

Parco

2285-80 HNBR Seals

Our Seals Extend the Life of Your Drill Bits

Parco understands the drill bit industry. We know that drill bits face some of the toughest conditions on the planet. Seals in drill bits are subject to highly abrasive conditions and severe compressive loads at high temperatures, and they must perform in both conventional and synthetic greases. To make matters worse, a seal failure in the field can cost more than \$100,000 a day in downtime.

That's why leading drill bit manufacturers rely on Parco for their seals. Parco's superior compounds extend seal life, increasing the service life of drill bits.

2285-80 Meets Your Needs

Parco's 80-durometer hydrogenated nitrile (HNBR) compound is tailored to the unique needs of oilfield machinery. Parco's 2285-80 compound provides these features:

- Superior resistance to abrasion
- Outstanding resistance to compression set
- Excellent performance in synthetic greases

Extensive testing by Parco's R & D laboratory has shown that 2285-80 seals last 20 percent longer

than most seals currently used in down-hole drilling. That means less downtime and higher productivity for drilling rigs around the globe.

HNBR Outperforms Conventional Nitrile

HNBR, like conventional nitrile, is made from acrylonitrile and butadiene monomers. After polymerization, a carbon-carbon double bond from the butadiene molecule is still present in the backbone of the nitrile polymer. Those unsaturated regions make the base polymer susceptible to uncontrolled cross-linking in the presence of heat, ozone, hydrogen sulfide, sour crude and other oxidizing agents. Under those conditions, nitriles can degrade, resulting in increased hardness and decreased ultimate elongation and tensile strength.

HNBR eliminates the weak link in the nitrile polymer by saturating (reacting with hydrogen) the remaining carbon-carbon double bond. As a result, HNBR significantly outperforms conventional nitriles in resisting heat and sour crude. HNBR compounds have typical service ranges from -40 to +325°F and are recommended when upgrading from nitriles. HNBR compounds are also a less expensive alternative to fluorocarbon.

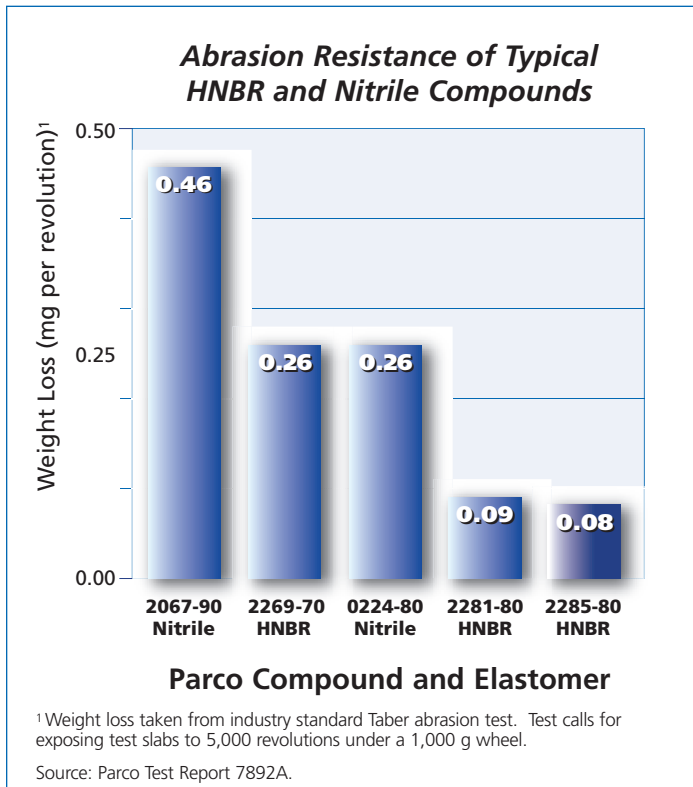
Key Properties

The enhanced properties of Parco's 2285-80 compound make it ideal for dynamic applications that require excellent abrasion resistance. Parco also recommends 2285-80 seals for use in conventional and synthetic greases and high-pressure applications.

