TIGRE

Line Sewage

Technical Catalogue and Products

Grupo TIGRE

A better world is in the works.

A TOMORROW BETTER FOR EVERYONE. THIS IS OUR BRAND IN TH WORLD.

Each of our actions or our products has a single goal: to build a better world for all.

Better for our professionals who, united and guided by solid values, create innovative solutions to transform reality and people's lives.

Better for our customers, who receive the technology and trust that only a market-leading brand for decades can offer.

And better for the planet, which has every drop of its most precious natural resource respected and preserved with all affection.

Today, we are an admired multinational worldwide, with 24 manufacturing units (10 in Brazil and 14 abroad), present in more than 40 countries. All this done by more than 5,000 dedicated and passionate employees.

These numbers fill us with pride, but what really inspires us is knowing that a better world is at work.

And if it depends on Tigre, he will be better and better for everyone.

Our solutions

When it comes to building or renovating, count on Tigre! More than 75 years of history and innovation with a complete line of products for each stage of your project. After all, as important as a pioneering and transformative stance, it is to bring to the homes of millions of Brazilians solutions that guarantee tranquility and comfort. Whether for home renovation, collective, industrial and building works, real estate and artistic painting, sanitary metals, drainage projects, basic sanitation, agriculture, mining, among other applications, Tigre products guarantee innovative solutions ranging from infrastructure to finishing. And the best part: they are easy to install and very safe.

- Water
- Sewage
- Drainage
- Accessories
- Electrical
- Painting Tools - Real Estate
- Painting Tools - Artistic
- Industry
- Irrigation
- Infrastructure
- Fire Fighting System
- Residential Gas

Summary

Aquapluv® Style

1. Aquapluv®Style

The rainwater that falls on the roof of your building needs to go somewhere, doesn't it? Tigre has ideal lines to collect and conduct this water. Roof rails are durable products, do not rust. They adapt easily to the most varied projects. Tigre Quality, more safety for your work.

1.1. Function/Application

Complete line of gutters, vertical conductors and connections for the collection and conduction of rainwater from roofs with eaves. It has a modern and differentiated design that contributes to the aesthetics of the work.

1.2. Benefits and Differentials

Easy to install
The standardized parts speed up assembly, brackets for fixation already incorporated into the gutter and assembly through simple fitting.

Increased durability and performance
They are resistant to the action of the weather and do not yellow.

Complete line of pipes and connections
Greater adaptation to designs due to the options of right to left end nozzles and circular and rectangular conductors.

Increased safety
Perfect sealing and distinctive design.

Maximum comfort at high temperatures
Recommended to operate at the service temperature of 80°C, conducting water under pressure of 60 m.c.a.

Easy maintenance
Painting is not required, simply washing with water and neutral soap.

1.3. Technical Characteristics

Material: Made of PVC Poly(vinyl chloride) with anti-UV additive.

Color: White and beige.

Dimensioning: Rectangular shaped gutters, 132 x 89 mm.

Two conductor options: Rectangular and circular.

Connection with eyebolts for direct attachment to the fascia boards and sealing rings already incorporated into the product.

Next, see the list of reference standards that govern the manufacture of the Aquapluv® Style Line and that ensure excellent performance, providing a high degree of safety to the facilities.

REFERENCE TECHNICAL STANDARDS	
NBR 10844	Rainwater Building Installations.

Supports available in the following versions:

PVC support: for direct use on the fascia boards or with the metal rod. Available in gutter colors.

Metal Rod: for roofs without a fascia board, using the PVC support.

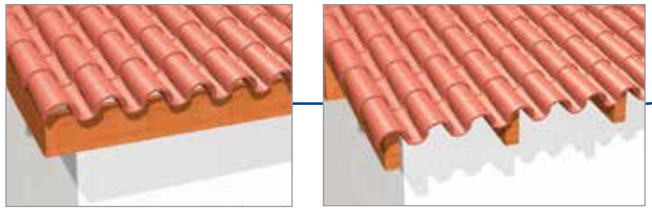
Folded Metallic Support: for roofs without fascia boards, for direct fitting of the gutter. Available in white and zinc-plated colors.

1.4. Installation of Aquapluv® Style Gutters

Tools required for installation:
Bubble level, screwdriver, level or string, pencil, saw bow, screws for use in wood (4.2 mm x ¾"), TIGRE Lubricant Paste to be used in seals.

1 Check whether or not the eaves have fascia boards.

Eaves with fascia boards **Eaves without fascia boards**

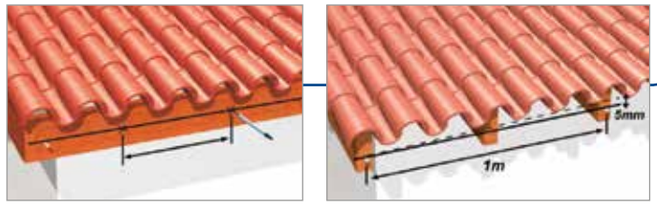


Eaves with fascia boards: the gutter will be fixed onto it.

In eaves without fascia boards: the gutter can be fixed on the rails, provided that the distance between them is not greater than the maximum spacing between supports, which is 60 cm. If the distance exceeds this value, it is recommended to install a fascia board on the eaves.

2 Mark the points for fixing the rail and connections.

Eaves with fascia boards **Eaves without fascia boards**



In eaves with fascia boards: to fix the gutter to the forehead, use the PVC supports and the connections, which, in this case, are all fixed directly to the forehead. To start, mark the position of the nozzles, which will be the points of descent of the water by the conductors and will decide the direction of the slope of the gutter. Measure the length of the fascia board section.

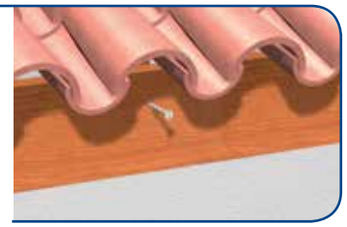
Calculate the unevenness between the start and end point (next to the conductor) in order to ensure a slope of 0.5% (5 mm every meter). Secure the first bolt at the start point and another at the end point. Stretch a line between them and mark the intermediate points, maintaining a maximum spacing between the supports of 60 cm.

In eaves without fascia boards: set the direction of the inclinations according to the position of the nozzles. In this case, the alignment of the fixing points is already predefined by the position of the rafters.

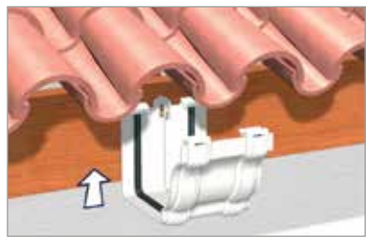
However, it is necessary to mark the differences between the points, to respect the slope of 0.5% for the gutter. Secure the first and last bolt.

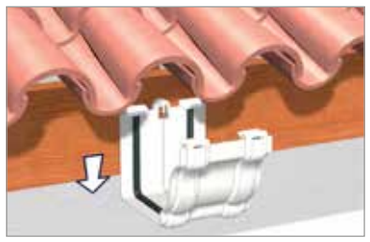
Stretch a line between them and mark the intermediate points in the center of the rafters.

3 Secure connections and brackets.



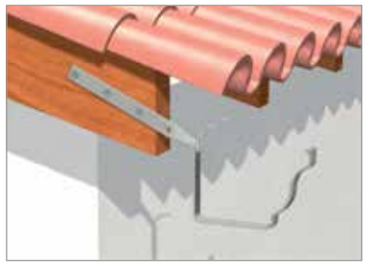
Eaves with fascia boards: directly fix the connections (seams and intermediate or end nozzles) by hanging them on the screws fixed in the corresponding positions, as shown in the figures. Tighten with screwdriver.

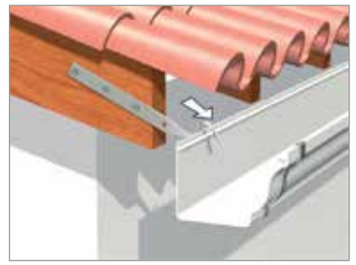




Eaves without fascia boards: in this case, two options of supports are available, whose application instructions are as follows:

Option 1: Folded metal support: it must be screwed on the side of the rack, at the ideal height to ensure the slope of 0.5% of the trough.



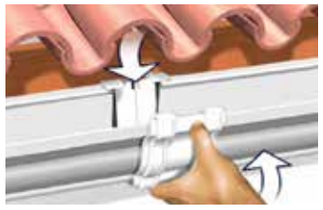


Option 2: Metal rod with PVC support: the rod can be fixed to the sides of the rafters, all at the same height, and the level of the supports can be adjusted by fixing the screws to ensure the slope of the gutter.

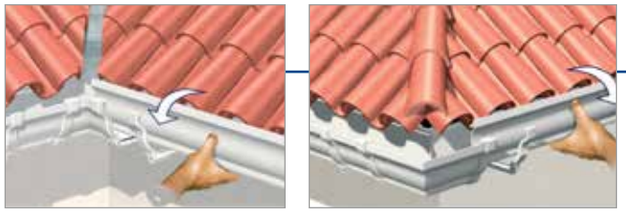
In these cases, the intermediate connections will be supported by the gutter itself, as there is no fascia board surface to fix them.

4 Place the chute. The rail must be fitted to the brackets and connections already fixed to the fascia boards or rafters. Fit the back first and rotate the chute downwards.

In the case of eaves without fascia boards, after fixing the gutter, the connections must be fitted to it.



5 Place the squares. After fixing the gutter and connections, enclose the squares at the points where they are provided.



6 Place the headboards. The last connections to be fitted in the gutter will be the headboards and bedside nozzles.

7 Install the conductors.

The Aquapluv® Style line of gutters has two types of conductors: rectangular and circular. For measurement and cutting of the conductors, in both cases, the first step is to measure the height and cut the segments, as needed. Connections should always be installed with the tips facing down. The splice of the conductors is placed by simple fitting.

8 Installation of clamps.

It is recommended to use two clamps every 3 m of circular or rectangular conductor. If necessary, use plumb to keep the conductor vertical during installation.

Option 1: Rectangular conductor clamp: it is composed of three parts: base, screw and clamp body. First fix the clamp base to the wall using screw and proper bushing.

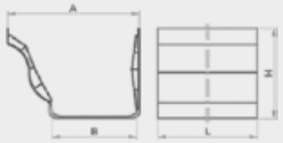
Then fit the clamp body to the conductor and position it on the base by tightening the bolt slightly. After adjusting the distance between the conductor and the wall, tighten the screw firmly.

Option 2: Clamp for circular conductor: it consists of a hinged ring and a locking pin. First, fix the clamp to the wall with screw and bushing.

Then mount the conductor and lock the clamp with the pin.

