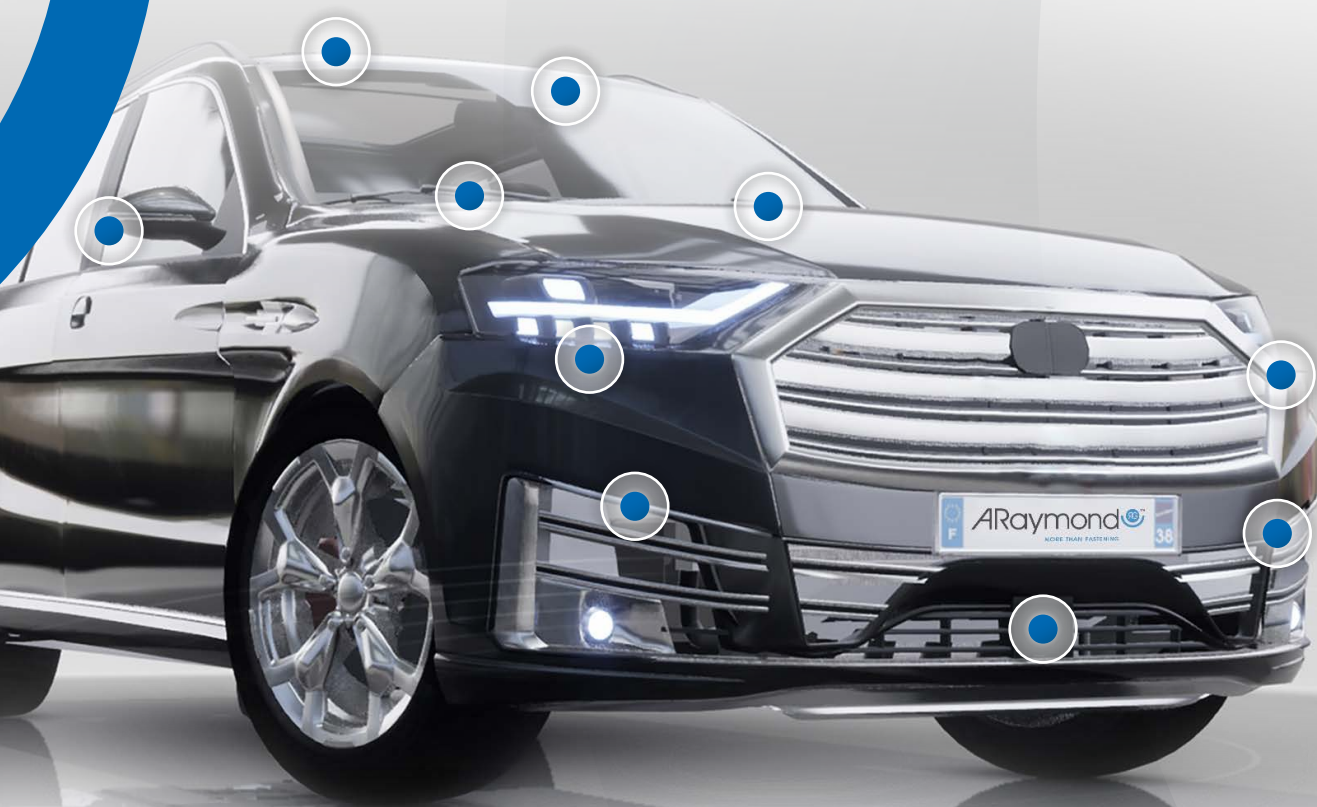


# ARaymond®

YOUR PARTNER FOR  
**CLEANING SYSTEMS**



# INTERNATIONAL EXPERT IN FASTENING AND ASSEMBLY SOLUTIONS

We partner with our customers to develop fastening, assembly, and cleaning systems for the complete vehicle life cycle.

Our mission is to increase assembly efficiency and optimize system performance for our customers worldwide.

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## CLEANING SYSTEMS

At ARaymond, we draw from over 30 years of experience designing and producing cleaning system sub-components in house.

We work closely with our customers to come up with value-creating cleaning solutions, whether it is to speed up the assembly time, guarantee efficient fluid usage, or ensure impeccable cleaning of front and rear windshields, lamps, LIDAR, and cameras.



Optimized cleaning results  
Efficient water management  
Integrated functions

# HOW WE WORK

1

## CONCEPT & DEVELOPMENT



Understanding your challenges



Concept development & testing



CAD analysis  
Spray angle analysis

Cross section investigation



Simulation systems:  
In-house Finite Element Analysis

Computational Fluid Dynamics

Installation space verification

## ASSEMBLY PROCESS & QUALITY CHECK

We build modular assembly machines in-house



QUALITY

A fully **automatic process**, using cutting-edge technology with assembly process **monitoring** for each assembly phase. Including a **100% spray angle check** with high-definition cameras. A **leakage test** is carried out for the nozzles with non-return valves.



FLEXIBILITY

A flexible and targeted process that allows **easy implementation** of **additional features** or **design adjustments**.



SPEED

The optimized production lead time speeds up the **time to market**.

