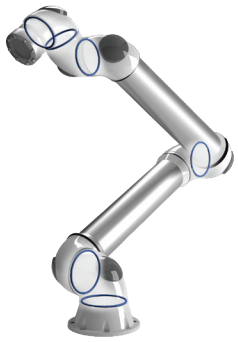


IPSR FOR COBOT JOINTS

Freudenberg Sealing Technologies develops and manufactures customized IPSR seals for cobot joints and humanoid robots for use in industrial applications, indoor and outdoor environments, as well as for demanding cleanroom applications.

Each seal is precisely designed for the customer's specific application, taking into account installation space, motion profiles, loads, and environmental factors such as temperature, humidity and media contact.

High-performance, wear-resistant materials combined with adaptive sealing lip geometry ensure reliable IP protection while maintaining low and constant friction.

With decades of material expertise, fully integrated value creation, and simulation-based design using WebFEM, we develop robust, long-lasting sealing solutions for dynamic robotics applications.

VALUES FOR THE CUSTOMER

Simulation-based optimized seal design with verified contact stresses, low friction, and validated performance across temperature and tolerance limits.

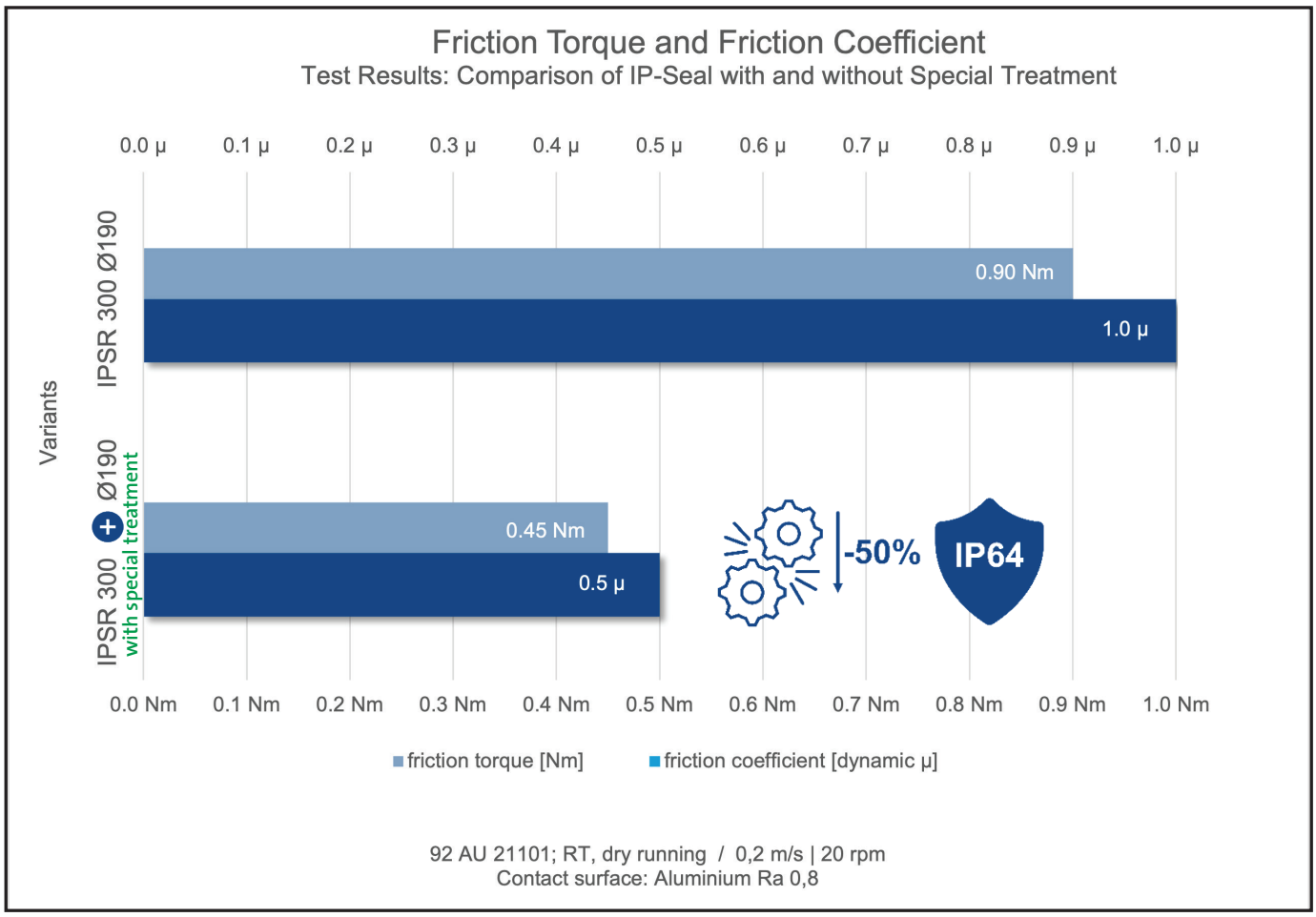
- **Compact, highly flexible seal design** for extremely limited installation spaces
- **Customized to meet specific customer requirements**
- **Reduced development time** through simulation-based design (FEA)
- **Secure sealing** for radial and axial movements
- **Reliably tested IP protection** (IEC 60529) against water, dirt, and dust
- **Low and constant friction** for energy-efficient operation with required protection
- **Robust materials & optimized surface design** ensure reliable function even under poor lubrication conditions
- **Validated performance** through comprehensive testing
- **Bidirectional sealing:** Protection against contamination from inside the drive for cleanroom applications

IP PROTECTION CLASS

6 4

Solids	
Protection against the ingress of large objects, **Ø > 50 mm** e.g., the size of a hand	1
Protection against the ingress of medium-sized objects, **Ø > 12.5 mm** e.g., a finger	2
Protection against the ingress of small objects, **Ø > 2.5 mm** e.g., tools	3
Protection against the ingress of very small objects, **Ø > 1 mm** e.g., fine wires	4
Dust protected Full protection against contact	5
Dustproof	6

Water	
1	Protection against dripping water
2	Protection against **dripping water at an angle (up to 15°)**
3	Protection against **spray water up to 60°** from the vertical
4	Protection against **splash water** from all directions
5	Protection against **jet water** from all directions
6	Protection against **strong water jets**
7	Protection against **brief submersion** in water (up to 1 m for 30 min.)
8	Protection against **continuous submersion** (more than 1 meter for 1 hour)



By selecting the right materials and surfaces, friction can be reduced by up to 50% depending on the application – while still meeting at least IP protection class 64, with higher protection classes also possible

IPSR solutions ensure reliable protection against dust and water.

Customized designs and solutions – tailored to your exact requirements.

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