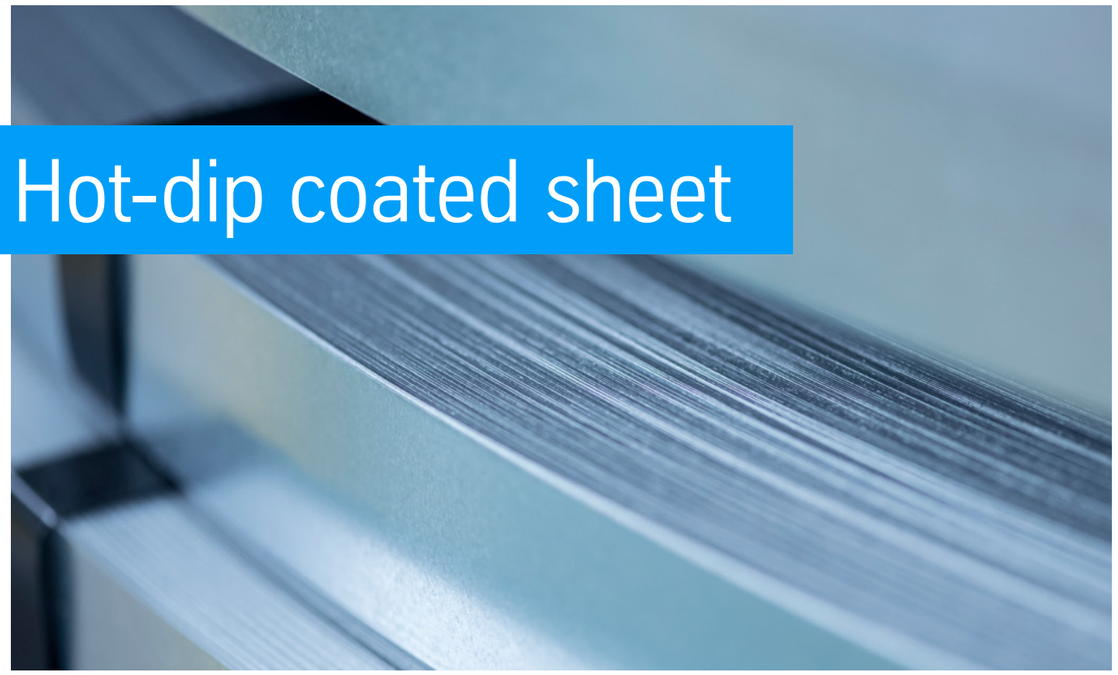
Multiphase steel · DIN EN 10 338

Steel type			Mechanical properties, longitudinal				
Short designation	VDA239-100*	Material number	Proof stress $R_{p0.2}$ MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[1] % min.	Strain hardening exponent $n_{n10\text{-}UE}$ min.	Bake hardening index BH_2 min.
Dual-phase steel							
HCT450X	–	1.0937	260–340	450	27	0.16	30
HCT490X	CR290Y490T-DP	1.0939	290–380	490	24	0.15	30
HCT590X	CR330Y590T-DP	1.0941	330–430	590	20	0.14	30
HCT780X	CR440Y780T-DP	1.0943	440–550	780	14	–	30
HCT980X	CR590Y980T-DP	1.0944	590–740	980	10	–	30
HCT980XG	CR700Y980T-DP	1.0997	700–850	980	8	–	30
Retained-austenite steel (TRIP steel)							
HCT690T	CR400Y690T-TR	1.0947	400–520	690	23	0.19	40
HCT780T	CR450Y780T-TR	1.0948	450–570	780	21	0.16	40
Complex-phase steel							
HCT600C	–	1.0953	350–500	600	16	–	30
HCT780C	CR570Y780T-CP	1.0954	570–720	780	10	–	30
HCT980C	CR780Y980T-CP	1.0955	780–950	980	6	–	30
Multiphase steel							
HCT1180G2	–	1.0969	900–1,150	1,180	4	–	30

Steel type			Chemical composition, heat analysis									
Short designation	VDA239-100*	Material number	Percentage by weight % max.									
			C	Si	Mn	P	S	$Al_{total\ (span)}$	Cr+Mo	Nb+Ti	V	B
Dual-phase steel												
HCT450X	–	1.0937	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT490X	CR290Y490T-DP	1.0939	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT590X	CR330Y590T-DP	1.0941	0.15	0.75	2.50	0.040	0.015	0.015–1.5	1.40	0.15	0.20	0.005
HCT780X	CR440Y780T-DP	1.0943	0.18	0.80	2.50	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980X	CR590Y980T-DP	1.0944	0.20	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980XG	CR700Y980T-DP	1.0997	0.23	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
Retained-austenite steel (TRIP steel)												
HCT690T	CR400Y690T-TR	1.0947	0.24	2.00	2.20	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
HCT780T	CR450Y780T-TR	1.0948	0.25	2.20	2.50	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
Complex-phase steel												
HCT600C	–	1.0953	0.18	0.80	2.20	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT780C	CR570Y780T-CP	1.0954	0.18	1.00	2.50	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT980C	CR780Y980T-CP	1.0955	0.23	1.00	2.70	0.080	0.015	0.015–2.0	1.00	0.15	0.22	0.005
Multiphase steel												
HCT1180G2	–	1.0969	0.23	1.20	2.90	0.080	0.015	0.015–1.4	1.20	0.15	0.20	0.005

1) Reduced minimum values of elongation at fracture apply to product thicknesses t < 0.60 mm (minus 2 units).

* Comparative grade, therefore minor deviations from DIN EN values possible



Hot-dip coated sheet

Depending on the application, different surface finishes are used for the hot-dip coating of sheet. The main priority for Z/GI, ZF, ZA, ZM, AZ coatings is the outstanding oxidation resistance based on zinc as well as the high-quality appearance combined with the strength of steel. The addition of aluminum to the coating (ZA, AZ, AS) increases its resistance to both corrosion and heat. A subsequent heat treatment causes a partial transformation of the zinc coating into a zinc-iron alloy layer, making it particularly suitable for welding and enamelling. ZM coatings belong to a new generation of economic coatings, which offer improved corrosion resistance.

Hot-dip coated sheet is used in the manufacture of a wide range of components including the automotive, machinery and plant construction, as well as the construction and household appliance industries.

