GREENPIPE

Flame traps

Flame traps for tunnels

European Directive 2004/54/EC,transposed in Italy in 2006 with Legislative Decree no. 264/2006, establishes minimum safety requirements for road tunnels.
This results in a clear definition of safe design criteria for new tunnels, as well as the need to upgrade existing ones.
Legislative Decree 264/2006 requires a risk analysis for each tunnel in order to identify potential hazards and define the appropriate safety measures.
In particular, paragraph 2.6.1 of Annex 2 specifies that for tunnels longer than 500 m, drainage systems must be installed to manage any accidental spillage of hazardous liquids.

Where the transport of dangerous goods is permitted, "the drainage of flammable and toxic liquids must be ensured through dedicated drainage channels or other suitable devices within the tunnel cross-section. These systems must be designed and maintained to prevent fires and to avoid the spread of flammable and toxic liquids."

These requirements are so stringent that, where existing tunnels cannot meet them - or can only do so at disproportionate cost - the competent authorities must take this into account when deciding whether to allow the transport of dangerous goods.

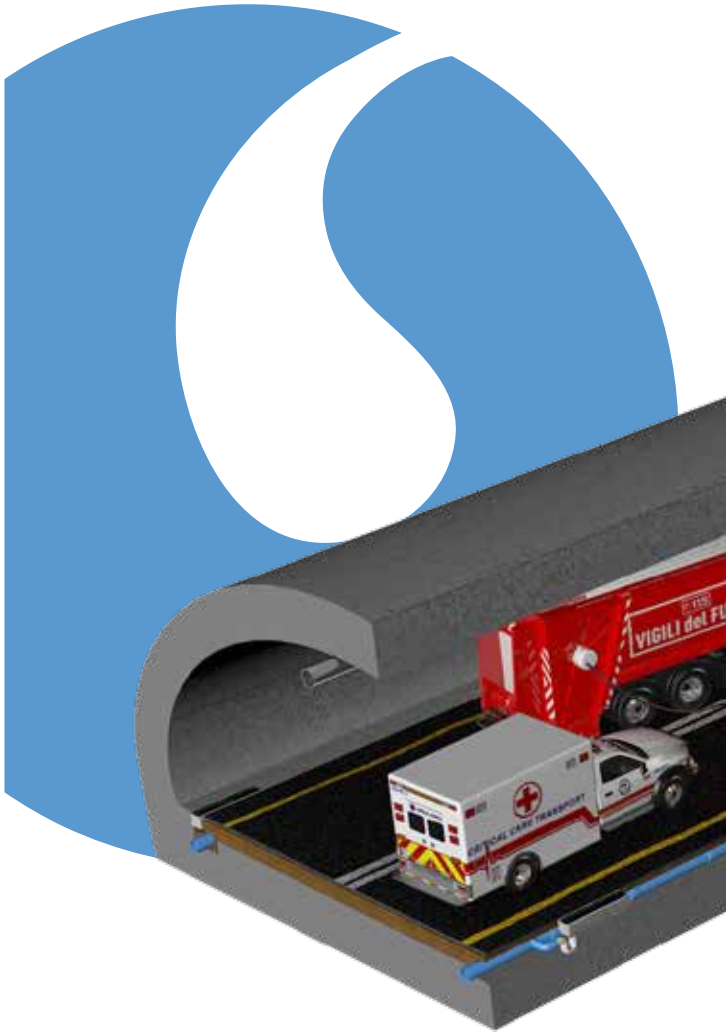
Greenpipe Srl has developed **solutions specifically** designed for the safe drainage of liquids in tunnels, namely systems capable of preventing flame propagation in the event of a fire:

- **Siphon and inspection concrete flame traps - SMART PRO 150**
- **Siphon and inspection stainless-steel AISI 430 (or AISI 304) flame traps**

Depending on the design choices of the road or motorway authority, drainage can be designed either as a **"point drainage"** system, by installing one flame trap every 20–25 metres, or as a **"linear drainage"** system, consisting of short runs of drainage channels (typically 4 to 5 metres long) that discharge into flame traps installed approximately every 50 metres.

Within a tunnel, the available surface space for installing liquid collection systems is always quite limited. For this reason, the width of fire-resistant inspection chambers (and any associated drainage channels) should not exceed 20–25 cm, in order to minimise exposure to traffic.

Conversely, the trap (siphon) - which provides the chamber's fire-resistant function-and the storage capacity (required to collect debris inevitably carried into the system) can be developed in depth.
For proper operation, each chamber must be periodically cleaned, removing leaves, dirt and gravel.



Simple and compact,
siphon and inspection flame traps favour:

collection of liquids, including flammable, resulting from accidental spills

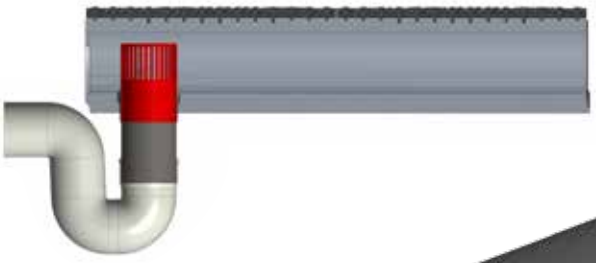
flame reduction, prevents the spread of flames in case of fire

