

# IN-LINE INDUCTORS (FIXED & PORTABLE TYPE)

## MODEL: NF-350B-225 (V), NF-350B-450 (V), NF-350B-600F



### DESCRIPTION

NAFFCO Foam Inductors provide a simple and accurate means of inducting foam concentrate into the water supply. Portable and fixed in-line inductors are available for reliable and accurate proportioning. Construction of Stainless steel (SS 304/316) material ensures long and trouble free operational life.

### PORTABLE IN-LINE INDUCTORS

Portable In-line Inductors provide the means for accurate induction of Foam compound into the Water stream for operation of Foam branches and equipment. Using a simple venturi, the device ensures accurate induction at the design pressure.

Our In-line Inductor capacities are matched to NAFFCO Foam equipment; models NF-500 LXB225 and NF-500 LXB450 though other capacities can be manufactured on request. An ergonomic design allows easy handling and mobilization, and a simple, robust construction ensures long and trouble free operation.

### FIXED IN-LINE INDUCTORS

Fixed In-line Inductors are meant for use in fixed foam systems for protection of fixed/floating roof storage tanks, foam spray systems for Tanker loading bays, etc. It's simple design make the operation simple and reliable, and when operated at the design pressure, it will ensure proper induction, and result in good quality foam being discharged from foam delivery devices.



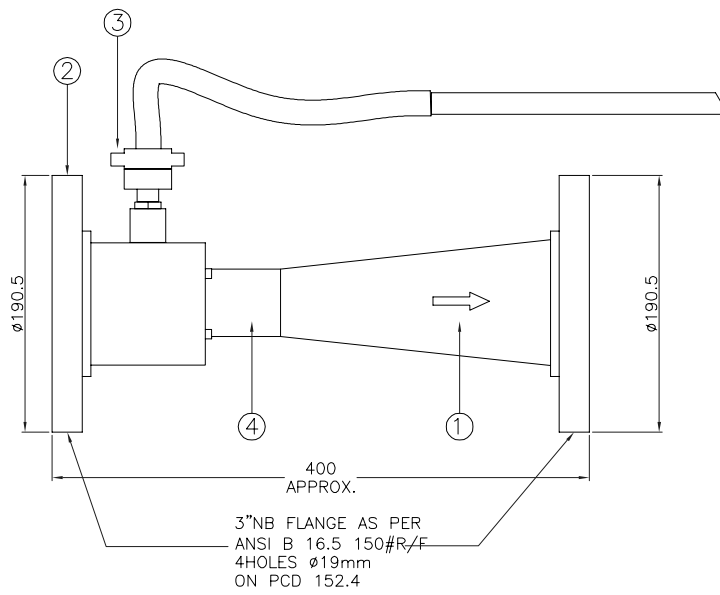
### \*NOTES:

- Fixed In-line Inductor to be located as close as possible to Foam concentrate container. Pipe lengths before and after inductor should be straight for at least 3 feet's to ensure correct performance. Inductor should not be located more than 6 feet above bottom of foam container.
- Inlet pressure should be within the working pressure 7 kg/cm<sup>2</sup> for correct performance. Diameter of inlet & outlet pipes should not be less than that of the inductor, and if shut-off valves are provided at inlet, it should be ensured that the valve is full bore On-Off type.

### PERFORMANCE DATA

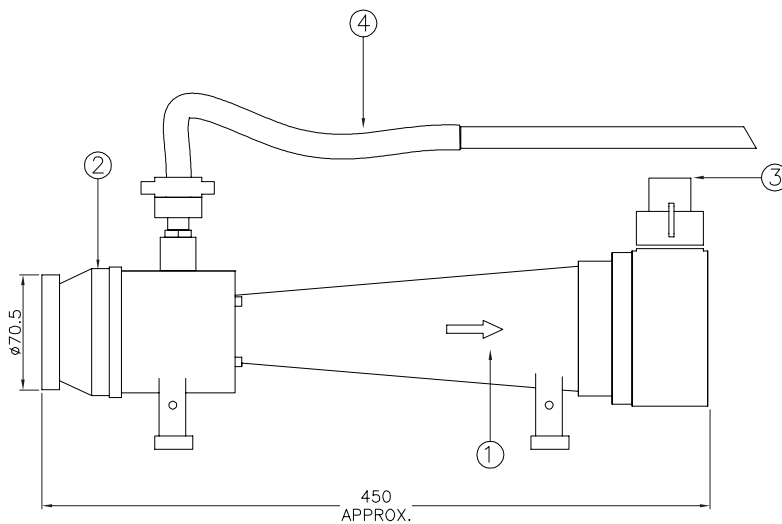
Model	Type	Performance	End Connection	Weight	Painting
NF-350B-225 (V)	Portable	225 LPM @ 100 psi	63 mm Instantaneous Male/ Female Outlet	5.5 kg.	Fire Red/Yellow
NF-350B-450 (V)	Portable	450 LPM @ 100 psi	63 mm Instantaneous Male/ Female Outlet	5.5 kg.	Fire Red/Yellow
NF-350B-600F	Fixed	600 LPM @ 100 psi	Flanged	5.5 kg.	Fire Red/Yellow

Inductors are fixed orifice type for 3% proportioning.



