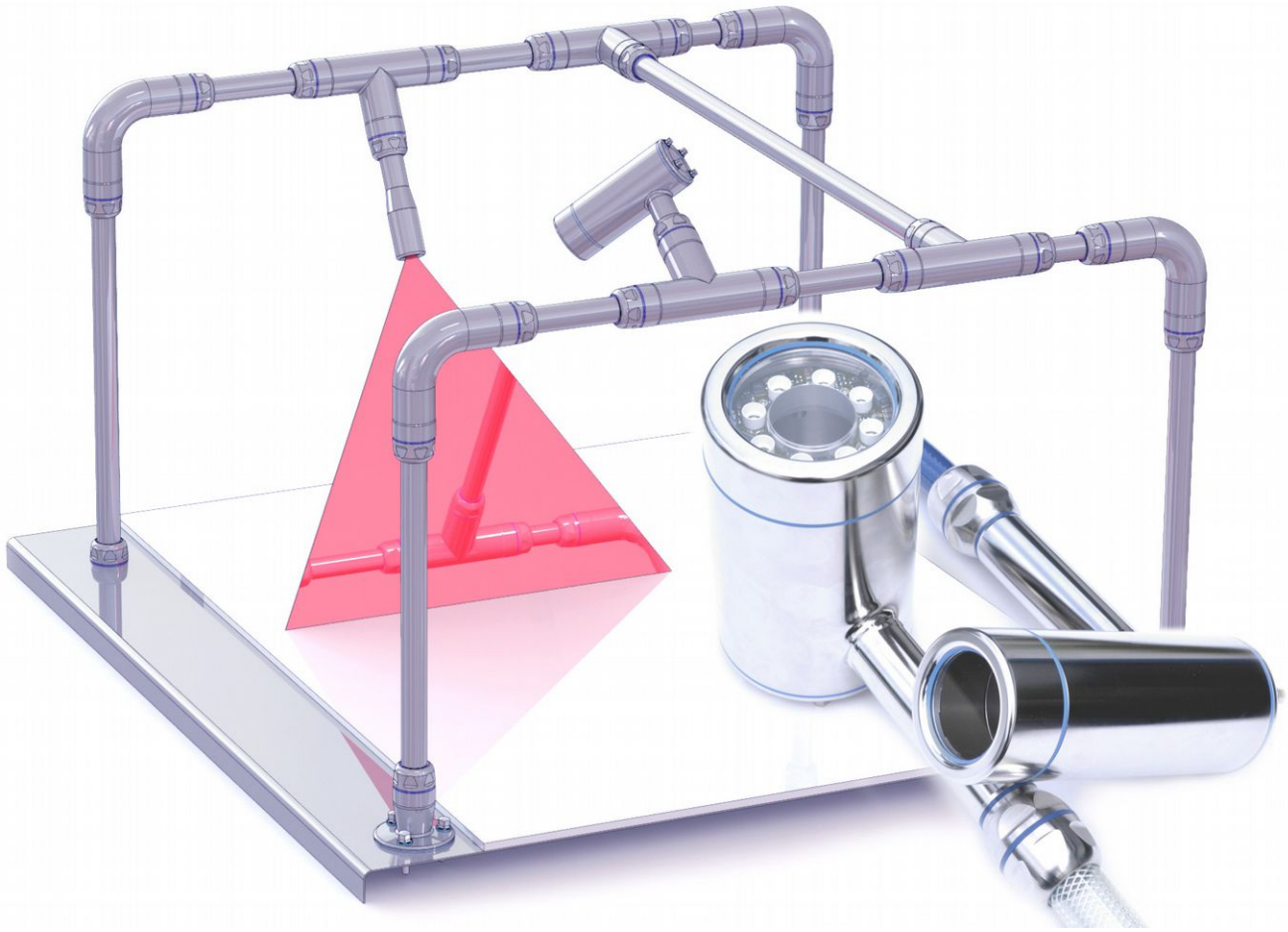
Hygienic Machine Vision-Building Kit



For highest hygienic requirements and chemical resistance in Food- Pharma- and Clean-room-Applications

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Technical Highlights:

- ➔ V4A, AISI 316L Stainless Steel (apart from hygienic standard mounts).
- ➔ IP69k ingress protection rating for high pressure cleaning up to 100 bar, dual seal system for additional safety.
- ➔ Most stringent hygienic design for use in direct food contact and dripping areas, EHEDG Certification in progress.
- ➔ All seal materials, protective tubes and acrylic windows with FDA approval.
- ➔ All enclosure materials tested according to ECOLAB standards with aggressive cleaning agents (Topactive 200/ 500/ OCTO, P3 Topax 66/ 990).
- ➔ Flexible vibration proof camera mount inside the enclosure with very good heat dissipation.
- ➔ Flexible mounting of camera enclosure.
- ➔ Different rear and side exit versions and mounting accessories available.

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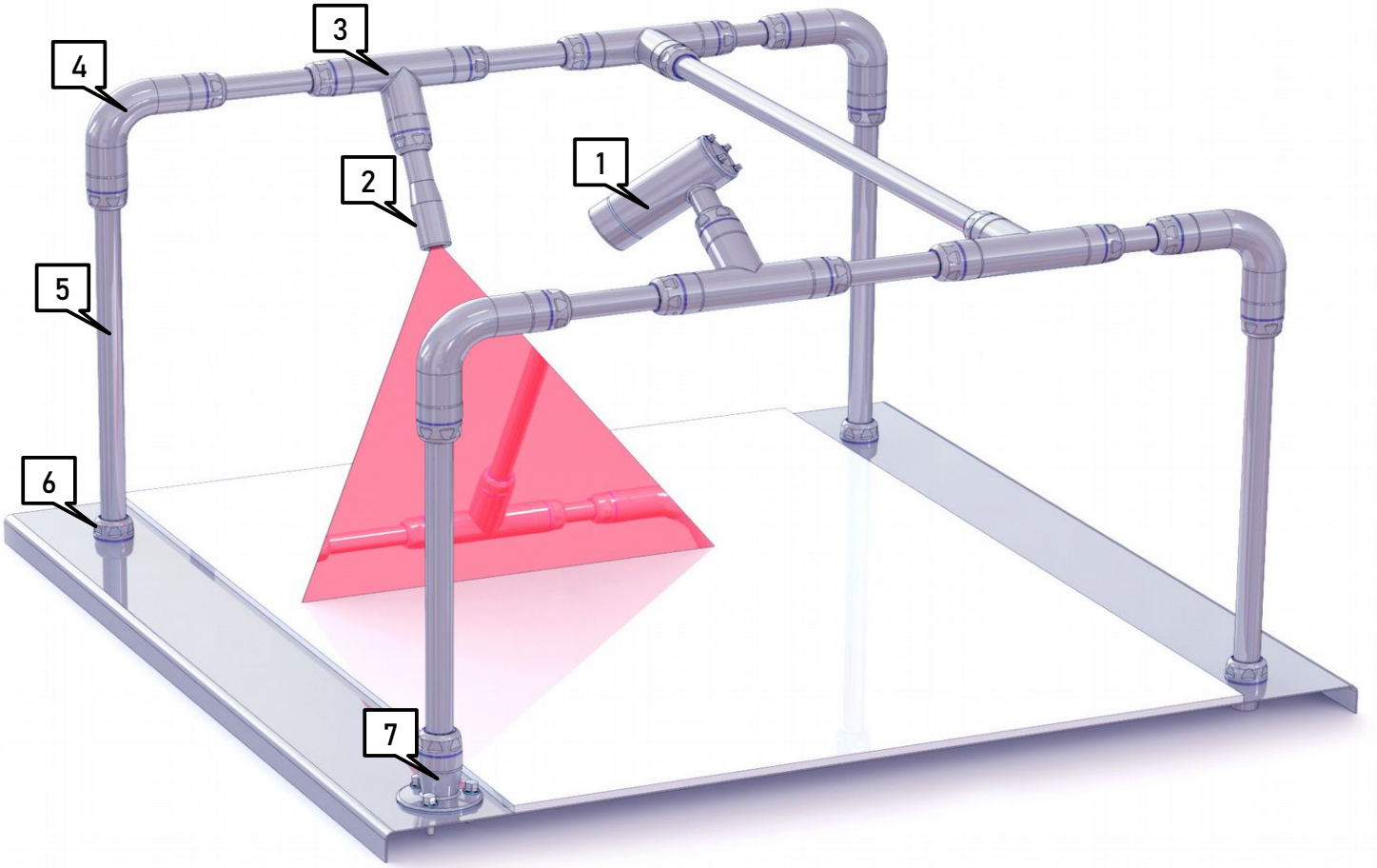
1 Hygienic PLUS Machine Vision-Building kit



Complete Hygienic building Kit for Machine Vision components

Purpose:

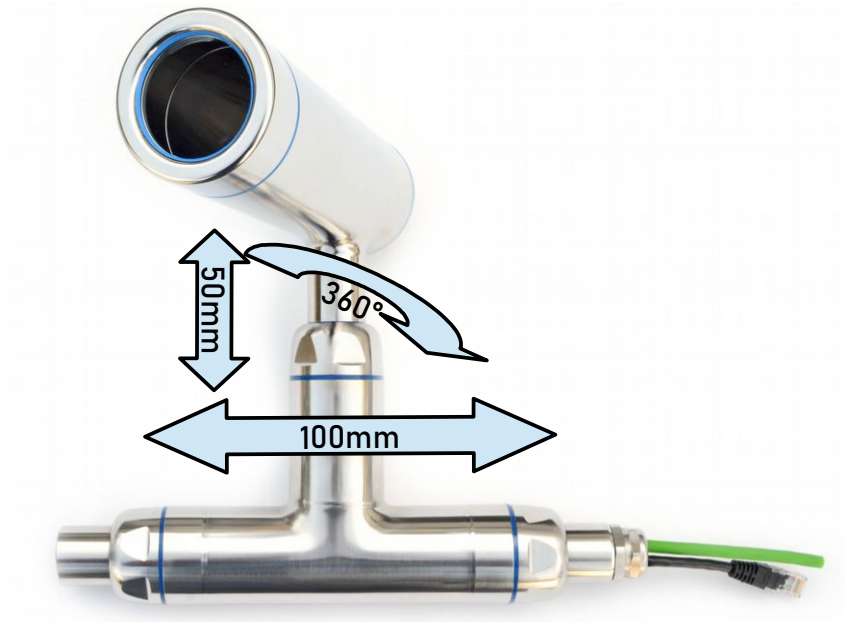
Making it easy to install Machine Vision equipment in food- and pharma production with prefabricated parts. The Hygienic Building Kit allows camera placement in any position and orientation - even in critical food contact and dripping areas above the food - in a food- safe and law- compliant manner.

Components:

1. Hygienic PLUS Dolphin and Shark enclosures for cameras and lights
2. Hygienic PLUS Piranha laser enclosures
3. Hygienic PLUS T-Pieces for 30mm Ø rod and enclosure connection
4. Hygienic PLUS 90° Elbows for 30mm Ø rod and enclosure connection
5. Hygienic PLUS 30mm Ø stainless steel rods in various length, with M25 tread in one end.
6. Hygienic PLUS rear mount
7. Hygienic PLUS front mount foot

1.1 Technical Highlights Hygienic PLUS MV Building Kit:

- All components comply with highest hygienic design requirements and are suitable for installation in food contact / dripping[1] areas:
  - Easy to clean
  - Seals between adjacent surfaces present bacteria build up.
  - Smooth surfaces easy to clean.
  - All sealing material with FDA approval.
  - Acrylic windows with FDA and EU approval available.
  - Undercut and dead spot free design, sloping surfaces and sealed threads prevent contamination risks.
- Cable routing completely protected inside rods – no problems with non-food rated cables.
- All components are easy to install and adjust – even by hand.
- Despite high hygienic requirements the mounting components allow large degree of mounting variance.
- Internal clamping of T-Pieces, Elbows and Foots are extremely robust.
- High grade stainless steel V4A (AISI 316L) and seals withstand harsh cleaning agents used, for instance in the meat industry.
- All components are rated IP69k – suitable for high pressure wash-downs at 100 bar and 80°C.
- Camera and laser enclosures with very good heat dissipation – the enclosure works like a heat sink for the installed equipment and cools it down by typically 13K (typical heat reduction value of camera installed in Dolphin enclosure compared with camera temperature without enclosure).

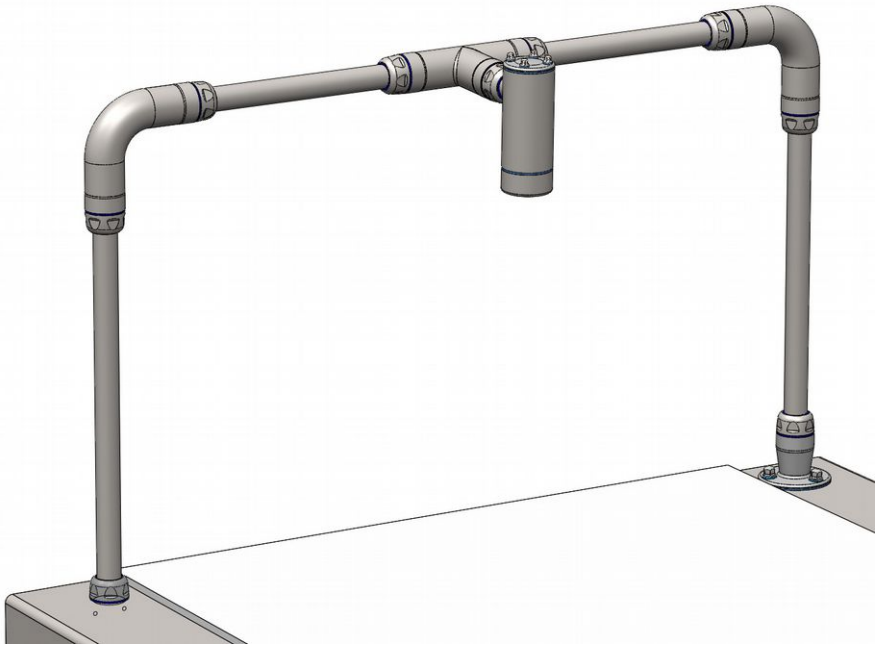


High degree of adjustment even with hygienic design

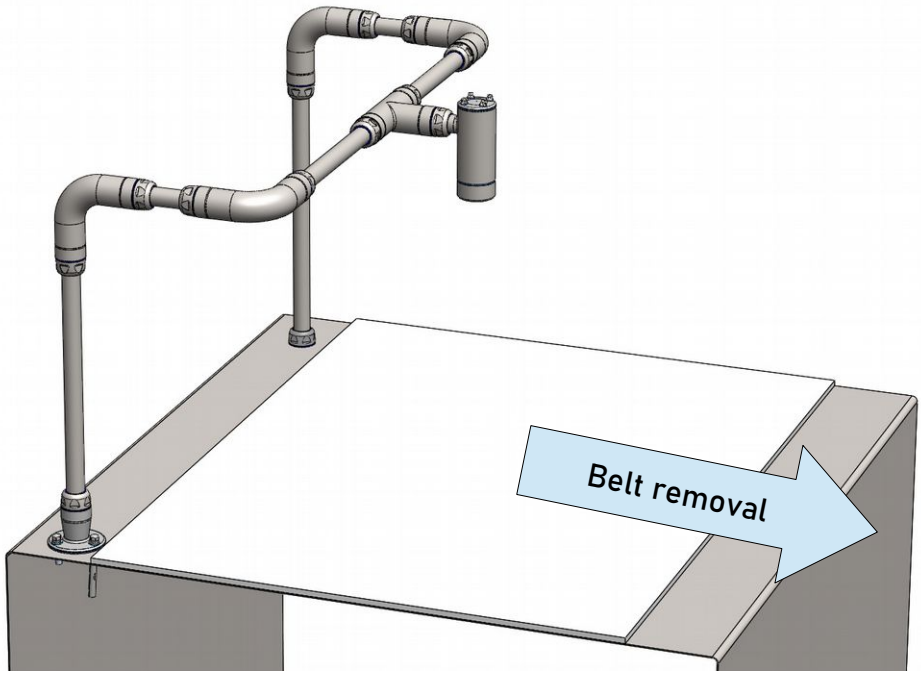
1 Dripping areas are installation locations above the food from where contaminated fluids could drip onto the food. These areas are as critical as direct food contact areas!

