

SEAL & DESIGN INC.

CHEMRAZ®

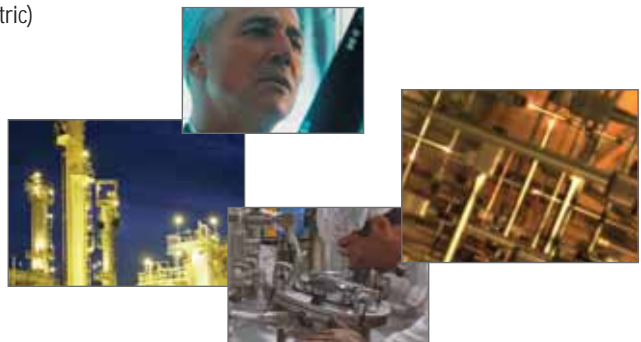
Superior Chemical Resistance



C h e m r a z ® P e r f l u o r o e l a s t o m e r



THE VALUE OF CHEMRAZ®	3
Industry knowledge	
Broad chemical resistance	
Cost effectiveness	
Market expertise	
Engineering & application know-how	
Assurance of quality	
COMPETITIVE ADVANTAGE IN ANY ENVIRONMENT	4
Chemicals and refinery	
Oil and gas production	
FDA compliant	
Biotechnology	
Power generation	
Paints, lacquers and adhesives	
HIGH-PERFORMANCE MATERIALS AT A GLANCE	5
CHEMRAZ PRODUCT DATA	6 – 15
Chemraz 555, 505, 504, 510, 605, 600, 615, 514 & 517 and 584 & 585	
SPECIALTY COMPOUNDS FOR SPECIFIC REQUIREMENTS	16
FDA	
Extraction data	
USP Class VI	
3-A® Sanitary Standards	
CHEMRAZ SD PRODUCT DATA	17 – 19
Chemraz SD625, SD517 and SD585	
EXPLOSIVE DECOMPRESSION RESISTANT	20
CHEMRAZ ED PRODUCT DATA	21
Chemraz 526	
TECHNICAL INFORMATION	22 – 24
Compression set	
Resilience, temperature changes	
Introduction to chemical compatibility list	
Collaborating toward success	
Seal geometries	
Groove design	
Sealing face quality	
GROOVE SIZES FOR STATIC AND DYNAMIC SEALS	25
O-RING SIZES	26 – 33
O-ring dimensions in inch (AS-568A Standard)	
Dimensions for plates and sheets	
O-ring dimensions (Metric)	



THE VALUE OF CHEMRAZ®

Greene, Tweed partners with customers to provide reliable, efficient answers to their application needs. As a world-class leader in high-performance materials and engineering design skills, we leverage our expertise in a variety of markets and products to give our customers the most innovative and comprehensive solutions to their performance challenges. With our worldwide network of design engineers, Greene, Tweed delivers local technical expertise with a global reach.



Industry knowledge

Our industry knowledge coupled with our understanding of the design requirements, parameters and specifications enable us to develop both standard and custom solutions quickly and cost effectively. Our experience in demanding environments led us to the creation of Chemraz®, our innovative and most chemical-resistant elastomer.

Broad chemical resistance

Greene, Tweed's Chemraz has the broadest chemical resistance of any elastomeric material, combining the resilience and sealing force of an elastomer with chemical resistance approaching that of PTFE. Chemraz O-rings, gaskets and custom elastomeric shapes extend MTBR (mean time between replacement) in harsh environments and withstand a wide range of temperatures (-22°F to 615°F, -30°C to 324°C).

Chemraz's distinctive chemical composition makes it well suited for a wide range of applications. Because of its low compression set, outstanding physical properties and almost universal chemical resistance, Chemraz provides an incredibly high sealing force. Products such as Chemraz extend the reliability and life of your equipment in hostile conditions while protecting people and the environment from emissions.

Cost effectiveness

Chemraz's unique property set and extended MTBR lowers customers' overall cost of operations. Versatile Chemraz seals work in almost all media, allowing our customers to use the same material in a variety of locations in one plant, lowering inventory control costs.

Market expertise

Greene, Tweed's extensive experience and knowledge in a variety of markets and products helps us create the best solution for each individual customer application. Our experience in several markets is particularly advantageous in the fluid handling arena. Because of our experience in the aerospace industry, we understand how to design seals with very close tolerances and exceptionally smooth surfaces, leading to reduced friction and wear while further improving resistance to chemicals and minimizing extractables. Our experience in the semiconductor and pharmaceutical industries enables us to reduce contaminants through cleanroom environments.

Engineering and application know how

With over 100 years of experience, we have perfected techniques that ensure our customers receive the optimal solution to their performance challenges. Our application engineers are experienced in polymer specialties and equipped with the most up-to-date technology such as 3D modeling, 3D rapid prototyping and FEA capabilities. We partner with our customers—from collaboration on concepts through testing of prototypes to validation and production of finished parts. These close customer relationships give our customers the information they need as we work together throughout the decision-making process.

Chemraz components are available in standard shapes such as O-rings and gaskets, as well as in customer-specific designs, including flat seals, diaphragms, tubing, valve seats and rubber-to-metal connections.

Assurance of quality

All Chemraz components can be traced back through Greene, Tweed's production processes. Each product's bar code carries a unique lot identification number enabling traceability throughout the manufacturing process, from the compounding stage to the completed part.

COMPETITIVE ADVANTAGE IN ANY ENVIRONMENT

Because Chemraz® components withstand a broad spectrum of chemicals and temperatures, they perform well in an array of applications and environments.

Chemicals and refining

Chemraz components offer almost universal chemical resistance, making them ideal for chemical and refining plants where aggressive chemicals are processed. Chemraz prolongs service intervals, enhances plant safety and protects the environment. Chemraz is ideal for a range of equipment, from mechanical seals and pump housings to compressors and valves.



Oil and gas production

Chemraz meets the critical requirements necessary for pumps, safety valves and other oilfield equipment. When ED (explosive decompression) is a concern we have specialty formulated material available.



FDA compliant

Products manufactured under the strictest regulatory standards, including FDA (U.S. Food and Drug Administration) and/or USP (United States Pharmacopoeia) Class VI, require components that provide unceasing reliability, feature total lot traceability, are fabricated using good GMPs (good manufacturing practices) and contain minimal extractables. Components made from Chemraz deliver the safety and cleanliness regulatory demanding industries requires.



Biotechnology

For the biotechnology market, reliability, safety, security and the ability to withstand extreme pressure and chemicals are paramount. Chemraz components provide resistance to a wide range of chemical solvents, extreme pressures and repeat sterilization. From HPLC and lab-on-a-chip to advanced laboratory and analytical equipment and solenoid valves, Greene, Tweed has experience meeting strict performance standards and design guidelines.



Power generation

In modern power stations pressure to keep costs down and heightened environmental awareness demand greater efficiencies, resulting in ever-increasing temperatures. At the same time, power station operators demand optimum reliability and long time between service intervals. Chemraz components help increase MTBR for a variety of applications, including pumps, valves and fittings in conventional and nuclear power stations and in nuclear fuel processing plants.



Paints, lacquers and adhesives

The manufacturing and processing of paints, lacquers and adhesives requires aggressive solvents and cleaning products. Silicone-free Chemraz components resist these media, leading to significantly longer time between service intervals.



HIGH-PERFORMANCE MATERIALS AT A GLANCE

Greene, Tweed's extensive portfolio of Chemraz® materials ensures customers the best compound available for each unique application.

Chemraz® 555, 605 and 600—broad chemical resistance

Chemraz 555, our newest compound, offers broad chemical resistance in an extremely wide temperature range, outstanding physical properties and superior compression set resistance. Chemraz 605 and 600 provide the same chemical resistance as Chemraz 505 but with a higher temperature range.

Compound	555	605	600
Shore A Hardness	80	80	90
Temperature Range	10°F to 600°F (-12°C to 316°C)	-4°F to 500°F (-20°C to 260°C)	
Color	Black		



Chemraz 505, 504 and 510—standard compounds

Chemraz 505 offers broad chemical resistance for a wide range of applications. Chemraz 504 and 510 are softer and harder versions of Chemraz 505. Chemraz 504 is ideal for applications experiencing low forces, while Chemraz 510 is perfect for high-pressure applications.

Compound	505	504	510
Shore A Hardness	75	65	90
Temperature Range	-22°F to 446°F (-30°C to 230°C)		
Color	Black		



Chemraz 615—for high temperatures

Ideal for continuous high temperatures up to 615°F (324°C) because of its low compression set and outstanding mechanical properties.

Compound	615
Shore A Hardness	80
Temperature Range	0°F to 615°F (-18°C to 324°C)
Color	Black



Chemraz 514 and 517—white compounds

White compounds used wherever carbon black contamination must be avoided.

Compound	514	517
Shore A Hardness	70	80
Temperature Range	-22°F to 428°F (-30°C to 220°C)	
Color	White	



Chemraz 584 and 585—specific media

Ideal for use in strongly oxidizing media and hot aqueous solutions.

Compound	584	585
Shore A Hardness	70	80
Temperature Range	-22°F to 428°F (-30°C to 220°C)	
Color	Cream	



Chemraz SD625, SD517 and SD585—FDA compliant

These specialty compounds are USP Class VI and FDA compliant. Additionally, SD625 and SD517 meet 3-A® Sanitary Standards.

Compound	SD625	SD517	SD585
Shore A Hardness	80	80	80
Temperature Range	-4°F to 500°F (-20°C to 260°C)	-22°F to 428°F (-30°C to 220°C)	
Color	Black	White	Cream



Chemraz 526—explosive decompression resistant

Explosive decompression resistant Chemraz with the same chemical resistance as Chemraz 505.

Compound	526
Shore A Hardness	95
Temperature Range	-4°F to 482°F (-20°C to 250°C)
Color	Black





CHEMRAZ® 555

Broad Chemical Resistance at Elevated Temperatures

SUPERIOR COMPRESSION SET RESISTANCE

With its broad chemical resistance, Chemraz® 555, a perfluoro-elastomer, is ideally suited for challenging fluid handling applications. Chemraz 555 provides a significantly wider operational band and superior compression set resistance than any other broad range perfluoroelastomer on the market. With an upper temperature limit of 600°F (316°C), it is the elastomer of choice for the most demanding services found in the chemical process and refining industries.

Chemraz 555 is suitable for use in a wide variety of media including acids, caustics, aldehydes, esters, ethers, aromatics, hot water, steam, amines, methanol, ketones, TBA, MTBE and mixed process streams. Chemraz 555 is one of Greene, Tweed's many cost-effective products and services that extend the reliability and life of our customers' equipment in hostile conditions while protecting people and the environment from unwanted emissions.

Chemraz 555 is available in O-rings, gaskets and many other custom shapes.