Surface types to DIN EN 10 346

A	normal surface
B	improved surface
C	best surface
N	normal spangle (only with +Z)
M	minimized spangle (only with +Z)

Surface types to VDA 239-100

E	Exposed parts
U	Non exposed parts

Surface treatments

C	chemically passivated
O	oiled
CO	chemically passivated and oiled
P	phosphated
PO	phosphated and oiled
S	sealed
U	untreated

Coating variants

+Z/GI	zinc (99 % Zn)
+ZF	zinc-iron alloy (Galvannealed)
+ZM	zinc-magnesium
+ZA	zinc-aluminum (galfan®, Zn + 5 % Al)
+AZ	aluminum-zinc (55 % Al + 1.6 % Si + Zn)
+AS	aluminum-silicon (11 % Si + Al)

Surface finishes

Hot-dip coated sheet

	Z/GI		ZF/GA		ZM		ZA	AZ	AS	AS
	DIN EN	VDA239-100*	DIN EN	VDA239-100*	DIN EN	VDA239-100*	DIN EN	DIN EN	DIN EN	VDA239-100*
Coating weight[1] in g/m²	–	–	–	–	70	30/30	–	–	–	–
	–	–	–	–	80	–	–	–	–	–
	100	40/40	100	40/40	100	40/40	95		–	–
	–	–	120	50/50	120	50/50	–	70	–	–
	–	–	–	–	130	–	–	–	50	–
	140	60/60	–	–	140	–	130	80	60	–
	–	–	–	–	150	–	–	–	–	–
	–	–	–	–	185	–	–	–	–	–
	200	85/85	–	–	200	–	185	100	80	30/30
	–	–	–	–	–	–	200	130	–	–
	225	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	100	–
	275	–	–	–	275	–	255	150	120	45/45
	–	–	–	–	–	–	300	165	–	–
	–	–	–	–	300	–	–	–	–	–
	350	–	–	–	350[1]	–	–	185	150	–
	450[1]	–	–	–	–	–	–	–	200	–
	600[1]	–	–	–	–	–	–	–	250	–

1) DIN EN specifies the triple spot tests and VDA239-100 the single spot test.
In variance from the standards, a triple spot test or single spot test can be ordered according to DIN EN or VDA239-100.

Tolerances: Dimensional and shape tolerances to DIN EN 10 143 (closer tolerances by arrangement).

* Comparative grade, therefore minor deviations from DIN EN values possible

Low-carbon steel for cold forming · DIN EN 10 346

Steel type				Mechanical properties, transverse				
Short designation	VDA239-100*	Surface finish	Material number	Yield strength R_e[1] MPa max.	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Anisotropy r_{90} min.	Strain hardening exponent n_{90} min.
DX51D	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0917	–	270–500	22	–	–
DX52D	CR1	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0918	140–300[3]	270–420	26	–	–
DX53D	CR2	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0951	140–260	270–380	30	–	–
DX54D	CR3	+Z,+ZA	1.0952	120–220	260–350	36	1.6[4]	0.18
DX54D	CR3	+ZF,+ZM	1.0952	120–220	260–350	34	1.4[4]	0.18
DX54D	–	+AZ	1.0952	120–220	260–350	36	–	–
DX54D	CR3	+AS	1.0952	120–220	260–350	34	1.4[4][5]	0.18[5]
DX55D	–	+AS	1.0962	140–240	270–370	30	–	–
DX56D	CR4	+Z,+ZA	1.0963	120–180	260–350	39	1.9[4]	0.21
DX56D	CR4	+ZF,+ZM	1.0963	120–180	260–350	37	1.7[4][5]	0.20[5]
DX56D	CR4	+AZ,+AS	1.0963	120–180	260–350	39	1.7[4][5]	0.20[5]
DX57D	CR5	+Z,+ZA	1.0853	120–170	260–350	41	2.1[4]	0.22
DX57D	CR5	+ZF,+ZM	1.0853	120–170	260–350	39	1.9[4][5]	0.21[5]
DX57D	CR5	+AS	1.0853	120–170	260–350	41	1.9[4][5]	0.21[5]

Steel type				Chemical composition, heat analysis					
Short designation	VDA239-100*		Material number	Percentage by weight % max.					
				C	Si	Mn	P	S	Ti
DX51D	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0917	0.18	0.50	1.20	0.12	0.045	0.30
DX52D	CR1	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0918	0.12	0.50	0.60	0.10	0.045	0.30
DX53D	CR2	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0951	0.12	0.50	0.60	0.10	0.045	0.30
DX54D	CR3	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0952	0.12	0.50	0.60	0.10	0.045	0.30
DX55D	–	+AS	1.0962	0.12	0.50	0.60	0.10	0.045	0.30
DX56D	CR4	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0963	0.12	0.50	0.60	0.10	0.045	0.30
DX57D	CR5	+Z,+ZF,+ZA,+ZM,+AS	1.0853	0.12	0.50	0.60	0.10	0.045	0.30

1) Where no yield strength is defined, the respective values shall apply to the 0.2 % proof stress $R_{p0.2}$, otherwise for the lower yield strength (R_{eL}).
2) Reduced minimum values of elongation at fracture apply to product thicknesses 0.50 mm < t < 0.70 mm (minus 2 units), 0.35 mm < t < 0.50 mm (minus 4 units), and t < 0.35 mm (minus 7 units).
3) The maximum yield strength for surface class A is R_e = 360 MPa.
4) For product thicknesses of 1.5 mm < t < 2 mm, the minimum r_{90} value is reduced by 0.2, and for t ≥ 2 mm by 0.4.
5) Depending on the product thickness, the minimum r_{90} value is reduced as follows: 0.50 mm < t < 0.70 mm by 0.2; 0.35 mm < t < 0.50 mm by 0.4, and t < 0.35 mm by 0.6.
Also depending on the product thickness, the minimum n_{90} value is reduced as follows: 0.50 mm < t < 0.70 mm by 0.01; 0.35 mm < t < 0.50 mm by 0.03, and t < 0.35 mm by 0.04.

Structural steel · DIN EN 10 346

Steel type			Mechanical properties, longitudinal			Chemical composition, heat analysis				
Short designation	Surface finish	Material number	Proof stress $R_{p0.2}$[1] MPa min.	Tensile strength R_m[2] MPa min.	Elongation at fracture A_{80}[3] % min.	Percentage by weight % max.				
						C	Si	Mn	P	S
S220GD	+Z,+ZF,+ZA,+ZM,+AZ	1.0241	220	300	20	0.20	0.60	1.70	0.10	0.045
S250GD	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0242	250	330	19	0.20	0.60	1.70	0.10	0.045
S280GD	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0244	280	360	18	0.20	0.60	1.70	0.10	0.045
S320GD	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0250	320	390	17	0.20	0.60	1.70	0.10	0.045
S350GD	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0529	350	420	16	0.20	0.60	1.70	0.10	0.045
S390GD	+Z,+ZF,+ZA,+ZM,+AZ	1.0238	390	460	16	0.20	0.60	1.70	0.10	0.045
S420GD	+Z,+ZF,+ZA,+ZM,+AZ	1.0239	420	480	15	0.20	0.60	1.70	0.10	0.045
S450GD	+Z,+ZF,+ZA,+ZM,+AZ	1.0233	450	510	14	0.20	0.60	1.70	0.10	0.045
S550GD	+Z,+ZF,+ZA,+ZM,+AZ	1.0531	550	560	–	0.20	0.60	1.70	0.10	0.045

1) Where yield strength is defined, the values apply to the upper yield strength R_{eH}.
2) For all steel types, with the exception of S550GD, a span of 140 MPa can be expected for the tensile strength.
3) Depending on the product thickness, the minimum values of elongation at fracture are reduced as follows:
0.50 mm < t < 0.70 mm (minus 2 units), 0.35 mm < t < 0.50 mm (minus 4 units), and t < 0.35 mm (minus 7 units).