**NF-350B-600F**

SL No.	QTY.	Description	Material
1	1	Body of Inductor	SS 304/SS316
2	2	Flange	SS 304/SS316-ANSI16.5
3	1	Foam Inlet	Gun Metal
4	1	Nozzle Diffuse	Gun Metal



**NF-350B-225(V) & NF-350B-450(V)**

SL No.	QTY.	Description	Material
1	1	Body of Inductor	SS 304/SS316
2	1	Male Instantaneous Inlet	SS 304/SS316
3	1	Female Instantaneous Inlet	SS 304/SS316
4	1	Pick Up Tube	PVC HOSE/SS 304 PIPE

# IN-LINE INDUCTORS (VARIABLE & FIXED TYPE)

MODEL: NF-350B (V), NF-350B (F)



## DESCRIPTION

Air Foam Proportioner/In-line Inductors are venturi devices that introduce Foam concentrate into a flowing stream of water at a controlled rate. The rate of solution flow from the device is related to the inlet pressure of proportioner. In addition to water pressure, handline proportioner/in-line inductors are sensitive to back pressure. Back pressure is the amount of pressure required down stream of the proportioner to discharge the total foam solution flow.

The total allowable back pressure on the discharge side of the handline proportioner/in-line inductors should not exceed 65% of the water inlet pressure. When using handline proportioner/ in-line inductors as portable devices a pick-up tube is provided to draw foam concentrate from the portable foam containers. Two different models are:

NF-350B (V)-Portable in-line Inductor with Variable Proportioning at 3% & 6% NF-350B (F)-In-line Inductor with Fixed Proportioning at 6%.

## SPECIFICATION

Air Foam Proportioner/In-line Inductors are a venturi type proportioning device designed to inject foam concentrate into the waterstream at a controlled rate of either 3% or 6%. The In-line Inductors (Proportioner) designed to operate with an inlet pressure of 15.5 kg/cm<sup>2</sup> (221 psi) and the total back pressure not exceed 65% of the inlet pressure.

The orifice is factory set for 6% foam injection at the designed flow for fixed type inductor Model NF-350B (F). Metering valve supplied in lieu of the fixed orifice, thereby providing field adjustable proportioning at 3% & 6% for portable Air Foam Proportioner/In-line Inductor Model NF-350B (V). A Pick-up tube is provided for Model No. NF-350B (V) to draw foam concentrate from the portable foam container.

## FEATURES

- NF-350B (V) having metering check valve to adjust foam induction/proportion rate at 3% & 6%.
- For fixed installation having fixed orifice of foam induction/proportion rate at 6%.
- Suitable for use with all foam concentrates.
- Designed to minimum pressure loss across the inductor
- Simple to operate
- Minimal maintenance
- Corrosion resistant



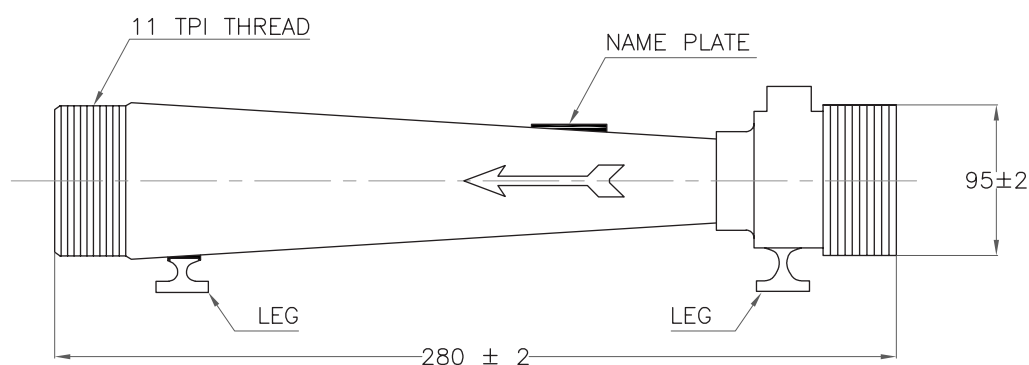
## APPLICATION

Air Foam Proportioner/In-line Inductors are designed for hose line applications and matched to specific Nozzle/ Nozzles. It is not recommended/suitable to operate over a range of flow or pressures. NF-350B (F) is not recommended for application using sprinklers or other multiple small orifice discharge devices which could increase the allowable back pressure sufficiently to cause proportioning failure.