1.2 Mounting Examples

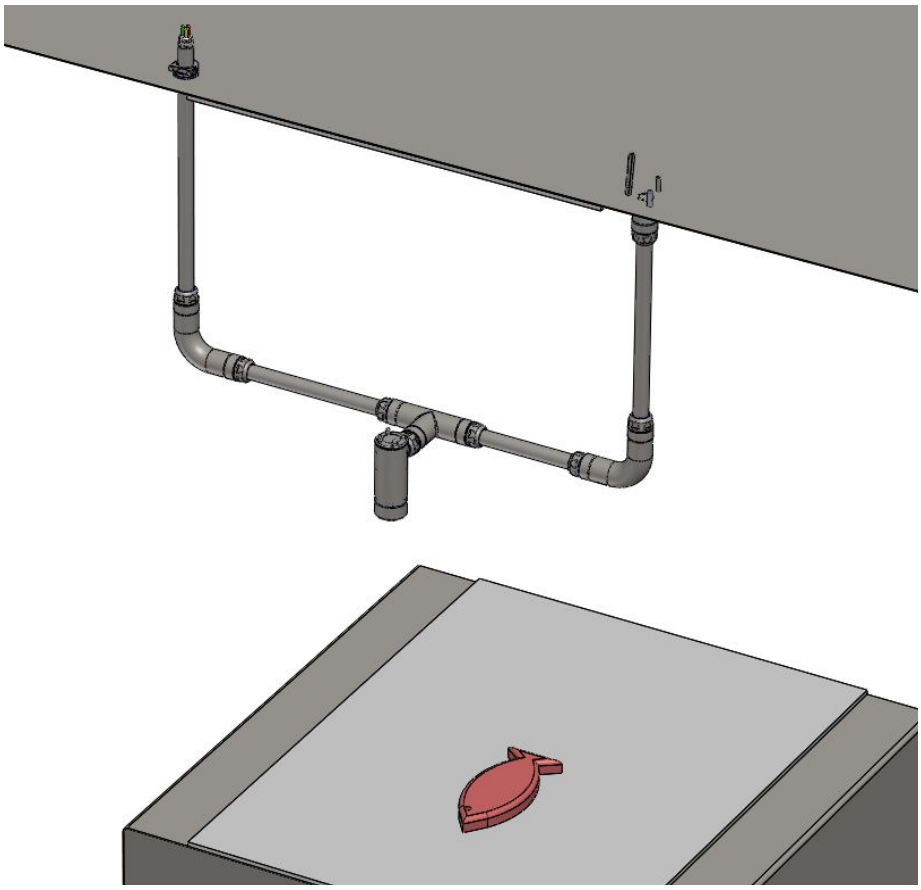
Since the internal clamping is very robust, it is possible to mount cameras and lights to a simple frame without further support. This of course depends on the mounting frame size, stability of the base and vibration of the machine.
Attaching inverted mounting frames at the ceiling is of course equally possible.



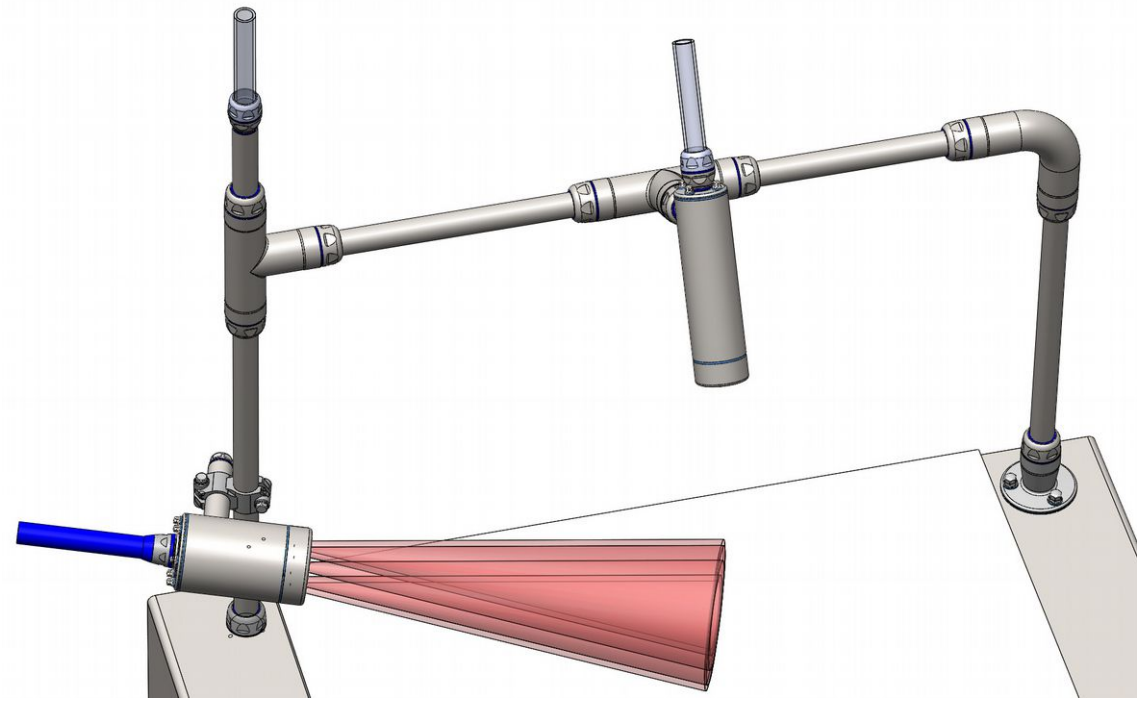
simple camera bridge across the conveyor belt



Camera bridge parallel to conveyor movement
in case the belt is removed for cleaning to the side

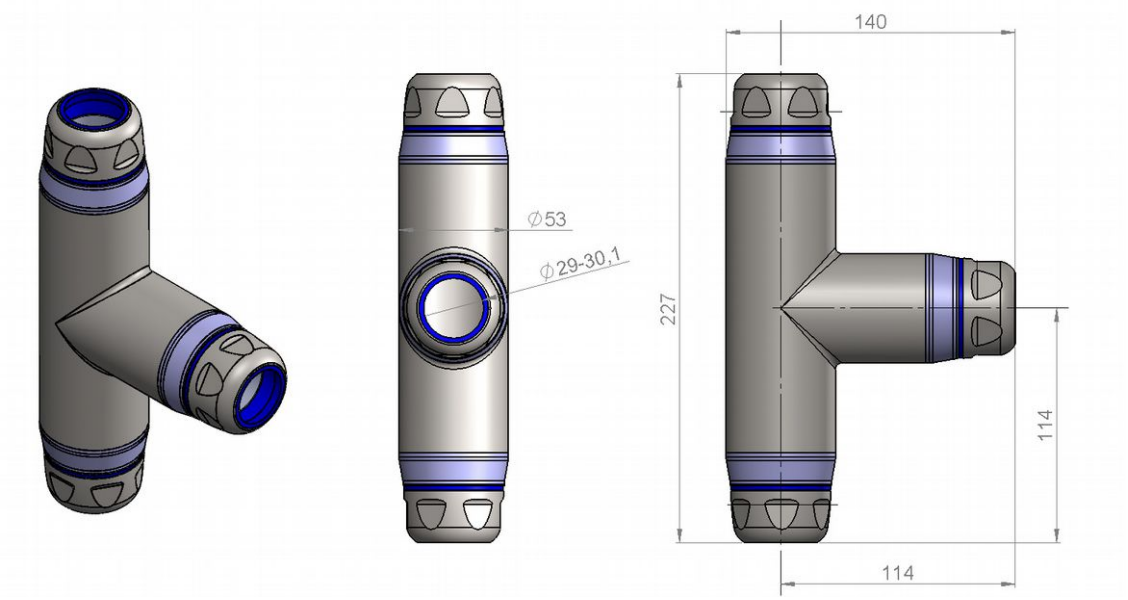


Ceiling Mount



Combination with hygienic tubes, Meganova LED light in Shark enclosure and 90° tube connector Hygienic in areas with less critical hygienic requirements

1.3 T-Piece tube connector Hygienic PLUS

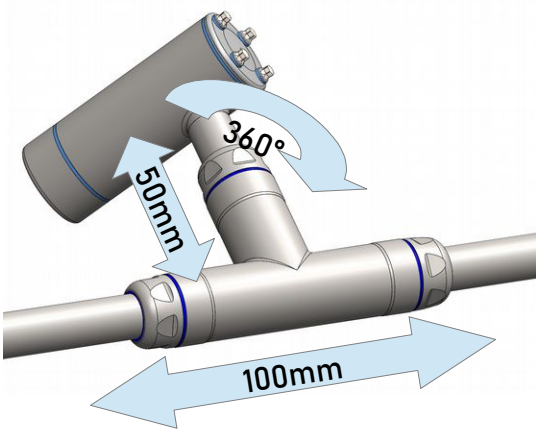


T-piece tube connector Hygienic PLUS, Art. No.: 80.006.007

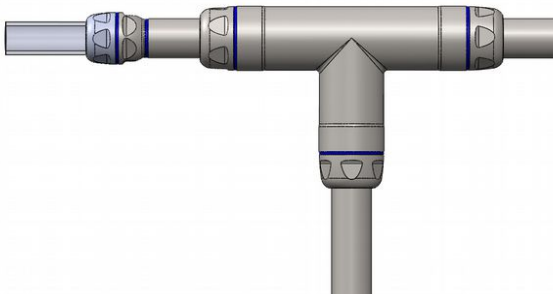
Features:

- Vertically connects three 29-30mm Ø stainless steel rods or one enclosures to a rod.
- Internal clamping mechanism allows height adjustment of rod by 50-65mm.
- Clamping mechanism adjustable by hand and very robust after tightening with a spanner.

Application Examples:

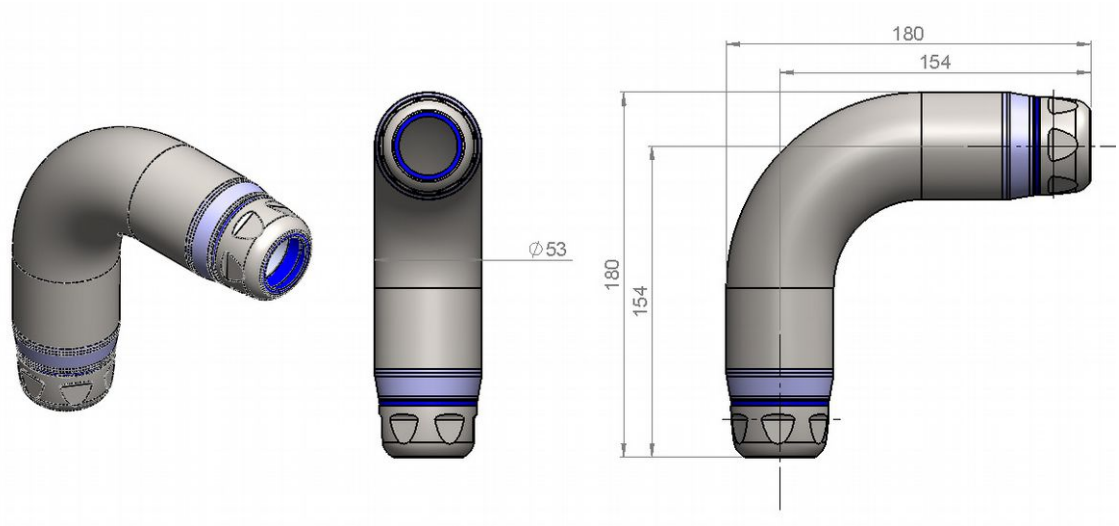


Connects up to 3 rods and enclosures



Adapter for hygienic tube connection

1.4 90°-Elbow tube connector Hygienic PLUS

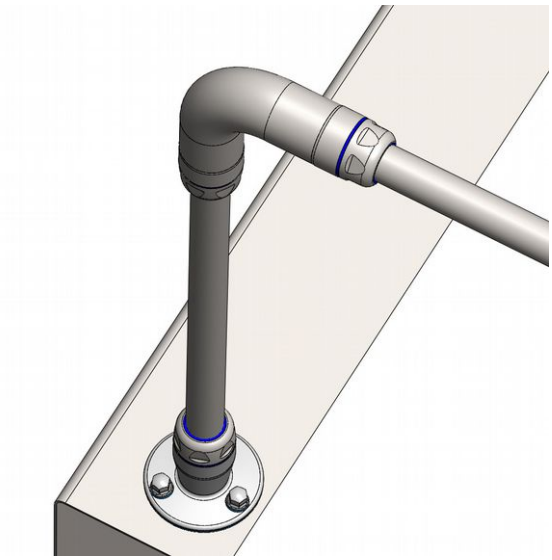


90° Elbow tube connector Hygienic PLUS, Art. No.: 80.006.001

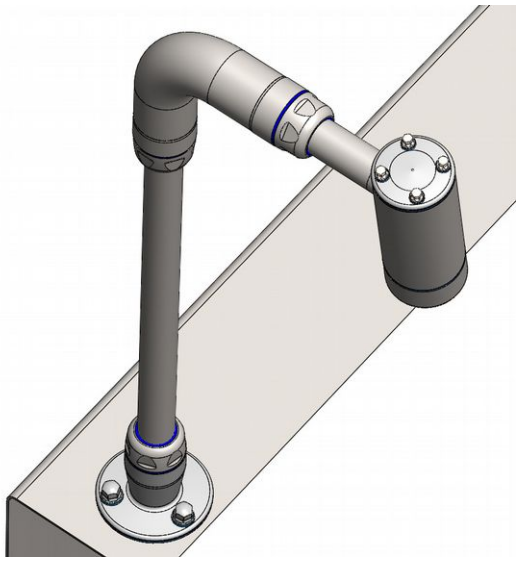
Features:

- Vertically connects two 29-30mm Ø stainless steel rods.
- Internal clamping mechanism allows height adjustment of rod by 65mm.
- Clamping mechanism adjustable by hand and very robust after tightening with a spanner.