2

PROTOTYPE & PRE-SERIES



Prototyping

Prototype tests on real vehicles

3

INDUSTRIALIZATION & PRODUCTION



Injection molding and tool shop

In-house engineering of assembly lines

Serial production



# CLEANING PORTFOLIO

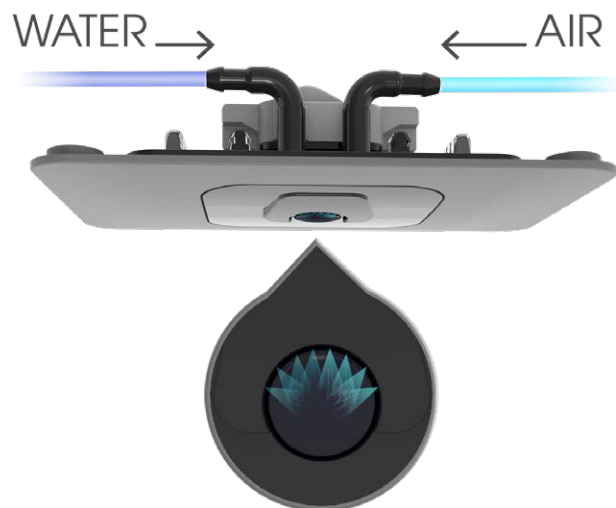


## INNOVATION EXPERTISE

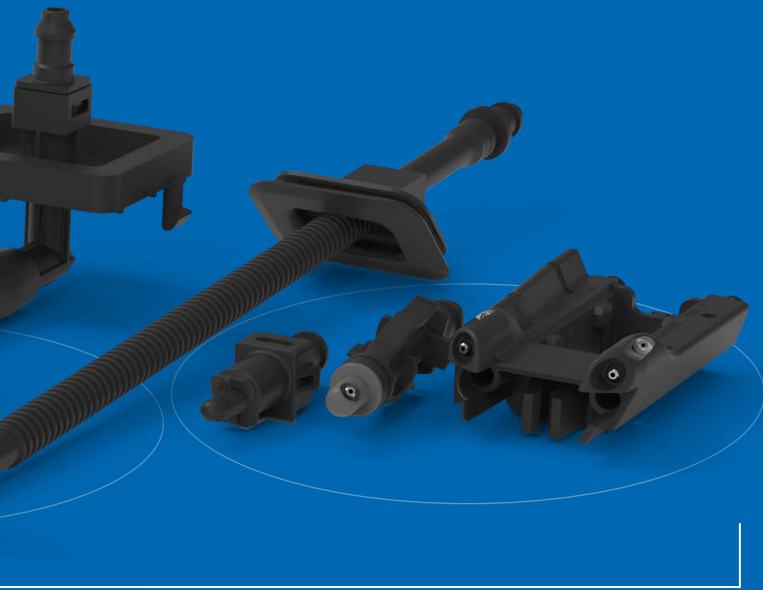
Custom solution developments for ADAS & Autonomous driving



Impeccable flush finish for sensor cleaning with telescopic nozzles that remain invisible when not in use.

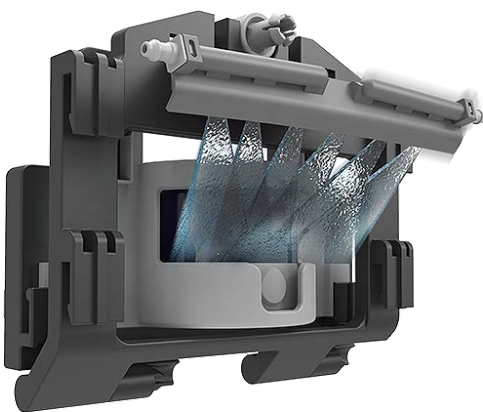


All-in-one, air and water, cleaning for autonomous vehicle cameras with dual media nozzles.



NOZZLES & JUMPER TUBES ASSEMBLY

Mounted on or under the hood of the car, on the cowl, in the stop lamp, spoiler or on the wiper arms, our nozzles can accommodate all front and rear windshields, as well as cameras and sensors. Options include integrated non-return valves, seals, and heated nozzles.



**High-precision LIDAR cleaning and optimized water distribution with multi-outlet nozzles.**



**High-speed cleaning and low water consumption with integrated electromagnetic valves.**

## CASE STUDY #1

# MAXIMIZED CLEANING PERFORMANCE WHILE KEEPING THE FRONT TRUNK DRY



### CHALLENGE

A high-end and rear-engine car, equipped with a “frunk,” with little space to integrate components.



### SOLUTION

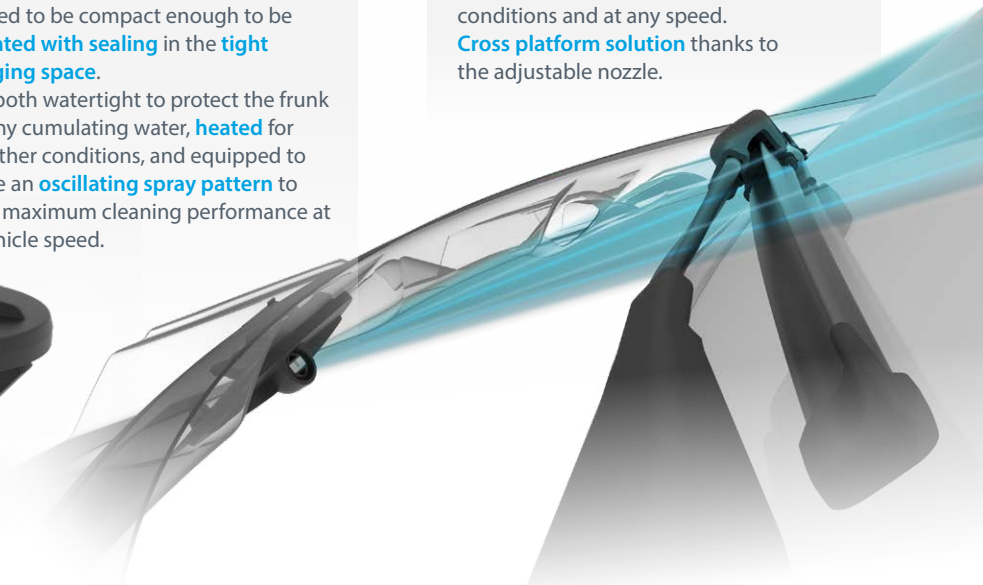
Our engineering team was invited as experts to rain tests at the customers’ to observe and improve the current solution. They came up with a front washer nozzle designed to be compact enough to be **integrated with sealing** in the **tight packaging space**.

It was both watertight to protect the frunk from any cumulating water, **heated** for all weather conditions, and equipped to provide an **oscillating spray pattern** to ensure maximum cleaning performance at any vehicle speed.



### CUSTOMER BENEFITS

Esthetic solution, easily integrated to the body in white, ensuring water tightness to protect the trunk. **Impeccable windshield cleaning** in all weather conditions and at any speed. **Cross platform solution** thanks to the adjustable nozzle.



## CASE STUDY #2

# EXPANDED WINDSHIELD CLEANING FOR BOTH DRIVER VISION AREA AND UPPER PART CAMERA



### CHALLENGE

A high-end vehicle, with high aesthetic requirements needed a powerful cleaning solution.



