



PRODUCT DATA SHEET

Nitrile 70 Durometer O-Ring Cord Stock

General purpose petroleum and hydraulic sealing cord for spliced rings, large diameter gaskets, and field repair.

Compound designation	TORS NBR-70, supplied as compound 25003
Material type	Nitrile butadiene rubber, copolymer of butadiene and acrylonitrile. ISO 1629 and ASTM D1418 designation NBR
Nominal hardness	70 $\pm$ 5 Shore A
Color	Black
Product form	Round extruded cord, 0.210 in (5.33 mm) nominal cross section, sold in bulk by the foot and by the spool
Manufacturing method	Continuous extrusion and cure. This is not a molded product and does not hold molded O-Ring tolerances. See Section 6.
Dimensional standard	RMA Table 13, Class E2 (Precision). 5.33 mm $\pm$ 0.50 mm, which is 0.190 to 0.230 in on the cross section
Regulatory status	Not FDA compliant. See Section 8.

1. What this material is

Nitrile is a copolymer of butadiene and acrylonitrile. The acrylonitrile content, usually shortened to ACN, is the one number that drives everything the material does. More acrylonitrile means better resistance to petroleum oils and fuels and worse flexibility in the cold. Less acrylonitrile trades the other direction. Compound 25003 is a standard medium ACN nitrile at 70 durometer, which is the balance point that fits the great majority of oil, fuel, and air sealing work.

Cord stock is the same polymer family as a molded O-Ring but a different product with a different job. It is extruded in a continuous length and cured straight, then the user cuts it and splices it into a ring or lays it in as a gasket. It exists for the sizes nobody molds, for seals too large to buy as a ring, for prototype and gland development work, and for the machine that is down right now and cannot wait three days for a molded part. What it gives up in dimensional accuracy and joint strength, it gives back in being available in any diameter you can cut to.

2. What this material does

The short version: it is standard 70 durometer nitrile in a form you cut to length, and it belongs in static, low pressure service where the right molded ring does not exist or cannot get there in time.

Performance area	How this compound behaves
Oil and fuel resistance	The reason nitrile exists. Handles petroleum oils, mineral hydraulic fluid, diesel, and aliphatic gasoline with low swell. Nothing in the price range does it better.
Water resistance	Good below 150 °F. Above that it softens and breaks down over time, and the cord form gives water more cut surface to work on.
Abrasion and wear	Fair. Roughly comparable to a molded nitrile ring of the same durometer, but a spliced ring should not be in sliding service in the first place.
Tear and cut resistance	Moderate. Cord nicks easily on sharp gland edges during installation because it is being pushed in by hand rather than stretched over a lead-in chamfer.
Compression set	Typical of 70 durometer nitrile, 15 to 25 % at 212 °F. Good enough for long term static clamping at moderate temperature.
Splice strength	The weak point of every cord seal. A glued butt splice carries a fraction of the parent tensile and will peel under pressure if it is oriented wrong. Plan around it rather than hope.
Dimensional consistency	RMA Class E2, plus or minus 0.020 in on a 0.210 in cord. That is roughly four times the variation allowed on a molded AS568 cross section, and the gland has to be designed for it.
Low temperature	Stiffens noticeably below -20 °F. Static sealing holds down to about -30 °F. Do not expect it to follow a moving surface in the cold.
Heat aging	Fine to 250 °F in oil and 212 °F in air. Past that it hardens, loses elongation, and leaks on the next thermal cycle.
Ozone, UV, and weather	Poor unless the compound is specifically ozone protected. Surface cracks start where the cord is bent or stretched. This is the failure that happens on the shelf, not in the machine.
Chemical resistance	Good with oils, fuels, water, glycol, and dilute acids and alkalis. Ketones, esters, chlorinated and aromatic solvents, and phosphate ester fluids destroy it.

3. Typical physical properties

The hardness, tensile strength, and elongation rows are the compound specification for TORS 25003. Tensile and elongation are stated as minimums rather than typical results, which is how extruded cord is normally specified, so measured values usually run above them. The remaining rows are typical for the compound class and are offered for engineering reference. Nothing in this table is a specification limit for a given lot. Lot specific results are reported on the Certificate of Conformance supplied with each shipment.