Once the In-line Inductors are installed properly, no further attention are required during operation except, for ensuring the required supply of foam concentrate time to time. Hose sizes can be varied to increase the distance between inductor and foam maker. Relay operation may be used when it is necessary to move foam to longer distance or to allow application from elevated master stream. Designed for application with Mobile Foam Unit in combination with UL Listed Foam Hose Stream Nozzle (Low Expansion Branch Pipe). Model: NF-500LXB

## TECHNICAL DATA

Model	NF-350B (V)	NF-350B (F)
Inlet water pressure, kg/cm <sup>2</sup> (psi)	7.0(100)	7.0(100)
Nominal Flow, LPM/GPM	385 (100) ± 5%	385 (100) ± 5%
Proportioning (%)	3% & 6% with metering check valve	6%(Fixed orifice)
Inlet and Outlet size, mm(inch)	63 (2.5)	63 (2.5)
Hose Size	63-70 (2.5-2.75)	63-70 (2.5-2.75)



## DIMENSIONS (Approx.)

Model	NF-350B (V)	NF-350B (F)
Length, mm(inch)	280(11)	280(11)
Height, mm(inch)	128(5)	128(5)
Width(Leg)	100x25	100x25

**\*NOTE:** Standard inlet and outlet hose couplings are supplied for both the models.

## MATERIAL OF CONSTRUCTION

Part	Material
Diffuser	Bronze
Injector	Bronze
Body	Bronze
Metering Check Valve	Stainless Steel 304
Valve Connector	Brass (Chrome Plated)
Orifice	Brass (Chrome Plated)
<b>PICK-UP TUBE</b>	
Flexible Tube	Plastic Flexible Tube with Spiral
Extension Tube	Stainless Steel
Strainer	Stainless Steel

# FIXED FLANGE TYPE In-line FOAM INDUCTOR

## MODEL: NFI SERIES

### DESCRIPTION

In-line Foam Inductor is used to induct the foam liquid concentrate in water stream to supply proportioned solution of the liquid concentrate and water, to the foam producing equipment. The inductors are designed primarily for use in the fixed foam installation to provide a simple and reliable method of proportioning in constant flow applications.

Each Inductor is designed for a predetermined water pressure to give the correct proportioning at that pressure and discharge rate. The increase or decrease of the inlet pressure will result in an increase or decrease in the flow rate, which in turn will change the proportioning.

### SPECIFICATION

Inductors are available in three different materials of construction, a wide range of flow from 75 to 3500 litres per minute at inlet pressure between 6.4 to 12 bar as shown in the graph.

Each Inductor is accurately calibrated at the factory to match the flow, pressure and the induction requirement of the system. This enables to ensure and achieve the correct performance.

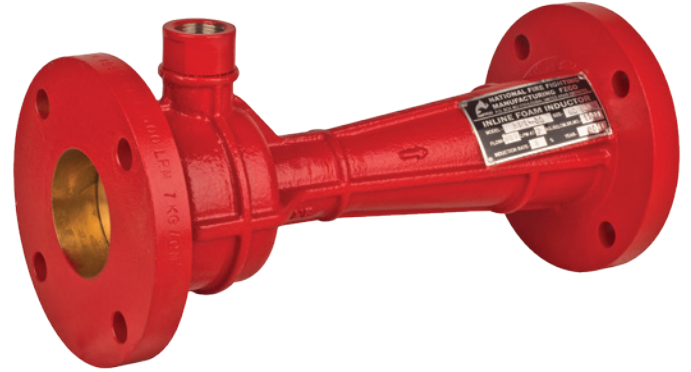
### SYSTEM DESIGN DETAILS

The Inductor must be selected and installed in a hydraulically calculated system considering the limitation of permissible back pressure. The maximum back pressure allowed is expressed as 65% of pressure at the inlet of the inductor. The optimum performance of In-line Inductor is with pressure above 8 bar (115 psi).

In the fixed foam system installation the inductor can be mounted above the concentrate storage tank. The maximum height of the Inductor suction pipe above the bottom of the storage tank to the inductor centre should not exceed 1.75 meters, with AFFF & 0.9 meter for AR-AFFF 3/3% foam concentrate. A minimum of 600 mm of unobstructed straight pipe line should be provided at the inlet and outlet of the inductor. The inductor must be installed in a system having minimum of 6.5 bar inlet pressure at inlet of inductor.

The diameter of water supply pipe and water foam solution pipe should not be less than that of the diameter of the inductor. A shut-off valve provided in the induction line must be full bore on-off valve.

The non-return valve if fitted in the foam induction pipe line, then it must be supplied or recommended by NAFFCO, so that the induction rate is properly calibrated in factory before supply. For best performance the inlet pressure at the in-line inductor should be 6.8 bar or higher.



### APPLICATION

In-line Foam Inductors are quite suitable for application utilizing single fixed discharge device. The In-line Inductors are not suitable for variable flow or pressure applications. The In-line Inductors are not suitable for Sprinkler system or system utilizing multiple small orifice discharge devices, which may result in increased back pressure due to blockage of discharge device.

