



## VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

The 221 Series is designed to provide emergency venting of low pressure storage tanks and vessels

221P



221PV

### FEATURES

- Available in emergency pressure only and emergency pressure and vacuum relief models.
- Cast metal cover provides added strength and extended life.
- Hinged cover provides a fixed pivot point, ensures proper reseating and added safety.
- Cover cannot separate from the base.
- Easily lifted open to provide a large, unobstructed passage for easy tank access.
- 221PV incorporates a spring loaded vacuum relief valve integral to the cover assembly.
- Weather hood and screen provided for protection.
- Non-metallic seat insert on the pallet minimizes leakage.
- Durable reinforced fabric diaphragm type pressure side seating surface backed by compressible, cellular non-metallic pads for added cushion and reduced leakage.
- Optional materials available to suit most chemical applications.

### GENERAL APPLICATION

221 Series manways protect tanks against costly rupture or implosion. The 221P provides emergency pressure relief only with vacuum relief supplied by a separate breather valve. The 221PV provides both pressure and vacuum relief.

### TECHNICAL DATA

Materials:	Carbon steel, aluminum, stainless steel
Sizes:	18", 20", 24" (450, 500, 600 mm)
Connections:	Drilled flange to API 650 or ANSI 150#
Pressure settings:	½ to 6 oz/in <sup>2</sup> (22 to 264 kg/m <sup>2</sup> )
Vacuum settings:	½ to 1 oz/in <sup>2</sup> (22 to 44 kg/m <sup>2</sup> )

# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## SPECIFICATIONS

### Sizes

18", 20", 24"

### Connections

Drilled to API 650 dimensions, flat face flange - standard  
 Drilled to ANSI 150# dimensions, flat face flange - optional  
 Special flange drilling requirements to DIN, JPI or JIS standards are available upon request.  
 Consult your local sales representative for further details.

### Setting ranges

Pressure See table below  
 Vacuum ½ oz/in<sup>2</sup> to 1 oz/in<sup>2</sup>

### Materials of construction

**Base** Carbon steel with stainless steel seating surface - standard  
 Aluminum - optional  
 316 Stainless steel - optional

**Cover** Low copper aluminum cover with carbon steel hinge arm - standard  
 Carbon steel cover with carbon steel hinge arm - optional  
 316 Stainless steel cover with 304 stainless steel hinge arm - optional

**Diaphragm and pads** NBR diaphragm with Neoprene pads - standard  
 PTFE diaphragm with Neoprene pads - optional  
 FKM diaphragm with FKM pads - optional

**Vacuum insert**  
 (221PV only) NBR - standard  
 PTFE - optional  
 FKM - optional

**Vacuum pallet assembly**  
 (221PV only) Aluminum - standard  
 316 Stainless steel - optional

**Hardware** Spring retainer, cotter pin, sleeve, hinge pin, cap screws, nuts and washers -  
 304 Stainless steel

### PRESSURE SETTING CODES\*

Size	Cover material	Below min. (counterweighted) - code 0			Min. - code 1			Above min. - code 2			Extra heavy - code 3		
		221P oz/in <sup>2</sup>	221PV Alum trim oz/in <sup>2</sup>	221PV SS trim oz/in <sup>2</sup>	221P oz/in <sup>2</sup>	221PV Alum trim oz/in <sup>2</sup>	221PV SS trim oz/in <sup>2</sup>	221P oz/in <sup>2</sup>	221PV Alum trim oz/in <sup>2</sup>	221PV SS trim oz/in <sup>2</sup>	221P oz/in <sup>2</sup>	221PV Alum trim oz/in <sup>2</sup>	221PV SS trim oz/in <sup>2</sup>
18"	Aluminum	0.5 - 1.0	0.5 - 1.1	0.5 - 1.35	1.0	1.1	1.35	1.0 - 3.0	1.1 - 4.5	1.35 - 4.5	3.0 - 6.0	4.5 - 6.0	4.5 - 6.0
18"	Carbon steel or 316 Stainless steel	2.5 - 3.5	-	2.75 - 3.75	3.5	-	3.75	3.5 - 6.0	-	3.75 - 6.0	-	-	-
20"	Aluminum	0.5 - 1.0	0.5 - 1.1	0.5 - 1.35	1.0	1.1	1.35	1.0 - 3.0	1.1 - 4.5	1.35 - 4.5	3.0 - 6.0	4.5 - 6.0	4.5 - 6.0
20"	Carbon steel or 316 Stainless steel	2.75 - 3.5	-	3.0 - 3.75	3.5	-	3.75	3.5 - 6.0	-	3.75 - 6.0	-	-	-
24"	Aluminum	0.5 - 1.0	0.6 - 1.1	0.85 - 1.35	1.0	1.1	1.35	1.0 - 3.0	1.1 - 4.5	1.35 - 4.5	3.0 - 6.0	4.5 - 6.0	4.5 - 6.0
24"	Carbon steel or 316 Stainless steel	3.0 - 3.5	-	3.25 - 3.75	3.5	-	3.75	3.5 - 6.0	-	3.75 - 6.0	-	-	-