1.5. Aquapluv® Style Line Items

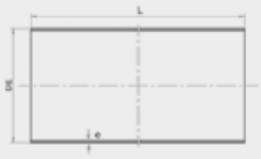
• Aquapluv® Style gutter



DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
13029377	132	90	89	300	White

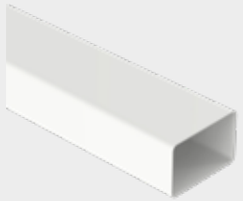
• Aquapluv® Style Circular Conductor

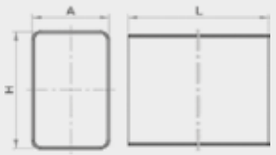


DIMENSIONS (mm)

CODE	DE	e	L	COLOR
13121133	88	1,7	3000	Beige
13121150	88	1,7	3000	White

• Aquapluv® Style Rectangular Conductor

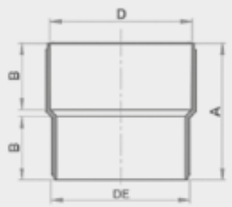




DIMENSIONS (mm)

CODE	A	H	L	COLOR
13121222	65,4	100	3000	White

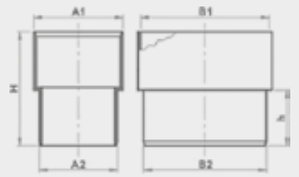
• Circular Coupling Aquapluv® Style



DIMENSIONS (mm)

CODE	A	B	D	DE	COLOR
32198872	88	41,5	88	84	Beige
32198899	88	41,5	88	84	White

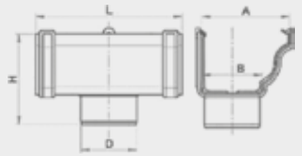
• Aquapluv® Style Rectangular Coupling



DIMENSIONS (mm)

CODE	A1	A2	B1	B2	H	h	COLOR
32198929	70	61	101	96	90	44	White

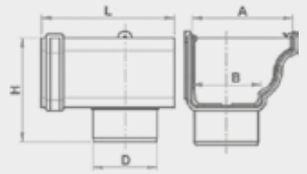
• Aquapluv® Style Circular Nozzle



DIMENSIONS (mm)

CODE	A	B	D	h	L	COLOR
32029523	133	91	83	142	222	White

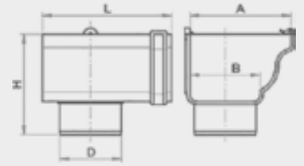
• Aquapluv® Style Circular Nozzle Right



DIMENSIONS (mm)

CODE	A	B	D	h	L	COLOR
32029582	133	91	84	142	177	White

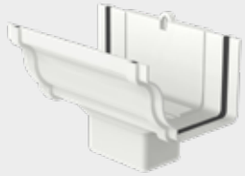
• Left Circular Nozzle Aquapluv® Style

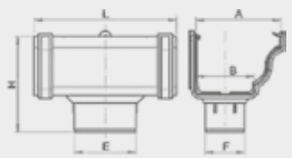


DIMENSIONS (mm)

CÓDIGO	A	B	D	H	L	COLOR
32029647	133	91	84	142	177	White

• Aquapluv® Style Rectangular Nozzle

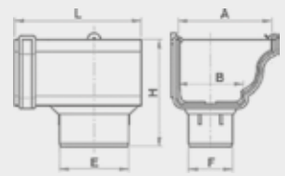




DIMENSIONS (mm)

CODE	A	B	E	F	H	L	COLOR
32029809	133	91	94	61	149,5	222	White

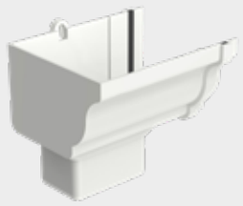
• Aquapluv® Style Right Rectangular Nozzle

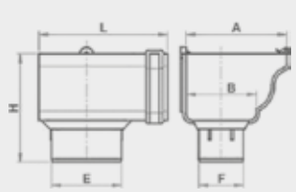


DIMENSIONS (mm)

CODE	A	B	E	F	H	L	COLOR
32029884	133	91	96	61	149,5	177	White

• Aquapluv® Style Left Rectangular Nozzle

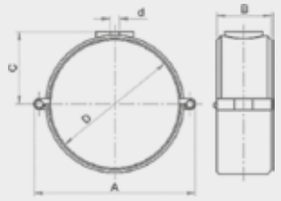




DIMENSIONS (mm)

CODE	A	B	E	F	H	L	COLOR
32029949	133	91	96	61	149,5	177	White

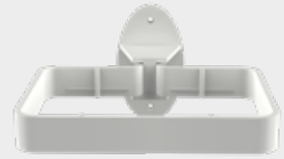
• Circular Clamp Aquapluv® Style

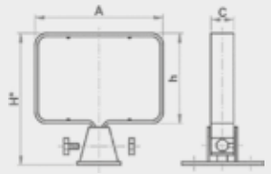


DIMENSIONS (mm)

CODE	A	B	C	d	D	COLOR
32048803	107,6	35	49,3	5	88,6	Beige
32048854	107,6	35	49,3	5	88,6	White

• Aquapluv® Style Rectangular Clamp

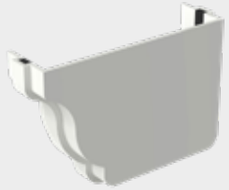


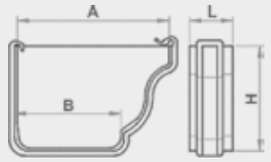


DIMENSIONS (mm)

CODE	A	C	h	Hmáx	Hmin	COLOR
32048870	106	19	74,5	142	115	White

• Right Headboard Aquapluv® Style

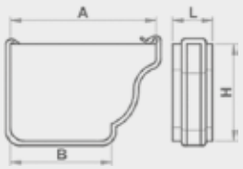




DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32068928	133	91	92	38	White

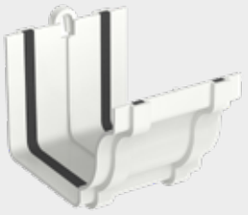
• Left Headboard Aquapluv® Style

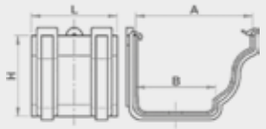


DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32068979	138	96	92	38	White

• Aquapluv® Style Splice

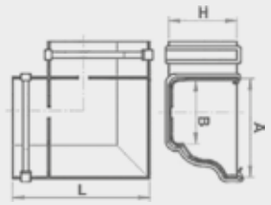




DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32118860	133	91	92	97	White

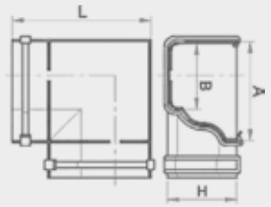
• Aquapluv® Style External Square



DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32138926	133	91	92	185,5	White

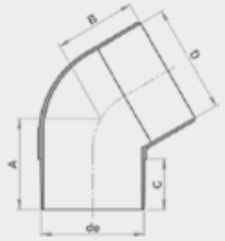
• Inner Square Aquapluv® Style



DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32128920	133	91	92	185,5	White

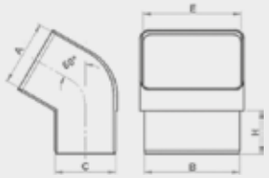
• Elbow 60° Circular Aquapluv® Style



DIMENSIONS (mm)

CODE	A	B	C	D	de	COLOR
32163017	77,5	71	41	88,5	84	Beige
32163068	77,5	71	41	88,5	84	White

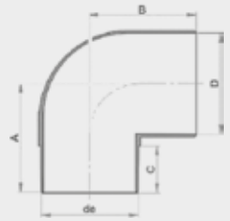
• Aquapluv® Style Rectangular 60 ° Elbow



DIMENSIONS (mm)

CODE	A	B	C	E	H	COLOR
32163122	66	96	61	101	44	White

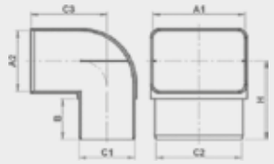
• 90 ° Elbow Circular Aquapluv® Style



DIMENSIONS (mm)

CODE	A	B	C	D	de	COLOR
32158960	95	92,5	41	88,5	84	Beige
32158927	95	92,5	41	88,5	84	White

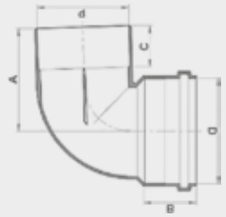
• Aquapluv® Style Rectangular 90° Elbow



DIMENSIONS (mm)

CODE	A1	A2	B	C1	C2	C3	H	COLOR
32158820	101	66	44	61	96	83	85	White

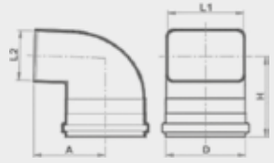
• Aquapluv® Style Circular Transition Elbow



DIMENSIONS (mm)

CODE	A	B	C	d	D	COLOR
32196055	100,8	50	40	88,5	101,5	Beige

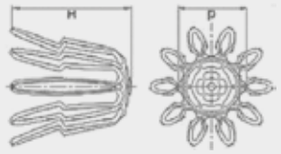
• Aquapluv® Style Rectangular Transition Elbow



DIMENSIONS (mm)

CODE	A	d	h	L1	L2	COLOR
32196071	94	106,5	105	101	70	White

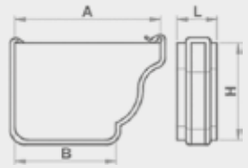
• Aquapluv® Style Flexible Grille



DIMENSIONS (mm)

CODE	d	H	COLOR
32196152	72,72	137,72	White

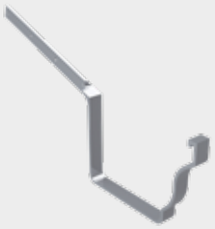
• Aquapluv® Style PVC Stand

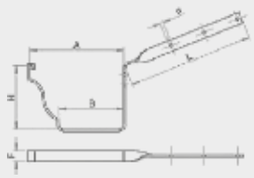


DIMENSIONS (mm)

CODE	A	B	H	L	COLOR
32197760	133	91	107	40	White

• Aquapluv® Style Folded Metallic Support





DIMENSIONS (mm)

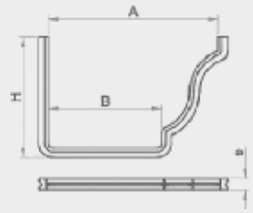
CODE	A	B	d	F	H	L	COLOR
32208720	137	92	4,5	16	90	180	White
32208703	137	92	4,5	16	90	180	Zinc plated

• Aquapluv® Style Metal Rod

DIMENSIONS (mm)

CODE	A	B	b	c	E	e	F	f	L	COLOR
32208827	112	86	15,9	6,5	51	3,2	57	6	285	Zinc plated

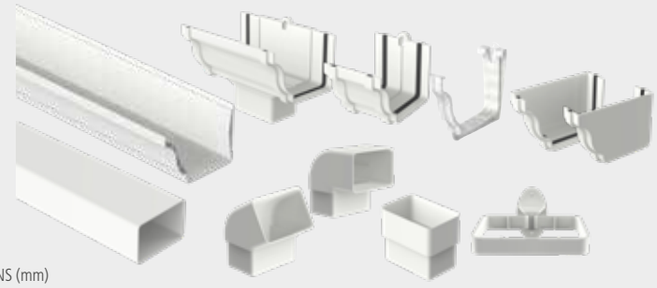
• Aquapluv® Style Seal



DIMENSIONS (mm)

CODE	A	B	H	e
32238858	131	89	91	8,5

• Aquapluv® Style White Gutter Set



DIMENSIONS (mm)