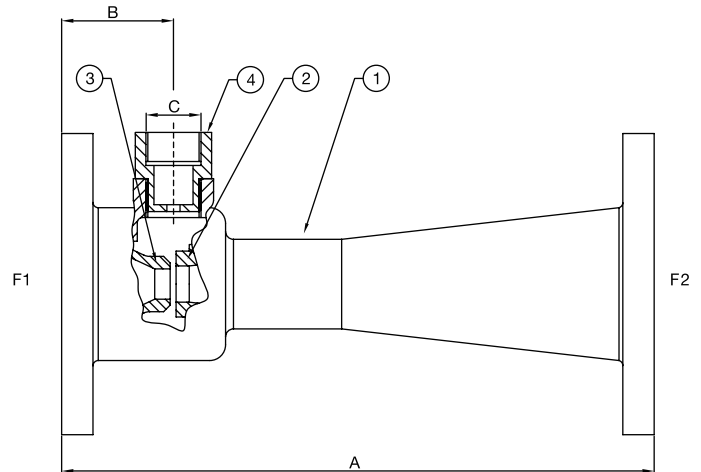
### INSTALLATION AND MAINTENANCE

Inductor must be supported firmly to prevent strain on the inductor itself. Qualified and trained person must commission the system. After few initial successful test, an authorized person must be trained to perform inspection and testing of the system. It is recommended to carry out physical inspection of the system regularly. The system must be fully tested at least once in a year or in accordance with applicable NFPA codes or in accordance to the standard of the organization having local jurisdiction.

Do not turn off the system or any valve to make repair or test the system, without placing a roving Fire Patrol in the area covered by the system. The Patrol should continue until the system is back in service. Also inform the local security guard and control alarm station, so that a false alarm will not be signaled.

## TECHNICAL INFORMATION

Size	65, 80, 100 & 150 NB
Material	Bronze or Stainless Steel
Operating Pressure	6.5-12 bar (93-175 psi)
Factory Hydrostatic Pressure	25 bar (365 psi)
Induction	3 or 6%
Maximum Back Pressure	65% of Inlet Pressure
Finish	Red RAL 3001
Ordering Information	Specify <ul style="list-style-type: none"> <li>• Model &amp; Size</li> <li>• Inductor Inlet Pressure</li> <li>• Inductor Percentage</li> <li>• Foam Solution Flow Required</li> <li>• Type of Foam Concentrate used</li> <li>• Maximum Suction Lift</li> </ul>



## SELECTION OF IN-LINE FOAM INDUCTOR SIZE

Model No.	Size	Inductor K-Factor Range
NFI-65	65 NB	29.4 to 170
NFI-80	80 NB	151.2 to 340
NFI-100	100 NB	302.4 to 680
NFI-150	150 NB	604.8 to 1030

For selecting Inductor size, following formula to be used :

$$Q = K \sqrt{P}$$

**Q** = Total solution flow rate in litres per minute.

**K** = Inductor constant

**P** = Inlet pressure in kg/cm<sup>2</sup>

Example: To find K-Factor

$$Q = 200 \text{ LPM}$$

$$P = 8.0 \text{ kg/cm}^2$$

$$K = 200 \div \sqrt{8}$$

$$K = 70.71$$

This K=70.71 falls within the range of inductor with 65 NB size. Hence 65 NB inductor should be selected.

### \*NOTES:

- It is recommended to select next higher size of inductor when the K-factor is very close to the higher range of model.
- A pressure gauge mounting socket at inlet and outlet of Inductor must be provided, which will help to analyze the system during commissioning.
- The socket can be plugged in once the system has been commissioned successfully.
- The maximum permissible back pressure is 65% of inlet pressure. The system designer should consider and design the system with 62% or less than back pressure as safe design.
- Inductor must be adequately supported so that no strain is imposed on the inductor body.

## DIMENSIONS

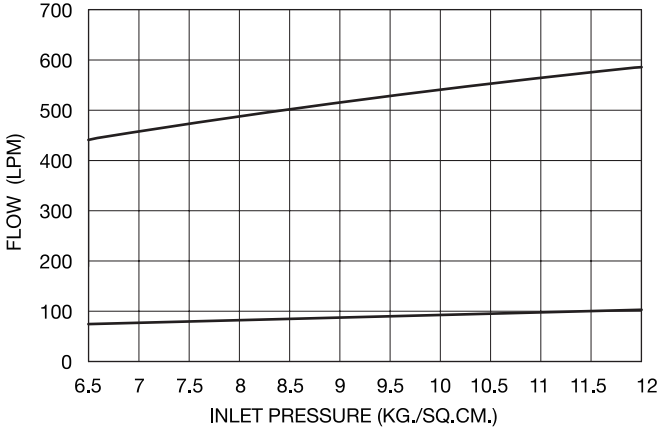
FLANGE SIZE F1/F2	A	B	C
65 NB	350	75	¾" BSP
80 NB	400	80	1" BSP
100 NB	450	85	1¼" BSP
150 NB	500	90	1¼" BSP

