

**CARACTERÍSTICAS  
TÉCNICAS  
RENDIMIENTOS  
LUMINOSOS**











# CARACTERÍSTICAS TÉCNICAS TUBO REFLEXIÓN



## 25 Years Materials Only Warranty for indoor sunlight applications

exclusive for: PLÁSTICOS Y CLARABOYAS MATILLA, S.L. | July 2016 | 128

**25**  
YEAR  
WARRANTY

Quality assurance  
to DIN ISO 9001

MIRO® & MIRO-SILVER® surface- caused by small amounts of inevitable water condensation in the pipe do not effect this warranty. *manufacture* guarantees that the products supplied for sunlight purposes under normal interior environmental conditions will not splinter, yellow, darken, peel-off, blister, crack or develop any other surface deterioration reducing the reflectivity when used in light-pipes and can withstand a temperature of max. 100°C (= 212°F).

Any defects with *manufacture* pre-anodized-materials respectively materials obtained by PVD-coating process (MIRO® and MIRO-SILVER®) suitable for sunlight purposes, that are caused by exposition to fire, accident, abuse, negligence, collision or corrosive atmosphere such as chemical fumes, alkaline

*manufacture* warrants for a period of 25 years – starting from the date of supply ex works *manufacture* – that their MIRO-SILVER® and their MIRO® – reflection-enhanced PVD coated material for lighting and sunlight purposes shall be free from defects in material and workmanship and correspond to the agreed material's properties.

This warranty applies only when the gasket at both ends of the light-pipe tube remain fully sealed and no water leakage into the tube can occur. It is void in the case of water damage. Minor marking of the

solution, acidity, or any other chemical atmosphere are not covered by this warranty. Liability only applies when the metal is used as a reflector material for indoor sunlight applications in light-pipe.

*manufacture* does not undertake any guarantee in case that products finished for lighting and sunlight purposes are used for any other specific application. An assumption of liability is not ensured in case the defects are due to third-party negligence and in case of consequential damages arising out of a warranty. Materials traceability must be guaranteed by the processor.

In case *manufacture* products manufactured for sunlight purposes should present such above mentioned defects performing a breach of this declaration of warranty, *manufacture* obligation will be to replace such material by an adequate quantity of faultless metal of the same grade suitable for lighting purposes (excluded production-costs with customer).

*manufacture* is able to offer this 25 year warranty due to the excellent durability of MIRO-SILVER® and MIRO®. MIRO's durability derives from the excellent photostability of MIRO® in all UV ranges, and its solid non-laminated construction.

The inert non-organic surface enables MIRO® to withstand extremes of temperature and light, without changing either – colour, image clarity or reflectivity. This certificate is only valid with the original signet.



Oliver Storbeck

Sebastian Stever



Reg. No. 29 209 - 02

# CARACTERÍSTICAS TÉCNICAS TUBO REFLEXIÓN

## CARACTERÍSTICAS TÉCNICAS

A continuación se presentan las características técnicas del tubo solar:

### PROPIEDADES MECANICAS Y ÓPTICAS DEL TUBO DE ALUMINIO

En el siguiente esquema se exponen las propiedades completas del tubo de aluminio reflectante.

Condiciones de Ensayo		Valores orientativos	Ud.	Método de ensayo
Espesor		0,5	mm	
Anchura max.		1.250	mm	
Aleación		Al 99,85	-	DIN EN 573-3
<b>MECANICAS</b>				
Tensión dúctil		160-200	MPa	ISO527-2/1B/50
Resistencia a la tracción		140-180	MPa	ISO527-2/1B/50
Alargamiento a la rotura		≥2	%	ISO527-2/1B/50
Lámina PVD		PVD Ag99,95		
Iridiscencia a los colores		Libre de color		
<b>TOLERANCIAS</b>				
Indicador para plancha aluminio		±0,04	mm	
Divergencia transversal		≤1,50(D1-D2)	mm	
Flatness	1% de máxima longitud de onda	8	mm	
<b>ÓPTICAS</b>				
Reflexión total de la luz		≥98	%	DIN 5036-3(U-Globe)
Perdida luz en reflexion		<6	%	DIN 5036-3(U-Globe)
Reflexión total de la luz		≥98	%	ASTM E 1651(TR-2)
Luminosidad Along	60°/calibrado 91.8	93		ISO7668
Luminosidad Across	60°/calibrado 91.8	92		ISO7668
Claridad de imagen	60°/calibrado 91.8	≥97		ASTM E-430 (Hunter Dorigon)
Valores de color	A 10°	0 b +5		DIN5033-4



