Datasheet

Material: INKUPAL-G100 (dry)

EN 02/12

Properties	Symbol	Unit	Standard	Value
Information				
Material code			Internal Standard	B6H
Colour				-
Density	ρ	kg/dm³	ISO 1183	1,15
Mechanical				
Compressive modulus	Ec	MPa	DIN EN ISO 604	-
Elastic limit	σ_{el}	MPa	Internal Standard	-
Compressive stress at yield	σ_Y	MPa	DIN EN ISO 604	-
Compressive strength	σ_M	MPa	DIN EN ISO 604	-
Compressive stress at 3,5% strain	$\sigma_{3,5\%}$	MPa	DIN EN ISO 604	-
Compressive strength (0,01 h)	σ_M	MPa	Internal Standard	-
Compressive strength (100 h)	σ_M	MPa	Internal Standard	-
Compressive strength (10000 h)	σ_M	MPa	Internal Standard	-
Compressive stress at break	σ_B	MPa	DIN EN ISO 604	-
Elastic compression limit	ε_{el}	%	Internal Standard	-
Nominal compressive yield strain	ε_{cy}	%	DIN EN ISO 604	-
Nominal compressive strain at compressive strength	ε_{cM}	%	DIN EN ISO 604	-
Nominal compressive strain at break	ε_{cB}	%	DIN EN ISO 604	-
Modulus in tension (tensile modulus)	E_t	MPa	DIN EN ISO 527	3100
Elastic limit	σ_{el}	MPa	Internal Standard	-
Tensile stress at yield	σ_Y	MPa	DIN EN ISO 527	80
Tensile strength	σ_M	MPa	DIN EN ISO 527	-
Tensile stress at break	σ_B	MPa	DIN EN ISO 527	-
Elastic yield point	ε_{el}	%	Internal Standard	-
Yield strain	ε_y	%	DIN EN ISO 527	-
Elongation at maximum force	ε_M	%	DIN EN ISO 527	-
Tensile elongation at break	ε_B	%	DIN EN ISO 527	40
Modulus in flexure	E_f	MPa	DIN EN ISO 178	3400
Outer fibre stress at 3,5% outer fibre strain	$\sigma_{f3,5}$	MPa	DIN EN ISO 178	-
Flexural strength	σ_{fM}	MPa	DIN EN ISO 178	140
Flexural stress at break	σ_{fB}	MPa	DIN EN ISO 178	-
Elongation at flexural yield stress	ε_M	%	DIN EN ISO 178	-
Flexural elongation at break	ε_B	%	DIN EN ISO 178	-
Creep modulus at 1% deformation after 1000h	E	N/mm²	DIN 53444	-
Stress at 1% deformation after 1000h	$\sigma_{1\%}$	N/mm²	DIN 53444	>7
Creep resistance			Relative value	-
Ball indentation hardness H358/30 (H132/30) [H49/30]	HB	N/mm²	DIN 2039	-
Shore A hardness		Shore	DIN 53505	-
Shore D hardness		Shore	DIN 53505	-
Impact strength Charpy not notched		kJ/m²	EN ISO 179/1eU	k.Br.
Impact strength Charpy notched		kJ/m²	EN ISO 179/1eA	>4
Loss tangent (1Hz)	tanδ	1	Internal Standard	-
Fatigue strength at 20°C, 106 stress cycles, 1 Hz		MPa	Internal Standard	-
Thermal				
Continuous operating temperature (long term)	RTi	°C	UL 746B	-40
Short term operating temperature (3 h)		°C	Internal Standard	+170
Maximum RTi temperature for bushings when pressed		°C	Internal Standard	-
Melting temperature	T_m	°C	DSC	220
Glass transition temperature	T_g	°C	DSC	-
Coefficient of thermal expansion up to 100°C	α	10^{-5}/K	ISO E 830	7-8
Coefficient of thermal expansion up to 150°C	α	10^{-5}/K	ISO E 831	-
Heat distortion temperature HDT/A 1,8 MPa	HDT(A)	°C	DIN EN ISO 75	-
Thermal conductivity	λ	W/(m*K)	DIN 52612	0,23
Specific heat capacity	c_p	kJ/(kg*K)	DSC	1,7
Fire behaviour (3,2mm) UL94			UL 94 HB	HB
Limiting oxygen index (LOI)	%	LOI	DIN EN ISO 4589	-

Properties	Symbol	Unit	Standard	Value
Electrical				
Volume resistivity	R_D	Ω*cm	IEC 60093	1,00E+15
Surface resistance	R_O	Ω	IEC 60093	1,00E+13
Penetration resistance	E	kV/mm	IEC 243	50
Tracking resistance		V	IEC 112	KA 3c
Dielectric constant (110Hz)		1	IEC 250	3,7
Dissipation factor (110Hz)	tanδ	1	IEC 112	0,03
PV values				
Max. surface pressure v=1m/min	p_{zul}	N/mm²	Internal test radial bushing	-
Max. surface pressure v=10m/min	p_{zul}	N/mm²		-
Max. surface pressure v=100m/min	p_{zul}	N/mm²		-
Max. surface pressure v=200m/min	p_{zul}	N/mm²		-
Evolution of heat with v=1m/min		°C		-
Evolution of heat with v=10m/min		°C		-
Evolution of heat with v=100m/min		°C		-
Evolution of heat with v=200m/min		°C		-
Friction				
μ static 20° C dry operation	$\mu_{stat.}$	1	Internal Standard inclined plane	-
μ dynamic 20° C dry operation	$\mu_{dyn.}$	1		-
μ dynamic 100° C dry operation	$\mu_{dyn.}$	1		-
Wear				
Wear factor at 20°C		mm/100 km	Internal test periodic translative movement under load	-
Wear factor at 100°C		mm/100 km		-
Wear factor at 200°C		mm/100 km		-
Wear factor at 240°C		mm/100 km		-
Available as				
Tubes (hollow rods) up to ø (de)				-
Sheets up to max. thickness				-
Rods up to ø (de)				-
Plastic granules				-
Injection moulded parts				-
Machined parts				-
Precision				
Dimensional stability with moisture absorption			Relative value	-
Water absorption 23°C / RMC 93%		%	DIN EN ISO 62	6,5
Water absorption until an equilibrium moisture content		%	DIN EN ISO 62	-
Dimensional stability with temperature variation			Relative value	-
High precision bushings (negative clearance)				-
Alignment adjustment			Relative value	-
Envrionmental influences				
Suitable for use in water				-
Resistance against hot water		°C		-
Resistance against dust, dirt, abrasive substances			Relative value	-
UV rays resistance			Relative value	-
Suitable for outdoor use			Relative value	-
Resistance to chemicals			Relative value	-
FDA compliant				-
Suitable for vacuum				-
Rate of desorption	a_{1h}	mbar*l/(s/cm²)		-
ROHS / WEEE				-
Free from silicone				-
Free from PTFE				-
Sterilization				
Resistant against disinfectant				-
Moist heat sterilization			Relative value	-
Gamma-rays radiation sterilization			Relative value	-
Chemical sterilization			Relative value	-
UV-sterilization			Relative value	-

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Legend

①	Low
⑩	High
✓	Applicable
×	Not applicable
(✓)	Limited
k.Br.	No break
n.d.	Not feasible
-	Not determined
n.v.	Non-existent