* Comparative grade, therefore minor deviations from DIN EN values possible

High and higher strength steel for cold forming · DIN EN 10 346

Steel type				Mechanical properties, transverse					
Short designation	VDA239-100*	Surface finish	Material number	Proof stress $R_{p0.2}$[1] MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[2][3] %	Anisotropy r_{90}[3][4][5] min.	Strain hardening exponent n_{90}[5] min.	Bake hardening index BH_2 min.
High-strength IF steel									
HX180YD	CR180IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0921	180–240	330–390	34	1.7	0.18	–
HX220YD	CR210IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0923	220–280	340–420	32	1.5	0.17	–
HX260YD	CR240IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0926	260–320	380–440	30	1.4	0.16	–
HX300YD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0927	300–360	390–470	27	1.3	0.15	–
Bake hardening steel									
HX180BD	CR180BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0914	180–240	290–360	34	1.5	0.16	30
HX220BD	CR210BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0919	220–280	320–400	32	1.2	0.15	30
HX260BD	CR240BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0924	260–320	360–440	28	–	–	30
HX300BD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0930	300–360	400–480	26	–	–	30
HX340BD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0945	340–400	440–520	24	–	–	30
Micro-alloyed steel									
HX260LAD	CR240LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0929	260–330	350–430	26	–	–	–
HX300LAD	CR270LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0932	300–380	380–480	23	–	–	–
HX340LAD	CR300LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0933	340–420	410–510	21	–	–	–
HX380LAD	CR340LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0934	380–480	440–560	19	–	–	–
HX420LAD	CR380LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0935	420–520	470–590	17	–	–	–
HX460LAD	CR420LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0990	460–560	500–640	15	–	–	–
HX500LAD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0991	500–620	530–690	13	–	–	–

Steel type				Chemical composition, heat analysis							
Short designation	VDA239-100*	Surface finish	Material number	Percentage by weight % max.							
				C	Si	Mn	P	S	Al min.	Nb	Ti
High-strength IF steel											
HX180YD	CR180IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0921	0.01	0.30	0.70	0.060	0.025	0.010	0.09	0.12
HX220YD	CR210IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0923	0.01	0.30	0.90	0.080	0.025	0.010	0.09	0.12
HX260YD	CR240IF	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0926	0.01	0.30	1.60	0.10	0.025	0.010	0.09	0.12
HX300YD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0927	0.015	0.30	1.60	0.10	0.025	0.010	0.09	0.12
Bake hardening steel											
HX180BD	CR180BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0914	0.06	0.50	0.70	0.060	0.025	0.015	0.09	0.12
HX220BD	CR210BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0919	0.08	0.50	0.70	0.085	0.025	0.015	0.09	0.12
HX260BD	CR240BH	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0924	0.10	0.50	1.00	0.10	0.030	0.010	0.09	0.12
HX300BD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0930	0.11	0.50	0.80	0.12	0.025	0.010	0.09	0.12
HX340BD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0945	0.11	0.50	0.80	0.12	0.025	0.010	0.09	0.12
Micro-alloyed steel											
HX260LAD	CR240LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0929	0.11	0.50	1.0	0.030	0.025	0.015	0.09	0.15
HX300LAD	CR270LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0932	0.12	0.50	1.4	0.030	0.025	0.015	0.09	0.15
HX340LAD	CR300LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0933	0.12	0.50	1.4	0.030	0.025	0.015	0.10	0.15
HX380LAD	CR340LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0934	0.12	0.50	1.5	0.030	0.025	0.015	0.10	0.15
HX420LAD	CR380LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0935	0.12	0.50	1.6	0.030	0.025	0.015	0.10	0.15
HX460LAD	CR420LA	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0990	0.15	0.50	1.7	0.030	0.025	0.015	0.10	0.15
HX500LAD	–	+Z,+ZF,+ZA,+ZM,+AZ,+AS	1.0991	0.15	0.50	1.7	0.030	0.025	0.015	0.10	0.15

1) Where the yield yield strength is defined, the respective values shall apply to the the lower yield strength (R_{eL}).
2) Depending on the product thickness, the minimum values of elongation at fracture are reduced as follows: 0.50 mm < t < 0.70 mm (minus 2 units), 0.35 mm < t < 0.50 mm (minus 4 units), and t < 0.35 mm (minus 7 units).
3) For AS, AZ, ZF and ZM coatings, the minimum A_{80} value is reduced by 2 units and the minimum r_{90} value by 0.2.
4) For product thicknesses of 1.5 mm < t < 2 mm, the minimum r_{90} value is reduced by 0.2, and for t ≥ 2 mm by 0.4.
5) Depending on the product thickness, the minimum r_{90} value is reduced as follows: 0.50 mm < t < 0.70 mm by 0.2; 0.35 mm < t < 0.50 mm by 0.4, and t < 0.35 mm by 0.6.
Also depending on the product thickness, the minimum n_{90} value is reduced as follows: 0.50 mm < t < 0.70 mm by 0.01; 0.35 mm < t < 0.50 mm by 0.03, and t < 0.35 mm by 0.04.

* Comparative grade, therefore minor deviations from DIN EN values possible

Multiphase steel · DIN EN 10 346

Steel type, cold rolled				Mechanical properties, longitudinal				
Short designation	VDA239-100*	Surface finish	Material number	Proof stress $R_{p0,2}$ MPa	Tensile strength R_m MPa min.	Elongation at fracture A_{80} [1)2)] % min.	Strain hardening exponent $n_{10\text{-}UE}$ min.	Bake hardening index BH_2 min.
Dual-phase steel								
HCT450X	–	+Z, +ZF	1.0937	260–340	450	27	0.16	30
HCT490X	CR290Y490T-DP	+Z, +ZF, +ZM	1.0995	290–380	490	24	0.15	30
HCT590X	CR330Y590T-DP	+Z, +ZF, +ZM	1.0996	330–430	590	20	0.14	30
HCT780X	CR440Y780T-DP	+Z, +ZF	1.0943	440–550	780	14	–	30
HCT980X	CR590Y980T-DP	+Z, +ZF	1.0944	590–740	980	10	–	30
HCT980XG	CR700Y980T-DP	+Z, +ZF	1.0997	700–850	980	8	–	30
Retained-austenite steel (TRIP steel)								
HCT690T	CR400Y690T-TR	+Z	1.0947	400–520	690	23	0.19	40
HCT780T	CR450Y780T-TR	+Z	1.0948	450–570	780	21	0.16	40
Complex-phase steel								
HCT600C	–	+Z, +ZA, +ZF	1.0953	350–500	600	16	–	30
HCT780C	CR570Y780T-CP	+Z, +ZA, +ZF	1.0954	570–720	780	10	–	30
HCT980C	CR780Y980T-CP	+Z	1.0955	780–950	980	6	–	30

