

### PNEUMATIC STOPPERS

Type F – G – H - FOG



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### Chapter 0 - PREFACE

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#### STRUCTURE OF THE MANUAL

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#### Scope of the manual

The information contained into the manual have the function of indicating the correct use of the Pneumatic Stoppers, according to their intended use and design characteristics.

Besides to this, various information on handling, installation, repair and maintenance of the Pneumatic Stoppers are provided considering the limits fixed by the manufacturer and described in the manual.

#### Conservation of the manual

The present manual is an integral part of the Pneumatic Stoppers and should be kept in a dry and safe place, in the proximity of the Pneumatic Stoppers for its ready use.

If it is missing, the user should ask a copy to the manufacturer.

#### Manual update

This operating manual reflects the state of the art at the time of the sale of the Pneumatic Stoppers.

The manufacturer has the right of modifying the characteristics of the Pneumatic Stoppers and of the present operating manual, without any obligation of modifying the previous editions.

The user can request any information which will form an integral part of this manual.

If the user transfers the Pneumatic Stoppers to another user, also the present manual should be given to him in order to guarantee the possibility of knowing successive integrations..

### Non responsibility of the manufacturer





The manufacturer will not be responsible in the following cases:

- ◇ improper usage of the product or usage made by non-professionally trained personnel
- ◇ usage in contrast with the specific national rules
- ◇ wrong installation
- ◇ defects of air supply (air overpressure)
- ◇ serious lack in the prescribed maintenance
- ◇ unauthorized modifications or interventions
- ◇ use of non original or non specific spare parts
- ◇ total or partial non observance of the operating instructions
- ◇ unforeseen events

## 0.1 Definitions

### 0.1.1 Warnings

In the present manual the following symbols are used with their explanation

	PROHIBITED OPERATION
	WARNING : The non observance of the given prescriptions could cause a damage or a malfunction of the product.
	This symbology indicates danger of burst and warns the user of those conditions which can cause death or body injuries if the necessary precautions are not taken.
	This symbology indicates DANGER. The non observance of the instructions could cause damage to persons.

### 0.1.2 Terminology

Trained person	<p>A person with technical knowledge or experience (instructed person)</p> <p>A person which has received specific instructions, in order to prevent danger, in relation to certain operations carried out under specified conditions (warned person)</p> <p>In both cases the training is relative to :</p> <ul style="list-style-type: none"> <li>◆ The type of operation to carry out</li> <li>◆ The type of plant to operate</li> <li>◆ Environmental conditions</li> </ul>
Dangerous zone	ANY ZONE IN THE PROXIMITY OF A PRODUCT WITHIN WHICH A PERSON IS EXPOSED TO THE RISK OF INJURIES OR HEALTH DAMAGE
Dangerous situation	Any situation in which a person is exposed to one or more sources of danger
Risk	Any combination of probability and possibility of serious injuries or damage to health in dangerous situation

<b>PS</b>	Maximum allowable pressure	Maximum design pressure of the product. It is defined in a specified point.
<b>TS</b>	Minimum/maximum allowable temperature	The minimum/maximum temperatures range of operation of the product.
<b>V</b>	Volume	Useful internal volume of the product when fully inflated.
<b>DN</b>	Nominal size	It is a rounded off number only for reference scopes and not in strict relation with design sizes. It is evidenced by the wording "DN" followed by a number.

## Chapter 1 - SAFETY

### 1.1 Limits of usage

#### 1.1.1 Typical usage





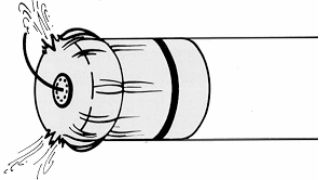


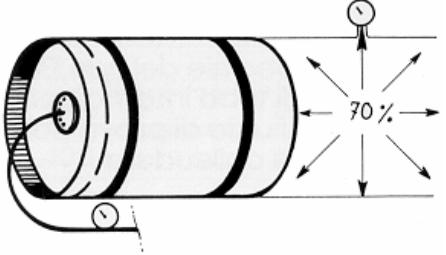



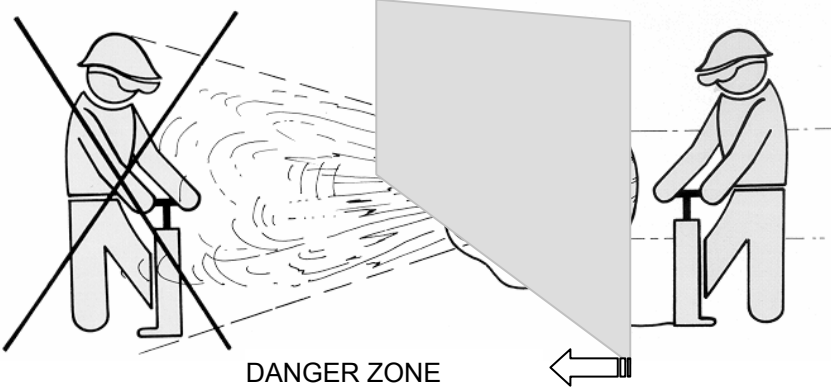
Temporary plugging of pipelines containing fluids in the limits fixed by the technical descriptive schedule and in the temperature range shown below.

