

# FOAM CHAMBER



## TECHNICAL DATA

MODELS	FCA-65, FCA-80 & FCA-100 Carbon Steel Construction
	FCA-S 65, FCA-S 80 & FCA-S 100 Stainless Steel Construction
INLET SIZE	65, 80, 100 NB
WORKING PRESSURE	Min 2.8 Kg/cm <sup>2</sup> (40 PSI) Max 7 Kg/cm <sup>2</sup> (100 PSI)
WEIGHT (Approx)	65 NB - 34.5 Kg 80 NB - 49.5 Kg 100 NB - 72.0 Kg
VAPOUR SEAL RUPTURE PRESSURE	0.7 to 1.75 Kg/sq.cm. (10 PSI to 25 PSI) Running water/ water foam solution pressure at inlet of Foam Chamber
MAXIMUM PERMISSIBLE BACK PRESSURE ON VAPOUR SEAL	0.07 Kg/sq.cm. (1.0 PSI)
VAPOUR SEAL	Glass
Deflector	Solid or Split Deflector
FINISH	Red RAL 3000
APPROVAL	UL Listed
ORDERING INFORMATION	a) Model & Size b) Flow & Pressure at inlet of each Foam Chamber c) Inlet, outlet flange specification d) Type of Deflector e) Foam concentrate used f) Tank number / Tag number



## FEATURES

- UL Listed
- Heavy duty welded construction with choice of Carbon Steel or Stainless Steel material
- Frangible Glass Vapour Seal
- Controlled Air Flow proportional to liquid flow for optimum foam quality and rupture of vapour seal in narrow pressure tolerances for increased reliability
- Field replaceable orifice plate fitted with Foam Chamber
- Interchangeable with HD Foam Chamber Model FC

## APPLICATION

Foam Chamber is used in one of the most common application to protect vertical fixed roof (cone) liquid storage tanks, with or without internal floating roof with the low expansion foam system. The application of foam is on the basis that the risk comprises the total surface area of the fuel. The foam system design guidelines generally used are in accordance with NFPA-11, standard.

Foam chambers are defined by NFPA-11 as Type II discharge outlets for delivering the foam to the surface of a flammable liquid. The Foam Chambers are widely used with the Inline Foam Inductor, Balance Pressure Foam Proportioning system, Bladder Tank Proportioner or Foam Tender.

## **SPECIFICATION**

Foam Chamber is an air aspirating foam discharge device, covering wide range of flow from 150 to 1780 litres per minute at 2.8 to 7 kg/sq.cm. inlet pressure. The Foam Chamber contains a vapour seal to prevent the entry of vapour into the foam chamber and the foam solution pipe. Each foam chamber is supplied with an orifice plate, designed for the required flow and inlet pressure. The orifice is field replaceable in the event of change in design parameters. The foam is produced by introducing air into the foam solution stream. The inlet of foam chamber is designed to create venturi jet which draws air into the foam solution stream. The air is drawn into the foam solution through the holes located on the foam chamber covered with stainless steel screen to exclude nesting birds and insects. The aerated foam is directed into the deflector for the gentle application of the expanded foam. The deflectors are available in different models.

On removal of cover plate from the top of the chamber allows the system to be tested and to draw a sample of the expanded foam, without removing the vapour seal or disconnecting the foam chamber from the tank. Frangible glass bursting disc (vapour seal) can be replaced by easily.

The vapour seal is designed to rupture within 0.7 to 1.75 Kg/sq.cm. (10 to 25 PSI) at inlet flange of Foam Chamber, as required by NFPA, UL & FM standard. The vapour seal will withstand maximum back pressure of 0.07 Bar (1.0 PSI) or equal to 686mm of water as specified by API for welded storage tank. If the requirement is to exceed 0.07 (1.0 PSI) back pressure, for example with nitrogen blanket.

The vapour seal is frangible glass. The vapour seal is supplied with holder and for spares it can be with or without holder. The 'O' ring used for seal are Nitride rubber and optional Viton for polar solvent.

## **SYSTEM DESIGN REQUIREMENT**

The NFPA-11, a standard for low expansion foam, provides the essential requirement of an appropriate designed foam pouring system, which are identified and outlined as below:

The Foam Deflector is used with the Foam Chamber.

The aerated foam from the Foam Chamber is directed in to the deflector for the gentle application of the expanded foam. The deflector reduces the expanded foam velocity and allows the foam to slide down the tank wall.