Mounting Examples:

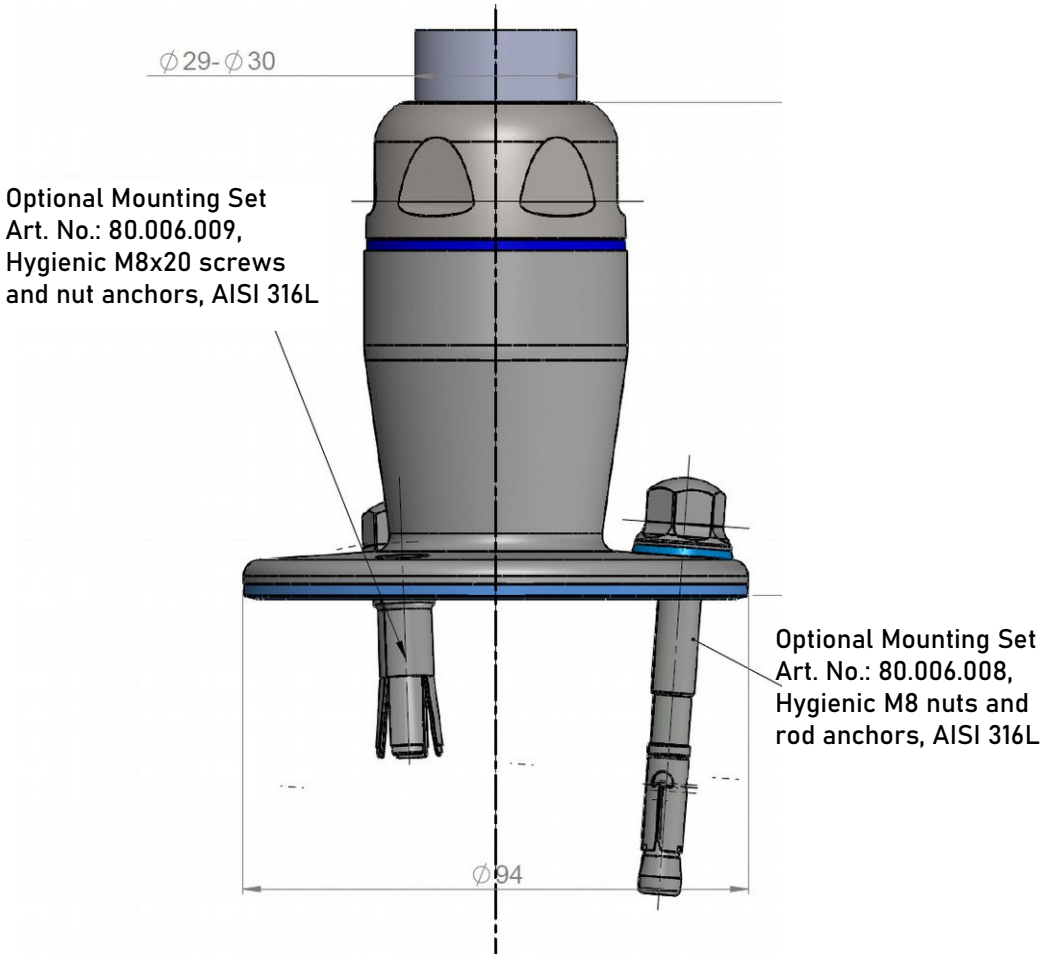


Vertical connection of steel rods



Direct mounting of cameras or lights

1.5 Front mount foot Hygienic PLUS



Front mount foot Hygienic PLUS, Art. No.: 80.006.004

Features:

- Sealed to the wall or floor with gasket under base-plate.
- Sloping base-plate ensures water run-off.
- Internal clamping mechanism allows height adjustment of rod or enclosure by 35mm.
- Clamping mechanism adjustable by hand and very robust after tightening with a spanner.
- Mounting sets shipped with plastic inserts for easy pre-drilling with a 8mm drill, protecting the hygienic foot serving as a drilling template.

Accessories Front Mount Foot Hygienic PLUS

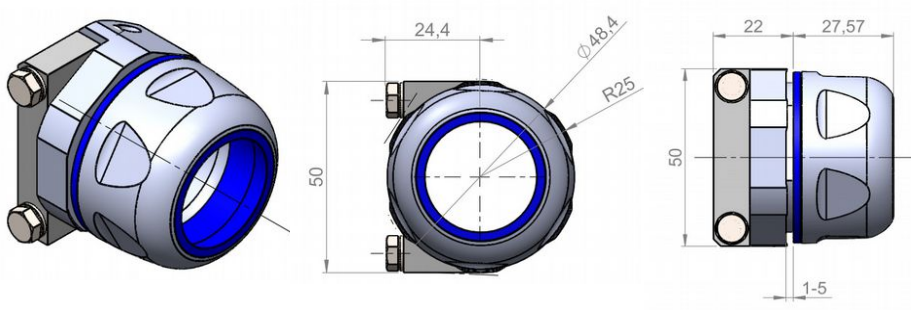
Mounting Set hygienic M8 nuts and rod anchors, AISI 316L, Art. No.: 80.006.008

Mounting Set hygienic M8x20 screws and nut anchors, AISI 316L, Art. No.: 80.006.009

The plastic sleeves allow to use the hygienic foot as a drilling template.

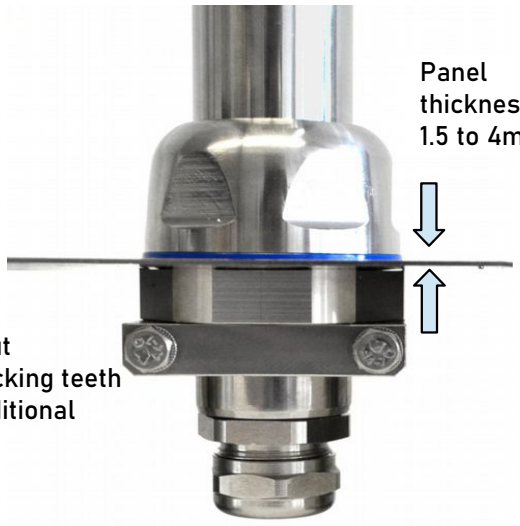
Front mount foot Hygienic PLUS, Art. No.: 80.006.004

1.6 Rear Mount Hygienic PLUS

Product Description	Art. No.:
Rear Mount Hygienic PLUS	80.006.000
	-40°C to +85°C Outside: V4A, AISI 316L TPU Seals conformity: (EU) 2011 (EG)1935/2004 FDA

Features:

- For front mounting of 29-30mm rods or Dolphin and Shark enclosures straight to a machine cover with the option of feeding the camera cables right into the machine.
- Compact on the outside: only 28mm high.
- Easy to mount with 40mm hole in machine cover. Hole cutter available, see section 8.



Rear Mount Hygienic PLUS

Strong enough to hold even large Shark enclosures with sufficient panel stiffness

Outside of the machine:

- Hygienic PLUS design

Enclosure mounts with a Ø40 hole in the machine panel (thickness 1.5 to 4mm).

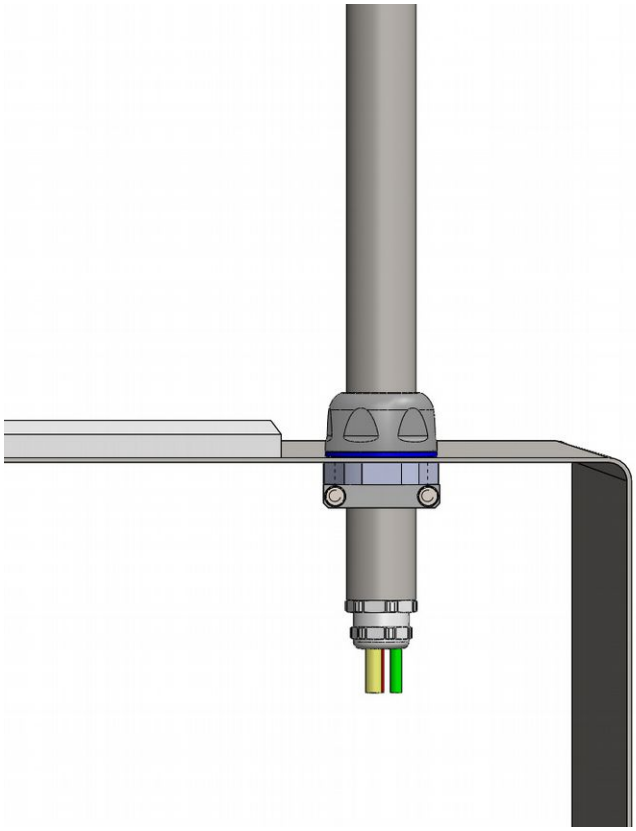
Inside the machine:

- standard AISI 316L cable gland with large seal insert for sealing individual cables

Outside of the machine: Hygienic PLUS

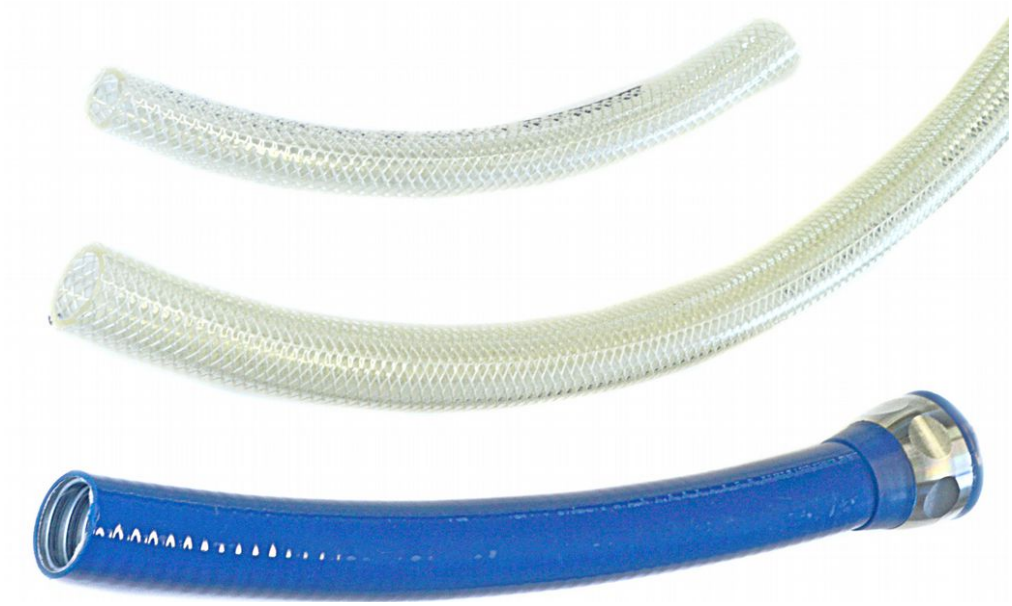
Inside the machine: Standard

several cables can be fed into the machine (individually sealed IP68).



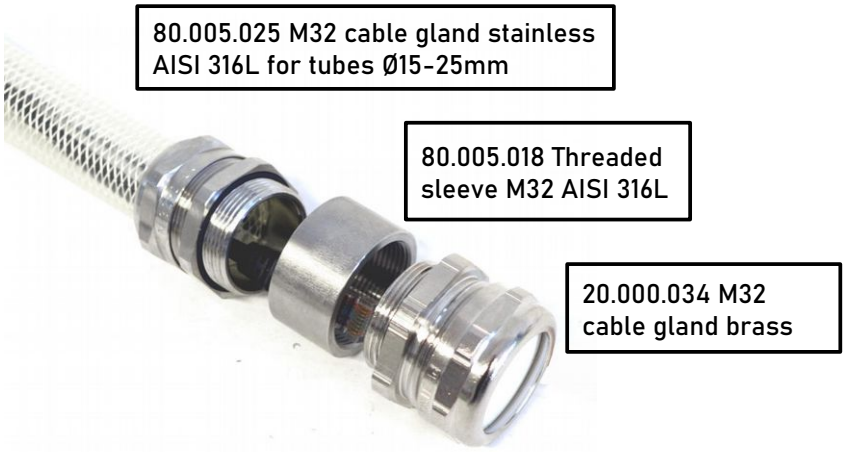
Compact mount for steel rods as base of the Hygienic PLUS mounting frame feeding cables trough the sealed rod opening straight into the machine

1.7 Hygienic Tubes



Product Description	Art. No.:
Hygienic Tube transparent, PUR 401, Ø18x13 -40°C to +90°C, FDA 21 CFR, EU Dir. 10/2011 and 2015/174, price per meter	80.007.001
Hygienic Tube transparent, PUR 401, Ø25x19, -40°C to +90°C, FDA 21 CFR, EU Dir. 10/2011 and 2015/174, price per meter	80.007.002
Hygienic Tube blue, metal with PU sheeting, 26.5x21,0, blue, -40°C to 80°C (110° short time), FDA approval, for Shark only, price per meter	80.007.003

Connecting the other tube end to an electrical cabinet



Standard fittings for feeding and sealing cables into a control cabinet

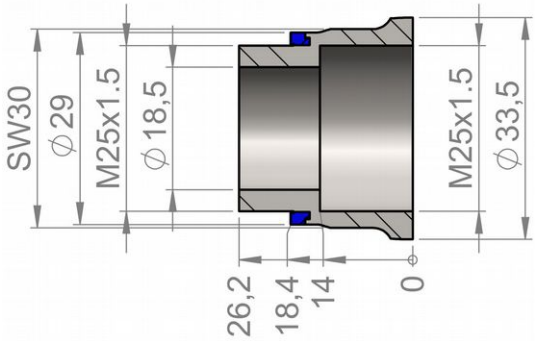
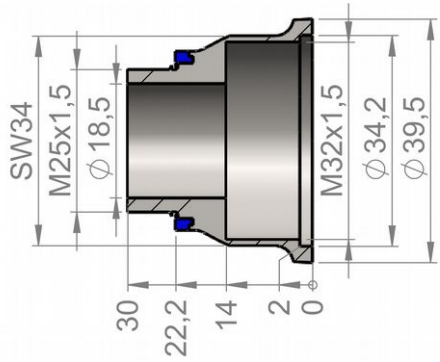
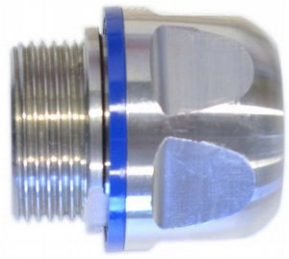
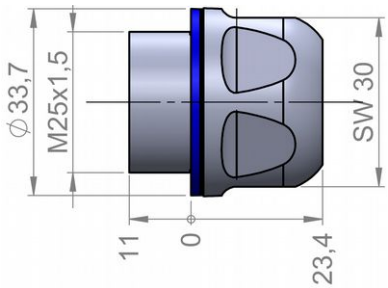
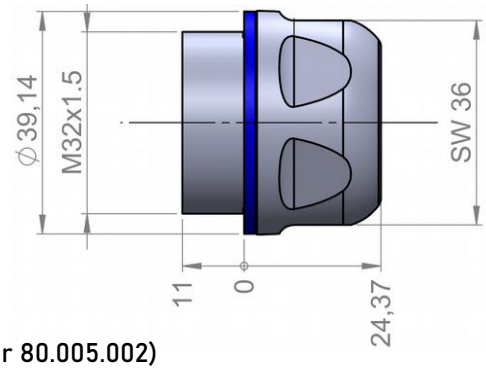
Hygienic Tubes application examples