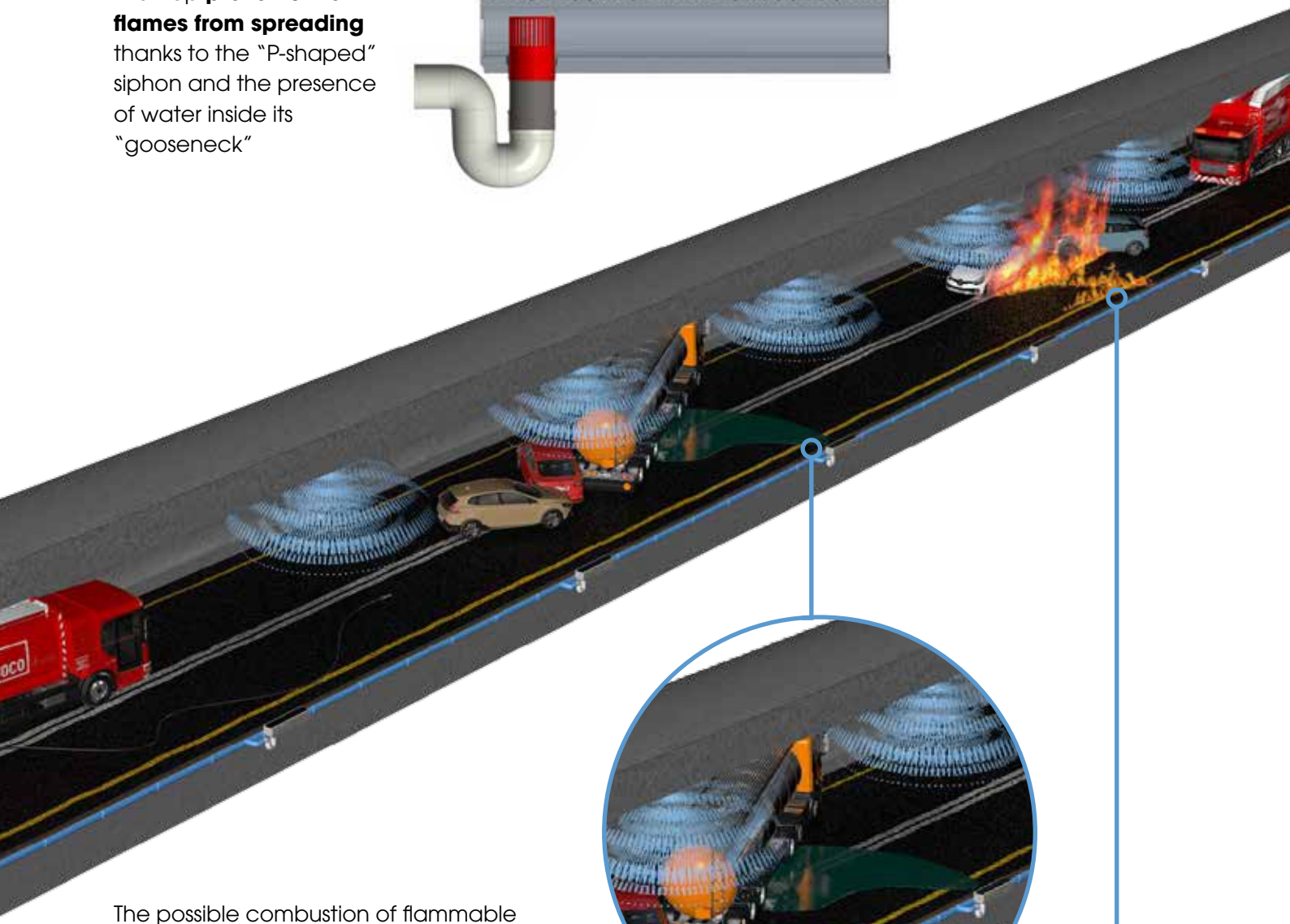
recovery of water from the fire-fighting system

drainage of infiltration, drains water from infiltration of the structure

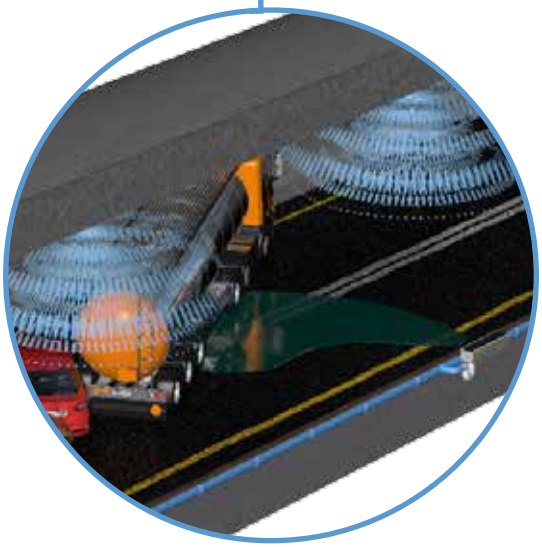
collection of rainwater coming from outside and conveyed by the transit of cars

The trap **prevents the flames from spreading** thanks to the "P-shaped" siphon and the presence of water inside its "gooseneck"





The possible combustion of flammable liquids is therefore **restricted only to the carriageway section closest to the trap**.



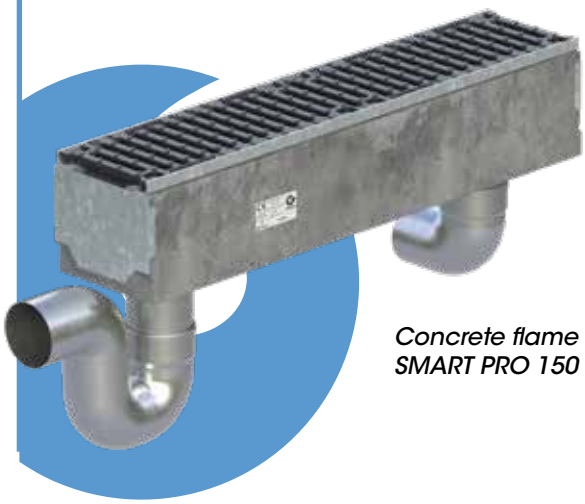
In the event of flammable liquids entering the channel and subsequently igniting, the siphon shape of the trap **stops any flow of oxygen and consequent combustion** (due to lack of air flow).

What is more, **the extinction of the flames is also facilitated** by the continuous flow of water from outside and by the firefighting system.

Flame traps, in both versions, can be configured in a wide range of variants and customised according to specific site conditions, which may sometimes impose physical constraints that must be accommodated. The following options are therefore available:

CONCRETE FLAME TRAPS **SMART PRO 150**

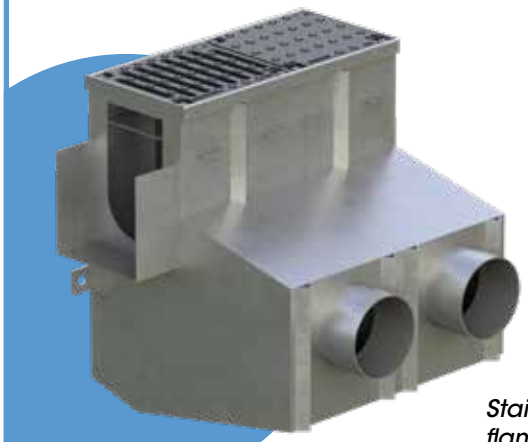
- with one outlet
- with two outlets
- with one or two outlets, with the addition of side inlets for the collection of seepage water from the structure



Concrete flame trap - SMART PRO 150 with 2 outlets

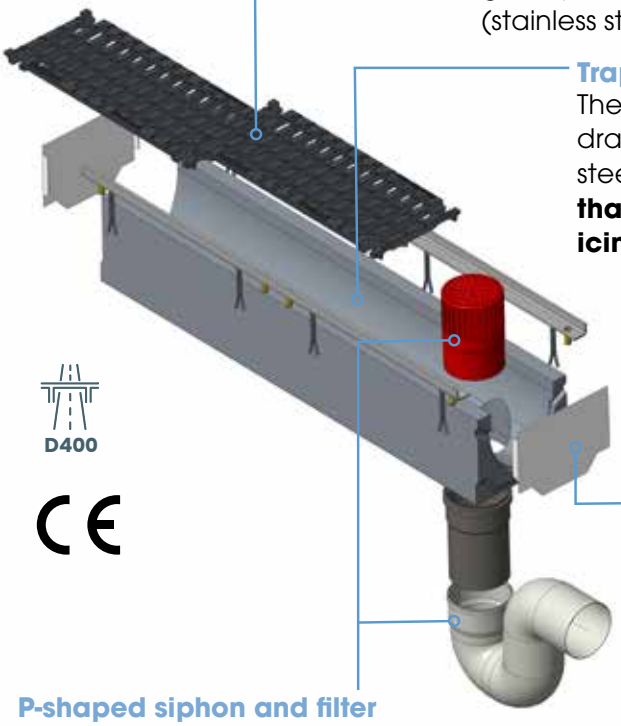
STAINLESS-STEEL AISI 430 (or AISI 304) FLAME TRAPS