Datasheet

Material: INKUPAL-G100 (humid air) EN 02/12

Properties	Symbol	Unit	Standard	Value
Information				
Material code			Internal Standard	B6H
Colour				-
Density	ρ	kg/dm³	ISO 1183	1,15
Mechanical				
Compressive modulus	Ec	MPa	DIN EN ISO 604	-
Elastic limit	σ_{el}	MPa	Internal Standard	-
Compressive stress at yield	σ_Y	MPa	DIN EN ISO 604	-
Compressive strength	σ_M	MPa	DIN EN ISO 604	-
Compressive stress at 3,5% strain	$\sigma_{3,5\%}$	MPa	DIN EN ISO 604	-
Compressive strength (0,01 h)	σ_M	MPa	Internal Standard	-
Compressive strength (100 h)	σ_M	MPa	Internal Standard	-
Compressive strength (10000 h)	σ_M	MPa	Internal Standard	-
Compressive stress at break	σ_B	MPa	DIN EN ISO 604	-
Elastic compression limit	ε_{el}	%	Internal Standard	-
Nominal compressive yield strain	ε_{cy}	%	DIN EN ISO 604	-
Nominal compressive strain at compressive strength	ε_{cM}	%	DIN EN ISO 604	-
Nominal compressive strain at break	ε_{cB}	%	DIN EN ISO 604	-
Modulus in tension (tensile modulus)	E_t	MPa	DIN EN ISO 527	1800
Elastic limit	σ_{el}	MPa	Internal Standard	-
Tensile stress at yield	σ_Y	MPa	DIN EN ISO 527	60
Tensile strength	σ_M	MPa	DIN EN ISO 527	-
Tensile stress at break	σ_B	MPa	DIN EN ISO 527	-
Elastic yield point	ε_{el}	%	Internal Standard	-
Yield strain	ε_y	%	DIN EN ISO 527	-
Elongation at maximum force	ε_M	%	DIN EN ISO 527	-
Tensile elongation at break	ε_B	%	DIN EN ISO 527	100
Modulus in flexure	E_f	MPa	DIN EN ISO 178	2000
Outer fibre stress at 3,5% outer fibre strain	$\sigma_{f3,5}$	MPa	DIN EN ISO 178	-
Flexural strength	σ_{fM}	MPa	DIN EN ISO 178	60
Flexural stress at break	σ_{fB}	MPa	DIN EN ISO 178	-
Elongation at flexural yield stress	ε_M	%	DIN EN ISO 178	-
Flexural elongation at break	ε_B	%	DIN EN ISO 178	-
Creep modulus at 1% deformation after 1000h	E	N/mm²	DIN 53444	-
Stress at 1% deformation after 1000h	$\sigma_{1\%}$	N/mm²	DIN 53444	>7
Creep resistance			Relative value	-
Ball indentation hardness H358/30 (H132/30) [H49/30]	HB	N/mm²	DIN 2039	-
Shore A hardness		Shore	DIN 53505	-
Shore D hardness		Shore	DIN 53505	-
Impact strength Charpy not notched		kJ/m²	EN ISO 179/1eU	k.Br.
Impact strength Charpy notched		kJ/m²	EN ISO 179/1eA	>15
Loss tangent (1Hz)	tanδ	1	Internal Standard	-
Fatigue strength at 20°C, 106 stress cycles, 1 Hz		MPa	Internal Standard	-
Thermal				
Continuous operating temperature (long term)	RTi	°C	UL 746B	+105
Short term operating temperature (3 h)		°C	Internal Standard	+170
Maximum RTi temperature for bushings when pressed		°C	Internal Standard	-
Melting temperature	T_m	°C	DSC	220
Glass transition temperature	T_g	°C	DSC	-
Coefficient of thermal expansion up to 100°C	α	10^{-5}/K	ISO E 830	7-8
Coefficient of thermal expansion up to 150°C	α	10^{-5}/K	ISO E 831	-
Heat distortion temperature HDT/A 1,8 MPa	HDT(A)	°C	DIN EN ISO 75	-
Thermal conductivity	λ	W/(m*K)	DIN 52612	0,23
Specific heat capacity	c_p	kJ/(kg*K)	DSC	1,7
Fire behaviour (3,2mm) UL94			UL 94 HB	HB
Limiting oxygen index (LOI)	%	LOI	DIN EN ISO 4589	-

Properties	Symbol	Unit	Standard	Value
Electrical				
Volume resistivity	R_D	Ω*cm	IEC 60093	1,00E+12
Surface resistance	R_O	Ω	IEC 60093	1,00E+12
Penetration resistance	E	kV/mm	IEC 243	20
Tracking resistance		V	IEC 112	KA 3b
Dielectric constant (110Hz)		1	IEC 250	3,7
Dissipation factor (110Hz)	tanδ	1	IEC 112	0,03
PV values				
Max. surface pressure v=1m/min	p_{zul}	N/mm²	Internal test radial bushing	-
Max. surface pressure v=10m/min	p_{zul}	N/mm²		-
Max. surface pressure v=100m/min	p_{zul}	N/mm²		-
Max. surface pressure v=200m/min	p_{zul}	N/mm²		-
Evolution of heat with v=1m/min		°C		-
Evolution of heat with v=10m/min		°C		-
Evolution of heat with v=100m/min		°C		-
Evolution of heat with v=200m/min		°C		-
Friction				
μ static 20° C dry operation	$\mu_{stat.}$	1	Internal Standard inclined plane	-
μ dynamic 20° C dry operation	$\mu_{dyn.}$	1		-
μ dynamic 100° C dry operation	$\mu_{dyn.}$	1		-
Wear				
Wear factor at 20°C		mm/100 km	Internal test periodic translative movement under load	-
Wear factor at 100°C		mm/100 km		-
Wear factor at 200°C		mm/100 km		-
Wear factor at 240°C		mm/100 km		-
Available as				
Tubes (hollow rods) up to ø (de)				-
Sheets up to max. thickness				-
Rods up to ø (de)				-
Plastic granules				-
Injection moulded parts				-
Machined parts				-
Precision				
Dimensional stability with moisture absorption			Relative value	-
Water absorption 23°C / RMC 93%		%	DIN EN ISO 62	6,5
Water absorption until an equilibrium moisture content		%	DIN EN ISO 62	-
Dimensional stability with temperature variation			Relative value	-
High precision bushings (negative clearance)				-
Alignment adjustment			Relative value	-
Envrionmental influences				
Suitable for use in water				-
Resistance against hot water		°C		-
Resistance against dust, dirt, abrasive substances			Relative value	-
UV rays resistance			Relative value	-
Suitable for outdoor use			Relative value	-
Resistance to chemicals			Relative value	-
FDA compliant				-
Suitable for vacuum				-
Rate of desorption	a_{1h}	mbar*l/(s/cm²)		-
ROHS / WEEE				-
Free from silicone				-
Free from PTFE				-
Sterilization				
Resistant against disinfectant				-
Moist heat sterilization			Relative value	-
Gamma-rays radiation sterilization			Relative value	-
Chemical sterilization			Relative value	-
UV-sterilization			Relative value	-

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Legal Information

All the tests are been made with a standard conditioning atmosphere of 23°C (at the moment no other temperature is available). The specified values are established from average values of several tests and they correspond to our today's knowledge. They are only to be used as information about our products and as help for the material selection. With these values, we do not ensure specific properties, or the suitability for certain application, therefore we do not assume any legal responsibility for an improper usage. The used test pieces have been machined from extruded semi-finished material. Since the plastics´ properties depend on the manufacturing process (extrusion, injection moulding), on the dimensions of the semi finished material and on the degree of crystallinity, the actual properties of a specific product may slightly deviate from the tested ones. For information about divergent properties do not hesitate to contact us. On request we advise you regarding the most appropriate component design and the definition of material specifications more suitable to your application data. Notwithstanding, the customer bears all the responsibility for the thorough examination of suitability, efficiency, efficacy and safety of the chosen products in pharmaceutical applications, medical devices or other end uses.

Legend

①	Low
⑩	High
✓	Applicable
×	Not applicable
(✓)	Limited
k.Br.	No break
n.d.	Not feasible
-	Not determined
n.v.	Non-existent