Property	Test method	Value
Hardness	ASTM D2240	70 $\pm$ 5 Shore A

Hardness	AS 1M D2240	70 ± 5 Shore A, specification
Tensile strength	ASTM D412	1,400 psi (9.7 MPa) minimum, specification
Elongation at break	ASTM D412	200 % minimum, specification
Cross section, 0.210 in nominal	RMA Table 13, Class E2	5.33 mm ± 0.50 mm (0.190 to 0.230 in)
Modulus at 100 %	ASTM D412	500 to 800 psi, class typical
Tear strength, Die C	ASTM D624	150 to 250 lbf/in, class typical
Compression set, 70 hr at 212 °F	ASTM D395 B	15 to 25 %, class typical
Specific gravity	ASTM D792	1.20 to 1.30, class typical
Rebound resilience	ASTM D2632	30 to 40 %, class typical
Low temperature retraction, TR-10	ASTM D1329	-20 to -30 °F, class typical
Volume swell, ASTM No. 3 oil, 70 hr at 212 °F	ASTM D471	10 to 20 %, class typical

4. Service temperature

Condition	Range
Continuous service in petroleum oil	-30 °F to +250 °F (-34 °C to +121 °C)
Continuous service in air	-30 °F to +212 °F (-34 °C to +100 °C)
Intermittent, short excursion	to +275 °F (+135 °C)
Continuous service in water	to +150 °F (+66 °C)
Low temperature dynamic limit, recommended	-20 °F (-29 °C)
Brittle point, ASTM D746	approx. -50 °F (-46 °C)

The two numbers that get confused in the field are the brittle point and the sealing limit. Nitrile does not shatter until roughly -50 °F, but it stops following a surface well before that, which is why the practical limit is around -20 °F and why a machine that leaks on a cold morning and stops leaking by noon has a compound problem and not a gland problem. At the top end, the difference between the air rating and the oil rating is oxidation. Oil keeps air off the rubber, so the same compound lives longer at 250 °F submerged than it does at 212 °F in open air. On a spliced cord seal, treat the top of the range as more conservative than you would on a molded ring, because heat aging costs elongation and the splice is where the loss shows up first.

5. Media compatibility

RECOMMENDED Petroleum oils and greases. Mineral hydraulic fluids, ISO VG and AW grades. Diesel fuel. Aliphatic gasoline. Kerosene. Propane, butane, and natural gas. Silicone oils and greases. Water below 150 °F. Ethylene glycol antifreeze. Compressed air below 212 °F. Vegetable and animal oils. Dilute acids and alkalis at ambient temperature. HFA, HFB, and HFC water based hydraulic fluids.	LIMITED OR CONDITIONAL High aromatic gasoline swells the compound, so size the gland for it. Water above 150 °F softens it and eventually breaks it down. Alcohol blended fuels such as E85 cause moderate swell. Sour crude containing H2S hardens standard nitrile over time, so consider HNBR. Steam is short exposure only. Ozone and direct sunlight crack the surface, which matters as much in storage as in service. On spliced cord, any fluid that swells the compound also loads the joint, so allow more margin than you would on a molded ring.	NOT RECOMMENDED Ketones such as MEK and acetone. Esters. Chlorinated hydrocarbons. Aromatic solvents such as toluene, benzene, and xylene. Nitro hydrocarbons. Phosphate ester hydraulic and fire resistant fluids. Brake fluid, DOT 3 and DOT 4. Concentrated acids. Strong oxidizers. Continuous ozone exposure. Extended direct sunlight.
--	--	--

6. Cord stock cautions, dimensions and splices

Extruded cord is not held to molded O-Ring tolerances, and it never has been. This cord is supplied to RMA Table 13 Class E2, which allows 5.33 mm plus or minus 0.50 mm on the cross section. In inches that is 0.190 to 0.230 on a nominal 0.210 cord, roughly four times the variation permitted on a molded AS568 cross section. Extruded rubber also runs slightly oval, takes a set from the spool, and relaxes for a while after it is cut. If a gland is designed to the nominal number alone, some of the cord will seal and some of it will not. Design the squeeze so it still works at 0.190, and check gland fill at 0.230.	A spliced ring is only as strong as its splice, and the splice is not the rubber. A cyanoacrylate butt joint carries a fraction of the parent tensile strength, and it fails by peeling rather than by tearing. Pressure that pushes across the joint will open it long before the cord itself is in trouble. Keep spliced cord seals static, keep the pressure low, and put the joint where the pressure pushes the ends together instead of apart.
--	--