CODE	COTA
100002685	6m
100002687	8m

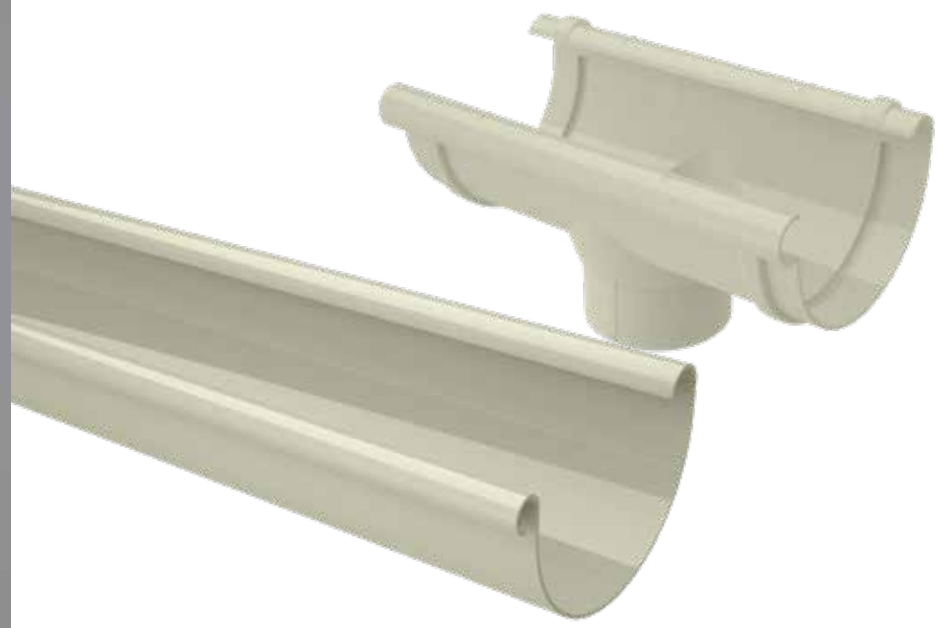
Aquapluv®

2. Aquapluv®

The rainwater that falls on the roof of your building needs to go somewhere, doesn't it? Tigre has ideal lines to collect and conduct this water. Roof rails are durable products, do not rust and adapt easily to the most varied projects. Tigre Quality, more safety for your work.

2.1. Function/Application

For the collection of rainwater from roofs, leading to the rainwater collection network.



2.2. Benefits and Differentials

Easy installation
Simple fitting, ready to install.

Increased durability and performance
Made of PVC, they resist corrosion and salt spray.

Increased safety
Rubber rings give 100% tightness.

Easy maintenance
Painting is not required; for cleaning, just wash with water and mild soap.

2.3. Technical Characteristics

Material: Made of PVC Poly(vinyl chloride) with anti-UV additive.

Color: Beige.

Dimensioning: Circular shaped gutters, DN 125.

Conductors: Verticals in circular format.

Next, see the list of reference standards that govern the manufacture of the Aquapluv® Line and that ensure excellent performance, providing a high degree of safety to the facilities.

REFERENCE TECHNICAL STANDARDS	
NBR 10844	Rainwater Building Installations.

Supports available in the following versions:

PVC support: for direct use on the fascia boards or with the metal rod.

Metal Rod: for roofs without a fascia board, using the PVC support.

Zinc plated support: for roofs without fascia boards, for direct fitting of the gutter.

2.4. Instructions

2.4.1. Installation of Aquapluv® Gutters

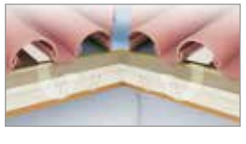
1 Screw the gutter supports onto the roof structure. Calculate a 0.5% gap between the start point of the trough and the vertical conductor. The maximum distance between supports should be 60 cm.

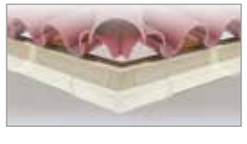
In eaves with fascia boards:
use the PVC Brackets (A).

In eaves without fascia boards: use the Metallic Support (B) or the Metallic Rod with PVC Support (C).

2 To fit the rails, first place the rear part on the brackets and rotate the rack downwards.

3 Fix the splices and the squares in the points where they are foreseen.



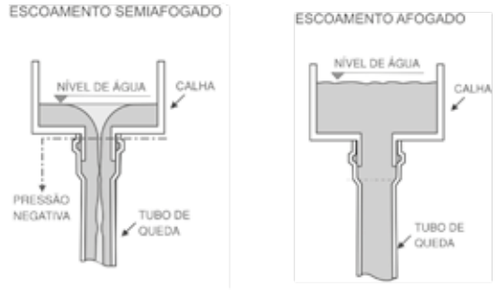


4 Finally, fit the headboards to the ends of the chute and the nozzles for coupling with the circular conductors.

2.4.2. Phenomena that occur in Vertical Rainwater Pipes

Experience shows that in pipes with greater height, intended to control rainwater, phenomena can occur, such as negative pressures inside, that is, vacuum. This phenomenon is harmful to the facilities, as it causes rupture in the piping. It can occur in the following situations:

a) When rainfall pipes are poorly sized, with diameters smaller than necessary. This can cause, in cases of heavier rains, excessive accumulation of water inside the gutters. For this reason, the inlet of the pipe (part of the nozzle) remains drowned, that is, no air passes along with the water into the pipe. In these cases, negative pressure occurs. The higher the height of the building, the higher it will be.



b) When there is an accumulation of leaves or other materials at the entrance of the nozzle, which also drown it and prevent air from passing through the piping along with water.

As these accidental situations are practically impossible to predict, to avoid further damage to the pipes, it is recommended to use special pipes, capable of withstanding vacuum conditions, without suffering any damage, especially in buildings with more than three floors. For these situations, TIGRE recommends the Reinforced Series Sewage line (see Technical Sewage Catalog), as established in ABNT NBR 5688:2010.

2.4.3. General System Check

After installing the entire system, check the tightness of all gutter joints and whether or not there is leakage in any of them.

Leaks usually happen when:

- O-ring missing.
- Some ring is out of position or twisted.
- Fitting between connections and gutters was poorly performed.
- Some ring is damaged.

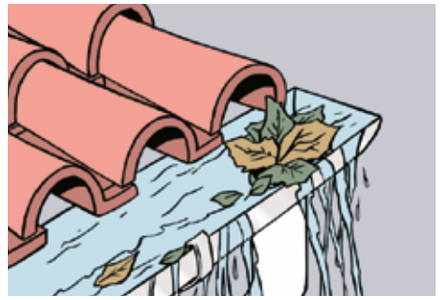
It is important to remember that the Aquapluv® and Aquapluv® Style Gutters must be installed respecting the fitting limit that comes marked on the body of the gutters, as the PVC undergoes dilation when exposed to the sun, which is normal.

Also check the spacing between brackets and correct if any are not recommended. Remember that the maximum spacing is 60 cm. Correct the positions and retighten the brackets if you notice that any are loose.

For apparent vertical conductors, it is recommended to use plumb to ensure their vertical alignment.

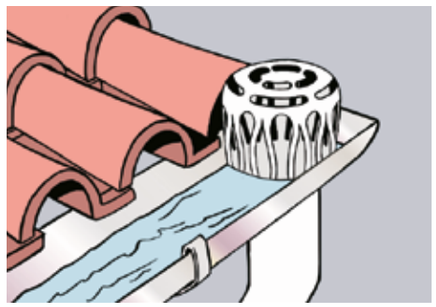
2.4.4. Cleaning Roof Gutters

It is very common, after a period of use, for the gutters to accumulate dirt and leaves inside. This is normal, but it affects the good performance of the system. For this reason, it is recommended to periodically clean the inside of the gutters.



When cleaning, be careful not to damage the walls of the gutter and its seals.

To prevent clogging of vertical conductors, use the TIGRE Flexible Grille. Installed in the nozzles of the gutters, it prevents dirt and sheets from being routed through the rainwater piping.



2.4.5. Vertical Conductors

In the case of apparent conductors, in case of clogging, the ideal is to disassemble the section, remove the accumulated dirt and, if possible, do a simple internal washing.

If the conductor is recessed, a wire, metal rod or some equipment that allows the unclogging must be used, taking care not to damage the conductor.

Make sure it has been fully unclogged by testing it with some water and seeing if it reaches the sandbox.

The SN and SR sewage pipes cannot be used as vertical conductors, in view of the difference between the dimensions and also the absence of protection against UV rays. They can be used in the buried sections after the use of the transition elbows, which make the gauges compatible.

2.4.6. Storage

The area receiving the pipes must be horizontal, level, without stones or sharp objects and protected from the weather.

2.5. Sizing

The standard that sets the requirements by which rainwater building installations must be designed and executed, taking into account the minimum technical conditions of hygiene, safety, durability, economy and comfort of users is NBR 10844 - Rainwater Building Installations.

Table 1 - Flow in Nozzles

Location	At - Roof area that a rectangular nozzle can flow (m²)	At - Roof area that a circular nozzle can drain (m²)
Aracajú - SE	137,7	175,8
Belém - PA	107,01	136,61
Belo Horizonte - MG	74,01	94,49
Cuiabá - MT	88,42	112,89
Curitiba - PR	82,35	105,14
Florianópolis - SC	140,0	178,74
Fortaleza - CE	107,69	137,49
Goiânia - GO	94,38	120,50
João Pessoa - PB	120,0	153,20
Maceió - AL	137,7	175,80
Manaus - AM	93,33	119,16
Natal - RN	140,0	178,74
Porto Alegre - RS	115,07	146,91
Porto Velho - RO	100,60	128,43
Rio Branco - AC	120,86	154,3
Rio de Janeiro - RJ	96,55	123,27
Salvador - BA	137,7	178,8
São Luiz - MA	133,33	170,22
São Paulo - SP	97,67	124,70
Teresina - PI	70,0	89,37
Vitória - ES	107,69	137,49

2.5.1. Sizing guidelines

In Table 1, find the maximum roof area that each conductor can drain. To do this, mark the city where the installation will be made, according to the conductor model.

