Application Bulletin

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High Pressure Vapor Recovery

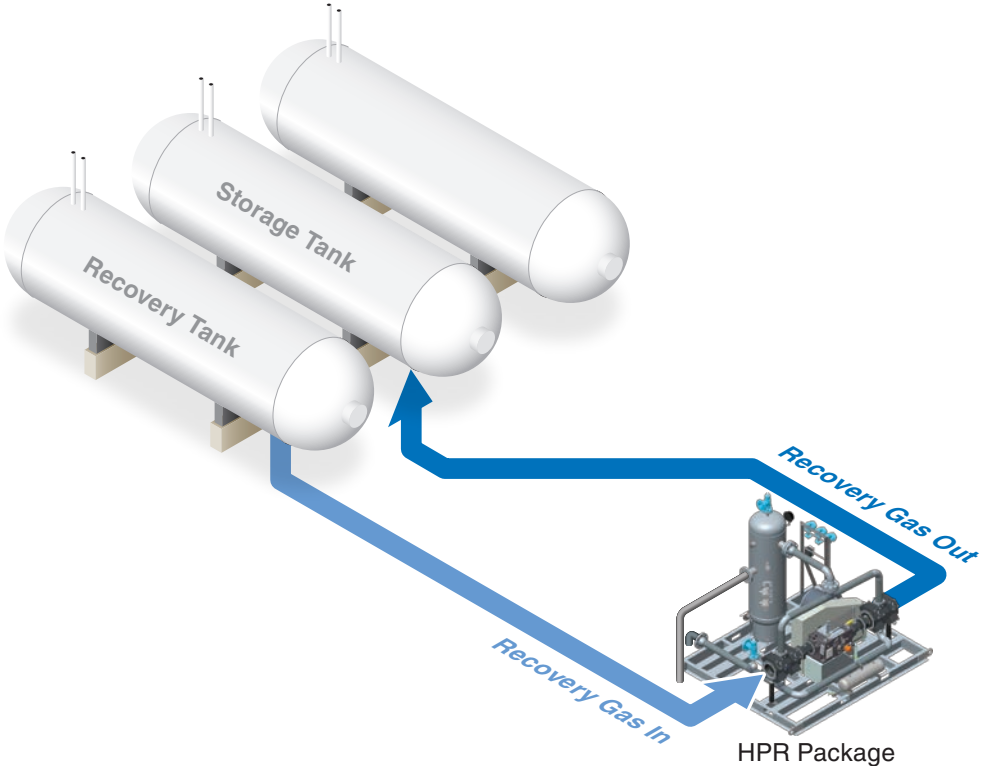
Minimize pollution and waste while maximizing production...

Corken specializes in vapor recovery and manufactures a wide variety of compression packages for the process gas, liquefied petroleum gas (LPG), and oil & gas markets. Whether are you evacuating low pressure tank battery systems or high pressure bullet and spherical tanks, Corken has a solution.

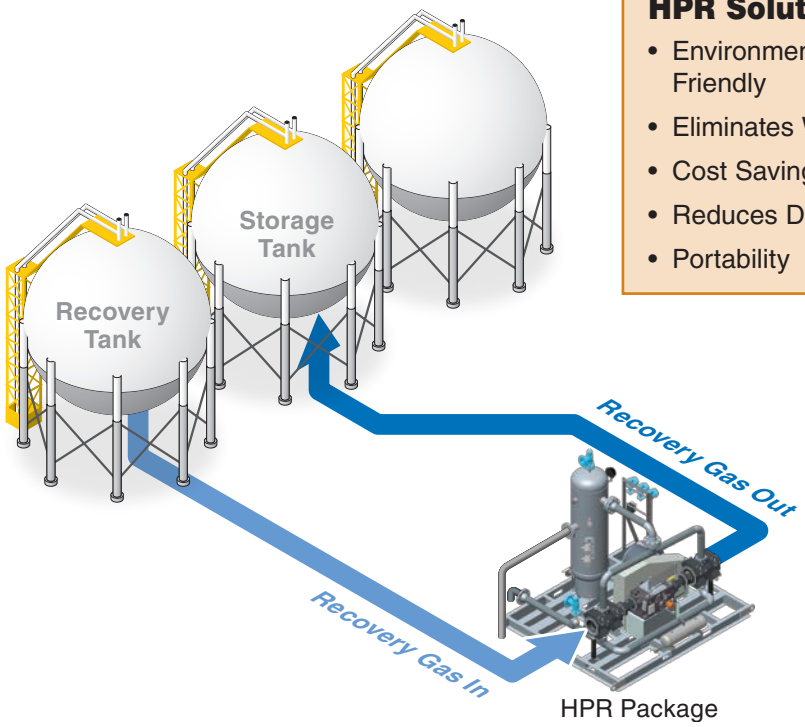
High pressure gases such as propylene, propane, ammonia, butadiene, and vinyl chloride monomer are valuable products but unfriendly to the environment and highly flammable when released to the atmosphere. Many times plant operators need to perform routine tank inspections or change gas products within each tank. The conventional methods for evacuating residual gas are flaring, purging by water or nitrogen, and releasing to the atmosphere. In addition to being time consuming and inconvenient, these methods are costly, unfriendly to the environment, wasteful, and may be in violation of local environmental codes.

