

Drip irrigation PE LDPE pipes and KATIFF self-compensating drippers

Introduction

Fresh water is a scarce resource and man uses it mostly for agriculture. Therefore, it is necessary to use this resource rationally, so the system of drip irrigation is essential for a sustainable development in the expansion of arable land and gradual increase in food production.

In terms of technology, watering is one of the areas that have undergone a noticeable development, with several innovative products arising in markets, enabling networks new arrangements, with innovative technologies that save water and energy, particularly in localized drip irrigation.

The section of plantations whose irrigation is performed by dripping (fruit trees, shrubs and vegetables) is increasingly important, requiring from its installers and users the proper technical information able of assisting in the preparation / inspection of any installation.



Drip irrigation PE system has the function of watering plants using drippers or micro-sprinklers. This system is composed of low density polyethylene pipes (LDPE) used in the derivation that feed the side pipe lines where the drippers or micro-sprinklers are applied.

Drip irrigation advantages

- Versatile and modular for an easy and quick installation;
- Durability, the system can sustain the weathering exposure;
- Flexibility in maintenance and updated the network layout, due the modular system;
- Possibility of applying directly the fertilizers in irrigation system;
- Can be used on any type of soil and topography, without causing erosion;
- Doesn't cause soil salinization;
- Controls the growth of weeds;
- Allows an important water saving, which is currently of vital importance, considering the lack of it and its high cost;
- Allows a quantitative and qualitative improvement of agricultural production.

Scope

FERSIL Drip Irrigation PE system is recommended for any type of plantation with low water needs (diversified orchards, tomatoes, watermelon, passion fruit melon, pineapple, red fruits, fruit trees such vines) and garden areas.

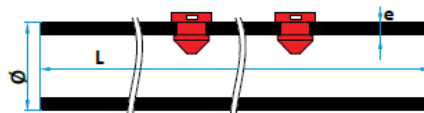
Geometrical characteristics

FERSIL LDPE pipes Class PN4/PN2,5



Ø _{ext} (mm)	Ø _{ext} (pol.)	e _n (mm)	L (m)
12	3/8"	1,0	600
16	1/2"	1,2	400
20	5/8"	1,2	300
25	3/4"	1,5	150
32	1"	1,8	150

FERSIL LDPE pipes with "KATIF" self-compensating drippers



Ø _{ext} (mm)	Ø _{ext} (pol.)	e _n (mm)	L (m)	"KATIF" dripper spacing (cm)				
12	3/8"	1,0	600	33	50	70	100	120
16	1/2"	1,2	400	33	50	70	100	120
20	5/8"	1,2	300	33	50	70	100	120

This irrigation system is intended for tertiary drip irrigation lines in black with "KATIF" self-compensating drippers in black (2.3 l/h) or in red (3.75 l/h).

The distribution of drippers and the operation of the irrigation system always depend on the crop irrigation needs, weathering (raining fall profile during seasons) in the region and the type of soil permeability.

Technical Characteristics

- Pipes made of black LDPE with high UV resistance;
- Pipes with great flexibility and easy installation and handling;
- They resist to usual chemical agents used as fertilizers and have good organoleptic properties;
- They are manufactured in accordance with the requirements of the ISO 8779 standard;
- Quick coupling system with barbed fittings;
- Connection system to main lines can be done with barb grommet or barb/threaded adapter Ø16 x 3/4" Male to connect to threaded saddles;
- Smooth LDPE pipes in coils for free choice of drippers;
- Smooth coiled pipes with preinstalled "KATIF" self-compensating drippers and predefined spacing between drippers. Available from stock with 16mm (1/2") diameter for operating pressure of 8 m.w.c (0,8 bar) up to 30 m.w.c. (3,0 bar). at 20 °C.

Note: Diameters 12mm (3/8"), 20mm (5/8") and 25mm (3/4"), on request and subject to minimum economic quantities of manufacture.

Complementary products

- PP/PE barb valves;
- Lubricants type silicone grease;
- PTFE "Teflon" tape for threads);
- Cartridge stainless steel filters (with 120 mesh or 130 microns).