### NOTE

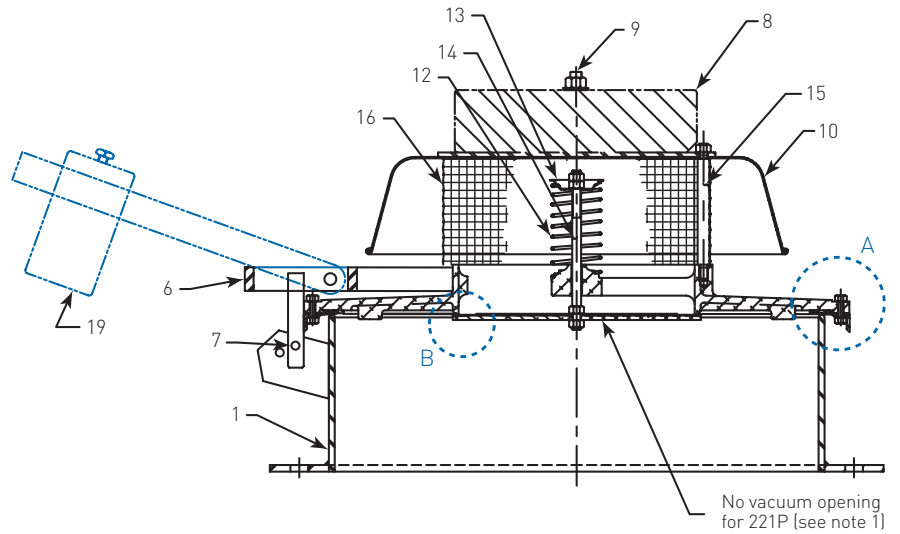
\* For higher pressure settings see technical product data sheet for Figure 4210A (VCTDS-00308) or contact your sales representative.

# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## DIMENSIONS

### PARTS

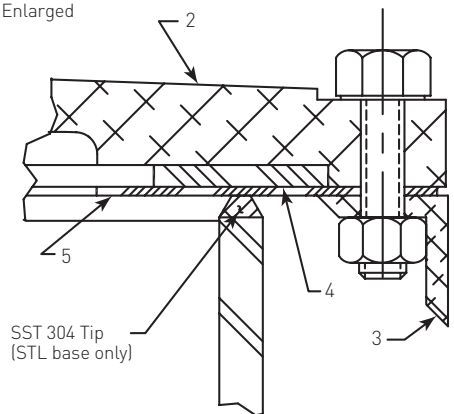
Item	Description
1	Base assembly
2	Cover
3	Cover ring
4	Cover pad
5	Diaphragm
6	Hinge arm assembly
7	Hinge pin
8	Loading weight
9	Weight mtg stud/assembly
10	Vacuum hood <sup>[1]</sup>
11	Vacuum pallet <sup>[1]</sup>
12	Vacuum spring <sup>[1]</sup>
13	Vacuum spring retainer <sup>[1]</sup>
14	Vacuum stem <sup>[1]</sup>
15	Vacuum post <sup>[1]</sup>
16	Vacuum screen <sup>[1]</sup>
17	Vacuum seat insert <sup>[1]</sup>
18	Vacuum insert retainer <sup>[1]</sup>
19	Counter weight assembly <sup>[2]</sup>



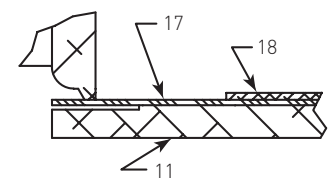
### NOTES

- Used only for the 221PV vacuum port.
- Used only for the 'below minimum' pressure range.

