

High Performance Glass Epoxy Laminate

TENMAT FEROFORM AE2 has been developed as an economical high performance epoxy glass laminate with good mechanical properties.

FEROFORM AE2 machines to an excellent surface finish and is available in sheets or fully machined parts.

FEROFORM AE2 is typically used as rotor vanes for compressors and vacuum pumps.



PROPERTIES	UNITS	AE2
Impact Strength	kJ/m^2	33
Flexural Strength	MPa	340
Tensile Strength	MPa	300
Compressive Strength	MPa	350
Shear Strength	MPa	30
Density	g/cm^3	1.8
Coefficient of Thermal Expansion (Parallel to lamia)	$10^{-6}/^{\circ}\text{C}$	13
Maximum Continuous Operating Temperature	$^{\circ}\text{C}$	180

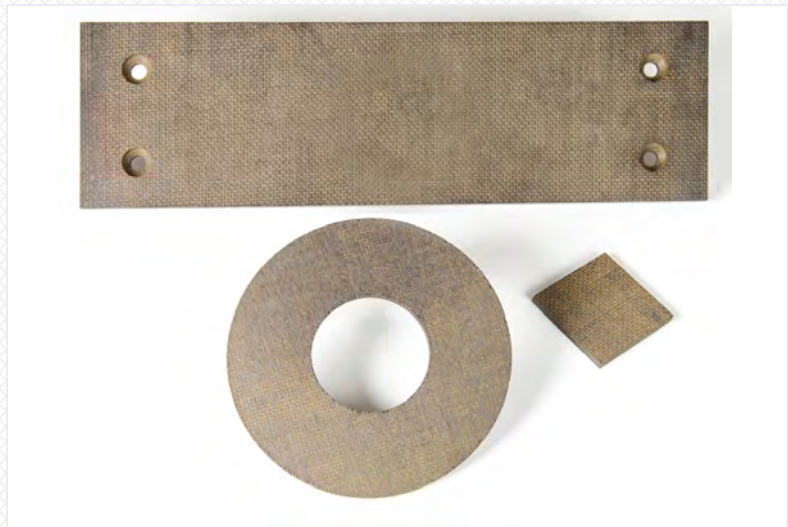
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For further information please contact our Technical Sales Department on +44 161 872 2181.

General Purpose Bearing Material

TENMAT FEROFORM F21 is a composite material made from woven fibre bonded with resin with a friction modifier.

FEROFORM F21 has been developed as a general purpose wearing and bearing material for many industrial applications, offering low wear and friction rates due to the inclusion of friction modifiers.



TENMAT FEROFORM F21 is widely used in railway applications, such as Side Bearer Liners, Corridor End Faces (vestibule buffers), and Tread Plates.

PROPERTY	UNITS	F21
Coefficient of Friction	Dry	0.17 - 0.23
Compressive Strength	MPa	180
Normal Working Pressure	MPa	48
Compressive Yield	% @ 68.9 MPa	1.8
Impact Strength	kJ/m ²	10
Shear Strength	MPa	35
Hardness	Brinell	30
Swell in Water	% @ 20 °C	0.5
Density	g / cm ³	1.36
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	110 15
Maximum Continuous Operating Temperature	°C	130
Maximum Intermittent Operating Temperature	°C	150

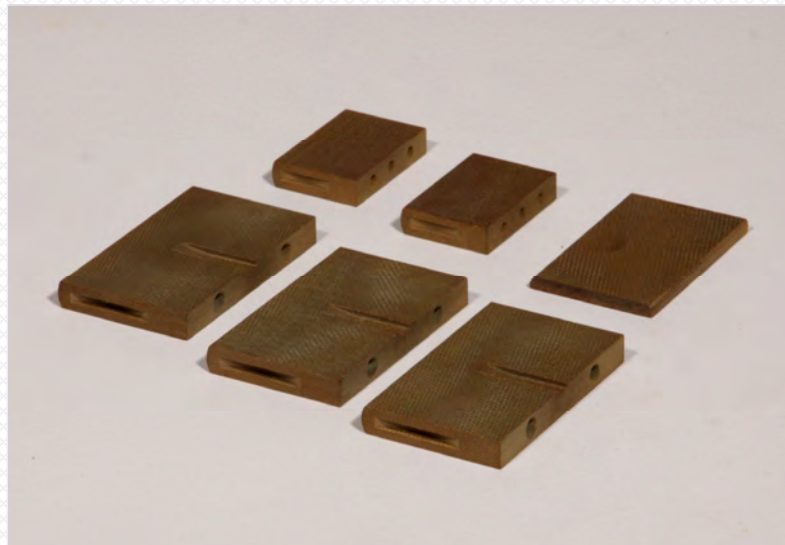
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Rotor Vane Material

TENMAT FEROFORM F43 was specifically developed for oil lubricated single and two stage high vacuum pumps

TENMAT FEROFORM F43 is a unique blend of high temperature fibres and resins for the most demanding applications.