- single chamber
- dual-chamber
- for inspection



Stainless-steel AISI 430 (or AISI 304) flame trap dual-chamber

Concrete flame traps **SMART PRO 150**



Grids

Two Smart 150 spheroidal cast-iron GJS 500/7 class D400 drainage grids (according to EN 1563 standard) are screwed to the channel (stainless steel screws).

Trap body

The trap body is obtained from the Greenpipe Smart Pro 150H210 drainage channel, made of vibro-compressed concrete and steel fibres, with **high resistance to compression, to freeze/thaw** cycles in the presence of stagnant water containing **de-icing salts** (+R class according to EN 1433 standard) and to aggression due to atmospheric agents (W class according to EN1433 standard). The mixture contains steel fibres which thanks to their binding power make the product more compact and **prevent the propagation of any cracks or fissures**.

End-caps

At both ends, the channel is fitted with two **galvanised steel end-caps** inserted under pressure in order to close and compartmentalise the flame trap.

P-shaped siphon and filter

The bottom of the channel is perforated and is connected to the main drainage pipe (manifold) that runs along the woutlet tunnel, through a "P-shaped" siphon (also called "gooseneck").
The constant presence of water inside the siphon **ensures the insulation of the fire trap, preventing the propagation of any flames inside the main drainage pipe (manifold)**.
The siphon is connected to the trap body by means of an **additional external pipe** secured to the channel
by means of a single-component polyurethane sealant with high elastic modulus. In the upper part (i.e. inside the channel), is an **anti-debris and anti-rat filter**. The additional pipe, the P-shaped siphon and the filter **are made of AISI 316 stainless steel and are noncombustible**.
The connections to the additional pipe, of both the siphon and the filter, are by means of a **spigot joint with NBR rubber gasket**.

Code	Description	Weight Kg	Pieces per pallet
4181091	Concrete flame trap - SMART PRO 150 - **One outlet**	67	20

Code	Description	Weight Kg	Pieces per pallet
4181092	Concrete flame trap - SMART PRO 150 - **Two outlets**	68	20

Technical features

WATER RUNOFF RATE – 6.67 litres a second
The hydraulic capacity test was carried out at the laboratories of the Istituto Giordano. The test was performed on a hydraulic test bench whereby the trap was supplied through a series of water jets on a guide with appropriate inclination.
The water flow rate was gradually increased with the aim of **verifying the maximum flow rate which the trap was able to deal without a water head forming**. This figure proved **to be higher than that required by Legislative Decree no. 264/2006.**

HIGHLY RESISTENT GASKETS
The gaskets in the spigot joints of the additional pipe and siphon are made of **NBR (nitrile rubber)** and provide a broad **operating temperature window**, high and constant friction, high **abrasion resistance** including with increasingly high temperatures, **high dynamic** properties, excellent **antistatic** properties, excellent resistance to **oils, mineral greases, hydraulic fluids** derived from petroleum, aliphatic hydrocarbons, **methane and LPG, diesel fuel and kerosene, alcohols and glycols,** vegetable and animal fats, **hot water** up to 100 °C.

NON-COMBUSTIBLE MATERIALS RESISTENT TO HYDROCARBONS
The materials from which the trap is made (concrete, iron, steel, AISI 316 stainless steel) besides being resistant to hydrocarbons, are included on the Fire Fighters' list of "materials considered as belonging to fire reaction classes A1 **without having to undergo testing"**.
The composition of the sealant used to secure the additional external pipe to the channel also ensures **utmost resistance to hydrocarbons**.

CE MARKING
At the bottom of the flame trap is a **Smart Pro 150H210 channel tested in compliance with the EN1433 standard and bearing the CE mark** as required by Regulation (EU) 305/2011.
The **Smart 150 D400** cover grids are also tested to determine their suitability to the class to which they belong and also bear the CE mark.

Use and maintenance

In order to ensure the correct operation of the **Smart Pro 150 flame traps**, a number of important solutions must be adopted:

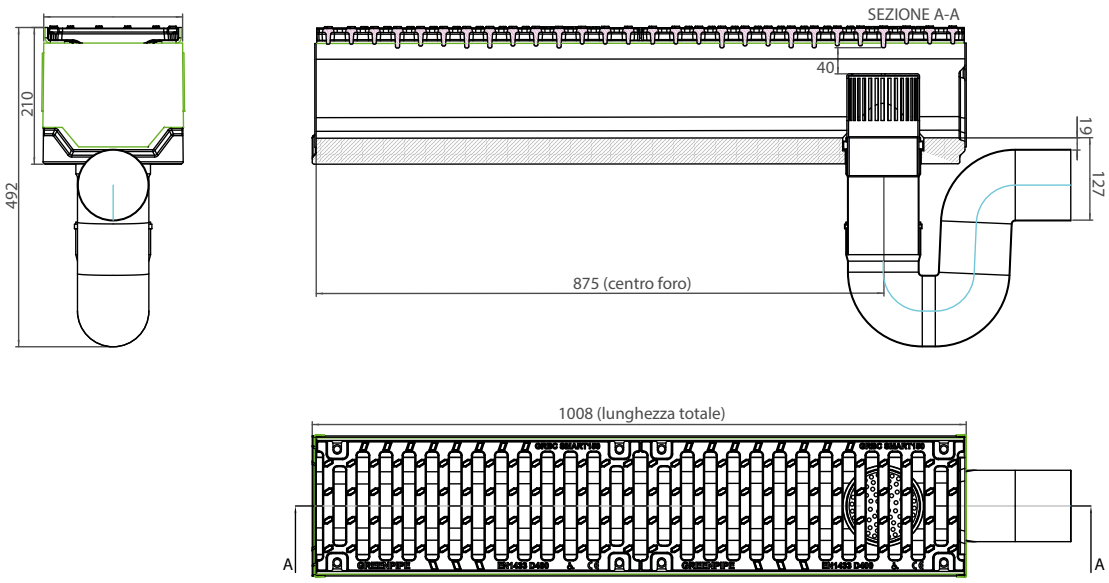
1. always keep the siphon full of water: if the system is not used for a long time, the water inside the siphon risks evaporating and the product would no longer fulfil its function. In these cases, it is sufficient to refill with water to ensure that the system is restored.

