



MEMBER OF
FRANKISCHE GROUP



FIPVISION

Efficient sensor cleaning systems
for maximum safety in autonomous driving

FIPVISION sensor cleaning solutions

The cleanliness of sensors plays a key role in the safety and efficiency of driver assistance systems and autonomous vehicles. Contamination on sensors such as cameras, LiDAR systems and radar sensors can impair the sensor technology and cause potential hazards on the road. **Effective sensor cleaning solutions** are therefore essential to optimize the performance of sensors and extend their service life.

Benefits of our sensor cleaning solutions

Our corrugated tubing and connectors offer a range of benefits that will take your sensor cleaning systems to the next level:

■ Reliable connections

Our corrugated tubing and connector solutions provide secure and durable connections between your cleaning unit and sensors. This ensures continuous sensor cleaning, even under difficult conditions.

■ Easy installation

Our quick and easy installation processes save you time and increase the uptime of your cleaning systems. Less effort during installation means greater efficiency and safety.

■ Flexible accessories

Our comprehensive range of accessories offers tailored solutions for a wide variety of sensor sizes and types, including LiDAR, radar and ultrasonic sensors. This allows us to respond individually to your sensor cleaning and camera cleaning needs.



FIPVISION

Optimization for the challenges of autonomous driving

Our sensor cleaning systems are specifically designed to meet the challenges of autonomous and electric driving. We understand the importance of every single measurement and sensor lens and ensure that our products meet the highest industry standards. With our solutions, you can ensure that your sensor technology always delivers the precision required for autonomous vehicle control and environmental sensing.

Our technical expertise enables us to develop innovative products that not only meet today's requirements, but are also future-proof. We work closely with our customers to create customized solutions that are perfectly tailored to their sensor cleaning and driver assistance needs.

Technical specifications

■ Light and flexible

Our solutions offer a high degree of flexibility with the smallest bending radius and are also very light.

■ High load capacity

Our products are extremely crush resistant and offer excellent protection even in demanding conditions.

■ Temperature resistant

Our systems operate reliably in temperatures up to 125°C.

■ Kink resistant

Our corrugated conduits and connectors are kink resistant and remain stable under load.

■ High pressure resistance

They guarantee a constant operating pressure range from 2.5 to 11 bar.

Tailored support

■ Support at all stages

We offer comprehensive support from concept development through serial production and beyond.

■ In-house development

Our in-house research and development teams offer customized solutions from simulation to finished product.

■ Full integration

We fully integrate our sensor cleaning solutions into your customized system.

■ Testing and quality control

We offer extensive testing, including accredited testing for leakage and flow requirements.

■ Global manufacturing standards

Our global manufacturing facilities ensure that all products are manufactured to the same high standards.

