

UltraCOMP™ Sealing for the Oilfield

No. 5216B1-USA

UltraCOMP™ Series of Engineered Thermoplastic Compounds for performance in extreme operating conditions

Parker EPS Division's UltraCOMP™ series of Engineered Thermoplastic Compounds is a unique group of materials formulated for unparalleled performance in applications requiring high temperature, high pressure and extreme chemical resistance. As a high-temperature, rigid material, UltraCOMP™ exhibits superior mechanical properties for use as a seal material. Its mechanical aspects make this compound series extremely well-suited as back-up ring materials to support elastomeric seals. (Where elastomers conform to metal surfaces at lower temperatures, UltraCOMP™ will conform at higher temperatures.)

Features and Advantages

Very high working temperature range

- Physical properties sustained even at temperatures of 500° F
- Suitable to support and back-up expensive fluoroelastomer sealing elements

Exceptional chemical resistance

- Insoluble in most common chemicals. Resistant to attack by wide range of organic or inorganic chemicals such as diesel fuel, H₂S (sour gas and sour crude oil) and amine solutions

Excellent water resistance

- Excellent resistance to hydrolysis in boiling water and superheated steam, as well as down-hole in oil field applications where water and steam are encountered

High Tensile and Compression:

- UltraCOMP's high tensile strength bridges metal clearance gaps, particularly in sideloadng conditions where compression resistance through bearing support is required to prevent metal to metal contact in moving components

UltraCOMP™ Flexibility and Back-up Rings

UltraCOMP's semi-crystalline attributes mean the material can be manufactured by methods where it can bend and flex. This flexing property is extremely important in back-up rings where installation is a challenge. Additionally,



flexibility is required to bridge extrusion gaps when used as backup ring material. At the same time, UltraCOMP™ has a high tensile property which helps the extrusion resistance of the thermoplastic.

High temperature capability increases performance capability of many products

UltraCOMP™ high temperature material is well suited for the Energy, Oil & Gas market with products like:

- Back-up Rings
- Bearings
- Sub-Sea Connectors
- Special Shapes
- Male/Female Vee adapters
- T-Seal Back-up Rings
- Billets & Tubes for special machined shapes



UltraCOMP™ PIP Rings

Parker PIP seal design can use UltraCOMP rings to make the PolyPak™ a double-acting seal so the set can successfully seal pressure reversals. This function as provided by the rigid UltraCOMP PIP ring provides protection for the seal, but also provides a reactive advantage force against the O-spring of the PolyPak seal to make it bi-directional (see Bulletin 5218B1-USA). The big advantage for the user is the requirement of only one seal groove and purchase and installation of only one set of seals.

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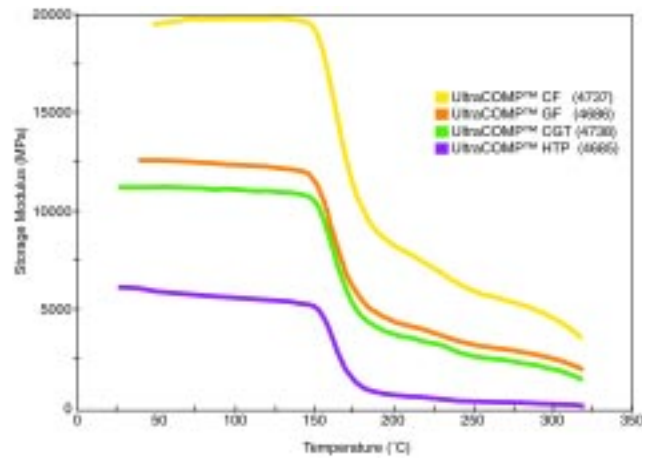
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UltraCOMP™ Typical Physical Properties

Parker now offers four UltraCOMP™ compounds in this series as shown below.

	UltraCOMP™ HTP Virgin	UltraCOMP™ GF 30% Glass filled	UltraCOMP™ CF 30% Carbon fiber filled	UltraCOMP™ CGT 10% Carbon 10% Graphite 10% PTFE filled
Compound Number	4685	4686	4737	4738
Hardness (Rockwell R)	126R	124R	124R	-
Density (g cm ⁻³) Crystalline	1.32	1.51	1.41	1.44
Tensile Strength (psi)	14,065	22,620	32,480	20,445
Elongation (%) Break	>60	2.7	2.0	2.5
Flexural Modulus (psi)	594,500	1,450,000	2,929,000	1,174,500
Compressive Strength (psi)	17,110	31,175	34,800	21,750
Shear Strength (psi) 73°F	7,685	14,065	14,065	-
Melting Temperature (°F)	644	644	644	644
Glass Transition Temp (°F)	289	289	289	289
Typical Crystallinity	35	30	30	30
Water Absorption (%) 24 hr/73°F	0.5	0.11	0.06	0.06

Storage Modulus Curves of Parker UltraCOMP™ Series



UltraCOMP™ HTP's ability to resist deformation at increased temperatures is high, given its crystalline polymer nature. By utilizing fillers, UltraCOMP™ alloys exhibit increased storage modulus (a measure of strength & stiffness).

Seal Compound/ Extrusion Gap Pressure Rating Matrix

Parker premiere materials, used in PolyPaks and anti-extrusion rings, possess sealing capabilities (pressure ratings) that vary according to temperature range and extrusion gap/clearance. The table below illustrates maximum pressure rating as it applies to a specific material and clearance.

Temperature	Extrusion Gap Size (inches)	PolyMyte Z4674D60	Molythane P4615A90	UltraCOMP™ HTP (4685)	Polon 08 Filled PTFE
100° F	0.004 (.008 diametral)	16,000	16,000	20,000	8000
	0.008 (.016 diametral)	16,000	16,000	20,000	3000
	0.015 (.030 diametral)	16,000	16,000	18,000	2000
	0.022 (.044 diametral)	12,800	10,800	16,000	1000
200° F	0.004 (.008 diametral)	16,000	16,000	20,000	6000
	0.008 (.016 diametral)	11,200	16,000	18,000	2000
	0.015 (.030 diametral)	9,000	6,400	14,000	1000
	0.022 (.044 diametral)	4,000	4,100	8,000	800
300° F	0.004 (.008 diametral)	7,200	5,400	15,000	4000
	0.008 (.016 diametral)	6,400	4,800	12,000	1500
	0.015 (.030 diametral)	4,000	2,400	8,000	750
	0.022 (.044 diametral)	3,200	1,200	5,000	400

NOTE: Customer test and validation is the only means of ensuring a seal recommendation will work in an application. The above table should be used for reference purposes only.

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