FEATURES & BENEFITS

- Superior high temperature capability (600°F/316°C) combined with broad chemical resistance in a wide range of media
- Outstanding physical properties allows for robust designs in various applications
- Excellent compression set maintains seal integrity in wide temperature and pressure variations as well as vibration
- Breadth of service capabilities can reduce the number of products in inventory through seal standardization
- Longer and better seal integrity in seal applications lowering life cycle cost of the equipment



APPLICATIONS

- Mechanical seals
- Valves
- Pump housings
- Sampling/metering equipment
- Reactors
- Quick connect couplings
- Mixers
- Controls/instrumentation
- Compressors
- Sprayers/dispensers

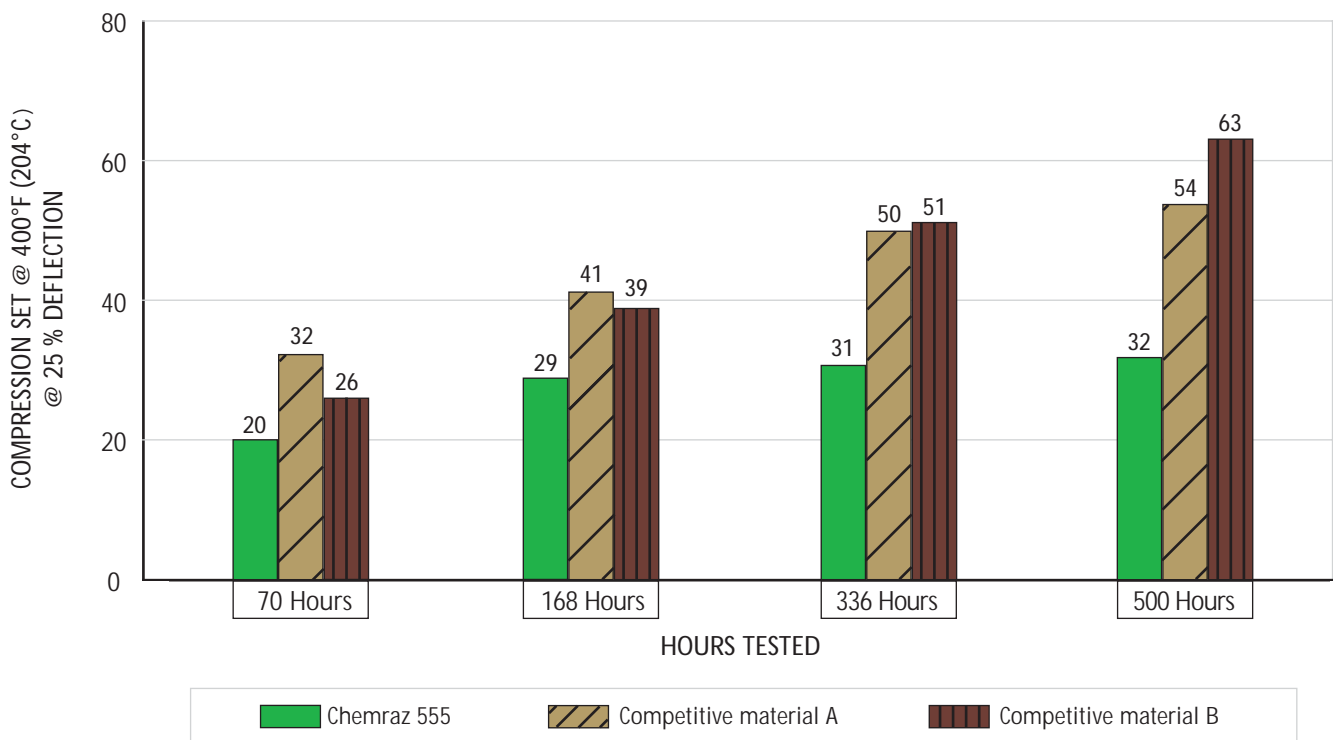
TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D792	2.00
Hardness, Shore A, Points	D2240	80
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	20
Elongation @ Break, %	D1414	175
Modulus @ 50% Elongation, psi (MPa)	D1414	450 (3.1)
Modulus @ 100% Elongation, psi (MPa)	D1414	1475 (10.2)
Tensile Strength @ Break, psi (MPa)	D1414	3425 (23.6)
Service Temperature Range, °F (°C)		10°F to 600°F (-12°C to 316°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings. All test results are preliminary.



CHEMRAZ[®] 555

The following chart compares compression set resistance of Chemraz[®] 555 and several other materials currently on the market.





CHEMRAZ® 505

SEALING SOLUTIONS

Greene, Tweed's Chemraz® 505 a perfluoroelastomer, provides a broader range of chemical resistance than any other compound on the market. With a temperature range of -22°F to 446°F (-30°C to 230°C), Chemraz 505 is the elastomer of choice for more than 90 percent of the most demanding services found in the chemical process and refining industries.

Chemraz 505 is ideal for processes taking place in subzero temperatures as well as for use in multisubstance plants or in mixed media due to its broad chemical resistance.

Chemraz 505 is available for use as O-rings, gaskets and many other custom shapes. Because of its versatility, Chemraz 505 is often used as a standard compound and can be found in a variety of applications including acids, caustics, aldehydes, esters, ethers, aromatics, hot water, steam, amines, methanol, ketones, TBA and MTBE.



FEATURES & BENEFITS

- Broad chemical compatibility for use with a wide range of harsh solutions
- Lower compression set provides better ability to handle temperature and pressure variations, shaft misalignment and O-ring shrinkage
- Low temperature capabilities (-22°F/-30°C)

APPLICATIONS

- Mechanical seals
- Valves
- Pump housings
- Reactors
- Compressors
- Sampling/metering equipment
- Mixers
- Controls/instrumentation
- Sprayers/dispensers
- Couplings

TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.93
Hardness, Shore A, Points	D2240	75
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	25
Elongation @ Break, %	D1414	140
Modulus @ 50% Elongation, psi (MPa)	D1414	450 (3.1)
Modulus @ 100% Elongation, psi (MPa)	D1414	1150 (7.9)
Tensile Strength @ Break, psi (MPa)	D1414	1750 (12.1)
Service Temperature Range, °F (°C)		-22°F to 446°F (-30°C to 230°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.

Chemraz 505 can be exposed to the following media:

Hot water and steam	Seawater, demineralized water, deionized water, boiler feedwater
Amines	Ethanol amine, ethylene diamine, butylamine, monomethyl amine
Inorganic acids	Sulphuric acid, nitric acid, hydrochloric acid, phosphoric acid, hydrofluoric acid
Organic acids	Formic acid, acetic acid, diacetic acid, benzoic acid, terephthalic acid
Bases	Sodium hydroxide, potassium hydroxide, ammonium hydroxide
Aldehydes	Formaldehyde, acetaldehyde, butyraldehyde, benzaldehyde
Aromatic media	Benzene, toluene, phenol, chlorobenzene, aniline, xylene, benzyl chloride
Aliphatic media	Methane, ethane, ethylene, acetylene
Alcohols	Methanol, ethanol, propanol, benzyl alcohol, ethylene glycol
Ether	Dimethyl ether, diethyl ether, ethylene oxide
Esters	Acetate, acrylate, phthalate
Ketones	Acetone, methylethylketone (MEK), diethylketone
Solvents	Methylene chloride, dimethyl formamide (DMF), tetrahydrofuran (THF), MTBE



CHEMRAZ[®] 504

SEALING SOLUTIONS

Greene, Tweed's Chemraz 504, a 65 Shore A hardness perfluoro-elastomer, provides an extremely broad range of chemical resistance and is perfect for services with low pressures and/or low temperatures. Chemraz 504 seals effectively in temperatures ranging from -22°F to 446°F (-30°C to 230°C). Chemraz 504 is well suited for a variety of applications, from mechanical seals to valve housings.

Chemraz 504 is available for use as O-rings, gaskets and many other custom shapes. Because of its versatility, Chemraz 504 is often used as a standard compound and can be found in a variety of fluids and solutions including acids, caustics, aldehydes, esters, aromatics, hot water, steam, amines, methanol, ketones, TBA and MTBE.



FEATURES & BENEFITS

- Broad chemical compatibility for use with a wide range of harsh solutions
- Lower compression set provides better ability to handle temperature and pressure variations, shaft misalignment and O-ring shrinkage
- Low temperature capabilities (-22°F/-30°C)

APPLICATIONS

- Mechanical seals
- Valves
- Pump housings
- Sampling/metering equipment
- Reactors
- Mixers
- Controls/instrumentation
- Sprayers/dispensers
- Couplings

TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.95
Hardness, Shore A, Points	D2240	65
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	30
Elongation @ Break, %	D1414	150
Modulus @ 50% Elongation, psi (MPa)	D1414	180 (1.2)
Modulus @ 100% Elongation, psi (MPa)	D1414	530 (3.7)
Tensile Strength @ Break, psi (MPa)	D1414	1050 (7.3)
Service Temperature Range, °F (°C)		-22°F to 446°F (-30°C to 230°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.

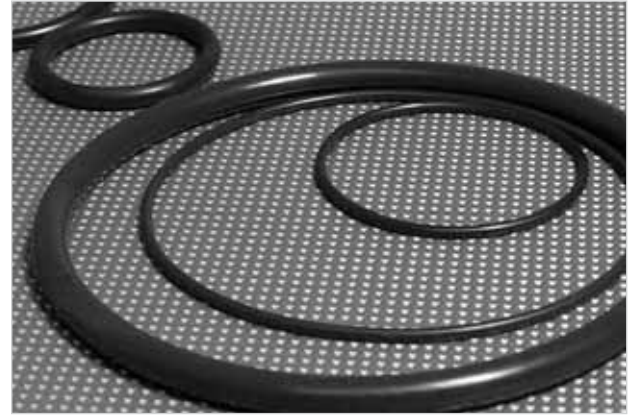


CHEMRAZ® 510

SEALING SOLUTIONS

Greene, Tweed's Chemraz® 510, a perfluoroelastomer, offers an extremely broad range of chemical resistance with a Shore A hardness value of 90. With a temperature range from -22°F to 446°F (-30°C to 230°C), Chemraz 510 is well suited for use in a range of applications, from mechanical seals to pump housings.

Because of its versatility, Chemraz 510 is often used as a standard compound for sealing at high pressures. It can be found in a variety of fluids and solutions including acids, caustics, aldehydes, esters, aromatics, hot water, steam, amines, methanol, ketones, TBA and MTBE. Chemraz 510 is available for use as O-rings, gaskets and many other custom shapes.



FEATURES & BENEFITS

- Broad chemical compatibility for use with a wide range of harsh solutions
- Low temperature capabilities (-22°F/-30°C)
- Higher hardness and density reduces likelihood of gap extrusion

APPLICATIONS

- Mechanical seals
- Valves
- Pump housings
- Sampling/metering equipment
- Reactors
- Mixers
- Controls/instrumentation
- Compressors
- Sprayers/dispensers
- Couplings

TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.92
Hardness, Shore A, Points	D2240	90
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	30
Elongation @ Break, %	D1414	85
Modulus @ 50% Elongation, psi (MPa)	D1414	1100 (7.6)
Tensile Strength @ Break, psi (MPa)	D1414	1975 (13.6)
Service Temperature Range, °F (°C)		-22°F to 446°F (-30°C to 230°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.



CHEMRAZ® 605

SEALING SOLUTIONS

Chemraz® 605, a perfluoroelastomer, is ideally suited for challenging fluid handling applications. A high-temperature compound with superior compression set resistance, physical properties and excellent chemical resistance, it excels in demanding static and semi-dynamic applications. Chemraz 605 exhibits unparalleled performance with hot amines, steam and water and functions well in increased temperatures ranging from -4°F to 500°F (-20°C to 260°C).

Available in O-rings, gaskets and many other custom shapes, Chemraz 605 possesses a broad chemical resistance range. The 605 compound is suitable for use in a wide variety of media including acids, caustics, aldehydes, esters, ethers, aromatics, hot water, steam, amines, methanol, ketones, TBA and MTBE.