Calculate the contribution area of the roof.

$$Ac = \left(a + \frac{h}{2} \right) \times b$$

Where:
Ac = contribution area (m²)
a = water width (roof plane) (m)
b = roof length (m)
h = roof height (m)

Calculate the number of conductors that should be used for each roof plan.

$$Nc = \frac{Ac}{At}$$

Where:
Nc = number of conductors
Ac = contribution area (m²)
At = roof area (m²)

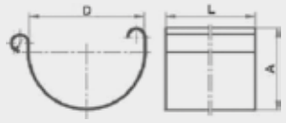
Calculate the distance between the conductors (for two or more conductors).

$$d = \frac{b}{(Nc - 1)}$$

Where:
d = distance between conductors (m)
b = total length of roof plane (m)
Nc = number of conductors

2.6. Aquapluv® Line Items

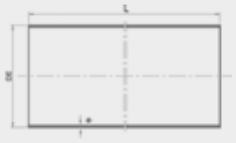
• Aquapluv® gutter



DIMENSIONS (mm)

CODE	A	L	D	COLOR
13029253	90,5	3000	124,5	Beige

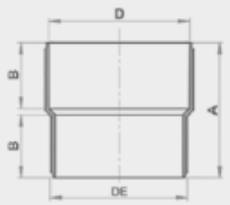
• Aquapluv® Circular Conductor



DIMENSIONS (mm)

CODE	DE	e	L	COLOR
13121133	88	1,7	3000	Beige

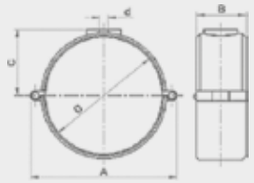
• Aquapluv® Circular Coupling



DIMENSIONS (mm)

CODE	A	B	D	DE	COLOR
32198872	88	41,5	88	84	Beige

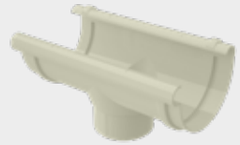
• Aquapluv® Circular Clamp

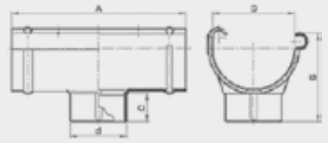


DIMENSIONS (mm)

CODE	A	B	C	d	D	COLOR
32048803	107,6	35	49,3	5	88,6	Beige

• Aquapluv® mouthpiece

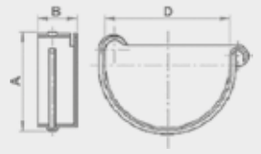




DIMENSIONS (mm)

CODE	A	B	C	d	de	COLOR
32029353	270	144	43	88,9	128	Beige

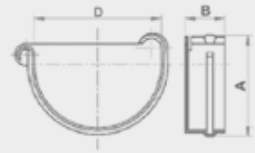
• Right Headboard Aquapluv®



DIMENSIONS (mm)

CODE	A	B	D	COLOR
32068804	101	40	128	Beige

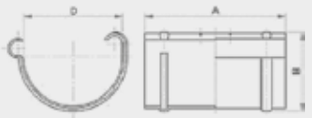
• Left Headboard Aquapluv®



DIMENSIONS (mm)

CODE	A	B	D	COLOR
32068855	101	40	128	Beige

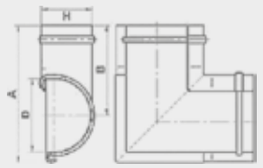
• Aquapluv® Splice



DIMENSIONS (mm)

CODE	A	B	D	COLOR
32118909	183	101	128	Beige

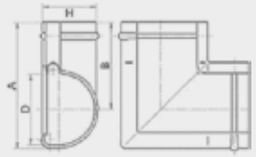
• Aquapluv® External Square



DIMENSIONS (mm)

CODE	A	B	D	H	COLOR
32138810	237,5	155	128	101	Beige

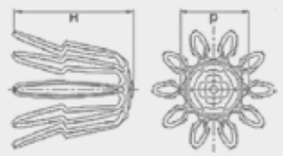
• Aquapluv® Indoor Square



DIMENSIONS (mm)

CODE	A	B	D	H	COLOR
321128807	245,5	175	128	101	Beige

• Aquapluv® Flexible Grid



DIMENSIONS (mm)

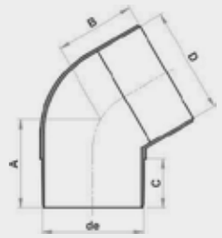
CODE	d	H	COLOR
32196152	72,72	137,72	White

• Aquapluv® Metal Rod

DIMENSIONS (mm)

CODE	A	B	b	E	e	F	f	L	COLOR
32208827	112	86	15,9	51	3,2	57	6	285	Zinc plated

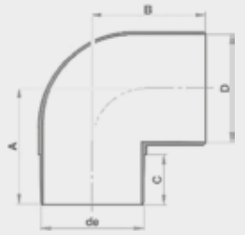
• Aquapluv® Circular 60 ° Elbow



DIMENSIONS (mm)

CODE	A	B	C	D	de	COLOR
32163017	77,5	71	41	88,5	84	Beige

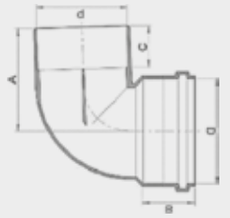
• Aquapluv® Circular 90° Elbow



DIMENSIONS (mm)

CODE	A	B	C	D	de	COLOR
32158960	95	92,5	41	88,5	84	Beige

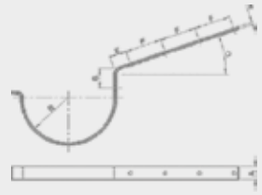
• Aquapluv® Circular Transition Elbow



DIMENSIONS (mm)

CODE	A	B	C	d	D	COLOR
32196055	95	50	40	88,5	101,6	Beige

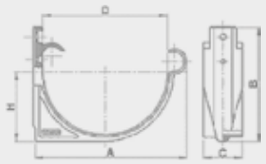
• Aquapluv® Metal Support



DIMENSIONS (mm)

CODE	A	B	e	E	F	O	R	COLOR
32208800	15,9	19	3,2	21	21	22	64	Zinc plated
32208754	15,9	19	3,2	21	21	22	64	Beige

• Aquapluv® PVC support



DIMENSIONS (mm)

CODE	A	B	C	D	H	COLOR
32198813	151	100,5	40	128	70,5	Beige

• Aquapluv® Seal

DIMENSIONS (mm)

CODE	A	d	e
32238807	210	3,7	6,7

• Aquapluv® Beige Gutter Set

CODE	DIMENSIONS (mm)
100002684	6m
100002686	8m

Notes

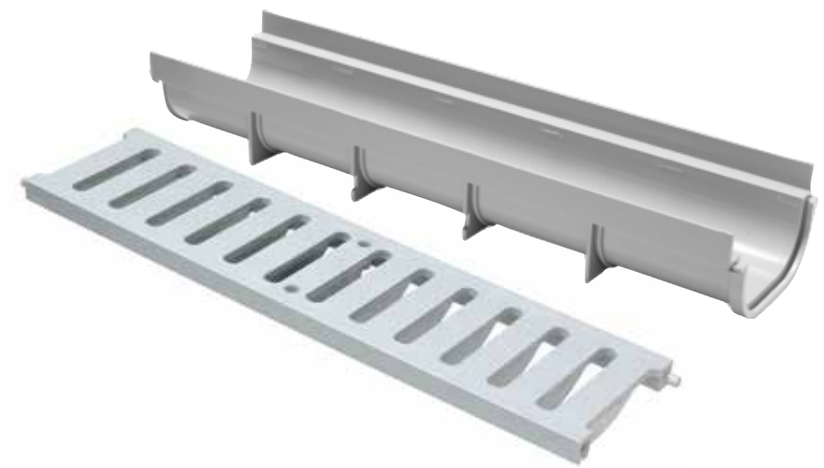
Grates and Channels

3. Grates and Channels

The Tigre Grates and Channels line has an excellent aesthetic to match different environments. A mix of light products, which do not rust and have high chemical resistance and are also very easy to install. Choose from the ideal shapes, sizes and colors to match your project, opting for the quality and safety of Tigre products.

3.1. Function/Application

Line of grates and channels to collect and conduct water and other liquids that flow from floor surfaces. For application in residential courtyards, parking lots, garages, squares, commercial buildings, sports courts, club and residential pools. They can also be used in industry, due to excellent chemical resistance and resistance to high temperatures (75°C).



3.2. Benefits and Differentials

Easy to install
The channels serve as ready-to-install moulds, without the need for wooden moulds, speeding up the execution of the work.

Easy maintenance
They have a smooth surface, do not create fouling, making it easier to clean.

Increased durability and performance
The grates and channels and gutters do not corrode and withstand excessive weights.

Increased safety
The grates have non-slip surfaces, offering greater safety against falls and slips.

Versatility
TIGRE Grates have perfect finishing and color options to choose from.

Easy assembly
To assemble the grates, simply fit each other and install on the floor.

3.3. Technical Characteristics

Material: Made of rigid PVC Poly(vinyl chloride) with anti-UV additive.

Color: Gray, white and sand.

Surface: Completely smooth channels and grills with non-slip surfaces.

Dimensioning: Channels and rigid grates indicated for applications in rectilinear sections: do not accept curvature in plan or profile.

Conductors: Grates with interlocking system.

Joint system: Through connections and welding between the gutters and the connections. Completely smooth gutter surfaces.

Below, see the list of reference standards that govern the manufacture of the Grates and Channels Line and that ensure excellent performance, providing a high degree of safety to the facilities

REFERENCE TECHNICAL STANDARDS	
NBR 10844	Rainwater Building Installations.

3.4. Line Components

Channel Standard: lighter, has a smooth wall 2 mm thick. Requires shoring during concreting. It can be cut at any point, and the fit with another trough profile is made by means of splicing and TIGRE Plastic Adhesive. Requires concrete ballast for laying.
Resistant to dumps up to 50ºC in continuous regime.

Dimensions:
130 x 140 x 2500 mm
200 x 160 x 2500 mm

Reinforced Channel: gutter with reinforced wall and thickness of 3 mm, no shoring during concreting. It can be cut every 10 cm (in the markings on its body, which serve to fit between the gutters). It is welded with TIGRE Plastic Adhesive and requires concrete ballast for laying. It resists dumps of up to 75ºC in continuous regime.

Dimensions:
130 x 75 x 500 mm
130 x 148 x 500 mm

Connections: squares, headboards, nozzles and other components to perform changes of direction, flow and plugging at the end of the lines.

Milestone type profile: recommended for placing the grids in concrete or masonry gutters. It can be used in renovations or in places where the channel needs unevenness.

Dimensions:
20 x 15 x 2500 mm

Blind covers: are recommended for applications in stretches where it is not necessary to collect water from the floor. Used for pedestrian traffic (500 kg).

Grates: allow the capture of water from the floor. There are several models to choose from according to the load that will pass over the surface where they will be installed (see installation instructions).

Articulated Grate: are recommended for applications in round or winding pools in places that require curves. Used where there is only pedestrian traffic.

The length of the Articulated Grate can be reduced or increased as needed, simply by fitting the segments that make up the grate.

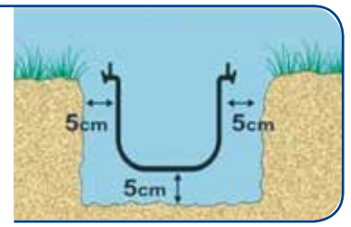
Rigid Grates: which support greater weight, do not necessarily need to be used with the Reinforced channels, since the load is supported by the concrete ballast that surrounds the channel.

The choice between Normal and Reinforced channel does not depend on local traffic, as they are only coatings of concrete ballasts. The temperature of the dump and the form of installation determine this choice.

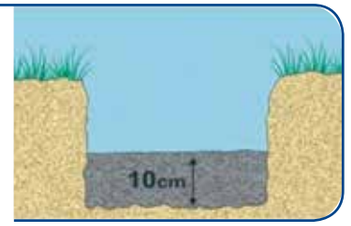
3.5. Instructions

3.5.1. Installation of the Channel Standard

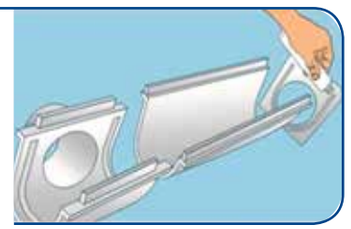
1 Dig a trench with a width and depth greater than the trough dimensions. Adopt 5 cm of clearance, as shown.



2 Make a concrete cradle 10 cm thick and avoid protruding stones.



3 Mount the gutter, outside the trench, with the appropriate connections. Use Plastic TIGRE Sticker to solder the pieces.