#### 1.1.2 Temperature range

The product should be stored and used not in presence of icing conditions as follows:

Storage temperature range                      - 10°C                      + 50°C

### 1.2 Safety prescriptions

	<p><b>An initial checking should always be made !!!</b></p> <p>Before usage, always check that the product is no damaged (tearings, holes etc.)</p> <p> <b>Chapter - Maintenance</b></p>	
	<p><b>It is absolutely forbidden to inflate the stopper partially placed into the pipe !!!</b></p> <p>The stopper must always be completely inserted into the pipeline.</p>	
	<p><b>Do not exceed the maximum inflating pressure !!!</b></p> <p>The maximum inflating pressure value is always printed on the stopper.</p>	
	<p><b>Maximum pressure in the pipeline !!!</b></p> <p>The pressure value in the pipeline which the stopper should plug (backpressure) must not exceed a value corresponding to <b>70%</b> of the maximum real and actual inflating pressure of the stopper.</p> <p><i>FOR INSTANCE :</i></p> <ul style="list-style-type: none"> <li>◆ Actual inflating pressure of the stopper :- 1bar</li> <li>◆ Maximum pressure value allowable in the pipeline :- <math>1(\text{bar}) \times 70/100=0.7 (\text{bar})</math></li> </ul>	
  	<p><b>It is forbidden to stand in front of the burst area !!!</b></p> <p>During inflating, usage and deflating it is mandatory to avoid the standing of personnel in the danger area.</p>  <p style="text-align: center;">DANGER ZONE</p>	

## Chapter 2 - TECHNICAL SCHEDULE

### 2.1 TECHNICAL SCHEDULE – Pneumatic Stoppers Type “F”

#### 2.1.1 Typical usage

The Pneumatic Stopper type “F” is suitable for the temporary plugging of low pressure gas lines.

#### 2.1.2 Material description

The Pneumatic Stopper type “F” has a spherical body and it is made with an elastic material which allows a diameter increase of up to 30% from the initial nominal size.

It is fitted with a 3 m. long flexible hose and a car-type valve for inflating.



Picture 1

#### 2.1.3 Limits of usage

- ◆ Maximum temperature of use : 50°C



**Do not exceed the maximum inflating pressure !!!**

The maximum inflating pressure value is always printed on the stopper.

Diameter of the stopper		Maximum inflating pressure (bar)	Min.diam. opening for stopper insert	
(mm)	(inch)		(mm)	(inch)
100	4	0.30	70	3.0
152	6	0.30	80	3.0
203	8	0.30	100	4.0
254	10	0.30	120	5.0
304	12	0.20	140	5.5
355	14	0.20	150	6.0
406	16	0.20	160	6.0
457	18	0.13	170	7.0
507	20	0.13	180	7.0
558	22	0.13	190	7.5
609	24	0.13	200	8.0
660	26	0.10	215	8.5
711	28	0.10	230	9.0
761	30	0.10	250	10.0
812	32	0.08	265	10.5
863	34	0.08	285	11.0
914	36	0.08	300	12.0
1066	42	0.08	330	13.0
1168	46	0.08	365	14.0
1270	50	0.07	400	16.0
1371	54	0.07	430	17.0
1473	58	0.07	460	18.0
1574	62	0.07	490	19.0
1676	66	0.06	520	20.0
1778	70	0.06	550	22.0

### TECHNICAL SCHEDULE – Pneumatic stoppers type “G”

#### 2.1.4 Typical usage

The Pneumatic Stopper type “G” is suitable for the temporary plugging of metal pipelines (oil lines, gas lines etc.) in presence of flammable gas and liquids.

#### 2.1.5 Material description

The Pneumatic Stopper type “G” has a cylindrical body 1,2 times as long as its diameter and is made with an extrastrong synthetic fabric coated on both faces with hydrocarbons resisting plastomeric compounds.

It has a fixed diameter (single size) when inflated and can only plug pipes whose internal diameter is equal to that of the stopper.

It is fitted with a 3 m. long flexible hose, a car type valve for inflating and a safety valve.



Picture 2

#### 2.1.6 Limits of usage

- ◆ Maximum temperature of use : 50°C



**Do not exceed the maximum inflating pressure !!!**

The maximum inflating pressure value is always printed on the stopper.

Diameter of the stopper		Maximum inflating pressure (bar)	Min.diam. opening for stopper insert	
(mm)	(inch)		(mm)	(inch)
100	4	1.8	70	3.0
152	6	1.8	80	3.0
203	8	1.7	100	4.0
254	10	1.6	120	5.0
304	12	1.5	140	5.5
355	14	1.5	150	6.0
406	16	1.4	160	6.0
457	18	1.3	170	7.0
507	20	1.1	180	7.0
558	22	1.0	190	7.5
609	24	0.9	200	8.0
660	26	0.8	215	8.5
711	28	0.8	230	9.0
761	30	0.7	250	10.0
812	32	0.7	265	10.5
863	34	0.6	285	11.0
914	36	0.6	300	12.0
1066	42	0.4	330	13.0
1168	46	0.4	365	14.0
1270	50	0.4	400	16.0
1371	54	0.4	430	17.0
1473	58	0.4	460	18.0
1574	62	0.4	490	19.0
1676	66	0.4	520	20.0
1778	70	0.4	550	22.0

### 2.2 TECHNICAL SCHEDULE – Pneumatic Stoppers type “H”

#### 2.2.1 Typical usage

The Pneumatic Stopper type “H” is suitable for the temporary plugging of metal pipelines (oil lines, gas lines etc.) in presence of flammable gas and liquids.

