

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^{1),2)}

Position	Material	Description	Grade	Standard
Core	Deep drawing steel	DD14 <i>1006</i>	1.0389/2.0090 <i>1006</i>	EN 10111 <i>ASTM A 568/A 568M</i>
Intermediate layer	Pure Copper (about 1% of total thickness)	Cu-HTP / Cu-ETP <i>DHP</i>	2.0090 / 2.0060 <i>UNS C12200</i>	EN 1652
Cladding layer	Austenitic stainless steel	X5CrNi18.10 <i>304</i>	1.4301 <i>UNS S30400</i>	EN 10088 <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 ¹⁾	Yield point $R_{p0,2}$ (N/mm ²)	Tensile Strength R_m (N/mm ²)	Elongation A_{80} (%)
all	Mill finish Isotropic matt	LC	200 - 350	420 - 580	min. 32

¹⁾ 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.