### SOLUTION

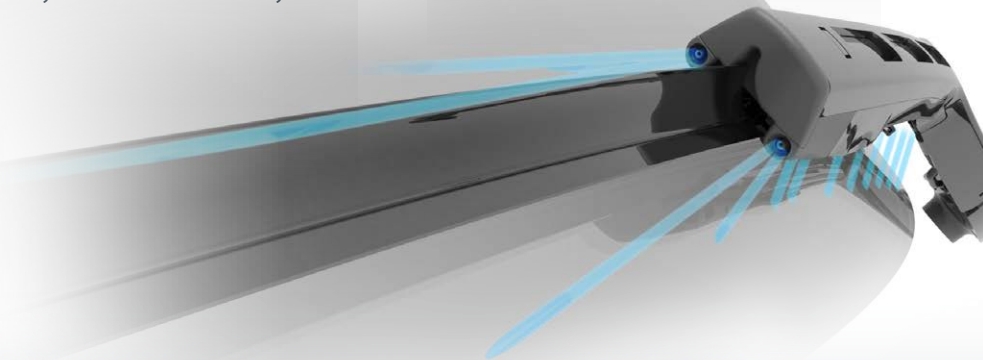
The ARaymond solution consisted of a **two ramp cleaning** system **integrated directly into the wiper arm**.

Two heated nozzles were designed to fit into each side of the wiper arm, allowing **effective** and **secure cleaning** of the complete windshield. The nozzle body holds and fastens the wiper blade, which enables easy access and serviceability.



### CUSTOMER BENEFITS

**Aerodynamic** and **sleek design**, ensuring **efficient water consumption**. Secure cleaning thanks to the direct water application from the wiper blades that maintain the driver visibility.



## CASE STUDY #3

# REAR WINDSHIELD CLEANING SUITABLE FOR SEVERAL CAR LINES



### CHALLENGE

A major OEM was looking for a cost-effective and sealed nozzle suitable for different car body configurations.



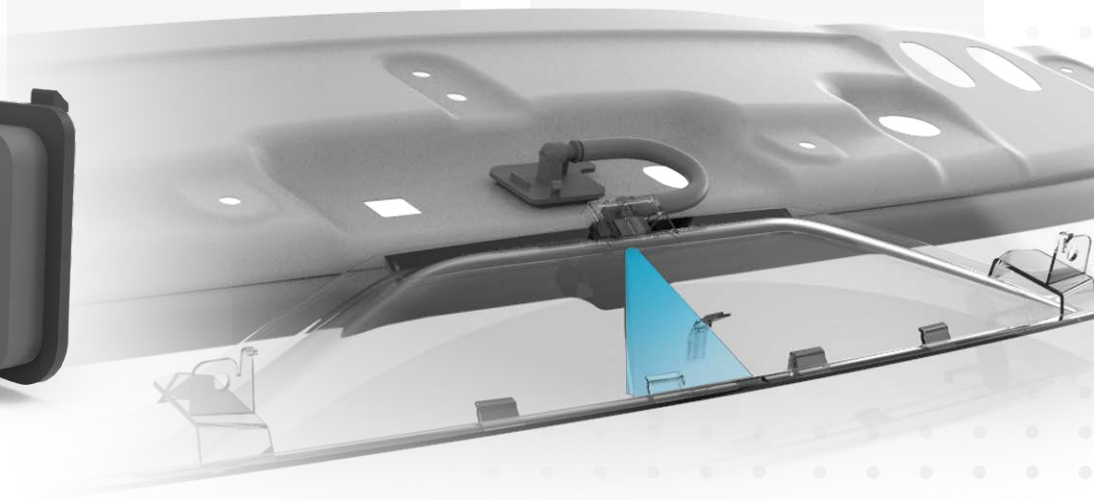
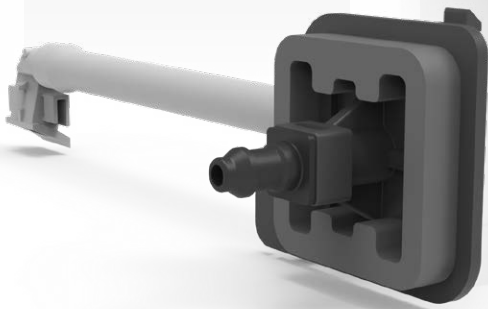
### SOLUTION

For this case, we provided a **standard solution that is both** flexible and modular. A high-quality nozzle that can be equipped with different **fluidic chips** depending on the required fan spray angle. The **orientation of the nozzle head can be adapted** to different backlite angles by adjusting the holding fixture in the spoiler.



### CUSTOMER BENEFITS

This flexible and worthwhile solution enables **standardization** between car lines. The **high-performing nozzle** with an **oscillating fan spray** and an integrated non-return valve provides **precise cleaning** with an optimized quantity of water.



## CASE STUDY #4

# INVISIBLE AND RELIABLE HIGH PRECISION CLEANING FOR THE REAR CAMERA



### CHALLENGE

Integration of a cleaning system for a rear-end camera where very little space was available.



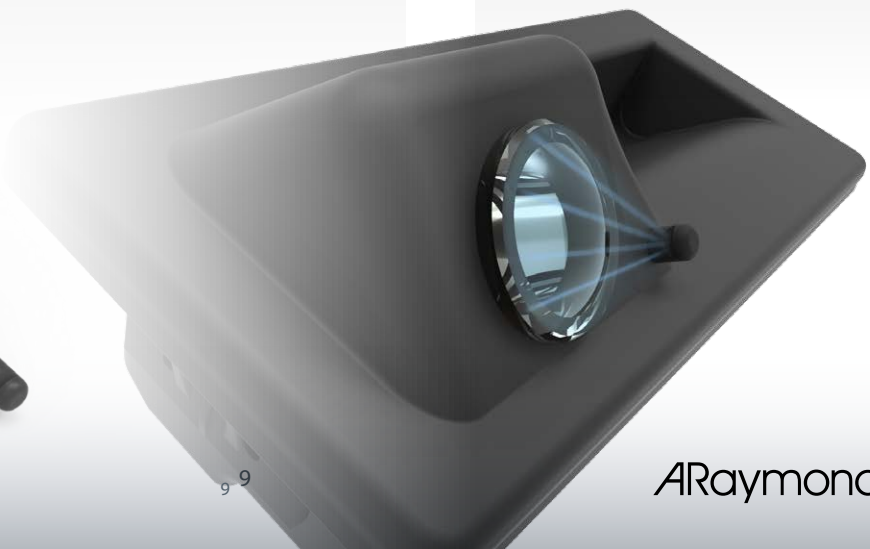
### SOLUTION

The ARaymond's response to this request was an **ultra-thin nozzle** with **jet precision** developed for very tight packaging areas. The nozzle with an integrated **non-return valve** was embedded into the trunk handle.