## MATERIAL OF CONSTRUCTION

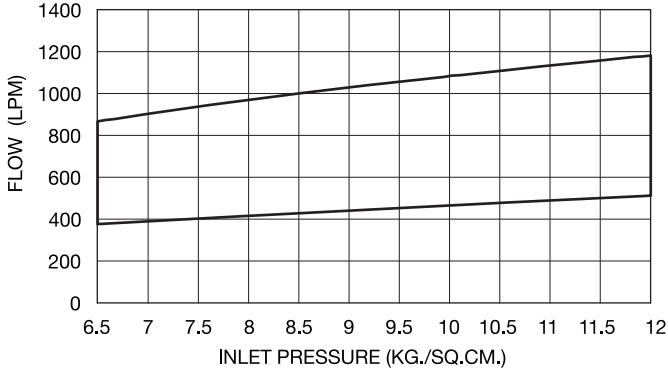
Description	Material	
Housing	Bronze	SS 304/316 ASTM A351-CF8M
Diffuser	Bronze	SS 304/316 ASTM A351-CF8M
Nozzle	Bronze	SS 304/316 ASTM A351-CF8M
Orifice	SS 304/316	SS 304/316 ASTM A351-CF8M

\*NOTE: Standard supply is CF8, optional is CF8M

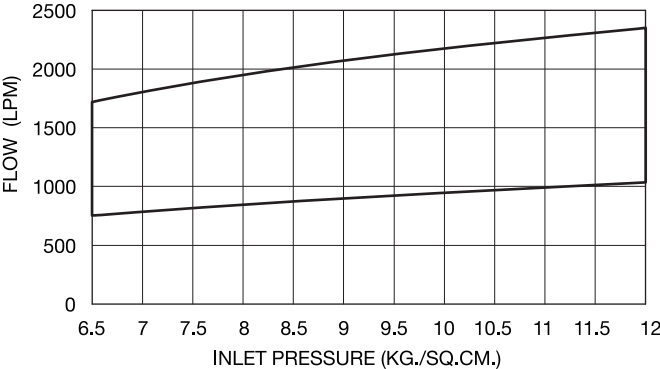
**PRESSURE VS. FLOW-PERFORMANCE CHARACTERISTICS**



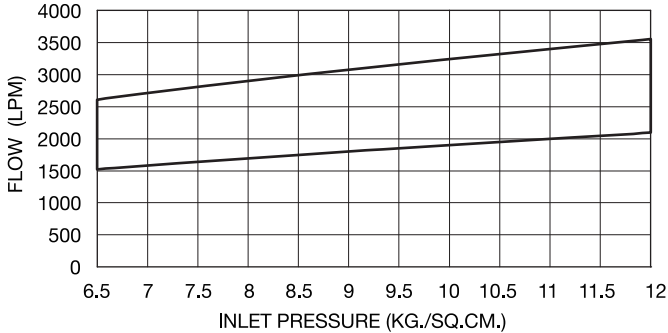
**SIZE 65NB**



**SIZE 80NB**



**SIZE 100NB**



**SIZE 150NB**

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# PORTABLE In-line INDUCTOR

## MODEL: NF-PI.225 & NF-PI.450

### SPECIFICATION

The material of construction of the inductor is corrosion resistant Stainless Steel or bronze. The inductors have instantaneous couplings at inlet and outlet for easy and fast deployment in the field. A rugged handle is provided to relocate the inductor during operation. A clear transparent helix wire braided pickup tube of 1.5 meters long with Stainless steel suction tube is provided. Inductors NF-PI.225 and NF-PI.450 are to be used with matching foam branch pipes NF-BP(F) .2 and NF-BP(F) .4. Improper selection of branch pipe will not give the desired performance. Mismatch of the inductor and branch pipe will lead to either reduced throw or no induction. Refer table for proper matching of the Inductor and Branch pipe, longer length can be used if care is taken to keep the hose in straight length & level between inductor & branch pipe. It is recommended to use 1 length of 15 meters or 2 length 15 meters of hose of 2-1/2" size for coupling to inductor with branch pipe.