2. always keep the siphon and filter clean: in the lower part of the gooseneck, various types of debris (stones, asphalt, very fine residues, etc.) could accumulate to the point of rendering the siphon ineffective. For this reason, a filter has been fitted above it which itself requires careful maintenance and cleaning to ensure the correct operation of the entire system.

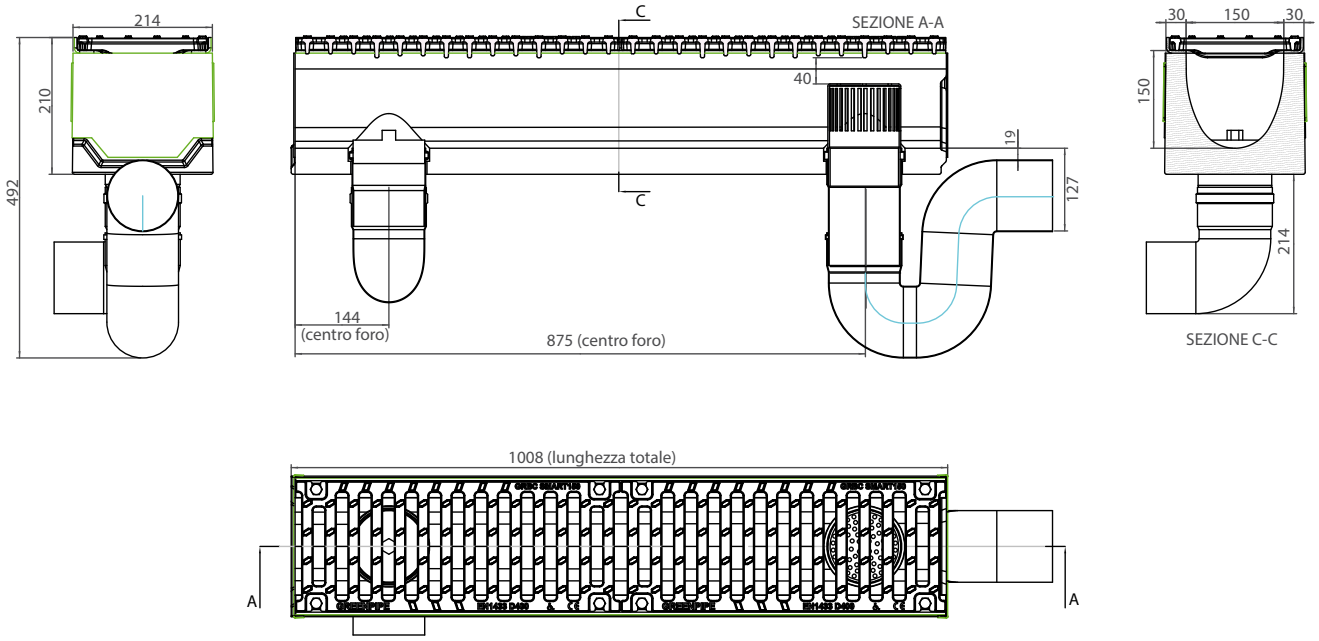
Liquid level control and cleaning operations are the responsibility of the end user of the flame trap, who must follow the instructions provided by the manufacturer (see "Installation and maintenance instructions").

Technical drawings

CONCRETE FLAME TRAP - SMART PRO 150 - **ONE OUTLET**



CONCRETE FLAME TRAP - SMART PRO 150 - **TWO OUTLETS**



Installation

1. These installation guidelines are of an approximate nature; the customer (or designer) must ensure that they are compatible with the type of soil and the surrounding conditions.

2. In order to comply with its drainage function and not to overload the grid support surface with enormous stresses, the trap must be installed at least 3-5 mm below the level of the surrounding pavement (see installation diagrams).

3a. The single-outlet trap is supplied on site as follows:

- 1 SMART PRO 150 H210 drainage channel with integrated galvanized-steel reinforcement profiles and additional external pipe H180 in AISI 316 stainless steel and 1 SMART150 D400 spheroidal cast-iron grid already assembled with M10 screws;
- 1 "P-shaped" siphon with diameter 110mm in AISI316 stainless steel;
- 1 AISI316 stainless-steel anti-debris and anti-rat filter;
- 1 SMART 150 D400 spheroidal cast-iron grid complete with 4 stainless steel M10 screws for fastening;
- 1 90°-curve with diameter 110mm in AISI316 stainless steel;
- 2 galvanized-steel closing end-caps.

The contracting firm is responsible for assembling the siphon, the filter, the closing end-caps and the second grid.

3b. The double-outlet trap is supplied on site as follows:

- 1 SMART PRO 150 H210 drainage channel with integrated galvanized-steel reinforcement profiles, additional external pipe H180 and additional external pipe H120 (both made in AISI 316 stainless steel);
- 1 "P-shaped" siphon with diameter 110mm in AISI316 stainless steel;
- 1 AISI316 stainless-steel anti-debris and anti-rat filter with diameter 110 mm;
- 2 SMART 150 D400 spheroidal cast-iron grids complete with stainless steel M10 screws for fastening;
- 1 90°-curve with diameter 110mm in AISI316 stainless steel;
- 1 watertight cap with diameter 110mm in AISI316 stainless ste el;
- 2 galvanized-steel closing end-caps.

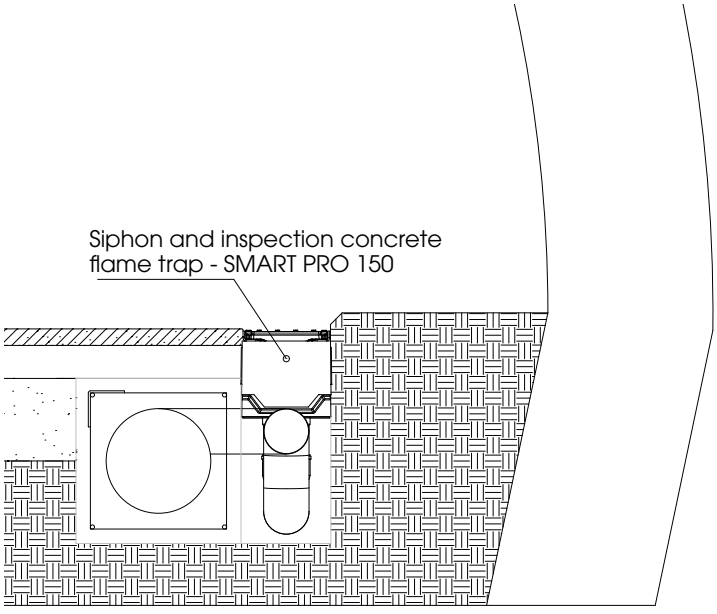
The contracting firm is responsible for assembling the siphon, the filter, the closing end-caps and the grids.