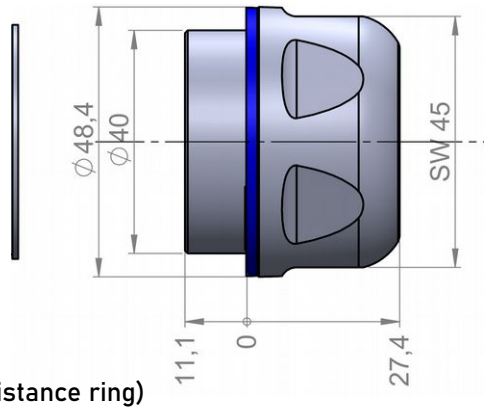
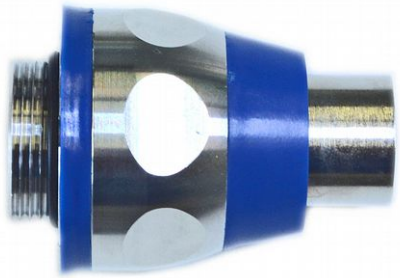
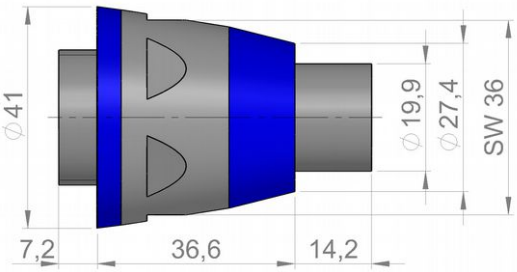
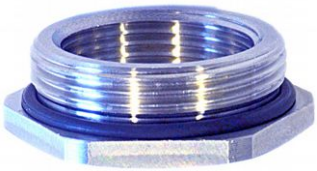
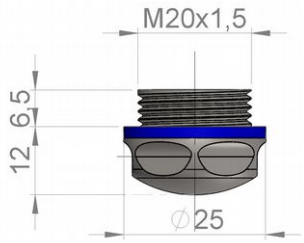
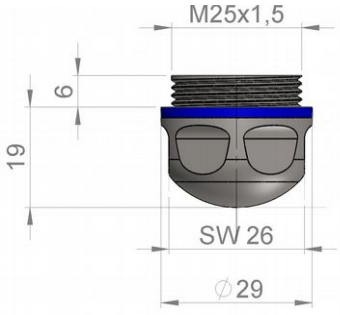
Shark enclosure with Hygienic Tube blue, metal with PU sheeting, 26.5x21,0, rear exit

Dolphin enclosure with Hygienic Tube transparent, PUR 401, Ø18x13, rear exit

Shark enclosure with Hygienic Tube transparent, PUR 401, Ø25x19, side exit

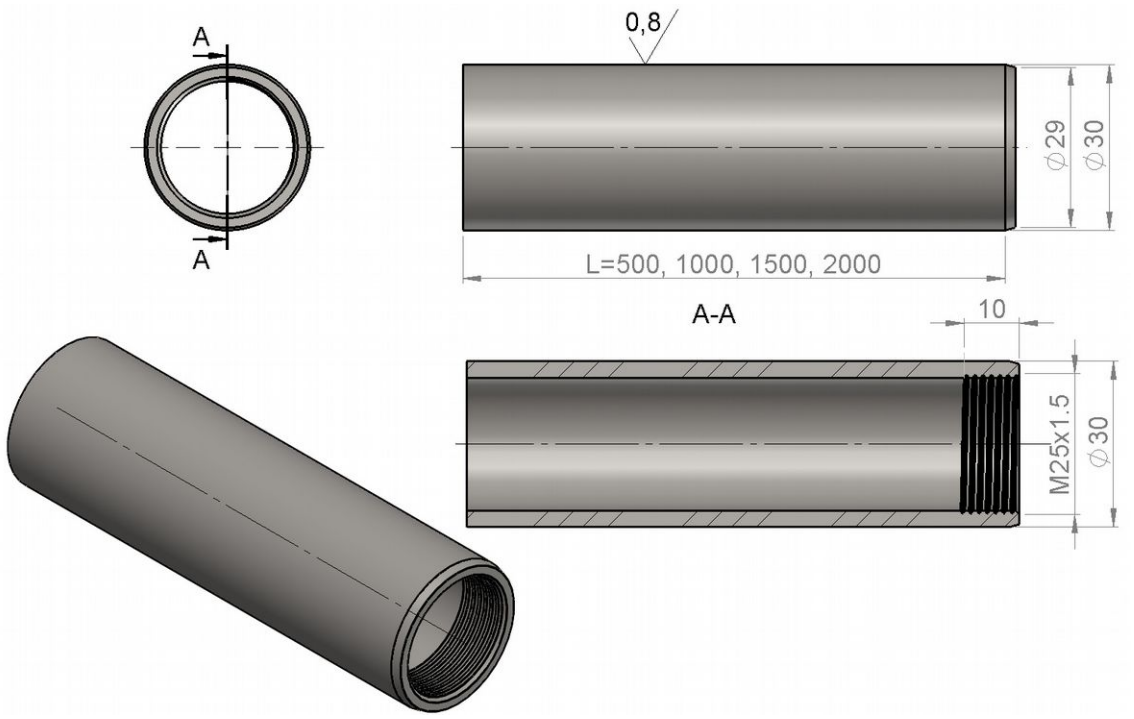
1.8 Hygienic PLUS Tube connectors and fittings

Product Description	Art. No.:
Adapter M25, 29mm to M25 hygienic cable gland	80.005.001
	-40°C to +85°C IP68/ IP69k V4A, AISI 316L TPU Seals (EU) 2011 (EG)1935/2004 FDA
Adapter M25, 29mm to M32 hygienic cable gland	80.005.002
	-40°C to +85°C IP68/ IP69k V4A, AISI 316L TPU Seals (EU) 2011 (EG)1935/2004 FDA
Cable gland Hygienic M25	80005003
  Sealing Range: Ø15-18	-40°C to +85°C IP68/ IP69k Nut V4A, AISI 316L TPU Seals (EU) 2011,(EG)1935/2004 FDA ECOLAB EHEDG
Cable gland Hygienic M32	80.005.004
 Sealing Range: Ø20-23 (Ø25 with adapter 80.005.002)	-40°C to +85°C IP68/ IP69k Nut V4A, AISI 316L TPU Seals (EU) 2011 (EG)1935/2004 FDA ECOLAB EHEDG

Cable gland Hygienic M40	80.005.005
   Sealing Range: Ø36-30 (Ø30 with 1mm distance ring)	-40°C to +85°C IP68/ IP69k Nut V4A, AISI 316L TPU Seals (EU) 2011 (EG)1935/2004 FDA ECOLAB EHEDG
Food Safe M25 Ø26.5mm tube connector, AISI 316L, FDA approved TPE seal	80.005.019
 	-40°C to +125°C IP68, IP69k V4A, AISI316L TPE Seals FDA ECOLAB
Reduction M32 to M25 required for connecting 80.005.020 to Shark rear wall	80.005.020
	EPDM O-ring -40°C to +120°C IP68
Blind plug Hygienic PLUS M20	80.005.009
  	-40°C to +85°C IP68/ IP69k V4A, AISI 316L TPU Seals, (EU) 2011 (EG)1935/2004 FDA, ECOLAB
Blind plug Hygienic PLUS M25	80.005.010
  	-40°C to +85°C IP68/ IP69k V4A, AISI 316L TPU Seals, (EU) 2011 (EG)1935/2004 FDA, ECOLAB

1.9 Hygienic PLUS stainless steel tubes

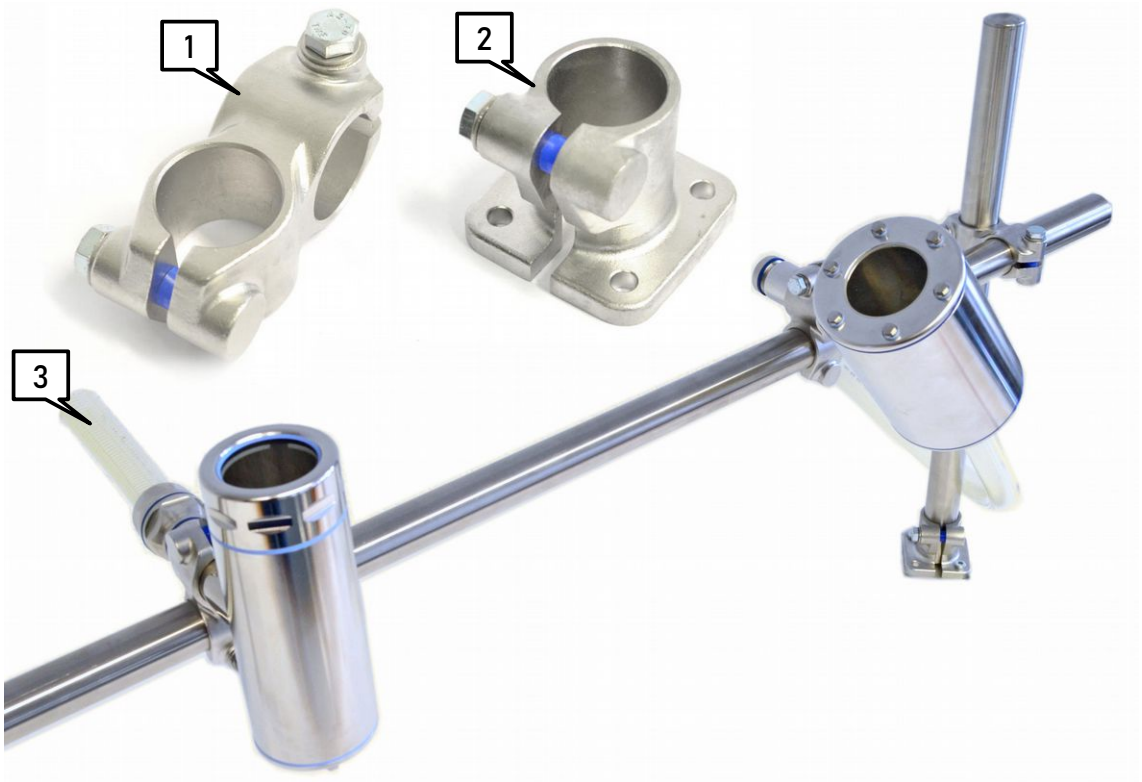
All standard stainless steel rods with diameter 29.0 to 30.2mm can be used with the Hygienic PLUS Machine Vision-Building Kit. However, autoVimation provides a few standard high grade stainless tube sizes ex stock with M25 thread on one side. Cut to length the M25 thread can be used to connect an M25 cable gland to the tube for feeding several cables into the tube system with IP68 or IP69k protection.



Product Description	Art. No.:
Stainless steel tube, 30mm diameter +- 0,1mm, wall thickness 3mm with M25x1.5mm thread on one side, Length 0.5m	80.010.500
Stainless steel tube, 30mm diameter +- 0,1mm, wall thickness 3mm with M25x1.5mm thread on one side, Length 1.0m	80.011.000
Stainless steel tube, 30mm diameter +- 0,1mm, wall thickness 3mm with M25x1.5mm thread on one side, Length 1.5m	80.011.500
Stainless steel tube, 30mm diameter +- 0,1mm, wall thickness 3mm with M25x1.5mm thread on one side, Length 2.0	80.012.000
Other length available at request	80.01X.XXX

2 Hygienic STANDARD MV-Building Kit

Hygienic Standard MV Building components can be used in not direct food contact areas, for instance above packaged food or at the side of the food conveyor.



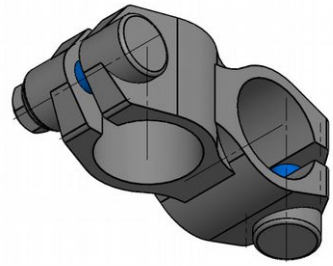
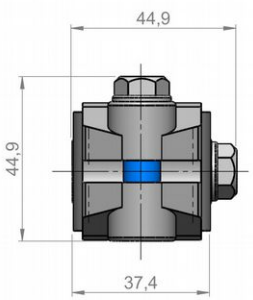
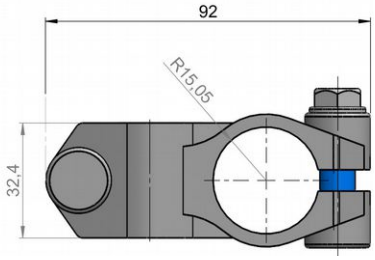
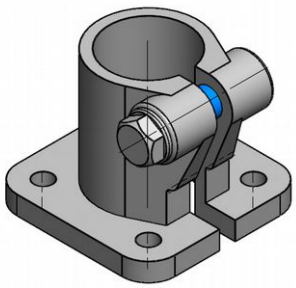
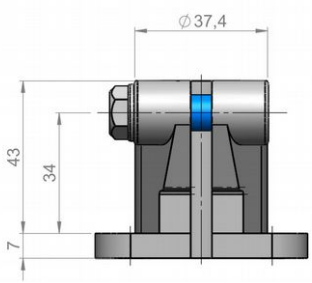
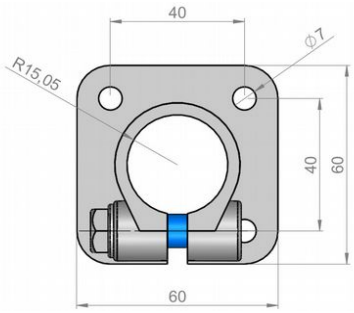
Hygienic Building Kit with Hygienic Standard components

Purpose:

Allowing hygienic camera installations in areas with less strict hygienic requirements (not direct food contact). Cable feeding though hygienic tube where more practical.

Components:

1. Front mount Foot hygiene standard, V2A (AISI 304), basic hygienic design with covered threads and bores.
2. 90° tube connector Hygienic standard, V2A (AISI 304), basic hygienic design with covered threads and bores.