Exposure	Guidance
Static face, flange, hatch, or cover gasket	The primary use. Cord does this job well and often better than anything else available in the size.
Static radial gland, spliced ring, low pressure	Acceptable. Design the squeeze to the low end of the cord tolerance band and orient the splice away from the pressure gradient.

Pressure above roughly 200 psi	Not recommended on a glued splice. Use a molded ring, or a vulcanized splice made to order.
Dynamic, reciprocating, or rotary service	Not recommended. The joint passes over the sealing surface on every stroke and will not survive. Use a molded ring.
Outdoor or UV exposed installation	Expect surface cracking over time on standard nitrile. Move to EPDM cord if the fluid allows it.
Continuous service above 250 °F in oil	Not recommended. Move to HNBR or FKM.
Storage near motors, welders, or sunlight	Keep cord coiled loosely in closed opaque packaging. Ozone cracks cord on the shelf, and a bent coil is under strain, which is exactly where cracks start.

If the size exists as a molded ring, buy the molded ring. It holds tighter dimensions, has no joint, and usually costs less than the labor of splicing. Cord earns its place when the size does not exist, when the seal is too large to handle as a ring, or when the machine is down today. If the seal lives outdoors or in hot water, ask us about EPDM cord, which gives up petroleum oil resistance completely but lasts years longer in weather and glycol. If the problem is heat or a solvent, ask about FKM or silicone cord. We stock all of these in the same cross sections and can put the right one on the shelf for you.

7. Design and installation guidance

Item	Guidance
Intended service	Static sealing. Face and flange gaskets, spliced rings in static glands, and temporary or field repair work.
Gland design basis	Design to the cord tolerance band, not the nominal. Squeeze must still be adequate at 0.190 in cross section, and gland fill must still be under 85 % at 0.230 in.
Squeeze, static	20 to 30 % on the nominal cross section. Cord runs a heavier squeeze than a molded ring on purpose, to cover the dimensional variation.
Gland fill	75 to 85 % at ambient, checked at the maximum cord diameter. Rubber does not compress, so an overfilled groove pushes the seal out rather than tighter.
Cut length	Cut to the mean groove circumference plus about 2 %, so the splice sits in light compression rather than in tension. Measure the cord relaxed, never stretched against a tape.
Cutting	Square cut with a sharp blade or a cord cutting fixture. An angled or ragged cut is the most common reason a splice comes apart, because only part of the face is bonded.
Splicing	Clean both faces with isopropyl alcohol, let them dry, and bond with a cyanoacrylate rated for rubber. Hold the joint square and under light compression until it sets. Orient the finished splice away from the pressure gradient and away from any port or slot in the gland.
Stretch on installation	Keep permanent installed stretch under 5 %. Stretch thins the cross section, and on cord that is already at the low end of the band it can cost the seal.
Surface finish, static	32 microinch Ra or better on the sealing faces. Cord conforms less readily than a molded ring, so a rough face leaks sooner.
Lubrication	A light mineral oil or silicone grease compatible with the system fluid. Do not use brake fluid or a phosphate ester fluid as an installation lubricant on nitrile.
Backup rings	Not applicable to a spliced cord seal. If the application needs a backup ring, it needs a molded ring instead.
Measuring the cord you receive	Measure the cross section relaxed, at room temperature, with light gauge pressure. Rubber compresses under a micrometer, and a heavy hand will read a cord as undersized when it is in tolerance.

8. Regulatory status

This compound is not FDA compliant.

Compound 25003 is a standard industrial nitrile. It is not compliant to FDA 21 CFR 177.2600, it is not NSF certified, and it has not been tested to USP Class VI. Keep it out of food contact, beverage, potable water, pharmaceutical, and medical device applications where any of those apply.