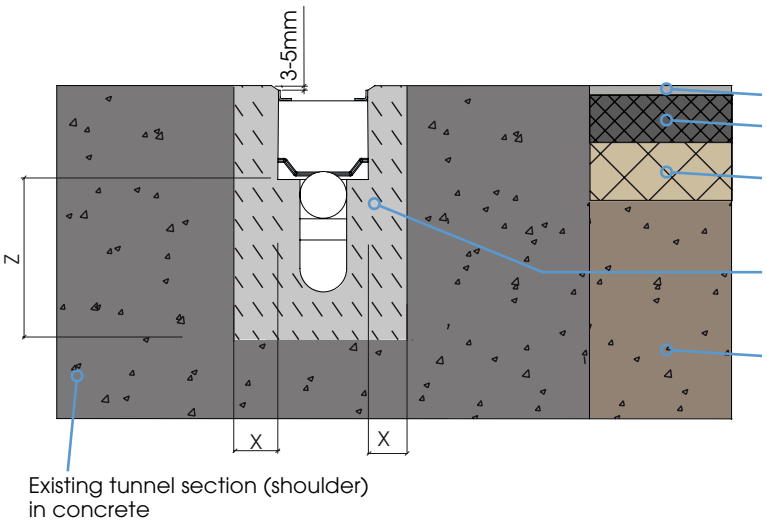
4. CLEANING and MAINTENANCE JOBS

a. The structure management firm is responsible for deciding the flame trap cleaning and maintenance schedule. Such jobs must in any case be performed at least every 2 months.

b. The work must at least consist of cleaning the filter, the bottom of the channel and, if necessary, the lower part of the siphon, as well as of checking the water level inside the P-neck of the siphon itself, which must always remain full at the maximum possible level.

c. During trap maintenance and cleaning, the grids must be removed: it is advisable to tighten the screws in the respective seats (beds) without overtightening them for the sole purpose of protecting the seats from any debris.





Load class	**D400**
Concrete type	C 25/30
X (widths) cm	5
Z (thickness) cm	according to specific design

The designer is entrusted with checking the load-bearing capacity of the soil and the conditions around the site and, consequently, choosing the X and Z dimensions, the type of concrete and any suitable reinforcement. In case of concrete exposed to freeze-thaw cycles, use an exposure class XF4.

References

Project	**Locality**	**Type** (1 outlet - 2 outlets)
Highway A26	OVADA (AL)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A1	BOLOGNA-FLORENCE SECTION	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A23	CARNIA (UD)	SMART PRO 150H210 flame trap with 1 outlet
Highway A14	PINETO (TE)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A23	CARNIA (UD)	SMART PRO 150H210 flame trap with 1 outlet
Highway A1	BARBERINO D/M (FI)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A26	OVADA (AL)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A23	UGOVIZZA (UD)	SMART PRO 150H210 flame trap with 1 outlet
Highway A14	ROSETO D/A (TE)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A12	RECCO (GE)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A16	MONTEMILETTO (AV)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A10	Barriera SAVONA	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A26	GENOVA	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A8/A26	CASTELLETTO S/T (NO)	SMART PRO 150H210 flame trap with 2 outlets
Highway A26	MASONE (GE)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A23	UGOVIZZA (UD)	SMART PRO 150H210 flame trap with 1 outlet
Highway A7	GENOVA Gall. GIOVI	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets
Highway A12	PRIARUGGIA (GE)	SMART PRO 150H210 flame trap with 1 outlet
		SMART PRO 150H210 flame trap with 2 outlets

Specification clauses

Supply and installation of prefabricated fire trap type M model 150H210 with 1 outlet for the collection of different kinds of liquids, including flammable, present in the tunnel. The structure will be made of high-strength vibrated concrete, fibre-reinforced with steel fibres, minimum class C35/45, walls not less than 30mm thick, provided with "W", "+R" and CE markings in compliance with UNI EN1433 and Regulation (EU) 305/2011. The product will consist of the following parts:

- channel with load-bearing capacity from A15 to E600, semi-circular bottom to ensure maximum water flow and avoid stagnation, no integrated slope, featuring galvanised-steel profiles perfectly secured to the concrete, featuring M10 threaded inserts to which the screws for fixing the grids can be fastened - 8 per metre -, edge subject to traffic with a thickness of not less than 4mm, thickness of the contact surface not less than 2mm and height not less than 19mm; a outlet with a maximum diameter of 125mm must be drilled in the bottom of the channel at a distance of 125mm from the female side; the maximum overall dimensions of the channel will be 212x210x1000 mm, internal section 150x150 mm, slotted grids made of spheroidal graphite cast iron GJS 500/7 according to EN1563, load class D400, dimensions 200 x 498 x 19 mm, with fixing system with 8 screws per linear metre;
- additional external pipe in AISI 316 stainless steel with a diameter of 110mm, length 180mm, featuring thin wall with a maximum sheet thickness of 0.9-1.0 mm, and spigot joint in which an NBR gasket will be fitted; the pipe will be inserted in the outlet of the channel to which it will be made integral by means of a single-component polyurethane sealant with high elastic modulus for hydrocarbon resistant joints; once installed, the pipe will protrude from the channel extrados by 140mm;
- AISI 316 stainless-steel P-shaped siphon, diameter 110mm, featuring thin wall with a maximum sheet thickness of 0.9-1.0 mm, and spigot joint in which an NBR gasket will be fitted; the siphon will be fastened to the additional external pipe and made to slide up against the end of its spigot;
- AISI 316 stainless steel filter with a diameter of 110mm to be fitted from inside the channel into the spigot of the additional external pipe; the insertion depth must be at least 40mm;
- galvanised-steel closing end-caps to be pressure fitted at the two ends of the channel; no watertight seal is required.

The total height of the trap, siphon included, must not exceed 492 mm +/- 5 mm and its minimum length will be 1008 mm +/- 5 mm.