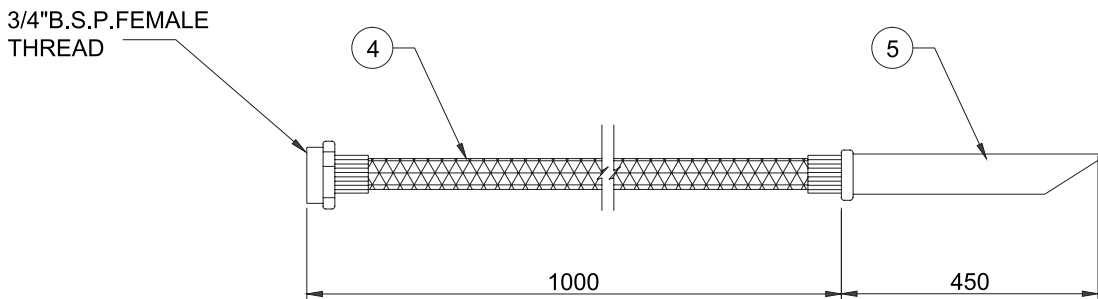
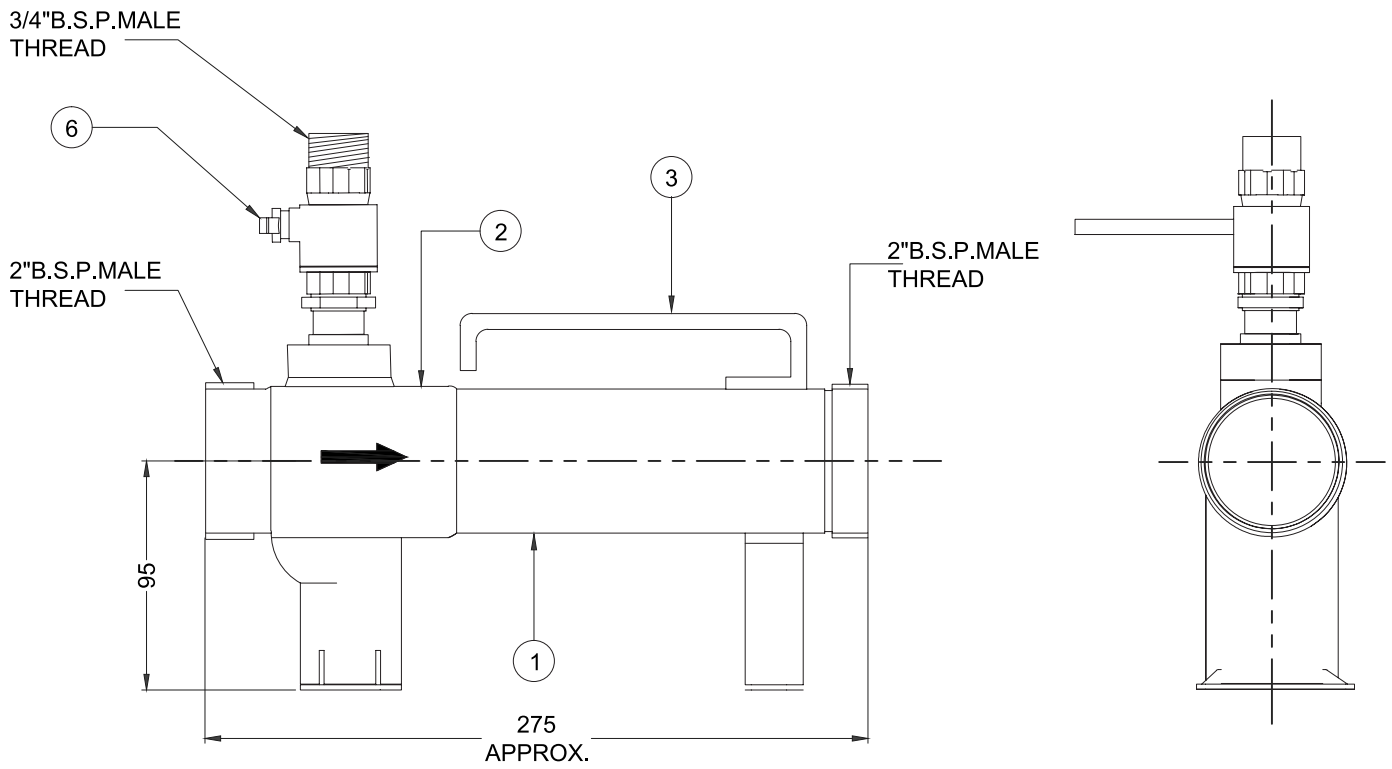
### DESCRIPTION

NAFFCO make hand held/portable inductors series NF-PI.225 and NF-PI.450 are designed primarily for use in the manual firefighting operation to provide a simple and reliable method of proportioning in constant flow applications. Each Inductor is designed for a pre-determined water pressure to give the correct proportioning at that pressure and discharge rate. Inductor model NF-PI.225 and NF-PI.450 flow 225 LPM and 450 LPM at pressure 7 bar respectively. The increase or decrease of the inlet pressure will result in an increase or decrease in the flow rate, which in turn will change the proportioning.

Size	65 NB
Working Pressure	7 kg/cm <sup>2</sup>
Connection	2-1/2" MALE Instantaneous Coupling at INLET 2-1/2" FEMALE Instantaneous Coupling at OUTLET (as Per BS:336 and IS:903)
Finish	Yellow Finish
Induction	3%
Ordering Information	Model No. & Pressure

### TECHNICAL DATA

	NF-PI.225	NF-PI.450
Material of Construction	Stainless Steel 304, 316 & 316L	Stainless Steel 304, 316 & 316L
Flow Rate (GPM)	59	119
Induction	3%	3%
Rated Working Pressure	100 psi	100 psi
Pressure Range	80 psi to 200 psi	80 psi to 200 psi
Length	400 mm	400 mm
Width	95 mm	95 mm
Height	200 mm	200 mm



No.	Part	Material
1	Discharge Pipe	S.S, ASTM A312, TP 304/316/316L
2	Body	S.S, ASTM A351, Gr CF8/CF8M
3	Holding Clamp	S.S, ASTM A351, Gr CF8/CF8M
4	Pick Up Tube(3/4" Nb)	P.V.C
5	Strainer	S.S, ASTM 276, TP 304/316/316L
6	Ball Valve	S.S, ASTM A351, Gr CF8

# FOAM INDUCTOR

## MODEL: NF-28B

### DESCRIPTION

The first necessity of any hand-line foam system is a means of introducing foam concentrate into the water supply. The simplest, most efficient and least expensive way of doing this is a portable Foam inductor. These inductors are constructed of rugged bronze alloys.