Steel type, hot rolled				Mechanical properties, longitudinal			
Short designation	VDA239-100	Surface finish	Material number	Proof stress $R_{p0,2}$ MPa	Tensile strength R_m MPa min.	Elongation at fracture A_{80} % min.	Strain hardening exponent $n_{10\text{-}UE}$ min.
Ferrite-bainite-phase steel							
HDT450F	HR300Y450T-FB	+Z	1.0961	300–420	450	24	–
HDT580F	HR440Y580T-FB	+Z	1.0994	460–620	580	15	–
Complex-phase steel							
HDT750C	–	+Z	1.0956	620–760	750	10	–
HDT760C	HR660Y760T-CP	+Z	1.0998	660–830	760	10	–
HDT950C	–	+Z	1.0958	720–950	950	9	–

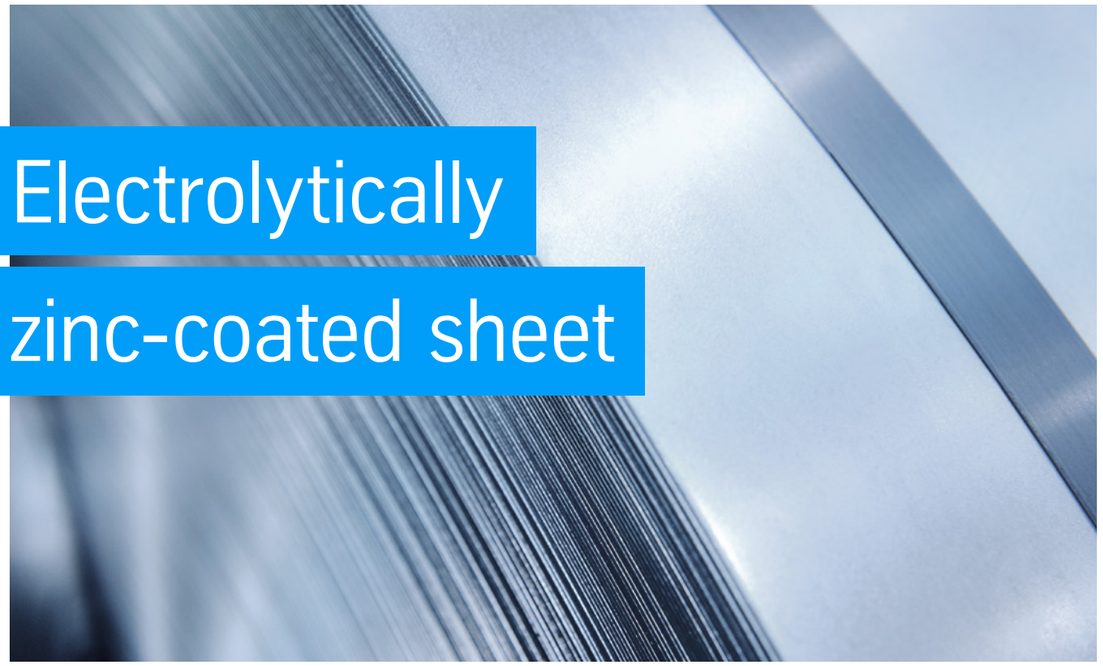
1) Reduced minimum values of elongation at rupture apply to product thicknesses t < 0.60 mm (minus 2 units).
2) For ZF-coated products, the minimum values of elongation at fracture are reduced by 2 units.
For ZF-coated products in thicknesses t < 0.60 mm, the minimum elongation at rupture is reduced by 4 units.

* Comparative grade, therefore minor deviations from DIN EN values possible

Multiphase steel · DIN EN 10 346

Steel type				Chemical composition, heat analysis										
Short designation	VDA239-100*	Surface finish	Material number	Percentage by weight % max.										
				C	Si	Mn	P	S	$Al_{total\ (span)}$	Cr + Mo	Nb + Ti	V	B
Ferrite-bainite-phase steel													
HDT450F	HR300Y450T-FB	+Z	1.0961	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.005
HDT580F	HR440Y580T-FB	+Z	1.0994	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.01
Dual-phase steel													
HCT450X	–	+Z, +ZF	1.0937	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT490X	CR290Y490T-DP	+Z, +ZF, +ZM	1.0995	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT590X	CR330Y590T-DP	+Z, +ZF, +ZM	1.0996	0.15	0.75	2.50	0.040	0.015	0.015–1.5	1.40	0.15	0.20	0.005
HCT780X	CR440Y780T-DP	+Z, +ZF	1.0943	0.18	0.80	2.50	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980X	CR590Y980T-DP	+Z, +ZF	1.0944	0.20	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980XG	CR700Y980T-DP	+Z, +ZF	1.0997	0.23	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
Retained-austenite steel (TRIP steel)													
HCT690T	CR400Y690T-TR	+Z	1.0947	0.24	2.00	2.20	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
HCT780T	CR450Y780T-TR	+Z	1.0948	0.25	2.20	2.50	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
Complex-phase steel													
HCT600C	–	+Z, +ZA, +ZF	1.0953	0.18	0.80	2.20	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT780C	CR570Y780T-CP	+Z, +ZA, +ZF	1.0954	0.18	1.00	2.50	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT980C	CR780Y980T-CP	+Z	1.0955	0.23	1.00	2.70	0.080	0.015	0.015–2.0	1.00	0.15	0.22	0.005
HDT750C	–	+Z	1.0956	0.18	0.80	2.20	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HDT760C	HR660Y760T-CP	+Z	1.0998	0.18	1.00	2.50	0.080	0.015	0.015–2.0	1.00	0.25	0.20	0.005
HDT950C	–	+Z	1.0958	0.25	0.80	2.70	0.080	0.015	0.015–2.0	1.20	0.25	0.30	0.005

* Comparative grade, therefore minor deviations from DIN EN values possible



Electrolytically zinc-coated sheet

A continuous electrolytic process provides for a high-grade surface finish of cold-rolled sheet. The zinc is applied as an anti-corrosion coating to either one or both surfaces of the steel. In combination with standard surface treatments, the coating acts as an efficient adhesive agent for a layer of paint or film. Applications include exposed automotive components and other parts subject to high requirements on the surface quality, household appliances and electrical industries, packaging and machine casings.

