

EN10346:2015

DX51D, DX52D, DX53D, DX54D, DX56D, DX57D

Metal coated formable steels are the right choice when you need excellent cold formability and galvanic corrosion protection.

Dimension Range

DX51D is available in thicknesses of 0.45-3.00 mm and widths up to 1520 mm.

DX52D is available in thicknesses of 0.50-3.00 mm and widths up to 1520 mm.

DX53D is available in thicknesses of 0.50-3.00 mm and widths up to 1520 mm.

DX54D is available in thicknesses of 0.50-3.00 mm and widths up to 1520 mm.

DX56D is available in thicknesses of 0.50-2.50 mm and widths up to 1520 mm.

DX57D is available in thicknesses of 0.75-2.00 mm and widths up to 1370mm .

Available as coils, slit coils and as cut to length in lengths up to 6 meters.

Available dimensions vary depending on coating.

Mechanical Properties

Hide/Show specific columns EDIT

	COATING	STANDARD	YIELD STRENGTH RE 1) (MPa)	TENSILE STRENGTH RM (MPa)	ELONGATION A80 3) (MIN %)	R90 (MIN)	N90 (MIN)
DX51D	Z, ZA, ZF	EN 10346	—	270 - 500	22	—	—

	COATING	STANDARD	YIELD STRENGTH RE 1) (MPa)	TENSILE STRENGTH RM (MPa)	ELONGATION A80 3) (MIN %)	R90 (MIN)	N90 (MIN)
DX52D	Z, ZA, ZF	EN 10346	140 - 300 2)	270 - 420	26	—	—
DX53D	Z, ZA, ZF	EN 10346	140 - 260	270 - 380	30	—	—
DX54D	Z, ZA, ZF	EN 10346	120 - 220	260 - 350	36	1.6 4)	0.18
DX56D	Z, ZA, ZF	EN 10346	120 - 180	260 - 350	39	1.9 5)	0.21 5)
DX57D	Z, ZA	EN 10346	120 - 170	260 - 350	41	2.1 5)	0.22

DX53D, DX54D, DX56D and DX57D are non-ageing steels, i.e. their properties will remain unaltered at least for six months

- 1) If no pronounced yield point is present, the 0.2 % yield point value Rp0,2 is used. If the product has a pronounced yield point, the values apply to the lower yield point ReL.
- 2) DX52D: this upper limit applies only to Surface quality B. For Surface quality A, the upper limit is 360 MPa.
- 3) Decreased minimum elongation A80 value for thickness $0.50\text{mm} < t \leq 0.70\text{mm}$ (minus 2 units) and $t \leq 0.50\text{mm}$ (minus 4 units) apply. In addition, in case of ZF coating on DX54D or DX56D the minimum elongation A value is reduced (minus 2 units).

4) DX54D: decreased minimum r90-values for product thickness $1.5\text{mm} < t < 2\text{ mm}$ (minus 0.2 units) and $t \geq 2\text{ mm}$ (minus 0.4 units) apply. In addition, in case of ZF coating the minimum r90-value is reduced (minus 0.2 units).

5) DX56D and DX57D decreased minimum r90-values for product thickness $1.5\text{mm} < t < 2\text{ mm}$ (minus 0.2 units) and $t \geq 2\text{ mm}$ (minus 0.4 units) apply.

In addition, in case of ZF coating both minimum r90-value (minus 0.2 units) and minimum n90-value (minus 0.01 units) are lower and further the following reductions apply:

- decreased minimum r90-values for product thickness $0.50\text{mm} < t \leq 0.70\text{mm}$ (minus 0.2 units) and $t \leq 0.50\text{mm}$ (minus 0.4 units).

- decreased minimum n90-values for product thickness $0.50\text{mm} < t \leq 0.70\text{mm}$ (minus 0.01 units) and $t \leq 0.50\text{mm}$ (minus 0.03 units)

Material Testing

Testing direction transverse to the rolling direction.

Each metal coated mother coil is regarded as one test unit. Mechanical properties (EN-ISO 6892-1:2009) and coating mass (EN 10346) are determined per test unit.

An inspection document of the required type according to EN 10204 is provided when agreed in the order.

Chemical Composition (ladle analysis)

Hide/Show specific columns EDIT

	C (MAX %)	SI (MAX %)	MN (MAX %)	P (MAX %)	S (MAX %)	TI (MAX %)
DX51D	0.18	0.50	1.20	0.12	0.045	0.30
DX52D	0.12	0.50	0.60	0.10	0.045	0.30

	C (MAX %)	SI (MAX %)	MN (MAX %)	P (MAX %)	S (MAX %)	TI (MAX %)
DX53D	0.12	0.50	0.60	0.10	0.045	0.30
DX54D	0.12	0.50	0.60	0.10	0.045	0.30
DX56D	0.12	0.50	0.60	0.10	0.045	0.30
DX57D	0.12	0.50	0.60	0.10	0.045	0.30

Content % by mass.

Tolerances

The tolerances of metal coated products are mainly in accordance with standard EN 10143. If no special instructions are given on the order, products are delivered with the normal tolerances of this standard. Special tolerances according to standard EN 10143 or other tolerance specification can be agreed separately at the time of order.

Coatings

The metal coated products are offered with Zinc (Z), Galfan zinc-aluminium (ZA), or Galvannealed zinc-iron alloy (ZF) coating. The cathodic corrosion protection of these metal coatings is in direct proportion to its thickness, i.e. a thick coating will provide better corrosion protection for the underlying steel than a thin coating. However, thin coatings are recommended for applications with high formability requirements.

Zinc

The Zinc (Z) coating has a composition consisting almost entirely of zinc (>99%) and is lead free, resulting in finely crystallized zinc spangle that meets high requirements for visual appearance. It is produced by hot-dip galvanizing process. Thanks to the good formability of lead-free coatings, the corrosion protection, for example, in areas which have been bent is good. The small spangle coating is designated by the letter M.

Galfan

Galfan (ZA) is a zinc-aluminium alloy coating with the eutectic composition approximately of 95% Zn and 5% Al. This coating has better anticorrosive and forming properties than normal zinc coatings. Galfan coating can be recognized by its bright metallic and mildly cellular-patterned surface. It is produced by hot-dip coating process.

Galvannealed

Galvannealed (ZF) is a zinc-iron alloy coating having an iron content of about 10%. This coating is produced by heat-treatment after continuous hot-dip coating process. ZF coated steels are excellent for resistance welding applications and are designed for use in high-quality painted products. Galvannealed coating can be recognized by its typically grayish, matte surface.

Hide/Show specific columns EDIT

COATING DESIGNATION	MINIMUM TOTAL COATING MASS, BOTH SURFACES * (g/m ²)	GUIDANCE VALUE FOR COATING THICKNESS PER SURFACE (TYPICAL μm)
Z100	100	7
Z140	140	10
Z180	180	13

COATING DESIGNATION	MINIMUM TOTAL COATING MASS, BOTH SURFACES * (g/m ²)	GUIDANCE VALUE FOR COATING THICKNESS PER SURFACE (TYPICAL μm)
Z200	200	14
Z225	225	16
Z275	275	20
Z350	350	25
Z450	450	32
Z600	600	42
ZA095	95	7
ZA130	130	10

COATING DESIGNATION	MINIMUM TOTAL COATING MASS, BOTH SURFACES * (g/m ²)	GUIDANCE VALUE FOR COATING THICKNESS PER SURFACE (TYPICAL μm)
ZA155	155	11
ZA185	185	14
ZA200	200	15
ZA255	255	20
ZA300	300	23
ZF080	80	6
ZF100	100	7
ZF120	120	8

COATING DESIGNATION	MINIMUM TOTAL COATING MASS, BOTH SURFACES * (g/m ²)	GUIDANCE VALUE FOR COATING THICKNESS PER SURFACE (TYPICAL μm)
ZF140	140	10

*In triple spot test.

In addition to these coating thicknesses defined according to EN10346, the offering contains different asymmetric coatings, coatings with equal coating minimum mass per surface, and other OEM specifications that are available upon request.

Surface Quality

Normal surface (A)

Imperfections such as pimples, marks, scratches, pits, variations in surface appearance, dark spots, stripe marks and light passivation stains are permissible. Stretch levelling breaks or run-off marks may appear. Coil breaks and stretcher strains may appear as well. Surface quality A has a shiny appearance.

Improved surface (B)

Surface quality B is obtained by skin passing. With this surface quality, small imperfections such as stretch levelling breaks, skin pass marks, slight scratches, surface structure, run-off marks and light passivation stains are permissible. Surface quality B has a matte appearance.

Surface Treatments

In order to prevent formation of white rust during transportation or storage, the following surface treatments are available:

Chemical passivation (C)

Unless otherwise agreed, zinc and Galvan coated coils and sheets are delivered as chemically passivated. A thin passivation layer remains on the surface of the product. The purpose of this is to protect the coating against the formation of white rust during transportation and storage. This treatment is not sufficient,

however, for protection under all conditions.

Oiling (O)

If required, oiling can be used instead of chemical passivation. Metal coated products to be painted are recommended to be delivered in oiled condition and therefore Galvannealed coated coils are delivered as oiled, unless otherwise agreed. The temporary corrosion protection provided by oil is especially dependent on storage time, and therefore long storage times should be avoided with oiled products.

Chemical passivation and oiling (CO)

Passivation with oiling is also available for maximum surface protection.

Unprotected (U)

In unprotected condition, i.e. without surface treatment, there is a risk for formation of corrosion products and scratches during transportation, storage or handling. The products are supplied without surface treatment only if explicitly required by the customer on its own responsibility.

General about surface treatments

All surface treatments are in accordance with RoHS directive (2011/65/EU) and do not contain Chromium VI (Cr6+). Surface treatments provide only temporary surface protection during transportation and storage. White rust tends to form easily on the surface of bright, newly coated coils or in the space between tightly packed sheets if condensed water or rainwater collects on the surface and is not able to evaporate away quickly. In order to avoid white rust, care must be taken to keep the coated products dry during transportation and storage. Condensation may form between laps or sheets due to, for example, daily temperature changes or when bringing cold products into a warm building. If they become wet and white rust begins to form, they must be separated and situated so that they are dried quickly. This will prevent any further formation of white rust.