FEATURES & BENEFITS

- High-temperature capability
- Excellent compression set resistance
- Broad chemical compatibility for use with a wide range of harsh solutions

APPLICATIONS

- Mechanical seals
- Pump housings
- Reactors
- Sampling/metering equipment
- Mixers
- Compressors
- Controls/instrumentation
- Valves
- Sprayers/dispensers
- Diaphragms
- Couplings



TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.97
Hardness, Shore A, Points	D2240	80
Elongation @ Break, %	D1414	130
Modulus @ 50% Elongation, psi (MPa)	D1414	420 (2.9)
Modulus @ 100% Elongation, psi (MPa)	D1414	1310 (9.0)
Tensile Strength @ Break, psi (MPa)	D1414	2150 (14.8)
Service Temperature Range, °F (°C)		-4°F to 500°F (-20°C to 260°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.



CHEMRAZ® 600

SEALING SOLUTIONS

Chemraz® 600, a perfluoroelastomer, works well in both high and low temperatures. It is capable of withstanding temperatures ranging from -4°F to 500°F (-20°C to 260°C). Additionally, Chemraz 600 provides unparalleled performance in hot water and steam. Because of its high durometer rating (Shore A 90), components made from Chemraz 600 offer greater resistance in high pressure and aggressive environments.

Chemraz 600 has an extremely broad chemical resistance range and is made from a high-density base polymer. Chemraz 600 offers a low compression set and is perfect for sealing at high pressures. Components made from Chemraz 600 are available for use as O-rings, gaskets and many other custom shapes.



FEATURES & BENEFITS

- High durometer and high density material helps withstand high pressure and harsh environments
- Broad chemical resistance range
- High-temperature capability

APPLICATIONS

- Mechanical seals
- Pump housings
- Reactors
- Mixers
- Compressors
- Valves

TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.97
Hardness, Shore A, Points	D2240	90
Elongation @ Break, %	D1414	110
Modulus @ 50% Elongation, psi (MPa)	D1414	1410 (9.7)
Modulus @ 100% Elongation, psi (MPa)	D1414	3010 (20.8)
Tensile Strength @ Break, psi (MPa)	D1414	3250 (22.4)
Service Temperature Range, °F (°C)		-4°F to 500°F (-20°C to 260°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.



CHEMRAZ® 615

SEALING SOLUTIONS

Greene, Tweed's Chemraz® 615 exhibits outstanding high-temperature properties, with a temperature range from 0°F to 615°F (-18°C to 324°C). Chemraz 615's chemical resistance and low compression set characteristics combine to out perform tin-cured perfluoroelastomers.

Chemraz 615 shows lower compression set at high temperatures and a higher retained sealing force than other perfluoroelastomers available.

Because Chemraz 615 allows for the use of higher process operating temperatures, it is ideal for a range of markets, from chemical process to petroleum refining. This superior perfluoroelastomer performs well in a variety of fluids such as inorganic and organic chemicals, acids, reagents, heat transfer fluids and hydrocarbons.

Chemraz 615 is available in standard O-rings and custom shapes for a range of equipment, from pumps and valves to agitators and mixers, from mechanical seals and process control instruments to heat exchangers and diagnostic equipment.

FEATURES & BENEFITS

- Low compression set at continuous temperatures up to 615°F (324°C)
- Ability to handle severe thermal cycles, meaning longer life and lower downtime costs
- Does not stick at high temperatures
- Superior service life in a variety of media, including heat transfer oils
- Excellent chemical resistance



TYPICAL PROPERTIES		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	2.02
Hardness, Shore A, Points	D2240	80
Elongation @ Break, %	D1414	170
Modulus @ 50% Elongation, psi (MPa)	D1414	400 (2.8)
Modulus @ 100% Elongation, psi (MPa)	D1414	1000 (6.9)
Tensile Strength @ Break, psi (MPa)	D1414	1700 (11.7)
Service Temperature Range, °F (°C)		0°F to 615°F (-18°C to 324°C)

APPLICATIONS

- Mechanical seals
- Process control instruments
- Heat exchangers
- Valves
- Agitators & mixers
- Pumps
- Couplings



CHEMRAZ® 514 and 517

SEALING SOLUTIONS

Greene, Tweed's Chemraz® 514 and Chemraz 517, perfluoroelastomers, are white specialty compounds, perfect for applications where contamination from carbon black must be prevented. Chemraz 514 offers a Shore A hardness value of 70, while Chemraz 517 has a Shore A hardness value of 80. Both Chemraz compounds have a wide temperature range, -22°F to 428°F (-30°C to 220°C). Chemraz 514 and Chemraz 517 are ideally suited for use in a range of applications, from mechanical seals to mixers.

Chemraz 514 and Chemraz 517 are available for use as O-rings, gaskets and many other custom shapes.



FEATURES & BENEFITS

- No carbon black residue
- Low temperature capabilities (-22°F/-30°C)

APPLICATIONS

- Mechanical seals
- Pump housings
- Reactors
- Sampling/metering equipment
- Mixers
- Valves
- Couplings
- Sprayers and dispensers

CHEMRAZ 514 TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		White
Specific Gravity	D297	2.12
Hardness, Shore A, Points	D2240	70
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	25
Elongation @ Break, %	D1414	190
Modulus @ 50% Elongation, psi (MPa)	D1414	300 (2.1)
Modulus @ 100% Elongation, psi (MPa)	D1414	680 (4.7)
Tensile Strength @ Break, psi (MPa)	D1414	1460 (10.1)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

CHEMRAZ 517 TYPICAL PROPERTIES*		
Physical Properties	ASTM Method	Typical Value
Color		White
Specific Gravity	D297	2.22
Hardness, Shore A, Points	D2240	80
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	25
Elongation @ Break, %	D1414	165
Modulus @ 50% Elongation, psi (MPa)	D1414	540 (3.7)
Modulus @ 100% Elongation, psi (MPa)	D1414	1050 (7.3)
Tensile Strength @ Break, psi (MPa)	D1414	1600 (11.0)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.



CHEMRAZ[®] 584 and 585

SEALING SOLUTIONS

Greene, Tweed's Chemraz[®] 584 and Chemraz 585, cream-colored perfluoroelastomers, are specialty compounds formulated to outlast the most demanding chemical process applications. Because of their outstanding overall chemical resistance, Chemraz 584 and Chemraz 585 work well in chlorine, ozone, strong oxidation fluids and hot aqueous solutions. Their recommended temperature range is -22°F to 428°F (-30°C to 220°C).

These cream compounds are perfect for applications where contamination from carbon black must be prevented.

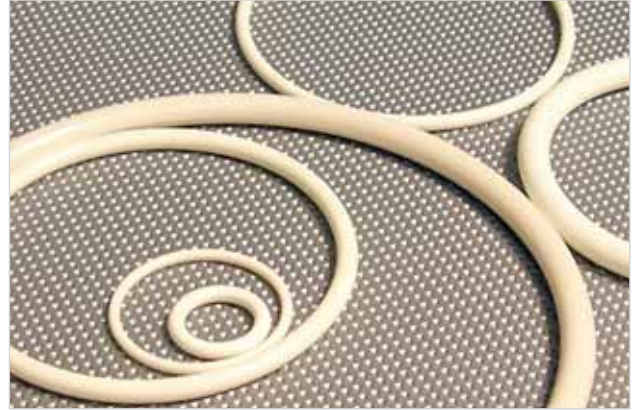
Chemraz components are available for use as O-rings, gaskets and many other custom shapes.

FEATURES & BENEFITS

- Superior chemical resistance for use in strong oxidation fluids and hot aqueous solutions as well as chlorine and ozone
- No carbon black residue

APPLICATIONS

- Mechanical seals
- Pump housings
- Reactors
- Sampling/metering equipment
- Mixers
- Valves
- Controls/instrumentation
- Couplings



CHEMRAZ 584 TYPICAL PROPERTIES

Physical Properties	ASTM Method	Typical Value
Color		Cream
Specific Gravity	D297	1.98
Hardness, Shore A, Points	D2240	70
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	35
Elongation @ Break, %	D1414	145
Modulus @ 50% Elongation, psi (MPa)	D1414	350 (2.4)
Modulus @ 100% Elongation, psi (MPa)	D1414	780 (5.4)
Tensile Strength @ Break, psi (MPa)	D1414	1300 (9.0)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

CHEMRAZ 585 TYPICAL PROPERTIES

Physical Properties	ASTM Method	Typical Value
Color		Cream
Specific Gravity	D297	1.99
Hardness, Shore A, Points	D2240	80
Compression Set, 70 hours @ 400°F (204°C) @ 25% Deflection, %	D395	35
Elongation @ Break, %	D1414	165
Modulus @ 50% Elongation, psi (MPa)	D1414	625 (4.3)
Modulus @ 100% Elongation, psi (MPa)	D1414	1240 (8.5)
Tensile Strength @ Break, psi (MPa)	D1414	1825 (12.6)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

* Note: Unless otherwise indicated, all tests are performed on (-214) O-rings.

SPECIALTY COMPOUNDS FOR SPECIFIC REQUIREMENTS

Greene, Tweed's engineering experts work side by side with customers to find the best possible material and design to optimize every application. The following sections highlight some specialty elastomers that were designed to meet the needs of specific challenging applications.

FDA

Compliance to U.S. FDA regulations is critical for those manufacturing products for the food or drug market. Greene, Tweed constantly strives to provide seal components that optimize both mechanical and physicochemical (absorption and extractables) performance. As a result, we do things for our customers that other companies are not able to offer. For complete and uncompromising solutions to pharmaceutical or hygienic fluid handling applications, only Greene, Tweed has virtual prototype and test capabilities in house. Our FEA design validations use mock-up equipment to deliver solutions that meet all your compliance needs in innovative ways.

At Greene, Tweed we take compliance seriously. Our reputation is built on the reputation of our customers. All of our compounded materials are third-party compliance tested. No matter what pharmaceutical or hygienic fluid handling process you are working with—or what part of the world you operate in—we deliver the most effective solution possible.

The FDA approves the use of food contact substances via the FCN process (Food Contact Substance Notification) described in Section 409(h) of the Federal Food, Drug and Cosmetic Act (21 U.S.C Section 348(h)).

In publishing FCNs 000245 and 000247, the FDA confirmed that articles made from the Chemraz perfluoroelastomers SD625, SD517 and SD585 comply with the requirements for repeated use in contact with foods.

Parts made from these materials can be supplied with a certificate of conformity if required.

Extraction data

All extraction data have been determined by an independent certified test laboratory according to the descriptions in the FDA paragraph 21 CFR, part 58 Good Laboratory Practice for Nonclinical Laboratory Studies:

- Total extractions according to 21 CFR 177.2400(d)(1)
(0.2 mg/in² = 3,1 mg/dm²)



- Fluoride extractions according to 21 CFR 177.2400(d)(2)
(0.03 mg/in² = 0,47 mg/dm²)

Parts made from these materials can be supplied with a certificate of conformity if required.

USP Class VI

The biocompatibility between a plastic or elastomer and a living organism is regulated with tests defined by the USP. Cytotoxicity is determined in the test tube (in vitro), while toxicity to the living organism is determined in the body (in vivo). Chemraz SD625, SD517 and SD585 are USP Plastic Class VI compliant; therefore, they are biocompatible.

