

# Parco

## 5778 EPDM Seals



## Full Line of NSF 61 Seals for Drinking Water Systems

Suppliers of drinking water systems know that access to markets throughout the world requires that their products be certified to NSF/ANSI Standard 61<sup>1</sup> ("NSF 61"). NSF 61 replaced the EPA Additives Advisory Program for drinking water system components. NSF 61 sets limits for the amount of chemicals permitted to leach into drinking water from the materials used in water transmission and distribution. Parco has more than ten years of experience providing seals that meet NSF 61. Parco offers peroxide-cured compounds in four hardnesses, specially formulated to resist chloramines and certified to NSF 61. Those compounds also meet the Federal Drug Administration (FDA) §177.2600 requirements for food-handling applications.

### 5778 Seals Meet Your Needs

Parco seals made from its internally lubricated peroxide-cured ethylene-propylene (EPDM) compounds are tailored to the unique needs of water filtration equipment. Parco's 5778 compounds are available in four hardnesses from 50 to 90 Shore A durometer and provide these features:

- Excellent resistance to chloraminated water
- Enhanced resistance to compression set

- Improved resistance to damage during installation

After extensive laboratory testing, Parco's 5778 seals had exceptional resistance to chemicals and compression set. That means improved resistance to leakage in chloraminated water.

### EPDM is Ideal for Many Applications

EPDM compounds are general-purpose materials with superior resistance to water and steam. EPDM is well suited for use with glycol-based brake fluids and engine coolants. EPDM is frequently specified for Skydrol and other phosphate-ester hydraulic fluids. EPDM also resists ozone and weathering. EPDM seals are economical. They are not recommended for petroleum-based fuels and fluids, including petroleum-based military hydraulic fluid. Individual EPDM compounds have service temperatures from -65 to +300°F, including certain compounds formulated for higher temperatures.

<sup>1</sup>NSF/ANSI Standard 61 was jointly developed by NSF International (formerly National Sanitation Foundation) and ANSI (American National Standards Institute).

## Elastomers and Chloramines

Field experience and laboratory tests of various elastomer samples have shown that:

- Chloramines are significantly more aggressive to elastomers than equivalent concentrations of free chlorine.
- Elastomers degrade from exposure to chloramines, not to excess ammonia used to generate the chloramines.
- Peroxide-cured EPDMs are superior to nitriles, natural rubbers, neoprenes and styrene-butadienes.
- Chloramine attack appears to be temperature dependent, with warmer localities reporting more elastomer failures.
- It is difficult to predict if a water system will be degraded by chloramines. System performance is affected by type and age of seal materials, fluctuations in water temperature, and variations in water chemistry.

## Key Properties of 5778

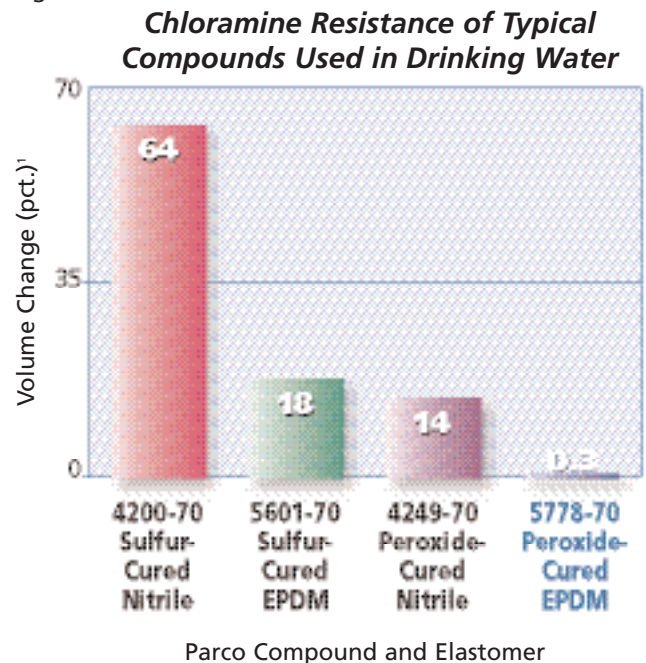
The enhanced properties of Parco's 5778 compounds make them ideal for chlorinated or chloraminated water applications. Parco recommends its 5778 compounds for faucets, hose bibs, and other residential plumbing fixtures.

