High-Performance Seals

Parco 4081-90 Nitrile Seals

Our 4081-90 Compound Meets AMS-P-5510

When missions and lives depend on a seal, specifying the right product is critical. That's why the United States Congress mandated in 1956 certain Qualified Products Lists (QPLs) to standardize supplies for the Department of Defense. Today, QPLs are maintained by various authorities and identify companies qualified to manufacture and sell products to various specifications. Before being added to a QPL, a company must undergo a rigorous evaluation of its quality system.

Parco is one of only a few manufacturers approved to supply QPL rubber seals for aerospace and defense applications. Our 4081-90 nitrile compound has QPL approval from the Air Force Research Laboratory at Wright-Patterson Air Force Base under Aerospace Material Specification AMS-P-5510. Whether your operations are on the ground or in the air, our seals will give you the quality performance, and reliability you require.

4081-90 Meets Your Needs

Parco's 90-durometer nitrile compound is tailored to the unique needs of the aerospace and defense industry. Parco's 4081-90 compound provides these features:

- **Superior performance at low temperatures**
- **Outstanding resistance to compression set**

After extensive laboratory testing, Parco's 4081-90 seals had outstanding resistance to compression set and cracking in low-temperature applications. That means improved performance and safety for your aircraft or equipment at high altitudes and in cold environments.

Nitrile Sets the Standard

Because nitriles are versatile and inexpensive, they are the most popular industrial seal material. Nitrile compounds are copolymers of acrylonitrile and butadiene. Acrylonitrile provides resistance to petroleum-based fluids, such as oils and fuels. Butadiene contributes low-temperature flexibility. Standard nitrile is also known as Buna N.

Nitrile compounds perform well in gasoline, crude oil, power-steering fluid, hexane, toluene, water, water-based hydraulic fluids, and dilute bases, such as sodium hydroxide. Because nitriles contain unsaturated carbon-carbon bonds in the base polymer,

they are not suitable for exposure to ozone, sunlight and weathering.

More than 50 percent of sealing needs can be met using nitrile. Parco recommends that you follow the general rule: consider nitrile seals first. Individual nitrile compounds have service temperature from -65 to +285°F, including certain compounds formulated for low temperatures. Parco's most popular nitrile compound is 4200-70.

Key Properties

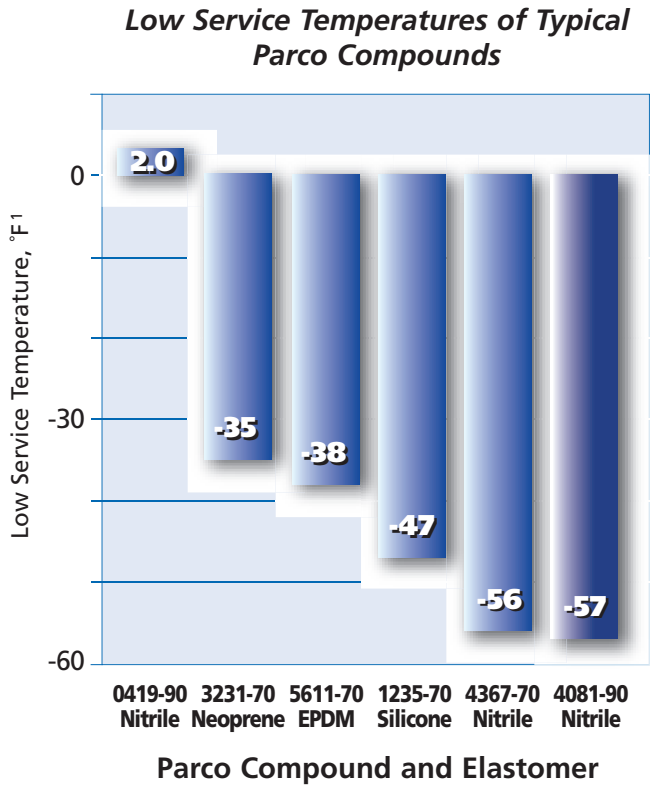
The enhanced properties of Parco's 4081-90 compound make it ideal for applications that require a material that resists low temperatures and higher pressures. Parco recommends its 4081-90 compound for straight-thread, tube-fitting boss seals for use in hydraulic or pneumatic systems.

Superior performance at low temperatures

Seals used in aerospace and defense applications are regularly exposed to extreme heat and cold. Seal performance is particularly affected by temperature variations in cold environments. Seals become hard and brittle in low temperatures, making them more susceptible to cracking.

Our 4081-90 compound can be used in applications with continuous service temperatures as low as -60°F. Our laboratory technicians performed a temperature retraction test (TR-10) on our 4081-90 material. The American Society for Testing and Materials (ASTM) recommends that test to evaluate rubber for low-temperature service. After stretching strips of our 4081-90 compound 50 percent in freezing temperatures, we gradually raised the temperature. The strips retracted 10 percent at the low temperature of -57°F. The temperature at which rubber retracts 10 percent closely approximates the material's low service temperature. The excellent low-temperature properties of 4081-90 seals make them less susceptible to cracking in low-temperature applications (see Figure 1).