Chemraz SD625 has also passed USP Physicochemical Testing <661> and has also been successfully tested to USP Elastomeric Closures <381>. This makes it the most comprehensively tested perfluoroelastomer for the food, drug and biomedical technology markets today.

3-A® Sanitary Standards

3-A® SSI (3-A Sanitary Standards, Inc.) is a nonprofit organization serving the U.S. public health community through the development of standards for the advancement of food sanitation and hygiene. Chemraz SD625 and SD517 have passed the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-03, meaning these perfluoroelastomers meet strict hygienic criteria applicable to dairy equipment and systems.

More detail on these Chemraz materials appears on the following pages.



CHEMRAZ® SD625

FDA & USP CLASS VI COMPLIANT

Chemraz® SD625, a black-colored perfluoroelastomer, offers the broadest chemical resistance of any elastomer, combining the resilience and sealing force of an elastomer with chemical resistance and low extractables similar to PTFE. Not only is it FDA and USP Class VI compliant, but Chemraz SD625 also passes USP Physico-chemical Testing, USP <661>, and has been tested to USP elastomeric closures, USP <381>, making it the most comprehensively tested perfluoroelastomer on the market. Critical applications and difficult seal replacement locations where maximizing MTBR (mean time between replacement) is paramount will benefit greatly from Chemraz SD625.

With its outstanding performance in high temperatures, Chemraz SD625 delivers excellent performance in hot water and steam and in CIP/SIP processes. Chemraz SD625 is also well suited for dynamic applications.

Chemraz components are available for use as O-rings, gaskets, sanitary seals and many other custom shapes.

FEATURES & BENEFITS

- Superior high temperature properties
- Outstanding resistance in steam over 302°F (150°C) and in CIP/SIP processes
- Outstanding hot water & steam resistance
- 3-A® and FDA compliance meeting the highest purity standards

APPLICATIONS

- Mechanical seals
- Valves
- Pumps
- Mixers
- Fermenters
- Biomedical equipment
- Couplings



TYPICAL PROPERTIES		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	2.00
Hardness, Shore A	D2240	80
Compression Set @ 25% Deflection		
70 Hrs. @ 400°F/200°C, in Air, % of Original Deflection	D1414	23
Elongation, %	D1414	135
Modulus @ 50% Elongation, psi (MPa)	D1414	650 (4.5)
Modulus @ 100% Elongation, psi (MPa)	D1414	1900 (43.4)
Tensile Strength @ Break, psi (MPa)	D1414	3200 (22.1)
Service Temperature Range, °F (°C)		-4°F to 500°F (-20°C to 260°C)

EXTRACTION DATA (in mg/in ²)				
Medium	FDA Limitations		Chemraz SD625	
	Total	Fluoride	Total	Fluoride
Distilled Water	≤ 0,2	≤ 0,03	0,03	< 0,0004
Ethanol, 50%	≤ 0,2	≤ 0,03	0,03	< 0,0003
n-Heptane	≤ 0,2	≤ 0,03	0,01	< 0,0003



CHEMRAZ® SD517

FDA & USP CLASS VI COMPLIANT

Chemraz® SD517, a white-colored perfluoroelastomer, offers the broadest chemical resistance of any elastomer, combining the resilience and sealing force of an elastomer with chemical resistance and low extractables similar to PTFE. Providing the lowest temperature sealing properties of any perfluoroelastomer on the market (-22°F, -30°C), Chemraz SD517 is an ideal seal component for subambient mechanical seal applications and is the preferred alternative to encapsulated O-rings. With its white color, Chemraz SD517 meets the needs of applications requiring nonblack elastomers.

Chemraz SD517's many features make it well suited for critical applications and difficult seal replacement locations where maximizing MTBR (mean time between replacement) is paramount.

Chemraz components are available for use as O-rings, gaskets, sanitary seals and many other custom shapes.

This product is FDA and USP Class VI compliant making it an ideal product for elastomeric applications requiring regulatory compliance.



TYPICAL PROPERTIES		
Physical Properties	ASTM Method	Typical Value
Color		White
Specific Gravity	D297	2.22
Hardness, Shore A	D2240	80
Compression Set @ 25% Deflection		
70 Hrs. @ 400°F/200°C, in Air, % of Original Deflection	D395	25
Modulus @ 50% Elongation, psi (MPa)	D1414	540 (3.7)
Modulus @ 100% Elongation, psi (MPa)	D1414	1050 (7.3)
Tensile Strength @ Break, psi (MPa)	D1414	1600 (11.0)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

FEATURES & BENEFITS

- Special white material for applications where black impurities must be prevented
- FDA approved to FCN 000247
- 3-A® and FDA compliance meeting the highest purity standards

APPLICATIONS

- Mechanical seals
- Valves
- Pumps
- Mixers
- Fermenters
- Biomedical equipment
- Couplings

EXTRACTION DATA (in mg/in ²)				
Medium	FDA Limitations		Chemraz SD517	
	Total	Fluoride	Total	Fluoride
Distilled Water	≤ 0,2	≤ 0,03	0,011	< 0,0008
Ethanol, 50%	≤ 0,2	≤ 0,03	0,029	< 0,0008
n-Heptane	≤ 0,2	≤ 0,03	0,005	< 0,0008



CHEMRAZ® SD585

FDA & USP CLASS VI COMPLIANT

Chemraz® SD585, a cream-colored perfluoroelastomer, offers the broadest chemical resistance of any elastomer, combining the resilience and sealing force of an elastomer with chemical resistance similar to PTFE. Because it offers the best low-temperature sealing properties of any perfluoroelastomer on the market, Chemraz is an ideal seal component for subambient mechanical seal applications. Chemraz SD585 is recommended for strong oxidizing media and hot aqueous solutions.

Chemraz SD585's many features make it well suited for critical applications and difficult seal replacement locations where maximizing MTBR (mean time between replacement) is paramount. With its cream color, Chemraz SD585 meets the needs of applications requiring nonblack elastomers.

Chemraz components are available for use as O-rings, gaskets, sanitary seals and many other custom shapes.

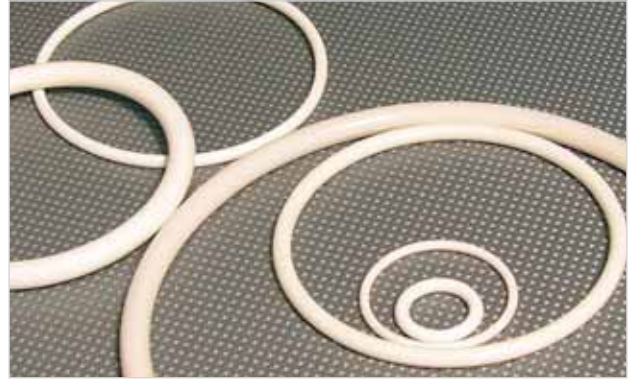
This product is FDA and USP Class VI compliant making it an ideal product for elastomeric applications requiring regulatory compliance.

FEATURES & BENEFITS

- Special beige material for applications where carbon black impurities must be prevented
- FDA approved to FCN 000247
- Recommended for strong oxidizing media and hot aqueous solutions
- Broad chemical resistance to Chlorine and Ozone

APPLICATIONS

- Mechanical seals
- Valves
- Pumps
- Mixers
- Fermenters
- Biomedical equipment
- Couplings



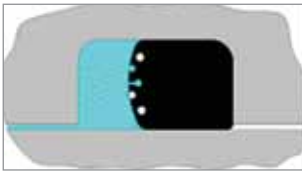
TYPICAL PROPERTIES		
Physical Properties	ASTM Method	Typical Value
Color		Cream
Specific Gravity	D297	1.99
Hardness, Shore A	D2240	80
Compression Set @ 25% Deflection		
70 Hrs. @ 400°F/200°C, in Air, % of Original Deflection	D395	35
Elongation (%)	D1414	165
Modulus @ 50% Elongation, psi (MPa)	D1414	625 (4.3)
Modulus @ 100% Elongation, psi (MPa)	D1414	1240 (8.6)
Tensile Strength @ Break, psi (MPa)	D1414	1825 (42.6)
Service Temperature Range, °F (°C)		-22°F to 428°F (-30°C to 220°C)

EXTRACTION DATA (in mg/in ²)				
Medium	FDA Limitations		Chemraz SD585	
	Total	Fluoride	Total	Fluoride
Distilled Water	≤ 0,2	≤ 0,03	0,025	< 0,0008
Ethanol, 50%	≤ 0,2	≤ 0,03	0,101	< 0,0008
n-Heptane	≤ 0,2	≤ 0,03	0,005	< 0,0008

EXPLOSIVE DECOMPRESSION RESISTANT— CHEMRAZ® 526

The severe consequences of ED (explosive decomposition) occur in elastomers when there is a sudden drop in the pressure of gases, gas compounds or liquefied gases.

All elastomers are more or less permeable. When an elastomer is exposed to a high gas pressure for a certain length of time, it absorbs the gases that settle in the interstices between the elastomer's molecule chains. This process continues until the pressure inside the seal equals the pressure in the surrounding system. The higher the pressure, the more gas is absorbed.



Gases penetrating a seal

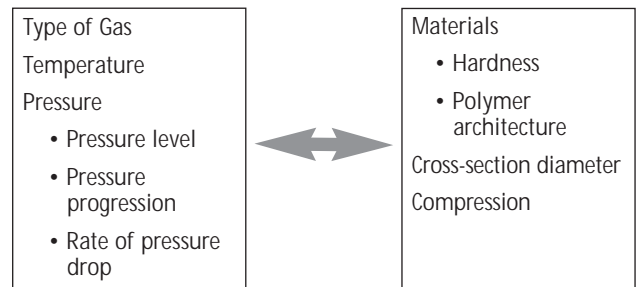
If the system depressurizes rapidly, the gas in the elastomer will expand under its own high pressure. If pressure cannot escape from the elastomer fast enough or if the elastomer's structure is not stable enough, bubbles or cracks will form, destroy the seal and lead to a loss of functionality. These problems will continue to occur hours after the drop in pressure. The seal's rapid increase in volume may also cause extrusion phenomena.



O-ring exposed to rapid depressurization

The photo above shows an O-ring that has been exposed to rapid depressurization in natural gas extraction at high pressure and high temperature. The ruptures and blisters caused by the sudden and rapid drop in pressure are visible.

Consider the following when ED is an issue:



Components made from ED resistant Chemraz 526 withstand the challenging conditions caused by the mix of high pressures and high temperatures. Chemraz 526 offers superior explosive decomposition properties, broader chemical compatibility and an improved lower temperature operating window. Its compression set delivers improved sealing and leak prevention unmatched by the leading competitive material. In addition, the hardness of ED resistant Chemraz 526 significantly reduces the risk of gap extrusion. More information about the features and benefits of Chemraz 526 appears on the following page.



CHEMRAZ® 526

Explosive Decompression Resistant

SEALING SOLUTIONS

Greene, Tweed's Chemraz® 526, a perfluoroelastomer, offers superior chemical compatibility coupled with explosive decompression resistance, making it the ideal compound for fluid handling equipment exposed to extreme chemical environments. Chemraz 526 has a temperature range from -4°F to 482°F (-20°C to 250°C). With its outstanding explosive decompression resistant capabilities, Chemraz 526 is well suited in a range of applications from pumps and valves to oilfield completion equipment.