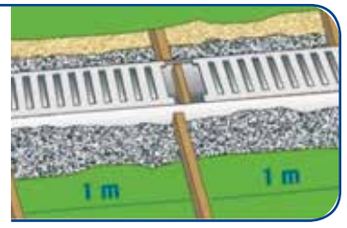
4 Drill small holes, every 50 cm, in the flat part of the flaps of the channel. This will allow air and liquid cement to escape at the time of installation.

5 To ensure good adherence of the trough to the concrete, follow the instructions:
- Sand the external side surfaces.
- Apply TIGRE Plastic Sticker to the sanded place.
- Spray surfaces with dry sand.
- Let it dry for a while.

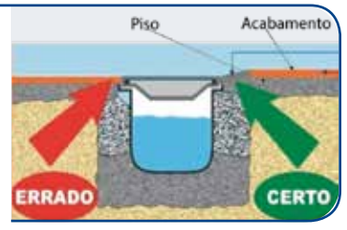
6 Install the channel together with the grate, this will prevent the channel from deforming during the curing of the construct. Place small strips of cardboard between the channel and the grate to create minimal slack. Fill the trench with concrete or grout (polymeric mortar).

Important:
Be careful not to leave empty spaces in the concrete.

7 To ensure the uniformity of the alignment of the channels, it is recommended to place wooden battens on both sides, positioning them transversely every meter. These battens will avoid twists and misalignments of the channels during concreting.



8 The floor finish should be a few millimeters above the channel level.

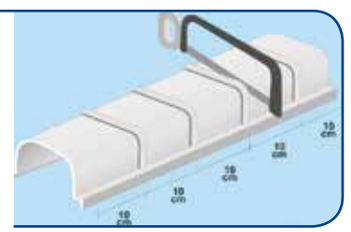


Important:
In the case of coated floors, the coating cannot rest on the flap of the chute.

3.5.2. Reinforced Channel Installation

The modular profile is supplied in pieces of 50 cm in length, composed of 5 modules of 10 cm each. The 50 cm pieces fit together.

1 By cutting in the center of the reinforcement that separates each module, it is possible to make the fit with other elements and work with multiple lengths of 10 cm.

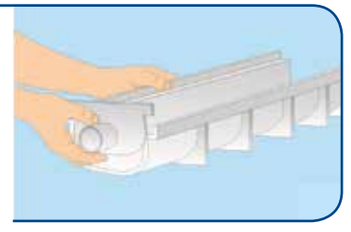


2 Using the Plastic Adhesive for TIGRE PVC, the mobile profiles assume the structure of a monolithic gutter, ensuring perfect tightness to the system.

3 If you need to use one of the side outlets DN 40, use the bag/tip adapter that comes with the nozzle with outlets.

4 Rupture the diaphragm.

5 Example of head fitting that, with the rupture of the diaphragm, becomes a headboard with an exit.



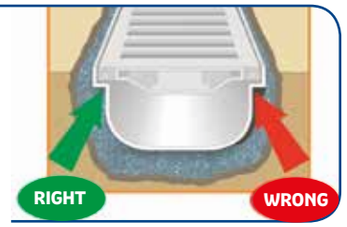
3.5.3. Installation of Trench Reinforced Channel

1 1 Dig a trench so that it is at least 5 cm on each side in relation to the profile of the channel.

2 Mount the channel, outside the trench, using the appropriate connections for the joining of the parts. Use the PVC Plastic Adhesive, so the assembly will be monolithic and watertight.

3 Install the channel with the grids already in place to prevent the profiles from deforming when curing the concrete.

4 Carefully fill the trench with a mortar of cement and grout sand, so that no holes or voids are left.

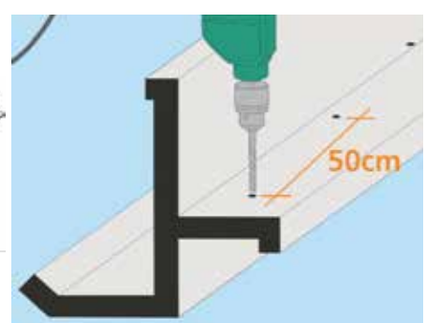


Notes: The profiles are not self-supporting and function only as molds. For this reason, the system needs concrete on the base and sides.

3.5.4. Installation of Floor Grate Milestone

The TIGRE Floor Grate Landmarks have been developed to make it possible to easily and quickly install the TIGRE PVC grates in concrete or masonry channels.

Drill holes every 50 cm in the horizontal flap of the landmark, to allow air and liquid cement to escape when it is installed.

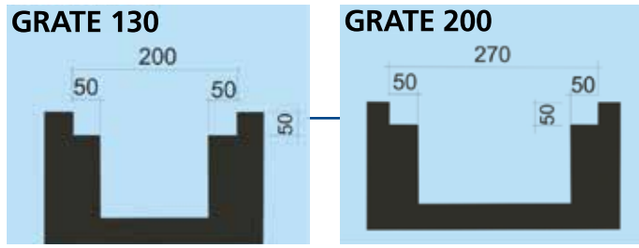


The installation of the milestones can be performed in two ways:

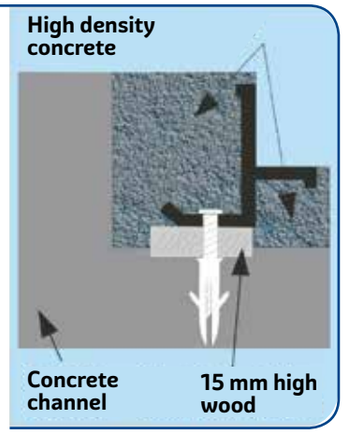
a) With wooden batten;
b) No wooden batten.

a) Option with wooden batten:

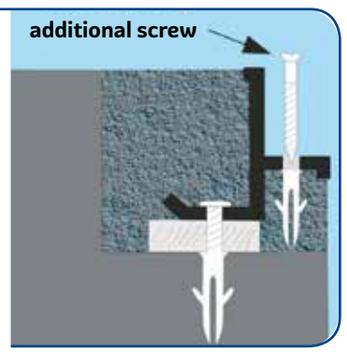
1 First, concrete the channel with the dimensions appropriate to the size of the grates, as shown in the illustrations:



2 After curing the concrete, fix the PVC landmarks and wooden battens (spaced 50 cm apart) on the concrete gutter using screws and plastic bushings. Fill in the marked spaces with the arrows carefully with high strength grout mortar.

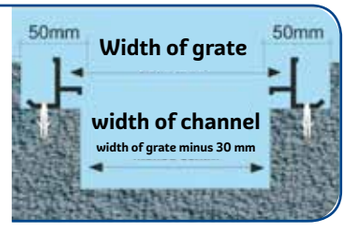


3 A reinforcement can be made by fixing the horizontal flap of the landmark on the filling material with an additional screw.

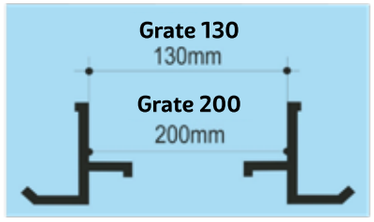


b) Option without wooden batten:

1 After curing the concrete, fix the PVC landmarks directly on the concrete gutter using screws and plastic bushings. Note that, in this case, the recess of the concrete channel should be 35 mm.

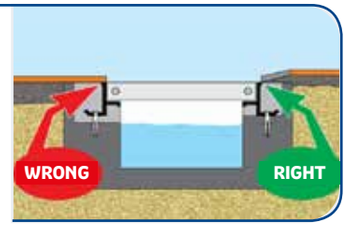


Important:
The milestones must be installed level and placed strictly at a distance appropriate to the width of the grates, with 1 mm of clearance. Measure the internal parts of the vertical flaps of the profiles, as shown:



2 While there is no definitive curing of the concrete trough, insert small strips of cardboard between the milestones and the grill to maintain minimum clearance.

3 The floor finish should be a few millimeters higher than the grills. In the case of coated floors, the coating should not be supported on the flaps of the landmarks.

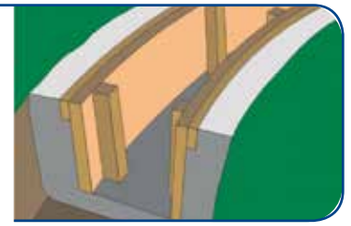


Important:
When installing the rails and grates, leave a gap of 3 mm between the grilles so that they can move due to the thermal expansion they undergo.

3.5.5. Installation of the Articulated Grate

1 Prepare the base by regularizing the bottom of the ditch and compacting it. Next, lay the lean concrete 5 cm thick. Wait for your cure.

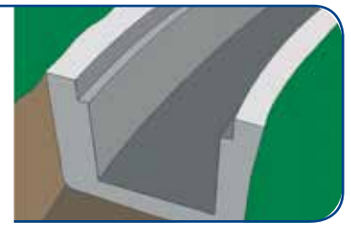
2 Prepare the wooden formwork by bypassing the trench. Make your reinforcement with paddocks spaced every 50 cm maximum.



Concrete taking care to avoid failures in the consolidation.

Notes: For good curing of the concrete, keep it moistened for 2 days. The width of the formwork must respect the total width of the articulated floor plus 4 mm for clearance.

3 Perform the shredding after 3 days of concreting. Finish with mortar on the side walls and at the bottom of the ditch, obeying the proper fit stipulated by the project.



4 After curing the finished surfaces (1 day), place the articulated grate, adjusting it according to the design of the ditch built and make any adjustments.

3.6. Sizing

For the correct sizing of TIGRE Grates and Channels, use the following procedure and tables:

1 Calculate the total flow rate of the area to be drained.
First, identify the rainfall intensity (amount of rainfall in the region, calculated in millimeters per hour). To do so, simply select in Table 2 the place where the project will be carried out and the rain return period according to the guidelines below:

Return Period T = 1 year, used in paved areas where pools can be tolerated;
Return Period T = 5 years, used for terraces;
Return Period T = 25 years, for roofs and areas where pools cannot occur.

Table 2 - Rainfall Indexes in Brazil

Local	1	5	25
Aracajú - SE	116	122	126
Belém - PA	138	157	185(20)
Belo Horizonte - MG	132	227	230(12)
Cuiabá - MT	144	190	230(12)
Curitiba - PR	132	204	228
Florianópolis - SC	114	120	144
Fortaleza - CE	120	156	180(21)
Goiânia - GO	120	178	192(17)
João Pessoa - PB	115	140	163(23)
Maceió - AL	102	122	174
Manaus - AM	138	180	198
Natal - RN	113	120	143(19)
Porto Alegre - RS	118	146	167(21)
Porto Velho - RO	130	167	184(10)
Rio Branco - AC	126	139(2)	x
Rio de Janeiro - RJ	122	156	174(20)
Salvador - BA	108	122	145(24)
São Luiz - MA	120	126	152(21)
São Paulo - SP	122	132	x
Teresina - PI	154	240	262(23)
Vitória - ES	102	156	210

The values in parentheses indicate the return periods to which the rainfall intensities refer, instead of 5 or 25 years, because the observation periods of the stations were not sufficient. For locations not mentioned, they should use data from the nearest city that has similar weather conditions.