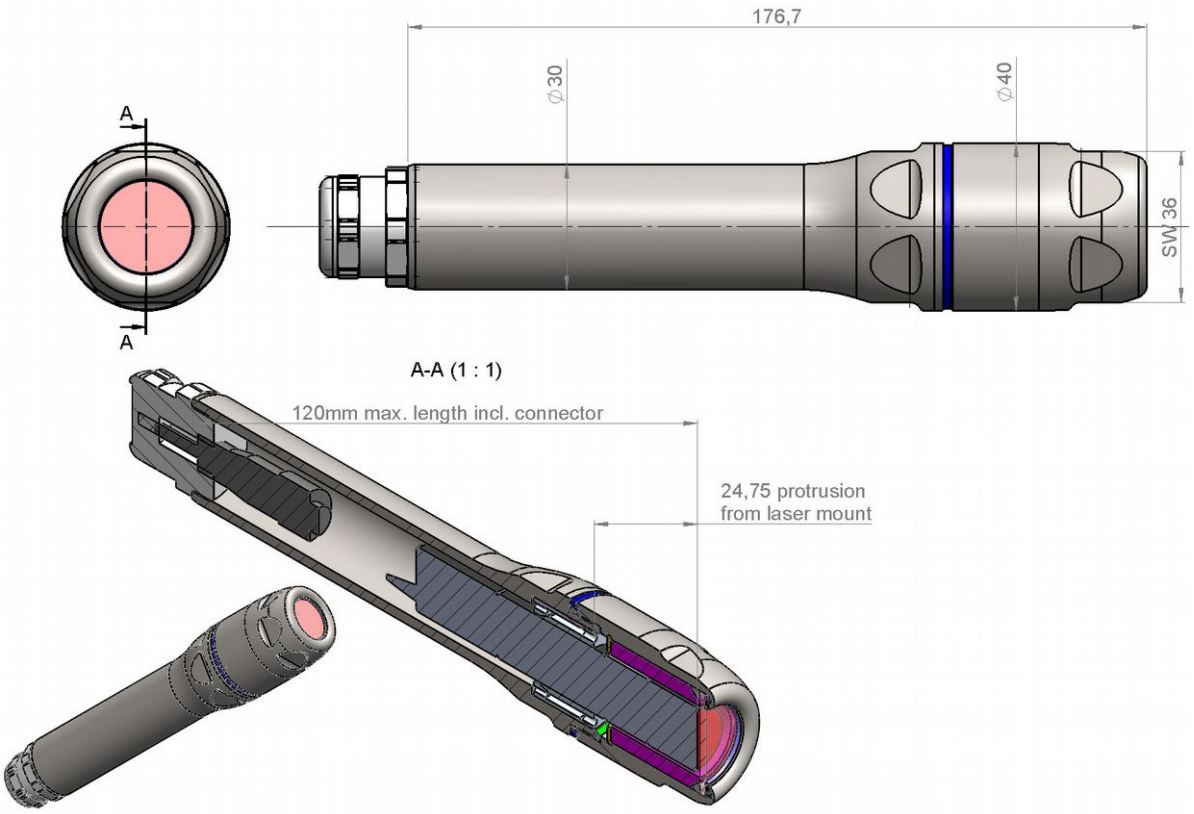
Product Description	Art. No.:
90° tube connector Hygienic standard	80.006.002
  	V2A, AISI 304 blue silicone tube: FDA food contact USP Class 4
Front Mount Foot Hygiene standard	80.006.006
  	V2A, AISI 304 blue silicone tube: FDA food contact USP Class 4

2.1 Hygienic standard Tube connectors and fittings

Product Description		Art. No.:
Cable gland stainless steel M25 standard (fits connectors up to Ø16), AISI 316L, closed insert		80.005.012
Cable gland stainless steel M25 extended (fits connectors up to Ø20.5), AISI 316L, closed insert		80.005.013
Cable gland stainless steel AISI 316L, M32, for protective tube up to Ø25, 8mm thread length		80.005.025
Lock nut stainless steel V4A AISI 316L, M25		80.005.006
Lock nut stainless steel V4A AISI 316L, M32		80.005.007
Lock nut stainless steel V4A AISI 316L, M40		80.005.008
Threaded sleeve M32 AISI 316L		80.005.008

3 Piranha IP69k Hygienic PLUS laser enclosure

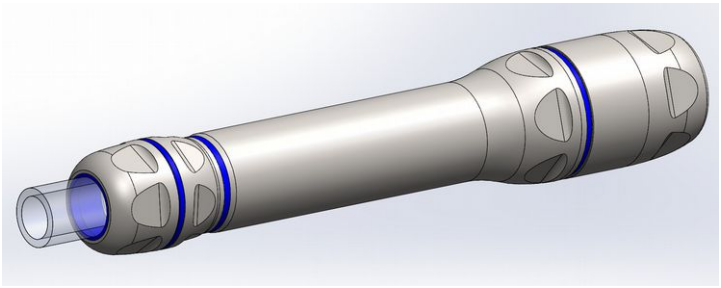
Compact IP69k Hygienic Plus laser enclosure for 19 Ø – 20mm Ø laser up to 120mm length.



Standard Piranha Laser enclosure

Features:

- Houses 19 Ø – 20mm Ø laser in a Hygienic PLUS IP69k enclosure.
- Laser mount with good heat dissipation.
- Window easy to change thanks to snap ring mount.
- Deep lid ensure that the focus adjustment ring is accessible after front lid removal.
- All Laser – with or without focus adjustment ring - can be mounted close behind the front window.
- Standard Piranha enclosure shipped with standard V4A (AISI 316L) cable gland with 16mm bore, as usually the rear end is mounted inside a hygienic T- Piece.
- For different mounting options the Piranha is also available with a hygienic cable gland:



Piranha Laser enclosure with hygienic PLUS cable gland and hygienic tube 18x13mm Ø

4 Dolphin IP69k Hygienic PLUS camera enclosure

Hygienic PLUS IP69k protection for cameras with cross section up to 29x47 and 40x40mm

Features:

- High grade stainless steel V4A (AISI 316L)
- All sealing material with FDA approval, FDA certified acrylic windows available.
- Strict hygienic design, suitable for use in food contact and dripping areas.
- Window easy to change thanks to snap ring mount.
- Rear wall locks with 45° turn and slight tightening of screws.
- Dual seal on all lids, window and cable glands.
- Good heat dissipation with inbuilt cameras usually 13K cooler inside the enclosure than without enclosure.
- Easy to mount hygienically with the 30mm Ø, 100mm long shaft handle, that also serves as cable conduit.
- 3 different length and 30mm enclosure extension rings available.
- 5 different versions available, depending on mounting situation, see section 4.3.

4.1 Cameras that fit into the Dolphin enclosures

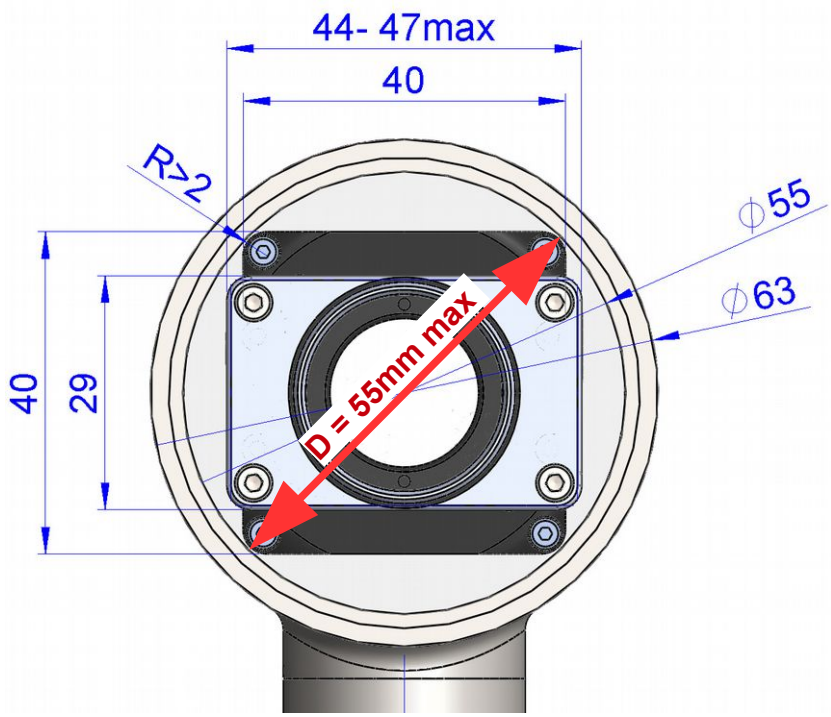
The Dolphin enclosure has the same internal diameter as the Salamander enclosure, so the same compact cameras fit, for instance:

- Cameras with a square cross section of 40x40mm
- Cameras with 29mm height and a maximum width of 47mm.
- All cameras with a diagonal of less then 55mm.
- We can also mount cylindrical objects with 19, 20 and 30mm diameter (laser, pattern projectors, spot lights, etc.).

Does my camera fit into the Dolphin?

Two ways to find out:

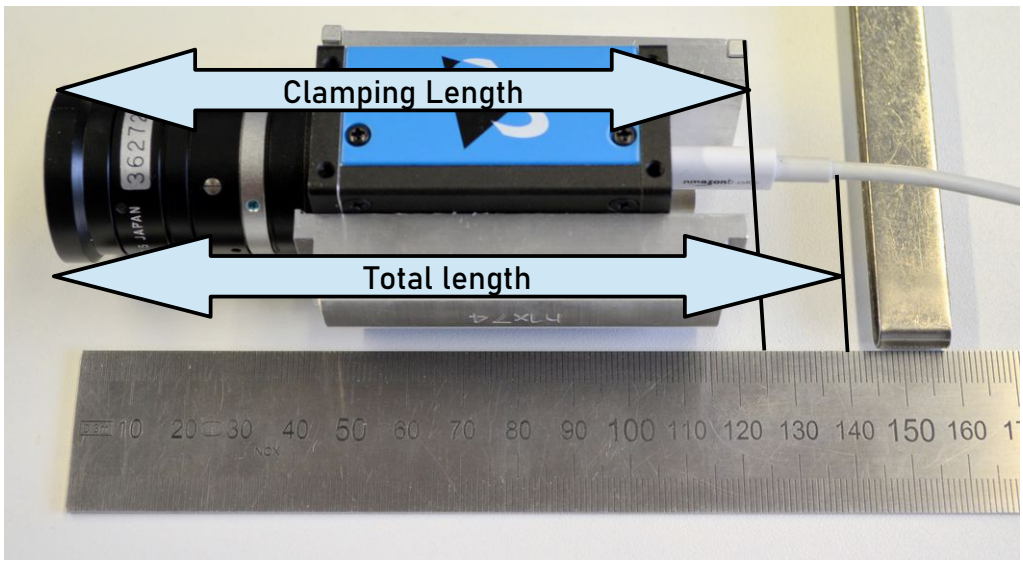
- Measure the diagonal with a vernier.
- Dmax = 55mm > $(w^2+h^2)^{½}$ – f * R, with:
  - R is the corner radius of the camera.
  - Factor "f" equals 0,83 for square cameras going down to 0,74 for cameras with w/h=0,62.
  - For instance a corner radius of 2mm allows to mount a 40x40mm camera, that would have a 56.6mm diagonal with sharp corners.



Cross section of the Dolphin enclosure with a 40x40 and a 44x29mm camera.

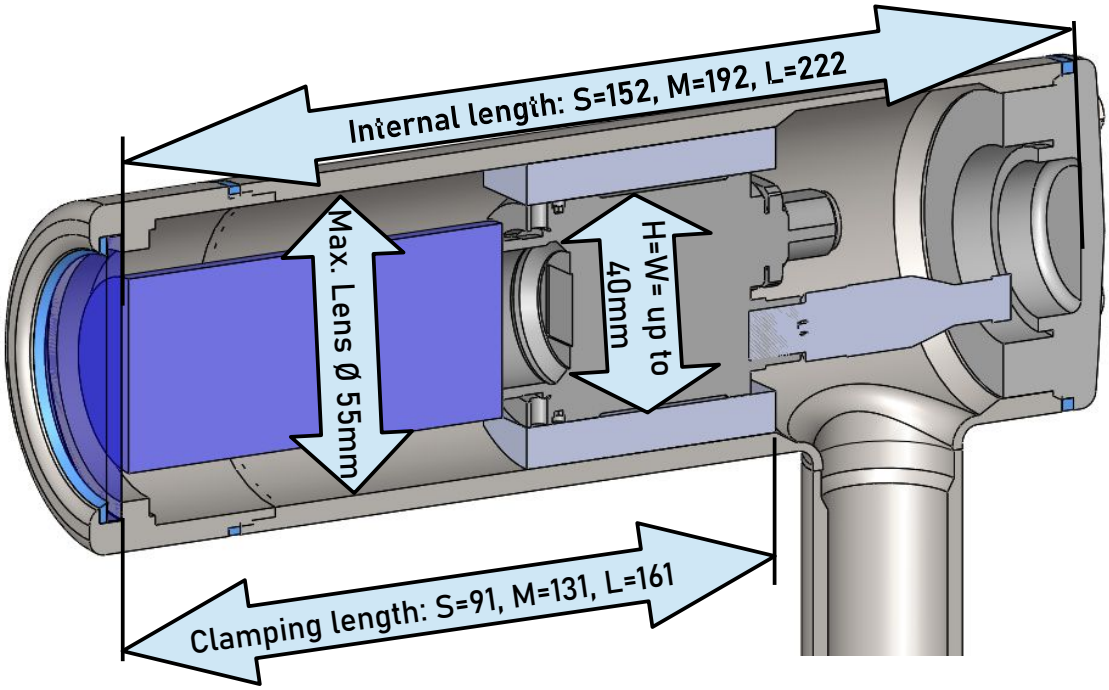
4.2 Selecting the right enclosure length

Measure the camera length and compare it with the “Internal length” provided in all data sheets.



The total length of camera, lens and connector amounts to about 140mm, so this camera should fit into the Dolphin S enclosure with an internal length of 152mm with some extra space to bend the cable.

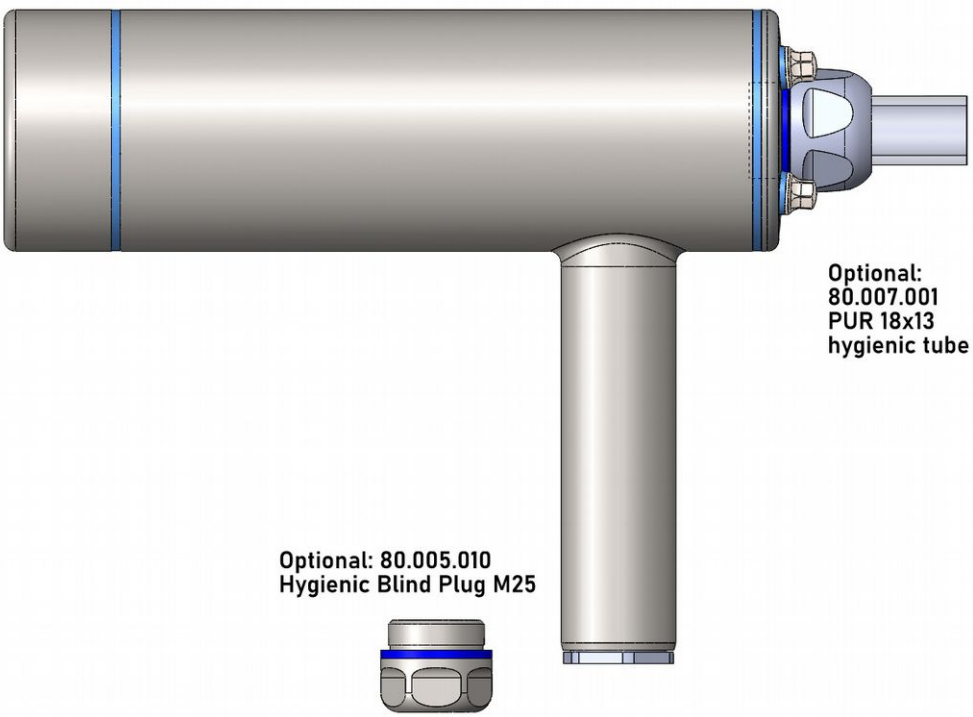
However, the clamping length of the enclosure needs to be at least 125mm, so the right choice would be the Dolphin M enclosure, offering 131mm clamping space for the camera mount.