Superior resistance to abrasion

Abrasion resistance is a measure of the amount of wear a seal can withstand when its surface is constantly scraped or rubbed. The abrasion resistance of Parco's 2285-80 compound significantly outperforms other general-purpose HNBR compounds. Parco performed an industry-standard Taber abrasion test in its ISO/IEC 17025 certified laboratory. After 5,000 revolutions under a 1,000 g wheel, the 2285-80 seals had a weight loss of only 0.0792 mg per revolution (see Figure 1).

Fig. 1:

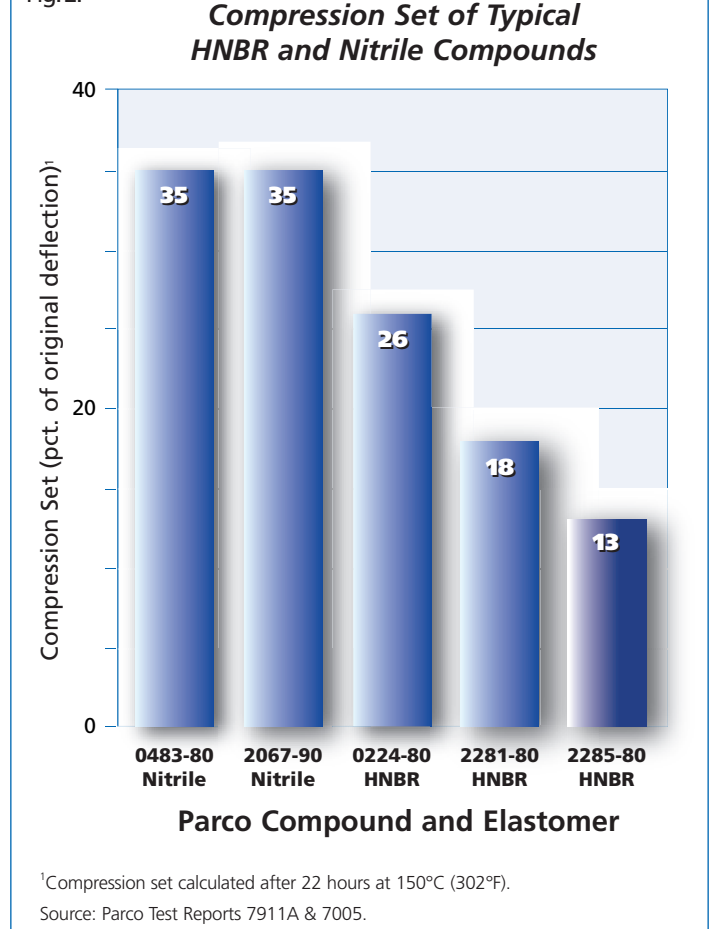


Outstanding resistance compression set

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 2285-80 compound provides excellent resistance to compression set at higher temperatures. After testing 2285-80 for 22 hours at 302°F, it had compression set of only 13 percent (see Figure 2).

Fig. 2:



Excellent performance in synthetic greases

Conventional greases are refined from crude oil, with properties that vary significantly. Even after refinement, petroleum greases contain different chemicals that vary in lubricating qualities. That variation leaves conventional greases more susceptible to oxidation and chemical degradation which reduce lubricant performance.

Synthetic greases have more uniform properties and offer superior performance over conventional petroleum greases. That structural stability and molecular uniformity reduce oxidation and allow better lubricant performance at high temperatures, while offering extended grease life.

Parco's 2285-80 seals perform extremely well in both conventional and synthetic greases. Our seals had volume swell of less than 5 percent after prolonged exposure to either type of lubricant (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 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.