TENMAT FEROFORM F43 exhibits superb stability under vacuum, insensitivity to moisture, excellent strength retention, low noise, and fine machining ability.



PROPERTY	UNITS	F43
Flexural Strength	MPa @ 20 °C	440
	MPa @ 200 °C (4 days)	260
Flexural Modulus	GPa	22
	GPa @ 200 °C (4 days)	20
Bond Strength	KN @ 7.9 thick	5.7
Swell in Water (24 hours)	% @ 80 °C length	<0.02
	% @ 80 °C thick	<0.02
Vacuum Movement (96 hours)	% @ 125 °C length	<0.02
	% @ 125 °C thick	<0.02
Coefficient of Thermal Expansion	10 ⁻⁶ /°C length	13
	10 ⁻⁶ /°C thick	30
Density	g / cm ³	1.8
Maximum Continuous Operating Temperature	°C	200
Maximum Intermittent Operating Temperature	°C	225

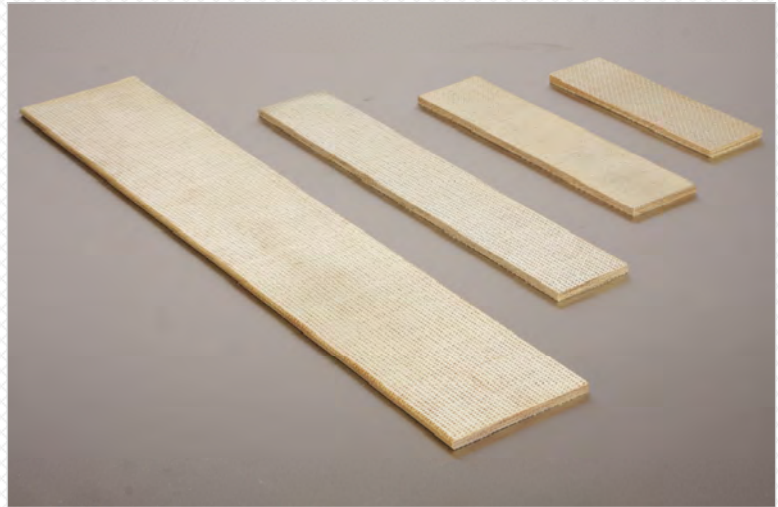
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High Performance Rotor Vane Material

TENMAT FEROFORM F57 is a high performance material for rotor vanes in vacuum pumps and compressors.

FEROFORM F57 is a cured phenolic resin matrix, reinforced with a specially engineered woven Kevlar fibre cloth.

TENMAT FEROFORM F57 exhibits superb stability under vacuum, insensitivity to moisture, excellent strength retention, and low noise.



The main areas of use are in single and two stage high vacuum pumps and compressors.

PROPERTY	UNITS	F57
Flexural Strength	MPa @ 20 °C	165
	MPa @ 200 °C (4 days)	68
	lbf/in ² @ 20 °C	23,925
	lbf/in ² @ 200 °C (4 days)	9,860
Flexural Modulus	GPa @ 20 °C	5.6
	GPa @ 200 °C (4 days)	4.9
	lbf/in ² x10 ⁶ @ 20 °C	0.81
	lbf/in ² x10 ⁶ @ 200 °C (4 days)	0.62
Compressive Strength	MPa	380
	lbf/in ²	55,100
Bond Strength	KN @ 7.9 thick	4.6
Scar Wear	mm	4.3
Density	g / cm ³	1.2
Coefficient of Thermal Expansion	10 ⁻⁶ /°C	11.5
Maximum Continuous Operating Temperature	°C	200