Supply and installation of prefabricated fire trap type M model 150H210 with 2 outlets for the collection of different kinds of liquids, including flammable, present in the tunnel. The structure will be made of high-strength vibrated concrete, fibre-reinforced with steel fibres, minimum class C35/45, walls not less than 30mm thick, provided with "W", "+R" and CE markings in compliance with UNI EN1433 and Regulation (EU) 305/2011. The product will consist of the following parts:

- channel with load-bearing capacity from A15 to E600, semi-circular bottom to ensure maximum water flow and avoid stagnation, no integrated slope, featuring galvanised-steel profiles perfectly secured to the concrete, featuring M10 threaded inserts to which the screws for fixing the grids can be fastened - 8 per metre -, edge subject to traffic with a thickness of not less than 4mm, thickness of the contact surface not less than 2mm and height not less than 19mm; two outlets with a maximum diameter of 125mm must be drilled in the bottom of the channel, the first at a distance of 125mm from the female side and the second at a distance of 144mm from the male side; the maximum overall dimensions of the channel will be 214x210x1008 mm, internal section 150x150 mm;
- slotted grids made of spheroidal graphite cast iron GJS 500/7 according to EN1563 standard, load class D400, dimensions 200 x 498 x 19 mm, with fixing system with 8 sc rews per linear metre;
- additional external pipe in AISI 316 stainless steel with a diameter of 110mm, length 180mm, featuring thin wall with a maximum sheet thickness of 0.9-1.0 mm, and spigot joint in which an NBR gasket will be fitted; the pipe will be inserted in the outlet of the channel -female side- to which it will be made integral by means of a single-component polyurethane sealant with high elastic modulus for hydrocarbon resistant joints; once installed, the pipe will protrude from the channel extrados by 140mm;
- AISI 316 stainless-steel P-shaped siphon, diameter 110mm, featuring thin wall with a maximum sheet thickness of 0.9-1.0 mm, and spigot joint in which an NBR gasket will be fitted; the siphon will be fastened to the additional external pipe H180 and made to slide up against the end of its spigot;
- AISI 316 stainless steel filter with a diameter of 110mm to be fitted from inside the channel into the spigot of the additional external pipe H180; the insertion depth must be at least 40mm;
- additional external pipe in AISI 316 stainless steel with a diameter of 110mm, length 120mm, featuring thin wall with a maximum sheet thickness of 0.9-1.0 mm, and spigot joint in which an NBR gasket will be fitted; the pipe will be inserted in the outlet of the channel -male side- to which it will be made integral by means of a single-component polyurethane sealant with high elastic modulus for hydrocarbon resistant joints; once installed, the pipe will protrude from the channel extrados by 80mm;
- 90° curve in AISI 316 stainless steel with 110mm diameter complete with spigot joint to which will be fitted an NBR rubber gasket; the curve will be fitted to the extra external pipe H120 and made to slide up against the end of the spigot;
- AISI 316 stainless-steel watertight cap to be fitted inside the channel in the spigot of the extra external pipe H120;
- galvanised-steel closing end-caps to be pressure fitted at the two ends of the channel; no watertight seal is required.

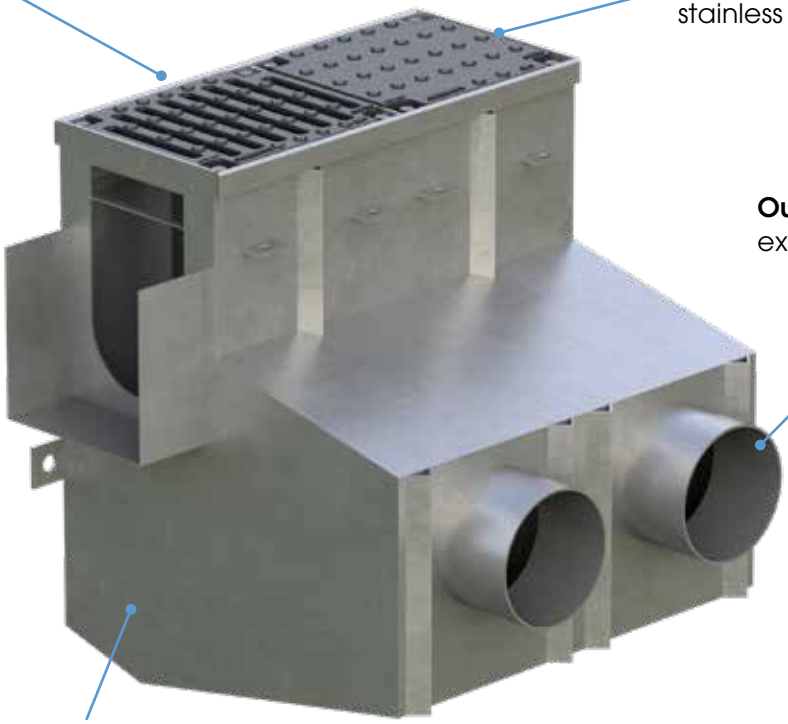
The total height of the trap, siphon included, must not exceed 492 mm +/- 5 mm and its minimum length will be 1,008 mm +/- 5 mm.

Stainless steel flame traps (dual-chamber or single chamber)

EXEMPLE OF DUAL-CHAMBER STAINLESS STEES FLAME TRAP

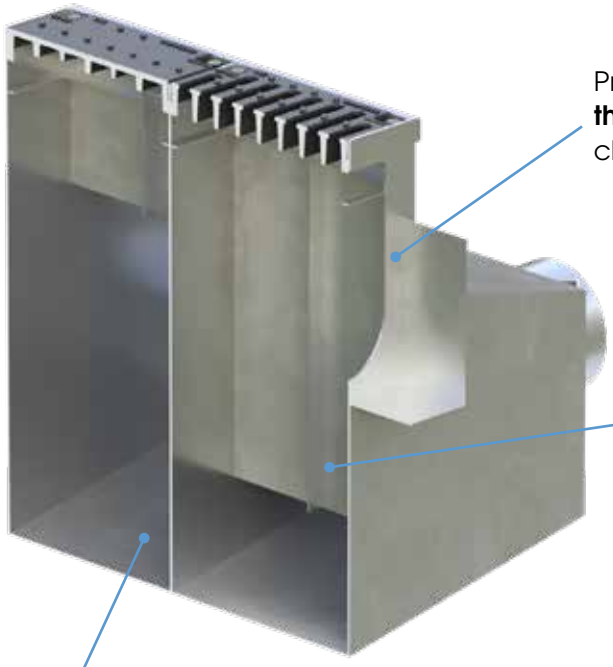
Ductile iron **GRATING class D400** (according to the definition of EN1433), screwed to the flame trap body with stainless steel screws M10

Ductile iron **CLOSED COVER class D400** (according to the definition of EN1433), screwed to the flame trap body with stainless steel screws M10



Outlet openings with pre-welded external pipes

Stainless steel (AISI 304/316/430) flame trap body (with customizable shape)

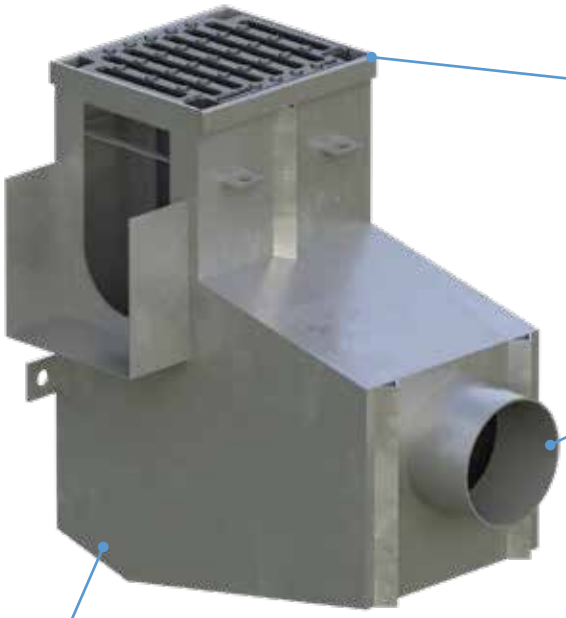


Preformed inlet **connection for the inflow of water** from drainage channels

SYPHON chamber.
The **constant presence of water** inside this chamber ensures the insulation of the flame trap, preventing the propagation of any flames inside the main drainage pipe (manifold).