Surface types to DIN EN 10152

A	normal surface
B	improved surface

Surface types to VDA 239-100

E	Exposed parts
U	Non exposed parts

Surface finishes

m	matt	b	bright
r	rough	g	semi-bright

Surface treatments

U	untreated
P	phosphated
PO	phosphated, oiled
O	oiled
C	chemically passivated
CO	chemically passivated, oiled

Surface finishes

		Nominal coating per side		Single spot test		Single spot test	
		Thickness [µm]	Weight [g/m²]	Weight [g/m²]		Thickness [µm]	Weight [g/m²]
Electrolytically zinc-coated sheet (ZE/EG)							
Location/type	**DIN EN**				**VDA239-100***		
Same coating on both sides	ZE25/25	2.5/2.5	18/18	12/12	EG12/12	1.7–4.5	12–32
	–	–	–	–	EG18/18	2.5–5.4	18–38
	ZE50/50	5.0/5.0	36/36	29/29	EG29/29	4.1–6.9	29–49
	ZE75/75	7.5/7.5	54/54	47/47	EG47/47	6.6–8.6	47–61
	–	–	–	–	EG50/50	7.0–9.9	50–70
	–	–	–	–	EG53/53	7.5–10.3	53–73
	–	–	–	–	EG60/60	8.5–11.3	60–80
	ZE100/100	10.0/10.0	72/72	65/65	EG65/65	9.2–12.0	65–85
	–	–	–	–	EG70/70	9.9–12.7	70–90
Coating on one side only	ZE25/0	2.5/0	18/0	12/0	–	–	–
	ZE50/0	5.0/0	36/0	29/0	–	–	–
	ZE75/0	7.5/0	54/0	47/0	–	–	–
	ZE100/0	10.0/0	72/0	65/0	–	–	–
Different coating on both sides	ZE50/25	5.0/2.5	36/18	29/12	–	–	–
	ZE75/25	7.5/2.5	54/18	47/12	–	–	–
	ZE75/50	7.5/5.0	54/36	47/29	–	–	–
	ZE100/50	10.0/5.0	72/36	65/29	–	–	–
	ZE100/75	10.0/7.5	72/36	65/47	–	–	–

Tolerances: Dimensional and shape tolerances to DIN EN 10 131 (closer tolerances on arrangement).

Mild low-carbon steel for cold forming · DIN EN 10 152

Steel type				Mechanical properties, transverse					Chemical composition, heat analysis				
Short designation	VDA239-100*	Surface finish	Material number	Yield strength R_e[1] MPa max.	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] %	Anisotropy r_{90}[3][4] min.	Strain hardening exponent n_{90}[3] min.	Percentage by weight % max.				
									C	P	S	Mn	Ti
DC01	CR1	+ZE	1.0330	280	270–410	28	–	–	0.12	0.045	0.045	0.60	–
DC03	CR2	+ZE	1.0347	240	270–370	34	1.3	–	0.10	0.035	0.035	0.45	–
DC04	CR3	+ZE	1.0338	220	270–350	37	1.6	0.170	0.08	0.030	0.030	0.40	–
DC05	CR4	+ZE	1.0312	200	270–330	39	1.9	0.190	0.06	0.025	0.025	0.35	–
DC06	CR5	+ZE	1.0873	180	270–350	41	2.1	0.210	0.02	0.020	0.020	0.25	0.3
DC07	–	+ZE	1.0898	160	250–310	43	2.5	0.220	0.01	0.020	0.020	0.20	0.2

1) Where no yield strength is defined, the respective values shall apply to the 0.2 % proof stress $R_{p0.2}$, otherwise for the lower yield strength (R_{eL}). For thicknesses ≤ 0.7 mm, but > 0.5 mm, the maximum yield strength may be 20 MPa higher, and for thicknesses ≤ 0.5 mm 40 MPa.
2) For thicknesses ≤ 0.7 mm but > 0.5 mm, the minimum elongation at fracture may be 2 units lower. For thicknesses ≤ 0.5 mm, the minimum elongation at fracture may be 4 units lower.
3) The r_{90} and n_{90} values shown apply to product thicknesses ≥ 0.5 mm only.
4) For thicknesses > 2 mm, the r_{90} value is reduced by 0.2.

* Comparative grade, therefore minor deviations from DIN EN values possible

High and higher strength steel for cold forming · DIN EN 10 268

Steel type				Mechanical properties, transverse						
Short designation	VDA239-100*	Surface finish	Material number	Proof stress $R_{p0,2}$[1] MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Anisotropy r_{90}[3][4]	Strain hardening exponent n_{90}[3] min.	Bake hardening index BH_2[5] min.
High-strength IF steel							min.		
HC180Y	CR180IF	+ZE	1.0922	180–230	330–400	35	1.7	0.19	–
HC220Y	CR210IF	+ZE	1.0925	220–270	340–420	33	1.6	0.18	–
HC260Y	CR240IF	+ZE	1.0928	260–320	380–440	31	1.4	0.17	–
Isotropic steel							max.		
HC220I	–	+ZE	1.0346	220–270	300–380	34	1.4	0.18	–
HC260I	–	+ZE	1.0349	260–310	320–400	32	1.4	0.17	–
HC300I	–	+ZE	1.0447	300–350	340–440	30	1.4	0.16	–
Bake hardening steel							min.		
HC180B	CR180BH	+ZE	1.0395	180–230	290–360	34	1.6	0.17	35
HC220B	CR210BH	+ZE	1.0396	220–270	320–400	32	1.5	0.16	35
HC260B	CR240BH	+ZE	1.0400	260–320	360–440	29	–	–	35
HC300B	–	+ZE	1.0444	300–360	390–480	26	–	–	35
Micro-alloyed steel									
HC260LA	CR240LA	+ZE	1.0480	260–330	350–430	26	–	–	–
HC300LA	CR270LA	+ZE	1.0489	300–380	380–480	23	–	–	–
HC340LA	CR300LA	+ZE	1.0548	340–420	410–510	21	–	–	–
HC380LA	CR340LA	+ZE	1.0550	380–480	440–580	19	–	–	–
HC420LA	CR380LA	+ZE	1.0556	420–520	470–600	17	–	–	–
HC460LA	CR420LA	+ZE	1.0574	460–580	510–660	13	–	–	–

Steel type				Chemical composition, heat analysis							
Short designation	VDA239-100*	Surface finish	Material number	Percentage by weight % max.							
				C	Si	Mn	P	S	Al min.	Ti[6]	Nb[6]
High-strength IF steel											
HC180Y	CR180IF	+ZE	1.0922	0.01	0.3	0.7	0.06	0.025	0.01	0.12	0.09
HC220Y	CR210IF	+ZE	1.0925	0.01	0.3	0.9	0.08	0.025	0.01	0.12	0.09
HC260Y	CR240IF	+ZE	1.0928	0.01	0.3	1.6	0.1	0.025	0.01	0.12	0.09
Isotropic steel											
HC220I	–	+ZE	1.0346	0.07	0.5	0.6	0.05	0.025	0.015	0.05	–
HC260I	–	+ZE	1.0349	0.07	0.5	1.2	0.05	0.025	0.015	0.05	–
HC300I	–	+ZE	1.0447	0.08	0.5	0.7	0.08	0.025	0.015	0.05	–
Bake hardening steel											
HC180B	CR180BH	+ZE	1.0395	0.06	0.5	0.7	0.06	0.030	0.015	–	–
HC220B	CR210BH	+ZE	1.0396	0.08	0.5	0.7	0.085	0.030	0.015	–	–
HC260B	CR240BH	+ZE	1.0400	0.1	0.5	1.0	0.1	0.030	0.015	–	–
HC300B	–	+ZE	1.0444	0.1	0.5	1.0	0.12	0.030	0.015	–	–
Micro-alloyed steel											
HC260LA	CR240LA	+ZE	1.0480	0.1	0.5	1.0	0.03	0.025	0.015	0.15	0.09
HC300LA	CR270LA	+ZE	1.0489	0.12	0.5	1.4	0.03	0.025	0.015	0.15	0.09
HC340LA	CR300LA	+ZE	1.0548	0.12	0.5	1.5	0.03	0.025	0.015	0.15	0.09
HC380LA	CR340LA	+ZE	1.0550	0.12	0.5	1.6	0.03	0.025	0.015	0.15	0.09
HC420LA	CR380LA	+ZE	1.0556	0.14	0.5	1.6	0.03	0.025	0.015	0.15	0.09
HC460LA	CR420LA	+ZE	1.0574	0.14	0.6	1.8	0.03	0.025	0.015	0.15	0.09