If the application does need a food or water rating, we stock FDA compliant white and black nitrile, FDA compliant EPDM and silicone, and NSF/ANSI 61 listed EPDM for potable water, in cord as well as molded rings, and we can send the listing paperwork with the quote so the quality file is complete the first time. Tell us the fluid, the temperature, and which standard your customer is holding you to, and we will tell you which one fits.

Standard	Status
FDA 21 CFR 177.2600, rubber articles for repeated food contact	Not compliant
NSF/ANSI/CAN 61, drinking water system components	Not certified
NSF/ANSI 51, food equipment materials	Not certified
USP Class VI	Not tested
3-A Sanitary Standards	Not certified
EC 1935/2004, food contact materials	Not compliant
RoHS 2011/65/EU restricted substances	Contains none intentionally added
REACH SVHC	No SVHC above 0.1 % w/w to the current candidate list
California Proposition 65 listed substances	None intentionally added

Animal derived materials	None used
Natural rubber latex	Contains none

9. Storage, handling, and shelf life

Storage guidance follows SAE ARP5316 and ISO 2230, which are the standards a quality department will want cited. Nitrile is one of the compounds where storage actually matters, because ozone and sunlight damage material that never left the shelf, and cord on a spool is under bend strain the whole time it sits there.

- Store between 40 °F and 77 °F (4 °C to 25 °C). Below 60 °F, let the cord reach room temperature before cutting or installing. Cold cord is stiff, cuts ragged, and splices poorly.
- Relative humidity below 75 %. Avoid condensation.
- Keep cord out of direct sunlight and fluorescent light, and away from electric motors, arc welders, and anything else that makes ozone.
- Leave the cord in its original sealed, opaque packaging until it is needed. The bag is part of the shelf life.
- Coil loosely at the largest practical diameter. Do not kink it, do not hang it on a nail or a wire, and do not stack weight on the coil. A tight bend holds the surface in tension, which is where ozone cracking starts.
- Shelf life for nitrile under ARP5316 is 15 years from the cure date quarter when the conditions above are met. ISO 2230 is more conservative for this family, so if your quality system cites ISO 2230, use that number instead.
- Clean with isopropyl alcohol or mild soap and water only. Do not clean nitrile with ketones, chlorinated solvents, or aromatic solvents. The cleaner does more damage than the dirt.

10. Typical applications

Large diameter flange, hatch, manway, and tank lid gaskets. Filter and strainer housings. Electrical enclosures, junction boxes, and instrument cases. Machine guards, access panels, and inspection covers. Custom and oversized static seals above the practical molded ring range. Prototype and gland development work, where an engineer needs to prove the groove before committing to tooling. Field repair on agricultural, construction, and logging equipment when the machine is down and the molded ring is days out. Odd sizes that fall outside AS568 and metric standards entirely, including anything an old machine was built around before the standards existed. The line that sells this product is simple: it is what you reach for when the right size does not exist, and when it does exist, we would rather sell you the molded ring.

11. What you get from The O-Ring Store

We stock the most common O-Ring sizes, plus the ones our customers ask for and use. Every batch is certified by the Olypsys® O-Ring Measurement System from The O-Ring Store LLC, an ISO 9001:2015 certified distributor.

- Certificate of Conformance with every shipment, no charge and no asking twice.
- Dimensional verification on every lot through the Olypsys® system, reporting actual measured ID, cross section, and out of round rather than a pass or fail stamp.
- Full AS568 size range, plus metric and custom sizes.
- Lot traceability maintained on all material. Cure date and lot number on every bag.
- Technical support on gland design, compound selection, and failure analysis at no charge. Send us the failed part along with the fluid and the temperature, and we will tell you what happened to it.

THE O-RING STORE LLC

1847 Wilma Drive, Port of Wilma, Clarkston, WA 99403 | Phone 208-413-6377 | sales@theoringstore.com | www.theoringstore.com
ISO 9001:2015 Certified | CAGE Code 72PRO

We make getting O-Rings easy!

The information in this data sheet is offered in good faith for engineering reference. Typical values represent the compound class and are not specification limits, guarantees, or warranties of performance. Compatibility, service life, and suitability for any specific application must be verified by the user under actual service conditions. Revision A, September 2026.