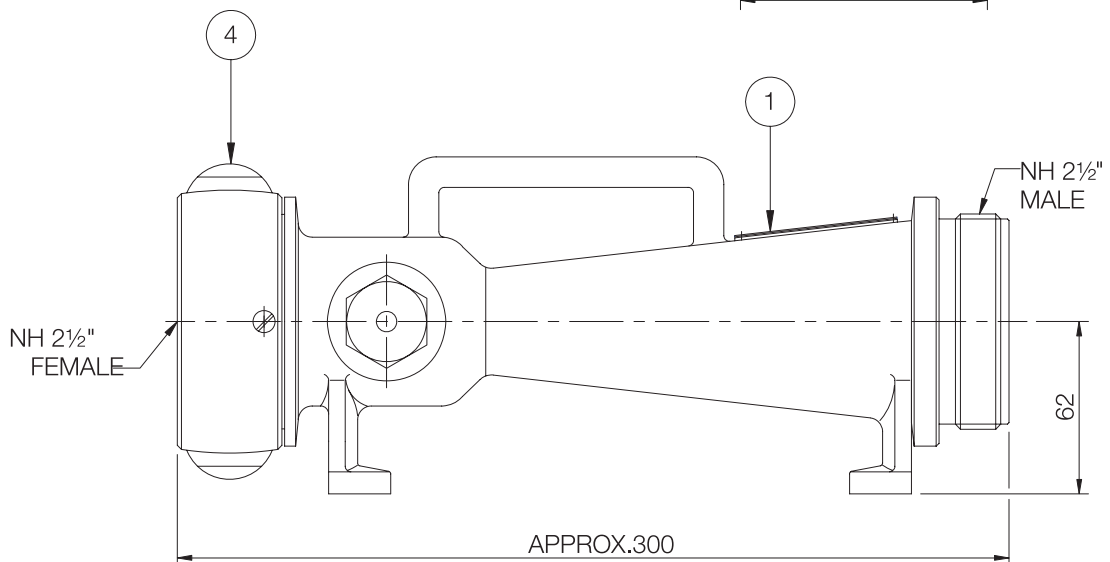
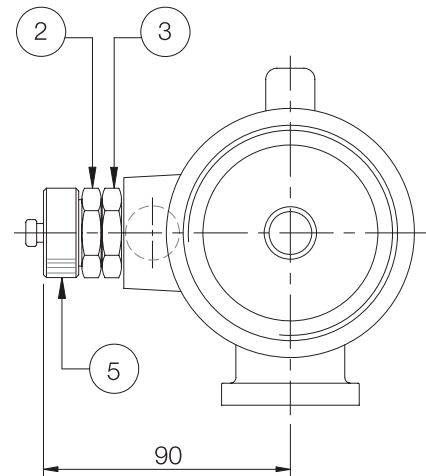
Their efficient and simple design assures the lowest possible friction loss. Metering devices on all these inductors are easily removed for cleaning and are designed to prevent foam contamination when the line is shut down. The optional foam setting metering device on all models have a settings: 1% ~ 6%. Includes inductor with female swivel inlet x male outlet, removable metering/check valve and pickup tube and clear PVC pick-up hose. Inductors are suitable for all types of foams.



### TECHNICAL INFORMATION

Construction	Full bronze (ASTM C83600)
Inlet Size	2½" NH Female (BS 336 optional)
Outlet Size	2½" NH Male (BS 336 optional)
Foam Flow	AFFF 3%, 300 ~ 600 LPM @ 7 bar (please specify what flow you need)
Weight	Approx. 6.0 kg
Metering Device Model: NF-FM	1% ~ 6% option (Foam mix device is optional product)

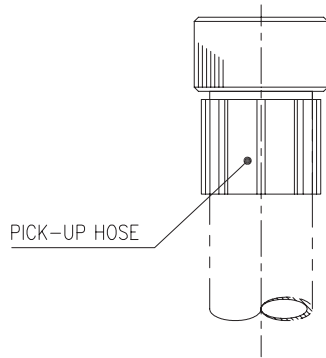
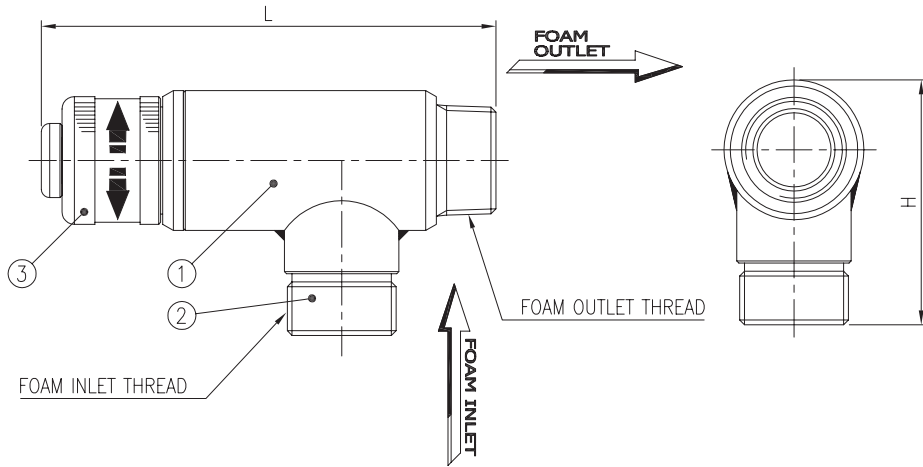
\*NOTE: c/w clear PVC foam pick up hose