# CARACTERÍSTICAS TÉCNICAS TUBO REFLEXIÓN

<b>Quality:</b>	4270AG			Miro Silver Highgloss
<b>Additional Information</b>				
<b>Availability</b>				
Thickness from to	[mm]	0,20 - 0,80		
max. width	[mm]	1250,00		
<b>Alloy:<sup>1</sup></b>	Al 99,85			
<b>Hardness:<sup>2</sup></b>	hard			
<b>Mechanical Properties:</b>				
Tensile strength	[MPa]	160	-	200
Yield strength	[MPa]	140	-	180
Elongation (A50)	[%]	≥ 2		
Deformation/Bending:	bending	≥ 1,5 x gauge of material		
<b>Treatment Front:</b>	(S1) electrolytically brightened anodized and PVD coated			
<b>PVD layer</b>	(S1) PVD Ag 99,95			
<b>Iridescent colours</b>	(S1) absolutly colourfree			
<b>Tolerances</b>	Coil, strip, sheet, blanks			
<b>Gauge:</b>	[mm]	0,30 - 0,50 ± 0,04		0,61 - 0,80 ± 0,06
	[mm]	0,51 - 0,60 ± 0,05		
<b>Width/Coil:</b>	[mm]	+3,00 /-0.00		
<b>Width Slit Coil:</b>	[mm]	±0,20	Standard	±0,05 Special
<b>Longitudinal Curvature:</b>	[mm]	≤ 1,00 on a measuring length of 1000mm		
<b>Sheet:</b>	[mm]	0 - 600 +1,0/-0.00		
	[mm]	600 - 1500 +1,5/-0.00		
	[mm]	1500 - 2500 +2,5/-0.00		
	[mm]	2500 - 3500 +3,5/-0.00		
<b>Flatness:</b>		1% of wavelength maximum		8 [mm]
<b>Transversal divergency:</b>	[mm]	≤ 1,50 (D1-D2)		
<b>Optical Properties:</b>				
<b>Total light reflection:</b>	(S1) [%]	≥ 98	DIN 5036-3 (U-Globe)	
<b>Diffuse light reflection:</b>	(S1) [%]	< 6	DIN 5036-3 (U-Globe)	
<b>Total light reflection:</b>	(S1) [%]	≥ 98	ASTM E-1651 (TR-2)	
<b>Solar Reflection</b>	(S1) [%]	95	DIN EN 410	
<b>Brightness</b>	along: [ ]	93	ISO 7668 (60° / calibrated 91.8)	
	across: [ ]	92	ISO 7668 (60° / calibrated 91.8)	
<b>Brightness</b>	Image Clarity [ ]	≥ 97	ASTM E-430 (Hunter Dorigon)	
	Diffuseness [ ]	0,00	ASTM E-430 (Hunter Dorigon)	
<b>Color values</b>	b* [ ]	0 b* +5	DIN 5033-4 10°	
<b>Protective Film:</b>	PE - Foil gauge 50 - 60 µm			
<b>Characteristic:</b>				



# CARACTERÍSTICAS TÉCNICAS POLIETILENO

## Características técnicas del plástico del aro difusor embellecedor



### Brief characteristic:

High impact polystyrene with excellent mechanical properties and high cold resistance, good deflection temperature and high stress cracks performance.