ED (explosive decompression) is a phenomenon that often occurs when high-pressure gas molecules migrate into an elastomer at a compressed state. When the pressure surrounding the elastomer is suddenly released, the compressed gas inside the elastomer tries to expand and exit the elastomer, thus causing ED. Most elastomers experience severe blistering or cracking when the forces of these expanding gases overcome the strength of the surrounding material. However, Chemraz 526 offers superior explosive decompression properties and the broadest chemical compatibility, e.g., better resistance to sour gas, acids, caustics, hot water and steam.

Chemraz 526 is available for use as O-rings, gaskets and many other custom shapes.

FEATURES & BENEFITS

- Provides excellent ED resistance so parts maintain sealing properties and equipment life is extended
- Combines broad chemical resistance with ED resistance while preventing leakage and equipment failure
- Reduces maintenance cost
- Increases mean time between failure

APPLICATIONS

- Pumps
- Valves
- Oilfield completion equipment
- Compressors

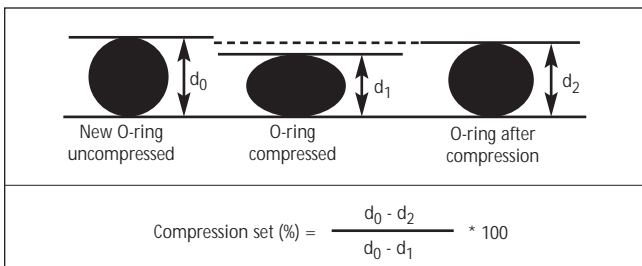


TYPICAL PROPERTIES		
Physical Properties	ASTM Method	Typical Value
Color		Black
Specific Gravity	D297	1.92
Hardness, Shore A, Points	D2240	95
Elongation @ Break, %	D1414	100
Modulus @ 10% Elongation, psi (MPa)	D1414	575 (3.9)
Tensile Strength, psi (MPa)	D1414	2580 (17.7)
Temperature Range, °F (°C)		-4 to 482 (-20 to 250)

TECHNICAL INFORMATION

Compression set

Generally, an elastomer's compression set is determined according to ASTM 395B. All tests are carried out in air at a temperature of 401°F (205°C) over 70 hours unless otherwise stated.



ASTM 395B states that compression set must be measured on a test body with a diameter of 29 mm and a thickness of 12.5 mm. Although the value for compression set obtained by this method is very low, it is of little significance for parts used in field. Greene, Tweed's data reflects the compression set obtained on O-rings of size -214 (24.99 mm x 3.53 mm). These percentages are larger than those obtained on the test body but are more practical for the user.

The table below compares compression set measurements on three Chemraz® materials, first on the size -214 O-ring and second on the ASTM 395B test body, for otherwise identical conditions (70 h, air, 401°F, 205°C): Depending on the particular material, the compression set measured in air can be very different from that measured in nitrogen, for example. Chemraz materials, however, deliver superior performance in a wide range of environments.

	With O-ring -214	With test body
Chemraz 505	25%	13%
Chemraz 510	30%	17%
Chemraz 605	20%	11%

Resilience, temperature changes

Most methods for measuring compression set only measure resilience. They do not take into account the time taken by a seal to recover or its response to changes in temperature. Many dynamic applications, e.g., mechanical seals or quick-release couplings, require the rapid recovery of an elastomer for the safe functioning of a seal. Chemraz materials excel in these environments by delivering the type of rapid recovery usually associated with rubber.

TECHNICAL INFORMATION

Introduction to chemical compatibility list

For further information on the chemical compatibility of Chemraz please visit us at www.gtweed.com. You will find information on the compatibility of the compounds mentioned in this brochure in more than 2400 media.

For any doubts or especially in case of new or non-approved applications we recommend to contact us. We are also at your disposal for any other question and can also support you in the selection of the ideal compound for your specific application and the seal design.

Collaborating toward success

At Greene, Tweed our goal is satisfied customers who look forward to partnering with us again and again. In our efforts to meet and exceed customer expectations we constantly strive to formulate and produce better, more efficient materials that anticipate our customers ever-changing needs.

With fully qualified engineering, sales and support personnel located throughout the Americas, Europe and Asia, Greene, Tweed delivers innovative solutions to individual customer challenges on a global scope. This consistent high level of experience and skill creates a unique customer experience. Our success is based on providing products and services that make our customers successful. We are committed to providing local service and technical expertise to help our customers thrive.

TECHNICAL INFORMATION

Seal geometries

The most common geometry for a seal is the O-ring, a closed ring seal with a circular section. Its inside diameter (d_1) and its cross-section diameter (d_2) determine the size of an O-ring. (Fig. 1).

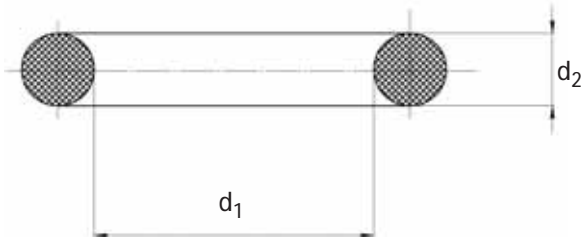


Fig.1 – Seal Geometries

O-rings prevent the escape of fluids or gases. Their circular form facilitates their use as rod seals, piston seals or flange seals. The seal is achieved by axial or radial compression. The total compression is the sum of the contact force and the system pressure (Fig. 2a/b).

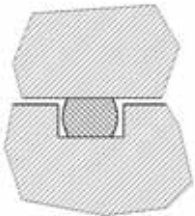


Fig. 2a
Pressureless

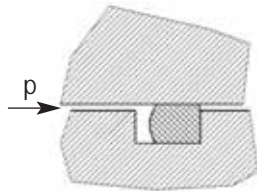


Fig. 2b
Deformed under pressure

Groove design

O-rings are used for both static and dynamic sealing. Seal type affects the groove geometry. Most O-ring grooves are rectangular in section, although a flank angle of up to 5° is permitted. Groove volume is about 25 percent more than the volume of the corresponding O-ring to prevent the groove overfilling due to expansion, swelling and tolerances.

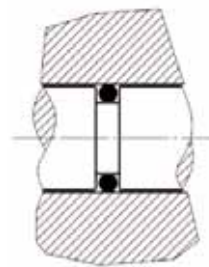
Sealing face quality

Static seals

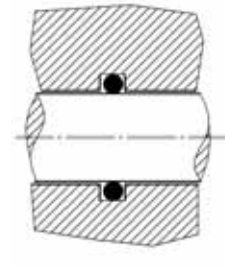
The surface roughness should be $R_a = 0.8 \mu\text{m}$ or finer. The O-ring can be used without a back-up ring for pressures up to $P = 120 \text{ bar}$ (12 MPa). Higher pressures require a back-up ring.

Dynamic seals

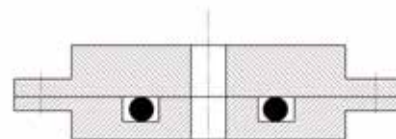
A surface roughness of $R_a = 0.4 \mu\text{m}$ is normally recommended for dynamic seals. The fit clearance should be a close running fit of H8/f7 for pressures up to 100 bar (10MPa). For pressures over 100 bar (10 MPa) the fit clearance should be H7/g6. Use a back-up ring for pressures greater than 150 bar (15MPa).



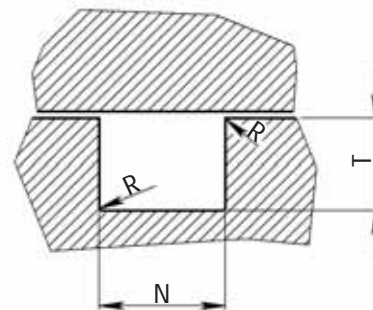
External sealing



Internal sealing



Face Seal



Groove Design

GROOVE SIZES FOR STATIC AND DYNAMIC SEALS

O-ring cross section d2 (mm)	Groove depth T static (mm)		Groove depth T dynamic (mm)		Groove width N (mm)		Groove base radius (mm)
1.00	0.70	+ 0,03	0.75	+ 0,03	1.50	+ 0,2	0,1 – 0,2
1.50	1.10	+ 0,03	1.20	+ 0,03	2.10	+ 0,2	0,1 – 0,3
1.60	1.20	+ 0,03	1.30	+ 0,03	2.20	+ 0,2	0,1 – 0,3
1.78	1.40	+ 0,03	1.45	+ 0,03	2.40	+ 0,2	0,1 – 0,4
1.90	1.50	+ 0,04	1.60	+ 0,04	2.55	+ 0,2	0,1 – 0,4
2.00	1.60	+ 0,04	1.70	+ 0,04	2.70	+ 0,2	0,1 – 0,4
2.40	1.90	+ 0,04	2.05	+ 0,04	3.40	+ 0,2	0,1 – 0,4
2.50	2.00	+ 0,04	2.15	+ 0,04	3.50	+ 0,2	0,1 – 0,4
2.62	2.20	+ 0,04	2.25	+ 0,04	3.60	+ 0,2	0,1 – 0,4
3.00	2.45	+ 0,05	2.60	+ 0,05	4.10	+ 0,2	0,1 – 0,4
3.50	2.85	+ 0,05	3.00	+ 0,05	4.80	+ 0,2	0,1 – 0,4
3.53	2.90	+ 0,05	3.05	+ 0,05	4.80	+ 0,2	0,2 – 0,6
4.00	3.30	+ 0,08	3.50	+ 0,08	5.50	+ 0,2	0,2 – 0,6
4.50	3.80	+ 0,08	4.00	+ 0,08	6.10	+ 0,2	0,2 – 0,6
5.00	4.20	+ 0,08	4.50	+ 0,08	6.80	+ 0,2	0,2 – 0,6
5.33	4.50	+ 0,08	4.70	+ 0,08	7.20	+ 0,2	0,4 – 0,8
5.70	4.80	+ 0,08	5.10	+ 0,08	7.80	+ 0,2	0,4 – 0,8
6.00	5.10	+ 0,08	5.40	+ 0,08	8.20	+ 0,2	0,4 – 0,8
6.99	5.90	+ 0,08	6.20	+ 0,08	9.60	+ 0,2	0,4 – 0,8
8.00	6.80	+ 0,10	7.10	+ 0,10	10.80	+ 0,2	0,4 – 0,8
10.00	8.50	+ 0,10	8.90	+ 0,10	13.60	+ 0,2	0,4 – 0,8

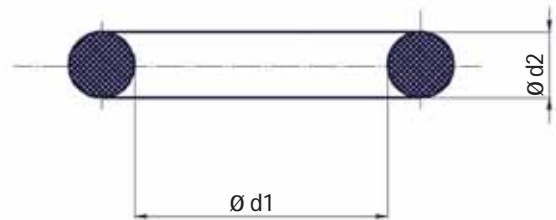
O-RING DIMENSIONS IN INCH (AS-568A STANDARD)

Part number system				Order example
9 O-ring, inch	223 Size according to AS-568A	-	505 Compound-No.	9223-505 Chemraz 505 O-ring, cross section 3,53 mm, inner diameter 40,87 mm