#### 2.2.2 Material description

The Pneumatic Stopper type “H” has a cylindrical body 1,8 times as long as its diameter and is made with an extrastrong synthetic fabric coated on both faces with hydrocarbons resisting plastomeric compounds.

It has a fixed diameter (single size) when inflated and can only plug pipes whose internal diameter is equal to that of the stopper.

The high inflating pressure of this type of stopper allows the hermetic plugging of the pipeline to repair and the resistance to a possible residual pressure in the pipeline.

It is fitted with a 3 m. long flexible hose, a car type valve for inflating and a safety valve.



Picture 3

#### 2.2.3 Limits of usage

- ◆ Maximum temperature of use : 50°C



**Do not exceed the maximum inflating pressure !!!**

The maximum inflating pressure value is always printed on the stopper.

Diameter of the stopper		Maximum inflating pressure (bar)	Min.diam. opening for stopper insert	
(mm)	(inch)		(mm)	(inch)
100	4	2.0	70	3.0
152	6	2.0	80	3.0
203	8	1.9	100	4.0
254	10	1.8	120	5.0
304	12	1.7	140	5.5
355	14	1.7	150	6.0
406	16	1.5	160	6.0
457	18	1.4	170	7.0
507	20	1.2	180	7.0
558	22	1.1	190	7.5
609	24	1.0	200	8.0
660	26	0.9	215	8.5
711	28	0.9	230	9.0
761	30	0.8	250	10.0
812	32	0.8	265	10.5
863	34	0.7	285	11.0
914	36	0.7	300	12.0
1066	42	0.5	330	13.0
1168	46	0.5	365	14.0
1270	50	0.5	400	16.0
1371	54	0.5	430	17.0
1473	58	0.5	460	18.0
1574	62	0.5	490	19.0
1676	66	0.5	520	20.0
1778	70	0.5	550	22.0

## 2.2.4 Usage of Pneumatic Stoppers type "H"

Example of use of SO.CA.P. Pneumatic Stoppers type "H" to be abandoned, for the repair of a broken pipeline.

1 Broken pipeline to be repaired



2 The pipe after having been cut, with the broken section already removed



3 Placing and inflation of SOCAP stoppers type 'H' to be abandoned



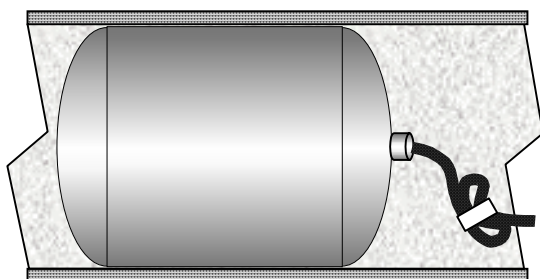
4 Welding of a pipe section which replaces the broken part



5 After welding, oil pushes the stoppers along the pipe to the filters



### Leaving the stopper inside the pipeline



Picture 4

If it is required to abandon the inflated Pneumatic Stopper into the pipeline :

- ⇒ Bend firmly the inflating hose
- ⇒ Tie firmly the inflating hose
- ⇒ Cut it to remove both the inflation valve and the safety valve.

In this way the pneumatic stopper which remains into the pipeline does not have metal parts.

Liquid or gas pressure will subsequently push it along the pipeline until filters or pig traps which will not be damaged because of the absence of metal parts.



### 2.3 TECHNICAL SCHEDULE – Pneumatic Stoppers type “FOG”

#### 2.3.1 Typical use

The Pneumatic Stopper type “FOG” is suitable for the temporary plugging of concrete or other materials pipeline (plastic, GRP, clay etc.) in order to carry out interventions or tests on new or repaired sewerlines, drainages etc.

This type of stopper can be used with non-corrosive liquids.



The Pneumatic Stopper type “FOG” is not suitable to the contact with pure hydrocarbons.

The Pneumatic Stopper type “FOG” is available in two models :

- ◆ Type **FOG/N** To plug pipelines and separate totally one section from the other before the necessary interventions are carried out.
- ◆ Type **FOG/S** To plug pipelines and place into them water or air for tests.

#### 2.3.2 Material description

The Pneumatic Stopper type “FOG” have a section which can be cylindrical, egg shaped or elliptical with a body 1,5 times as long as its diameter and is made with a synthetic fabric coated on both faces with plastomeric compounds.

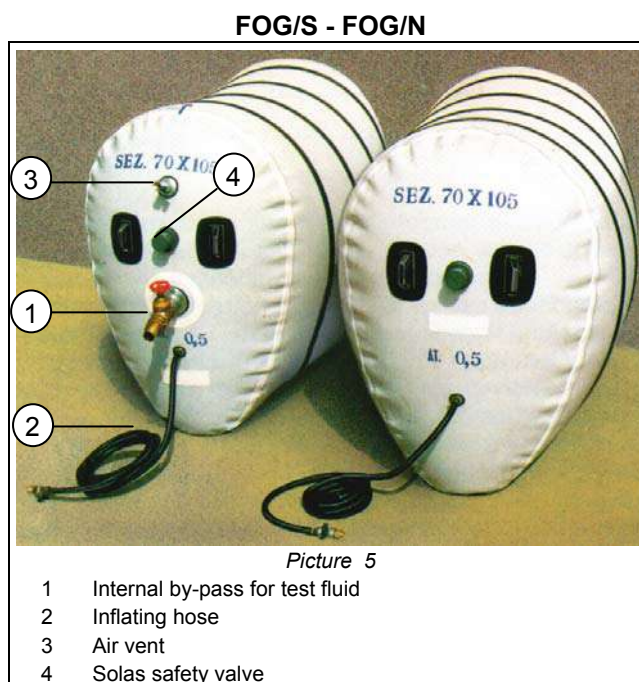
It has a fixed diameter (single size) when inflated and can only plug pipes whose internal diameter is equal to that of the stopper.