Advantages of FERSIL drip irrigation LDPE

- Facility and quickness of installation:
 - FERSIL LDPE pipe flexibility and low weight facilitate handling and placement during installation;
 - The use of barbed fittings increases the quickness of the joints and the availability of different punches and drippers for free installation according to watering needs.
- Durability:
 - FERSIL LDPE pipes strongly resist to weather bad conditions, so there are no limitations to their exposure;
 - High resistance to chemical agents (fertilizers).
- Easy maintenance:
 - The jointing system allow an easy assembly and dismantling for resets of irrigation watering matrix;
 - The corrective maintenances can be done with a simple cut and the damaged pipe repaired with a quick barbed joint.

Handling and transport

- When handled individually, coils should be lowered, raised and transported in a controlled manner without being thrown or dragged, in order to preserve its integrity;
- While loading and unloading, avoid strong impacts and friction with stones, metal objects and sharp edges;
- In transport the bearing surface should be flat, since the coils should not suffer bending stresses for a long time to avoid permanent deformation.

Storage

- FERSIL LDPE pipe coils must be stored on a sufficiently flat surface, free of sharp objects, stones or protrusions to prevent deformation s or defects that could become permanent;
- Stacking should not exceed the height of 10 coils (recommended stacking fire form);
- Despite the high resistance to bad weather conditions, it is recommended to store the coils in the shade for longer than three months periods;
- The coils should be stored away from heat sources and must not contact with potentially dangerous products such as diesel fuel, paints or solvents.

Pipe assembly



- In the irrigation project, FERSIL LDPE pipes and barb fittings should be connected by simple jointing, ensuring that the ends are clean and free of soil particles;
- The FERSIL LDPE pipes and barb fittings must be installed on the surface of the ground or suspended in wire for overhead installations, using hanger clamps;
- FERSIL LDPE pipes have a high linear expansion when exposed to the sun and consequent contraction with the operation input by the pipe cooling water and consequently on each line mark the pipe must be extended having these involuntary pipe movements into account and if necessary it must be anchored with plastic stacks.



Lateral line connection to water derivations

- In the pipe derivation, where you are installing lateral lines, apply a threaded saddle 3/4 " female. After installing the saddle, make a hole with an appropriate device (3/4 " punch or metal cutter) and remove any burrs;
- Apply "Teflon" tape on male thread (12 mm) and engage the adapter $\varnothing 16 \times 3/4$ " in the thread saddle;
- Apply the FERSIL LDPE Pipe in the threaded end by simple joint. To increase the pull out resistance, if necessary apply a fastening clamp (depending on the network service pressure).



Manual dripper assembly

- In the area of the lateral line where the irrigation point is desired, drill the hole in the FERSIL PEBD pipe with the help of a pliers or a hand-held drill, eliminate the burr and insert the dripper.



End closure of drip irrigation line

- For each end line closure, use the barb end plug (for maximum service pressure of 1,5 bar) or the double ring (8) at the end of the pipe.

Maintenance

- Preventive maintenance consists only in cleaning filters and the flush out after using fertilizers.
- Check the drippers and provide their cleaning or replacement whenever necessary;
- Corrective maintenance can be done with a simple cut and the damaged pipe repaired with a quick barbed coupler.

Recommended fittings for FERSIL LDPE pipes

Barbed connectors



\varnothing_{Ext} (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)
16	55,7	26,0

Barbed tees



\varnothing_{Ext} (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)	H_{Height} (mm)
16	67,2	26,0	40,2

Barbed plugs



\varnothing_{Ext} (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)
16	18,5	14,5

Barbed adapter male thread



$\varnothing_{Ext} \times \varnothing_R$ (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)	L_{Thread} (mm)
16 x 3/4"	58,0	30,0	16,0

Barbed mini valve with adapter male thread



$\varnothing_{Ext} \times \varnothing_R$ (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)	L_{Thread} (mm)
16 x 3/4"	86,0	25,4	16,0