### **(a) Number of Foam Chamber:**

The number of foam chambers required is determined by the tank diameter. Where two or more foam chambers are required, they shall be spaced equally around the tank periphery and each Foam Chamber shall be sized to deliver foam at an approximately same rate. Please refer graph to select the unit that will provide the required minimum foam solution application rate at the available operating pressure of the Foam Chamber.

For minimum number of Foam Chamber requirement, kindly follow the recommendations as per NFPA/OISD/TAC or as per the governmental codes or ordinances wherever applicable.

### **(b) Minimum Foam Solution Application Rate:**

The minimum foam solution application rate is the rate at which the water and foam concentrate in correctly proportioned ratio should be delivered to the surface of a storage tank under protection to control and extinguish the fire.

For minimum application rate requirement, follow the recommendations as per NFPA/OISD/TAC or governmental codes or ordinances wherever applicable.

## TESTING & MAINTENANCE

Qualified and trained person must commission the system. After few initial successful tests, 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/OISD/TAC standards or in accordance with standards 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 put back in service. Also inform the local security guard and control alarm station, so as to avoid false alarm.

Each system is to be flushed properly. The vapour seal must be replaced if the system has been operated. Normal testing of the chamber can be carried out by removing the cover plate from the top of the chamber. This allows the system to draw a sample of the expanded foam without removing the vapour seal or disconnecting the Foam Chamber from the tank.

The air screen is to be inspected periodically for the obstruction of air inlet holes. If any obstruction is noticed, remove the same and flush if necessary.

It is recommended to have regular maintenance programme to inspect the Vapour Seal Chamber discharge area and deflector for possible deposit or obstruction.

### **CAUTION**

Do not install Foam chambers on pressured storage tanks (Inert gas blanketed tanks) and storage tanks containing product which attack the foam chamber standard construction material.

Maximum permissible back pressure on vapour seal is 0.07 Kg/sq.cm.2 (1.0 PSI)

### NOTE:

1. A PROVISION IS TO BE MADE FOR PRESSURE GAUGE MOUNTING AT INLET OF FOAM CHAMBER, WHICH MAY BE PLUGGED AFTER SUCCESSFUL COMMISSIONING OF THE SYSTEM. THIS WILL HELP TO ANALYSE THE SYSTEM WHILE COMMISSIONING.
2. REFER TO THE INDIVIDUAL FOAM LISTING FOR OPERATING LIMITATION WITH EACH FOAM CONCENTRATE AND FOAM CHAMBER.

### Selection of HD Foam Chamber:

FOAM CHAMBER SIZE	K - FACTOR
65 NB	89.6 TO 207.8
80 NB	179.2 TO 385.9
100 NB	358.5 TO 672.7

To select the size of the Foam Chamber use the following formula:

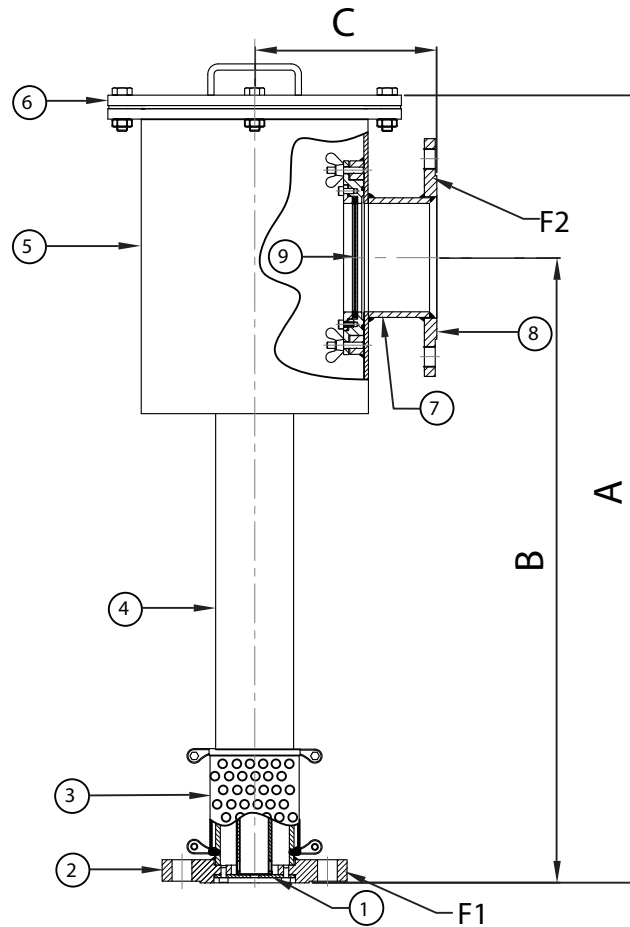
$$Q = K \sqrt{P}$$

Q = Total solution flow in litres per minute.