### PARTS

1. Body
2. Pick-Up Nipple
3. Bushing
4. Coupling
5. Cap

## METERING DEVICE



No.	Description	Material
1	Body	Brass
2	Pick-Up Nipple	Brass
3	Controller	Brass

Model	Connection Size		Dimension	
	Foam Inlet	Foam Outlet	L	H
Metering Valve NF-FM	3/4"	1/2"	107	60
	3/4"	3/4"	111	60
	1"	3/4"	133	63
	1"	1"	133	63
	1-1/4"	3/4"	168	80
	1-1/2"	1-1/2"	168	90

# FOAM INDUCTOR

## MODEL: NF-F160G

### DESCRIPTION

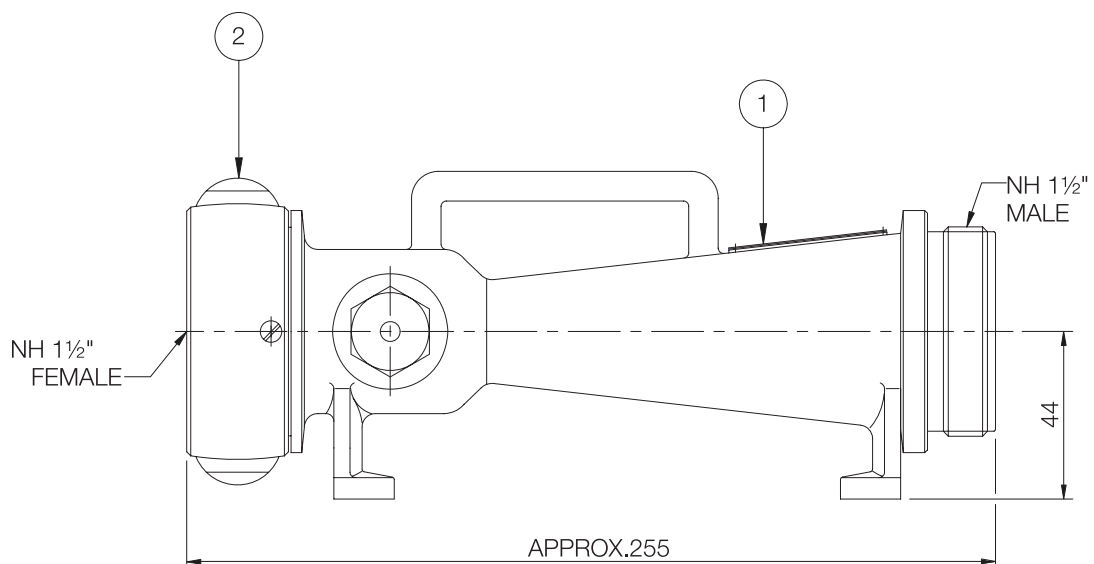
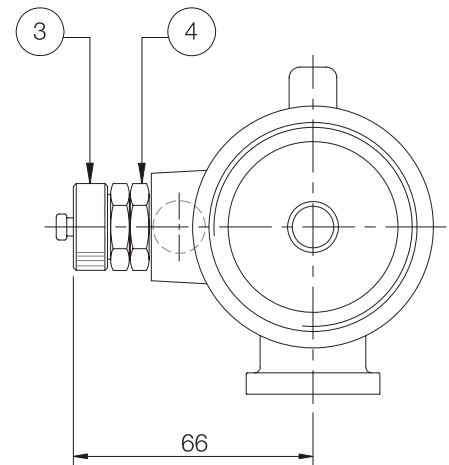
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Their efficient and simple design assures the lowest possible friction loss. Metering devices on all these inductors are easily removed for cleaning and are designed to prevent foam contamination when the line is shut down. The optional foam setting metering device on all models have a settings: 1% ~ 6%. Includes inductor with female swivel inlet x male outlet, removable metering/check valve and pickup tube and clear PVC pick-up hose. Inductors are suitable for all types of foams.



### TECHNICAL INFORMATION

Construction	Full bronze (ASTM C83600)
Inlet Size	1½" NH Female (BS 336 optional)
Outlet Size	1½" NH Male (BS 336 optional)
Foam Flow	AFFF 3%, 100 ~ 300 LPM @ 7 bar (please specify what flow you need)
Weight	Approx. 3.5 kg



### PARTS

1. Body
2. Inlet
3. Pick-Up Nipple
4. Bushing