

HC220I

Isotropic steel grades with high yield strength for cold forming

Material no.	1.0346
Material data sheet	10-110
according to	DIN EN 10268 (10/06)

Usage

Isotropic steels feature excellent forming characteristics and high yield strength and are ideal for the construction of diverse complex cold formed components, intended for demanding interior components as well as large outdoor panels. The isotropic behaviour ensures a uniform flow, regardless of the position in relation to the rolling direction.

Rotational-symmetric pressed parts do not show any earing due to the quasi-isotropic forming characteristics. Wall thickness fluctuation or local thinning will not develop. Isotropic steels are mainly used to produce:

1. Cold pressed parts
2. Large surface body parts
3. Cold profiles

Value added potentials in terms of weight optimization by means of a reduction of steel sheet thickness were proven in extensive examinations, including 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.

Mechanical properties (transverse)

Yield strength $R_{eL}/R_{p0,2}$	220 – 270 MPa
Tensile strength R_m	300 – 380 MPa
Total elongation $A_{80}^{1) 2)}$	32 %
Strain hardening exponent $n_{90}^{2)}$	≥ 0.17
vertical anisotropy $r_{90}^{2)}$	≤ 1.40

¹⁾ With finish category A to EN 10130, the breaking elongation values will increase by one unit and the n value by 0.01 units.

²⁾ With additional organic thin-film coating, the elongation values will increase by two units, and the strengthening exponential n_{90} is reduced by 0.01. The vertical anisotropic coefficient r_{90} will increase by 0.1.

Melting process

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 yield strength achieved by addition of titanium.

Chemical composition

(in percent by weight)

	min.	max.
C		0.07 %
Si		0.5 %
Mn		0.6 %
P		0.05 %
S		0.025 %
Al		0.015 %
Ti		0.05 %

Available dimensions

Thickn. in mm	Width in mm
0.50 – 0.59	900 – 1,700
0.60 – 2.00	900 – 1,850
2.01 – 3.00 ¹⁾	900 – 1,850

¹⁾ surface categorie A only

Form of delivery

These steel sheet types with higher tensile strength and isotropic forming properties are available as cold-rolled sheet with a thickness of $\geq 0.50 \text{ mm} \leq 3.00 \text{ mm}$ in surface categories A and B.

This steel family is delivered to rerollers in the form of hot-rolled strip. Rerolling and annealing conditions must be agreed upon ordering.

The maximum strip width is 1,860 mm, depending on the steel sheet thickness.

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Surface finish

Our isotropic steel products can be finished with anti-corrosive / forming aid (prelube oil, hotmelt), including forming aids (such as phosphating or μ phos®) to suit application requirements.

Processing

I-steels support all known processes, such as stamping, jointing and varnishing techniques.

Cold forming ability

Isotropic steel products are ideal for cold forming.

They feature excellent deep drawing properties and are particularly suitable for the applications in the stretch forming field.

Welding

Isotropic steels are suitable for all manual or automatic electrical welding processes in accordance with general technical rules. Brittleness will not develop in the heated zones. Preheating is not required.

We recommend the use of soft wires and electrodes as welding auxiliaries. The specifications of the manufacturers of selected welding auxiliaries must be observed.

Finish category

Isotropic steel grades are delivered with finish category A and in category B finish.

Surface coating

We can supply our isotropic steels with electrolytic galvanization finish to DIN EN 10152. Certification to DIN EN 10268 is pending.

We can also supply our isotropic

steels with hot-dip galvanization finish to DIN EN 10292. Certification to DIN EN 10292 is pending. However, special terms must be agreed.

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

Test scope

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.

Certification

Proof of the steel grade to DIN EN 10204.

Delivery

Delivery is based on conditions to DIN EN 10021, in combination with relevant valid dimensioning standards (DIN EN 10131 or DIN EN 10143), or on special terms of delivery.