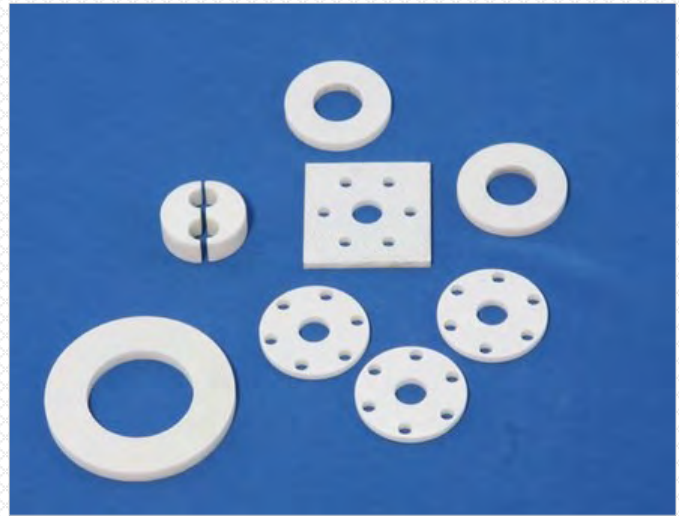
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High Temperature Resistant Composite

TENMAT FEROFORM F61 has been developed as the high performance, high temperature insulation material for demanding applications.

FEROFORM F61 has good resistance to temperatures up to 300°C.

The main area of application is in the aerospace industry where reliability and dependability are paramount requirements.



FEROFORM F61 is manufactured to BS EN ISO 9001:2008 approved procedures.

PROPERTIES	UNITS	F61
Maximum Continuous Operating Temperature	°C	300
Maximum Intermittent Operating Temperature	°C	350
Ultimate Compressive Strength	MPa	260
Normal Working Pressure	MPa	75
Compressive Yield @ 68.9MPa	%	2.35
Impact Strength	kN	66
Shear Strength	MPa	81
Hardness	Brinell	28
Bond Strength	kN @ 6.4 thick	3.1
Density	g/cm ³	1.75
Coefficient of Thermal Conductivity Normal to Laminae	W/m°C @ 20°C	0.2
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal	150
Coefficient of Thermal Expansion	10 ⁻⁶ /°C parallel	10

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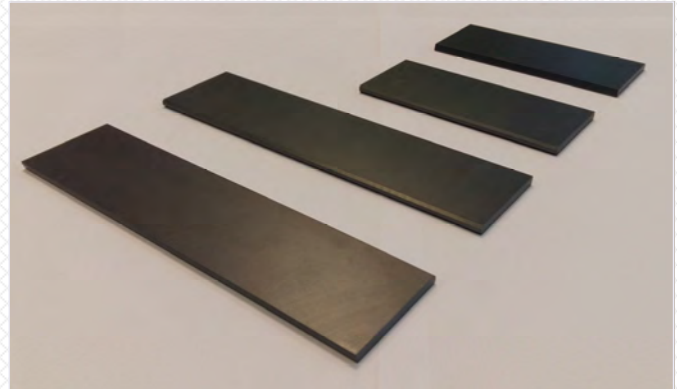
Dry Running Rotor Vane Material

TENMAT FEROFORM F200a has been developed as a high performance dry running rotor blade material.

FEROFORM F200A is preferred due to its high mechanical strength and shock resistance.

The principal areas of use are in single stage vacuum/pressure pumps for the tanker discharge market and general industrial duties.

FEROFORM F200a is available as fully machined rotor blades only.



PROPERTIES	UNITS	F200A
Flexural Strength	MPa	75
Modulus of Elasticity	GPa	20
Hardness	HRB 10 / 150	105
Density	g/cm ³	1.75
Coefficient of Thermal Expansion	10 ⁻⁶ /°C	11
Maximum Continuous Operating Temperature	°C	175
Intermittent Temperature	°C	200

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– High Temperature Bearing Material

TENMAT FEROFORM F3637 has been specially developed as a high-performance bearing material ideal for high temperature bearing applications. This low friction composite material exhibits superior thermal insulation properties. Thus, FEROFORM F3637 has found success as the material of choice for load bearing insulation pads used to support sulphur, asphalt, bitumen, and coal tar tanks up to 280 °C.