DETAIL A  
Enlarged



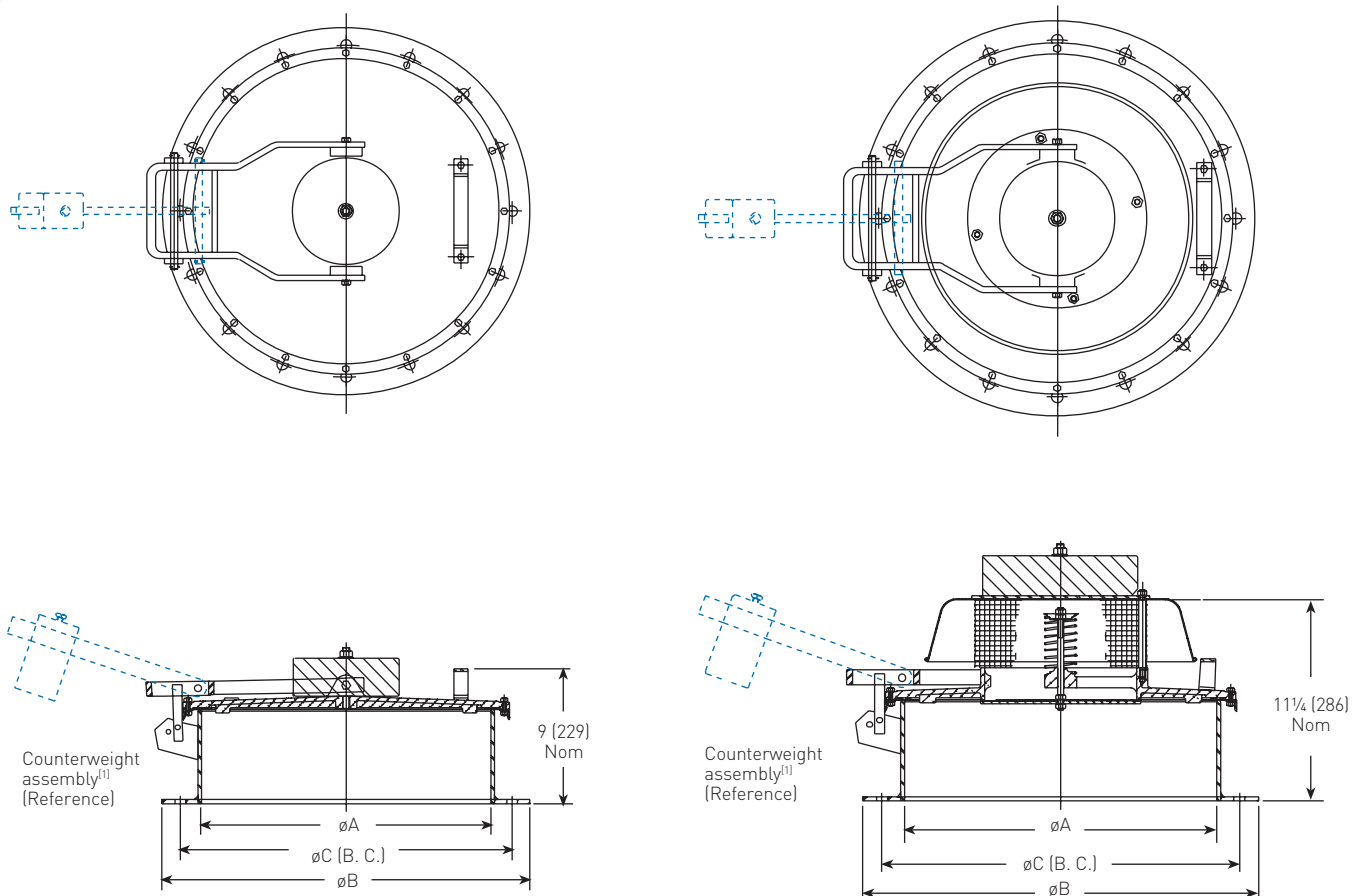
DETAIL B  
Enlarged



# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## DIMENSIONS

Specifications, inches (mm)



### DRILLED FOR API 650 FLANGE

Size code	18	20	24
<b>Nominal pipe size</b>	<b>18 (450)</b>	<b>20 (500)</b>	<b>24 (600)</b>
A	18½ (470)	20½ (521)	24½ (622)
B	25 (635)	26 (660)	30 (762)
C	21½ (546)	23½ (597)	27½ (698)
Diameter of holes	¾ (19)	¾ (19)	¾ (19)
No. of holes	16	16	20

### DRILLED FOR ANSI 150# FLANGE (optional)

Size code	18	20	24
<b>Nominal pipe size</b>	<b>18 (450)</b>	<b>20 (500)</b>	<b>24 (600)</b>
A	18½ (470)	20½ (521)	24½ (622)
B	25 (635)	27½ (698)	32 (813)
C	22¾ (578)	25 (635)	29½ (749)
Diameter of holes	1¼ (32)	1¼ (32)	1¾ (35)
No. of holes	16	20	20

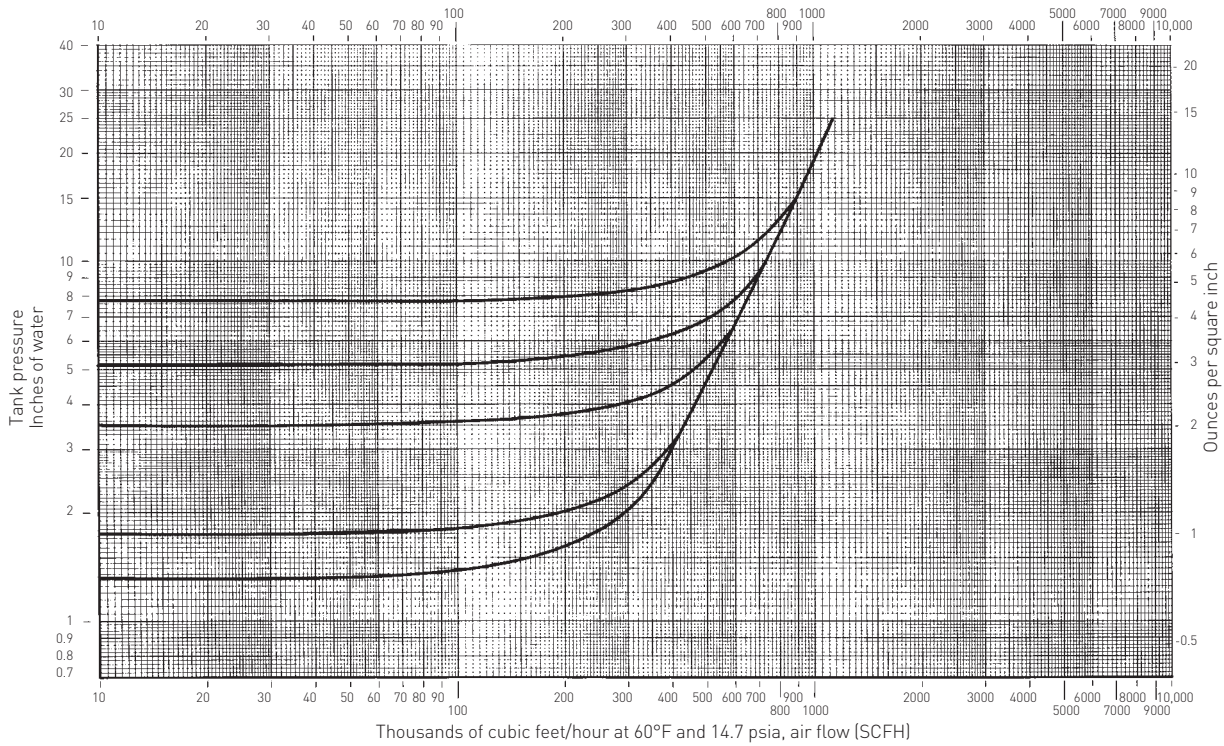
### NOTES

1. For pressure setting code 0 only.
2. Installation, mounting arrangement and dimensions are preliminary general information not to be used for construction. Certified drawings are available upon request.