This value will now be used to calculate the total flow of the area to be drained, and so we will know how many liters of rainwater should be drained by the gutters.

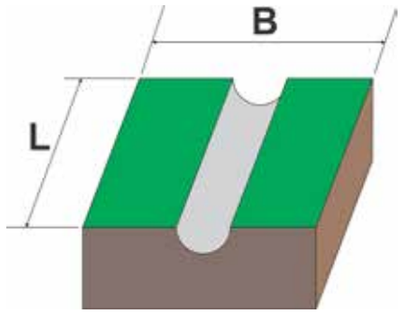
Calculation of the Total Flow of the Area

$$V = \frac{(H \times S)}{3600}$$

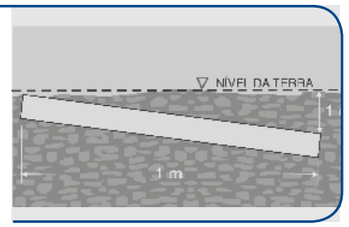
Where:
V = total flow (liters/second)
H = rainfall index (mm/hour) of table 2
S = surface area to be drained (m²)

Area Calculation

Area = B x L



2 Calculate the number of trough outlets for the drain pipes.



This step must be initiated by selecting the diameter and slope of the drain pipe that will be used in the project. Note that slope is given in percent. For example, what does a slope of 1% mean?

That is, for every 1 meter of length horizontally, the pipe will have 1 cm of unevenness in relation to ground level.

Then, table 3 should be consulted to determine the flow rate of the selected drain pipe (Vtubo).

This information will be used to determine the number of outlet pipes.

Calculation of the Number of Outlet Pipes

$$N = \frac{V}{Vtubo}$$

Where:
N = number of outlet pipes
V = total flow (liters/second)
Vtubo = flow rate of each drain pipe (liters/second) of Table 3

Table 3 - Flow of Drainage Pipes for Different Slope

PVC Pipe Diameter (DN)	Slope %						
	0,5%	1,0%	1,5%	2,0%	3,0%	5,0%	10,0%
	Flow rate (l/s)						
100	2,76	3,9	4,78	5,51	6,76	8,72	12,33
75	1,19	1,61	2,07	2,39	2,93	3,78	5,34
50	0,35	0,5	0,61	0,71	0,87	1,12	1,58
40	0,17	0,24	0,29	0,34	0,41	0,54	0,76

3 Check the flow capacity of the chute.
This step is the choice of the type of gutter to be used, whose ability to drain the collected water will depend on the slope and length of the stretches.

Flow Capacity Calculation

The flow capacity must be calculated per chute section, between every 2 outputs:

$$\text{Vtrecho} = \frac{V}{N}$$

Where:
Vtrecho = flow in each section of gutter, between 2 outlets for drainage pipes (liters/second)
V = total flow (liters/second) of equation 1
N = number of outlets for drain pipes from equation 2

The calculated flow rate "Vtrecho" was now located in tables 4 and 5 (according to the chosen slope). In this way, it is possible to know which type of channel gutter will have the ideal capacity to drain the desired area.

Table 4 - Channel X Slope

Gutter Type	Slope %						
	0,5	1,0	1,5	2,0	3,0	5,0	10,0%
	Flow rate (l/s)						
Normal floor chute DN 130	8,98	12,7	15,55	17,96	21,99	28,4	40,16
Normal floor chute DN 200	17,37	24,57	30,09	34,77	42,55	54,94	77,69
Reinforced floor gutter 130x75	1,27	1,8	2,2	2,54	3,12	4,02	5,69
Reinforced floor gutter 130x148	8,98	12,7	15,55	17,96	21,99	28,4	40,16

Table 5 - Flow of Channels with Zero Slope * X Length

Channel Type	Length of gutter sections (meters)									
	2,5	5,0	7,5	10,0	15,0	20,0	25,0	30	35,0	40,0
	Flow rate (l/s)									
Channel Standard normal DN 130	6,15	4,35	3,55	3,07	2,51	2,17	1,94	1,77	1,64	1,54
Channel Standard normal DN 200	11,57	8,1	6,68	5,78	4,72	4,09	3,66	3,34	3,09	2,89
Channel reinforced 130x75	0,38	0,27	0,22	0,19	0,16	0,13	0,12	0,11	0,1	0,09
Channel reinforced 130x148	6,15	4,35	3,55	3,07	2,51	2,17	1,94	1,77	1,64	1,54

* Zero slope: channels installed without unevenness.

At this point it is important to check in table 5 if the type of gutter chosen has adequate connections for outlet with the drain pipe diameter chosen in step 2 and confirm which connections should be used at each outlet point along the gutter (nozzles, side outlets, headboards, etc.).

Table 6 - Connections for Connecting Gutters to Drain Pipes

Gutter	Components	DN Output
Standard 130	Nozzle for normal floor gutter with bottom outlet	50
	Nozzle for normal floor outlet w/side outlet	100
	Headboard for normal floor gutter with optional exit	100
Standard 200	Nozzle for normal floor gutter with bottom outlet	100
	Headboard for normal floor gutter with optional exit	100
	Headboard for normal floor gutter with optional exit	100
Reinforced 130X75	Nozzle for reinforced floor gutter with bottom outlet and 2 sides	75 and 40
	Headboard for reinforced floor gutter with optional exit	40
Reinforced 130X148	Nozzle for reinforced floor gutter with bottom outlet and 2 sides	75
	Headboard for reinforced floor gutter with optional exit	100

4 Check the flow capacity of the grids.
The sizing of the floor drainage system ends with the selection of the grids and verification of their flow capacity in relation to the need of the site. For this, table 6 should be used, which contains the types of grids for each gutter width, their load capacity and flow rate.

Calculation of the Number of Grates per Section

First, determine the number of grids required to cover each chute stretch:

$$\text{Ng} = \frac{\text{L stretch}}{0{,}50}$$

Where:
Ng = number of grates per section
L stretch = length of the stretch in meters (the gutters are already supplied in the standard length of 0.5m)

Notes: To transform "cm" to meters, simply divide the value by 100.

Now choose the grate model through table 7, depending on the load capacity that the grid should support, and its width (according to the width of the rail defined in step 3).

Table 7 - Working Load Capacity and Flow Rate of the Grids

Recommended application	Model	Flow rates (liters/sec)
Pedestrian Traffic	Articulated grate for channel chute DN 130 0.5m -P	2,00
	Articulated grate for channel DN 200 0.5m -P	3,00
	Grate for channel DN 300 0.5m -P	2,00
	Grate for channel DN 400 0.5m - P	2,90
	Grate for channel DN 130 Swimming pool 0.5m - P	1,40
	Grate for channel DN 200 Pool 0.5m - P	1,90
	Blind Cover for floor gutter DN 130 0.5m - P	-
Vehicle Traffic Lightweight	Grate for channel DN 200 0.5m - VL	2,50
Vehicle Traffic	Grate for channel DN 130 0.5m - V	2,70
	Grate for channel DN 200 0.5m - V	2,90
	Blind cover for floor gutter DN 200 0.5m - V	-
Heavy traffic	Grate for channel DN 130 0.5m - C	2,10

Where:
P = Pedestrian traffic
VL = Light Vehicle Traffic (up to 1.5 tons)
V = Vehicle traffic (up to 3.0 tons)
C = Heavy traffic (automobiles and medium trucks of up to 10 tons of cargo)

Then check that the flow capacity of the grids is sufficient to flow the flow of this section.

Calculation of the Flow Rate of the Grate Section

To do this, calculate the flow rate of the grid section and compare this result with the flow rate of the channel section (Vtrecho) obtained in step 3.

VTg = Grate X Ng

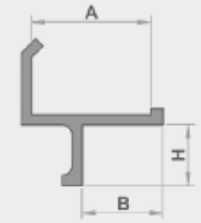
Where:
VTg = Flow capacity of the section grates (in L/s)
Grid = Flow rate of each grid (in L/s)
Ng = Number of grates per section

Since the "VTg" value is greater than "V section", it is concluded that the grid is compatible with the necessary flow rate.

If the VTg value is less than V section, repeat step 4 and choose another grid with a higher flow capacity.

3.7. Line Items Grates and Channels

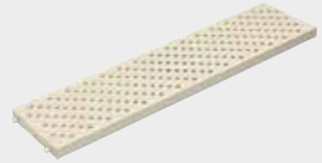
• Grate Milestone 2,5 m

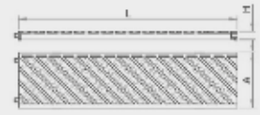


DIMENSIONS (mm)

CODE	A	H	B	COLOR
13030219	29,6	15	20	Beige

• Grate DN 130 0.5 m for Pedestrians

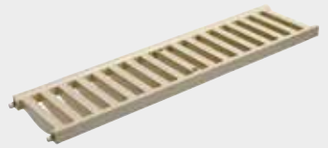


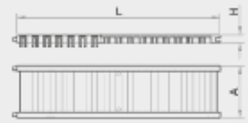


DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030556	128	20	500	Sand
32030580	128	20	500	White
32030572	128	20	500	Gray

• Grate DN 130 0.5 m for Light Vehicles 3 Ton





DIMENSIONS (mm)

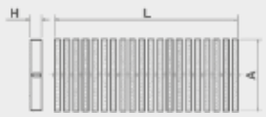
CODE	A	H	L	COLOR
32030645	128	20	500	Sand
32030564	128	20	500	White
32030637	128	20	500	Gray

• Grate DN 130 0.5 m for Heavy Vehicles 10 Ton

DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030599	128	20	500	Gray

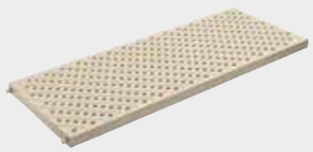
• Articulated Grate DN 130 0.5 m for Pedestrians

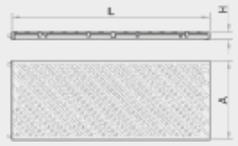


DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030734	129	29,9	480	White

• Grate DN 200 0.5 m for Pedestrians

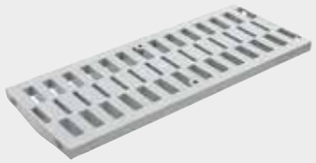


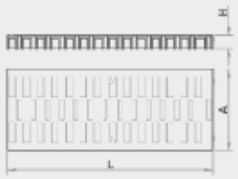


DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030661	199	20	500	Sand
32030548	199	20	500	White
32030653	199	20	500	Gray

• Grate DN 200 0.5 m for Light Vehicles 1.5 Ton

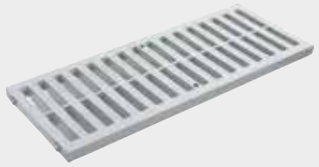


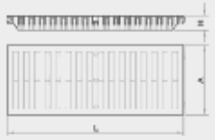


DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030670	199	31	500	Gray

• Grate DN 200 0.5 m for Light Vehicles 3 Ton

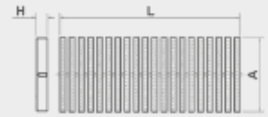




DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030696	199	39,5	500	Gray

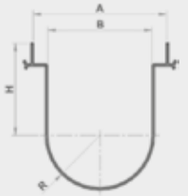
• Articulated Grate DN 200 0.5 m for Pedestrians