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
001	0,74	1,02
002	1,07	1,27
003	1,42	1,52
004	1,78	1,78
005	2,57	1,78
006	2,90	1,78
007	3,68	1,78
008	4,47	1,78
009	5,28	1,78
010	6,07	1,78
011	7,65	1,78
012	9,25	1,78
013	10,82	1,78
014	12,42	1,78
015	14,00	1,78
016	15,60	1,78
017	17,17	1,78
018	18,77	1,78
019	20,35	1,78
020	21,95	1,78
021	23,52	1,78
022	25,12	1,78
023	26,70	1,78
024	28,30	1,78
025	29,87	1,78
026	31,47	1,78
027	33,05	1,78
028	34,65	1,78
029	37,82	1,78
030	41,00	1,78
031	44,17	1,78
032	47,35	1,78
033	50,52	1,78
034	53,70	1,78
035	56,87	1,78
036	60,05	1,78
037	63,22	1,78
038	66,40	1,78
039	69,57	1,78
040	72,75	1,78

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
041	75,92	1,78
042	82,27	1,78
043	88,62	1,78
044	94,97	1,78
045	101,32	1,78
046	107,67	1,78
047	114,02	1,78
048	120,37	1,78
049	126,72	1,78
050	133,07	1,78
102	1,24	2,62
103	2,06	2,62
104	2,84	2,62
105	3,63	2,62
106	4,42	2,62
107	5,23	2,62
108	6,02	2,62
109	7,59	2,62
110	9,19	2,62
111	10,77	2,62
112	12,37	2,62
113	13,94	2,62
114	15,54	2,62
115	17,12	2,62
116	18,72	2,62
117	20,29	2,62
118	21,89	2,62
119	23,47	2,62
120	25,07	2,62
121	26,64	2,62
122	28,24	2,62
123	29,82	2,62
124	31,42	2,62
125	32,99	2,62
126	34,59	2,62
127	36,17	2,62
128	37,77	2,62
129	39,34	2,62
130	40,94	2,62
131	42,52	2,62

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
132	44,12	2,62
133	45,69	2,62
134	47,29	2,62
135	48,90	2,62
136	50,47	2,62
137	52,07	2,62
138	53,64	2,62
139	55,25	2,62
140	56,82	2,62
141	58,42	2,62
142	59,99	2,62
143	61,60	2,62
144	63,17	2,62
145	64,77	2,62
146	66,34	2,62
147	67,95	2,62
148	69,52	2,62
149	71,12	2,62
150	72,69	2,62
151	75,87	2,62
152	82,22	2,62
153	88,57	2,62
154	94,92	2,62
155	101,27	2,62
156	107,62	2,62
157	113,97	2,62
158	120,32	2,62
159	126,67	2,62
160	133,02	2,62
161	139,37	2,62
162	145,72	2,62
163	152,07	2,62
164	158,42	2,62
165	164,77	2,62
166	171,12	2,62
167	177,47	2,62
168	183,82	2,62
169	190,17	2,62
170	196,52	2,62
171	202,87	2,62



Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
172	209,22	2,62
173	215,57	2,62
174	221,92	2,62
175	228,27	2,62
176	234,62	2,62
177	240,97	2,62
178	247,32	2,62
179	253,67	2,62
201	4,34	3,53
202	5,94	3,53
203	7,52	3,53
204	9,12	3,53
205	10,69	3,53
206	12,29	3,53
207	13,87	3,53
208	15,47	3,53
209	17,04	3,53
210	18,64	3,53
211	20,22	3,53
212	21,82	3,53
213	23,39	3,53
214	24,99	3,53
215	26,57	3,53
216	28,17	3,53
217	29,74	3,53
218	31,34	3,53
219	32,92	3,53
220	34,52	3,53
221	36,09	3,53
222	37,69	3,53
223	40,87	3,53
224	44,04	3,53
225	47,22	3,53
226	50,39	3,53
227	53,57	3,53
228	56,74	3,53
229	59,92	3,53
230	63,09	3,53
231	66,27	3,53
232	69,44	3,53

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
233	72,62	3,53
234	75,79	3,53
235	78,97	3,53
236	82,14	3,53
237	85,32	3,53
238	88,49	3,53
239	91,67	3,53
240	94,84	3,53
241	98,02	3,53
242	101,19	3,53
243	104,37	3,53
244	107,54	3,53
255	110,72	3,53
246	113,89	3,53
247	117,07	3,53
248	120,24	3,53
249	123,42	3,53
250	126,59	3,53
251	129,77	3,53
252	132,94	3,53
253	136,12	3,53
254	139,29	3,53
255	142,47	3,53
256	145,64	3,53
257	148,82	3,53
258	151,99	3,53
259	158,34	3,53
260	164,69	3,53
261	171,04	3,53
262	177,39	3,53
263	183,74	3,53
264	190,09	3,53
265	196,44	3,53
266	202,79	3,53
267	209,14	3,53
268	215,49	3,53
269	221,84	3,53
270	228,19	3,53
271	234,54	3,53
272	240,89	3,53

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
273	247,24	3,53
274	253,59	3,53
275	266,29	3,53
276	278,99	3,53
277	291,69	3,53
278	304,39	3,53
279	329,79	3,53
280	355,19	3,53
281	380,59	3,53
282	405,26	3,53
283	430,66	3,53
284	456,06	3,53
309	10,46	5,33
310	12,07	5,33
311	13,64	5,33
312	15,24	5,33
313	16,81	5,33
314	18,42	5,33
315	19,99	5,33
316	21,59	5,33
317	23,16	5,33
318	24,77	5,33
319	26,34	5,33
320	27,94	5,33
321	29,51	5,33
322	31,12	5,33
323	32,69	5,33
324	34,29	5,33
325	37,47	5,33
326	40,64	5,33
327	43,82	5,33
328	46,99	5,33
329	50,17	5,33
330	53,34	5,33
331	56,52	5,33
332	59,69	5,33
333	62,87	5,33
334	66,04	5,33
335	69,22	5,33
336	72,39	5,33

O-RING DIMENSIONS IN INCH (AS-568A STANDARD)

Part number system			Order example
9 O-ring, inch	223 Size according to AS-568A	-	505 Compound-No.
			9223-505 Chemraz 505 O-ring, cross section 3,53 mm, inner diameter 40,87 mm

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
337	75,57	5,33
338	78,74	5,33
339	81,92	5,33
340	85,09	5,33
341	88,27	5,33
342	91,44	5,33
343	94,62	5,33
344	97,79	5,33
345	100,97	5,33
346	104,14	5,33
347	107,32	5,33
348	110,49	5,33
349	113,67	5,33
350	116,84	5,33
351	120,02	5,33
352	123,19	5,33
353	126,37	5,33
354	129,54	5,33
355	132,72	5,33
356	135,89	5,33
357	139,07	5,33
358	142,24	5,33
359	145,42	5,33
360	148,59	5,33
361	151,77	5,33
362	158,12	5,33
363	164,47	5,33
364	170,82	5,33
365	177,17	5,33
366	183,52	5,33
367	189,87	5,33
368	196,22	5,33
369	202,57	5,33
370	208,92	5,33
371	215,27	5,33
372	221,62	5,33
373	227,97	5,33
374	234,32	5,33
375	240,67	5,33
376	247,02	5,33

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
377	253,37	5,33
378	266,07	5,33
379	278,77	5,33
380	291,47	5,33
381	304,17	5,33
382	329,57	5,33
383	354,97	5,33
384	380,37	5,33
385	405,26	5,33
386	430,66	5,33
387	456,06	5,33
388	481,41	5,33
389	506,81	5,33
390	532,21	5,33
391	557,61	5,33
392	582,68	5,33
393	608,08	5,33
394	633,48	5,33
395	658,88	5,33
425	113,67	6,99
426	116,84	6,99
427	120,02	6,99
428	123,19	6,99
429	126,37	6,99
430	129,54	6,99
431	132,72	6,99
432	135,89	6,99
433	139,07	6,99
434	142,24	6,99
435	145,42	6,99
436	148,59	6,99
437	151,77	6,99
438	158,12	6,99
439	164,47	6,99
440	170,82	6,99
441	177,17	6,99
442	183,52	6,99
443	189,87	6,99
444	196,22	6,99
445	202,57	6,99

Size No.	Dimensions in accordance with AS-568A in Millimeters	
	d1	d2
446	215,27	6,99
447	227,97	6,99
448	240,67	6,99
449	253,37	6,99
450	266,07	6,99
451	278,77	6,99
452	291,47	6,99
453	304,17	6,99
454	316,87	6,99
455	329,57	6,99
456	342,27	6,99
457	354,97	6,99
458	367,67	6,99
459	380,37	6,99
460	393,07	6,99
461	405,26	6,99
462	417,96	6,99
463	430,66	6,99
464	443,36	6,99
465	456,06	6,99
466	468,76	6,99
467	481,46	6,99
468	494,16	6,99
469	506,86	6,99
470	532,26	6,99
471	557,66	6,99
472	582,68	6,99
473	608,08	6,99
474	633,48	6,99
475	658,88	6,99

DIMENSIONS FOR PLATES AND SHEETS

Greene, Tweed Part number	Dimensions in Millimeters		
	Length	Width	Thickness
SM03-03-010-***	76,2	76,2	0,25
SM03-03-020-***	76,2	76,2	0,51
SM03-03-030-***	76,2	76,2	0,76
SM03-03-040-***	76,2	76,2	1,02
SM03-03-050-***	76,2	76,2	1,27
SM03-03-060-***	76,2	76,2	1,52
SM03-03-070-***	76,2	76,2	1,78
SM03-03-080-***	76,2	76,2	2,03
SM03-03-090-***	76,2	76,2	2,29
SM03-03-110-***	76,2	76,2	2,79
SM03-03-125-***	76,2	76,2	3,18
SM06-06-010-***	152,4	152,4	0,25
SM06-06-020-***	152,4	152,4	0,51
SM06-06-030-***	152,4	152,4	0,76
SM06-06-040-***	152,4	152,4	1,02
SM06-06-050-***	152,4	152,4	1,27
SM06-06-060-***	152,4	152,4	1,52
SM06-06-070-***	152,4	152,4	1,78
SM06-06-080-***	152,4	152,4	2,03
SM06-06-090-***	152,4	152,4	2,29
SM06-06-110-***	152,4	152,4	2,79
SM06-06-125-***	152,4	152,4	3,18
SM06-012-040-***	152,4	304,8	1,02
SM06-012-050-***	152,4	304,8	1,27
SM06-012-060-***	152,4	304,8	1,52
SM06-012-070-***	152,4	304,8	1,78
SM06-012-080-***	152,4	304,8	2,03
SM06-012-090-***	152,4	304,8	2,29
SM06-012-110-***	152,4	304,8	2,79
SM06-012-125-***	152,4	304,8	3,18
SM012-012-040-***	304,8	304,8	1,02
SM012-012-050-***	304,8	304,8	1,27
SM012-012-060-***	304,8	304,8	1,52
SM012-012-070-***	304,8	304,8	1,78
SM012-012-080-***	304,8	304,8	2,03
SM012-012-090-***	304,8	304,8	2,29
SM012-012-110-***	304,8	304,8	2,79
SM012-012-125-***	304,8	304,8	3,18

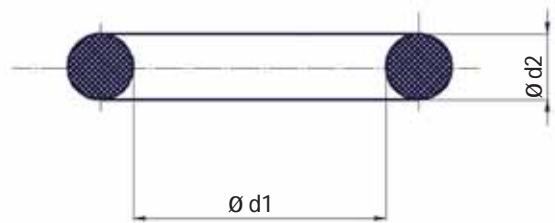
Instead of *** at the part number please insert the desired compound number.
 Upon request Greene, Tweed also produces customer-shaped parts by waterjet or laser cut.

