CR700Y980T-DP (HCT980XG*)

Multi-phase steel for cold forming – Dual-phase steel

Material no.	-
Materialinformationsblatt (MIB)	
according to	DIN EN 10143 (Sept 06)
according to	VDA 239-100
	* DIN EN 10346

Dual-phase steel with high yield strenth

General Information

Dual phase steel (DP steel) is a steel with a ferritic and martensitic matrix. With increasing strength it can contain bainite as a second phase. Remnants of austenite may be present. DP steels combine a very low elastic limit with very high tensile strength and a high degree of cold hardening. They are characterized by good cold formability.

After the oxygen blowing process in the converter, the steel is melted and submitted to an alloying treatment in the secondary metallurgy. It is aluminum-killed and achieves its high tensile strength with the defined addition of e.g. manganese, chromium, molybdenum or silicon as well as other micro-alloying elements. The mechanical properties are adjusted by controlled raising and lowering of temperature in the continuous heat treatment unit.

Chemical composition[1)]

(melt analysis in percent by weight)

	min. in %	max. in %
C		0,23
Si		1,0
Mn		2,90
P		0,050
S		0,010
Al	0,015	1,0
Cr+Mo		1,40
Nb+Ti		0,15
B		0,005
Cu		0,20

The material is described as low-carbon (LCE) with a max. of 0.115 %. With a carbon equivalent CEV(IIW) of max. 0.65 % it can be described as reduced.

Synonym: LCE = Low Carbon Equivalent

CEV(IIW): C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5)

1) Heat analysis

Mechanical properties

(as-delivered)

Yield strength $R_{p\,0,2}$ in Mpa
700 – 850

Tensile strength R_m in Mpa
980 – 1,130[2)]

Total elongation A_{80} in %
≥ 8

Bake-hardening BH_2
≥ 30

2) According to VDA 239-100

The samples for the tensile test are taken along the rolling direction. Transverse samples are available on request. Because the stability of mechanical properties may depend on time (dual-phase steels tend to natural aging), the consumer should process the products as soon as possible. The mechanical values are guaranteed for a maximum of three months after delivery of the material.

Available dimensions

Thickness in mm	Width in mm
1.00 – 1.20	900 – 1,250
1.21 – 2.00[3)]	900 – 1,350

3) Thicknesses from 2.00 mm to 3.00 mm on request.

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Form of delivery

This grade of sheet steel is supplied as hot galvanized sheet (cold-rolled sheet carrier material) in the surface type MB or U ("unexposed") with PRETEX® texturing in accordance with the available material data sheet (MIB) (based on VDA 239-100).

The delivery is subject to the conditions of DIN EN 10021 in combination with the dimensioning standard DIN EN 10143 or special conditions if arranged.

The test unit amounts to 20 t or every part of 20 t of products of the same grade of steel and nominal thickness. The test unit for strip stock is the coil.

The strip width as wide strip is 900 mm to 1,350 mm (see table).

Slit strip dimensions can be delivered after agreement.

Application characteristics

Dual phase steels were developed in (hot) galvanized form for automotive construction. Other application areas are being added continuously. What is special about this steel is that, despite the high tensile strength, it displays sufficient formability and is thereby suitable for components with complex shapes.

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. These properties allow the necessary component strength to be achieved with reduced weight. The potential which is possible with regard to weight reduction by reduction of sheet thickness has been proven in extensive investigations, including FEM (finite element method) simulation. The processor of this grade of steel must be sure that their calculation, construction and processing procedures are suitable for the material.

The shaping technology used must be suitable for the intended application and correspond to the state of the art and be adapted if required.

The dual-phase grades of steel can receive post-treatment depending on the application with corrosion protection/forming aid (Prelube oil, hotmelt), as well as with forming aids (ATP®). In the processing of dual-phase steel grades, all known technologies of pressing, joining and painting can continue to be used. The dual-phase grades of steel have good cold formability and harden strongly after deformation.

The dual-phase steels described may be welded by all known welding processes both manual and automated. As filler material, welding wires or electrodes approved for this strength group should be used.

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