### CUSTOMER BENEFITS

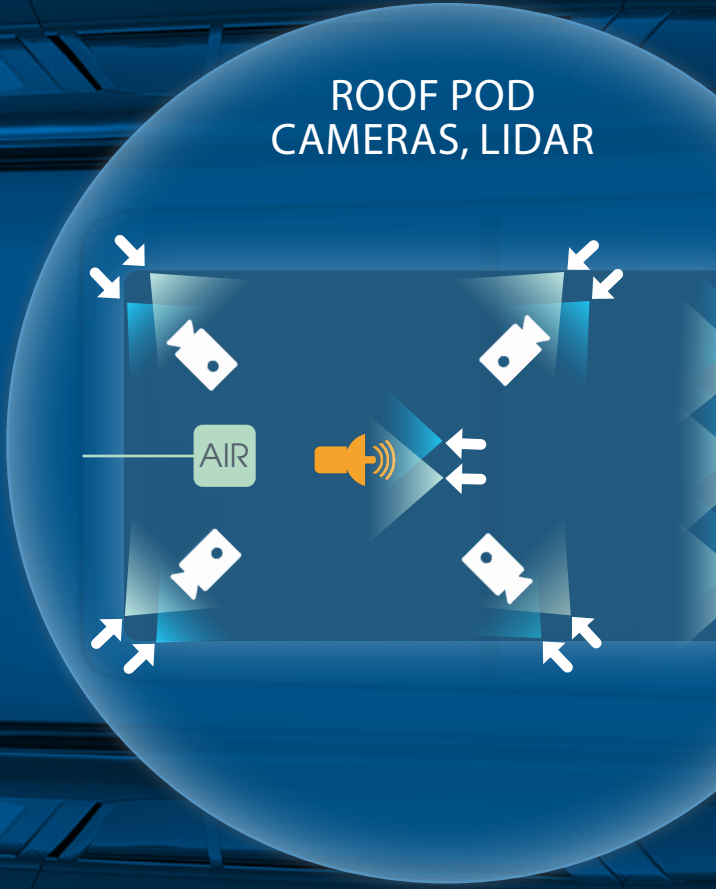
This compact and **invisible powerful cleaning** nozzle maintains the **camera clean at all times**.



# APPLICATION AREAS

REAR CAMERA  


REAR SCREEN  




## SOLUTIONS PER APPLICATION AREA

### WINDSHIELD

Front nozzle mounted on or under the hood, on the cowl, on the screen or the wiper arms.

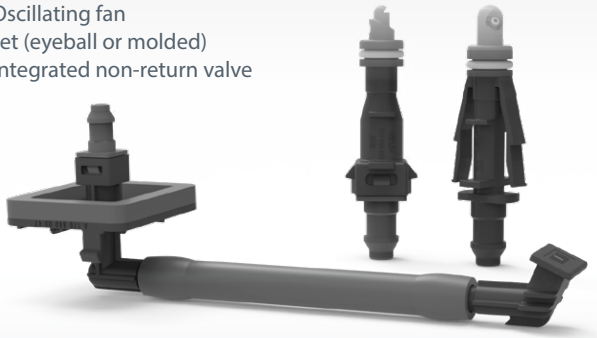
- Oscillating fan
- Jet (eyeball)
- Adjustable
- Heated
- Integrated non-return valve