Around the body of the stopper some sealing rings are fitted to increase the plugging capacity.

It is fitted with a 3 m. long hose, car type valve for inflating or ball valve, safety valve, internal by pass with gate valve and internal by pass air vent with ball valve.

##### 2.3.2.1 Egg Shaped Pneumatic Stoppers type FOG

- ◆ Maximum temperature of use : 50°C

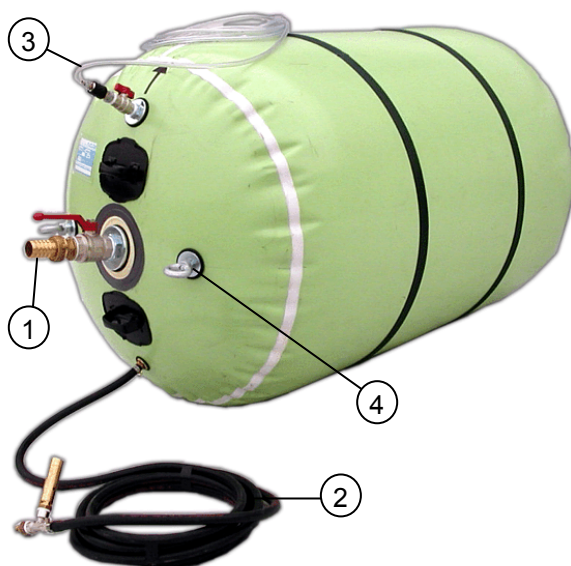
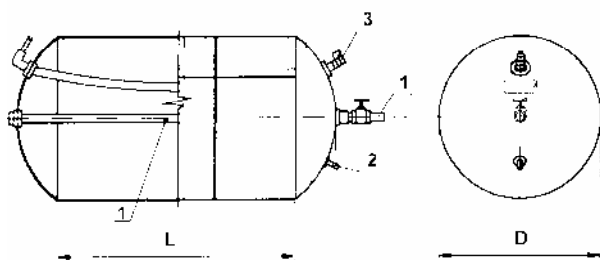


Stopper section (mm)	Maximum inflat.pressure (bar)
600 x 900	0.7
700 x 1050	0.7
800 x 1200	0.5
900 x 1350	0.5
1000 x 1500	0.5
1100 x 1650	0.5
1200 x 1800	0.3
1400 x 2100	0.3

**FOG/S**

### 2.3.2.2 Circular section FOG type Pneumatic Stoppers

FOG/SC



- 1 Internal by pass for test fluid
- 2 Inflating hose
- 3 Test pressure measuring hose
- 4 Metal ring for stopper positioning and retaining

Stopper diameter (mm)	Maximum infl. pressure (bar)
100 ♦	1.9
150 ♦	1.8
200	1.7
250	1.6
300	1.5
350	1.5
400	1.4
450	1.3
500	1.1
550	1.0
600	0.9
650	0.8
700	0.8
750	0.7
800	0.7
850	0.7
900	0.7
1000	0.7
1100	0.7
1200	0.5
1300	0.5
1400	0.5
1500	0.5
1600	0.5
1700	0.5

FOG/NC



**Do not exceed the maximum inflating pressure !!!**

The maximum inflating pressure is always printed on the stopper.



