

# Material Data Sheet: WINOX 304 (preliminary)

Issued: 11.03.2008

**Cladding composite:** **WINOX**  
(unalloyed deep drawing steel, both sides clad with stainless steel)

## Brief description

WINOX is a compound material based on an unalloyed, low-carbon steel with a Cu intermediate layer and an austenitic stainless steel on the outside as a substitution of pure stainless steel

## Standard-Raw materials<sup>1,2)</sup>

| Position           | Material                                     | Description                   | Grade                                | Standard                                 |
|--------------------|--|-------------------------------|--------------------------------------|--|
| Core               | Deep drawing steel                           | DD14<br><i>1006</i>           | 1.0389/2.0090<br><i>1006</i>         | EN 10111<br><i>ASTM A 568/A<br/>568M</i> |
| Intermediate layer | Pure Copper<br>(about 1% of total thickness) | Cu-HTP / Cu-ETP<br><i>DHP</i> | 2.0090 / 2.0060<br><i>UNS C12200</i> | EN 1652                                  |
| Cladding layer     | Austenitic stainless steel                   | X5CrNi18.10<br><i>304</i>     | 1.4301<br><i>UNS S30400</i>          | EN 10088<br><i>ASTM A 666</i>            |

1) Material name, number and standard in italics refer to US-standards

2) The associated chemical analyses take into account the lower as well as the upper limits of each element with respect to the corresponding European and US-standards

## Deliverable (standard)-sizes

Thickness: 0.5– 1.5 mm (0.02" – 0.06")  
Width: 20 – 500 mm (0.8" – 20")  
Length: 480 – 4000 mm (20" – 157")

## Cladded layer and adhesion

Thickness of layer: double-sided 8/8, 10/10 or 15/15% of strip thickness. Alternative layer thickness can be supplied on special request including different top & bottom layer thicknesses.

Adhesion: Metallic bond with copper intermediate layer  
No mechanical separation of foil from core possible

Measuring of layer thickness: Metallographical method

## Surface Conditions

| Description    | Characteristics   | Roughness Ra   |
|----------------|---|----------------|
| Mill Finish    | Metallically clean surface. Pittings, minimal defects and scratches are acceptable in a scale not impairing the technical function of the outside layers of the composite material. | 0.15 – 0.80 µm |
| Isotropic matt |   | 0.8 – 1.6 µm   |

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## Mechanical properties

| Layer thickness (%) | Surface condition             | Mechanical strength <sup>1)</sup> | Yield point $R_{p0,2}$ (N/mm <sup>2</sup> ) | Tensile Strength $R_m$ (N/mm <sup>2</sup> ) | Elongation $A_{80}$ (%) |
|---------------------|-------------------------------|-----------------------------------|---|---|-------------------------|
| all                 | Mill finish<br>Isotropic matt | LC                                | 200 - 350                                   | 420 - 580                                   | min. 32                 |

<sup>1)</sup> Description LC following to DIN EN 10139

## Tolerances

Size limits of thickness - according to classes A, B, C of DIN EN 10140  
Size limits of width - according to classes A, B of DIN EN 10140  
Size limits of length - according to classes A, B of DIN EN 10140

## Edge type

GK, NK according to DIN EN 10140

## Delivering types

Strips, sheets

## Ordering example

Orders should be specified as below using the information stated in this material data sheet:

| Product Features  | Sample 1                           | Sample 2   |
|---|------------------------------------|--|
| Cladding Composite  | WINOX                              | WINOX  |
| Layer material  | 1.4301                             | 1.4301   |
| Layer P(side1-side2) (%)  | P(08-08)                           | P(10-10)   |
| Strength Condition  | LC                                 | LC   |
| Surface Quality   | Mill Finish                        | Mill Finish  |
| Edge Type   | GK                                 | GK   |
| Delivery Form   | Strip                              | Sheet  |
| Thickness (Tolerance) x Width (Tolerance) x Length (Tolerance) (mm) | 0,80 (+/- 0,025) x 100 (+/-0,13)mm | 1,20 (+/-0,030) x 420 (+/-0,30) x 1.500 (-0/+6) mm |

## Miscellaneous

All information in this material data sheet refer to WINOX materials based on a standard production.

Further product features on request.