DIMENSIONS (mm)

CODE	A	H	L	COLOR
32030750	199	29,9	480	White

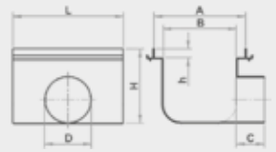
• Channel Standard DN 130 x 2.5 m



DIMENSIONS (mm)

CODE	A	B	H	R
13030014	129	101	88,5	50,5

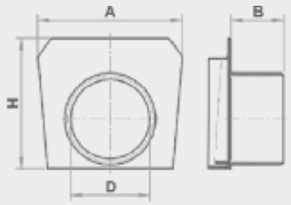
• Nozzle for Channel Standard DN 130 with Side Outlet



DIMENSIONS (mm)

CODE	A	B	D	H	h	L	R
32030858	129	101	50,7	88,5	20	200	50,5

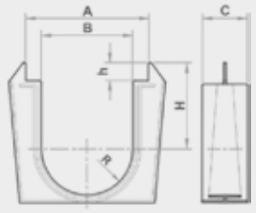
• Headboard for Channel Standard DN 130 with Optional Outlet



DIMENSIONS (mm)

CODE	A	B	C	D	H	h
32030181	161	59	144	101,6	-	-

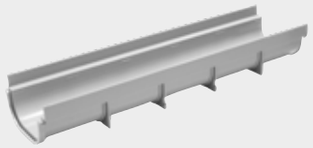
• Splice for Channel Standard DN 130

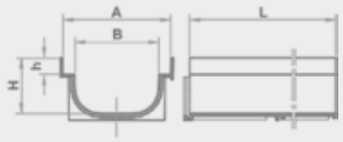


DIMENSIONS (mm)

CODE	A	B	C	H	h	R
32030874	126,5	94,5	46,8	89,2	18,5	47,5

• Reinforced Channel DN 130 x 75 x 50

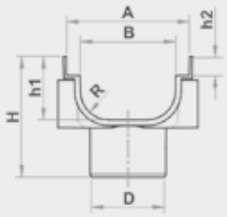




DIMENSIONS (mm)

CODE	A	B	H	h	L
13030359	130	101	66,7	20	500

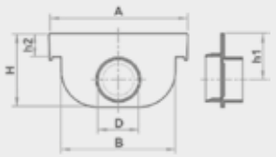
• Nozzle for Reinforced Channel DN 130 x 75 with Bottom Outlet and 2 Sides



DIMENSIONS (mm)

CODE	A	B	D	H	h1	h2	R
32030831	130	101	75,5	127	66,7	20	30

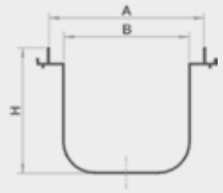
• Headboard for Reinforced Channel DN 130 x 75 with Optional Output



DIMENSIONS (mm)

CODE	A	B	D	H	h1	h2
32030173	136,5	112,5	40	72	45,3	23

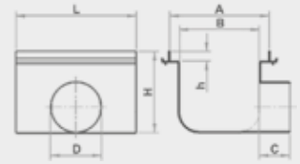
• Channel Standard DN 200 x 2.5 m



DIMENSIONS (mm)

CODE	A	B	H
13030111	198	160	162

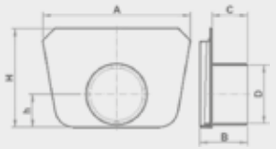
• Nozzle for Channel Standard DN 200 with Side Outlet



DIMENSIONS (mm)

CODE	A	B	C	D	H	h	L
32031048	198	160	61	97	162,2	20	240

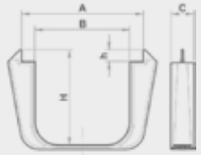
• Headboard for Channel Standard DN 200 with Optional Outlet



DIMENSIONS (mm)

CODE	A	B	C	D	H	h
32030459	245,7	79	59	101,6	164	55

• Gutter Splice of Channel DN 200



DIMENSIONS (mm)

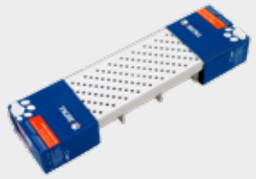
CODE	A	B	C	H	h
32030890	200,7	155,7	38,5	157	19,6

• Grate and Channel Set DN 100 to Pedestrian

DIMENSIONS (mm)

CODE	COLOR
100002638	White
100002639	Gray

• Grate and Channel Set DN 130 to Pedestrian



DIMENSIONS (mm)

CODE	COLOR
100002636	Gray

• Grate and Channel Set DN 130 - 3 Ton

CODE	COLOR
100002645	Gray

Notes

Drainage Pipes

4. Drainage Pipes

Tigre has innovative and ideal solutions for your residential, commercial and industrial construction. The drainage pipes are buried in the soil and have the function of capturing rainwater to prevent it from infiltrating and soaking the ground too much. An efficient system for your project, with the guarantee and quality of Tigre products.

4.1. Rigid Pvc Pipes for Drainage

4.1.1. Function/Application

PVC perforated pipe line, specially indicated for drainage of urban land, retaining walls, airports, railways, highways and urban areas in general. It can also be applied in agricultural areas and sports lawns.

4.1.2. Benefits and Differentials

Easy to install
Facilitated installation of simple fitting between pipe and connection and due to the lightness of the material.

Increased durability and performance
High durability and resistance to chemical attacks, such as those from soil contamination and acid rain.

Complete line of pipes and connections
Complete line of connections, having compatibility with the Normal Series Sewage line.

Easy to transport
Lightweight and easy to carry.

4.3.1. Technical Characteristics

Material: Made of PVC Poly(vinyl chloride), corrugated and perforated to allow water to enter.

Color: Gray.

Diameters: DN 100 supplied in 6.0 m bars.

Interchangeable with the connections of the Normal Series Sewage line.

Table 8 - Diameter and Number of Pipe Holes

Gauge	Diameter Approx. of holes	Nº. of holes Cross section	Nº. of holes per meter	Nº. of holes per meter
D (mm)	df (mm)	n	N	N
100	5,0	12	312	1102,50
150	6,0	12	312	1588,00

Below, see the list of reference standards that govern the manufacture of Rigid PVC Drainage Pipes and that ensure excellent performance.

REFERENCE TECHNICAL STANDARDS	
NBR 15073	PVC and Polyethylene Corrugated Pipes for Agricultural Underground Drainage.

4.1.4. Execution of Joints

For union between drainage pipes DN 100, use the Simple Sleeve of the Normal Series Sewage Line. It is not necessary to apply plastic adhesive or rubber ring. Just the simple fitting is enough.

To perform fishbone drainage, use the Normal Series Double Sewage Junction.

4.2. Drenoflex

4.2.1. Function/Application

Line of flexible, corrugated and perforated PVC pipes, for application in agricultural drainage, in various types of crops and orchards, gardens, sports lawns, lands with excess moisture, and other areas without great load/traffic on the ground.

4.2.2. Benefits and Differentials

Easy to install
Easy and simple installation due to the lightness of the material. Use of coils for laying continuous lines, without the need for joints, speeding up the installation in large extensions.

Increased durability and performance
High durability and resistance to chemical attacks, such as those from soil contamination, acid rain, etc.

Reduced transportation cost
Reduced cost of transportation and storage due to the small weight per meter and possibility of winding in coils.

4.2.3. Technical Characteristics

Material: Corrugated and perforated flexible pipes made of PVC Poly(vinyl chloride).

Color: Yellow.

Diameter: DN 110 supplied in 50 m coils.

Next, see the list of reference standards that govern the manufacture of Drenoflex and ensure excellent performance.

REFERENCE TECHNICAL STANDARDS	
NBR 15073	PVC and Polyethylene Corrugated Pipes for Agricultural Underground Drainage.

4.3. Instructions

4.3.1. Facilities

The trench shall be opened with a minimum width of three times the pipe diameter. That is, if the pipe is DN 100, calculating we will have: 100 x 3 = 300 mm (or 30 cm). In this case the width of the trench will be 30 cm.

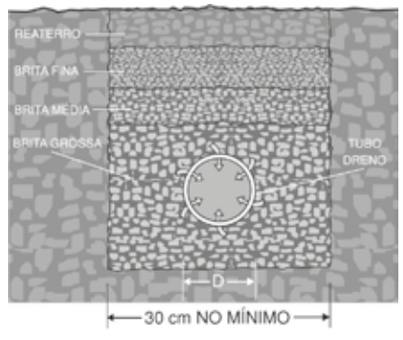
The depth may vary depending on the loads that will exist on the site. Open the trench according to the calculated width (DN + 30 cm), and at the ideal depth according to the table below.

Table 9 - Optimal Ditch Depth According to Load

Loads	Depht
Batch interior	30cm
Tours	60cm
Light vehicle traffic	80cm
Heavy and intense traffic	1,20m
Railway	1,50m

Trim 0.5% (0.5 cm per meter) or 1% (1 cm per meter) in the longitudinal direction (trench length direction). For placing the drainage pipes in the trench, proceed as follows:

- Clean the trench and line the bottom and sides with geotextile blanket.
- Throw approximately 10 cm of gravel over the blanket.
- Place the TIGRE Drain Pipe.
- Cover the pipe with 30 cm of gravel.
- Finish wrapping the trench with the geotextile blanket.
- Finish filling the trench with the same material removed and compact.



In the case of lawns and sports fields, the most used facilities are fishbone or parallel.

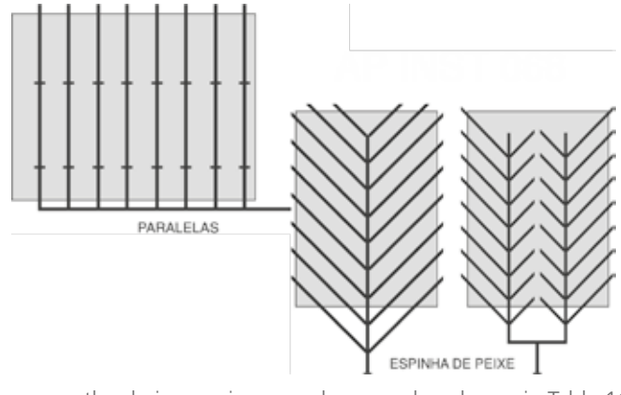
In these cases, we recommend trying to keep the slope constant on all lines, which can be 0.5% to 1%.

The distances between the drains vary depending on the type of soil. As a practical fact, the following distance can be adopted:

Table 10 - Spacing Based on Soil Type

Land Type	Spacing (M)
With a lot of clay (more than 70%)	10
With medium amount of clay (40%)	15
Low clay (20% maximum)	20

The depth should be around 0.8 to 1.0 meters.



If necessary, the drainage pipes may be curved as shown in Table 11.

Table 11 - Maximum Bend Radius

Diameter (DN)	Maximum Allowable Bend Radius (mm)
100	550

4.3.2. Drainage System Check

The ideal way to verify that the drainage system is working correctly, as foreseen in the project, is to analyze it during a heavy rainy season. In the problem area, a greater accumulation of water can be noticed, which means that the soil is saturated and the system is not able to drain the water.

