CROSSFLON®

High Performance Engineering Plastics

Beldam Crossley

INDUSTRIAL SEALING, BEARING AND POLYMER EXPERTS

An Integral Part of Your Success

Our Heritage

Beldam Crossley has a proud history, the origins of which date back to 1876. During that time, we have achieved an unrivalled reputation for providing advanced sealing, bearing and polymer based products. This experience and expertise means we are able to offer safe and highly reliable solutions for use in the most arduous of conditions.

Industry Sector Experience

Always at the forefront of new developments, we have responded quickly to the constantly changing worldwide demands of specialised sectors as diverse as aerospace, power generation, construction, marine, automotive, oil & gas, petrochemical and defence.

Quality Assurance Standards

All our manufacturing is based in the UK and operates to internationally accepted standards - including BS EN ISO 9001:2008 and BS EN ISO AS 9100 Rev. C standards for design and manufacture of products for aerospace, and environmental management system standards to BS EN ISO 14001:2004.

This means we are able to provide a proven range of products and services, together with expertise and experience, which offer robust and high quality life-protecting installations in applications where failure is not an option.

Research & Development

Today, we are recognised as being at the leading edge of technology. A position gained through our commitment to research and continued investment in the most sophisticated manufacturing plant and equipment.

With a clear focus on the future, we are committed to being the ‘best in class’ choice by offering groundbreaking ideas, the ultimate in product reliability, and unbeatable customer support.

Global Reach

As a global business, Beldam Crossley has a network of Partners worldwide to ensure efficient and consistent product supply.

bsi. AS/EN 9100 Series Aerospace | ISO 9001 Quality Management | ISO 14001 Environmental Management

“Our products are tailor-made to meet client’s exacting needs, with engineers on hand to support our customer base every step of the way”

FORWARD THINKING SOLUTIONS WITH A HISTORY OF EXPERTISE

Materials

High Performance Engineering Plastics

Beldam Crossley have been at the leading edge of development within the polytetrafluoroethylene industry since its introduction into the UK market in the early 1950's.

By continually developing the exclusive and comprehensive Crossflon® range of specialist compounded materials, we aim to satisfy the ever increasing demands of today's industries. Great care is taken in selecting the most suitable polymer to match each requirement.

As part of the Beldam Crossley service, we manufacture a wide range of PTFE products and components to individual customers' specifications. In addition, with the latest CNC equipment plus a highly skilled workforce, we can produce complex machined, moulded, and fabricated parts in a wide range of sizes.

Our technical department is always available to assist with design and development of your PTFE parts.

Incorporating the most modern fillers, and backed by our ongoing development and test programme, Crossflon® meets the ever increasing requirement for longer life, higher speeds and loads, chemical resistance and cost-effectiveness.

Machined Components

Beldam Crossley offers a comprehensive range of machining capabilities and has the flexibility to manufacture one off development prototype components to volume production batches in high performance engineering plastics and metals such as PTFE, PEEK, PCTFE, steel, stainless steel and aluminum. Our manufacturing facility has equipment to support polymer and metal machining requirements from conventional to CNC milling, turning and grinding

Bearings

Plane cylindrical and flange type bearings are available in most Crossflon® compounds. Please contact us for us advice on selecting the appropriate material for your application.

Rings

Solid and split pistons rings with a wide range of joint configurations can be manufactured to customer specifications. Alternatively, we can assist in designing a ring to meet with your individual requirements.

Sheets & Tapes

Most Crossflon® compounds are available in sheet and tape form, which can be etched making them suitable for bonding to other materials or used in wide range of applications where reduced friction is needed. Compounds specifically f ormulated w ith F DA c ompliant c omponents can be used as non-stick coating surfaces in food and drug contact applications.

Formed Parts

We offer hot or cold formed parts in most Crossflon® compounds. Please contact us to discuss your requirement.

Rods & Tube

Moulded rods and tubes are available in most Crossflon® XF compounds. Please contact us for more information on the range.

Wear Components

Wear components are available in a wide range of sizes and shapes, other than those indicated above. These include wear strips, pump bodies, and pistons for chemically and thermally demanding operating conditions. We can manufacture to customer specifications or provide design assistance. Please contact us for more information.