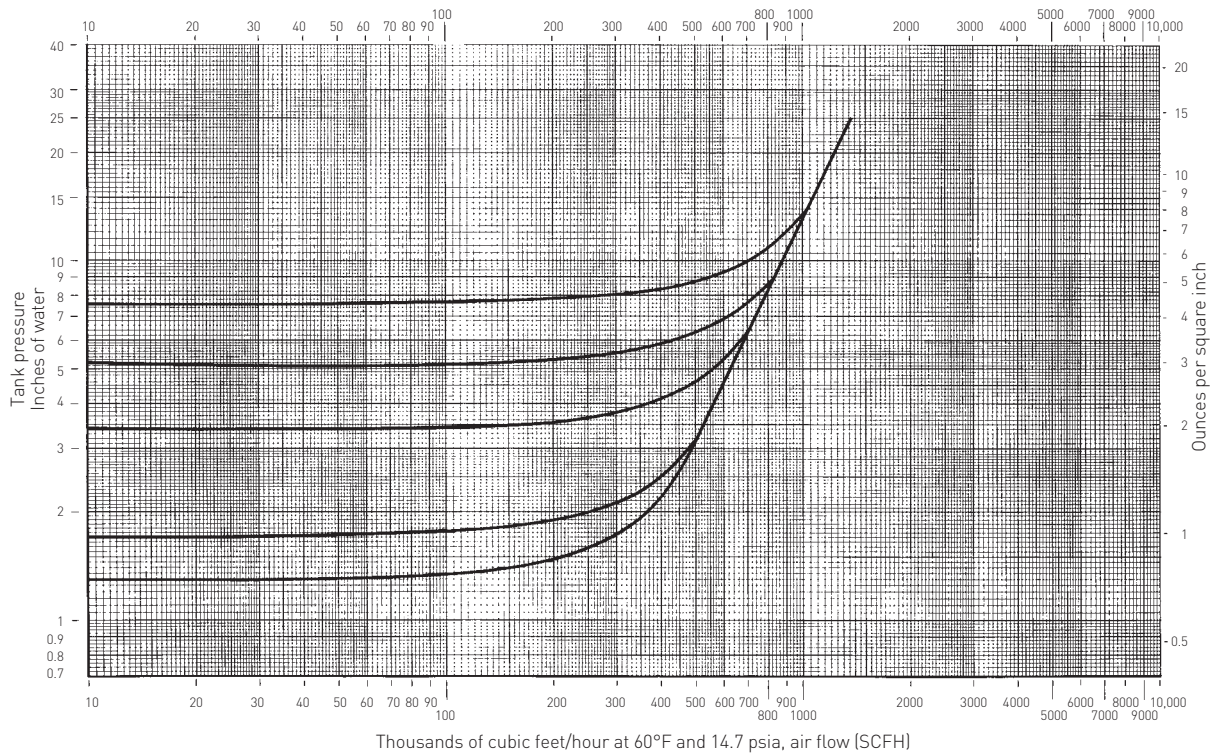
# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## FLOW CAPACITY