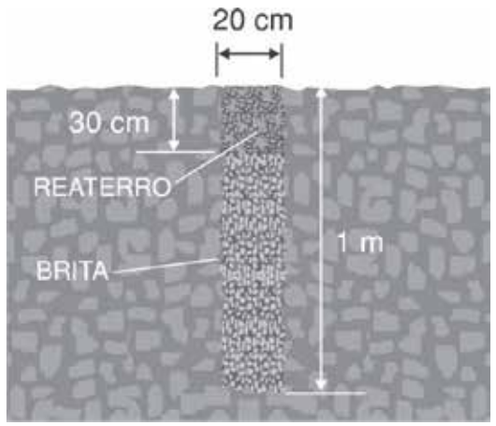
If some area is flooding between the drainage pipes, the ideal procedure is to make vertical drains, which will act as a sink valve: when the valve cover is removed, the water drains out, emptying the sink.

This vertical drain is made as follows:

Step 1: Drill the soil approximately 20 cm in diameter and 1 meter deep using a hand shovel.

Step 2: Fill the hole with gravel # 2 up to 30 cm below the surface level.

Step 3: Make up the hole with the soil removed and replace grass or gravel.



4.3.3. Line Repairs Rigid PVC Drainage Pipes

If the rupture or perforation of the Rigid PVC Drainage Pipes accidentally occurs, perform the following procedure for repair:

1. Cut the broken section with a saw.

2. Cut a new pipe segment of the same diameter, longer than the cut segment. Make a longitudinal cut in this new pipe segment, open this phenomenon and fit over the place to be repaired.

3. Repair executed.

4.3.4. Drenoflex Line Repairs

1. Cut the broken section with a saw.

2. Replace the broken section with a new pipe segment of the same diameter, longer than the cut segment. Make a long dinal cut in this new pipe segment, open this crack and fit over the place to be repaired.

3. Repair executed.

4.4. Rigid PVC Pipe Line Items for Drainage

• Rigid Corrugated Pipe for Drainage 6 Meters

DIMENSIONS (mm)

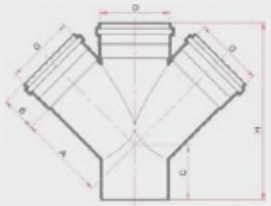
CODE	GAUGE	L	DE
11311016	100	6000	101,6

• Cap

DIMENSIONS (mm)

CODE	GAUGE	A	D
26061008	100	50	101,6
26061504	150	67	150

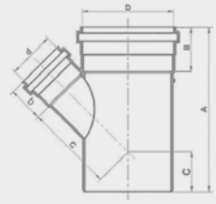
• Double Junction



DIMENSIONS (mm)

CODE	GAUGE	A	B	C	D	H
26288290	100 x 100 x 100	129	50	50	101,6	259

• Simple Joining



DIMENSIONS (mm)

CODE	GAUGE	A	B	C	D	b	c	d
26277485	100 x 100	259	50	80	101,6	50	129	101,6
26277540	150 x 100	282	67	66	150	50	164	101,6
26277523	150 x 150	351	67	99	150	67	99	150

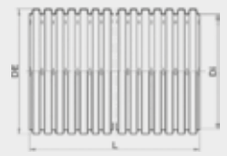
• Running Sleeve

DIMENSIONS (mm)

CODE	GAUGE	A	D
26321000	100	113	102,1

4.5. Drenoflex Line Items

• Drenoflex Pipe Coiled TIGRE



DIMENSIONS (mm)

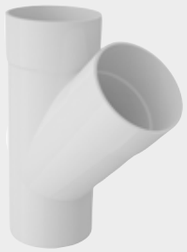
CODE	GAUGE	L	DE	Di
11314058	110	50000	110	101,4

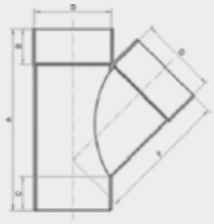
• Cap

DIMENSIONS (mm)

CODE	GAUGE	A	B
26060753	75	45,8	76

• Simple Joining





DIMENSIONS (mm)

CODE	GAUGE	A	B	C	D	F
26277299	75 x 75	218	50	68	75,5	150

Notes

Sandbox

5. Sandbox

The Tigre Sandbox line is versatile, easy to install and very easy to clean. The products are manufactured on a completely smooth surface, which does not accumulate dirt and allows you to easily remove sheets and other objects that enter the pipeline. It has perfect sealing and excellent durability, with the quality of Tigre products.

5.1. Function/Application

The TIGRE Sandboxes are used to collect debris contained in the rainwater pipes and allow inspection of the system. They are indicated for buried networks of rainwater drainage up to DN100, in residential or commercial works.

5.2. Benefits and Differentials

Easy installation
Simply join the pieces using the TIGRE Plastic Sticker.

Increased durability and performance
Total durability: does not degrade in contact with the ground.

Easy to transport
Lightweight product with practical packaging.

Easy to clean
Totally smooth surface, does not generate dirt accumulation and facilitates the removal of sediments.

Water table
It can be used in regions with high water table.

Easy fixing
External grooves in the body and base favor fixation on the ground (anchoring), dispensing with concrete.

Connections with unevenness
Allows uneven connections: through inlet extenders.

Depth adjustable
With the use of extenders that can be cut every 1 cm.

Tightness
It does not leak and prevents infiltration into the ground.

5.3. Technical Characteristics

Grid raw material: ABS in gray.

Raw material body and cover holder: PVC Poly(vinyl chloride) in gray color.

Diameters: 3 DN 100 inlets and 1 100 mm outlet (double acting joints).

Maximum temperature: 45 °C.

Dimensions: 311 mm x 300 mm.

Maximum pressure: conduit free/no pressure.

One version comes with an ABS grille with a 500 kg resistant grille holder, and another version consists only of the body of the box.

The aluminum grille with grille holder can be purchased separately.

The ABS grille with grille holder can be purchased separately.

Collector bottom with a volume of 6.0 liters for retention of dirt and leaves.

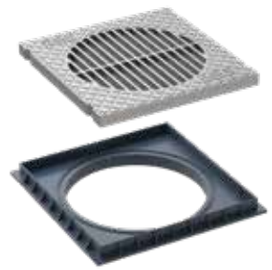
Cover: ABS plastic
Color: gray

Cover holder: PVC

Body: PVC

Aluminum Grid

- Made of aluminum.
- Light vehicle traffic resistant – withstands up to 500 kg of load.
- Simple fitting in the grid holder.
- Dimensions: 350 x 350 x 25 mm.



Next, see the list of reference standards that govern the manufacture of the Sandbox and that ensure excellent performance, providing a high degree of safety to the facilities.

REFERENCE TECHNICAL STANDARDS	
NBR 10844	Rainwater building installations.

5.4. Assembly and Installation of Sandboxes

Step 1: Separate all parts and check the contents of this package.

Step 2: Assemble the parts of the box by applying Plastic Adhesive between the parts.

Step 3: Manually fit the pieces, pushing until it touches the bottom of the bag.

Step 4: Fit the PVC Grill to the Box Lid Holder before concreting around.

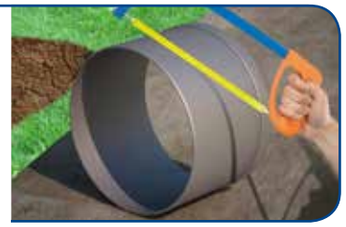
Step 5: Connect the pipes in the box: follow TIGRE recommendations for jointing in sewage installations. Double acting joint, weldable or with elastic joint.

Step 6: If necessary, to adjust the depth, use extender (s).

Step 7: Make the side backfill. The backfill soil around the box must be very well compacted in layers of 20 in 20 cm to ensure perfect support of the cover holder. Finish the floor around the cover holder with the cover installed, to avoid its lateral deformation.

5.5. Assembly and Installation of the extender

1. If necessary, cut the protractor at the indicated location using a saw bow. The protractor can be cut every centimeter.



2. Manually fit the extender into the sandbox with TIGRE Plastic Adhesive, pushing until it touches the bottom of the bag.

3. Assembled product.

The maximum depth must be limited to 1 meter to guarantee resistance and accessibility for cleaning.

5.6. Instructions

5.6.1. Installation of Interconnection Boxes

Install a TIGRE Interconnection/Inspection Box in the rainwater network at each change of direction or at maximum distances of 25 meters. In this way, any inspections that are necessary are facilitated.

5.6.2. Rainwater Return

As in sewage building installations, rainwater branches can be returned from public networks, especially in situations of flooding, floods, tidal ebb, clogging or even high flows during periods of heavy rainfall.

To prevent this return, the TIGRE Sewage Check Valve must be installed in the piping of the rainwater building branch. Manufactured in diameter DN 100, it has a top cover that allows access for eventual inspections. Inside, the hatch is responsible for preventing the return of water flow from public networks.

It must be installed after the Sandbox and Inspection Boxes so that the entire residential system is protected.

5.6.3. Maintenance of Sandboxes and Inspection Boxes

To clean the TIGRE Boxes, simply remove the top cover to clean the excess dirt accumulated at the bottom of the boxes and unclog the passage for the perfect operation of the network.

Check if the connection between the vertical conductor and the horizontal piping was made using the Transition Elbow, or if it was improvised. The Transition Elbow allows a perfect coupling between the vertical conductor, whether rectangular or circular, and the sewage pipe.

Depending on the situation, suggest replacing with the correct solution.

Transition Elbow
Circular
DN 88 X 100

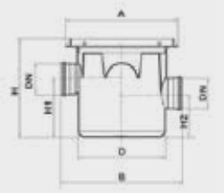
Rectangular
Transition Elbow
DN 100 X 65 X 100

5.6.4. Storage

The storage of Sandboxes and their components must be done in places protected from the weather, preferably on platforms that are isolated from contact with soil moisture. The maximum stacking height of the packages is 2 meters.

5.7. Sandbox Line Items

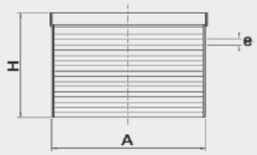
• Sandbox



DIMENSIONS (mm)

CODE	A	B	D	DN	H	H1	H2
27801145	388	420	300	100	348	201	151

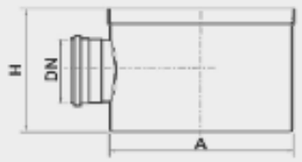
• Non-Input Extender



DIMENSIONS (mm)

CODE	A	e	H
27801552	300	10	200

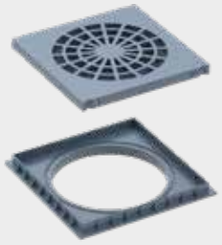
• Inlet Extender

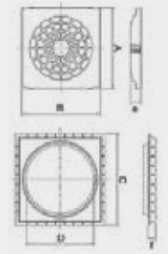


DIMENSIONS (mm)

CODE	A	DN	H
27801501	300	100	200

• Square Floor Grid with Gray Lid Holder





DIMENSIONS (mm)

CODE	A	B	C	D	E	F	COLOR
27801374	348	348	388	293	50	31	Gray

• Lubricating Paste

DIMENSIONS (mm)

CODE	MEASUREMENTS
53201814	160
53201830	400
53201849	1000

Notes

Notes

TIGRE GROUP

24 UNIDADES FABRIS

10 no **Brasil**

14 no exterior

Presente em mais de **40** **países**

+de **5.000** colaboradores

TIGRE

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