Processes

- Automatic Moulding
- Compression Moulding
- Machining
- Skiving
- Stamping / Forming
- Etching
- Milling

Contents

Products

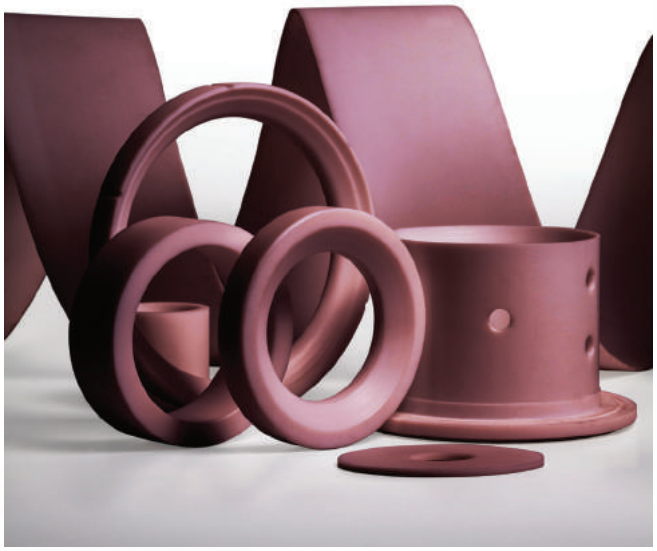
- Bearings
- Components
- Rods and Tubes
- Specialty Profiles
- Rod, Sheet and Tube
- Custom Machined Parts
- Tapes and Thin Sheet
- Seals
- Washers

For more information contact us on:
T: +44 (0) 1204 675700
E: sales@beldamcrossley.co.uk

Selection Guide

Material Selection Guide

	Grade	LRD4	LRD5	J	FG	1110	1702	1408	403	707	512
XF GRADES	Colour	Maroon	Maroon	Gold	White	Turquoise	Tan	Tan	Black	Black	Black
PERFORMANCE	Max Load "P" (psi) MPa	7	14	5.2	15	14	6.9	20	10	14	14
	Max Speed "V" m/s	2	2	2	5	2	2	5	5	5	2
	Max "PV" (MPa. m/s)	0.35	0.7	0.26	0.7	0.78	0.35	0.9	0.42	0.7	0.78
MATING SURFACE	Rb 25 & Higher			X	X		X	X	X	X	
	Rc 25 & Higher	X	X			X					X
	Painted metal and porcelain										
	Aluminium			X	X		X	X			
ENVIRONMENT	FDA Compliant				X		X	X			
	Steam	X	X		X	X	X	X	X	X	X
	Wet	X	X	X	X	X	X	X	X	X	X
	Dry	X	X	X	X	X	X	X	X	X	X
	Vacuum	X	X	X	X	X	X	X	X		
RELATIVE RATING (1= Low, 5=High)	Coefficient of friction	3	3	1	1	2	4	2	2	2	1
	Creep Resistance	3	5	3	4	5	2	4	4	4	5
	Insulation Properties	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No
COMMENTS		This grade is our standard physical grade with higher properties.	This grade is our standard bearing grade. High creep and abrasion resistance	This grade has the lowest coefficent of friction. An excellent insulator	This grade is used across food industry standards.	This grade is widely used in machine tool guideways	This grade is a standard material for compressor piston flip seals	This grade is excellent against Aluminium surfaces	This grade is a good thermal and electrostatic dissipation.	This grade is excellent for wet applications	This grade has extremely low deformation under load and high impact



Description

Crossflon® LRD4 is primarily used in the manufacture of seals. It has excellent load and wear characteristics and is compatible with soft mating surfaces. This material is light maroon in colour and specifically formulated for use in food and drug contact applications with all components being FDA compliant.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Skived sheet • Piston / Piston rings • Stamped / Machined formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe support • Wear bands

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.35 MPa.m/s 7 MPa 2 m/s
Shaft Hardness - Minimum	60-62 Shore D
Shaft finish recommended Ra (µm)	0.2 - 0.4)
Shaft Material	Steel

Engineering Information	
Friction - Static & Dynamic	0.15 - 0.18
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.26 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 3.6 Length 6.2

Physical Data	
Elongation (ASTM D4894)	180%
Tensile Strength (ASTM D4894)	14 MPa
Deformation (ASTM D621)	6.4%
Specific Gravity (ASTM D792)	2.27 g/cm^3

A more complete data sheet is available upon request.

Description

Crossflon® LRD5 is maroon in colour and has a good balance of physical properties whilst maintaining chemical resistance. This material is compatible with most hardened steel surfaces and eliminates the need for lubrication in most environments. It is ideally suited to rotary and linear bearing applications.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe support • Wear bands • Textile industry

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.70 MPa.m/s 14 MPa 2 m/s
Shaft Hardness - Minimum	62 Shore D
Shaft finish recommended Ra (µm)	
Shaft Material	Steel

Engineering Information	
Friction - Static & Dynamic	0.13 - 0.15
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.33 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 2.5 Length 6.0

Physical Data	
Elongation (ASTM D4894)	160%
Tensile Strength (ASTM D4894)	11
Deformation (ASTM D621)	2.2%
Specific Gravity (ASTM D792)	2.27 g/cm³

A more complete data sheet is available upon request.