O-RING DIMENSIONS (METRIC)

Part number system				Order example		
M	0400	-	05400	-	505	M0400-05400-505
O-ring metric	Cross section d2 *100		Inner diameter d1 *100		Compound no.	Chemraz 505 O-ring, cross section 4,0 mm, inner diameter 54,00 mm

Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters	
d1	d2	d1	d2	d1	d2	d1	d2	d1	d2
1,15	1,00	25,00	1,50	32,10	1,60	32,00	2,00	5,30	2,40
3,00	1,00	26,00	1,50	35,10	1,60	33,00	2,00	5,60	2,40
4,00	1,00	27,00	1,50	37,10	1,60	34,00	2,00	6,30	2,40
5,00	1,00	28,00	1,50	6,35	1,78	35,00	2,00	6,60	2,40
6,00	1,00	29,00	1,50	9,52	1,78	36,00	2,00	7,30	2,40
7,00	1,00	30,00	1,50	2,40	1,90	37,00	2,00	7,60	2,40
8,00	1,00	31,00	1,50	2,60	1,90	38,00	2,00	8,30	2,40
9,00	1,00	32,00	1,50	3,40	1,90	39,00	2,00	8,60	2,40
10,00	1,00	33,00	1,50	4,20	1,90	40,00	2,00	9,30	2,40
11,00	1,00	34,00	1,50	4,80	1,90	41,00	2,00	9,60	2,40
12,00	1,00	35,00	1,50	4,90	1,90	42,00	2,00	10,30	2,40
13,00	1,00	37,00	1,50	5,70	1,90	43,00	2,00	10,60	2,40
14,00	1,00	39,00	1,50	6,40	1,90	44,00	2,00	11,30	2,40
15,00	1,00	40,00	1,50	7,20	1,90	45,00	2,00	11,60	2,40
16,00	1,00	41,00	1,50	8,00	1,90	46,00	2,00	12,30	2,40
17,00	1,00	42,00	1,50	8,90	1,90	47,00	2,00	12,60	2,40
18,00	1,00	45,00	1,50	16,00	1,90	48,00	2,00	13,30	2,40
19,00	1,00	46,00	1,50	3,00	2,00	49,00	2,00	13,60	2,40
20,00	1,00	47,00	1,50	4,00	2,00	50,00	2,00	14,30	2,40
21,00	1,00	49,00	1,50	5,00	2,00	51,00	2,00	14,60	2,40
22,00	1,00	50,00	1,50	6,00	2,00	52,00	2,00	15,30	2,40
23,00	1,00	2,20	1,60	7,00	2,00	53,00	2,00	15,60	2,40
24,00	1,00	2,75	1,60	8,00	2,00	54,00	2,00	16,30	2,40
25,00	1,00	3,10	1,60	9,00	2,00	55,00	2,00	16,60	2,40
3,00	1,50	4,10	1,60	10,00	2,00	56,00	2,00	17,30	2,40
4,00	1,50	5,10	1,60	11,00	2,00	57,00	2,00	17,60	2,40
5,00	1,50	6,10	1,60	12,00	2,00	58,00	2,00	18,30	2,40
6,00	1,50	7,10	1,60	13,00	2,00	59,00	2,00	18,60	2,40
7,00	1,50	8,10	1,60	14,00	2,00	60,00	2,00	19,30	2,40
8,00	1,50	9,10	1,60	15,00	2,00	62,00	2,00	19,60	2,40
9,00	1,50	10,10	1,60	16,00	2,00	65,00	2,00	20,30	2,40
10,00	1,50	11,10	1,60	17,00	2,00	68,00	2,00	20,60	2,40
11,00	1,50	12,10	1,60	18,00	2,00	70,00	2,00	21,30	2,40
12,00	1,50	13,10	1,60	19,00	2,00	72,00	2,00	21,60	2,40
13,00	1,50	14,10	1,60	20,00	2,00	75,00	2,00	22,30	2,40
14,00	1,50	15,10	1,60	21,00	2,00	78,00	2,00	23,30	2,40
15,00	1,50	16,10	1,60	22,00	2,00	80,00	2,00	24,60	2,40
16,00	1,50	17,10	1,60	23,00	2,00	85,00	2,00	25,00	2,40
17,00	1,50	18,10	1,60	24,00	2,00	90,00	2,00	25,30	2,40
18,00	1,50	19,10	1,60	25,00	2,00	96,00	2,00	27,30	2,40
19,00	1,50	20,10	1,60	26,00	2,00	6,00	2,20	27,60	2,40
20,00	1,50	21,10	1,60	27,00	2,00	9,00	2,20	29,60	2,40
21,00	1,50	22,10	1,60	28,00	2,00	3,30	2,40	30,30	2,40
22,00	1,50	25,10	1,60	29,00	2,00	3,60	2,40	31,60	2,40
23,00	1,50	27,10	1,60	30,00	2,00	4,30	2,40	33,30	2,40
24,00	1,50	29,10	1,60	31,00	2,00	4,60	2,40	34,60	2,40

Lead times need to be confirmed for parts that are not in stock. Tooling costs may be waived if sufficient quantities are purchased. In some cases partial cost for tools might occur.

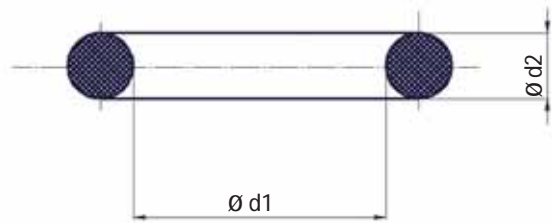


Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters	
d1	d2	d1	d2	d1	d2	d1	d2	d1	d2
37,60	2,40	50,00	2,50	20,20	3,00	44,20	3,00	88,00	3,00
39,60	2,40	51,00	2,50	21,00	3,00	44,50	3,00	89,00	3,00
41,60	2,40	52,00	2,50	21,30	3,00	45,00	3,00	89,50	3,00
44,60	2,40	53,00	2,50	21,50	3,00	45,20	3,00	90,00	3,00
47,60	2,40	54,00	2,50	22,00	3,00	46,00	3,00	92,00	3,00
49,60	2,40	55,00	2,50	22,20	3,00	46,20	3,00	93,00	3,00
51,60	2,40	57,00	2,50	22,50	3,00	47,00	3,00	94,00	3,00
54,60	2,40	58,00	2,50	23,00	3,00	48,00	3,00	94,50	3,00
57,60	2,40	59,00	2,50	24,00	3,00	49,00	3,00	95,00	3,00
59,60	2,40	60,00	2,50	24,20	3,00	49,50	3,00	96,00	3,00
61,60	2,40	62,00	2,50	24,50	3,00	50,00	3,00	98,00	3,00
64,60	2,40	63,00	2,50	25,00	3,00	50,20	3,00	99,00	3,00
67,60	2,40	65,00	2,50	25,20	3,00	52,00	3,00	99,50	3,00
69,60	2,40	67,00	2,50	25,50	3,00	53,00	3,00	100,00	3,00
6,00	2,50	68,00	2,50	26,00	3,00	54,00	3,00	104,50	3,00
7,00	2,50	70,00	2,50	26,20	3,00	54,50	3,00	109,50	3,00
8,00	2,50	75,00	2,50	26,50	3,00	55,00	3,00	110,00	3,00
9,00	2,50	80,00	2,50	27,00	3,00	55,20	3,00	114,50	3,00
10,00	2,50	85,00	2,50	27,50	3,00	56,00	3,00	115,00	3,00
11,00	2,50	90,00	2,50	28,00	3,00	56,20	3,00	119,50	3,00
12,00	2,50	95,00	2,50	28,20	3,00	57,00	3,00	124,50	3,00
13,00	2,50	100,00	2,50	29,00	3,00	57,20	3,00	129,50	3,00
14,00	2,50	105,00	2,50	29,20	3,00	58,00	3,00	134,50	3,00
15,00	2,50	110,00	2,50	29,50	3,00	59,00	3,00	139,50	3,00
16,00	2,50	115,00	2,50	30,00	3,00	59,50	3,00	145,00	3,00
17,00	2,50	120,00	2,50	30,20	3,00	60,00	3,00	145,50	3,00
18,00	2,50	130,00	2,50	31,00	3,00	60,50	3,00	203,00	3,00
19,00	2,50	140,00	2,50	31,20	3,00	61,00	3,00	214,00	3,00
20,00	2,50	150,00	2,50	31,50	3,00	62,00	3,00	11,00	3,50
21,00	2,50	29,10	2,55	32,00	3,00	62,20	3,00	15,00	3,50
22,00	2,50	8,90	2,70	32,20	3,00	63,00	3,00	17,00	3,50
23,00	2,50	10,50	2,70	33,00	3,00	64,00	3,00	20,00	3,50
24,00	2,50	12,10	2,70	34,00	3,00	64,50	3,00	22,00	3,50
25,00	2,50	13,60	2,70	34,20	3,00	65,00	3,00	25,00	3,50
26,00	2,50	15,10	2,70	34,50	3,00	66,00	3,00	28,00	3,50
27,00	2,50	16,90	2,70	35,00	3,00	67,00	3,00	30,00	3,50
28,00	2,50	18,40	2,70	35,20	3,00	68,00	3,00	33,00	3,50
29,00	2,50	27,30	2,70	35,50	3,00	69,00	3,00	34,00	3,50
30,00	2,50	6,00	3,00	36,00	3,00	69,50	3,00	36,00	3,50
31,00	2,50	7,00	3,00	36,20	3,00	70,00	3,00	38,00	3,50
32,00	2,50	8,00	3,00	36,50	3,00	71,00	3,00	39,00	3,50
33,00	2,50	9,00	3,00	37,00	3,00	72,00	3,00	40,00	3,50
34,00	2,50	10,00	3,00	37,20	3,00	73,00	3,00	41,00	3,50
35,00	2,50	11,00	3,00	37,50	3,00	74,00	3,00	42,00	3,50
36,00	2,50	12,00	3,00	38,00	3,00	74,50	3,00	43,00	3,50
37,00	2,50	13,00	3,00	39,00	3,00	75,00	3,00	44,00	3,50
38,00	2,50	14,00	3,00	39,20	3,00	76,00	3,00	47,00	3,50
39,00	2,50	15,00	3,00	39,50	3,00	77,00	3,00	49,00	3,50
40,00	2,50	16,00	3,00	40,00	3,00	78,00	3,00	50,00	3,50
41,00	2,50	17,00	3,00	40,20	3,00	79,50	3,00	52,00	3,50
42,00	2,50	17,20	3,00	41,00	3,00	80,00	3,00	57,00	3,50
43,00	2,50	18,00	3,00	41,50	3,00	82,00	3,00	60,00	3,50
44,00	2,50	18,20	3,00	42,00	3,00	83,00	3,00	62,00	3,50
45,00	2,50	19,00	3,00	42,20	3,00	84,00	3,00	63,00	3,50
46,00	2,50	19,20	3,00	42,50	3,00	84,50	3,00	64,00	3,50
47,00	2,50	19,50	3,00	43,00	3,00	85,00	3,00	66,00	3,50
48,00	2,50	20,00	3,00	44,00	3,00	86,00	3,00	70,00	3,50