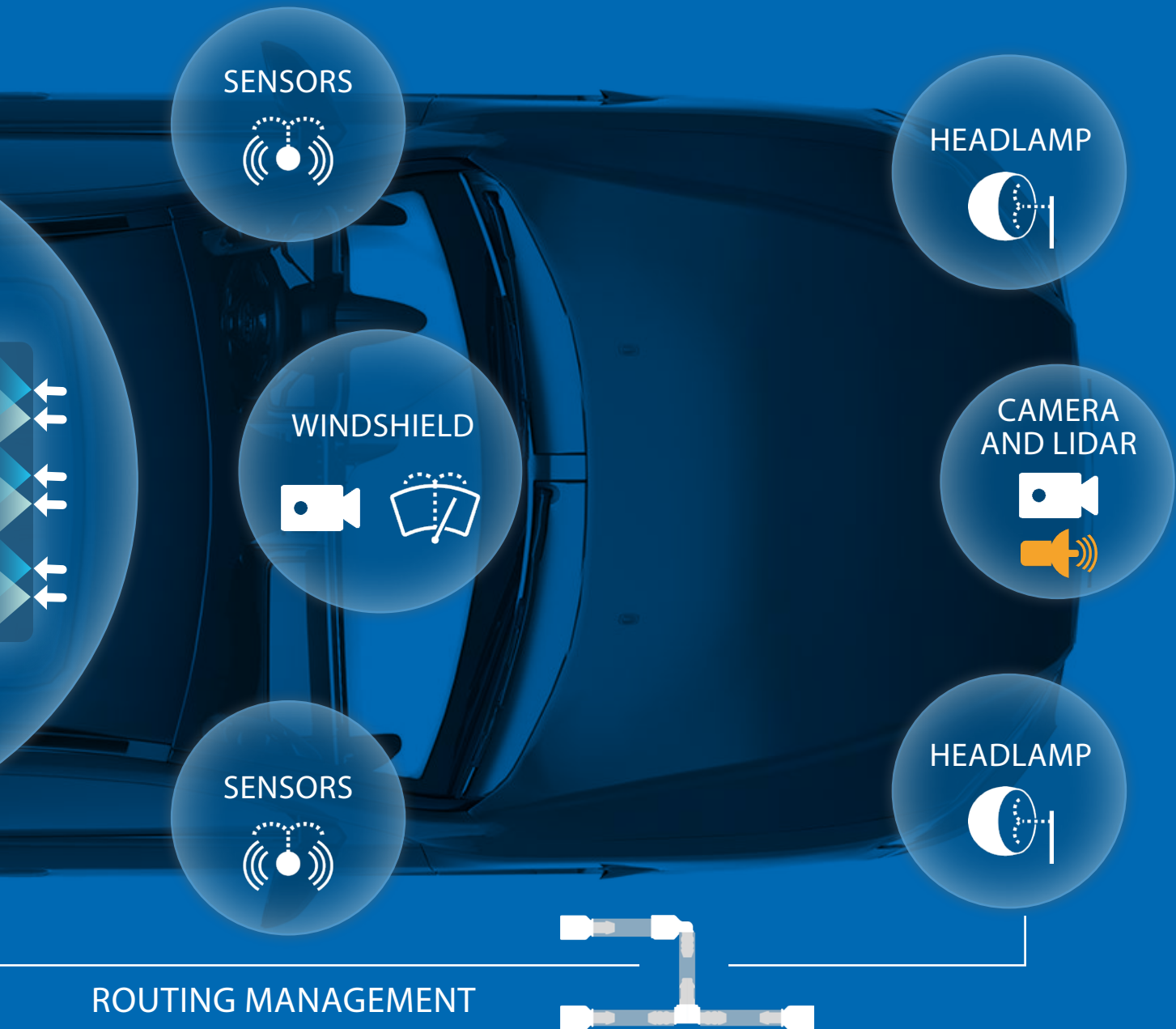


### REAR SCREEN

Mounted to the center high mounted stop lamp, spoiler, or sheet metal.

- Static fan (chip or molded)
- Oscillating fan
- Jet (eyeball or molded)
- Integrated non-return valve





## CAMERA & SENSORS



Mounted in the front bumper, tailgate, grab handle, roof pod.

- Static fan (chip or molded)
- Jet (eyeball or molded)
- Integrated non-return valve
- Multi outlet



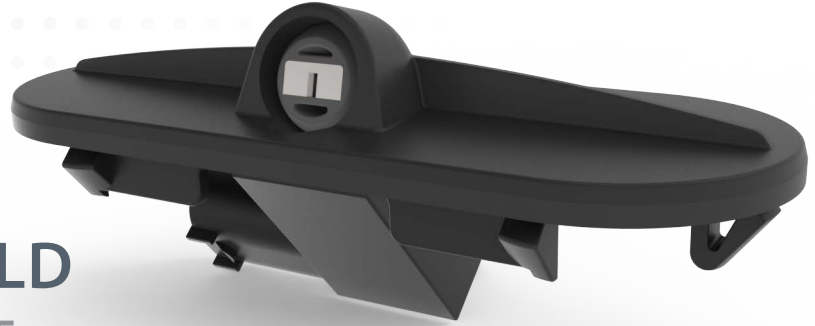
## ROUTING MANAGEMENT

Supply tube routing, attachment to the body, and connections.

- Unions
- Tape-on and fir tree
- Quick Connectors (straight, 90°, tee, and non-return valve)
- Inline non-return valve (sleeve, diaphragm, Quick Connector)



# WINDSHIELD FRONT NOZZLE



TYPE OF SPRAY

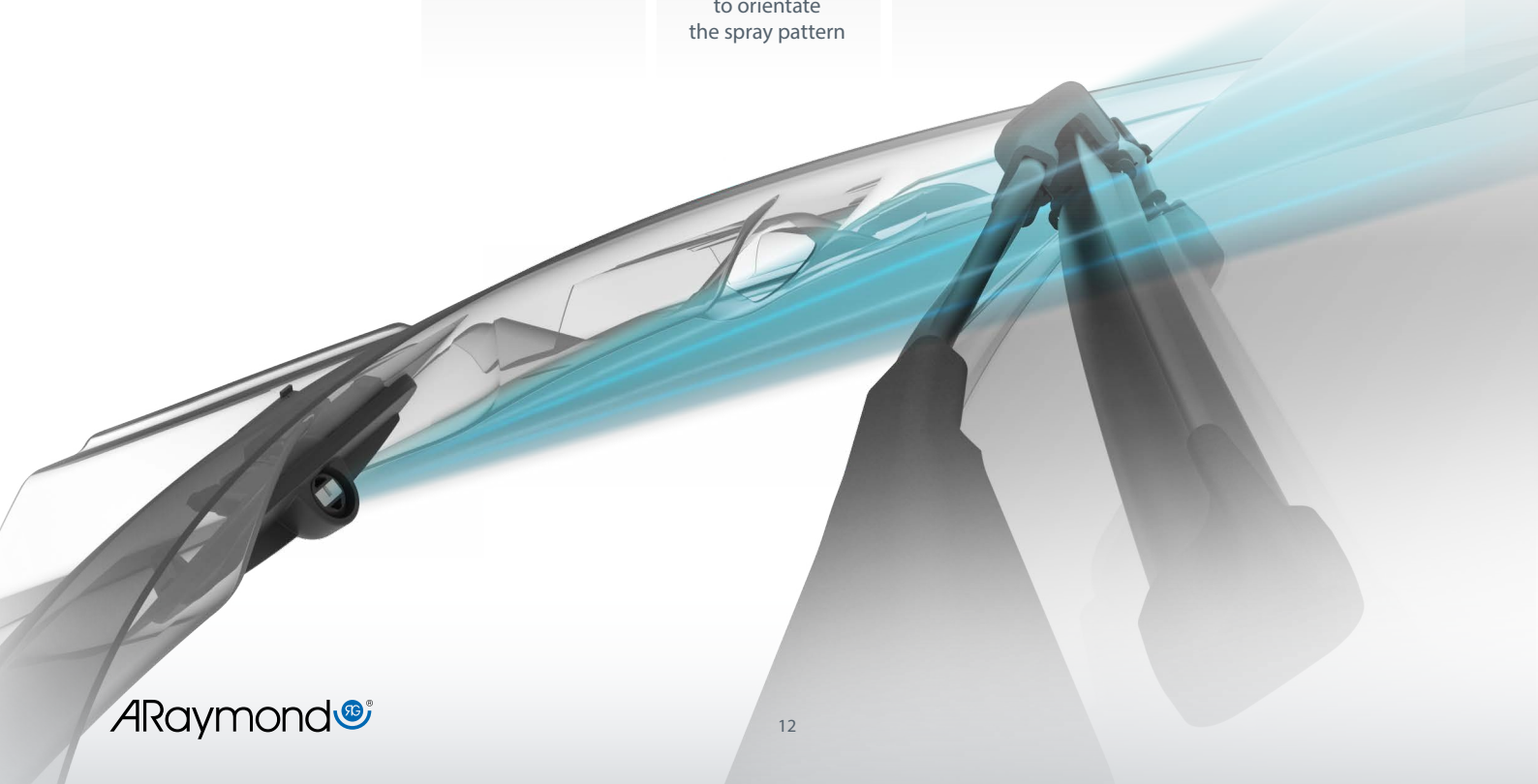
JET STREAM	OSCILLATING FAN SPRAY	COMBINATION SPRAY
Efficient cleaning at high speed	Low water consumption	High and low speed spray pattern

BENEFITS

**MOUNTING ENVIRONMENT**  
Mounted to the hood, under hood, cowl screen

## INTEGRATED FUNCTIONS

<p>Non-return valve</p>	<p>Ball adjustment to orientate the spray pattern</p>	<p>Heating and sealing</p>
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# WIPER ARM WET ARM NOZZLE



TYPE  
OF SPRAY



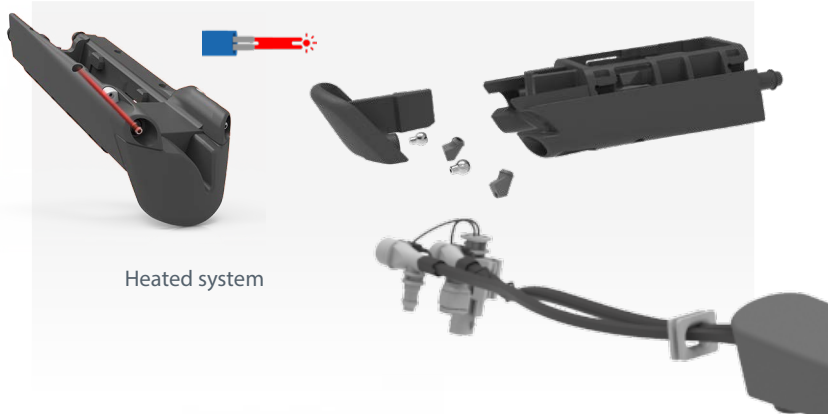
BENEFITS

Directly integrated in the wiper arm for efficient and secure cleaning

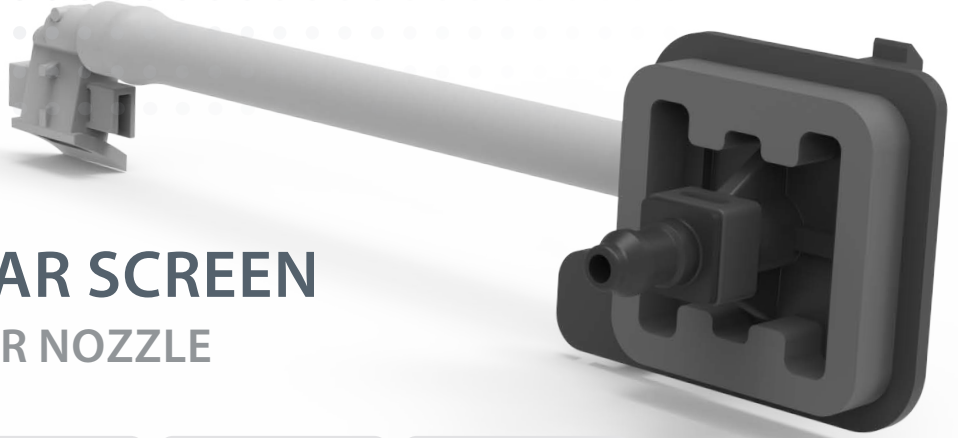
**MOUNTING  
ENVIRONMENT**  
Wiper arm



## INTEGRATED FUNCTIONS



# REAR SCREEN REAR NOZZLE



TYPE OF SPRAY

JET STREAM	OSCILLATING FAN SPRAY	FAN SPRAY
 	 	 

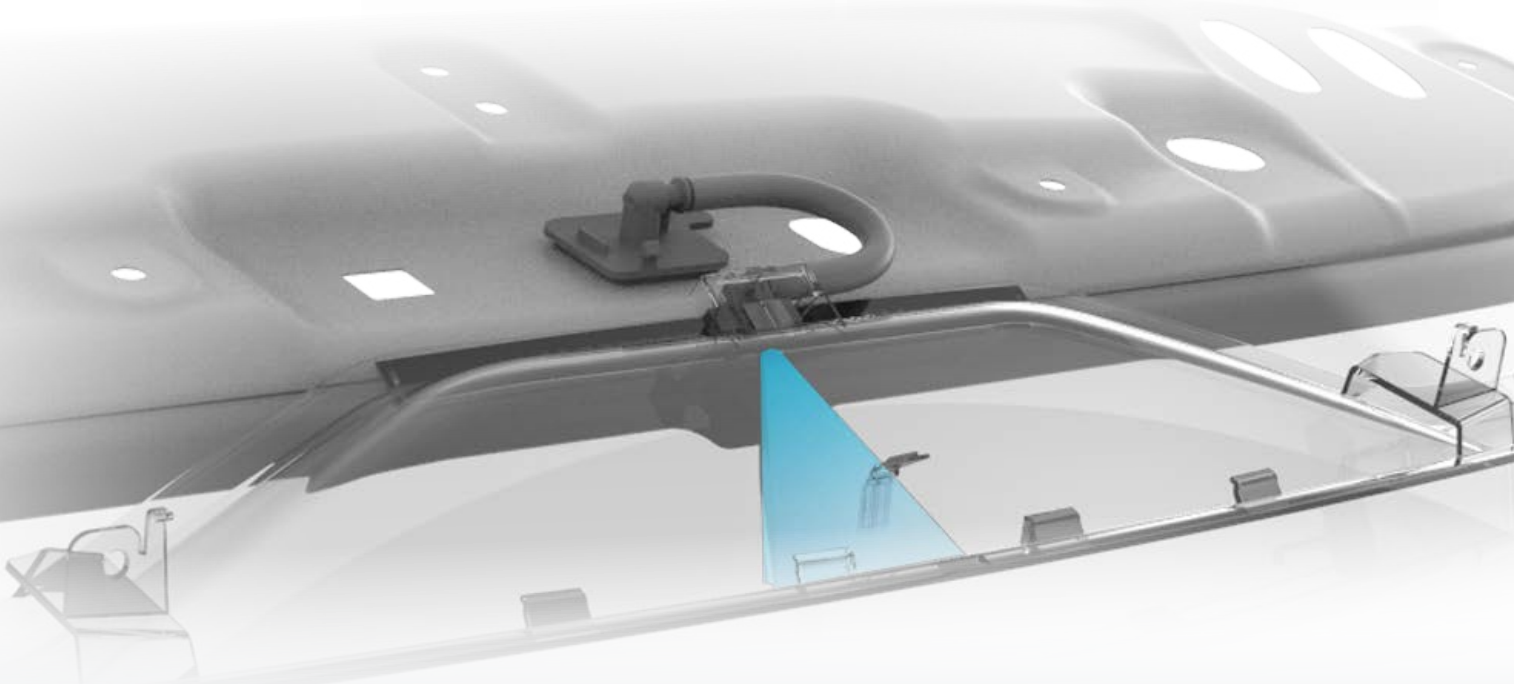
**MOUNTING ENVIRONMENT**  
Center high mounted stop lamp, spoiler, or sheet metal

BENEFITS

Integration of nozzle into critical packaging  
Consistent water distribution

## INTEGRATED FUNCTIONS

  <p>Non-return valve and o-ring</p>	  <p>With hose, seal and non-return valve</p>
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# SENSORS

## CAMERA NOZZLE



TYPE OF SPRAY

JET STREAM



FAN SPRAY



BENEFITS

BEFORE CLEANING

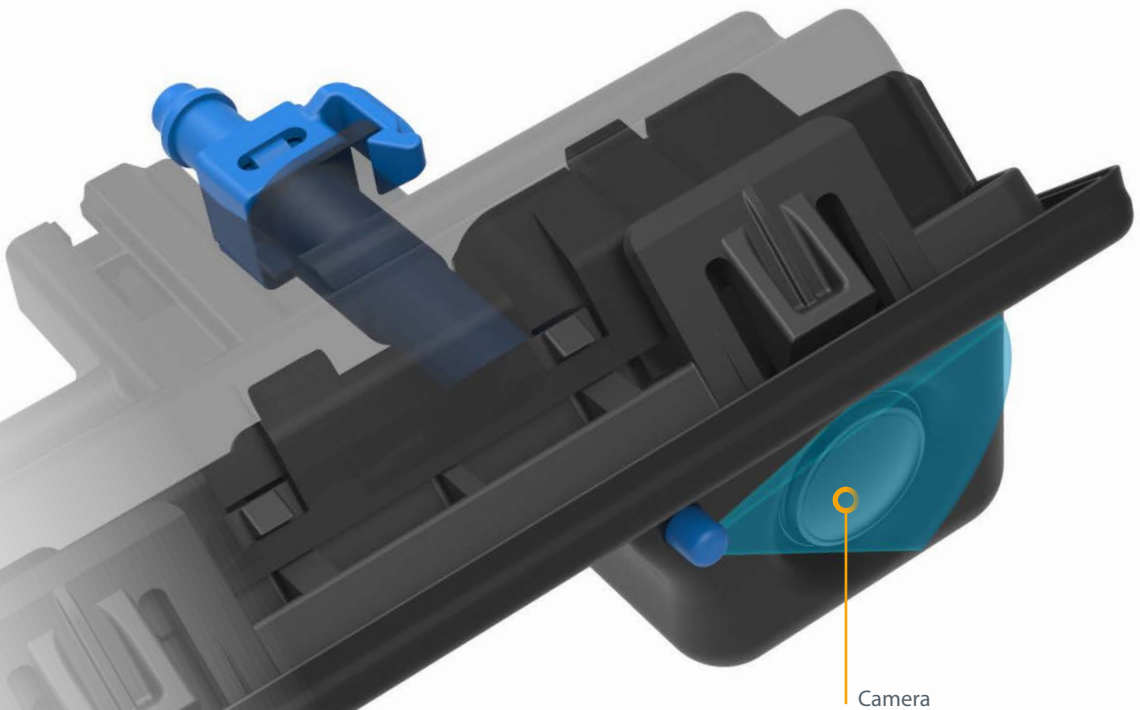


AFTER CLEANING



### MOUNTING ENVIRONMENT

Front bumper, front upper, tailgate, side mirror, B-pillar, roof pod, handle grip



Camera

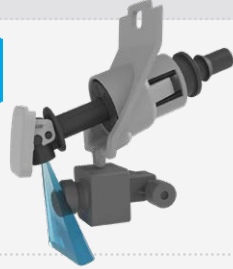
# SENSORS

## TELESCOPE NOZZLE



TYPE OF SPRAY

### FAN SPRAY



- Max Hub 35 mm
- Fluid pressure 1-6 bar
- Spray operates in end position only
- Adjustable spray angle
- Non-return valve included
- No draining when nozzle is in open position
- Flow rate 900 ml/min at 2.5 bar

### FAN SPRAY



- Max Hub of 10 mm
- Fluid pressure 2-8 bar
- Spray operates in end position
- Integrated non-return valve
- No draining when nozzle is in open position
- Flow rate 750 ml/min at 2 bar

TECHNICALS DETAILS

### MOUNTING ENVIRONMENT

Bumper, side mirror, roof pod

# WASHING LINES

## WASHER NOZZLE ASSEMBLY



ASSEMBLY LINE COMPONENT



### MOUNTING ENVIRONMENT

Washing lines

PRODUCT BENEFITS

A complete nozzle assembly best suited to customers' requests with our spray nozzles, couplings, connectors, integrated hose non-return valves, and hose fastening solutions.

# ROUTING MANAGEMENT

## MINI QUICK CONNECTORS Ø4.87 mm



### MOUNTING ENVIRONMENT

Washing line

#### BENEFITS

Easy and quick assembly - Proof of connection by acoustical feedback -  
Perfect serviceability - Compact and smart design

#### TECHNICAL DETAILS

- Assembly force < 25 N
- Pull out force > 100 N
- Burst pressure QC > 40 bar
- Side load > 100 N
- Temperature range -40°C to 90°C



Require a male connector  
ARaymond standard S15-000077

### OPTIONS

- Optional dust plug
- End cap design
- T-Shape
- Flow reduction

- Integrated non-return valve
- Retaining spring coverage
- Standard EPDM, corrugated and customized unions



## QUICK CONNECTORS Ø9.50 mm



### MOUNTING ENVIRONMENT

Washing line

#### BENEFITS

Easy and quick assembly - Proof of connection by acoustical feedback -  
Perfect serviceability - Compact and smart design

#### TECHNICAL DETAILS

- Assembly force < 40 N
- Pull out force > 350 N
- Temperature range -40°C to 90°C
- Burst pressure QC > 16 bar
- Side load fir tree > 150 N



Require male connector  
ARaymond standard S15-000078

### OPTIONS

- Optional dust plug
- End cap design
- T-Shape
- Flow reduction

- Integrated non-return valve
- Retaining spring coverage
- Standard EPDM, corrugated and customized unions



# ROUTING MANAGEMENT

## NON-RETURN VALVES



**MOUNTING ENVIRONMENT**  
Washing line

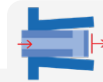
**BENEFITS**

Compact design  
Wide range of catalog parts  
Modular design and mold kit

**TECHNICAL DETAILS**

Temperature range -40°C to 90°C  
Burst pressure NRV > 10 bar

### OPTIONS



**SILICON SLEEVE TYPE**

Different opening pressure

- Sleeve I 0.1 to 0.4 bar
- Sleeve II
- Sleeve III 0.3 to 0.5 bar



**SPRING PISTON TYPE**

0.1 to 0.25 bar

## UNIONS



**MOUNTING ENVIRONMENT**  
Washing line

**PRODUCT BENEFITS**

Compact design  
Modular design and mold kit

**TECHNICAL DETAILS**

Temperature range -40°C to 90°C

### DESIGN OPTIONS



**MALE END FORM QC**  
Ø9.50 mm

- Std EPDM and corrugated pipe union
- Modular mold concept for new design



**MALE END FORMS MINI QC**  
Ø4.87 mm

- T-shape design
- Y-shape design
- L-shape design



Customized male connectors



# ROUTING MANAGEMENT

## PIPE FASTENERS



**MOUNTING ENVIRONMENT**  
Washing line

**BENEFITS** ▶

Wide range of catalog fastening clips for EPDM and corrugated washing lines with low assembly forces, and high retention forces. Metal, plastic and hybrid solutions.

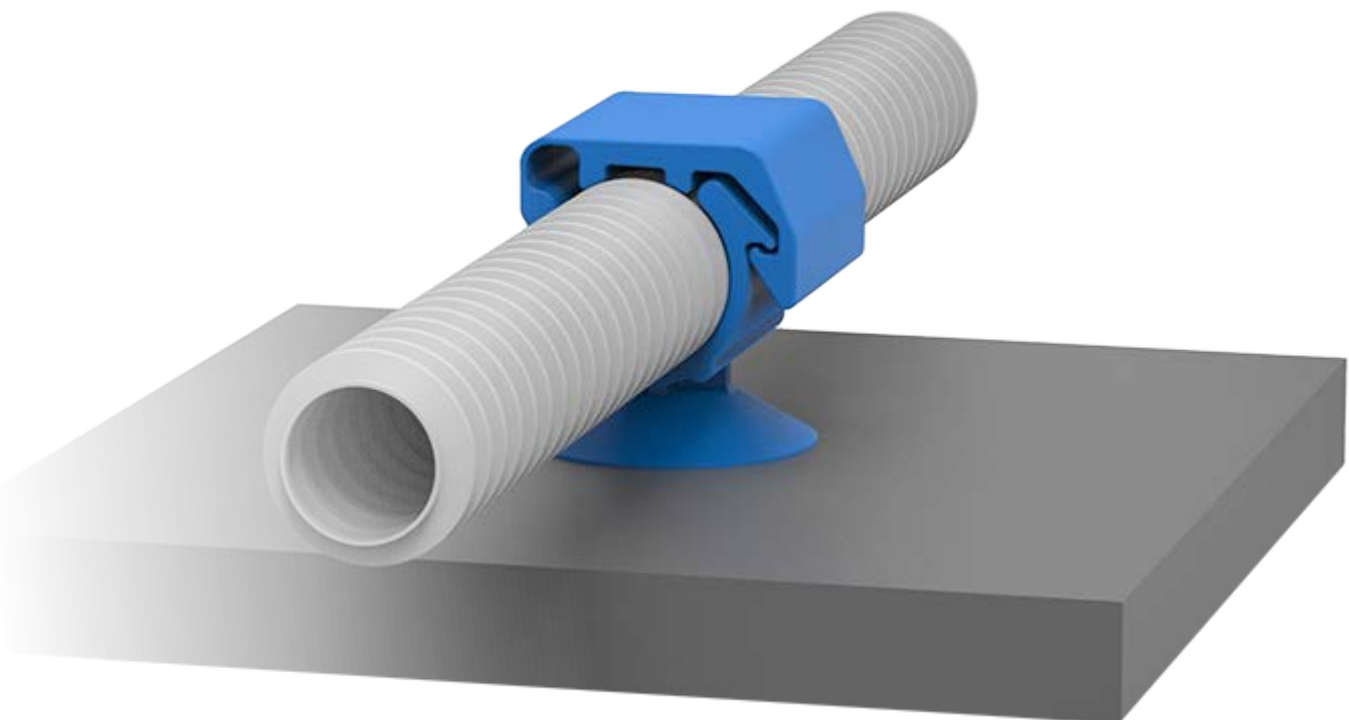
### DESIGN OPTIONS

**MOUNT**

- Round hole
- Oblong hole
- Cavity
- Stud mount
- Edge mount

**DESIGN**

Our pipe holders are available in several designs for a wide range of diameters and panel thicknesses.



# ARAYMOND CLEANING SYSTEMS EXPERTISE CENTERS



International teams in 3 continents with engineers, sales, and production.  
Automatic and semi automatic assembly, functional checks and logistics.

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