1) Where a yield strength is defined, the respective values shall apply to the lower yield strength (R_{eL})
2) For thicknesses ≤ 0.7 mm but > 0.5 mm, the minimum elongation at fracture may be 2 units lower. For thicknesses ≤ 0.5 mm, the minimum elongation at fracture may be 4 units lower.
3) The r_{90} and n_{90} minimum values apply to product thicknesses ≥0.5 mm only.
4) For thicknesses > 2 mm, the r_{90} value is reduced by 0.2.
5) For thicknesses > 1.2 mm, special arrangements are required.
6) Additions of vanadium and boron are also permissible. The total content of all four elements must not exceed 0.22 % .

* Comparative grade, therefore minor deviations from DIN EN values possible

Multiphase steel · DIN EN 10 338

Steel type, cold rolled				Mechanical properties, longitudinal				
Short designation	VDA239-100*	Surface finish	Material number	Proof stress $R_{p0,2}$ MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Strain hardening exponent $n_{n10\text{-}UE}$ min.	Bake hardening index BH_2 MPa min.
Dual-phase steel								
HCT450X	–	+ZE	1.0937	260–340	450	27	0.16	30
HCT490X	CR290Y490T-DP	+ZE	1.0939	290–380	490	24	0.15	30
HCT590X	CR330Y590T-DP	+ZE	1.0941	330–430	590	20	0.14	30
HCT780X	CR440Y780T-DP	+ZE	1.0943	440–550	780	14	–	30
HCT980X	CR590Y980T-DP	+ZE	1.0944	590–740	980	10	–	30
HCT980XG[1]	CR700Y980T-DP	+ZE	1.0997	700–850	980	8	–	30
Retained-austenite steel (TRIP steel)								
HCT690T	CR400Y690T-TR	+ZE	1.0947	400–520	690	23	0.19	40
HCT780T	CR450Y780T-TR	+ZE	1.0948	450–570	780	21	0.16	40
Complex-phase steel								
HCT600C	–	+ZE	1.0953	350–500	600	16	–	30
HCT780C	CR570Y780T-CP	+ZE	1.0954	570–720	780	10	–	30
HCT980C	CR780Y980T-CP	+ZE	1.0955	780–950	980	6	–	30

Steel type, hot rolled				Mechanical properties, longitudinal			
Short designation	VDA239-100*	Surface finish	Material number	Proof stress $R_{p0,2}$ MPa	Tensile strength R_m MPa	Elongation at fracture A_{80}[2] % min.	Elongation at fracture A[3] %
Ferrite-bainite-phase steel							
HDT450F	HR300Y450T-FB	+ZE	1.0961	300–420	450	24	27
HDT580F	HR440Y580T-FB	+ZE	1.0994	460–620	580	15	17
Martensitic steel							
HDT1180G1	HR900Y1180T-MS	+ZE	1.0960	900–1,200	1,180	4	5

1) XG means dual phase with increased yield strength
2) For elongation at fracture, reduced minimum values (minus 2 units) apply in the case of product thicknesses t < 0.60 mm.
3) Percentage elongation after fracture using a proportional specimen with $L_0 = 5.65\sqrt{S_0}$ for sheet thicknesses ≥ 3.0 mm

* Comparative grade, therefore minor deviations from DIN EN values possible

Multiphase steel · DIN EN 10 338

Steel type				Chemical composition, heat analysis									
Short designation	VDA239-100*	Surface finish	Material number	Percentage by weight % max.									
				C	Si	Mn	P	S	$Al_{total\ (span)}$	Cr+Mo	Nb+Ti	V	B
Ferrite-bainite-phase steel													
HDT450F	HR300Y450T-FB	+ZE	1.0961	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.005
HDT580F	HR440Y580T-FB	+ZE	1.0994	0.18	0.50	2.00	0.050	0.010	0.015–2.0	1.00	0.15	0.15	0.010
Dual-phase steel													
HCT450X	–	+ZE	1.0937	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT490X	CR290Y490T-DP	+ZE	1.0939	0.14	0.75	2.00	0.080	0.015	0.015–1.0	1.00	0.15	0.20	0.005
HCT590X	CR330Y590T-DP	+ZE	1.0941	0.15	0.75	2.50	0.040	0.015	0.015–1.5	1.40	0.15	0.20	0.005
HCT780X	CR440Y780T-DP	+ZE	1.0943	0.18	0.80	2.50	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980X	CR590Y980T-DP	+ZE	1.0944	0.20	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
HCT980XG[1)]	CR700Y980T-DP	+ZE	1.0997	0.23	1.00	2.90	0.080	0.015	0.015–2.0	1.40	0.15	0.20	0.005
Retained-austenite steel (TRIP steel)													
HCT690T	CR400Y690T-TR	+ZE	1.0947	0.24	2.00	2.20	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
HCT780T	CR450Y780T-TR	+ZE	1.0948	0.25	2.20	2.50	0.080	0.015	0.015–2.0	0.60	0.20	0.20	0.005
Complex-phase steel													
HCT600C	–	+ZE	1.0953	0.18	0.80	2.20	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT780C	CR570Y780T-CP	+ZE	1.0954	0.18	1.00	2.50	0.080	0.015	0.015–2.0	1.00	0.15	0.20	0.005
HCT980C	CR780Y980T-CP	+ZE	1.0955	0.23	1.00	2.70	0.080	0.015	0.015–2.0	1.00	0.15	0.22	0.005
Martensitic steel													
HDT1180G1	HR900Y1180T-MS	+ZE	1.0960	0.25	0.80	2.50	0.060	0.015	0.015–2.0	1.20	0.25	0.22	0.005

1) XG means dual phase with increased yield strength

* Comparative grade, therefore minor deviations from DIN EN values possible

Manganese-boron steel

Manganese-boron steel for hot forming offers maximum strength coupled with good formability. A combination of manganese-boron steel with high- and ultra-high-strength steels allows components with extremely complex geometries to be manufactured by hot forming.

In addition, significant weight savings can be achieved. In contrast to cold forming, this hot forming process combines the forming operation and the hardening treatment in a single step. Typical applications for manganese-boron steel are bumper crossbeams, side impact beams, pillars and components for car body reinforcement.

Surface
UC uncoated
AS Hot-dip aluminum-silicon alloy coating

Coating types
We offer manganese-boron steels with aluminum-silicon surface finishes. Aluminum-silicon coated steels are protected against process-related scaling and decarburization.