INSPECTION chamber

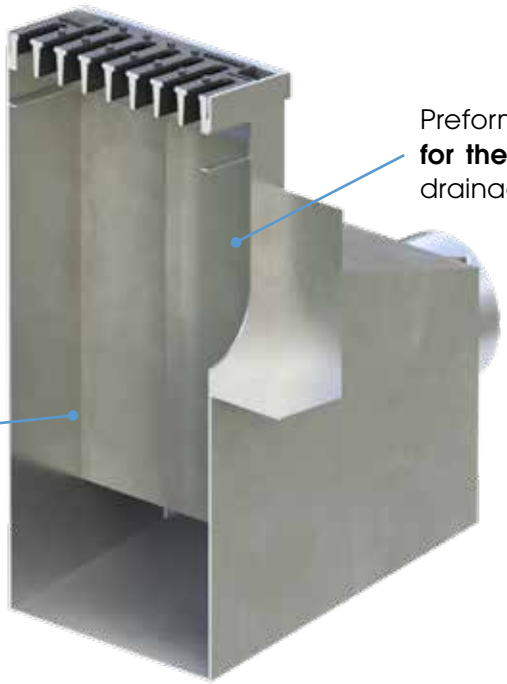
EXEMPLE OF SINGLE-CHAMBER STAINLESS STEES FLAME TRAP



Ductile iron **GRATING class D400** (according to the definition of EN1433), screwed to the flame trap body with stainless steel screws M10

Outlet openings with pre-welded external pipes

Stainless steel (AISI 304/316/430) flame trap body (with customizable shape)



Preformed **inlet connection for the inflow of water** from drainage channels

SYPHON chamber.
The **constant presence of water** inside this chamber ensures the insulation of the flame trap, preventing the propagation of any flames inside the main drainage pipe (manifold).

Technical features

NON-COMBUSTIBLE MATERIALS RESISTANT TO HYDROCARBONS

The materials from which the trap is made (stainless steel, ductile iron) besides being resistant to hydrocarbons, are included on the Fire Fighters' list of "materials considered as belonging to fire reaction classes A1 without having to undergo testing".

The composition of the sealant used to secure the additional external pipe to the channel also ensures utmost resistance to hydrocarbons.

Use and maintenance

In order to ensure the correct operation of the stainless-steel flame traps keep the siphon chamber always full of water. If the system is not used for a long time, the water inside the siphon chamber risks evaporating and the product would no longer fulfil its function. In these cases, it is sufficient to refill with water to ensure that the system is restored.

In the lower part of the syphon chamber various types of debris (stones, asphalt, very fine residues, etc.) could accumulate to the point of rendering the siphon ineffective. For this reason, a careful maintenance and cleaning of the chamber to ensure the correct operation of the entire system are required.

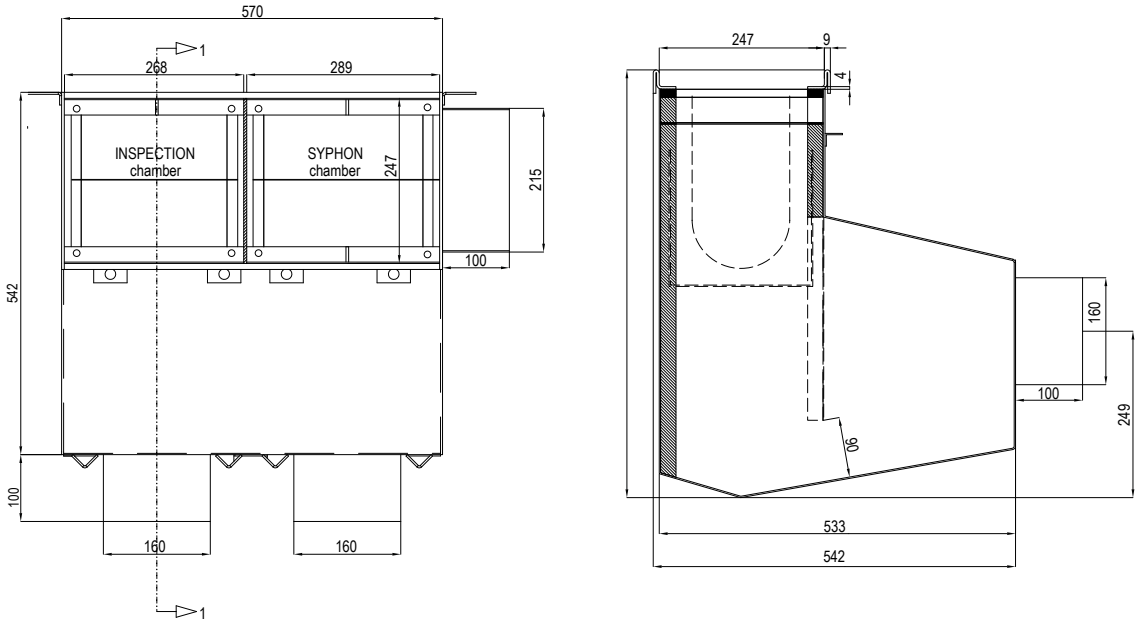
NOTE: For the installation of stainless steel flame traps, reference shall be made to the specific site conditions, and the solution shall be the responsibility of the Client. In any case, it is strictly forbidden to install the above-mentioned products and reopen the roadway to traffic without providing an adequate concrete surround, which protects the unit and makes it suitable for vehicular traffic loads.