An environmentally friendly and cost effective alternative is a high pressure recovery (HPR) package. They are small, versatile, and can be transported to multiple tank locations. Most packages will fit on a flatbed truck. A high pressure recovery (HPR) package eliminates waste and reduces down time.

Bullet Tank Recovery



Spherical Tank Recovery



Benefits of an HPR Solution

- Environmentally Friendly
- Eliminates Waste
- Cost Savings
- Reduces Down Time
- Portability

How does a vapor recovery application work?

As you start the recovery process, the differential pressure between the recovery tank and storage tank remains low so single-stage compression is all that is needed. However, as the pressure inside the recovery tank lowers, the differential pressure increases causing a high compression ratio that limits the performance of single-stage compression. With high differential pressures, two-stage compression is much more efficient.

To accommodate the challenges of escalating differential pressures, Corken's HPR packages are designed to operate with single-stage compression during the initial recovery process. As the pressure in the recovery tank lowers, the differential pressure increases. At a specified pressure the HPR package switches to two-stage compression and continues the recovery process until the desired evacuation pressure is achieved. Corken's team works with each application to determine the optimal solution for single- and two-stage compression.

Each HPR package can be outfitted with a vertical or horizontal compressor. The compressors have various packing configurations, distance piece options, and oil-free gas compression. The D-Style is a double packed reciprocating compressor with one distance piece and offers a high level of leakage containment. The highest level of leakage containment is the triple packed T-Style design with two distance pieces. Depending on the needs of the application, each distance piece can be pressurized, purged, or vented. All compressors are available with a standard mounting or custom engineered package. An ASME B31.3 - 2012 piping option is available for all custom engineered packages.

Below is a table showing the time and cost savings of using a HPR package:

HPR Time and Cost Savings (Approximate)

Model number	Product	VP @ 60°F	Tank Size	Approx. Time to Evacuate to 0 psig	Approx. Equivalent Liquid Gallons of Vapor Recovered	Approx. Equivalent Pound of Liquid Recovered	Assumed Cost of Product (US$/lb.)	$ Amount Saved by Pound
THG602BD (1025 rpm)	propylene	131 psia	1,000,000 gal	56.5 hours	30,830 gal	133,639 lbs	$0.49	$65,706
	propane	107 psia		43.7 hours	27,175 gal	115,531 lbs	$0.33	$38,510
	ammonia	108 psia		43 hours	8,995 gal	46,489 lbs	$0.17	$7,748
	butane	26 psia		8.6 hours	7,514 gal	36,329 lbs	$0.30	$10,899
T791 (800 rpm)	propylene	131 psia	700,000 gal	40.2 hours	21,537 gal	93,357 lbs	$0.49	$45,901
	propane	107 psia		36 hours	19,175 gal	81,520 lbs	$0.33	$27,173
	ammonia	108 psia		36.1 hours	6,297 gal	32,545 lbs	$0.17	$5,424
	butane	26 psia		7.5 hours	5,260 gal	25,431 lbs	$0.30	$7,629
FT591 (775 rpm)	propylene	131 psia	90,000 gal	10.4 hours	2,769 gal	10,603 lbs	$0.49	$5,213
	propane	107 psia		9.3 hours	2,446 gal	10,399 lbs	$0.33	$3,466
	ammonia	108 psia		9.4 hours	810 gal	4,186 lbs	$0.17	$698
	butane	26 psia		1.9 hours	676 gal	3,268 lbs	$0.30	$980
FT591 (775 rpm)	propylene	131 psia	60,000 gal	6.9 hours	1,846 gal	8,002 lbs	$0.49	$3,934
	propane	107 psia		6.2 hours	1,631 gal	6,934 lbs	$0.33	$2,311
	ammonia	108 psia		6.3 hours	540 gal	2,791 lbs	$0.17	$465
	butane	26 psia		1.3 hours	451 gal	2,181 lbs	$0.30	$654

Assumptions:
Product temperature: 60°F, Elevation: sea level, 14.7 psia
Tanks are liquid empty, just vapor is being evacuated, no boil off
Compressors start at single-stage compression and then go to two-stage compression at approximately 30 psig inlet pressure

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