Manganese-boron steel for hot forming

Steel type	Mechanical properties as-delivered, transverse				
according to VDA 239-500	Surface finish	Proof stress $R_{p0.2}$ MPa min.	Tensile strength R_m MPa min.	Elongation at fracture A_{80}% min.	Elongation at fracture $A^{1)}$% min.
HR1500T-MB	UC	>=280	450-800	10	12
CR500T-LA	+AS	280-500	380-540	12	–
CR600T-LA	+AS	320-650	500-750	12	–
CR1500T-MB	UC, +AS	300-620	440-700	10	–
CR1900T-MB	UC	280-680	440-850	10	–
CR1900T-MB	AS	450-650	600-800	10	–

1) Percentage elongation after fracture using a proportional specimen with $L_o = 5.65 \sqrt{S_o}$ for sheet thicknesses ≥ 3.0 mm

Steel type	Chemical composition, heat analysis														
according to VDA 239-500	Surface finsh	Percentage by weight % max.													
		C	Si	Mn	P	S	Al	Ti	Nb	Cr	Mo	B	Cu	N	Ni
HR1500T-MB	UC	0.20–0.25	≤0.50	1.10–1.50	≤0.025	≤0.005	0.015–0.080	0.020–0.050	–	≤0.35	≤0.35	0.0020–0.0050	≤0.20	≤0.010	≤0.10
CR500T-LA	+AS	≤-0.13	≤0.50	≤1.50	≤0.030	≤0.025	≥0.015	Ti+Nb ≤0.15		–	–	–	≤0.20	–	–
CR600T-LA	+AS	≤-0.13	≤0.50	≤2.00	≤0.030	≤0.025	≥0.015	Ti+Nb ≤0.19		–	–	–	≤0.20	–	–
CR1500T-MB	UC, +AS	0.20–0.25	≤0.50	1.10–1.50	≤0.025	≤0.005	0.015–0.080	0.020–0.050	–	≤0.35	≤0.35	0.0020–0.0050	≤0.20	≤0.010	≤0.10
CR1900T-MB	UC, +AS	0.30–0.38	<0.80	≤2.00	≤0.030	≤0.005	0.010–0.080	Ti+Nb ≤0.2		≤0.50	≤0.55	0.0010–0.0050	≤0.20	≤0.010	≤0.50

Organic coated sheet

Organic coated sheet is another composite comprising a metallic substrate with a colored organic coating. The coating materials consist of specially developed substances that combine high corrosion resistance with an attractive appearance and outstanding formability. Application areas include the construction sector (e. g. technical insulation) and the household appliances industry.

Coating types
Liquid coatings: Based on different binder systems such as polyester, polyurethane, PVDF, etc. in various colors and gloss levels; PVC plastisol, embossed and plain, coating structure, one- or two-sided

Film coatings: Various decors as well as single-color films in various colors and gloss levels; reverse side protective coating

Surface treatments: Strippable protective film

Sheet types[1)]
Cold-rolled
Hot-dip galvanized (Z/GI)
Zinc-magnesium (ZM)
Zinc-aluminum (ZA; galfan®)
Aluminum-silicon (AS)
Elektrolytically zinc-coated (ZE/EG)

Tolerances
Dimensional and shape tolerances to DIN EN 10 143 for hot-dip coated sheet, DIN EN 10 131 for cold-rolled and electrolytically coated sheet.

1) Other coatings on special agreement.

Electrical steel strip

Electrical steel is manufactured in a complex production process and is an ideal material for numerous industrial applications where electrical conductivity is required. This material is indispensable for the construction of electric motors, transformers and generators.

Our teams of experts at the Stuttgart (Germany), El Puig (Spain) and Győr (Hungary) sites have **decades of experience** and offer expertise in the processing of non-grain-oriented (NGO) and grain-oriented (GO) materials.

By investing heavily in **modern machinery** in Stuttgart, we will be able to produce electrical steel strip to new standards in the future and comprehensively serve the automotive portfolio.

With **slitting options from 0.20 mm**, we are able to meet the increasing demands of e-mobility and achieve a demanding burr of ≤0.025 mm. Our portfolio also includes other industrial applications in the thickness range ≥0.5mm.

In addition to our processing options for electrical steel, we also support you with the following services:
- Customs clearance
- CBAM reporting and monitoring
- Logistics (comprehensive logistics by rail, ship or truck; sustainable services, e.g. reusable pallets, pallet returns, scrap recycling; transparency through track and trace apps, insight into the flow of goods from the factory to you)

Quality standard according to DIN EN 10106:2015 (NGO) and DIN EN 10107:2014 (GO)

Stainless steel

We offer our customers high-grade stainless, acid-resistant and heat-resistant steels which are used in numerous applications. Their advantages include high corrosion resistance, good processing characteristics (weldability), high thermal resistance, easy maintenance and optimal hygienic properties. In addition, stainless steel offers an attractive appearance, long durability and high economic efficiency. The latter deserves special mention especially with a view to environmental protection projects.

Surface finishes

1D **Hot-rolled, heat-treated, pickled, de-scaled, rough surface**
Customary standard for the majority of steel grades to ensure good corrosion resistance. Also customary finish for processing. Not as smooth as 2D or 2B.

2B **Cold-rolled, heat-treated, pickled, skin passed, smooth, clean surface**
Most common finish for the majority of steel grades to ensure good corrosion resistance, smoothness, and evenness. Also customary finish for processing.

2R **Cold-rolled, bright-annealed, also skin-passed if necessary, smooth, clean bright, reflective**
Smoother and brighter than 2B. Also as customary finish for processing.

Other surface finishes on request.