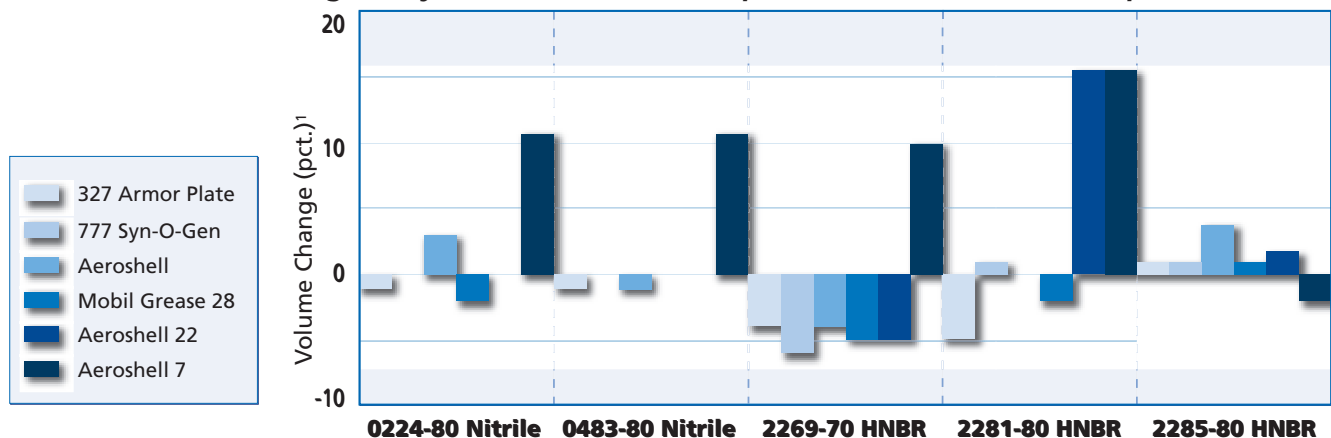
Parco Delivers Faster

Parco can provide samples of its 2285-80 HNBR 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 2285-80 HNBR compound or to obtain samples, please contact a Parco customer service representative or one of our distributors.

Fig. 3:

Volume Change in Synthetic Greases for Popular HNBR and Nitrile Compounds



¹All volume change results calculated after 70 hours at 150°C (302°F).

Source: Parco Test Report 7895A.

Parco Compound and Elastomer

Key Features

Parco's 2285-80 HNBR compound is designed for highly abrasive applications. Key features include the following:

- **Superior resistance to abrasion:**
After 5,000 revolutions under a 1,000 g wheel, Parco 2285-80 seals had a weight loss of only 0.0792 mg per revolution.
- **Outstanding resistance to compression set:**
Parco 2285-80 seals had a compression set of only 13 percent after 22 hours at 302°F.
- **Excellent performance in synthetic greases:**
Parco 2285-80 seals had volume swell of less than 5 percent after prolonged exposure to conventional or synthetic greases.
- **Wide range of service temperatures:**
Parco 2285-80 seals are suitable for applications ranging from -25 to +325°F.

Typical Values

Physical Property	Compound 2285-80	ASTM Test Method
Original Properties		
Hardness, Shore A	80	D2240
Tensile strength, MPa (psi)	25.5 (3696)	D412
Ultimate elongation, pct.	194	D412
Heat Aging		
70 hours at 150°C (302°F)		
Hardness change, pts., Shore A	4	D865
Tensile strength change, pct.	-2	
Ultimate elongation change, pct.	5	
Compression Set, Solid		
pct. of original deflection		
22 hours at 150°C (302°F)	13	D395 Method B
22 hours at 177°C (350°F)	21	
Fluid Aging, ASTM Oil No. 1		
70 hours at 150°C (302°F)¹		
Hardness change, pts., Shore A	0	D471
Tensile strength change, pct.	4	
Ultimate elongation change, pct.	5	
Volume change, pct.	1	
Fluid Aging, IRM 903 Oil		
70 hours at 150°C (302°F)¹		
Hardness change, pts., Shore A	-9	D471
Tensile strength change, pct.	-1	
Ultimate elongation change, pct.	13	
Volume change, pct., max.	14	
Abrasion Resistance		
H18, 1,000 g, 5,000 revolutions		
Weight loss in mg per revolution	0.0792	D3387

¹IRM is the acronym for Industry Reference Material.
Source: Parco Test Report 7695E.

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Parco, Inc. 1801 S. Archibald Ave., Ontario, CA 91761
909 947-2200 Fax 909 923-0288 parcoinc.com