References

Project	**Locality** (tunnel)	**No. of Units**
Highway A32 Torino-Bardonecchia	Cels	414
	Prapontin	327
	Perosa	52
	Giaglione	168
	Ramat	94
	Serre La Voute	97
	Mompantero	64

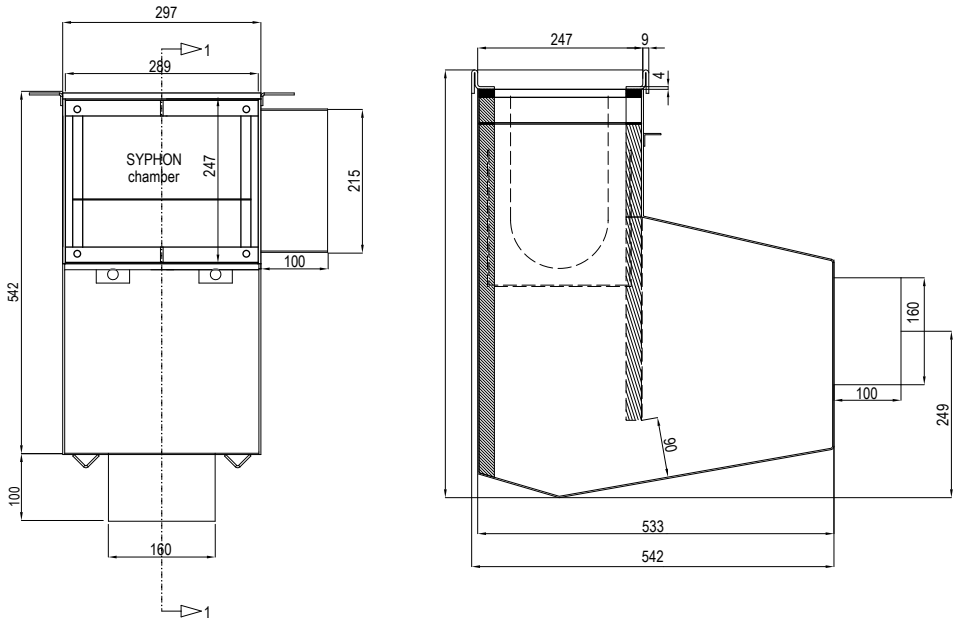
Technical drawings

STAINLESS-STEEL AISI 430 (OR AISI 304) FLAME TRAP - **DUAL-CHAMBER**



This drawing is purely indicative and refers to a model manufactured for a specific project site.
The product is customizable. Please contact our Technical Department for details.

STAINLESS-STEEL AISI 430 (OR AISI 304) FLAME TRAP - **SINGLE-CHAMBER**



This drawing is purely indicative and refers to a model manufactured for a specific project site.
The product is customizable. Please contact our Technical Department for details.

Specification clauses

Supply and installation of a dual-chamber flame trap in AISI 430 stainless steel (alternatively AISI 304 or AISI 316), pickled and passivated, manufactured with shapes, reinforcements and steel thickness designed to meet site conditions and operating requirements, as defined and agreed with the Contracting Authority.
All welds in the unit shall be continuous and executed using the TIG (tungsten electrode) process, ensuring maximum hydraulic tightness as well as excellent aesthetic quality, without spatter or defective weld beads.

The flame trap shall be equipped with two top openings, one per chamber, in which the following elements shall be fixed using M10 stainless steel bolts (4 per grating/cover):

- a slotted grating in ductile iron GJS 500/7 (SYPHON chamber)
- a closed cover in ductile iron GJS 500/7 (INSPECTION chamber)

Both the grating and the cover shall be coated with black paint, provided with identification markings and anti-slip surface features. All covering elements (gratings and covers) shall comply with load class D400 and be tested according to EN 1433.

The flame trap shall also be equipped with:

- a baffle in the "syphon chamber of suitable height to ensure correct siphon operation
- 2 outlet openings with pre-welded external pipes of diameter Ø____
- a preformed inlet connection for the inflow of water from drainage channels

The flame trap thickness and all reinforcements shall comply with the relevant structural calculation report.

Maximum overall dimensions:

- height ____ cm,
- width ____ cm,
- length ____ cm.

The flame trap shall be available in both left-hand and right-hand versions, mirrored to suit the traffic direction within the tunnel (North tube / South tube).

Supply and installation of a single-chamber flame trap in AISI 430 stainless steel (alternatively AISI 304 or AISI 316), pickled and passivated, manufactured with shapes, reinforcements and steel thickness designed to meet site conditions and operating requirements, as defined and agreed with the Contracting Authority.
All welds in the unit shall be continuous and executed using the TIG (tungsten electrode) process, ensuring maximum hydraulic tightness as well as excellent aesthetic quality, without spatter or defective weld beads.

The flame trap shall be equipped with one top opening, fitted with a slotted grating in ductile iron GJS 500/7, fixed using M10 stainless steel bolts (4 per grating).
The grating shall be coated in black paint and provided with identification markings and anti-slip features.
The grating shall comply with load class D400 and be tested according to EN 1433.

The flame trap shall also be equipped with:

- a baffle of suitable height to ensure correct siphon operation
- 1 outlet opening with pre-welded external pipe Ø____
- a preformed inlet connection for the inflow of water from drainage channels

Maximum overall dimensions:

- height ____ cm,
- width ____ cm,
- length ____ cm.

The flame trap shall be available in both left-hand and right-hand versions, mirrored to suit the traffic direction within the tunnel (North tube / South tube).

Supply and installation of an inspection chamber (type single-chamber flame trap) in AISI 430 stainless steel (alternatively AISI 304 or AISI 316), pickled and passivated, manufactured with shapes, reinforcements and steel thickness designed to meet site conditions and operating requirements, as defined and agreed with the Contracting Authority. All welds in the unit shall be continuous and executed using the TIG (tungsten electrode) process, ensuring maximum hydraulic tightness as well as excellent aesthetic quality, without spatter or defective weld beads.

The chamber shall be equipped with one top opening, fitted with a closed cover in ductile iron GJS 500/7, fixed using M10 stainless steel bolts (4 per element).
The cover shall be coated in black paint and provided with identification markings and anti-slip features.
The cover shall comply with load class D400 and be tested according to EN 1433.

The chamber shall also be equipped with 1 outlet opening with pre-welded external pipe Ø____.

Maximum overall dimensions:

- height ____ cm,
- width ____ cm,
- length ____ cm.

150P-D

Greenpipe prouct range

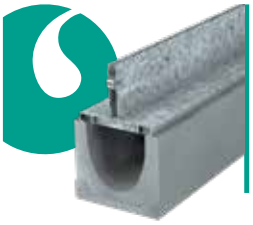
CONCRETE DRAINAGE CHANNELS
EN1433 TYPE M

BASIC+ | SMART PRO | SMART PRO G | BIG 47

"HPC" CONCRETE DRAINAGE CHANNELS
BG-FILCOTEN®
EN1433 TYPE M
BG-FILCOTEN® light | parkline | tec | pro | one

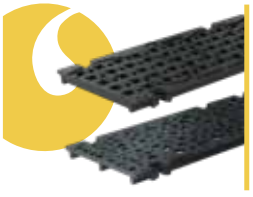
SELF SUPPORTING CHANNELS
EN1433 TYPE I

BIG 47 I | BIG I DRAIN | BIG InS | BIG TANK | STRONG



TOP SLOT DRAINAGE SYSTEM
EN1433 TYPE M
for **BASIC+** and BG-FILCOTEN® light channels

GRATINGS AND FRAMES
for drainage channels
for **cast-in-place installation**



DESIGN GRATINGS

TECHNICAL CHANNELS

For more information,
contact the Greenpipe
technical office

www.greenpipe.it

GREENPIPE

L'innovazione nel drenaggio dell'acqua

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