



- Geothermal Heat Pumps
- Packaged & HVAC Chillers
- Vapor Recovery Systems

Edwards Engineering Recogen Gasoline Vapor Recovery Systems

The RECOGEN Series uses a combination of RECOvery-GENeration for cooling the vapor stream to obtain a 99% plus efficiency by recovering 85% as liquid and then consuming the remaining 15% in an engine driven generator. This generator provides power equal to or greater than that used by the refrigeration system so that the entire operation is POWER FREE. The emissions from this system are less than 1 mg/liter.

A standard range of RECOGEN units is available that meet the requirements of small, medium and large sized petroleum truck and marine loading terminals. Units can be provided that meet customer site specific requirements and comply with 40 CFR Parts 9 & 63 NESHAPS, 14 December 1994 as well as all current European Union and TA Luft standards.

RECOGEN Model Number	Compressor and Generator Sets	Approx. Daily Capacity Gallons Before Defrost	Pumping Rate Gallons Per		Vapor Holder Recommended Capacity at Hourly Rating	Electrical Characteristics @ 460V/3Ph/60 (50 Hz multiply by .833)				
			Minute	Hour		Average Electrical Consumption @ 15° Ambient				
						Total Name-plate Connected HP	Ampere Draw		KWHr Data	
							Ampere Draw at Design Conditions	Full Ampere Draw of all Motors	KWHr Used During Operation	KWHr Generated During Operation
Units Requiring One Hour per Day Reduced Loading For Defrost										
(Dual coils or larger vapor holder for continuous full loading are available as an option)										
50	1	800,000	2,400	50,000	3,000 FT ³	96	64	120	50	85
100	1	1,200,000	4,800	100,000	3,000 FT ³	136	98	173	78	125
150	1	1,600,000	7,200	150,000	6,000 FT ³	161	117	204	93	150
200	1	2,400,000	9,600	200,000	6,000 FT ³	231	182	293	145	225
Units With Dual Systems										
(50% capacity 2 hr./day required for defrost)										
300	2	3,200,000	14,400	300,000	6,000 FT ³	281	234	357	186	300
400	2	4,800,000	19,200	400,000	9,000 FT ³	400	321	508	255	400



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OVERALL DIMENSIONS						
RECOGEN Model	50	100	150	200	300*	400*
Width	8'	8'	9"	9'	13'	13'
Length	45'	45'	50'	50'	38'	38'
Shipping Height	11'	11'	11'	11'	11'	11'
Vapor Inlet Size	10"	12"	14"	16"	18"	22"
Weight Lbs.	35,000	40,000	43,000	50,000	45,000	50,000

* Per skid - two required for models: 300 and 400

Vapor Holder

All units require a vapor holder. If one is not available, we can supply multiple modular vapor holders with 3,000 Ft³ - 9,000 Ft³ capacity that are skid mounted and shipped with the unit. The dimensions of these modules are 14' Dia x 30' H. up to 30' Dia x 30'H. These modules can be combined in parallel to provide the desired capacity.

Utilities

- 230/460 Volt, 3 Phase, 50/60 Cycle Power Supply at the rated load is required to operate the unit
- Vapor Holder must be provided within existing tank or skid can be purchased from Edwards
- Defrost fluid, Glycol/Water or Dynalene, to be provided by the customer

WEIGHT OF REFRIGERANTS/FLUIDS (LBS)			
Model Number	Defrost Fluid	Precooler R-22	High Stage AZ-50
50	4,840	58	129
100	4,950	75	140
150	5,200	85	155
200	6,250	92	175
300	6,525	96	190
400	7,040	104	210



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Safety

The refrigeration process offers the ultimate in efficient vapor recovery, safety, and fire protection. The recovery condenser is essentially a flame arrestor, refrigerated to -35°F. A detonation arrestor separates this condenser from the Engine-Generator system. This safe design and construction is in marked contrast to absorption/adsorption systems where millions of BTUs of energy are stored in the carbon. In the carbon, hot spots and peroxides can form which can be self-igniting or can involve spontaneous combustion. If safety and efficiency are the concern of the buyer, the RECOGEN process is the obvious choice.