Stainless steel

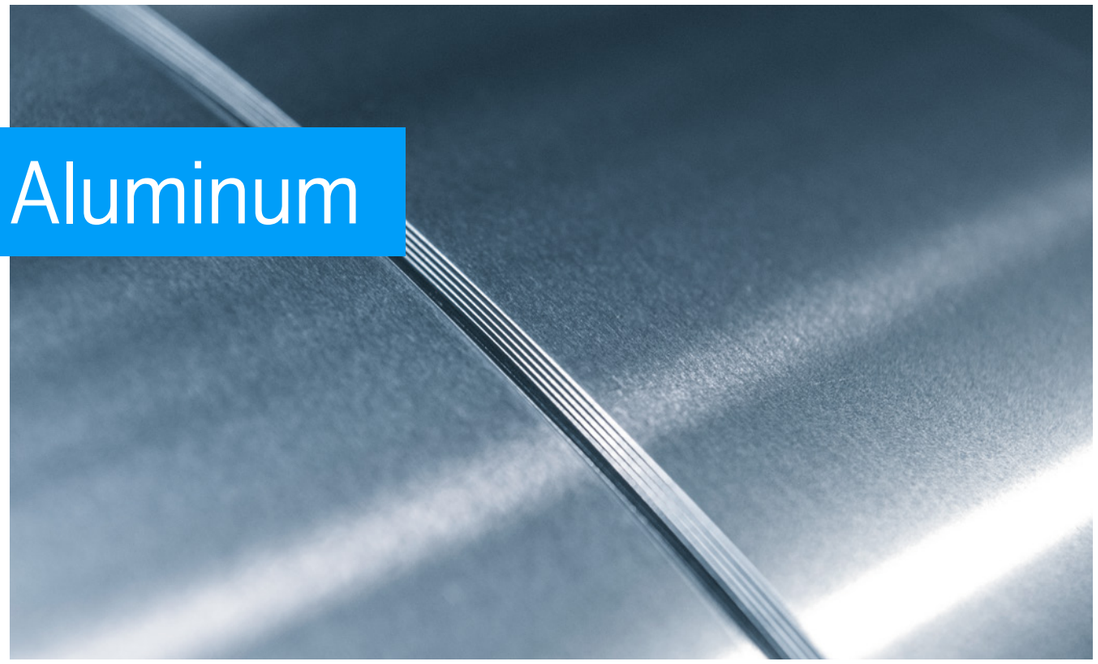
Steel type			Mechanical properties, transverse			Chemical composition, heat analysis							
Short designation	Material number	Aisi/SAE	Proof stress $R_{p0.2}$ MPa min.	Tensile strength R_m MPa	Elongation at fracture A_{80} % min.	Percentage by weight % max. C	Cr	Ni min.	N	Si	Mn	P	S
Ferritic steel · DIN EN 10 088, Part 2													
X2CrTi12	1.4512	409	220	380–560	25	0.030	10.5–12.5	–	–	1.00	1.00	0.040	0.015
X2CrTiNb18	1.4509	441	250	430–630	18	0.030	17.5–18.5	–	–	1.00	1.00	0.040	0.015
X3CrTi17	1.4510	439	240	420–600	23	0.05	16.0–18.0	–	–	1.00	1.00	0.040	0.015
X2CrMoTi17-1	1.4513	436	220	400–550	23	0.025	16.0–18.0	–	0.020	1.00	1.00	0.040	0.015
Austenitic steel · DIN EN 10 088, Part 2													
X5CrNi18-10	1.4301	304	230	540–750	45	0.07	17.5–19.5	8.0–10.5	0.10	1.00	2.00	0.045	0.015
X6CrNiTi18-10	1.4541	321	220	520–720	40	0.08	17.0–19.0	9.0–12.0	–	1.00	2.00	0.045	0.015
Heat-resistant steel · DIN EN 10 095													
X15CrNiSi-20-12	1.4828	309	230	550–750	28	0.20	19.0–21.0	11.0–13.0	0.11	1.50–2.50	2.00	0.045	0.015
X9CrNiSiNCe21-11-2	1.4835	253MA	310	650–850	37	0.12	20.0–22.0	10.0–12.0	0.20	1.40–2.50	1.00	0.045	0.015
X15CrNiSi25-21	1.4841	314	230	550–750	28	0.20	24.0–26.0	19.0–22.0	0.11	1.50–2.50	2.00	0.045	0.015

Other steel types to mill standards and international standards on request.

Steel properties

Ferritic chromium (-molybdenum) steel generally features lower elongation and corrosion resistance than austenitic Cr-Ni (-Mo) steel. Its heat resistance is lower than that of austenitic steel. In high-temperature applications, this leads to demonstrably lower tensioning.

In the as-delivered condition, austenitic chromium-nickel (-molybdenum) steel possesses higher elongation and generally also higher corrosion resistance. In addition, unlike ferritic chromium (-molybdenum) steel, it is not magnetizable. However, heavy deformation may cause the formation of martensite which, in turn, may make the material magnetizable.



Aluminum

After oxygen and silicon, aluminum is the third most common element in the earth's crust, and the most frequently occurring metal. In the aviation and aerospace sector, it has long become indispensable, but it has also become increasingly important in the automotive industry. The strength levels achieved in alloys with magnesium, silicon and other metals are hardly inferior at all to those of steel. At the same time, appreciable weight savings are achieved.

exsal
Our premium product exsal offers another surface innovation: it is first grinded in samples and then anodized, which gives it a thick protective layer. As an aesthetic and at the same time light material, it is used in interior furnishings and facades.

SAV2/2
SAV2/2 provides an alternative to the classic protective coating: It is anodized on both sides and is therefore ideal for outdoor use, such as facades, windows, doors and roofing.

Aluminum

Aluminum alloys

Alloy designation to EN 485	Chemical designation	Heat-treated condition	Thickness	Width max.
EN AW 1050A	Al99,5	H111	0.8–3.0	1,500
EN AW 1050A	Al99,5	H24	0.8–3.0	1,500
EN AW 1050A	Al99,5	H14	0.8–3.0	1,500
EN AW 5005A	AlMg1 (C)	H24	0.8–4.0	2,000
EN AW 5005A (anodizing quality)	AlMg1 (C)	H14	0.8–4.0	2,000
EN AW 5005A (anodizing quality)	AlMg1 (C)	H24	0.8–4.0	2,000
EN AW 5754	AlMg3	H111	0.5–5.0	2,000
EN AW 5754	AlMg3	H22	0.5–5.0	2,000
EN AW 5049	AlMg2Mn0,8	H22	0.6–1.0	1,000

Alloys for automotive applications

Alloy designation to EN 485	Chemical designation	Heat-treated condition	Thickness	Width max.
EN AW 5083	AlMg4,5Mn0,7	H111	1.0–3.0	1,600
EN AW 5182	AlMg4,5Mn0,4	H111	0.8–4.0	1,600
EN AW 6016	AlSi1,2Mg0,4	T4	0.8–4.0	2,000
EN AW 6181	AlSi1Mg0,8	T4	0.8–4.0	2,000
EN AW 6082	AlSi1MgMn	T4	1.0–3.0	1,600
EN AW 6082	AlSi1MgMn	T6	1.0–3.0	1,600

Coated alloys

Designation	Chemical designation	Color	Thickness	Width max.
Anodized E6/EV1 ~ 9–10 µm		Natural finish	1.0–3.0	2,000
Anodized E6/EV1 ~ 10–12 µm		Natural finish	1.0–3.0	2,000
Anodized E6/EV1 ~ 15/20 µm		Natural finish	1.0–3.0	2,000
EN AW 5049	AlMg2Mn0,8	Anodized on both sides	0.6–1.0	1,000
RAL 9006 Powder coating/Wet coating		White aluminum	1.0–2.0	1,500
RAL 9007 Powder coating/Wet coating		Gray aluminum	1.0–2.0	1,500
RAL 9010 Powder coating/Wet coating		Pure white	1.0–2.0	1,500
RAL 9016 Powder coating/Wet coating		Traffic white	1.0–2.0	1,500

Other dimensions and alloys are available on request.

All alloys comply with OEM standards and are available with EDT surfaces, dry lubricants and passivation. Slit strip, sheet and small coils are provided with intermediate paper layers and/or protective film on one or both sides in accordance with the customer's specifications.

General note
All information given regarding the properties and use of materials and products is for description purposes only. Guarantees in respect of specific properties or uses are subject to separate written agreement. All data given are subject to the norm valid at printing date.
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