O-RING DIMENSIONS (METRIC)

Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters	
d1	d2	d1	d2	d1	d2	d1	d2	d1	d2
73,00	3,50	305,00	3,50	54,00	4,00	125,00	4,00	65,00	4,50
76,00	3,50	330,00	3,50	56,00	4,00	126,00	4,00	69,00	4,50
79,00	3,50	355,00	3,50	57,00	4,00	127,00	4,00	70,00	4,50
82,00	3,50	380,00	3,50	58,00	4,00	128,00	4,00	74,00	4,50
85,00	3,50	405,00	3,50	59,00	4,00	129,00	4,00	76,00	4,50
88,00	3,50	430,00	3,50	60,00	4,00	130,00	4,00	80,00	4,50
92,00	3,50	18,30	3,60	61,00	4,00	131,00	4,00	82,00	4,50
95,00	3,50	19,80	3,60	62,00	4,00	132,00	4,00	85,00	4,50
98,00	3,50	21,30	3,60	63,00	4,00	133,00	4,00	88,00	4,50
101,00	3,50	23,00	3,60	64,00	4,00	134,00	4,00	91,00	4,50
104,00	3,50	24,60	3,60	65,00	4,00	135,00	4,00	94,00	4,50
105,00	3,50	26,20	3,60	66,00	4,00	136,00	4,00	97,00	4,50
108,00	3,50	27,80	3,60	67,00	4,00	137,00	4,00	100,00	4,50
111,00	3,50	29,30	3,60	68,00	4,00	138,00	4,00	15,00	5,00
114,00	3,50	30,80	3,60	70,00	4,00	140,00	4,00	16,00	5,00
117,00	3,50	32,50	3,60	72,00	4,00	142,00	4,00	20,00	5,00
120,00	3,50	34,10	3,60	73,00	4,00	143,00	4,00	25,00	5,00
123,00	3,50	35,60	3,60	75,00	4,00	144,00	4,00	30,00	5,00
124,00	3,50	37,30	3,60	76,00	4,00	145,00	4,00	35,00	5,00
126,00	3,50	43,40	3,60	77,00	4,00	147,00	4,00	40,00	5,00
127,00	3,50	13,00	4,00	78,00	4,00	150,00	4,00	42,00	5,00
130,00	3,50	14,00	4,00	79,00	4,00	152,00	4,00	44,00	5,00
133,00	3,50	16,00	4,00	80,00	4,00	160,00	4,00	45,00	5,00
135,00	3,50	18,00	4,00	82,00	4,00	162,00	4,00	46,00	5,00
139,00	3,50	20,00	4,00	84,00	4,00	166,00	4,00	48,00	5,00
140,00	3,50	21,00	4,00	85,00	4,00	170,00	4,00	50,00	5,00
142,00	3,50	22,00	4,00	86,00	4,00	172,00	4,00	52,00	5,00
143,20	3,50	23,00	4,00	87,00	4,00	174,00	4,00	54,00	5,00
146,00	3,50	24,00	4,00	88,00	4,00	180,00	4,00	55,00	5,00
149,00	3,50	25,00	4,00	89,00	4,00	182,00	4,00	56,00	5,00
152,00	3,50	26,00	4,00	90,00	4,00	188,00	4,00	58,00	5,00
158,00	3,50	27,00	4,00	91,00	4,00	190,00	4,00	60,00	5,00
159,00	3,50	28,00	4,00	92,00	4,00	192,00	4,00	62,00	5,00
162,00	3,50	29,00	4,00	94,00	4,00	198,00	4,00	63,00	5,00
164,00	3,50	30,00	4,00	95,00	4,00	200,00	4,00	64,00	5,00
165,00	3,50	31,00	4,00	96,00	4,00	207,00	4,00	65,00	5,00
166,00	3,50	32,00	4,00	97,00	4,00	217,00	4,00	67,70	5,00
171,00	3,50	33,00	4,00	98,00	4,00	225,00	4,00	68,00	5,00
173,00	3,50	34,00	4,00	99,00	4,00	235,00	4,00	69,00	5,00
177,00	3,50	35,00	4,00	100,00	4,00	245,00	4,00	70,00	5,00
178,00	3,50	36,00	4,00	102,00	4,00	255,00	4,00	72,00	5,00
181,00	3,50	37,00	4,00	104,00	4,00	34,70	4,50	74,00	5,00
190,00	3,50	38,00	4,00	105,00	4,00	37,70	4,50	75,00	5,00
196,00	3,50	40,00	4,00	107,00	4,00	40,00	4,50	76,00	5,00
197,00	3,50	41,00	4,00	108,00	4,00	42,00	4,50	78,00	5,00
210,00	3,50	42,00	4,00	110,00	4,00	44,00	4,50	80,00	5,00
215,00	3,50	43,00	4,00	112,00	4,00	46,00	4,50	82,00	5,00
216,00	3,50	44,00	4,00	113,00	4,00	48,00	4,50	84,00	5,00
222,00	3,50	45,00	4,00	114,00	4,00	50,00	4,50	85,00	5,00
228,00	3,50	46,00	4,00	115,00	4,00	52,00	4,50	86,00	5,00
235,00	3,50	47,00	4,00	116,00	4,00	54,00	4,50	88,00	5,00
240,00	3,50	48,00	4,00	117,00	4,00	56,00	4,50	90,00	5,00
266,00	3,50	49,00	4,00	118,00	4,00	58,00	4,50	91,00	5,00
279,00	3,50	50,00	4,00	120,00	4,00	60,00	4,50	92,00	5,00
292,00	3,50	52,00	4,00	122,00	4,00	63,00	4,50	94,00	5,00
304,00	3,50	53,00	4,00	124,00	4,00	64,00	4,50	95,00	5,00

Chemraz O-rings can be supplied in all current dimensions upon customer request.



Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters		Dimensions in Millimeters	
d1	d2	d1	d2	d1	d2	d1	d2	d1	d2
96,00	5,00	220,00	5,00	44,20	5,70	269,30	5,70	285,00	7,00
97,00	5,00	225,00	5,00	45,20	5,70	279,30	5,70	291,00	7,00
98,00	5,00	230,00	5,00	47,20	5,70	289,30	5,70	304,00	7,00
100,00	5,00	235,00	5,00	49,20	5,70	299,30	5,70	317,00	7,00
104,00	5,00	240,00	5,00	51,20	5,70	319,30	5,70	330,00	7,00
105,00	5,00	245,00	5,00	52,20	5,70	339,30	5,70	342,00	7,00
106,00	5,00	250,00	5,00	54,20	5,70	359,30	5,70	355,00	7,00
107,00	5,00	255,00	5,00	55,20	5,70	379,30	5,70	368,00	7,00
110,00	5,00	260,00	5,00	57,20	5,70	399,30	5,70	380,00	7,00
112,00	5,00	265,00	5,00	59,20	5,70	419,30	5,70	393,00	7,00
115,00	5,00	270,00	5,00	61,20	5,70	439,30	5,70	451,00	7,00
118,00	5,00	275,00	5,00	62,20	5,70	459,30	5,70	471,00	7,00
120,00	5,00	280,00	5,00	64,20	5,70	479,30	5,70	149,10	8,40
122,00	5,00	285,00	5,00	67,20	5,70	499,30	5,70	154,10	8,40
124,00	5,00	290,00	5,00	69,20	5,70	96,00	7,00	159,10	8,40
125,00	5,00	295,00	5,00	71,20	5,70	101,00	7,00	164,10	8,40
130,00	5,00	300,00	5,00	72,20	5,70	105,00	7,00	169,10	8,40
132,00	5,00	305,00	5,00	74,20	5,70	110,00	7,00	174,10	8,40
133,00	5,00	310,00	5,00	77,20	5,70	114,70	7,00	179,10	8,40
134,00	5,00	320,00	5,00	79,20	5,70	120,00	7,00	184,10	8,40
135,00	5,00	325,00	5,00	81,20	5,70	124,60	7,00	189,10	8,40
136,00	5,00	330,00	5,00	82,20	5,70	125,00	7,00	194,10	8,40
138,00	5,00	335,00	5,00	84,20	5,70	126,00	7,00	199,10	8,40
140,00	5,00	340,00	5,00	87,20	5,70	130,00	7,00	209,10	8,40
142,00	5,00	345,00	5,00	89,20	5,70	134,50	7,00	219,10	8,40
144,00	5,00	350,00	5,00	92,20	5,70	135,00	7,00	229,10	8,40
145,00	5,00	355,00	5,00	94,20	5,70	140,00	7,00	239,10	8,40
146,00	5,00	360,00	5,00	97,20	5,70	145,00	7,00	249,10	8,40
148,00	5,00	365,00	5,00	99,20	5,70	152,00	7,00	20,00	10,00
150,00	5,00	370,00	5,00	104,20	5,70	155,00	7,00	30,00	10,00
152,00	5,00	375,00	5,00	109,20	5,70	155,60	7,00	40,00	10,00
154,00	5,00	380,00	5,00	114,20	5,70	159,50	7,00	50,00	10,00
155,00	5,00	390,00	5,00	119,20	5,70	160,00	7,00	60,00	10,00
156,00	5,00	395,00	5,00	124,20	5,70	161,90	7,00	65,00	10,00
160,00	5,00	400,00	5,00	129,20	5,70	165,00	7,00	70,00	10,00
162,00	5,00	410,00	5,00	134,20	5,70	166,70	7,00	75,00	10,00
165,00	5,00	415,00	5,00	139,20	5,70	168,30	7,00	83,00	10,00
166,00	5,00	420,00	5,00	144,20	5,70	170,00	7,00	90,00	10,00
168,00	5,00	425,00	5,00	149,20	5,70	174,60	7,00	100,00	10,00
170,00	5,00	430,00	5,00	154,20	5,70	175,00	7,00	125,00	10,00
172,00	5,00	440,00	5,00	159,20	5,70	181,00	7,00	140,00	10,00
173,00	5,00	450,00	5,00	164,20	5,70	183,00	7,00	160,00	10,00
174,00	5,00	460,00	5,00	169,20	5,70	185,00	7,00	170,00	10,00
175,00	5,00	470,00	5,00	174,20	5,70	187,30	7,00	185,00	10,00
180,00	5,00	41,40	5,30	179,20	5,70	190,00	7,00	220,00	10,00
182,00	5,00	54,40	5,30	184,20	5,70	193,70	7,00	280,00	10,00
184,00	5,00	65,00	5,30	189,20	5,70	195,00	7,00	300,00	10,00
185,00	5,00	74,70	5,50	194,20	5,70	200,00	7,00	310,00	10,00
186,00	5,00	79,70	5,50	199,20	5,70	209,00	7,00	330,00	10,00
188,00	5,00	89,70	5,50	204,20	5,70	215,00	7,00	340,00	10,00
190,00	5,00	99,70	5,50	209,20	5,70	222,00	7,00	350,00	10,00
192,00	5,00	35,20	5,70	219,30	5,70	228,00	7,00	400,00	10,00
194,00	5,00	36,20	5,70	229,30	5,70	240,00	7,00	448,00	10,00
195,00	5,00	37,20	5,70	239,30	5,70	250,00	7,00		
210,00	5,00	39,20	5,70	249,30	5,70	265,00	7,00		
215,00	5,00	41,20	5,70	259,30	5,70	279,00	7,00		



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