POLYPROCESSING SOLUTIONS, SIMPLIFIED.	**Technical Bulletin**	**Venting – Design for ACFM** (Air Cubic Feet per Minute)

Poly Processing Company commissioned an engineering consulting firm to determine the proper venting requirements necessary for polyethylene storage tanks. Two methods of filling were considered, 1) mechanical pumping and 2) compressed air (pneumatic) from tanker trucks.

Filling by Mechanical Pump

Using mechanical pumps to fill your tank is a low impact process and typically does not cause excessive pressure to be placed upon the tank.

- ≤ 1000 gallons – vent size should equal the size of the largest fill or discharge fitting
- > 1000 gallons - vent size should exceed the largest fill or discharge fitting by one-inch.

Pneumatic Filling

The engineering study reviewed the pneumatic filling of a polyethylene storage tank for three common venting scenarios:

1. Short Vent (u-vent)
2. Long Vent (vented through the roof or into a common venting system)
3. Scrubber Vent (used where fume scrubbing is critical)

The following criteria were established for all three venting scenarios:

1. **Maximum pressure used to unload tanker trailer was 30 psig.**
2. Evaluate tanker hose impact; 1”, 2” & 3”.
3. Evaluate fill-line/fitting size impact; 1”, 2” & 3”.
4. Polyethylene tank internal pressure must not exceed 10” water column per ASTM D1998 section 1.1.3.

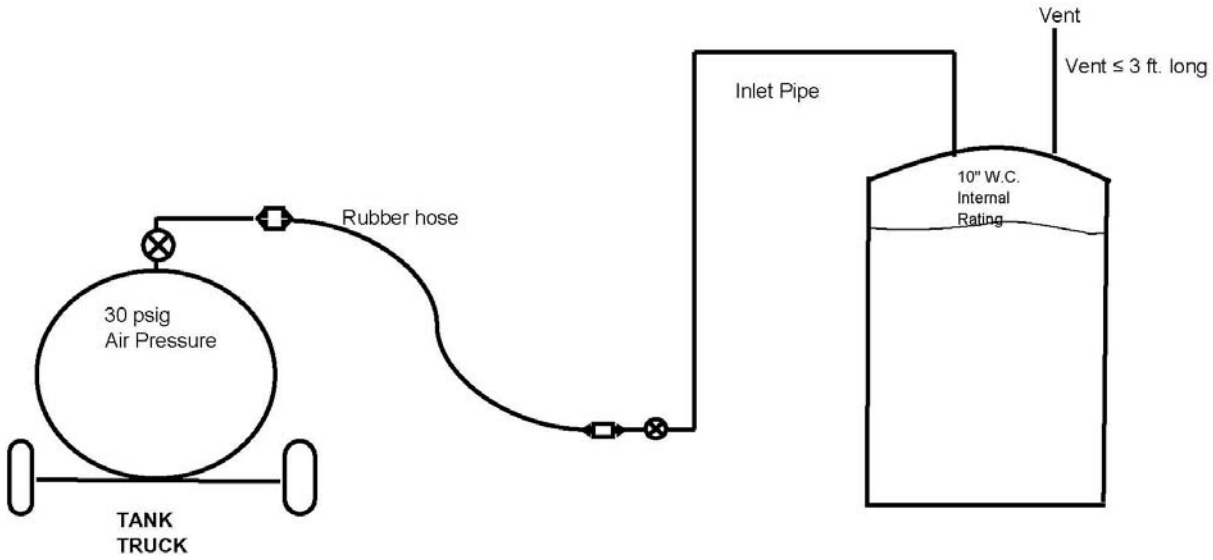
General Conclusions

1. Tanker trailer, once emptied of liquid, becomes large reservoir of compressed air at 30 psig.
2. Size of delivery hose from trailer to tank, 1 to 3 inches in diameter, impacts the volume of air delivered to the tank during line purge.
3. Size of fill line / fitting of the tank, 1 to 3 inches in diameter, impacts the volume of air delivered to the tank during line purge.
4. Vent size 2 inches larger than the fill assembly is sufficient to handle the delivery of the liquid product, but may **not** handle the volume of air released from the tanker trailer based on conclusions #2 and #3.
5. **Venting capacity must equal or exceed Air Cubic Feet per Minute (ACFM) coming from tanker truck for adequate margin of safety and increased tank life!**