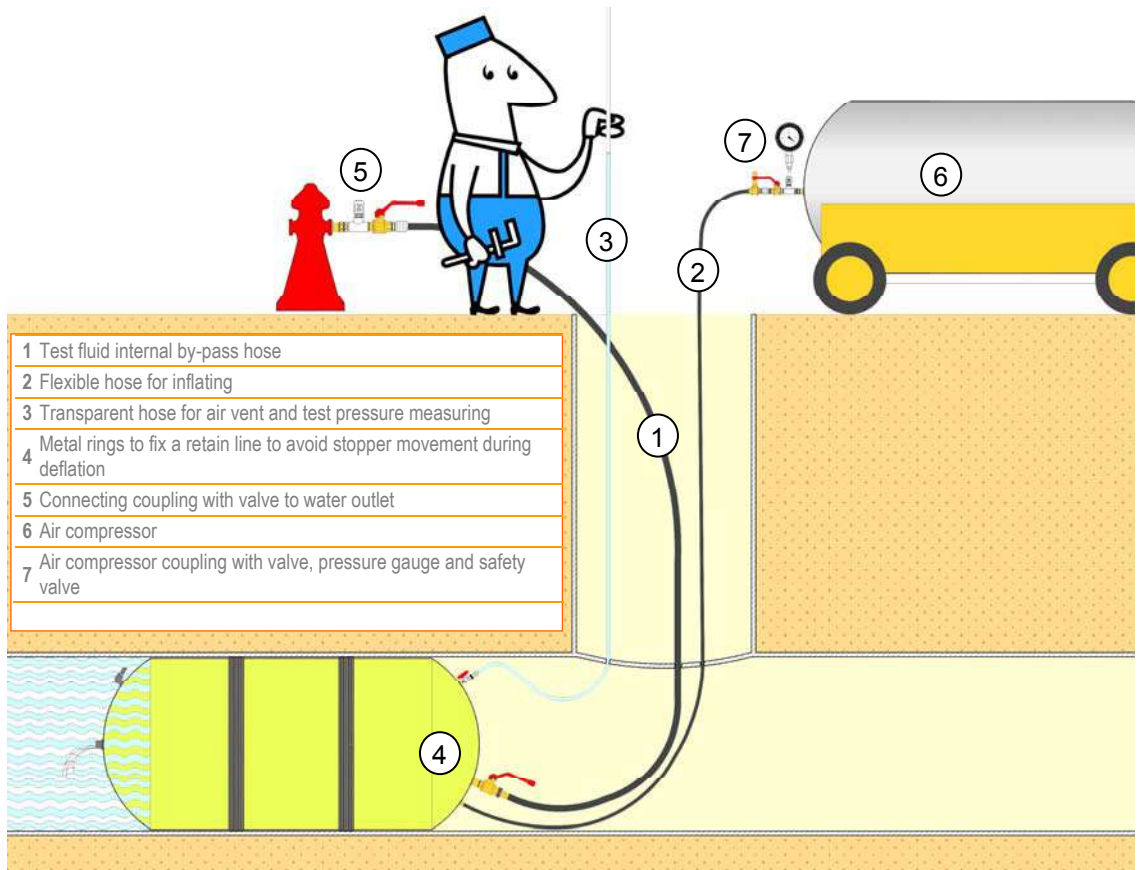
Maximum temperature of use : 50°C



If the Pneumatic Stopper is fitted with two Metal Ring it is mandatory to use them both at the same time.

- only for Type FOG/N

### 2.3.3 Usage of Pneumatic Stoppers type FOG



#### OPERATING PROCEDURE



THE PIPELINE AND THE MANHOLE SHOULD BE CONSIDERED DANGEROUS ZONES.

- Position the deflated stopper in the required pipe sector and observe the safety prescriptions at chapter 1.
- Open the valve of hose n. 1, fix a retain line to each metal ring (4).
- Connect the hose (2) to the air compressor and inflate the stopper partially to give it a round shape.
- Adjust correctly the stopper inside the pipe and abandon the area in front of the stopper.
- Inflate the stopper at the correct pressure value shown on the stopper label.
- Once the correct inflating pressure value has been reached, connect hose (1) to water outlet and place test water. Let the air contained in the pipeline, vent through hose (3).
- Test water pressure can be measured by looking at the water column height shown by the transparent hose (3). Then adjust water pressure at the required value and close the valve at point (5).
- After the pressure test is finished, prior to deflating the stopper, discharge the water contained into the pipeline by disconnecting the hose (1) from water outlet (5) and making it fall at pipeline bottom.
- After test water pressure is exhausted disconnect the valve (7) from the air compressor and deflate the stopper.
- Now you can go inside the pipeline to retrieve the stopper.

## Chapter 3 - OPERATING INSTRUCTIONS

### 3.1 Operators



The operators of the Pneumatic Stoppers, must be properly trained on their usage and informed on the residual risks and on the use of possible individual safety protective measures which could result necessary as a consequence of a risk assessment.

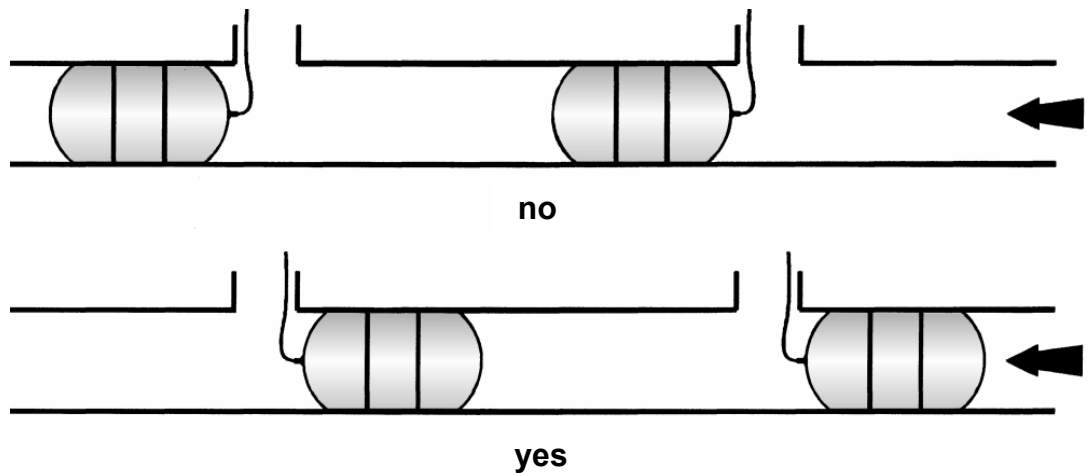
### 3.2 Positioning the Pneumatic Stopper



In case a Pneumatic Stopper has been pushed along the pipeline when inflated owing to unforeseen abnormal backpressure, check that no damage has been suffered by it.

