



CR330Y590T-DH

Multi-phase steels for cold forming

- Dual phase steels with improved formability

Materialinformationsblatt

in terms of	VDA 239-100/ DIN EN 10143 (Sept. 06)
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General information

Dual-phase steels (DP) consist of a multi-phase structure. Martensite islands are embedded in a ferritic matrix, the proportion of which is used to adjust the strength of the respective grade. In the case of dual-phase steels with improved formability (DH/xtend®), small amounts of bainite and retained austenite are also present in the microstructure. The microstructure and the desired mechanical properties are adjusted in the steel mill by means of the chemical composition and targeted cooling at the end of the annealing process in the hot-dip galvanizing line. Dual-phase steels show a very low yield strength ratio combined with very high tensile strength and strong work hardening. They are characterized by good cold formability.

As a logical continuation of the successful use of dual-phase steels, variants with improved formability have been developed. These are offered by Salzgitter Flachstahl as xtend® variants and enable the production of more complex and stronger components.

The multiphase steel is also available as xpanse® variant with guaranteed hole expansion. The edge crack sensitivity is significantly reduced in comparison to conventional material, thus reducing the risk of failure during processing.

Chemical compositions ¹⁾

(in percent by weight)

	min. in %	max. in %
C		0.15
Si		0.80
Mn		2.5
P		0.050
S		0.010
Al _{total}	0.015	1.0
Cr + Mo		1.40
Nb + Ti		0.15
V		0.02
B		0.005
Cu		0.20

1) Heat analysis

Mechanical properties (longitudinal)

Yield strength R_{p0.2} in MPa	330 - 430
Tensile strength R_m in MPa	590 - 700
Total elongation A₈₀ in %	≥ 26
Hardening exponent n	≥ 0.16
Bake-Hardening BH₂ in MPa	≥ 30

Available dimensions

Thickness in mm	Width in mm
0.80 - 0.90	1,100 ²⁾ - 1,450
0.90 - 1.20	1,100 ²⁾ - 1,580
1.20 - 2.50	1,100 ²⁾ - 1,650

2) Width ≤ 1,100 mm on request

Surface finish

Thickness ranges

Unexposed	0,80 - 2,50
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Form of delivery

These steel sheet products with increased yield strength are supplied in the form of hot-dip galvanised steel sheet (cold rolled steel sheet carrier material) with a thickness of ≥ 0.80 mm ≤ 2.50 mm, and surface finish unexposed with Pretex® Texturing in accordance with VDA 239-100. Delivery is based on conditions to DIN EN 10021, in combination with relevant valid dimensioning standards (DIN EN 10143) or special terms of delivery. The test unit comprises 20 tons, or 20 tons of each new batch of products of the same steel grade and nominal thickness. Strip material is tested in coil form.

The maximum strip width is 1,650 mm, as determined by the steel sheet thickness.





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Application examples

Galvanised dual-phase steel products were developed for the automotive industry. There is a constantly rising demand in other fields of application.

A special feature of these steel products is their high performance in terms of deflection limiting volume despite their high tensile strength, making the products particularly suitable for the production of components with complex structure.

High strength in the component is achieved by a combination of the work-hardening effect and the bake-hardening effect, which represents a special advantage of dual-phase steels.

The work-hardening effect refers to the increase in strength after the shaping procedure (strain hardening). The bake-hardening effect refers to the increase in strength after the stove-enamel process. Such properties contribute towards the mechanical

strength of components, under the aspect of reduced weight.

Value added potentials in terms of weight optimization by means of a reduction of steel sheet thickness were proven in extensive examinations, including an FEM (Finite Element Method) simulation.

Companies processing such steel products must verify compliance of their calculation, construction and processing methods with material requirements. The forming technology deployed must be fit for the purpose, compliant with state-of-the-art, and should be adapted as required.

Our dual-phase steel products can be finished with anti-corrosive / forming aid (pre-lube oil, hotmelt), including forming aids such as ATP® to suit application requirements.

Dual-phase steel products support all known processes, such as stamping, joining and varnishing techniques. Dual-phase

steel products feature an excellent cold forming capability and high yield strength after forming.

The dual-phase steel products described in this document can be welded manually or automatically in any known welding technique. Only the welding wires and electrodes approved as auxiliary welding materials for this group of high-tensile products should be used.

Information for processing

Dual-phase steel features a natural aging and tends to heat-aging properties (= bake hardening effect). It is therefore in the interests of the user to process the material in time.

The validity of the mechanical properties are limited to the maximum of 6 months after supply.

Commitments regarding certain properties or a certain purpose of use require written agreements. Technical changes as well as typesetting and printing errors reserved



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