Description

Crossflon® J is gold in colour and has been specifically formulated to operate against soft mating surfaces such as aluminium, brass, mild steel, other plastics and stainless steel. This material possesses no hard or abrasive fillers, has a low coefficient of friction, good creep resistance and compressive strength along with very low wear rates in comparison to unfilled PTFE.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Printers • Copiers • Air compressors • Appliances • Automotive • Insulatos • Linear slides • Anrmometers • Wear bands • Solenoid valves • Refrigeration valves

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.26 MPa.m/s 5.2 MPa 2 m/s
Shaft Hardness - Minimum	60 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	316 Stainless Steel and Non-Ferrous

Engineering Information	
Friction - Static & Dynamic	0.12 - 0.13
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.24 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 5.2 Length 6.8

Physical Data	
Elongation (ASTM D4894)	250%
Tensile Strength (ASTM D4894)	16.5
Deformation (ASTM D621)	2%
Specific Gravity (ASTM D792)	1.9 g/cm^3

A more complete data sheet is available upon request.

Description

Crossflon® FG is specifically formulated for use in food and drug applications with all components being FDA compliant. This material is white in colour and primarily used in the manufacture of bearings. Crossflon® FG offers excellent load and wear characteristics and is compatible with soft mating surfaces.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Chute Liners • Insulators • Linear slides • Shaft bearings • Wear bands • Seals

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.75 MPa.m/s 15.0 MPa 5 m/s
Shaft Hardness - Minimum	60 - 62 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Mild, 303 and 316 Stainless Steel

Engineering Information	
Friction - Static & Dynamic	0.1 - 0.11
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.38 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 4.1 Length 5

Physical Data	
Elongation (ASTM D4894)	400%
Tensile Strength (ASTM D4894)	22
Deformation (ASTM D621)	3.9%
Specific Gravity (ASTM D792)	2.33 g/cm³

A more complete data sheet is available upon request.

Description

Crossflon® 1110 is turquoise in colour and suitable for us in a wide range of applications. It has excellent thermal conductivity and cold flow resistance. This material is inert to most chemicals and is well suited for use in seals exposed to elevated temperatures, high loads or steam contact. Crossflon® 1110 is suitable for use in contacts with food and drugs with all components being FDA compliant.

Typical Product & Application Description

Products	Applications
• Packings • Sleeve, flanged and thrust bearings • Piston rings • Stamped parts • Machined parts • Moulded shapes • Wear bands • Seal rings	• Lathes • Gibs, guideways • Compressors • Appliances • Rotary tables • Motor mounts • Linear slides • Pipe supports • Hydraulic presses

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.78 MPa.m/s 14 MPa 2 m/s
Shaft Hardness - Minimum	63 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Mild / Hardened steel

Engineering Information	
Friction - Static & Dynamic	0.08 dry
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Data available
Thermal Conductivity	0.75 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 5.3 Length 7.0

Physical Data	
Elongation (ASTM D4894)	250%
Tensile Strength (ASTM D4894)	24
Deformation (ASTM D621)	2.4%
Specific Gravity (ASTM D792)	3.38 g/cm³

A more complete data sheet is available upon request.

Description

Crossflon® 1702 is primarily used in the manufacture of bearings and seals. This tan coloured composite material provides excellent high temperature performance and wear resistance. It is compatible with soft mating surfaces and can be used in food and drug contact applications with all components being FDA compliant.

Typical Product & Application Description

Products	Applications
• Packings • Sleeve, flanged and thrust bearings • Piston rings • Stamped parts • Extruded parts • Machined parts • Moulded shapes • Wear bands • Seal rings	• Lathes • Gibs, guideways • Compressors • Appliances • Rotary tables • Motor mounts • Linear slides • Pipe supports • Hydraulic presses

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.42 MPa.m/s 10 MPa 2 m/s
Shaft Hardness - Minimum	60 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Stainless to hardened steel

Engineering Information	
Friction - Static & Dynamic	0.1 - 0.12
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Data available
Thermal Conductivity	0.41 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 11.5 Length 13.9

Physical Data	
Elongation (ASTM D4894)	280%
Tensile Strength (ASTM D4894)	25
Deformation (ASTM D621)	3.5%
Specific Gravity (ASTM D792)	2 g/cm^3

A more complete data sheet is available upon request.