Barbed mini valve



\varnothing_{Ext} (mm)	L_{Total} (mm)	$L_{1 Pipe}$ (mm)
16	84	25,4

End line double ring (8)



\varnothing_{Ext} (mm)	L_{Total} (mm)	H_1 Height (mm)	H_2 Length (mm)
16	43,5	24,0	12,0

Hanger/hook clamp



\varnothing_{Ext} (mm)	L_{Total} (mm)	H_{Length} (mm)	\varnothing_{Wire} (mm)
16	32	12,0	2,5 / 3,0

Fixing clamp



\varnothing_{Ext} (mm)	L_{Total} (mm)	H_1 Height (mm)	H_2 Length (mm)
16	22,0	28,0	12,0

Inverter pipe stack



\varnothing_{Ext} (mm)	L_{Total} (mm)	L_1 Buried (mm)	H_{Length} (mm)
16	143	114	23,5

Pressure regulator type Y for 1.4 bar



\varnothing_R (pol.)	L_{Total} (mm)	L_1 Thread (mm)	H_{Height} (mm)
1"	72,0	22,4	80,0

- The pressure regulator Y is manufactured in PP material;
- Thread sockets male/female de 1";
- Service flow-rate 0,8 m³/h to 5 m³/h;
- It allows the reduction of operating pressure above 14 m.w.c (1,4 bar) and maintaining it in order to optimize the water consumption in lateral drip lines.

Irrigation filter in stainless steel cartridge 120mesh



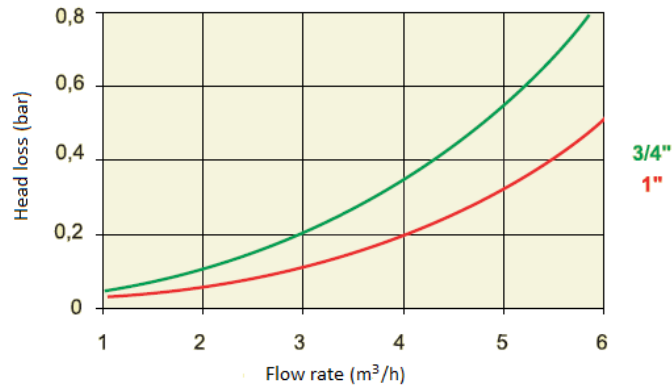
\varnothing_R (pol.)	L_{Total} (mm)	L_{Thread} (mm)	H_1 Height (mm)	H_2 Length (mm)
³ / ₄ "	120,0	16,2	143	72,0
1"	164,0	22,4	163	79,0

Stainless steel cartridge 120mesh



\varnothing_F (mm)	L_F (mm)	Stainless Steel grid (mesh)
37	129	120

- We advise to apply it in the beginning of water derivations or in tank outlet;
- It allows filtering water from sand or other solid impurities, preventing clogging of drippers in lateral lines;
- Filter body manufactured in PP material;
- Jointing with threaded male couplers ³/₄" or 1";
- Maximum operating pressure 80 m.w.c (8 bar) at 20 °C;
- Maximum service flow of 5 m³/h;
- Cartridge filter with stainless steel mesh of 120 mesh.



Flow rate versus pressure drop diagram for irrigation filter with stainless steel 120 mesh