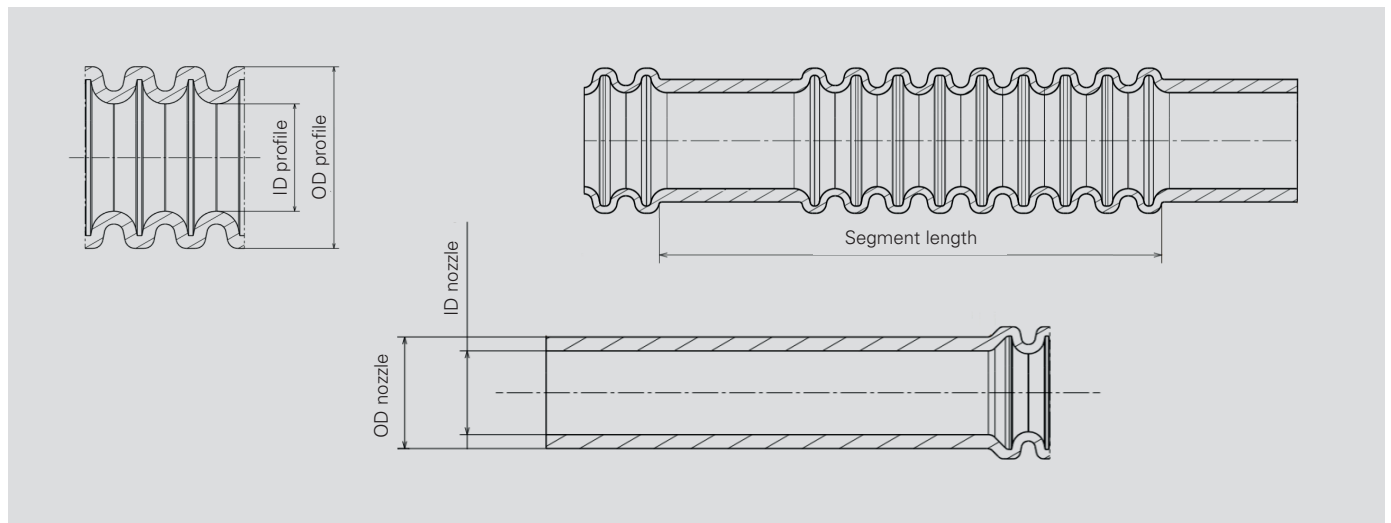
FIPVISION Product overview

Material characteristics

Material	Minimum temperature	Maximum temperature	Pressure resistance	Price level
PP + PA6	– 40°C	+ 90°C	+	low
TPE	– 40°C	+ 90°C	+	low
PA612	– 40°C	+ 130°C	+	medium
PA11	– 40°C	+ 120°C	++	high
MLT3	– 40°C	+ 100°C	+++	higher

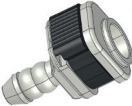
Corrugated tubes

Dimensions of corrugated tubes



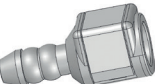
Nominal sizes	Type	Nominal sizes in mm					Material
		ID profile	OD profile	ID nozzle	OD nozzle	Segment length	
4,5	standard	4,20	7,10	4,50	6,00	–	PP+PA6 TPE PA612 PA11 MLT-3 PP+PA6 / Adhesion promoter / PA11
4,5	endless	4,70	7,10	4,50	6,00	~ 25,00	
4,5	heavy	4,00	7,10	4,0	6,00	–	
5,5	standard	5,40	8,55	5,50	7,05	–	
5,5	endless	5,30	8,55	5,40	7,05	~ 41,00	
8,5	endless	8,50	13,30	9,90	12,00	~ 31,00	

Accessories

Connector		Cat. Nr.	Color	Stand	NW
	Y-connector	490 90 037	black	serial	4,5
	Male connector 180°	490 90 057	black	serial	4,5
	Male-male connector 180°	490 90 058	black	serial	4,5
	T-connector	490 90 115	black	serial	4,5
	Tube-tube connector 180°	490 90 318	black	serial	4,5
	Female connector 180°	490 90 446	black	serial	4,5
	Female connector 180°	490 90 447	white	serial	4,5
	Female connector 180°	490 90 872	black	prototype	5,5
	Female connector 180°	490 90 873	white	prototype	5,5
	Female connector 90°	490 90 874	black	prototype	5,5
	Female connector 90°	490 90 875	white	prototype	5,5
	Male connector 90°	490 90 877	black	serial	4,5

Accessories

Connector		Cat. Nr.	Color	Stand	NW
	T-connector	490 91 283	black	prototype	5,5
	Y-connector	490 91 286	black	prototype	5,5
	T-connector	490 91 528	black	serial	8,5
	Tube-tube connector 90°	490 91 529	black	serial	8,5
	Female connector 90°	490 91 909	black	serial	4,5
	Female connector 90°	490 91 910	white	serial	4,5
	Y-connector parallel	490 92 325	black	serial	4,5
	Female connector 180°	490 92 424	gray	designed	8,5
	Male connector 180°	490 92 425	black	designed	8,5
	Male connector 90°	490 92 431	black	designed	8,5
	Female connector 90°	490 92 432	gray	designed	8,5
	Female connector 120°	490 92 435	gray	designed	8,5

Connector		Cat. Nr.	Color	Stand	NW
	Male connector 180°	490 90 106	black	serial	4,5
	Female connector 90°	490 90 132	black	serial	4,5
	Female connector 90°	490 90 133	white	serial	4,5
	Female connector 180°	490 90 155	black	serial	4,5
	Female connector 180°	490 90 370	white	serial	4,5
	Male connector 180°	490 90 999	black	serial	8,5
	Female connector 180°	490 91 000	blue	serial	8,5
	Y-connector female-tube-tube	490 91 001	blue	serial	8,5
	Female connector 90°	490 91 002	blue	serial	8,5
	Female connector 120°	490 91 051	blue	serial	8,5
	Y-connector female-male-tube	490 91 052	blue	serial	8,5
	Female connector 90°	490 92 046	white	serial	4,5

FRÄNKISCHE Industrial Pipes (FIP) is a global partner to the automotive and commercial vehicle industry, and is close to its customers' with sites in Africa, Asia, Europe and North America. The company's main headquarters is in Königsberg, Germany.

FRÄNKISCHE Industrial Pipes counts leading manufacturers and renowned suppliers from the industry among its customers. The company was founded in 2008 and has enjoyed success thanks to innovative, customer-oriented solutions for fluid management, protective components as well as thermal management.

A strong focus today is on e-mobility with thermal management. FIP's key competences also include industrial cable protection, and media-conducting systems that are used wherever liquids or gases are distributed under specific and stringent requirements. Other key competencies include the design, prototype construction, and mass production of customerspecific components, utilizing the company's own expertise in plastic technology and automation.



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