Before placing the Pneumatic Stopper into the pipeline, be sure that no sharp objects which can damage it, are present into the pipe.

Pneumatic Stoppers always should be installed upstream the inspection manhole to allow water pressure to push them into the manhole during deflation instead of making them slide into the pipe downstream the manhole.



Picture 6

Be sure that the Pneumatic Stopper is correctly positioned into the pipeline; it should be centered into the pipeline.

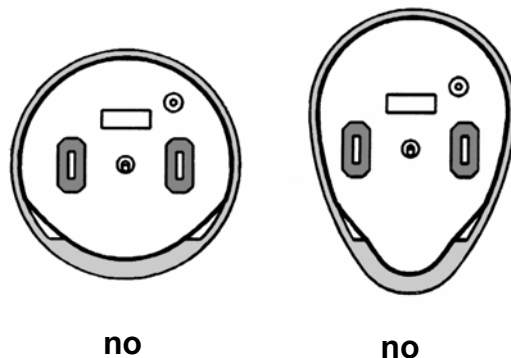


**WARNING** : The handles fitted to the Pneumatic Stoppers have the only function of positioning them and are not designed to take any load or pulling action.

Do not use the inflating hose to move the Pneumatic Stopper.

 REMINDER

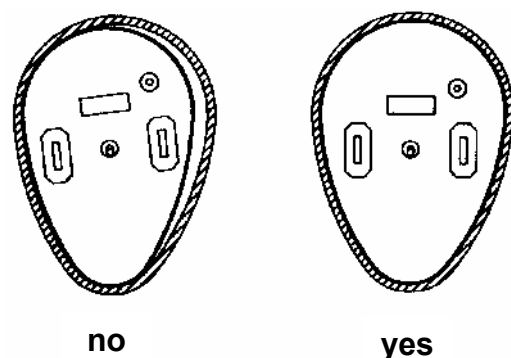
*In order to guarantee a perfect seal of Pneumatic Stoppers it is absolutely necessary to install them into pipes whose internal surface is free from prominences or depressions resulting from the presence of tiles or other anticorrosive coatings. This precaution is even more necessary when considering egg shaped pneumatic stoppers which are designed and produced according to the profile of the pipe section originally given.*



Picture 7

*These Stoppers should be placed into the pipe in the correct position.*

*It is recommended to install the Stopper into the pipe when deflated, then inflate it slightly to obtain the design shape and center it into the pipe before inflating it at its maximum inflating pressure.*



Picture 8

### 3.3 INFLATING



Inflating should be made only with air or inert gas !!!



**DO NOT EXCEED THE MAXIMUM INFLATING PRESSURE !!!**

The maximum inflating pressure is always printed on the stoppers.

**The Stoppers should be inflated only when completely placed into the pipeline.**

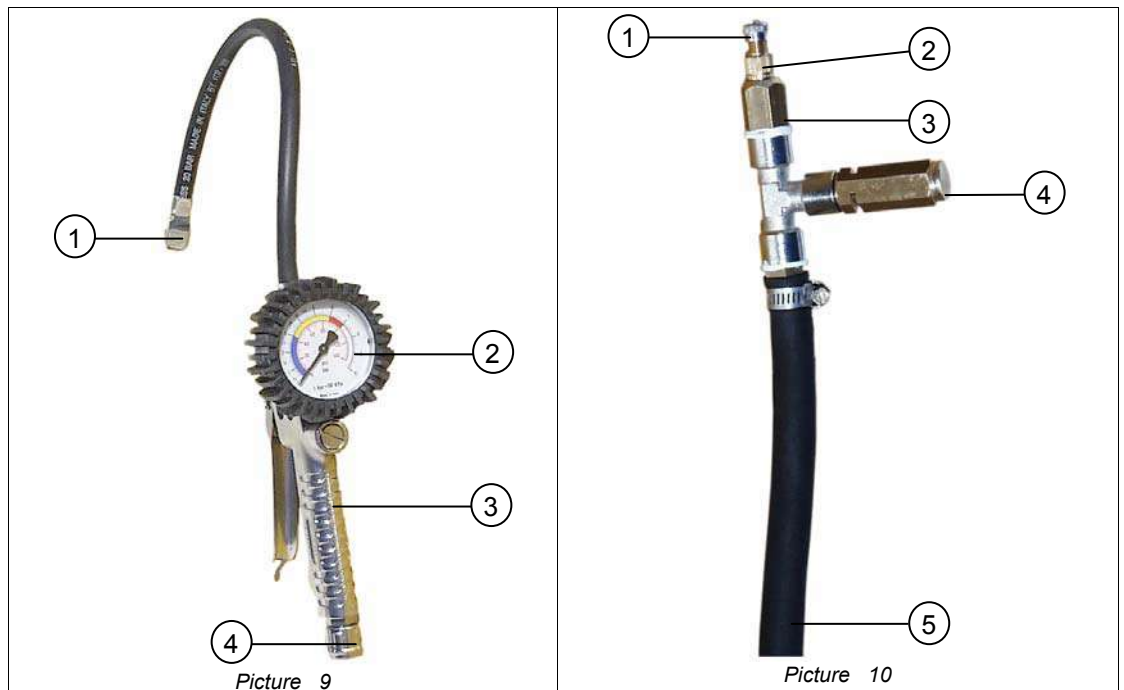


THE INTERNAL PRESSURE VALUE OF THE PNEUMATIC STOPPER MUST BE CHECKED ONLY WHEN THE PRESSURIZED AIR SOURCE IS NOT WORKING.

