TECASINT 2000 and 3000 for Direct Forming

TECASINT 2000 DF and 3000 DF are non meltable high temperature polyimides. High volume parts can be manufactured economically and precisely using the direct forming process.

TECASINT 2000 DF

The material has an enhanced thermal resistance and high creep strength under mechanical load. Furthermore, TECASINT 2000 DF has good impact strength and a high E-modulus.

Properties

- High thermal-mechanical load, impervious under thermal shock
- Very high creep strength
- Outstanding sliding and wear properties
- Low water absorption
- Good chemical resistance
- Low outgassing, high purity
- Inherently flame retardant (UL 94 V0)
- Easily machinable

TECASINT 3000 DF

The material has the highest thermal long term resistance combined with low creep under mechanical load. In comparison to TECASINT 2000 TECASINT 3000 is tougher and has lower water absorption.

Properties

- Highest thermal stability of all TECASINT products, impervious under thermal shock
- Good toughness
- High creep strength
- Outstanding sliding and wear properties
- Low outgassing, high purity
- Inherently flame retardant (UL 94 V0)
- Lower water absorption in comparison to TECASINT 2000
- Good chemical resistance
- Easily machinable

TECASINT 2012 and 3012
(unreinforced)
Maximum strength and elongation.
Lowest thermal conductivity
Optimal electrical properties.

TECASINT 2022 and 3022
(15 % graphite)
Improvement in wear resistance and thermal aging.

TECASINT 2032 and 3032
(40% graphite)
Low coefficient of thermal elongation,
maximum creep strength.

TECASINT 2062 and 3062
(15 % graphite and 10 % PTFE)
Lowest static coefficient of friction.

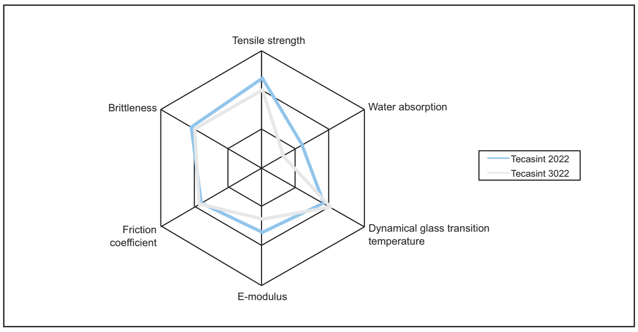
Preferred fields

Automotive, mechanical engineering, transmission technology, conveyor technology, cryo-engineering, hot glass technology, aerospace, plasma technology, cutting blow pipes, electrical and electronic technology, semi-conductor.

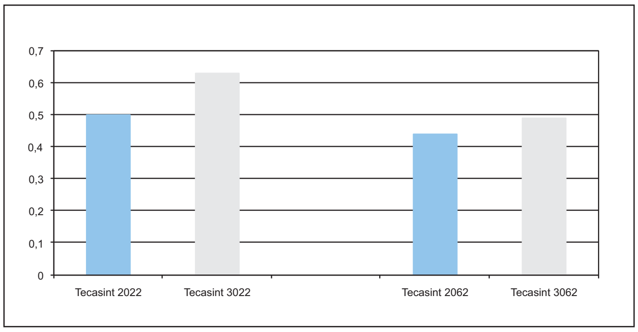
Applications

Valve seats, chain guides, wear pads, static seals, wearing elements, piston rings, bearing discs, bearing bushes, thrust washers, hot glass grippers.

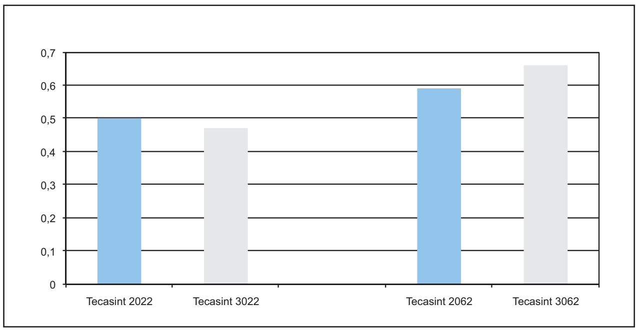
Comparison of the physical properties of TECASINT 2022 and TECASINT 3022