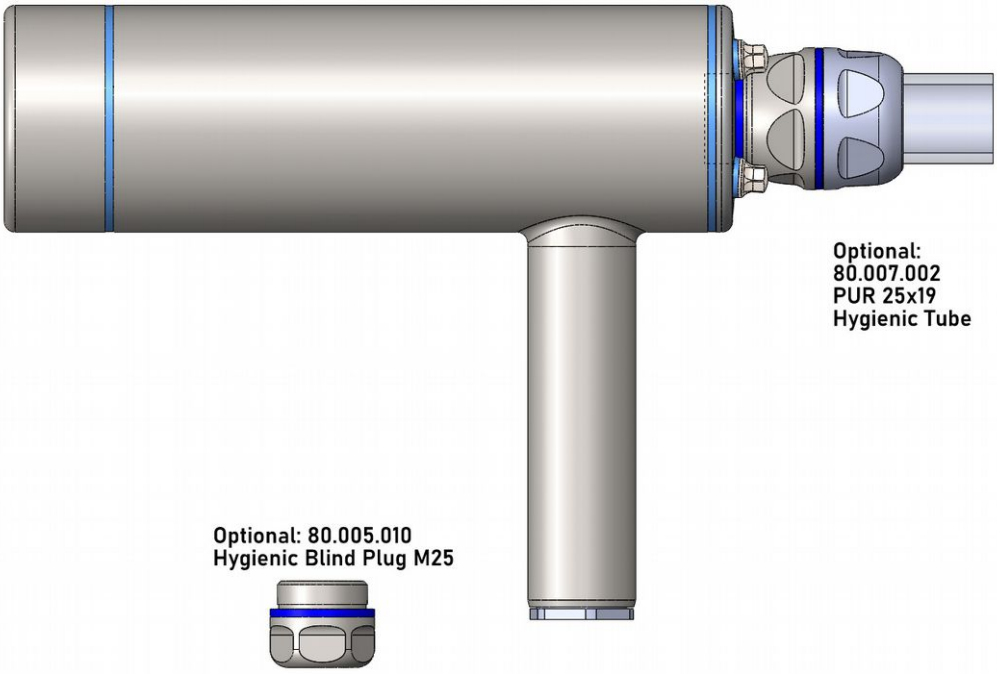
Both - the “Internal length” and “Clamping length” need to be sufficient to mount the camera/lens/connector assembly with the Dolphin enclosure!

4.3 Different enclosure Versions Dolphin

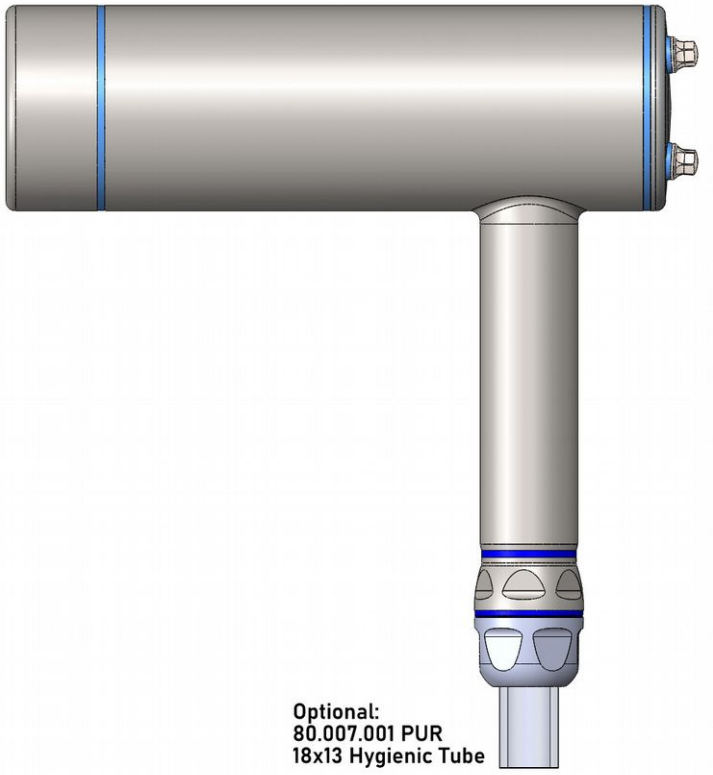
4.3.1 2X.X70.188 Dolphin M, M25 hygienic cable gland rear



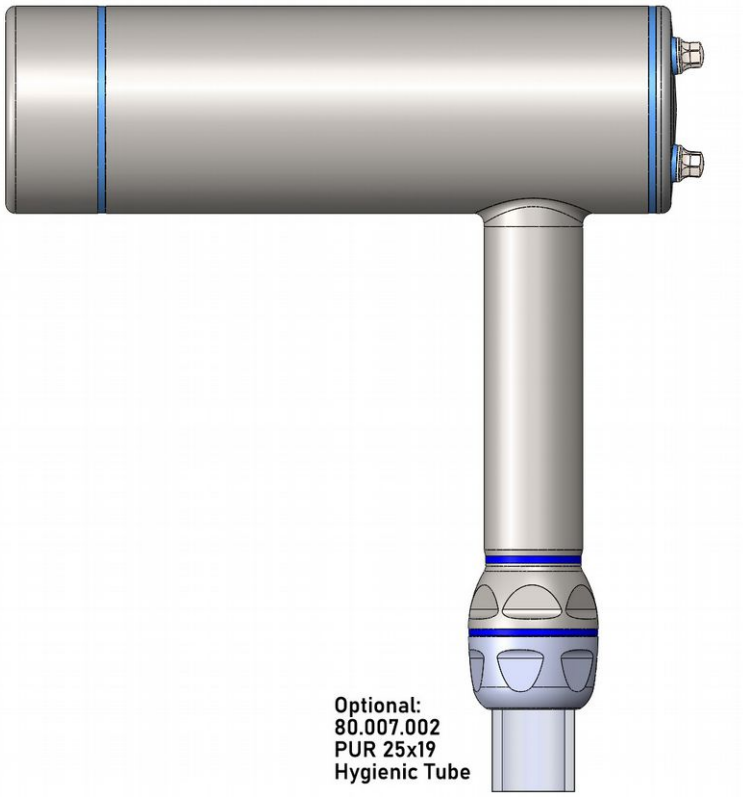
4.3.2 2X.X71.188_Dolphin M, M32 hygienic cable gland rear



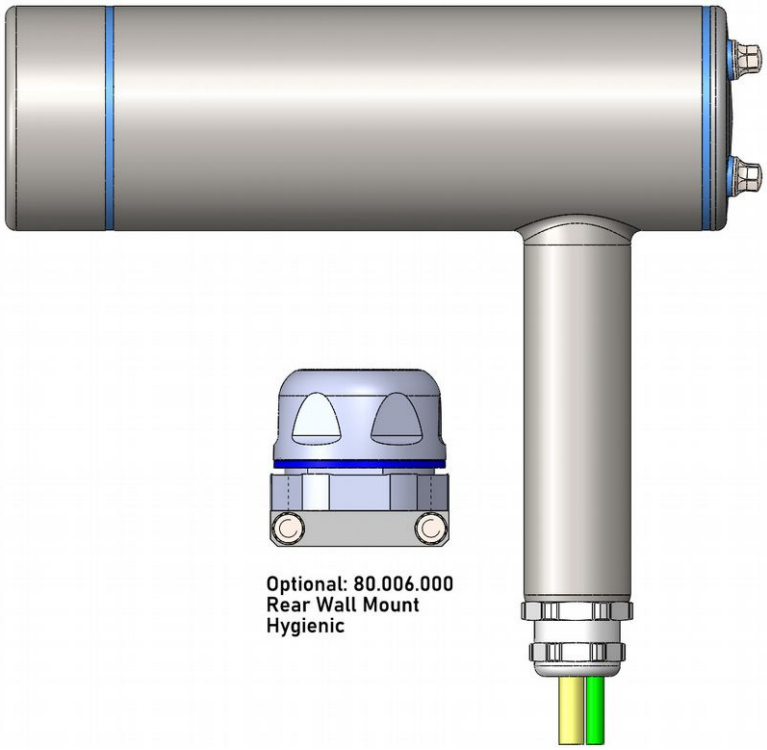
4.3.3 2X.X80.188 Dolphin M, M25 hygienic cable gland side



4.3.4 2X.X81.188 Dolphin M, M32 hygienic cable gland side

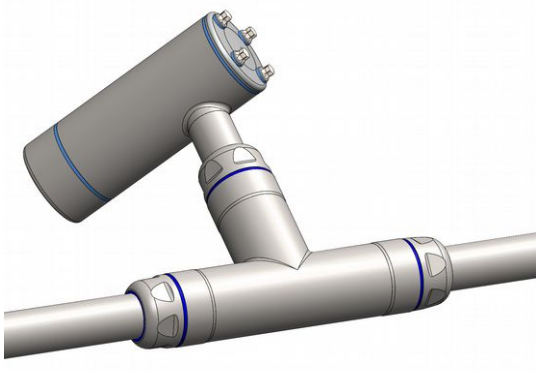


4.3.5 2X.X82.188 Dolphin M, M25 standard cable gland side

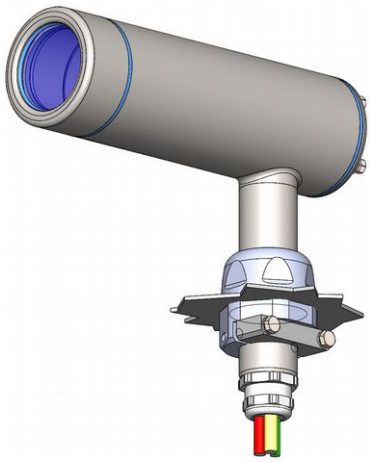


Application example:

The Dolphin M25 standard side, is the right choice for mounting the enclosure with Hygienic PLUS T-Piece, - 90° Elbow or - rear mount, since the standard cable gland is covered and allows to seal several cables individually, allowing to seal the enclosure completely.



Enclosure mounted in Hygienic PLUS T-Piece



Enclosure mounted with Hygienic PLUS rear mount

4.4 Dolphin camera enclosure order numbers

Article Description	Art. No.:
Dolphin S, IP69k, M25 hygienic cable gland rear, incl. camera mount	2X.X70.138
Dolphin M, IP69k, M25 hygienic cable gland rear, incl. camera mount	2X.X70.188
Dolphin L, IP69k, M25 hygienic cable gland rear, incl. camera mount	2X.X70.218
Dolphin S, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.138
Dolphin M, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.188
Dolphin L, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.218
Dolphin S, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.138
Dolphin M, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.188
Dolphin L, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.218
Dolphin S, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.138
Dolphin M, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.188
Dolphin L, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.218
Dolphin S, IP69k, IP66/IP67 M25 cable gland side exit, incl. camera mount	2X.X82.138
Dolphin M, IP69k, IP66/IP67 M25 cable gland side exit, incl. camera mount	2X.X82.188
Dolphin L, IP69k, IP66/IP67 M25 cable gland side exit, incl. camera mount	2X.X82.218

5 Shark IP69k Hygienic PLUS camera enclosure

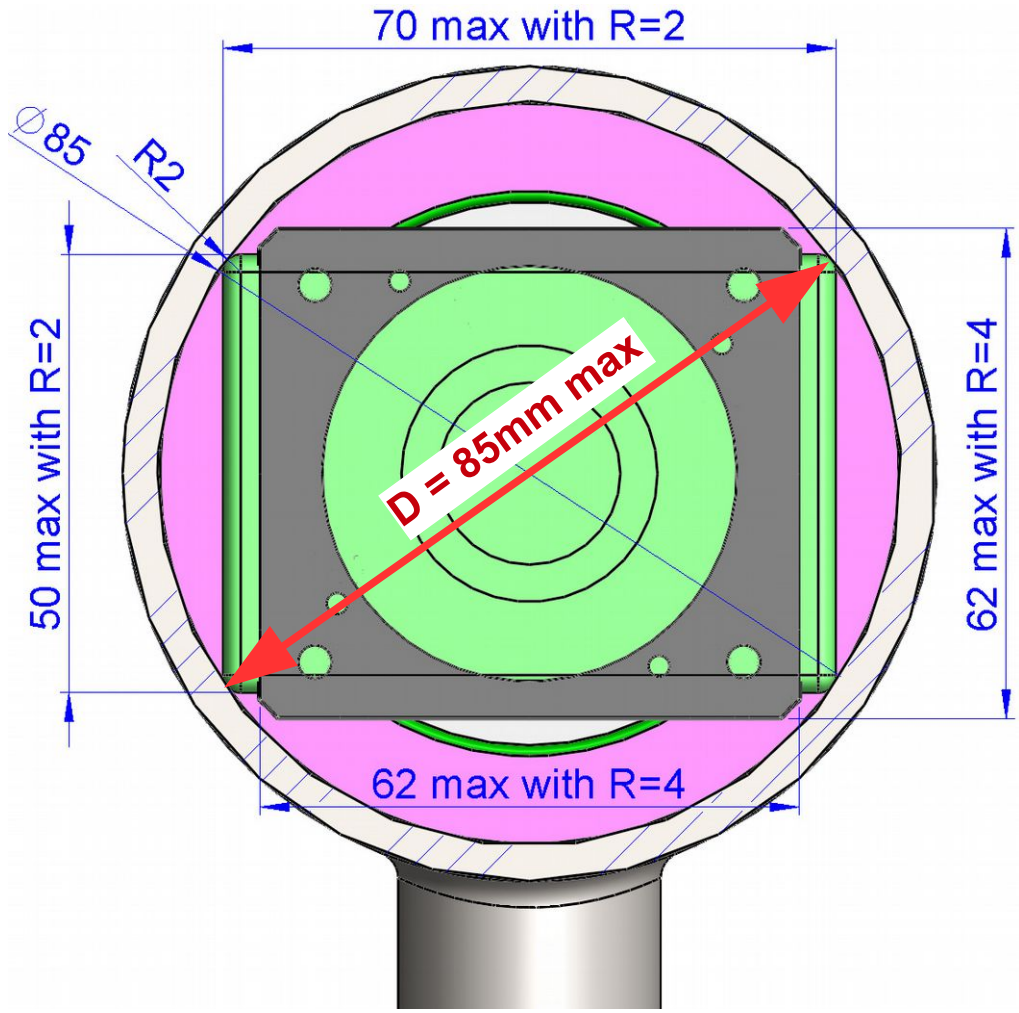
Features:

- High grade stainless steel V4A (AISI 316L)
- All sealing material with FDA approval, FDA certified acrylic windows available.
- Strict hygienic design, suitable for use in food contact and dripping areas.
- Windows are easy to change with snap ring pliers.
- Rear wall locks with 45° turn and slight tightening of screws.
- Dual seal on all lids, window and cable glands.
- Good heat dissipation with inbuilt cameras usually 13K cooler inside the enclosure than without enclosure.
- Easy to mount hygienically with the 30mm Ø, 100mm long shaft handle, that also serves as cable conduit.
- 3 different length and 30mm enclosure extension rings available.
- 5 different versions available, depending on mounting situation, see section 5.3.

