

# FOAM CHAMBER

MODEL: NF-FC SERIES

## 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 In-line Foam Inductor, Balance Pressure Foam Proportioning system, Bladder Tank Proportioner or Foam Tender.

## FEATURES

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

## SPECIFICATION

Foam Chamber is an air aspirating foam discharge device, covering wide range of flow from 40 GPM to 1086 GPM at 40 to 100 psi inlet pressure. The Foam Chamber contains a Vapor seal to prevent the entry of Vapor 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 foam, without removing the Vapor seal or disconnecting the foam chamber from the tank. Frangible glass bursting disc (Vapor seal) can be replaced by easily. The Vapor seal is designed to rupture within 0.7 to 1.75 kg/cm<sup>2</sup>. (10 to 25 psi) pressure at inlet flange of Foam Chamber, as required by NFPA, UL & FM standard. The Vapor seal will withstand maximum back pressure of 0.07 kg/cm<sup>2</sup>. bar (1.0 psi) or equal to 686 mm of water column as specified by API for welded storage tank. If the requirement exceeds 0.07 kg/cm<sup>2</sup>. bar (1.0 psi) as in case of nitrogen blanketing system, then this equipment may not be suitable. The Vapor seal is frangible glass. The Vapor 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.



## TECHNICAL DATA

Model	NF-FC/FCR-Carbon Steel Construction NF-FCSS/FCRSS-Stainless Steel Construction
Inlet Size	65, 80, 100, 150 NB
Working Pressure	Min. 2.8 kg/cm <sup>2</sup> (40 psi) Max. 7 kg/cm <sup>2</sup> (100 psi)
Foam Proportioning	AFFF 3%, 6%, AR-AFFF3/3, AR-AFFF3/6
Foam Type	AFFF, AR-AFFF, FP, FFFF
Flange Connection	Flange Connection ANSI B16.5 Class 150#
Weight (Approx.)	65 NB-34.5kg 80 NB-49.5kg 100 NB-72.0kg 150 NB-110kg
Vapor Seal Rupture Pressure	0.7 to 1.75 kg/cm <sup>2</sup> (10 psi to 25 psi) Running water/water foam solution pressure at inlet of Foam Chamber
Maximum Permissible Back Pressure on Vapor Seal	0.07 kg/cm <sup>2</sup> . (1.0 psi)
Vapor Seal	Glass standard supply (UL & FM Approved).
Deflector	Solid or Split Deflector
Finish	Red RAL 3000
Ordering Information	<b>Model &amp; Size</b> <ul style="list-style-type: none"><li>• Flow &amp; Pressure at inlet of each Foam Chamber</li><li>• Inlet, outlet flange specification</li><li>• Type of Deflector</li><li>• Foam concentrate</li><li>• Tank number/Tag number</li></ul>

## **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 Vapor 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 Vapor 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 program to inspect the Vapor Seal Chamber discharge area and deflector for possible deposit or obstruction.

## **CAUTION**

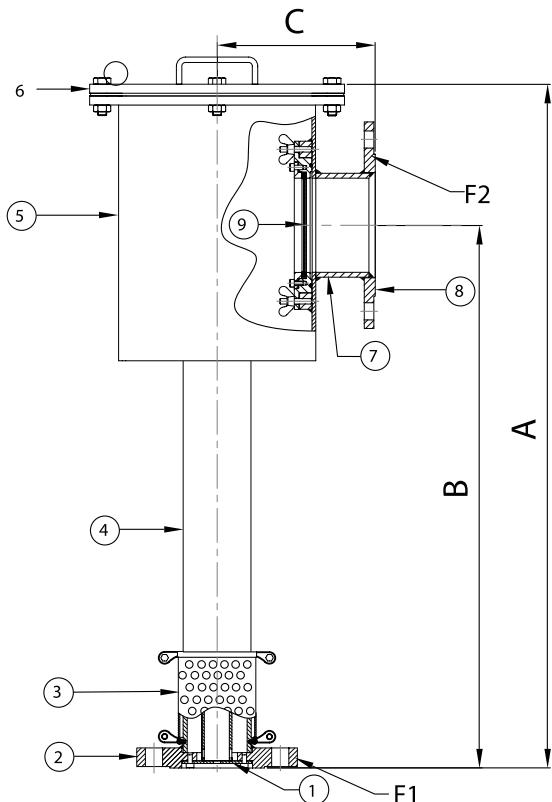
Do not install Foam chambers on pressured storage tanks (Inert gas blanketed tanks) and storage tanks containing product which attack the foam chamber standard construction material. Maximum permissible back pressure on Vapor seal is 0.07 kg/cm<sup>2</sup>. 2 (1.0 psi).