### Mechanical properties

Yield strength	DIN 53455	N/mm <sup>2</sup>	17,5
Elongation at yield	DIN 53455	%	2,0
Tensile strength at break	DIN 53455	N/mm <sup>2</sup>	17
Elongation at break	DIN 53455	%	> 30
Modulus in flexure	DIN 53457-B4	N/mm <sup>2</sup>	1850
Flexural stress at conventional deflection	DIN 53452	N/mm <sup>2</sup>	39
Impact strength at 23°C	DIN 53453	kJ/m <sup>2</sup>	> 30
Impact strength at -30°C	DIN 53453	kJ/m <sup>2</sup>	30
Impact strength notched at 23°C	DIN 53453	kJ/m <sup>2</sup>	6
Impact strength notched at -30°C	DIN 53453	kJ/m <sup>2</sup>	5
Indentation hardness (H 358/30)	DIN 53456	N/mm <sup>2</sup>	80

### Thermal properties

Vicat softening point VST B 50	DIN 53460	°C	90
ISO/R75 process A	DIN 53461	°C	78
ISO/R75 process B	DIN 53461	°C	89
Continuous working temperature		°C	70
Thermal coefficient of linear expansion	DIN 53752	10 <sup>-5</sup> /K	8-10
Thermal conductivity	DIN 52612	W/Km	0,17
Specific heat		kJ/kgK	1,2

### Electrical properties

Dielectric constant	DIN 53483		2,5
Dissipation factor	DIN 53483	10 <sup>-5</sup>	4
Specific volume resistivity	DIN 53482	Ωcm	>10 <sup>16</sup>
Surface resistivity	DIN 53482	Ω	>10 <sup>13</sup>
Dielectric strength	DIN 53481	kV/mm	155

### Other properties

Shrinkage		%	0,4-0,7
Water absorption	DIN 53495	%	<0,1
Density	DIN 53479	g/cm <sup>3</sup>	1,05

8/96

These are typical values and can't be construed as product specifications.

The mechanical properties of this technical information were established with extruded 4 mm thick sheets.

The information contained herein is believed to be reliable to the best of our knowledge. However, all recommendations are made without guarantee of performance or warranty of freedom from legal responsibility.

# CARACTERÍSTICAS TÉCNICAS ARO SUJECCIÓN CÚPULA

Características técnicas del aro exterior de sujeción de la cúpula fabricado en ABS



## Ficha técnica

### Formaterm® ABS/ASA

#### Características del producto

- Good vacuum forming properties
- Excellent weather resistance
- Very high impact strength and stiffness

#### Campos de aplicación

- Vacuum forming industry
- Sanitary engineering

	Método de prueba	Unidad	Valor
<b>Propiedades generales</b>			
Densidad	DIN EN ISO 1183-1	g / cm <sup>3</sup>	1,03
Absorción de agua	DIN EN ISO 62	%	0,7
Inflamabilidad (Espesor 3 mm / 6 mm)	UL 94		HB
<b>Propiedades mecánicas</b>			
Límite de elasticidad	DIN EN ISO 527	MPa	45
Alargamiento de rotura	DIN EN ISO 527	%	10
Tensor de coeficiente de elasticidad	DIN EN ISO 527	MPa	2300
Notched impact strength	DIN EN ISO 179	kJ / m <sup>2</sup>	35
Dureza Shore	DIN EN ISO 868	scale D	75
<b>Propiedades térmicas</b>			
Glass transition temperature	ISO 11357-3	°C	100
Conductividad térmica	DIN 52612-1	W / (m * K)	0,18
Coefficiente lineal de expansión térmica	DIN 53752	10 <sup>-6</sup> / K	60 - 110
Temperatura de servicio o mantenimiento, largo plazo	Average	°C	-40 ... 75
Temperatura de servicio o mantenimiento, corto plazo (max.)	Average	°C	85 - 90
Temperatura de desviación del calor	DIN EN ISO 306, Vicat B	°C	98
<b>Propiedades eléctricas</b>			
Constante dieléctrica	IEC 60250		3,40
Dielectric dissipation factor (10 <sup>6</sup> Hz)	IEC 60250		0,025
Resistencia volumétrica	DIN EN 62631-3-1	Ω * cm	>10 <sup>15</sup>
Resistencia a la superficie	DIN EN 62631-3-2	Ω	>10 <sup>13</sup>
Fuerza dieléctrica	IEC 60243	kV / mm	20

Lo ficho técnico de arriba refleja valores medios verificados por pruebas estadísticas en constante actualización. Está según DIN EN 15860. Lo ficho técnica de arriba es meramente informativo y no se debe considerar vinculante a menos que esté expresamente acordado en un contrato de venta.

# Matilla

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