Friction coefficient μ under pressure of 5 MPa, v = 0,5 m/s, Temp. 23 °C



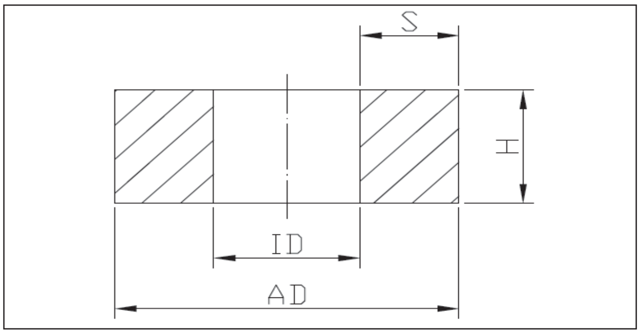
Average specific wear rate 10^{-6} mm^3/Nm under pressure of 5 MPa, v = 0,5 m/s, Temp. 23 °C



Conditions for direct forming:

Min. Thickness:	~ 1 mm
Max. Thickness:	30 mm
Max. outer diameter:	160 mm
Min. inner diameter:	~ 2 mm
Max. surface:	~ 2000 mm²
Surface quality:	~ 1 µm (Ra)
flattening at chamfers:	0,15 – 0,3 mm

Shape and position tolerances:



Diameter (AD):	**Height (H):**
0 - 20 mm ± 0,03 mm	0 – 5 mm ± 0,1mm
20 - 40 mm ± 0,05 mm	5 – 15 mm ± 0,2 mm
40 - 60 mm ± 0,075 mm	15 – 40 mm ± 0,25 mm
S = wall thickness	

Diameter	**Concentricity**	**Roundness**	**Parallelism**	**Flatness**
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0 – 25 mm	0,04	0,05	0,04	0,05
25 – 50 mm	0,05	0,125	0,075	0,125
>50 mm	0,05	0,13	0,076	0,13

All values in [mm]

Technical Properties

Trade name		TECASINT 2012	TECASINT 2022	TECASINT 2032	TECASINT 2062	TECASINT 3012	TECASINT 3022	TECASINT 3032	TECASINT 3062
Short description		PI	PI CS15	PI CS40	PI S15TF10	PI	PI CS15	PI CS40	PI CS 15TF10
Long term service temperature	°C	300	300	300	260	300	300	300	260
Density (ASTM D 792, DIN EN ISO 1183)	ρ g/cm	1,28	1,35	1,49	1,42	1,31	1,37	1,49	1,41
Tensile strength at break (DIN EN ISO 527)	σ_R Mpa	88	77	40	38	57,4	54,4	41,6	44,1
Elongation at break (DIN EN ISO 527)	ε_R %	4,6	3,6	1,7	1,7	6	4,6	2,2	3,6
Modulus of elasticity in tension (DIN EN ISO 527)	E_Z MPa	2600	3200	3494	2900	2284	2904	3524	2646
Flexural strength (DIN EN ISO 178)	σ_B Mpa	131	105	57	61	81	81	68	62
Modulus of elasticity after flexural test (DIN EN ISO 178)	E_B MPa	2842	3353	3440	3130	2215	2840	3865	2740
Hardness: Shore D (DIN 53505)	$H_{(d)}$	85	84	80	82	80	80	80	78
Impact strength: (DIN EN ISO 179 (Charpy)	a_n kJ/m²	24,7	23,6	7,8	8,7	31,1	23,5	10,7	17,8
Glass transition temperature (DMTA, Peak tanδ)	T_g °C	370	370	370	370	>400	>400	>400	>400
Heat distortion temperature DIN EN ISO 75 method A (1,8 MPa)	HDT/A °C	310	340			380	380		
Thermal conductivity (40°C) (ISO 8302)	λ W/(K·m)	0,23	0,32			0,28			
Specific heat (23°C)	c J/(g·K)	0,98	0,99						
Coefficient of linear expansion (50 - 200 °C, ASTM D 696, ASTM E 831, DIN 53 752)	α 10^{-5} 1/K	4,7	4,1			5,4	4,4	3,1	4,5
Coeffcient of linear expansion (200 - 300 °C, ASTM D 696, ASTM E 831, DIN 53 752)		5,9	5,2			7,1	5,7	4	5,7
Specific volume resistance (ASTM D 257, EC 93, DIN IEC 60093)	ρD Ω·cm	10*15				10*17	10*17		
Surface resistance (ASTM D 257, EC 93, DIN IEC 60093)	R_O Ω	10*15				10*16	10*16		
Dielectric strength (ASTM D 149, DIN EN 60243)	E_d kV/mm	34,3				20			
Water absorption at saturation (DIN EN ISO 62, 23°C, 24h)	W %	1,62	1,04	1,81	0,96	0,8	0,64	0,54	0,43
Flammability acc. to UL standard 94		V0	V0			V0	V0		

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