Condensing Coil

The condensing coils are manufactured from 304 stainless steel tubing with aluminum fins. Each coil is installed in its own 304 SS inner wall enclosure. The space between the inner and outer skin of the enclosure is insulated with urethane foam. All drain tubes leading from the enclosures are manufactured from 304 SS and heat traced. Connecting pipework is flanged to facilitate easy removal of coils.

Decanter/Meter

A hydrocarbon/water decanter is provided which gravity separates water from the gasoline. The decanter is heat traced with the defrost fluid. A positive displacement pump is included to pump the recovered gasoline back to storage. A meter is also provided to record the volume of Gasoline recovered. A direct reading indicator provides the user and operator with a cumulative record of the recovered condensate vapor in gallons. No additional equipment or gauges are required.

Engine Generator

This vapor recovery system will recover approximately 85% of the vapors and based on a 40% inlet concentration, this represents a recovery of 1.7 gallons per 1,000 gallons loaded. The engine generator uses the remaining 15% vapor not recovered to operate itself and then generates power greater than that consumed by the refrigeration system for a net recovery efficiency of 99.9%. The power generated is 1.6 kw for every 1,000 gallons of gasoline loaded. The power usage of the refrigeration system is 1.0 kw for every 1,000 gallons loaded which means that there is a net generation of 0.6 kw for every 1,000 gallons loaded. The recovered gasoline is also used to saturate the vapor stream when loading distillates and the net recovery is reduced by 0.2 gallons for every 1,000 gallons of distillate loaded.



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Reliability

Edwards experience of manufacturing vapor recovery systems since 1974 shows that the life-span of a system is 20 years, or more, without the need to replace any major components. Modern PLC control with modern capability allows ease of monitoring for service and maintenance purposes. Edwards offers service contracts on all equipment supplied.

Overload

The new Edwards RECOGEN Series of vapor recovery units are specifically designed for truck, rail and marine loading. The required vapor holder is used to smooth out the uneven flows associated with truck loading. It also allows high instantaneous overloads to occur without ever increasing emissions by storing the excess vapor for later processing.

Automatic

Operation of the complete unit is fully controlled from the single panel within the enclosure. All functions are automatic and PLC controlled. The Edwards Vapor Recovery units are furnished with controls which provide operation without full-time attendance.

Low Maintenance

The refrigeration systems are hermetically sealed and barring a malfunction are not opened for maintenance. Individual pumps and motors do require occasional maintenance but this can be done during the normal operation of the system or during the one hour defrost period. The engines selected for the generator system are specially designed for long-life using gaseous fuels, and the expected operating life is 30,000 hours before overhaul.

Defrost Period

The refrigeration system requires a one hour defrost period every 24 hours during which vapors may be processed at a reduced rate by the engine-generator only. This can be done automatically during a period of reduced loading with the vapor holder storing any vapors generated during this period. If there is not a period during the 24 hours where the vapor can be processed at a reduced rate from the vapor holder, dual coils can be provided as an option on Models 50 - 200, which will allow continuous operation of the system. Models 300 and 400 include dual coils as a standard item.



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60 Years of Excellence In Heat Transfer Products

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Certification

All units have air purged compressor/control housings suitable for installation in hazardous areas. All electrical equipment and wiring external to the air purged housing is for Class I Group D, Division I codes. Purging is in accordance with NFPA 496 and the units meet U.S. NEC codes.

Factory Package

Factory packaged units are available with various custom modifications to meet on-site specifications. The standard enclosure is designed to be mounted on a concrete pad and does not include flooring. If the unit is to be mounted on elevated supports, flooring can be provided. All operating components are mounted on a steel I-beam base ready to place on-site. The refrigeration machinery and generator are located within a weather-proof enclosure. Pick-up lugs are provided for the unit for ease in rigging.

Weather-Proof

All working components and electrical controls are either of weather-proof construction or are housed in a weather-proof enclosure constructed of fire-proof building panels with an exterior of painted aluminum panels. This enclosure provides ample room for maintenance personnel to enter for maintenance a