18" 221P/PV relief manway cover pressure relief



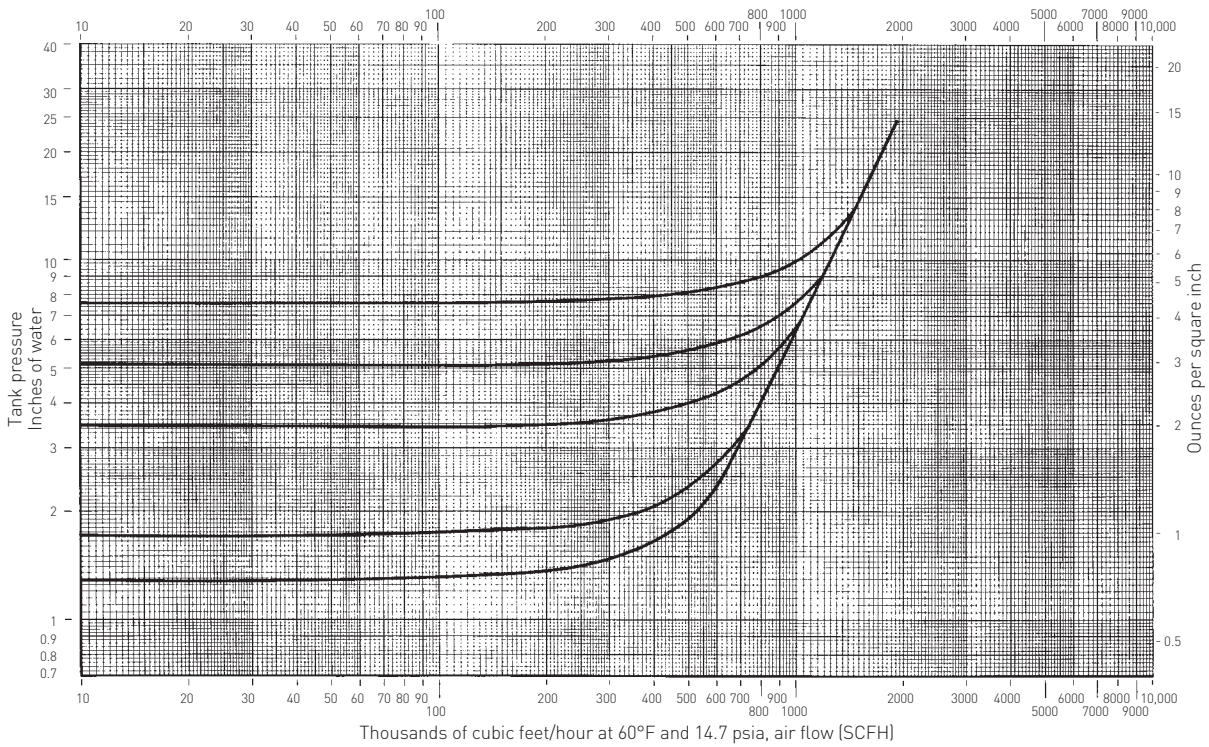
20" 221P/PV relief manway cover pressure relief



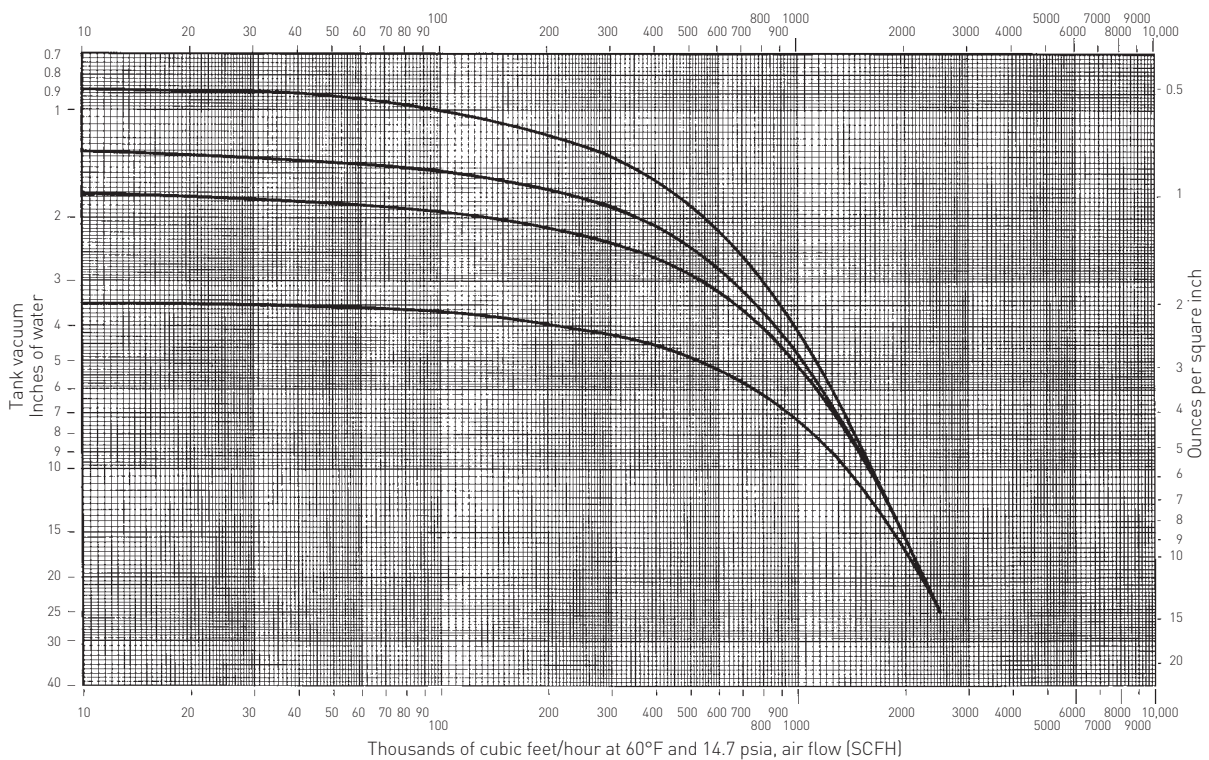
# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## FLOW CAPACITY