Pneumatic Fill Scenario #1

Short Vent

- Vent length ≤ 3’
- Mesh size on bug screen ≥ ¼” or no screen



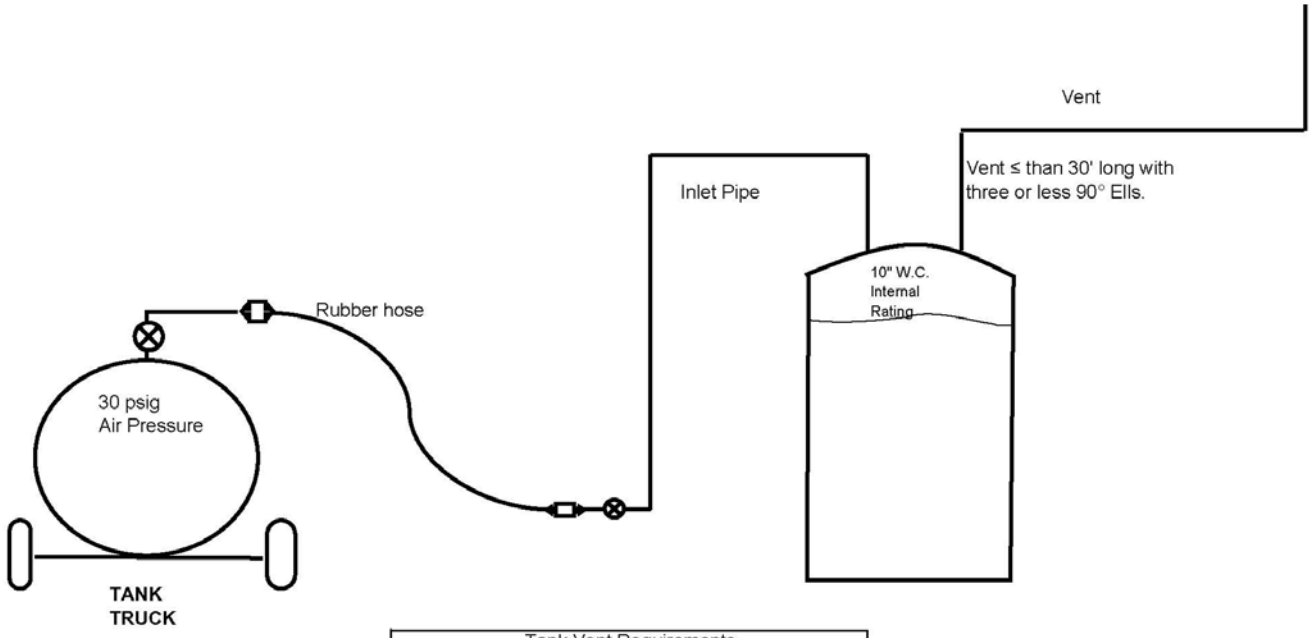
	Tank Vent Requirements				
	Hose	Inlet Pipe	Inlet Flow / ACFM	**Min. Vent Size**	Vent Flow / ACFM
A)	1"	1"	180	**3"**	600
B)	2"	1"	190	**3"**	600
C)	2"	2"	910	**4"**	1050
D)	3"	2"	1120	**6"**	2500
E)	3"	3"	2250	**6"**	2500

ACFM = air cubic feet per minute

Pneumatic Fill Scenario #2

Long Vent

- Vent length > 3’ and ≤ 30’
- Three or less 90° elbows and no other restrictions, i.e. smaller diameter pipe



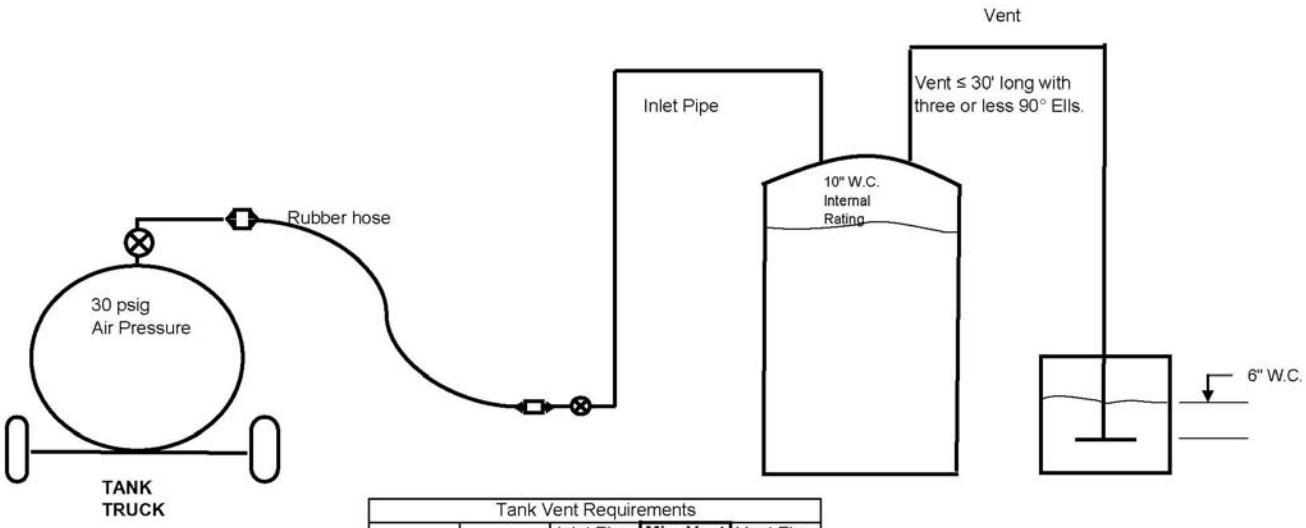
Tank Vent Requirements					
	Hose	Inlet Pipe	Inlet Flow / ACFM	**Min. Vent Size**	Vent Flow / ACFM
A)	1"	1"	180	**4"**	715
B)	2"	1"	190	**4"**	715
C)	2"	2"	910	**6"**	1870
D)	3"	2"	1120	**6"**	1870
E)	3"	3"	2250	**8"**	3450

ACFM = air cubic feet per minute

Pneumatic Fill Scenario #3

Scrubber Vent

- Piping from vent to scrubber cannot be reduced
- Perforated dispersion pipe must be same diameter, or larger, as vent
- Centerline of dispersion pipe not to be submersed > 6 inches
- Sum of perforations ≥ cross sectional area of pipe



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B)	2"	1"	190	**4"**	380
C)	2"	2"	910	**6"**	970
D)	3"	2"	1120	**8"**	1780
E)	3"	3"	2250	**10"**	2935

ACFM = air cubic feet per minute