GORE® GFO® Packing Fiber
For Compression Packing

USE LESS WATER AND POWER PER PUMP

GORE® GFO® Packing Fiber:
Reliable performance
at low total cost

Together, improving life

Performance advantages of GORE® GFO® Packing Fiber

Improve cost control

Compression packing has always been a cost-effective way to seal pumps. But mere cost-effectiveness is no longer enough: plant and mill operations now face rapidly increasing costs for everything from power and water to pump replacement parts and maintenance. The need to reduce costs requires pumps that operate at maximum efficiency, for:

- reduced power consumption
- minimal cooling-water usage and leakage
- less frequent maintenance for packing replacement, or gland-follower adjustment
- reduced risk of downtime and costly repair

Potential costs of inefficient packing

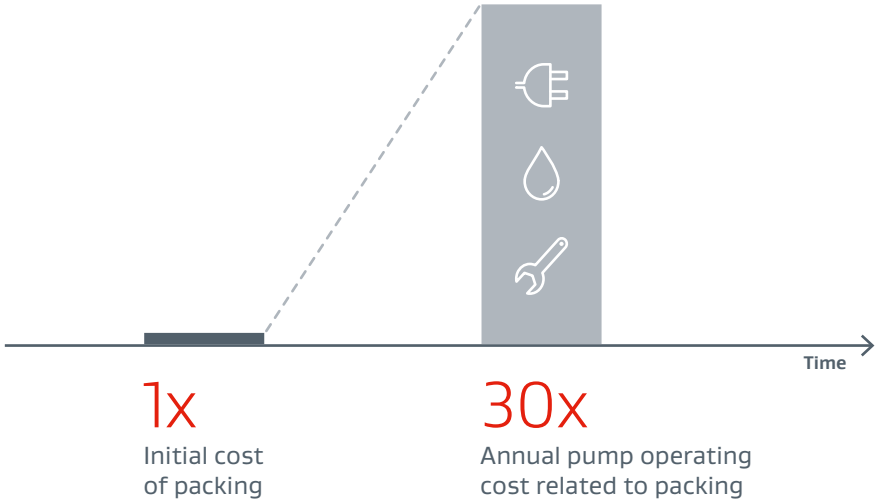
Per-pump excess power loss due to friction:
2,300–110,000 kWh (varies by material used & pump run-time)[1]

Per-pump yearly wasted water (Drip rate per inch of shaft diameter):
3,000–15,000 gallons (11.35–56.78 m³) per year[2]

Avoidable downtime for maintenance:
7.5–78.0 labor-hours per year[3]

Estimated for a 100 psi (6.9 bar) pump with 2" (50 mm) shaft.
kWh: $0.12 | Water: $15.00/1,000 gal. | Drip rate: 15,000 gal. (56.8 m³)/year | Packing: $ 40.00, replaced 3x/year

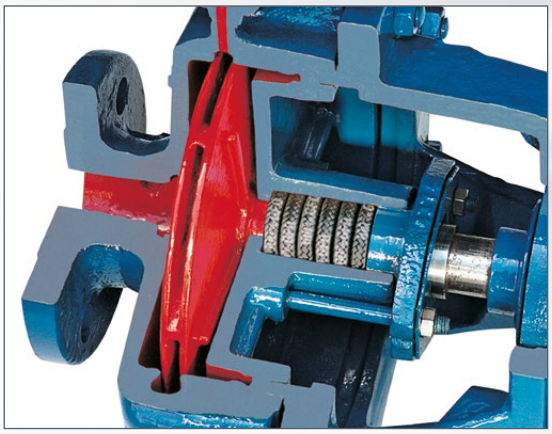
While procurement may prefer packing with the lowest up-front cost, operations has to deal with the resulting cost burdens and sustainability concerns.



1) Based on FSA article "What is the impact of packing friction . . .", Cetim testing (3rd party), Gore testing (details available upon request), and research on the coefficient of friction for various materials

2) Based on Pumps and Systems article "From the voice of the fluid sealing industry" April 2005, McKinsey Quarterly March 2013 "Measuring the real cost of water", Cetim testing (3rd party) and Gore testing (details available upon request)

3) Based on > 300 documented case histories



How can ePTFE + graphite packing cut per-pump operating costs?

With performance properties that are well-suited to pump shaft application requirements.