K = Constant for Foam Chamber

P = Inlet pressure in kg/sq.cm.

## FOAM CHAMBER



### DIMENSIONS OF FOAM CHAMBER

*in millimeter (Approximate)*

INLET SIZE	OUTLET SIZE	A	B	C
F1	F2			
65NB	100NB	756	600	175
80NB	150NB	1093	908	225
100NB	200NB	1221	996	275

### PART LIST

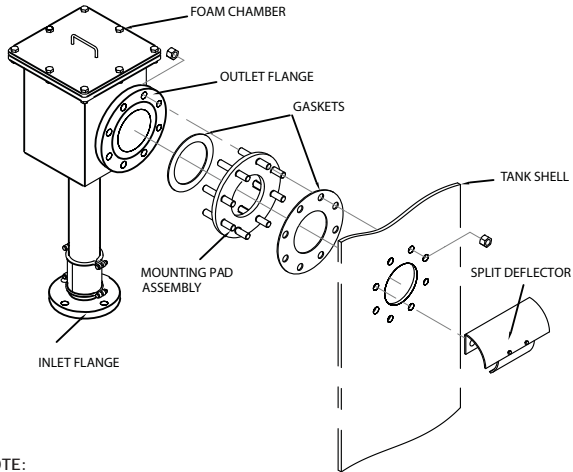
ITEM NO.	DESCRIPTION	MATERIAL SPECIFICATON	
		FCA	FCA-S
1	ORIFICE ASSEMBLY	STAINLESS STEEL	STAINLESS STEEL
2	INLET FLANGE	STEEL	STAINLESS STEEL
3	STRAINER ASSEMBLY	STAINLESS STEEL	STAINLESS STEEL
4	FOAM MAKING CHAMBER	STEEL PIPE	SS PIPE
5	FOAM CHAMBER	STEEL	STAINLESS STEEL
6	INSPECTION COVER	STEEL	STAINLESS STEEL
7	DISCHARGE PIPE	STEEL PIPE	SS PIPE
8	OUTLET FLANGE	STEEL	STAINLESS STEEL
9	VAPOUR SEAL ASSEMBLY	GLASS	GLASS

#### NOTE:

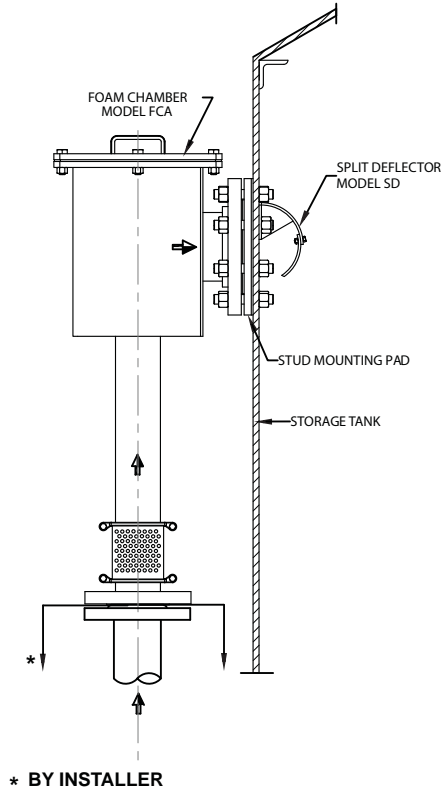
1. Pipes used are ERW (Seamless Pipe are optional)
2. Foam chambers are open to atmosphere & do not have internal shutoff device, hence no hydrotest is offered during inspection.