24" 221P/PV relief manway cover pressure relief



18", 20", and 24" 221P/PV relief manway cover vacuum relief



# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## ORDERING INFORMATION - PRESSURE AND VACUUM

### SELECTION GUIDE

<b>Example:</b>		<b>221</b>	<b>20</b>	<b>1PV1</b>	<b>B</b>	<b>1</b>	<b>1</b>
<b>Model</b>							
<b>221</b>	Emergency pressure and vacuum relief manway cover						
<b>Size</b>							
<b>18</b>	18"						
<b>20</b>	20"						
<b>24</b>	24"						
<b>Materials of construction</b>							
	<b>Base</b>	<b>Cover</b>	<b>Vacuum trim</b>				
<b>1PV1</b>	Carbon steel	Aluminum	Aluminum				
<b>1PV2</b>	Carbon steel	Aluminum	316 Stainless steel				
<b>2PV1</b>	Aluminum	Aluminum	Aluminum				
<b>2PV2</b>	Aluminum	Aluminum	316 Stainless steel				
<b>3PV2</b>	Carbon steel	Carbon steel	316 Stainless steel				
<b>4PV2</b>	316 Stainless steel	316 Stainless steel	316 Stainless steel				
<b>Diaphragm/cover pads/vacuum insert</b>							
<b>B</b>	NBR/Neoprene/NBR						
<b>T</b>	PTFE/Neoprene/PTFE						
<b>V</b>	FKM/FKM/FKM						
<b>Base flange drilling</b>							
<b>1</b>	API 650						
<b>2</b>	ANSI 150#						
<b>Pressure setting</b>							
<b>0</b>	Below minimum (counterweighted)						
<b>1</b>	Minimum (standard)						
<b>2</b>	Above minimum						
<b>3</b>	Extra heavy						

**Example:** 20" Emergency pressure and vacuum relief manway cover with carbon steel base, aluminum cover, aluminum trim, NBR diaphragm and vacuum insert, API 650 drilling, minimum setting. Specify pressure and vacuum settings when ordering.

# VAREC 221 SERIES EMERGENCY PRESSURE RELIEF MANWAY COVERS

## ORDERING INFORMATION - PRESSURE ONLY

### SELECTION GUIDE

Example:	221	20	1P0	B	1	1
<b>Model</b>						
<b>221</b>	Emergency pressure relief manway cover					
<b>Size</b>						
<b>18</b>	18"					
<b>20</b>	20"					
<b>24</b>	24"					
<b>Materials of construction</b>						
<b>Cover</b>						
<b>1P0</b>	Carbon steel/Aluminum					
<b>2P0</b>	Carbon steel/Aluminum					
<b>3P0</b>	Carbon steel/Carbon steel					
<b>4P0</b>	316 Stainless steel/316 Stainless steel					
<b>Diaphragm/cover pads</b>						
<b>B</b>	NBR/Neoprene					
<b>T</b>	PTFE/Neoprene					
<b>V</b>	FKM/FKM					
<b>Base flange drilling</b>						
<b>1</b>	API 650					
<b>2</b>	ANSI 150#					
<b>Pressure setting</b>						
<b>0</b>	Below minimum (counterweighted)					
<b>1</b>	Minimum (standard)					
<b>2</b>	Above minimum					
<b>3</b>	Extra heavy					

**Example:** 20" emergency pressure relief manway cover, carbon steel base with aluminum cover and NBR diaphragm, API 650 drilling, minimum setting. Specify pressure setting when ordering.