#### 3.3.1 Inflating with air compressor

##### 3.3.1.1 Fittings for inflating by air compressor

The Pneumatic Stoppers can be inflated by the following accessories for direct inflating by air compressor:



Inflating Gun		Inflating hose	
1	Lever coupling	1	Cap
2	Pressure gauge	2	Inflating valve
3	Handle	3	Valve mounting
4	Coupling to air source	4	Safety valve
		5	Hose to stopper

### 3.3.1.2 Inflating by air compressor

#### OPERATING PROCEDURE

1. Connect the inflating valve to the compressed air source and be sure that the Pneumatic Stopper is correctly positioned into the pipeline (see “*positioning*”).



If inflating is carried out by means of compressed air sources it is mandatory that they are fitted with a device for air pressure control.

2. Unscrew the valve cap (*Picture 10 - Nr1*) on the rubber hose (*Picture 10 - 2*) and inflate the stopper through the valve.
3. Start inflating and check repeatedly that the inflating pressure of the stopper does not exceed the maximum prescribed value (see “*technical schedule*”).

When the maximum inflating pressure value is almost reached, reduce air flow to allow a gradual completion of inflating.

#### REMINDER

THE SAFETY VALVE FITTED ON THE PNEUMATIC STOPPER IS ADJUSTED ON THE MAXIMUM INFLATING PRESSURE AND WILL VENT THE EXCESS AIR IN CASE THE PRESSURE VALUE INDICATED ON THE VALVE BODY IS EXCEEDED.



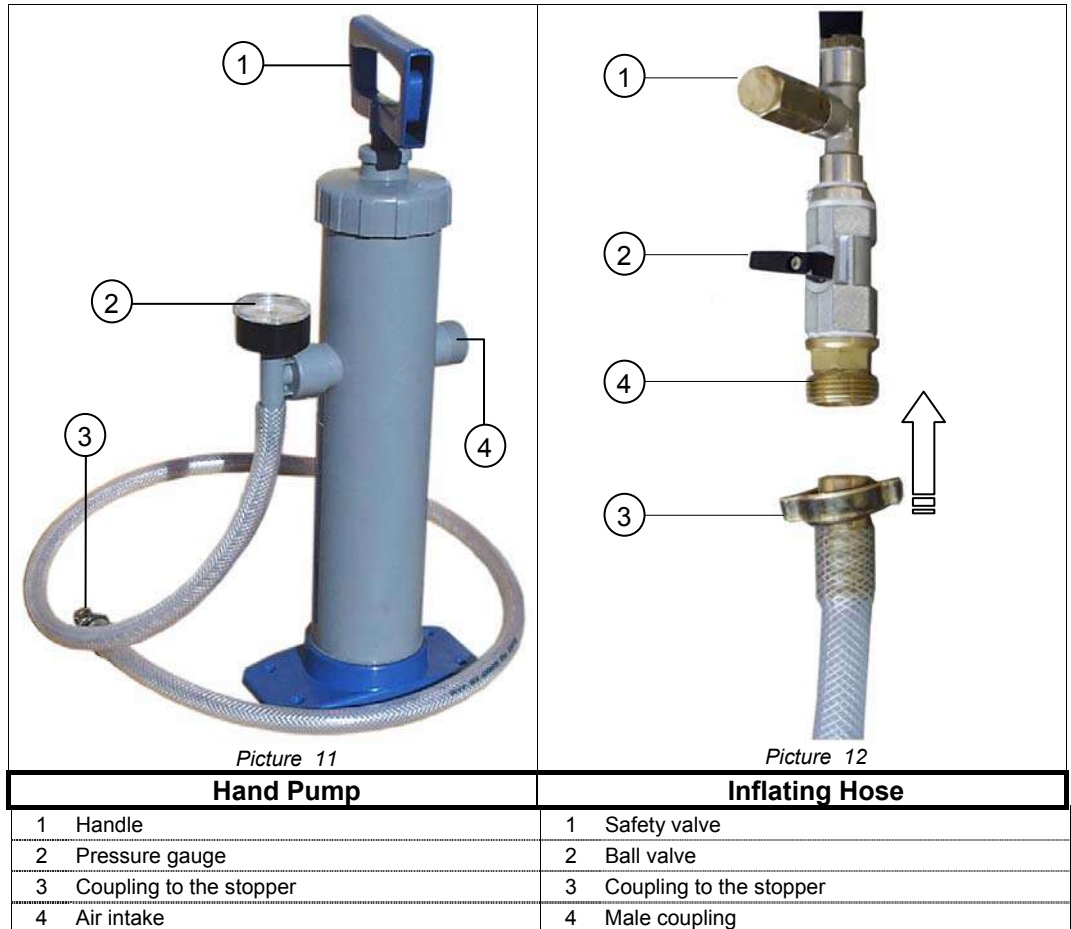
*In case the safety valve vents as a consequence of having exceeded the maximum pressure value, proceed as follows :*

- Stop the air flow
- Reduce the attained inflating pressure value of the stopper by at least 25% of the maximum inflating pressure
- Restart air flow without activating the safety valve.