5.1 Cameras that fit into the Shark enclosure

The Shark enclosure has the same internal diameter as the Orca enclosure, so the same compact cameras fit, for instance:

- Cameras with a square cross section up to 60x60mm (62x62 with at least 4mm corner radius).
- Cameras with 50mm height and 70mm width and at least 2mm corner radius
- For calculations see section 4.1.
- Smaller cameras that would fit into the Dolphin enclosure, but require a lens with diameter greater 55mm or the Meganova ring light.

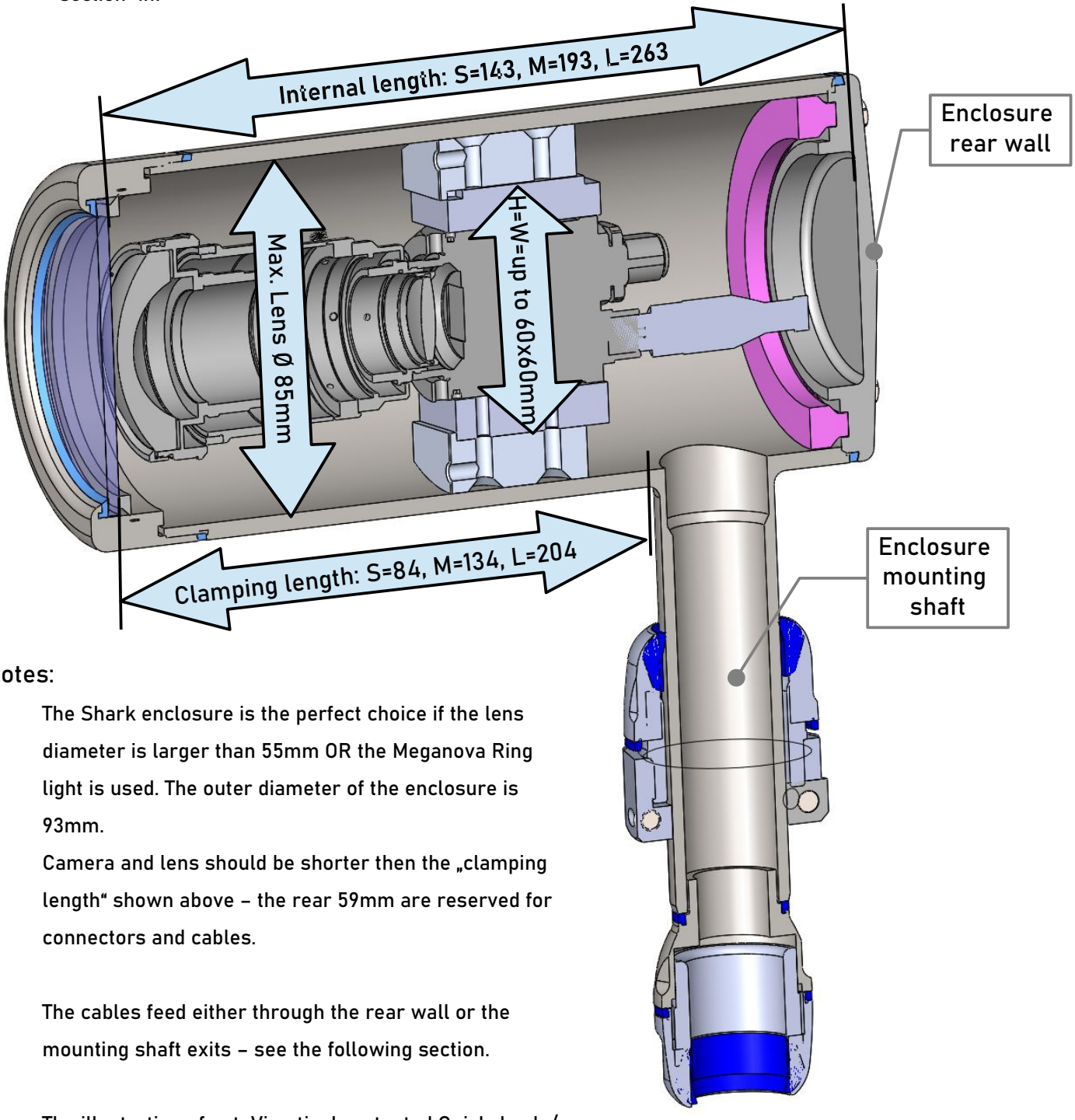


Maximum camera cross sections that fit into the Shark enclosure

For irregular camera shapes use CAD files provided and in doubt contact autoVimation!

5.2 Selecting the right enclosure length

1. Measure the total length of camera + lens + connectors and compare it with the "Internal length" provided in the shark data sheet. Allow sufficient extra length for bending the cable to the rear wall cable gland or side exit (mounting shaft).
2. Check if the "Clamping length" of the selected Shark enclosure is sufficient, see section 4.1.



Notes:

The Shark enclosure is the perfect choice if the lens diameter is larger than 55mm OR the Meganova Ring light is used. The outer diameter of the enclosure is 93mm.

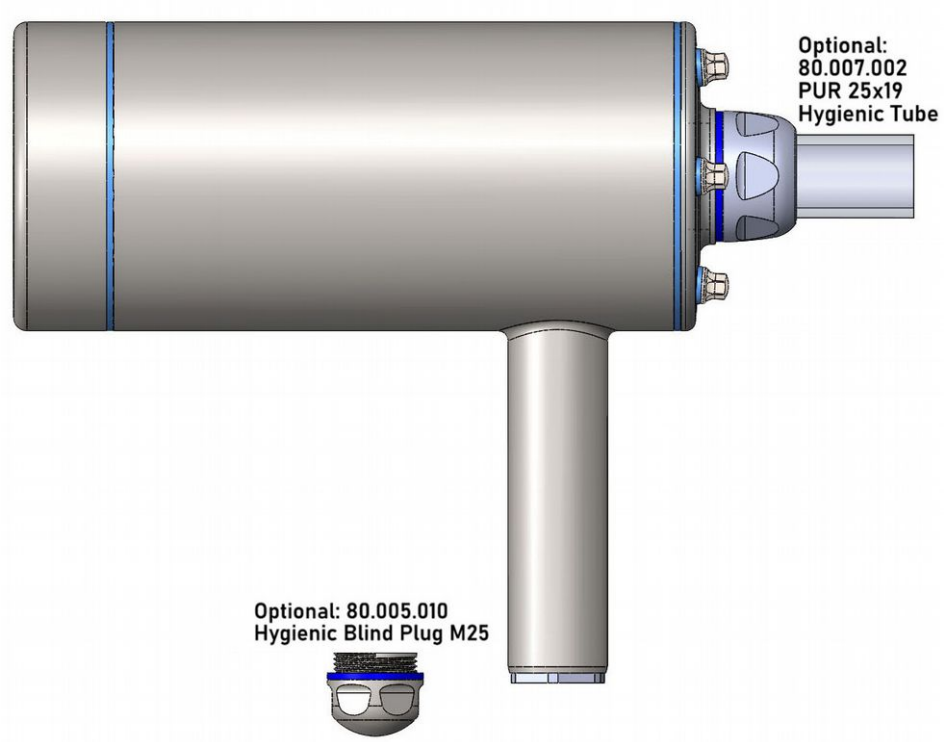
Camera and lens should be shorter then the „clamping length" shown above – the rear 59mm are reserved for connectors and cables.

The cables feed either through the rear wall or the mounting shaft exits – see the following section.

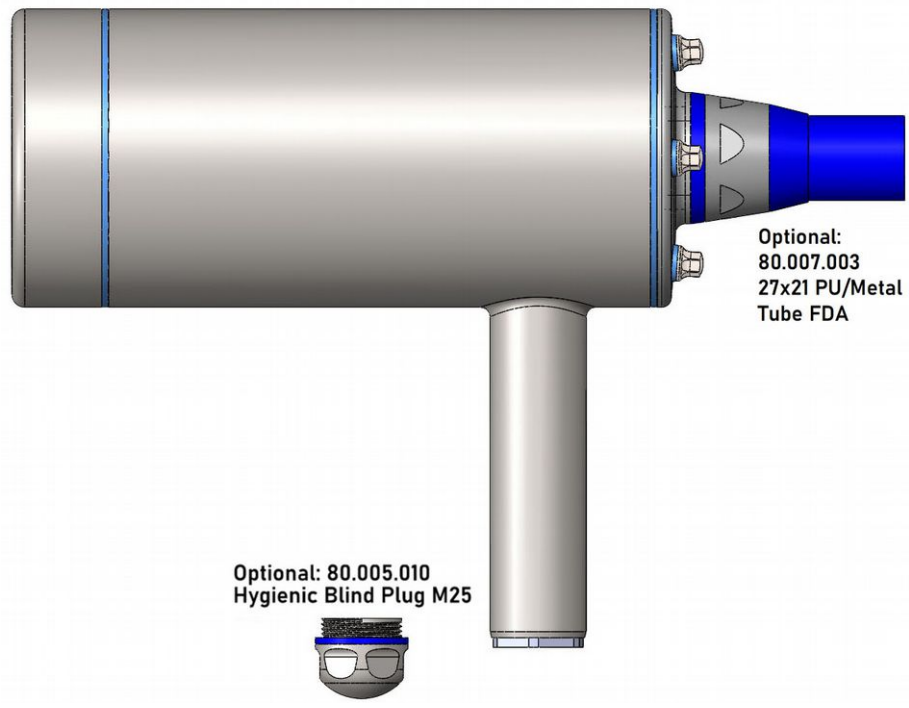
The illustration of autoVimation's patented Quick-Lock / Heat-Guide camera mount has been simplified.

5.3 Different enclosure Versions Shark

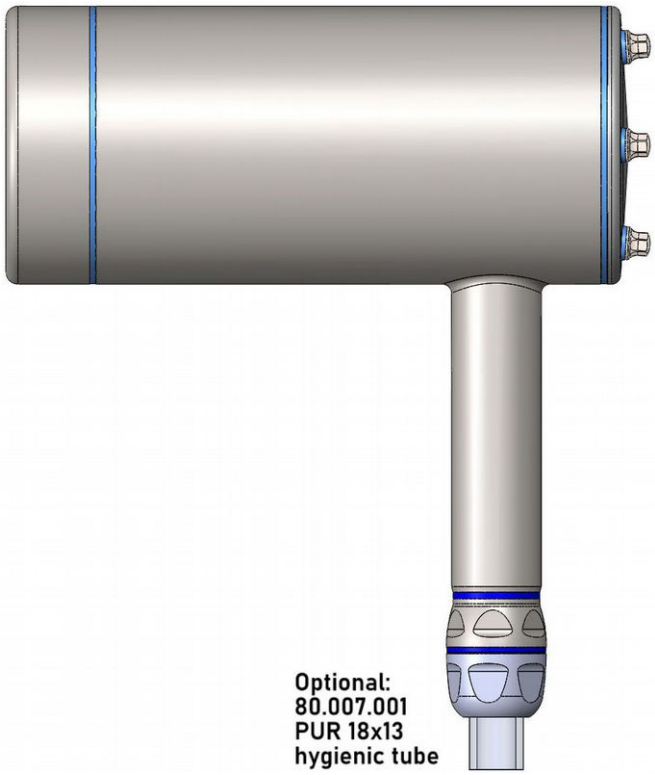
5.3.1 2X.X71.XXX Shark M32 hygienic cable gland rear



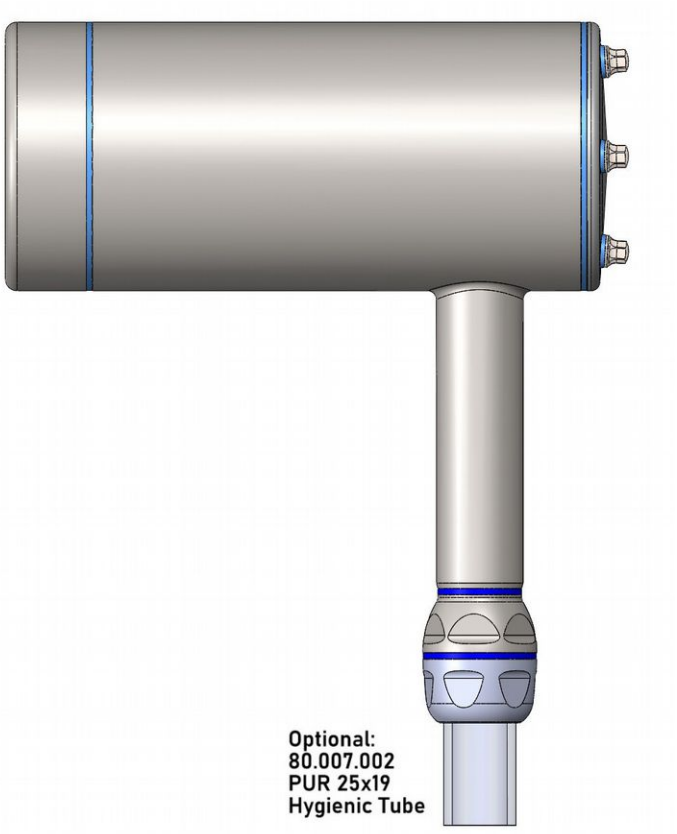
5.3.2 2X.X72.XXX Shark M25 hygienic tube connector rear



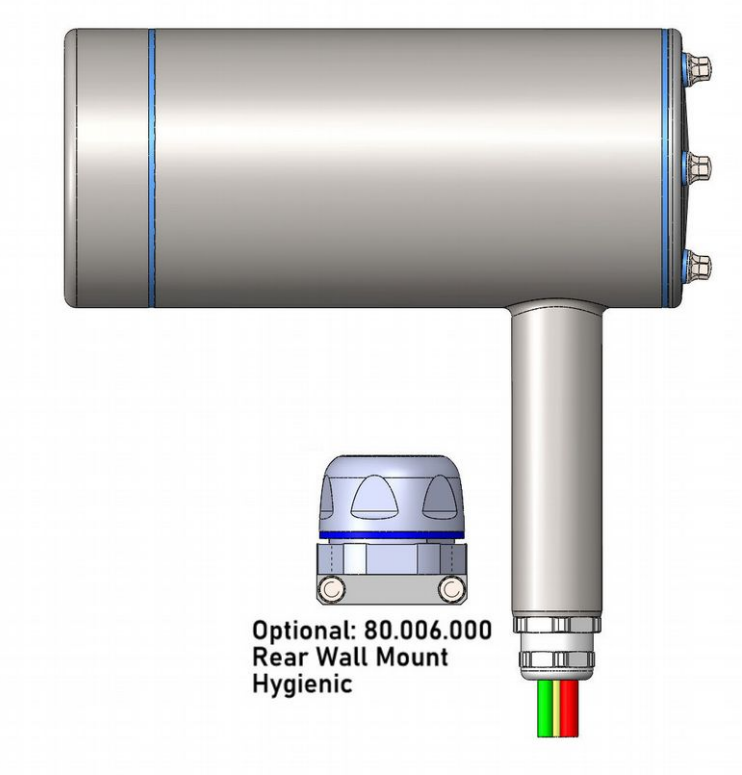
5.3.3 2X.X80.XXX Shark M25 hygienic side



5.3.4 2X.X81.XXX Shark M32 hygienic cable gland side

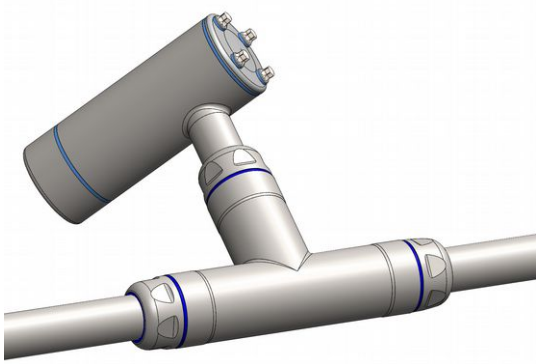


5.3.5 2X.X82.XXX Shark M25 standard side

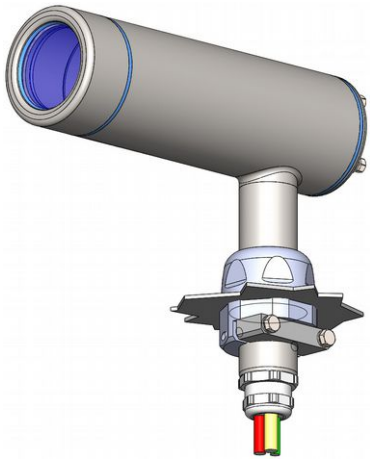


Application example:

The Shark M25 standard side, is the right choice for mounting the enclosure with Hygienic PLUS T-Piece, - 90° Elbow or - rear mount, since the standard cable gland is covered and allows to seal several cables individually, allowing to seal the enclosure completely.



Enclosure mounted in Hygienic PLUS T-Piece



Enclosure mounted with Hygienic PLUS rear mount

5.4 Shark camera enclosure order numbers

Article Description	Art. No.:
Shark S, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.130
Shark M, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.180
Shark L, IP69k, M32 hygienic cable gland rear, incl. camera mount	2X.X71.250
Shark S, IP69k, M25 hygienic tube connector rear, incl. camera mount	2X.X72.130
Shark M, IP69k, M25 hygienic tube connector rear, incl. camera mount	2X.X72.180
Shark L, IP69k, M25 hygienic tube connector rear, incl. camera mount	2X.X72.250
Shark S, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.130
Shark M, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.180
Shark L, IP69k, M25 hygienic cable gland side exit, incl. camera mount	2X.X80.250
Shark S, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.130
Shark M, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.180
Shark L, IP69k, M32 hygienic cable gland side exit, incl. camera mount	2X.X81.250
Shark S, IP66/IP67, M25 standard cable gland side exit, incl. camera mount	2X.X82.130
Shark M, IP66/IP67, M25 standard cable gland side exit, incl. camera mount	2X.X82.180
Shark L, IP66/IP67, M25 standard cable gland side exit, incl. camera mount	2X.X82.250

6 Dolphin Accessories

6.1 Windows

Standard Window: 2” BK7, anti-reflective coating both sides

Alternative Windows available:	Art. No.:
Replacement acrylic window 2“ diameter, FDA approval, no coating	20.000.058 (20.000.032)
Replacement acrylic window 2“ diameter, broad band anti-reflective coating (450-700nm), increased scratch and chemical resistance	20.000.029 (20.000.049)
Replacement 2" Sapphire front window, uncoated	20.000.053 (20.000.016)
Replacement 2" IR Mirror (heat reflecting glass)	20.000.052 (20.000.010)
Replacement 2" Germanium front window	20.000.054 (20.000.017)

The number in brackets should be used for the initial enclosure order in case it should be shipped with an alternative window *instead* of the standard BK7 window (discount and window assembled).

6.2 Dolphin enclosure extension

Enables easier access to focus and aperture settings with longer lenses:

Dolphin 30mm extension with trapezoid seal, Art. No.: 80.005.030

7 Shark Accessories

7.1 Windows

Standard Window: 3” BK7, anti-reflective coating both sides

Alternative Windows available:	Art. No.:
Replacement acrylic window 3“ diameter, FDA approval, no coating	20.000.003 (20.000.002)
Replacement acrylic window 3“ diameter, broad band anti-reflective coating (450-700nm), increased scratch and chemical resistance due to vacuum sputter coating.	20.000.059 (20.000.033)
Replacement 3" Germanium front window	20.000.054 (20.000.017)

The number in brackets should be used for the initial enclosure order in case it should be shipped with an alternative window *instead* of the standard BK7 window (discount and window assembled).

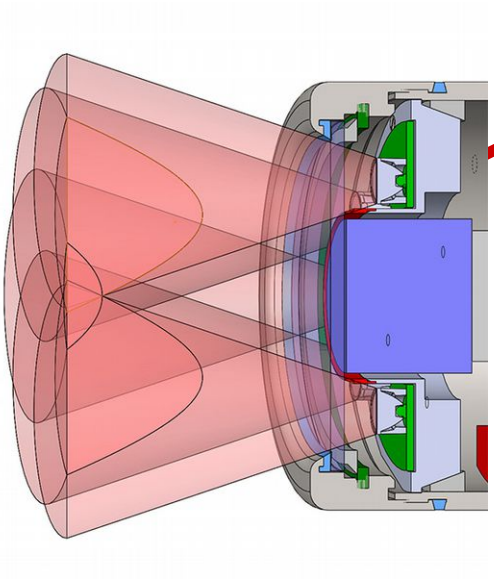
7.2 Shark enclosure extension

Easier access to focus and aperture settings with longer lenses:

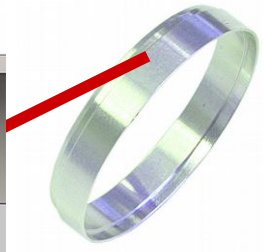
Shark 30mm extension with trapezoid seal, Art. No.: 80.020.030

7.3 Matching Meganova Ring light

- ➔ Fits into the Shark enclosure.
- ➔ Lenses up to 36mm diameter mount directly behind the front window.
- ➔ 8W nominal power – up to 45W in strobe mode (@ about 4 times nominal brightness).
- ➔ Very good heat dissipation to the enclosure allowing 200% continuous mode in normal conditions.
- ➔ Fully programmable Strobe controller on board!
- ➔ Connect the wide range opto-isolated trigger input of the Meganova light directly to the camera output for accurate synchronization!
- ➔ Pulse : pause ration of up to 1:1 possible, trigger frequency up to 10 kHz!
- ➔ 5 different colors (blue, green, red, IR, white) and 4 fan angles (14°, 23°, 36°, 76°) available.



Cross section of shark enclosure front lid with Meganova ring light



The "Anti-Reflecting Tube" simply snaps onto the Meganova light prevents LED light reflecting back into the lens.

Anti Reflection Tube for Shark required!

Shark enclosure with inbuilt Meganova ring light with 76° reflectors

Article numbers Meganova Ring-light and accessories, please refer to the Meganova documentation.

8 Mounting tools Dolphin and Shark

Article Description	Art. No.:
Dolphin and Shark front lid mounting tool	80.006.101
1/4" Socket spanner with plastic insert size 7mm for gentle tightening of M4 hex hygienic screws and adapter for battery drill use.	80.006.102
Replacement Plastic insert (PEPT) SW7 for M4 Dolphin and Shark rear wall screws. Only fits into modified socket part of 80.006.102 above.	80.006.103
Torque wrench set to 1.2Nm for tightening Dolphin and Shark rear walls, with 1/4" Socket spanner with plastic insert (see 80.006.102)	80.006.104

Article Description	Art. No.:
Adjustable wrench for scratch free tightening of all Hygienic Plus cable glands. Unlike standard adjustable pliers, this wrench adjusts gap-free to any screw up to 52mm width. The smooth and parallel jaws do not move on the flats which avoids any scratches to hygienic screws or fittings. An indispensable tool for assembling autoVimation's Hygienic building kit! 	80.006.105
Hole cutter set (size 20.4 and 40.5mm) for Hygienic PLUS rear mount This hole cutter set cuts in 3 steps a 40.5mm Ø hole into up to 2.5mm stainless steel machine covers for simple installation of autoVimation's Hygienic PLUS rear mount. 	80.006.106
Circlip pliers, tool for window exchange (Shark, Dolphin, Feuersalamander) 	90.000.017

Appendix: Certifications and Chemical Resistance

Elastomer and plastics certifications

Materials used	FDA	BfR[2]	USP	EU
Silicone tube hygienic standard fittings	21. CFR § 177, 2600	Recommendation XV	USP Class IV[3]	
EPDM enclosure and screw seals, RAL 5012	21. CFR § 177, 2600			
TPU cable gland seals dark blue	21. CFR HHS § 177.260 §175.300 §175.105			EU Dir. 10/2011 EU Dir. 1935/2004 2002/72/EC/ 90/128/EWG
Acrylic windows without coating[4]	21. CFR § 177.1010			EU Dir. 10/2011
Hygienic tubes Ø25 and Ø18, PUR 401	Approval acc to 21. CFR § 177, 2600 and 178.2010	Recommendation XXXIX		EU Dir. 10/2011 EU Dir 2015/174
Hygienic tube Ø26.5, blue RAL 5010 ,PU	21. CFR § 177, 2600			

2 Complies with recommendations of the "Bundesinstitut für Risikobewertung", the German institute for risk assessment, for food contact.

3 United States Pharmacopoeia

4 The coated windows are of the same material, but the coating has not been certified.

Ecolab testing acc to Test Method PM 40-1

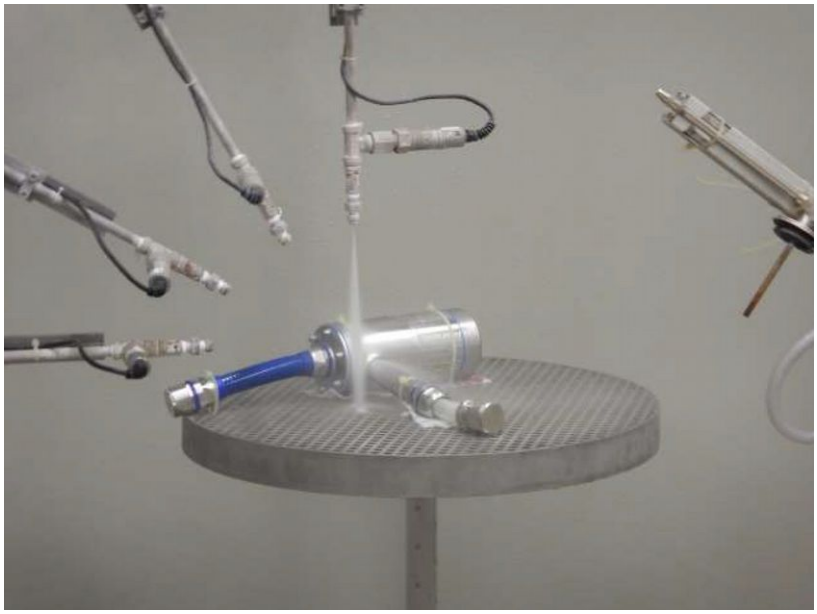
All elastomers and plastics have been tested for 4 weeks in application concentration of the following aggressive cleaning agents, typically used in the meat industry:

Ecolab testing with 5 cleaning agents plus distilled water as reference

Ecolab cleaning agent	Concentration	Active Ingredients
Topactive 200	5%	Sodium hydroxide, Potassium hydroxide, Anionic surfactants, Ethanol, Propan 2-ol
topactive OKTO	1%	acetic acid, Hydrogen- peroxide, Peracetic acid
Topactiv 500	5%	phosphoric acid, Ethanol, Alkylamine oxides
P3 Topax 66	3%	Sodium hypo- chloride, Sodium hydroxide, Alkylamine oxides
P3 Topax 990	3%	Dodecylpropane 1,3-diamine, Alkylamine oxides, Acetic acid, Alcohols

All elastomers and plastics used have endured the testing and have not been attacked by the cleaning agents, unlike other materials like NBR or urethane foam, also tested.
Also the acrylic windows have survived the tests surprisingly well.

IPX9k Testing according to ISO 20653



Shark enclosure on a rotary table during high pressure water jet testing, IPXX9k

IPX9k testing of Dolphin and Shark enclosures was conducted by the Fraunhofer Institute ICT in Berghausen in December 2020.

High pressure jet steam nozzles were directed at angles from 0° to 90° to Dolphin and Shark enclosures with hygienic tubes and fittings attached. Water pressure was at 80 to 100 bar @ 80°C +-5°C, distance between nozzle and enclosure was 100-150mm, exposure time 30s from each angle.

Test Result:

Enclosures, fittings and tubes attached passed the high pressure IP69k cleaning test at close distance. No water ingress could be visually detected inside the Dolphin and Shark enclosures after the test.

The complete report is available by autoVimation GmbH at request.

Chemical resistance

TPU[5] cable gland seals (dark blue)

Test medium	Test temp./°C	Resistance[6]
Acetone	20	2
Ammonia liquor, aqueous 10%	20	1
Ammonium nitrate (fertiliser)	20	1
ASTM Oil No. 1	80	1
ASTM Oil No. 2	80	1
ASTM Oil No. 3	80	1
Bitumen/asphalt	80	1
Brake fluid	80	1
Cyclohexane	20	2
Diesel oil	20	1
Diethylene glycol	20	1
Dimethylformamide	20	5
Ethylacetate	20	1
Ethyl alcohol 96%	20	1
Refrigerant R 11	20	2
Isopropyl alcohol	20	1
Potassium-based grease	80	1
Cold cleanser	20	1
Lithium-based grease	80	1
MEK, methyl ethyl ketone	20	2
Methanol 20 2	20	2
Methylene chloride	20	1
Methylene chloride	20	1
Engine oil	80	1
Sodium chloride, aqueous 10%	20	1
Sodium-based grease	80	1

5 Similar results expected for transparent PUR 401/ and blue PU covered metal tubes

6

1 = resistant, little or no change in weight or dimensions, no significant change in mechanical properties.

2 = limited resistance, notable changes in weight and dimensions after some time, discolouration and strength changes are also possible.

3 = Non-resistant, can still be used under certain conditions (short-term exposure).

5 = soluble, therefore unsuitable.

May be suitable for chemicals not listed here.

This information is only an extract from the extensive documentation provided by our suppliers.

Standard-grade petrol	20	1
P 3-topax 56 (5 %)	20	1
P 3-topax 66 (3 %)	20	1
P 3-topax 990 (3 %)	20	1
P 3-topactive 200 (5 %)	20	1
P 3-topactive OKTO (3 %)	20	1,2
Phosphoric acid, aqueous 10%	20	2
Hydrochloric acid, aqueous 10%	20	2
Sulphuric acid, aqueous 10%	20	2
Four-star petrol	20	1
Tetrahydrofuran (THF)	20	3
1.1.1 trichloroethane	20	1

If in doubt, if the sealing material meets your application requirements, do not heasitate to ask autoVimation for a test sample!

For the chemical resistance of other materials – for instance EPDM – refer to the appendix of the main product catalogue!

autoVimation GmbH

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