



## CR290Y490T-DP (HCT490X\*, HC300XD\*\*)

Dual-phase steel for cold forming

Material no.	1.0995
IMDS	539810684
	51308274**
Materialinformationsblatt (MIB) according to	VDA 239-100
	* DIN EN 10346 (10/15)/ DIN EN 10143 (09/06)

\*\* steel type designation specific to yield strength

### Surface finish

Thickness ranges

MB	0.50 – 2.00
MC	By agreement

### General Information

Dual-phase steel features a (soft) ferrite microstructure, with a matrix containing islands of martensite (increasing yield to tensile strength) in the secondary phase (with proportional volume fraction increase in analogue to tensile strength).

Dual-phase steel features a low yield to tensile strength ratio, high tensile strength and work hardening rate.

The steel melt is produced in an oxygen top blowing process in the converter, and undergoes an alloy treatment in the secondary metallurgy phase. The product is aluminium-killed steel, with high tensile strength achieved by the composition with manganese, chromium and silicone.

The increase in the yield to strength ratio in the martensitic phase is produced by quenching the hot cold rolled strip before it enters the zinc pot of the hot-dip galvanization unit.

### Chemical compositions<sup>1)</sup>

(according to VDA 239-100, in percent by weight)

	min. in %	max. in %
C		0.14
Si		0.50
Mn		1.80
P		0.050
S		0.010
Altotal	0.015	1.0
Cr + Mo		1.0
Nb + Ti		0.15
Cu		0.20
B		0.005

(according to DIN EN, in percent by weight)

	min. in %	max. in %
C		0.14
Si		0.75
Mn		2.0
P		0.080
S		0.015
Altotal	0.015	1.0
Cr + Mo		1.0
Nb + Ti		0.15
V		0.20
B		0.005

1) Heat analysis

### Mechanical properties<sup>2, 3)</sup>

Yield strength $R_e^{(4)}$ in MPa	
VDA	290 – 380
DIN EN	290 – 380
Tensile strength $R_m$ in MPa	
VDA	500 – 600
DIN EN	≥ 490

### Total elongation $A_{80}^{(5)}$ in %

VDA	≥ 24
DIN EN	≥ 24

### Hardening exponent $n_{90}$

VDA	≥ 0.15
DIN EN	≥ 0.15

### Bake hardening $BH_2$ in MPa

VDA	≥ 30
DIN EN	≥ 30

2) Valid to three months after supply.

3) The test direction is according to DIN EN and according to VDA in rolling direction.

4)  $R_{eL}/R_{p0.2}$

5) For a thickness of 0.60 mm,  $A_{80}$  reduces for 2 units.

### Available dimensions<sup>6)</sup>

Thickness in mm	Width in mm
0.50 – 0.70	1,000 – 1,435
0.71 – 1.20	1,000 – 1,500
1.21 – 2.00	1,000 – 1,700

6) Other dimensions upon request

### 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  $\geq 0.50 \text{ mm} \leq 2.00 \text{ mm}$ , and surface finish MB with Pretex® Texturing in accordance with DIN EN 10346. 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





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products of the same steel grade and nominal thickness. Strip material is tested in coil form.

The maximum strip width is 1,800 mm, as determined by the steel sheet thickness.

### Usage

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 3 months after supply.

### 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.

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 (prelube oil, hotmelt), including forming aids such as ATP to suit application requirements.

Dual-phase steel products support all known processes, such as stamping, jointing 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.

An anti-corrosive primer can be applied to dual-phase steel products.