## TYPICAL FOAM CHAMBER INSTALLATION WITH DEFLECTOR

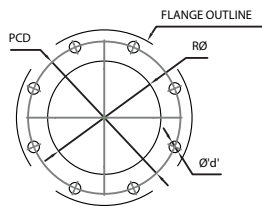
### TYPICAL INSTALLATION OF FOAM CHAMBER WITH STUD FLANGED SPLIT DEFLECTOR



**NOTE:**  
Stud Mounting Pad with gasket & split deflector are optional items. To be ordered separately.

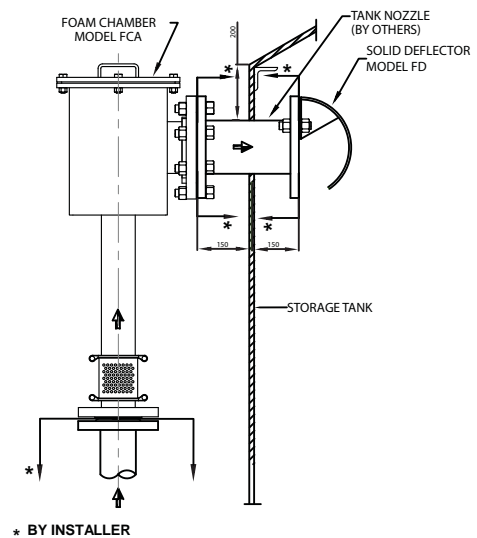
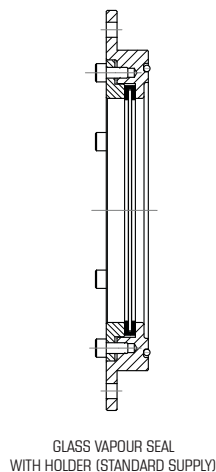


#### TANK CUTOUT FOR MOUNTING OF SPLIT DEFLECTOR



TYPE	FOAM CHAMBER SIZE		CUTOUT SIZE			
	INLET FLANGE SIZE	OUTLET FLANGE SIZE	RØ	PCD	HOLE Ø'd'	NO OF HOLES
FCA 65	65	100	114	191	19	4
FCA 80	80	150	168	241	22	4
FCA 100	100	200	219	298	22	8

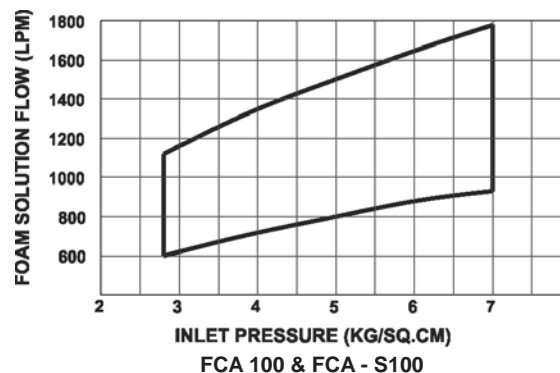
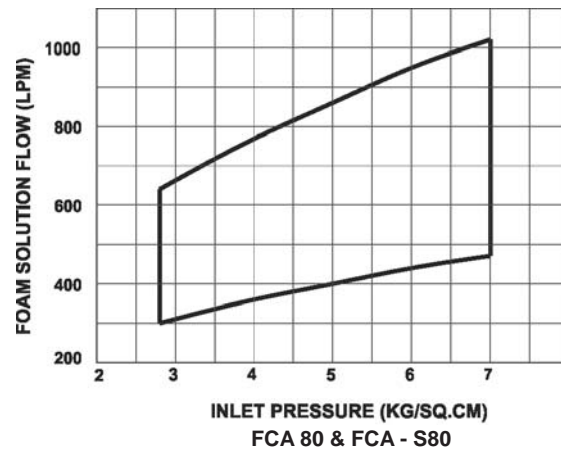
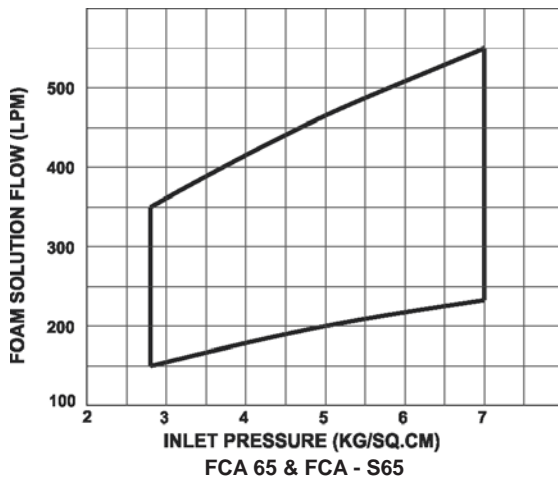
### TYPICAL INSTALLATION OF FOAM CHAMBER WITH STUD FLANGED TANK NOZZLE AND SOLID DEFLECTOR



**NOTE:**

1. Above dimensions are general guidelines only. The system designer can adopt the dimensions as per NFPA/TAC/OISD or as per the governing rules & ordinance having local jurisdiction.
2. Tank Nozzle nutbolts & gasket are optional to be ordered separately.
3. Split deflector Model SD and solid deflector Model FD is standard supply in carbon steel material and optional in stainless steel.

## PRESSURE VS FLOW PERFORMANCE CHARACTERISTIC



### LIMITED WARRANTY

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### NOTICE :

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