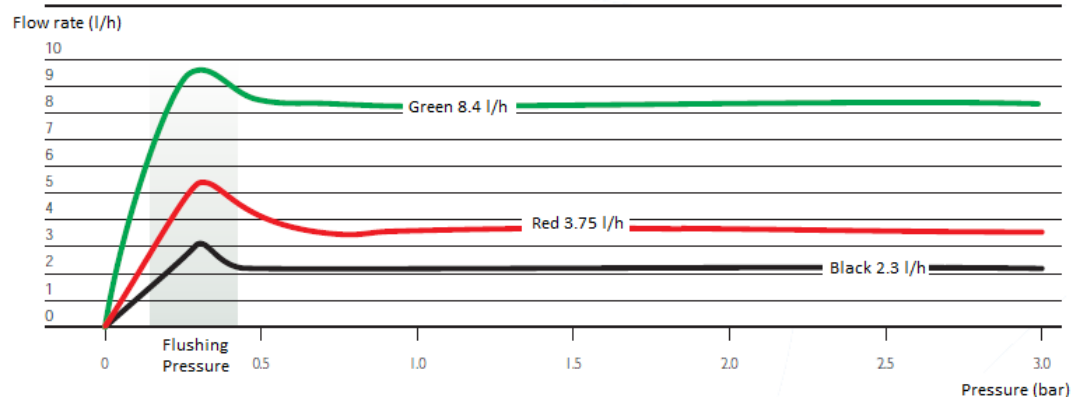
Characteristics of “KATIF” self-compensating dripper

The “KATIF” self-compensating drippers used with FERSIL LDPE pipes should have the following characteristics:

- Ensures constant flow rates along long run driplines or in the most challenging topographical conditions. Complies with emission uniformity category A (according to ISO 9261).
- Service Flow rate 2,3 l/h or 3,75 l/h or 8,4 l/h at operating pressure of 0,8 to 3,0 bar;
- Self-cleaning when starting irrigation;
- Design for side outlet (no water squirts above the dripline) and self-flushing when initial pressure builds up;
- Protection against UV degradation and resistant to chemicals and fertilizers commonly used in agriculture;
- Can be installed in LDPE pipes $\varnothing 16$ to $\varnothing 25$, and the spacing depends on the crop type and watering needs.
- Free installation on site using a specific punch with 2,8 mm cutter;
- Flat sized button allows wrapping the pipe with the incorporated drippers and that facilitate matrix resets or replacements.



Dripper Colour	Flow rate (l/h)	Pressure (bar)	\varnothing_{Ext} (mm)	\varnothing_{Insert} (mm)	L_{Total} (mm)	$L_{1 Insert}$ (mm)	\varnothing_{Hole} (mm)
Red	3,75	0,8 a 3,0	9,0	6,5	9,5	6,3	2,8
Black	2,30	0,8 a 3,0	9,0	6,5	9,5	6,3	2,8
Green	8,40	0,8 a 3,0	9,0	5,5	9,5	6,3	2,8



“KATIF” self-compensating drippers, performance curves

Maximum recommended driplines length with “KATIF” self-compensating drippers

FERSIL provides tables to support the installation project for tertiary branches made with FERSIL LDPE pipes with incorporated “KATIF” self-compensating drippers.

Side maximum length will depend on the available flow and water pressure, the ground slope and the distance between drippers.

“KATIF” Dripper colour (flow)	Dripper spacing (m)	LDPE Ø16 Dripline slope 0 % to 6 %			LDPE Ø20 Dripline slope 0 % to 6 %		
		Dripline inlet pressure (bar)					
		1,0	2,0	3,0	1,0	2,0	3,0
Red (3,75 l/h)	0,50	50 a 67	93 a 99	111 a 116	86 a 131	162 a 183	193 a 211
	0,75	69 a 101	129 a 142	154 a 164	114 a 194	218 a 259	260 a 296
	1,00	86 a 132	161 a 181	192 a 209	140 a 255	268 a 333	320 a 379
	1,25	102 a 163	191 a 220	228 a 253	163 a 311	312 a 405	374 a 457
Black (2,3 l/h)	0,50	70 a 100	129 a 145	156 a 167	117 a 201	223 a 277	271 a 315
	0,75	95 a 149	178 a 211	216 a 242	158 a 299	299 a 399	365 a 450
	1,00	117 a 197	222 a 275	270 a 313	193 a 389	366 a 514	448 a 575
	1,25	138 a 247	263 a 338	320 a 383	225 a 484	428 a 625	523 a 695
Green (8,4 l/h)	0,50	30	57	70	51	95	118
	0,75	41	78	97	68	128	159
	1,00	51	97	120	83	157	195
	1,25	60	114	141	96	184	229

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