### 3.3.2 Inflating with hand pump

#### 3.3.2.1 Fittings for inflating with hand pump

The Pneumatic Stoppers can be inflated by the following accessories for inflating with hand pump :



#### 3.3.2.2 Inflating with hand pump

##### OPERATING PROCEDURE

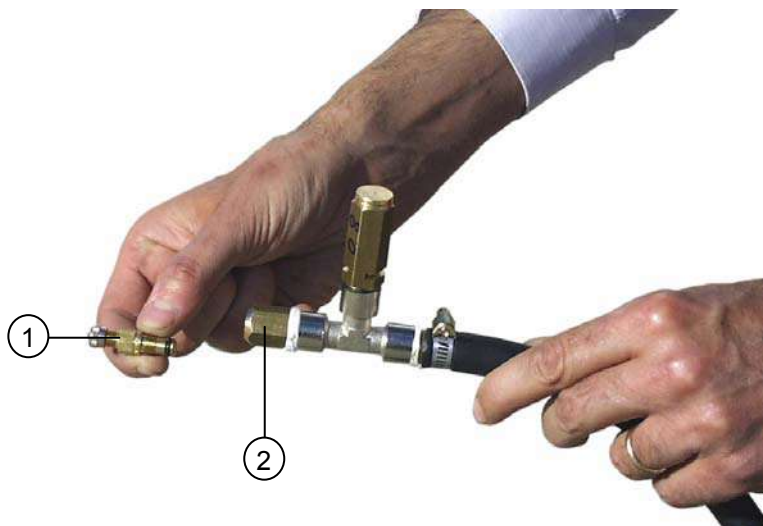
- ◆ Connect the hose of the pump to the hose from the stopper through the threaded coupling and be sure that the pneumatic stopper is correctly positioned into the pipeline (see "Positioning")
- ◆ Open the ball valve
- ◆ Start pumping
- ◆ Once the correct inflating pressure has been reached, close the ball valve and disconnect the two hoses



### 3.4 Desinflating

#### 3.4.1 Desinflating the Pneumatic Stoppers fitted with the accessories for inflating by air compressor

- For desinflating the Pneumatic Stoppers fitted with the accessories for air compressor, unscrew the inflating valve (Picture 13 - 1) from its stand (Picture 13 - 2).



Picture 13

#### 3.4.2 Desinflating the Pneumatic Stoppers fitted with the accessories for inflating by hand pump

- Disconnect the hand pump and open the ball valve (Picture 14 - Nr3).



Picture 14

## Chapter 4 - MAINTENANCE

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### 4.1 Checking the integrity of the Pneumatic Stopper

In order to check the integrity of the Pneumatic Stopper proceed as follows :

- ◆ Inflate the Pneumatic Stopper at a **very low pressure value**, in order to give its shape.
- ◆ Check visually the Pneumatic Stopper to verify the absence of punctures or tearings.



**DO NOT INFLATE THE PNEUMATIC STOPPER AT ITS MAXIMUM INFLATING PRESSURE OUT OF THE PIPELINE !!!**

### 4.2 Routine maintenance

The great simplicity in their construction, their design and their material, give to the Pneumatic Stoppers a remarkable reliability, versatility and durability with reduced maintenance needs.

#### 4.2.1 When using the Pneumatic Stoppers



Always keep clean the safety valve.

Avoid that soil or foreign objects penetrate into the safety valve. The malfunctioning of the safety valve can cause the exceeding of the maximum inflating pressure value with possible danger of bursting.

At the end of the use of the stopper it is necessary to clean and dry it.

#### 4.2.2 After each year

Every year the Pneumatic Stoppers and their fittings should be checked and tested .



**IN ORDER TO CARRY OUT FUNCTIONAL CHECKS AND TESTS OF THE STOPPERS AND OF THE SAFETY VALVE IT IS NECESSARY TO HAVE SPECIFIC TOOLS AND TECHNICAL SKILL.**

Contact SO.CA.P SRL Assistance Service.

#### 4.2.3 Storage after usage

The Pneumatic Stopper should be stored partially inflated in a dark place with the specified environmental conditions (see chapter "LIMITS").

### 4.3 Repairs

#### 4.3.1 Repair kit

The Pneumatic Stopper is complete of the following parts for repair :

1. Glue PU910
2. Patches



**WARNING !!!**

Handle the glue with care and follow the prescriptions indicated on the label



Picture 15

#### OPERATING PROCEDURE

- ◆ Clean carefully with rags the part of the stopper which will receive the patch. This part must be one to three centimeters bigger than the patch itself.
- ◆ Clean in the same way the patch on one side. If dirt cannot be removed with a dry rag, some solvent (toluene) can be used provided that the treated part is let dry up completely.
- ◆ Apply both on the clean part of the stopper and on the clean part of the patch the Socap special glue. The glue should be evenly applied.
- ◆ Then apply the patch on the stopper pressing strongly both in the center and on the edges place on the patch some weights (sand bags etc.).



Said repairing must not be made in the rain or in dusty places but only in closed places.

- ◆ The repaired stopper will be ready for usage in about 12 hours.

#### NOTES: