Steel

galfan®

Product information for zinc-aluminum coated sheet ZA

thyssenkrupp

Issue: June 14, 2024, version 2

Areas of application

galfan® zinc-aluminum coated sheet from thyssenkrupp Steel is a quality sheet product that is protected against corrosion by a dense, uniform, firmly adherent coating consisting of approx. 95% zinc and 5% aluminum. Its particularly high corrosion resistance makes galfan® zinc-aluminum coated sheet suitable for a wide range of engineering parts in the auto sector, such as gimbals, electric motor housings, oil filter housings and tail light fastenings.

An additional feature is that the intermetallic phase between the steel substrate and the coating is either very thin or absent completely, giving galfan® excellent forming properties. Thus it is ideal for complicated shapes with tight radii.

Sample microstructure galfan®

Example of the microscopic structure of galfan® zinc-aluminum coated sheet in vertical section.

Content

bluemint® Steel | Save CO_2 now! Available across our entire portfolio of grades, and all dimensions. Find out more: bluemint-steel.com

Available steel grades

Deep-drawing steel

Steel grade	Reference grade DIN EN 10346	Surface finishing galfan®
DX51D	DX51D	●
DX52D	DX52D	●
DX53D	DX53D	●
DX54D	DX54D	●
DX56D	DX56D	○

Structural steel

Steel grade	Reference grade DIN EN 10346	Surface finishing galfan®
S220GD	S220GD	●
S250GD	S250GD	●
S280GD	S280GD	●
S320GD	S320GD	●
S350GD	S350GD	●
S390GD	S390GD	○
S420GD	S420GD	○
S450GD	S450GD	○

High-strength IF steels

Steel grade	Reference grade DIN EN 10346	Surface finishing galfan®
HX 220	HC220Y / HX220YD	●

Micro-alloyed steel

Steel grade	Reference grade DIN EN 10346	Surface finishing galfan®
MHZ® 220	–	●
MHZ® 260	HC260LA / HX260LAD	●
MHZ® 300	HC300LA / HX300LAD	●
MHZ® 340	HC340LA / HX340LAD	●
MHZ® 380	HC380LA / HX380LAD	●
MHZ® 420	HC420LA / HX420LAD	●

● Serial production
○ On request

Tolerances

Dimensional and shape tolerances according to DIN EN 10143.

Detailed information on properties, processing and dimensions can be found in our product information at www.thyssenkrupp-steel.com.

Surfaces

Coating process

As with hot-dip galvanized sheet, galfan® zinc-aluminum coated sheet is produced in a continuous process (furnace, metal bath).

Available surface finishes, hot-dip coated

	Specification	Minimum coating two-sided sample [g/m²]		Coating on each side of single spot sample	
		Triple spot sample	Single spot sample	Thickness [µm]	Typicl thickness [µm]
galfan®					
Designation					
ZA95	DIN EN	95	80	5 – 12	7
ZA130	DIN EN	130	110	7 – 15	10
ZA185	DIN EN	185	150	10 – 20	14
ZA200	DIN EN	200	170	11 – 21	15
ZA255	DIN EN	255	215	15 – 27	20
ZA300	DIN EN	300	255	17 – 31	23

Other coatings and different coatings per side are available on request.

Surface condition and finishes

	Finish type	Type of surface
Product		
Hot-dip coated flat products	galfan®	A Normal surface
		B Improved surface
		C Best surface

A/B/C as per DIN EN 10346

Surface treatment

Type	
U [1]	Without surface treatment
O	Oiled
C	Chemically passivated
CO [1]	Chemically passivated and oiled
S	Sealed

[1] On request

Roughness

It is possible to set a specific roughness by prior arrangement.

Painting

galfan® offers good paint adhesion and is particularly suitable for organic coating. In general, all known organic coating methods can be used. In the painted condition galfan® offers particularly high corrosion protection.

Notes on applications and processing

Forming

All common forming processes used for cold-rolled sheet can be used for galfan® sheets if die geometry and surface are adapted accordingly. The type of zinc coating in conjunction with the surface topography has a decisive influence on the tribology of the forming process.

The characteristic parameter is the coefficient of friction µ. At thyssenkrupp Steel the coefficient of friction is determined in the strip drawing test between plane parallel tools. The scatter band results from the different oil coating weights and the roughness spectrum. When changing over from a different surface finish (coating) to zinc-aluminum coated sheet, the blank shape, blankholder forces or the geometry of the drawing bead may have to be adapted to the flow behavior of the material in the flange area.

To avoid coating abrasion, the die surface in the region of the blankholder, drawing beads and drawing radii must be completely smooth. Finishing of the die surfaces must be carried out in the flow direction of the material. Weld repairs must be finished carefully. As a guide, R_z values of approx. 1.6 µm (corresponding to R_a of approx. 0.15 µm) should be targeted. In addition the die surfaces should be hardened or plasma-nitrided to reduce susceptibility to adhesion.

With simple forming operations sealed surfaces can be formed dry if the active die surfaces are suitably polished.

Joining

All thermal and mechanical joining techniques can be used, as can adhesive bonding and sealing. However, the particular properties of the galfan® coating ZA require the processing parameters for some joining techniques to be adapted. Joining techniques which do not impair the surface, i.e. which preserve the anticorrosion properties of the coating, such as clinching and adhesive bonding are gaining in importance.

The preferred welding processes are resistance spot welding, projection welding and seam welding. These processes are easy to automate, cause little surface damage or component distortion and do not require weld fillers. It should be noted that, compared with uncoated cold-rolled sheet, a higher welding current is needed due to the lower contact resistance caused by the coating and the required higher electrode force.

The electrodes must be cooled intensively, as there is a strong tendency to electrode pick-up with the galfan® coating. With the CuCrZr electrodes used for preference in resistance spot welding, high electrode lifetimes can be achieved without remilling by stepper control of the welding current. In seam welding, electrode pick-up necessitates frequent cleaning of the rollers. Projection welding can be used with galfan® without any problems, provided the projection geometry and welding parameters are kept constant within close limits.

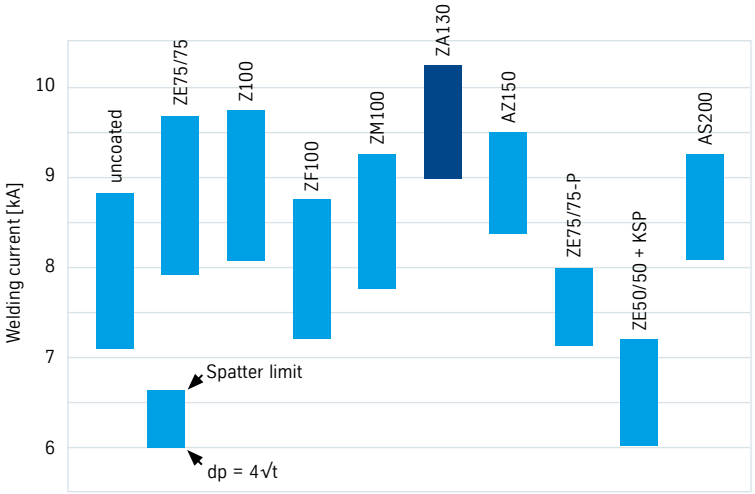
The laser beam, metal active gas (MAG), and tungsten inert gas/plasma gas (TIG/plasma) welding methods commonly used for uncoated cold-rolled sheet can also be used for galfan®. However, when welding lap joints, particularly with metal active gas welding, porosity must be expected.

A great alternative is arc brazing (MIG/plasma/TIG brazing) using copper braze alloys and flanged or lap joints.

As the coating burns in the weld and corrosion protection is thus reduced in this area, processes should be preferred which introduce relatively low levels of heat into the part to be welded. A slower welding speed than that used with cold-rolled sheet improves degassing of the weld pool and avoids the formation of pores. The best results are achieved with butt joints.

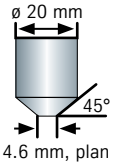
When welding galfan®, welding fumes are unavoidable. The amount of fumes depends on factors such as the coating thickness and the welding process. In general, good workplace ventilation is recommended, in certain cases direct extraction of the welding fumes is advised.

Comparison of the welding current setting ranges of different surface finishes



Welding parameters

Electrode cap

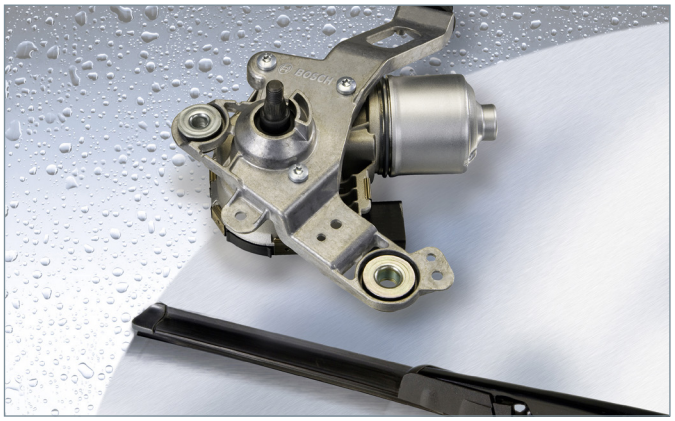


Type of current	: 50 Hz
Electrode force	: 2 kN
Squeeze time	: 20 Per.
Welding time	: 10 Per.
Holding time	: 10 Per.

Welding according to SEP1220-2
Deep-drawing steel DC 04, t = 0.8 mm
Source: DVS data sheet 2920

Sample applications

Motor housing
Source: PWO AG



Motor housing for windshield wipers
Source: Bosch

thyssenkrupp Steel Europe AG, Kaiser-Wilhelm-Strasse 100, 47166 Duisburg, Germany
Postal address: 47161 Duisburg, T: +49 203 52-0
www.thyssenkrupp-steel.com

General information
Information about the nature or usability of materials or products serves as a description. Assurances regarding the existence of certain properties or a specific purpose always require written agreements. Technical changes reserved. Reproduction, even in part, only with the permission of thyssenkrupp Steel Europe AG.