The combination of ePTFE and graphite enables a lower coefficient of friction than most packings, including ePTFE alone. For pump operations, this can mean:

- Improved heat dissipation
- Reduced water consumption to cool packing
- Sealing without scoring the shaft (less risk of shaft damage)
- Longer packing lifetime without losing sealing effectiveness

But, that is only the first part of the story.

Not all ePTFE + graphite packings perform equally

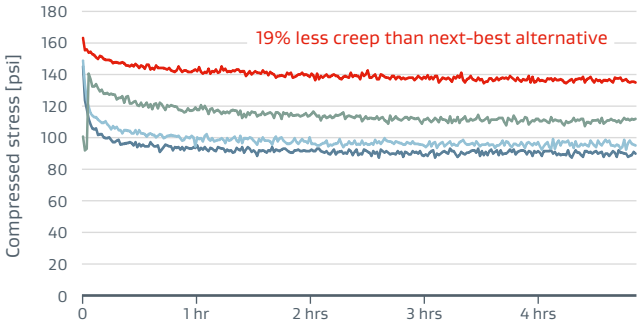
Packings made of 100% GORE® GFO® Packing Fiber achieve better results[1] in four performance categories.

GORE® GFO® Packing Fiber is engineered for high performance and long service life. Gore's unique material composition combines lower creep, lower weight loss and lower shrinkage, for fewer adjustments. Our product stability means you can benefit from a longer in-service lifetime with less frequent maintenance cycles.

Alternative packing materials typically need more attention and don't last as long. Testing confirms it!

Load retention (creep resistance)

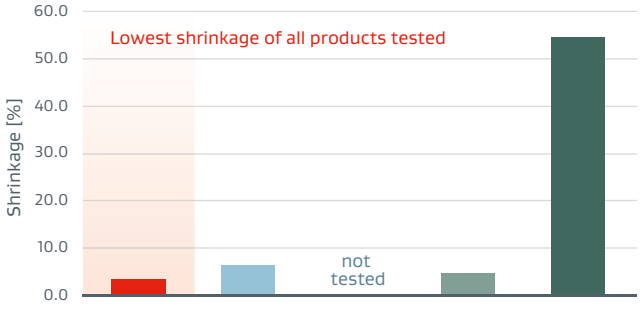
Test conditions: 200 psi compressive stress at ambient temperature for 4 hours



Gore's creep resistance means fewer adjustments and less water wasted.

Shrinkage (dimensional stability)

Test conditions: 80 °C for 15 minutes



Gore's low shrinkage with excellent creep resistance can enable long packing life and enhance pump efficiency.

Gore packing

GORE® GFO® Packing Fiber

Non-Gore packings made of ePTFE/graphite

Alternative A · Alternative B · Alternative C · Alternative D

1) Compared to other ePTFE/graphite products tested. Contact Gore for details.

Your assurance of quality that can save costs

Quality assured

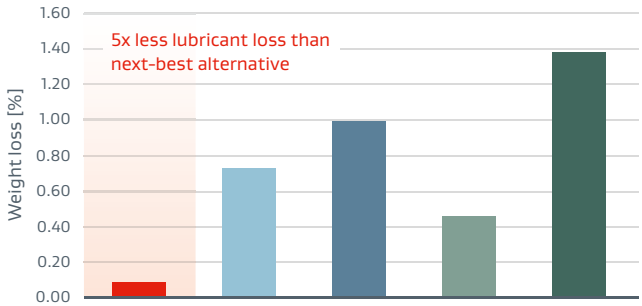
Our network of Authorized Braiders are equally committed to maintaining quality and consistency: Their participation in our Seal of Assurance Program guarantees that their braided packing consists of 100% GORE® GFO® Packing Fibers. The 100% GFO label on the package and on the braid tells you so!

Certification

GORE® GFO® Packing Fiber is manufactured in accordance with ISO 9001.