FEROFORM F3637 has low thermal conductivity and as such achieves a significant temperature difference across the pad thickness. FEROFORM F3637, reinforced with high-quality engineering fibres, has typically 4 times the load bearing capacity of traditional systems. For over 20 years, F3637 components have been specified on over 60 vessels of up to 37,000 tonnes in weight, classed by B.V., D.N.V., G.L., A.B.S., N.K.K., and Lloyds.

PROPERTY	UNITS	F3637
Maximum Continuous Operating Temperature	°C	200
Maximum Intermittent Operating Temperature	°C	300
Coefficient of Thermal Expansion (normal)	10 ⁻⁶ / °C	29
Coefficient of Thermal Expansion (parallel)	10 ⁻⁶ / °C	15
Ultimate Compressive Strength	MPa	301
Normal Working Pressure	MPa	80
Compressive Yield @ 68.9 MPa	%	2.8
Coefficient of Friction	Dry	0.28
Swell in Water @ 20 °C	%	0.5
Hardness	Brinell	38
Impact Strength	kJ/m ²	90
Shear Strength	MPa	101
Density	g / cm ³	1.54

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Self Lubricating Bearing Material

TENMAT FEROFORM PR18 is a self lubricating composite material, made from synthetic woven fibres which are impregnated with resins and friction modifiers

It is an ideal bearing material for a wide range of bearing applications. These include bearings for rudders (approved by the major marine classification societies) and all general purpose bearing applications such as deck equipment, pumps, offshore marine equipment etc.



FEROFORM PR18 is designed to give excellent service in dry applications possessing very low stick slip but also fully compatible with all common lubricants such as water, oils and greases.

PROPERTIES	UNITS	PR18
Ultimate Compressive Strength	MPa	259 ^A /395 ^B
Normal Working Pressure	MPa	87.5
Compressive Yield @ 68.9 MPa	%	2.7
Brinell Hardness		18
% Swell in Water	@20°C	0.05
Average Coefficient of Friction	Dry	0.08
Average Coefficient of Friction	Wet	0.12
Impact Strength	kJ/m ²	33
Density	g/cm ³	1.28
Coefficient of Thermal Expansion (normal)	10 ⁻⁶ /°C	93
Coefficient of Thermal Expansion (parallel)	10 ⁻⁶ /°C	N/A
Maximum Continuous operating Temperature	°C	100
Maximum Intermittent operating Temperature	°C	120

^AA tested on BS2782 on 25 x 25 x 25 sample

^BB tested on 50 x 50 x 5 sample, 400 MP is limit of test equipment

Tested on sheets samples, PR18 tested on tube samples

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General Purpose Bearing and Wearing Material

TENMAT FEROFORM T11 is a proprietary composite material made from a unique friction modified phenolic resin matrix, reinforced with inorganic woven fiber.

FEROFORM T11 has strength, durability, dimensional stability, low friction, and excellent wear characteristics.



The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.

PROPERTY	UNITS	T11
Coefficient of Friction	Dry	0.09 - 0.12
Compressive Strength	MPa	250
Normal Working Pressure	MPa	62
Compressive Yield	% @ 68.9 MPa	2.4
Impact Strength	kJ/m ²	65
Shear Strength	MPa	70
Hardness	Brinell	25
Swell in Water	% @ 20 °C	0.3
Density	g / cm ³	1.36
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	50 45
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

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FEROFORM T12 Bearing Material

TENMAT FEROFORM T12 has been developed as a superior electrolytic water lubricated general purpose wearing and bearing material for many marine and industrial applications offering low wear and friction rates due to the inclusion of molybdenum disulphide.

TENMAT FEROFORM T12 is approved by major classification societies and many Navies for ships bearing applications including stern tube, rudder and deck equipment.



The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.

PROPERTY	UNITS	T12
Coefficient of Friction	Dry	0.08-0.19
Compressive Strength	MPa	310 ^{*A} / >400 ^{*B}
Normal Working Pressure	MPa	75
Compressive Yield	% @ 68.9 MPa	4.4
Impact Strength	kJ/m ²	72
Shear Strength	MPa	62
Hardness	Brinell	18
Swell in Water	% @ 20 °C	0.2
Density	g / cm ³	1.30
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	50 21
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

*A tested on BS2782 on 25 x 25 x 25 sample

*B tested on 50 x 50 x 5 sample, 400 MP is limit of test equipment
Tested on sheets samples, PR18 tested on tube samples

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Multipurpose Bearing Material

TENMAT FEROFORM T14 is a composite material made from woven fibre bonded with resin.