### Excellent resistance to chloraminated water

In most fluids, elastomers reach a plateau in volume swell after several days of exposure. By contrast, chloraminated water has long-term effects on many commonly used seal materials, causing them to continue swelling even after weeks of immersion. In some cases, there appears to be no limit to the degree of swelling that can occur. Parco's 5778 seals are peroxide-cured, giving them high chemical stability. 5778 seals contain no sulfur, so they are compatible with materials commonly used

in plumbing fixtures. The seals experience long-term volume swell less than one percent, making them suitable in chloraminated or chlorinated water (see Figure 1).

Fig. 1:



<sup>1</sup>All volume change results calculated after six weeks at room temperature in water with 300 ppm chloramine.

Source: Parco Test Reports.

*Parco's 5778-70 peroxide-cured EPDM seals have outstanding resistance to chloramine. Our 5778-70 seals swelled less than one percent after six weeks in chloraminated water.*

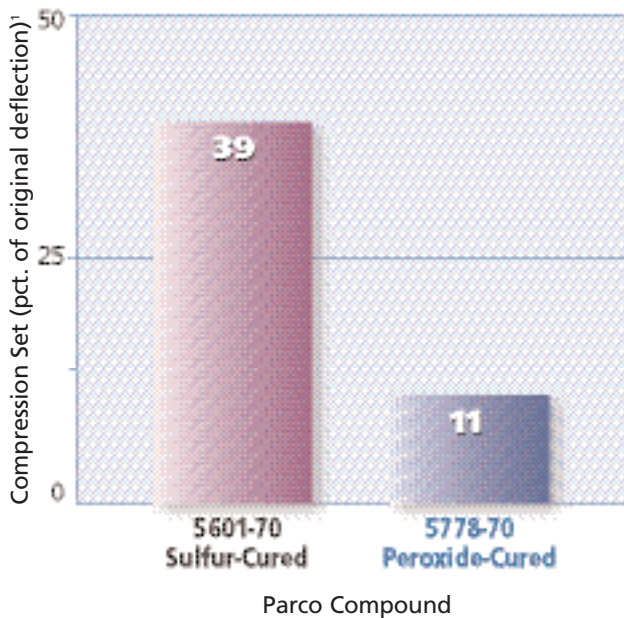
## Enhanced resistance to compression set

Compression set is an inherent property of all elastomers. It is the amount of thickness that a squeezed material fails to recover when the compressive force is removed. For example, a seal with 100 percent compression set has no rebound in thickness when a faucet is opened. With faucets containing seals that have experienced compression set, it is often necessary to exert ever-greater force to achieve a positive seal.

Parco's 5778 seals exhibit excellent resistance to compression set. For example, after testing for 22 hours at 212°F, 5778-70 seals had a compression set of only 11 percent (see Figure 2).

Fig. 2:

### Compression Set of EPDM Compounds



<sup>1</sup>Compression set calculated after 22 hours at 100°C (212°F).  
Source: Parco Test Report 7991.

*Parco seals made from peroxide-cured EPDM compound 5778-70 have excellent resistance to compression set. At 11 percent, 5778-70 significantly outperform similar sulfur-cured EPDM compounds.*

## Improved resistance to damage during installation

Modern automated assembly equipment requires O-rings that are easy to install. Seals with lower tension set snap back to their original size and shape during installation. Parco 5778 seals are well suited to automated assembly, exhibiting a low tension set of three percent after ten minutes stretched to 100 percent elongation (see Figure 3).

## Rely on Parco

Parco is a leading manufacturer of high-performance seals. We specialize in developing proprietary elastomeric compounds and bonding techniques. Parco's seals are available in 340 compounds, more than 25 percent developed in the last five years.

Founded in 1941, Parco was the first manufacturer to specialize in O-rings. Our modern 154,000 square-foot facility is one of the largest plants in the world making molded rubber seals. Parco also manufactures custom-molded elastomeric products, including rubber-to-metal bonded parts. Our quality management system is certified to ISO/TS 16949:2002, AS7115, and AS9100B. Our R & D laboratory is certified to ISO/IEC 17025.

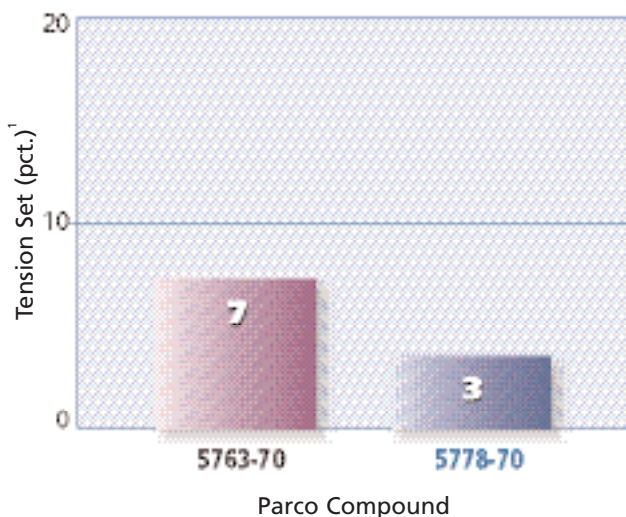
Parco products are available throughout the world from a network of knowledgeable distributors.