Crossflon® 1408

Description

Crossflon® 1408 has been specifically formulated for vacuum service. Tan in colour, this material has good load bearing properties, very low wear rates and is compatible with soft mating surfaces. It is well suited to parts that are subject to high abrasion at elevated temperatures in corrosive environments. All the constituents of Crossflon® 1408 are FDA compliant, which means it can be used in food and drug contact applications.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Vacuum pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Shaft support • Wear bands

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.9 MPa.m/s 20.0 MPa 5 m/s
Shaft Hardness - Minimum	60 - 62 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	All steels and aluminium

Engineering Information	
Friction - Static & Dynamic	0.1 - 0.12
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.41 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 3.9 Length 5.7

Physical Data	
Elongation (ASTM D4894)	290%
Tensile Strength (ASTM D4894)	16
Deformation (ASTM D621)	4.6%
Specific Gravity (ASTM D792)	2.04 g/cm³

A more complete data sheet is available upon request.

Description

Crossflon® 403 is black in colour and provides a good balance of properties for bearing applications. It has an extremely low coefficient of friction, a high level of chemical inertness and good wear resistance especially against soft mating surfaces. This material has higher creep resistance and thermal conductivity than unfilled PTFE to allow for greater loading ability and cooler running when used in dry conditions.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive lip seals • Liners • Linear Slides • Pipe supports • Wear bands • Dust seals • Solenoid valves • TPS shaft seals • EGR valves

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.42 MPa.m/s 14 MPa 5 m/s
Shaft Hardness - Minimum	62 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Steel

Engineering Information	
Friction - Static & Dynamic	0.1 - 0.2
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.69 (W/m•K)
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 6.0 Length 8.3

Physical Data	
Elongation (ASTM D4894)	150%
Tensile Strength (ASTM D4894)	10
Deformation (ASTM D621)	6.5%
Specific Gravity (ASTM D792)	2.15 g/cm^3

A more complete data sheet is available upon request.

Description

Crossflon® 707 has been specifically formulated for use in water related applications. This material possesses high creep resistance, good thermal conductivity, increased hardness and excellent wear properties. Black in colour this material is compatible with most soft mating surfaces and when improved chemical resistance is needed, a good alternative to Crossflon® J.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Fresh water submerged • Thrust bearings • Plating tanks • Wear bands • Ovens

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.70 MPa.m/s 14 MPa 5 m/s
Shaft Hardness - Minimum	62 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Hard, mild and stainless steels

Engineering Information	
Friction - Static & Dynamic	0.13 - 0.16
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	0.91 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 5.0 Length 7.0

Physical Data	
Elongation (ASTM D4894)	90%
Tensile Strength (ASTM D4894)	14
Deformation (ASTM D621)	4.6%
Specific Gravity (ASTM D792)	2.04 g/cm^3

A more complete data sheet is available upon request.

Crossflon® 512

Description

Crossflon® 512 has been specifically formulated for bearing applications. This black coloured material has excellent wear and deformation properties, but reduced chemical resistance and should not be used in conditions where it might be oxidised.
It has high dimensional stability and thermal conductivity and is suitable for use in steam and heavy duty mechanical services.

Typical Product & Application Description

Products	Applications
• Automatically moulded bearings & components • Sleeve, flanged and thrust bearings • Piston rings • Stamped and formed seals • Machined parts • Moulded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe supports • Wear bands

Design Criteria

Performance & Mating Surfaces	
Temperature Range	-250°C to +260°C
Short term limiting PV @ 0.5 m/s Maximum (P) Maximum (V)	0.78 MPa.m/s 14 MPa 2 m/s
Shaft Hardness - Minimum	70 Shore D
Shaft finish recommended Ra (µm)	8 - 16 (0.2-0.4)
Shaft Material	Steel

Engineering Information	
Friction - Static & Dynamic	0.11 - 0.13
Water Absorption (ASTM D570)	0%
Flammability (ASTM D635)	Non-Flammable
Chemical Resistance	Data available
Thermal Conductivity	0.41 W/m•K
Linear Coefficient of Thermal Expansion (26° to 149°C) (x 10-5 m/m °C)	Diameter 4.9 Length 3.7

Physical Data	
Elongation (ASTM D4894)	160%
Tensile Strength (ASTM D4894)	22
Deformation (ASTM D621)	1.4%
Specific Gravity (ASTM D792)	3.8 g/cm³

A more complete data sheet is available upon request.

LOCAL SERVICE IN A GLOBAL MARKET

With a highly equipped manufacturing base, Beldam Crossley supported by its partners worldwide, is perfectly placed to provide an immediate response to match every customer's requirements. Our team are technically trained to offer advice on all our products in the most demanding of applications across all industry sectors.

Head Office & Manufacturing
Beldam Crossley Ltd.,
Lostock Industrial Estate,
Lostock, Bolton,
BL6 4BL, England
T: +44 (0) 1204 675700
F: +44 (0) 1204 675701
W: www.beldamcrossley.co.uk
E: sales@beldamcrossley.co.uk

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