Weight loss of lubricant

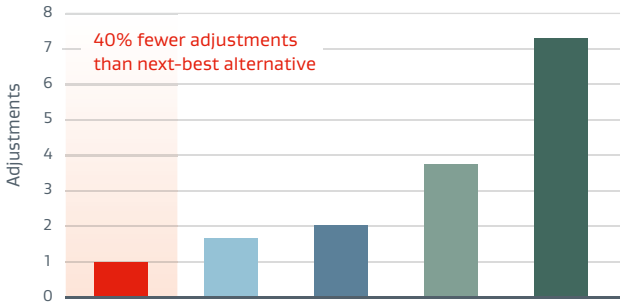
Test conditions: 200 psi compressive load at 100 °C for 8 hours



Gore retains more lubricant, for longer service life of the packing.

Number of adjustments

Test results: Average number of adjustments to maintain drip rate of 30 drips per minute over 100 hour test



Gore requires fewer adjustments, reducing maintenance time and labor costs.

Tests prove that GORE® GFO® Packing Fiber outperforms these alternative ePTFE/graphite packing materials in four key performance categories.

Estimated annual cost savings with GORE® GFO®

Superior performance leads to significant savings in power, water and maintenance costs.

These savings are estimated at a power cost of $0.12 per kWh, and a water cost of $0.015 per gallon. If your rates are higher — or you expect they will increase in the future — your savings with Gore will be higher too!

For your plant or mill, Gore recommends an application-specific calculation to estimate the savings that you could achieve by switching to 100% GORE® GFO® Packing Fiber.

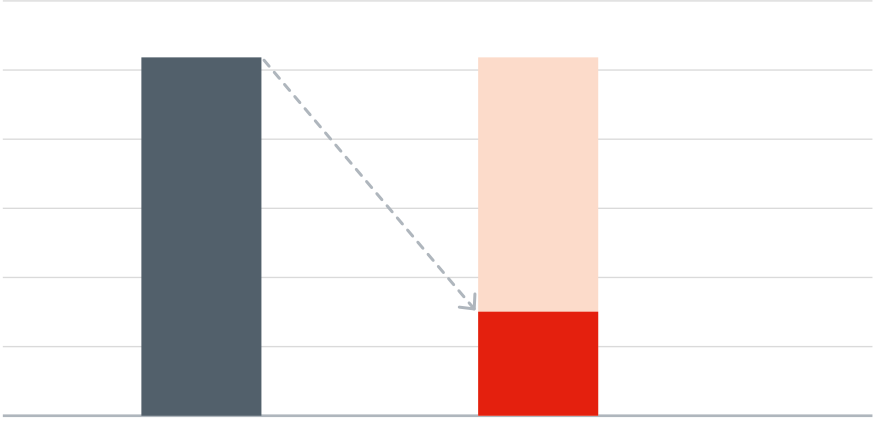
Per-pump annual operating cost	With other tested packing	With 100% GORE® GFO® Packing Fiber	Savings with GORE® GFO® (per pump)
Power consumption	$ 531	$ 227	$ 304
Water consumption	$ 228	$ 116	$ 112
Maintenance	$ 1,450	$ 245	$ 1,205
Subtotal operating cost	**$ 2,209**	**$ 588**	**$ 1,621**
Initial cost of packing	$ 40	$ 65	$ – 25
Total cost	**$ 2,249**	**$ 653**	**$ 1,596**

Estimated calculation assumes:
Pump shaft diameter: 2" | shaft speed: 3600 RPM | 6 packing rings | packing size: 0.5 in. | Back pressure: 100 psi | Electric cost: $0.12/kWh | Water cost: $15/1,000 gal | Maintenance cost: $30/hr

Estimated calculations are based on performance data from the comparative testing summarized on pages 4–5. Contact Gore for details.

Total cost comparison

Gore achieved per-pump savings of 50% on water and 40% on energy. That's compared to the next-best tested material but savings would be even greater if Gore replaces a lower-performing packing!



$2,249
Other tested ePTFE/graphite packing

$653
GORE® GFO® Packing Fiber

Technical data

You can rely on the consistent high quality of 100% GORE® GFO® Packing Fiber.

Technical specifications

Temperature range
–240 °C to +288 °C (–400 °F to +550 °F)

Chemical resistance
Chemically inert, with few exceptions[4], over the entire 0–14 pH range. Contact Gore with any questions about chemical compatibility.

Stability
Able to withstand shaft speeds up to 4,300 feet per minute (21.8 m/s)

Typical sizes: Finished compression packing

Braid density
The yield figures below are representative of satisfactory braided packing made of 100% GORE® GFO® Packing Fiber. The data serves as a working guideline only and not as a minimum quality standard.