## Parco Delivers Faster

Parco can provide samples of its 5778 EPDM compounds within ten working days. If you need sample parts even faster, Parco can deliver them in as few as three days through our Rapid Prototype Program. For more information on Parco's 5778 EPDM compounds or to obtain samples, please contact a Parco customer service representative or one of our distributors.

Fig. 3:

### Tension Set of Peroxide-Cured EPDM Compounds Used in Chloraminated Drinking Water



<sup>1</sup>All tension set values calculated after ten minutes stretched to 100 percent elongation at room temperature.  
Source: Parco Test Reports.

*Parco's 5778-70 peroxide-cured EPDM seals have extremely low tension set, making them well suited to automated assembly.*

## Key Features

Parco's 5778 EPDM compounds are designed for chloraminated water applications. Key features include the following:

- Certified to NSF/ANSI Standard 61:**  
 Parco 5778 seals are approved for materials used in drinking water service (listed for maximum exposure of seal material 1.3 in<sup>2</sup>/liter of commercial hot water at 180°F; listing includes domestic hot and cold water).
- Excellent resistance to chloraminated water:**  
 Parco 5778 seals had volume swell of less than 1 percent after prolonged exposure to chlorinated water.
- Meets FDA §177.2600:**  
 Parco 5778 seals are approved for repeated use in food handling equipment.
- Enhanced resistance to compression set:**  
 Parco 5778 seals have a low compression set. For example, 5778-70 seals had a compression set of only 11 percent after 22 hours at 212°F.
- Improved resistance to damage during installation:**  
 Parco 5778 seals have a low tension set of 3 percent or better after 10 minutes stretched at 100 percent elongation.
- Excellent wear resistance:**  
 Parco 5778 internally lubricated seals held up for more than 750,000 cycles of faucet opening and closing.
- Outstanding resistance to extrusion:**  
 Parco 5778 seals have a high modulus, up to 1560 psi depending on the hardness.
- Wide range of service temperatures:**  
 Parco 5778 seals are suitable for applications ranging from -40 to +300°F.

## Typical Values

| Physical Property                              | Compound <sup>1</sup> |         |         |         | ASTM Test Method |
|------------------------------------------------|-----------------------|---------|---------|---------|------------------|
|                                                | 5778-50               | 5778-70 | 5778-80 | 5778-90 |                  |
| <b>Original Properties</b>                     |                       |         |         |         |                  |
| Hardness, Shore A                              | 52                    | 68      | 79      | 89      | D2240            |
| Tensile strength, MPa (psi)                    | 2070                  | 2056    | 2227    | 2167    | D412             |
| Elongation, pct.                               | 520                   | 236     | 140     | 120     | D412             |
| Modulus at 100 pct. {50 pct.}, elongation, psi | 216                   | 658     | 1559    | {1318}  | D412             |
| Specific gravity                               | 1.10                  | 1.14    | 1.17    | 1.25    | D297             |
| <b>Compression Set</b>                         |                       |         |         |         |                  |
| <b>pct. of original deflection</b>             |                       |         |         |         |                  |
| 22 hours at 100°C (212°F)                      | 17                    | 11      | 11      | 9       | D1414            |
| <b>Volume Swell</b>                            |                       |         |         |         |                  |
| <b>Chloraminated water, pct.<sup>2</sup></b>   |                       |         |         |         |                  |
|                                                | 0.3                   | 0.3     | 0.2     | 0.4     | D471             |
| <b>Tension Set</b>                             |                       |         |         |         |                  |
| <b>100 pct. stretch at room temperature</b>    |                       |         |         |         |                  |
| Instantaneous, pct.                            | 3                     | 3       | 2       | 2       | D1414            |
| 10 minute hold, pct.                           | 4                     | 3       | 3       | n.a.    | D1414            |

<sup>1</sup>Last two digits of compound number identify hardness.

<sup>2</sup>Volume swell determined by accelerated tests consisting of immersion for six weeks at room temperature in water with 300 parts per million (ppm) monochloramine. Solutions were replenished every other day. Monochloramine concentrations in drinking water are typically about 2 ppm.

Source: Parco Test Report R-5633A.

# Parco

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