FEROFORM T14 has been developed as a superior bearing material used in many marine and industrial applications. It is used in dry and water lubricated general purpose applications.

TENMAT FEROFORM T14 has strength, durability, dimensional stability, and excellent wear characteristics.

The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.



PROPERTY	UNITS	T14
Coefficient of Friction	Dry	0.08 - 0.15
Compressive Strength	MPa	300 ^{*A} / >400 ^{*B}
Normal Working Pressure	MPa	75
Compressive Yield	% @ 68.9 MPa	3.6
Impact Strength	kJ/m ²	109
Shear Strength	MPa	65
Hardness	Brinell	15
Swell in Water	% @ 20 °C	0.2
Density	g / cm ³	1.29
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	50 30
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

^{*A} tested on BS2782 on 25 x 25 x 25 sample

^{*B} tested on 50 x 50 x 5 sample, 400 MP is limit of test equipment

Tested on sheets samples, PR18 tested on tube samples

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Advanced Bearing Material

TENMAT FEROFORM T127 has been developed as a superior water lubricated general purpose wearing and bearing material for many marine and industrial applications offering low wear and friction rates due to the inclusion of molybdenum disulphide.

TENMAT FEROFORM T127 has strength, durability, low friction, and excellent wear characteristics. It is particularly suited for bearings in vertical pumps where it can run dry at start up on the top bearings.



The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.

PROPERTY	UNITS	T127
Compressive Strength	MPa	285
Normal Working Pressure	MPa	75
Compressive Yield	% @ 68.9 MPa	2.5
Impact Strength	kJ/m ²	75
Shear Strength	MPa	75
Hardness	Brinell	23
Swell in Water	% @ 20 °C % @ 80 °C	0.3 1
Coefficient of Friction	Dry Wet	0.08-0.16 0.11-0.18
Density	g / cm ³	1.32
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	70 30
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

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Multipurpose Bearing Material

TENMAT FEROFORM T147 has been developed for use in oil lubricated stern tube systems, but with the added advantage of also working with water lubrication in case of seal failure.

It is a general purpose wearing and bearing material used for many marine and industrial applications.

FEROFORM T147 is a heat stabilised version of T14 with an improvement in dimensional stability on initial exposure to temperature.

The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.



PROPERTY	UNITS	T147
Coefficient of Friction	Dry	0.13-0.18
Coefficient of Friction	Wet	0.16-0.22
Compressive Strength	MPa	310
Normal Working Pressure	MPa	75
Compressive Yield	% @ 68.9 MPa	2.5
Impact Strength	kJ/m ²	55
Shear Strength	MPa	85
Hardness	Brinell	25
Swell in Water	% @ 20 °C	2
Density	g / cm ³	1.32
Coefficient of Thermal Expansion	10 ⁻⁶ /°C normal 10 ⁻⁶ /°C parallel	70 30
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

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High Performance Bearing Material

TENMAT FEROFORM T814 is a composite material made from woven fibre bonded with resin and PTFE as a friction modifier.

FEROFORM T814 has been developed as a high performance bearing material for both wet and dry service, making it extremely useful in Hydro and Marine applications.

TENMAT FEROFORM T814 replaces traditional grease lubricated bearings, promoting a cleaner environment whilst reducing operating cost.

The material is available as sheets (1220mm x 1220mm) in various thicknesses, rods and tubes (1200mm long) with external diameters ranging from 30mm up to 1175mm.

Fully machined components and parts to customer requirements and other sizes are available upon request.



PROPERTY	UNITS	T814
Coefficient of Friction	Dry	0.07 - 0.10
Compressive Strength	MPa	310 ^A / >400 ^B
Normal Working Pressure	MPa	75
Compressive Yield	% @ 68.9 MPa	4.3
Impact Strength	kJ/m ²	83
Shear Strength	MPa	72
Hardness	Brinell	17
Swell in Water	% @ 20 °C	0.25
Density	g / cm ³	1.31
Coefficient of Thermal Expansion	10 ⁻⁶ /°C Normal 10 ⁻⁶ /°C Parallel	43 31
Maximum Continuous Operating Temperature	°C	100
Maximum Intermittent Operating Temperature	°C	120

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^BB tested on 50 x 50 x 5 sample, 400 MP is limit of test equipment
Tested on sheets samples, PR18 tested on tube samples

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