Braided packing cross section		Yield	
in	cm	ft/lb	m/kg
1/8	3.18	80.00	53.64
3/16	4.76	38.00	25.48
1/4	6.35	23.00	15.42
5/16	7.94	15.00	10.06
3/8	9.50	11.00	7.38
7/16	11.11	8.00	5.36
1/2	12.70	6.00	4.02
9/16	14.29	5.00	3.35
5/8	15.88	4.00	2.68
11/16	17.46	3.20	2.14
3/4	19.05	2.80	1.88
7/8	22.26	2.00	1.34
1	25.40	1.50	1.00

Braid dimensional tolerances
Another significant factor affecting braided packing performance is the degree to which it is properly sized. Calendaring braid and die-forming rings are two effective ways that the manufacturer can produce packing that closely adheres to dimensional specifications. The Fluid Sealing Association recommends the following tolerances.

Cross section	≤ 1/4 in	≤ 6 mm	1/4–1 in	6–25 mm	> 1 in
Tolerance	±1/64 in	±0.4 mm	±1/32 in	±0.8 mm	±1/16 in

Gore makes it easy to save more

Find out how a simple switch to our low-friction, cool-running packing can improve pump efficiency and operating costs, with minimal disruption to operations.

Watch our free 30-minute webinar

More than 300 cases prove it

GORE® GFO® Packing Fiber outlasted alternative materials in all types of industries and installations.

See our customers' documented results

4) Molten alkali metals, fluorides, aleum, fuming nitric acid, aqua regia, and other strong oxidizing agents.

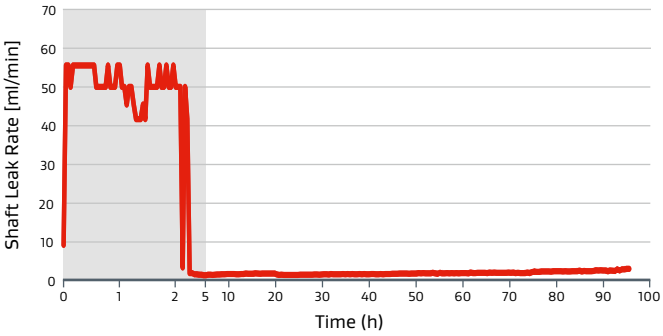
Technical information

Cetim EN 16752 test results

100% GORE® GFO® Packing Fiber has been tested [5] by Cetim according to EN 16752 (“Centrifugal pumps — Test procedure for seal packing”).

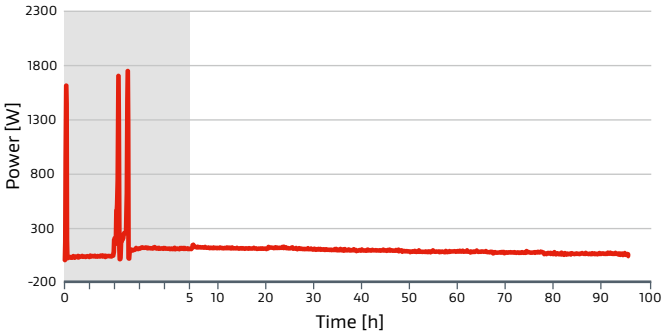
These test results confirm that when GORE® GFO Packing Fiber is properly installed, it can enable both a low leak rate and low power consumption. A switch to GORE® GFO® Packing Fiber can offer a fast, easy way to reduce per-pump water and power consumption.

Shaft leak rate



After initial break-in period, shaft leak rate stabilizes at 2.7 ml/min (after 5 adjustments)

Power consumption



After initial break-in period, power consumption stabilizes at 85.2 W (after 5 adjustments)

5) Test protocol summary: (See detailed test protocol.)
Ambient temperature
Test medium: clean water
50 mm shaft diameter, 3000 rpm
Pressure: steady 0.6 Mpa (~87 psi)
Loading: After 2 hours: 1.8 kN (~400 pound force)
After second adjustment: <1.5 kN (~340 pound force)
After subsequent adjustments: 1.6–1.8 kN (~160–340 pound force)

PLEASE VISIT GORE.COM/GFO TO FIND CONTACT DETAILS FOR ALL LOCAL SALES OFFICES.

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