Fig. 1:



[1] Values taken from temperature retraction tests (TR-10).
Source: Parco Test Reports.

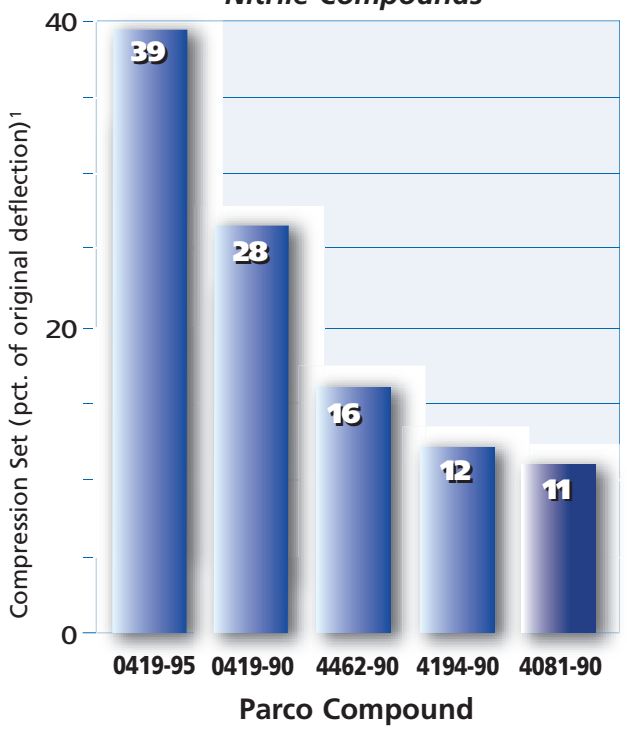
Outstanding resistance to compression set

When installed, most seals must resist fluid under pressure to seal properly. When a seal takes a set from compression, it no longer exerts force on the mating surfaces, resulting in leakage. A compound with low compression set better maintains its elastic properties and original thickness, preserving seal integrity.

Parco's 4081-90 compound provides excellent resistance to compression set. After testing 4081-90 for 22 hours at 212°F, it had compression set of only 11 percent (see Figure 2).

Fig. 2:

Compression Set of Typical Parco High-Durometer Nitrile Compounds



[1] Compression set calculated after 22 hours at 100°C (212°F).
Source: Parco Test Reports.

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 of which were developed in the last five years.

Founded in 1941, Parco was the first manufacturer to specialize in O-rings. Our new 154,000 square-foot facility is one of the largest rubber seal plants in the world. 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 4081-90 nitrile compound within 10 working days. If you need sample parts even faster, Parco can deliver them in as few as three days through its Rapid Prototype Program.

For more information on Parco's 4081-90 nitrile compound or to obtain samples, please contact a Parco customer service representative or one of our distributors.

Key Features

Parco's 4081-90 nitrile compound is designed for low-temperature, higher pressure sealing applications. Key features include the following:

- **Superior performance at low temperatures:**
  Parco 4081-90 seals can be used in applications with continuous service temperatures as low as -60˚F.
- **Outstanding resistance to compression set:**
  Parco 4081-90 seals had a compression set of only 11 percent after 22 hours at 212°F.
- **Wide range of service temperatures:**
  Parco's 4081-90 seals are suitable for applications ranging from -60° to +200°F.

Typical Values

Physical Property	Requirements	Compound 4081-90	ASTM Test Method
Original Properties			
Specific gravity	1.25-1.45	1.31	D297
Hardness, Shore A	88 min.	88	D2240
Tensile strength, psi, min.	1450	1904	D1414
Ultimate elongation, pct., min.	80	150	D1414
Modulus at 50 pct. elongation, psi, min.	500	768	D1414
TR-10 °C (°F), max.	-43(-45)	-49(-57)	D1329
Heat Aging			
168 hours at 70°C (158°F)			D471
Hardness change, pts., Shore A	0 to 5	2	D1414
Tensile strength change, pct., max.	-10	-7	D1414
Ultimate elongation change, pct., max.	-15	-14	D1414
Compression set pct. of original deflection, max.	35	17	D1414
Fluid Aging			
Mil-H-5606, 168 hours at 70°C (158°F)			D471
Tensile strength change, pct., max.	-15	-12	D1414
Ultimate elongation change, pct., max.	-20	-12	D1414
TR-10°C (°F), max.	-43(-45)	-52(-61)	D1329
Compression set, pct. of original deflection, max.	25	10	D1414

Source: Parco Test Report 7935.

4081-90

Parco

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