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July 10, 2018

Mr. William Cruz
Branch Manager – Florida
Safety-Kleen
A Clean Harbors Company
5610 Alpha Drive
Boynton Beach, FL 33426

RE: Emergency Pressure Relief Vent Certification
For the Above Referenced location

Dear Mr. Cruz:

A representative of our firm has inspected the recently installed (6/29/2018) Morrison Brothers UL listed 8" Flanged Emergency Pressure Relief Vent on the 15,000-gallon horizontal tank for the storage of used solvent, as shown in the attached photograph. Pursuant to the enclosed Morrison Brothers Venting Guide for horizontal cylindrical tanks, the 8" emergency vent selected is the correct vent size for the referenced tank with a venting capacity of 429,020 CFH.

This vent conforms to the requirements of the International Fire Code; National Fire Code of Canada; National Fire Protection Agency - NFPA 1, 30, 30A, 31, 37, 110; Petroleum Equipment Institute - PEI RP200, PEI RP800; Underwriters Laboratories Inc. UL-142, UL-2085, UL- 2244.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,



N.D. Eryou, Ph.D., P.E.
FL PE # 46888



USE





Venting Guide for Aboveground Storage Tanks

This guide is intended for reference use only. All final details of design and construction must meet the requirements of federal, state and local codes. In case where plan approval is required, such approval must be obtained from the authority having jurisdiction before any work is performed. The equipment presented in the Guide applies only to shop fabricated tanks.

Background Information

The Morrison Venting Guide was created to assist in equipment selection for aboveground storage tanks. Examples on the next two pages illustrate a vent selection process. It is best to work through the examples before attempting to use any of the tables in this book.

Tables include examples for standard sized tanks. The venting capacity charts and wetted area tables were taken directly from NFPA 30 and UL 142.

The vent selection chapter includes venting capacities of specific Morrison vents. This data was obtained from results of laboratory testing and engineering calculations. Catalog pages of the Morrison equipment follow the vent capacity chart.

Definitions

Emergency Venting — Venting sufficient to relieve excessive internal pressure in storage tanks caused by exposure fires. Venting rate may exceed requirements of normal atmospheric and product transfer effects. In such cases, the construction of the tank will determine if additional venting capacity must be provided.

Atmospheric Tank — A storage tank that has been designed to operate at pressures from atmospheric through 1.0 PSIG (760 mm Hg through 812 mm Hg) measured at the top of the tank (NFPA 30 Pg. 30-13). Pressure not to exceed 1.0 PSIG under normal operation, and 2.5 PSIG under emergency conditions (PEI RP-200).

Pressure Relieving Devices — Defined in NFPA 30 4.2.5.2.3, where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of

the shell or bottom of the tank if vertical, or of the shell or heads if horizontal.

Wetted Area — Exposed surface or shell area of a tank used in determining the venting requirements needed for that size tank in event of an exposure fire. In a horizontal tank, the wetted area is calculated as 75% of the exposed surface area. In a vertical tank, the wetted area is calculated as the first 30 ft. above grade of the exposed shell area of the tank.

CFH — Abbreviation for Cubic Feet per Hour used to quantify or measure the airflow and degree of pressure relief for venting calculations.

Vent Capacity — The maximum rate of airflow (CFH) recorded under test conditions at a maximum pressure of 2.5 PSI for specific sized emergency vents. This capacity rating is often required to be indicated on the vent itself.

Table A: Pre-Calculated Data

Horizontal Cylindrical Tanks

TANK			WETTED AREA (Sq Ft)	REQ'D VENT CAPACITY (CFH)	EMERGENCY VENT SIZE (Inches)
CAPACITY (Gallons)	DIAMETER (Ft or In)	LENGTH (Ft-In)			
280	36"	5'-2"	47	49,520	3
300	38"	5'-0"	49	51,640	3
500	48"	5'-5"	69	72,650	4
530	46"	6'-0"	71	74,750	4
550	48"	6'-0"	75	78,950	4
1,000	48"	10'-8"	119	124,950	5
1,000	64"	6'-0"	109	114,450	5
1,500	64"	9'-0"	147	154,350	5
2,000	64"	12'-0"	184	193,200	6
2,500	64"	15'-0"	222	223,320	6
3,000	64"	18'-0"	259	243,680	6
3,000	6'-0"	14'-0"	240	233,400	6
4,000	64"	24'-0"	335	281,100	8
4,000	6'-0"	19'-0"	311	270,060	6
5,000	8'-0"	13'-4"	326	276,960	6
6,000	8'-0"	16'-0"	376	300,480	8
8,000	8'-0"	21'-4"	477	344,340	8
10,000	8'-0"	27'-0"	584	385,920	8
10,000	9'-0"	21'-0"	540	369,200	8
10,000	10'-0"	17'-0"	518	360,840	8
10,000	10'-6"	15'-7"	515	359,700	8
12,000	8'-0"	32'-0"	678	420,080	8
12,000	9'-0"	25'-0"	625	401,000	8
12,000	10'-0"	20'-6"	600	392,000	8
12,000	11'-0"	17'-0"	583	385,540	8
15,000	8'-0"	40'-0"	829	470,990	8
15,000	10'-6"	23'-5"	703	429,020	8
20,000	10'-0"	34'-2"	922	499,820	8
20,000	10'-6"	31'-0"	896	491,760	8
20,000	11'-0"	28'-0"	868	483,080	8
25,000	10'-6"	38'-6"	1,082	537,530	10
30,000	10'-6"	46'-3"	1,274	568,100	10