### **\*NOTES:**

- 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 analyze the system while commissioning.*

## DIMENSIONS

Inlet Size (F1)	Outlet Size (F2)	A	B	C
65 NB	100 NB	756	600	175
80 NB	150 NB	1093	908	225
100 NB	200 NB	1221	996	275
150 NB	250 NB	1250	1018	325



## FOAM CHAMBER: FLOW RATE IN GPM

Foam Concentrate	Approval	Working Pressure	NF-FC65 / NF-FCSS65	NF-FC80 / NF-FCSS80	NF-FC100 / NF-FCSS100	NF-FCR150 / NF-FCRSS150
AFFF 3%	UL	40-100 psi	39.62-145.30	79.25-269.72	158.50-634.01	--
AR-AFFF 3/3	UL	40-100 psi	39.62-145.30	79.25-269.72	158.50-634.01	--
AFFF 3%	FM	40-100 psi for 65NB 50-100 psi for other sizes	52-156	101-309	198-679	493-1048
AFFF 6%	FM	50-100 psi	59-158	94-303	195-674	489-1042
AR-AFFF 3/3	FM	50-100 psi	57-167	110-311	211-678	516-1086
AR-AFFF 3/6 3%	FM	50-100 psi	59-157	107-305	197-675	512-1073
AR-AFFF 3/6 6%	FM	50-100 psi	59-157	100-304	192-680	514-1072

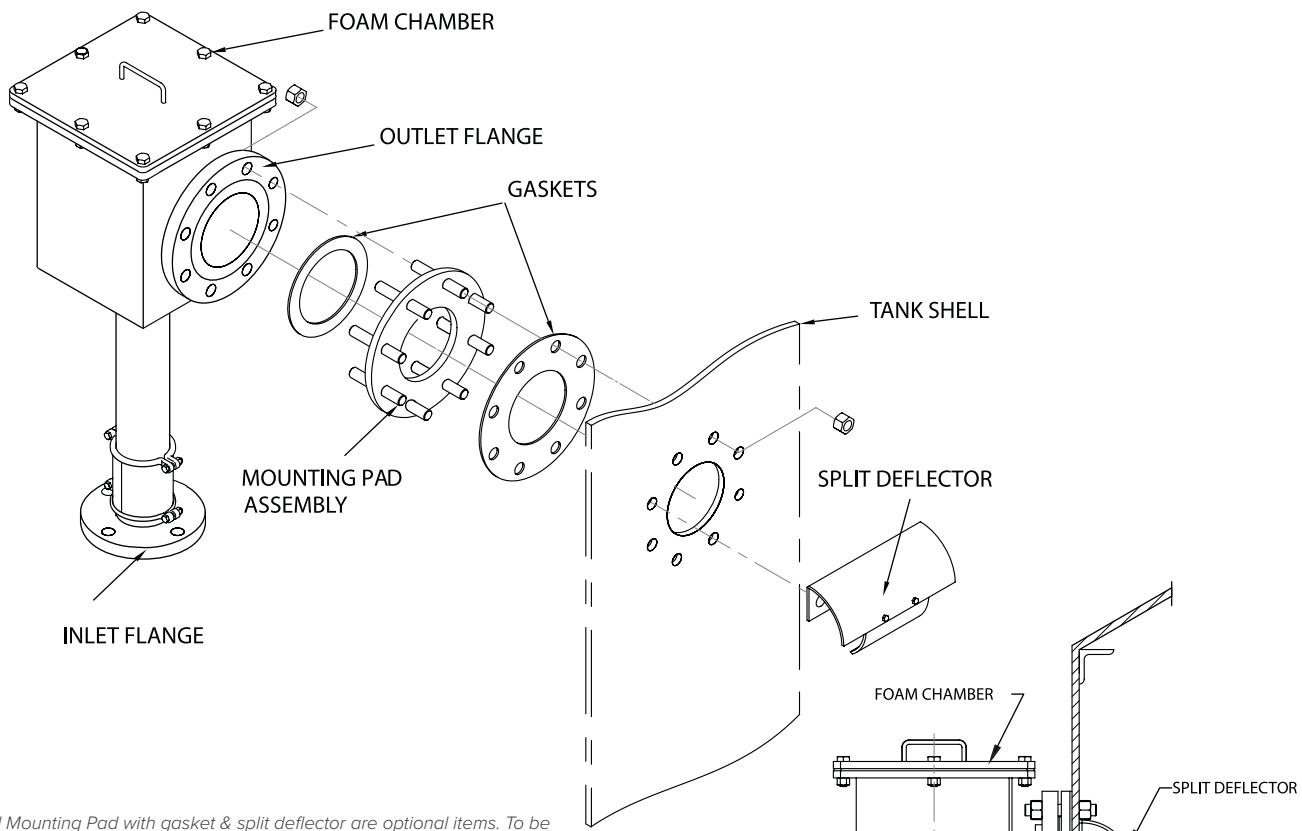
## PART LIST

Item No.	Description	Material Specification	
		NF-FC/NF-FCR	NF-FCSS/NF-FCRSS
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	Vapor Seal Assembly	Glass	Glass

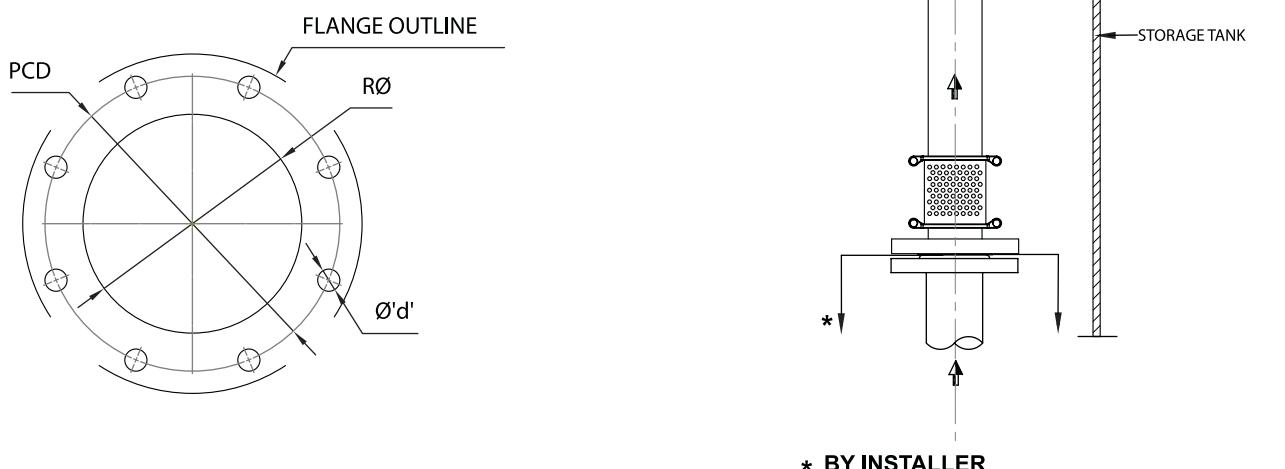
### \*NOTES:

- Pipes used are ERW (Seamless Pipe are optional)
- Foam chambers are open to atmosphere & do not have internal shutoff device, hence no hydrotest is offered during inspection.
- Strainer assembly consists of SS perforated sheet, SS strainer holder & galvanized nut/bolt.

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

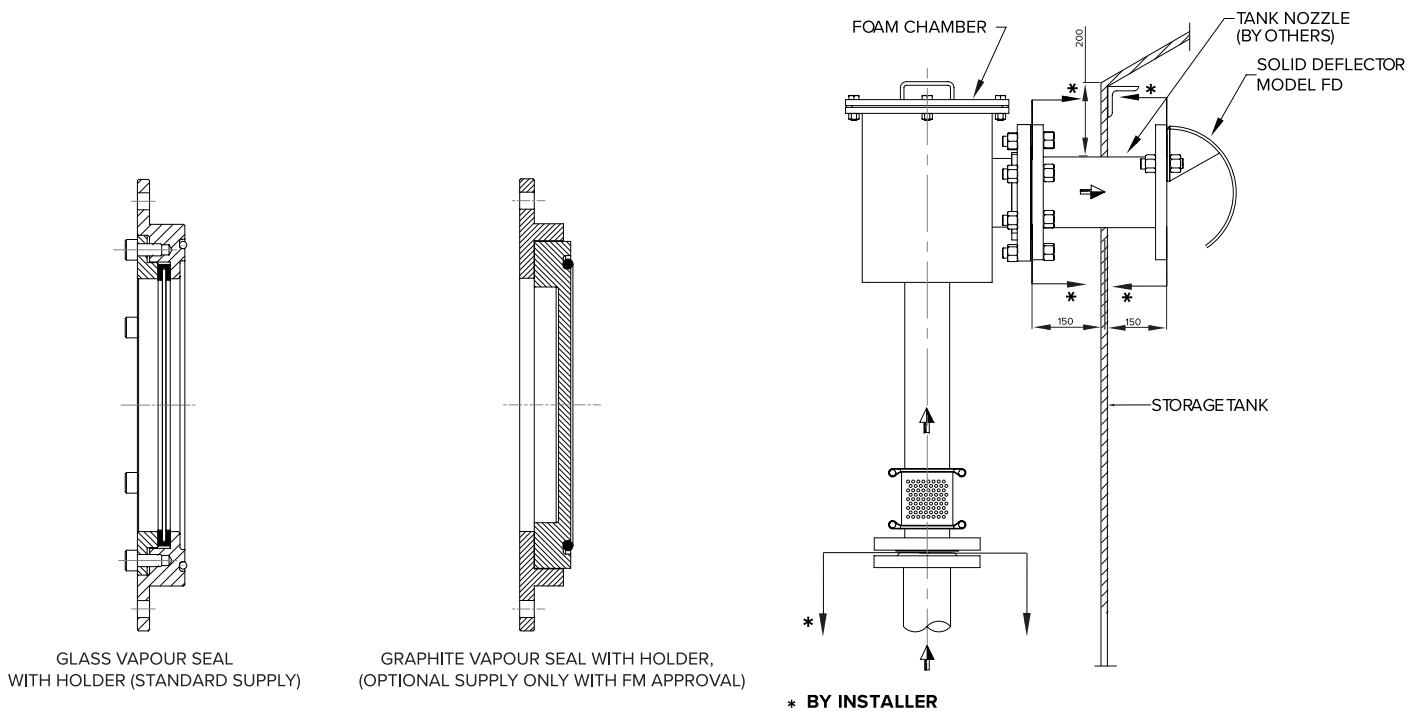


### TANK CUTOUT FOR MOUNTING OF SPLIT DEFLECTOR



Model No	RØ	PCD	Hole Diameter Ø-D'	Number of Holes
NF-FC 65/NF-FCSS 65	116	191	19	4
NF-FC 80/NF-FCS S80	170	241	22	4
NF-FC 100/NF-FCSS 100	221	298	22	8
NF-FCR 150/NF-FCRSS 150	276	362	25	12

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

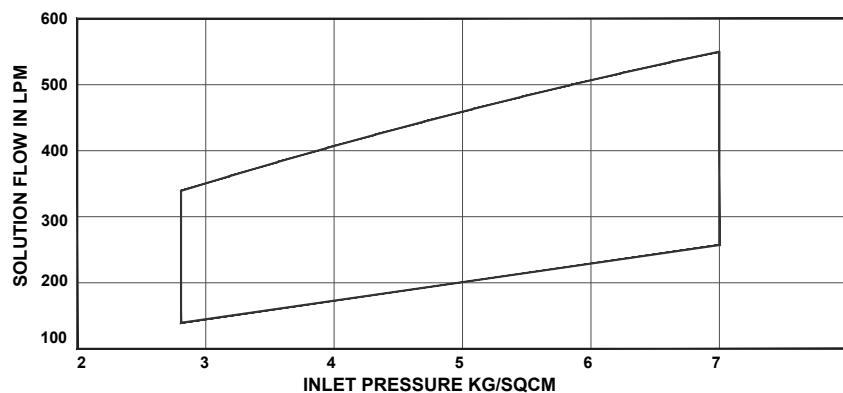


**\*NOTES:**

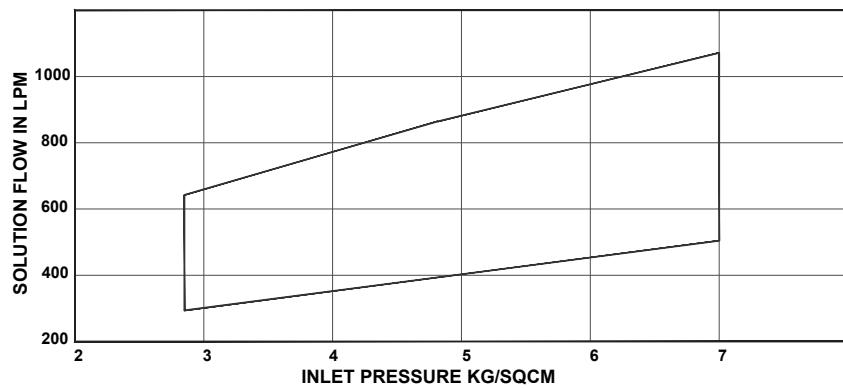
- Above dimensions are general guidelines only. The system designer can adopt the dimensions as per NFPA as per the governing rules & ordinance having local jurisdiction.
- Tank Nozzle nut bolts & gasket are optional to be ordered separately.
- Split deflector Model SD and solid deflector Model FD is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

PRESSURE VS FLOW PERFORMANCE CHARACTERISTIC  
UL LISTED WITH FOAM CONCENTRATE AFFF 3% AND AR-AFFF 3 X 3-C6

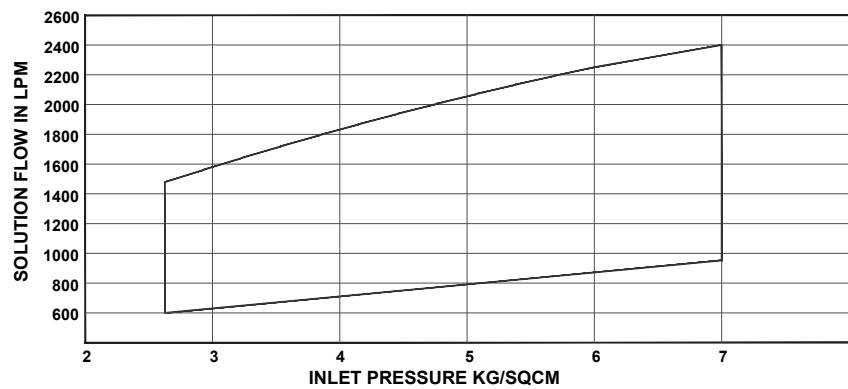
MODEL NF-FC65 & NF-FCSS65



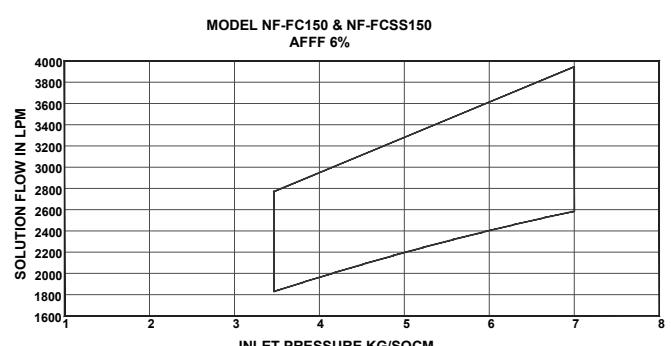
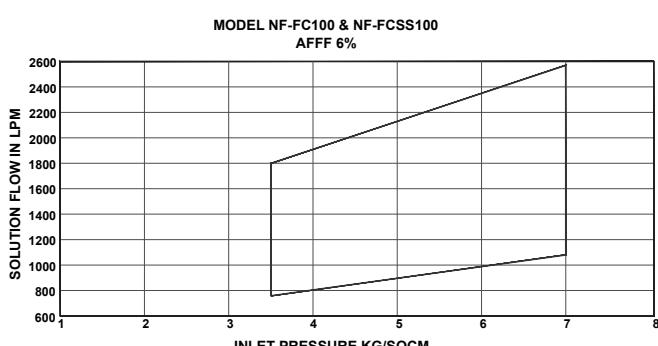
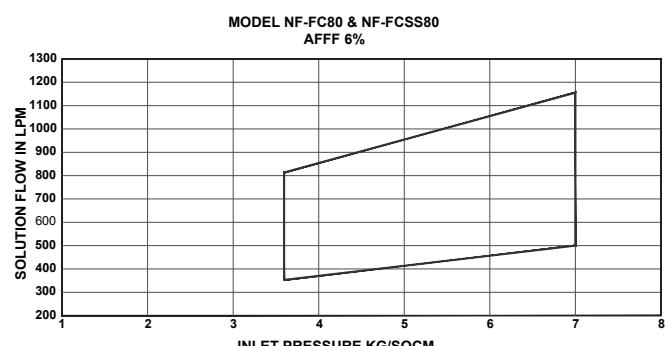
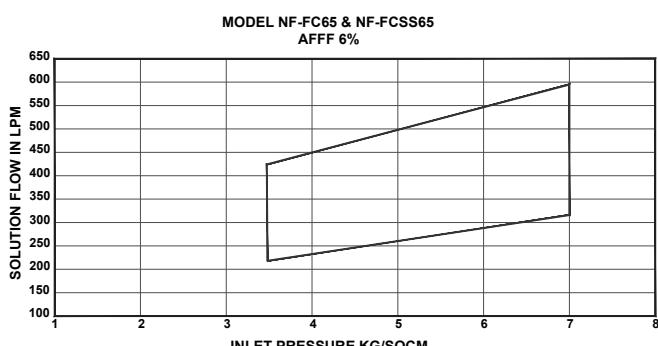
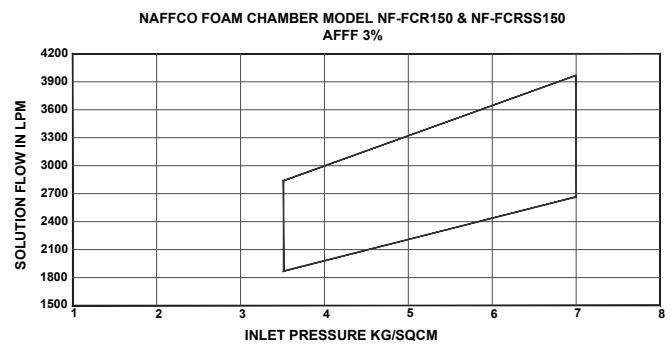
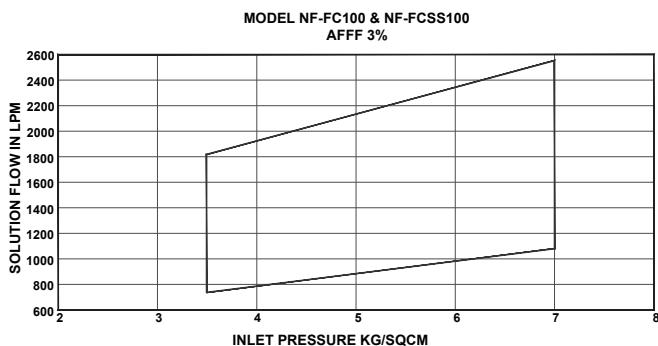
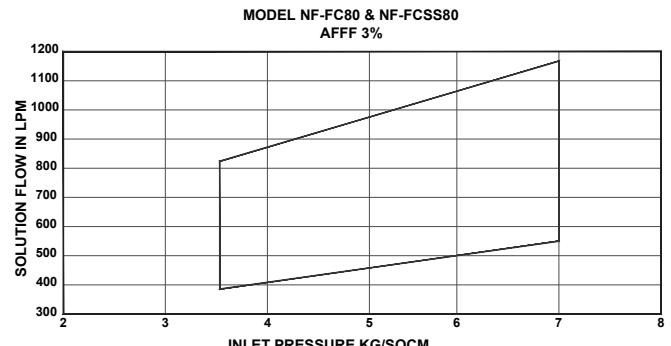
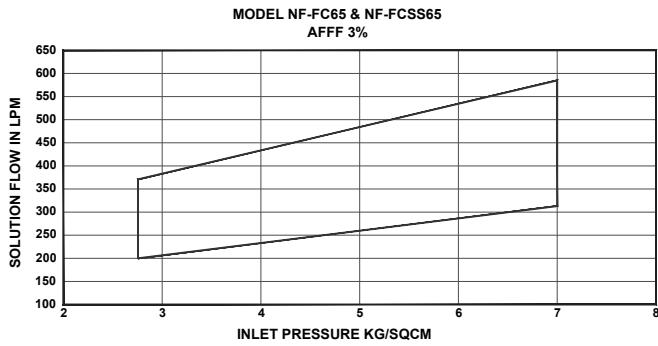
MODEL NF-FC80 & NF-FCSS80



MODEL NF-FC100 & NF-FCSS100



**PRESSURE VS FLOW PERFORMANCE CHARACTERISTIC**  
**FM APPROVED WITH FOAM CONCENTRATE AFFF 3% & AFFF 6%**



**PRESSURE VS FLOW PERFORMANCE CHARACTERISTIC**  
**FM APPROVED WITH FOAM CONCENTRATE AR-AFFF 3X3-C6 AND AR-AFFF 3X6-C6**

