GE
Oil & Gas

Reciprocating Compressors

YOUR AUTHORIZED PACKAGER

COBEY®

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Contents

Performance, reliability and innovation.

Introduction

The current range of GE reciprocating compressors is backed by a full century of experience. In addition to the original Nuovo Pignone product line, designed and manufactured in Florence, Italy, the GE product portfolio also includes machines that began as the Gemini brand of high speed reciprocating compressors, currently built in Oshkosh, Wisconsin, USA.

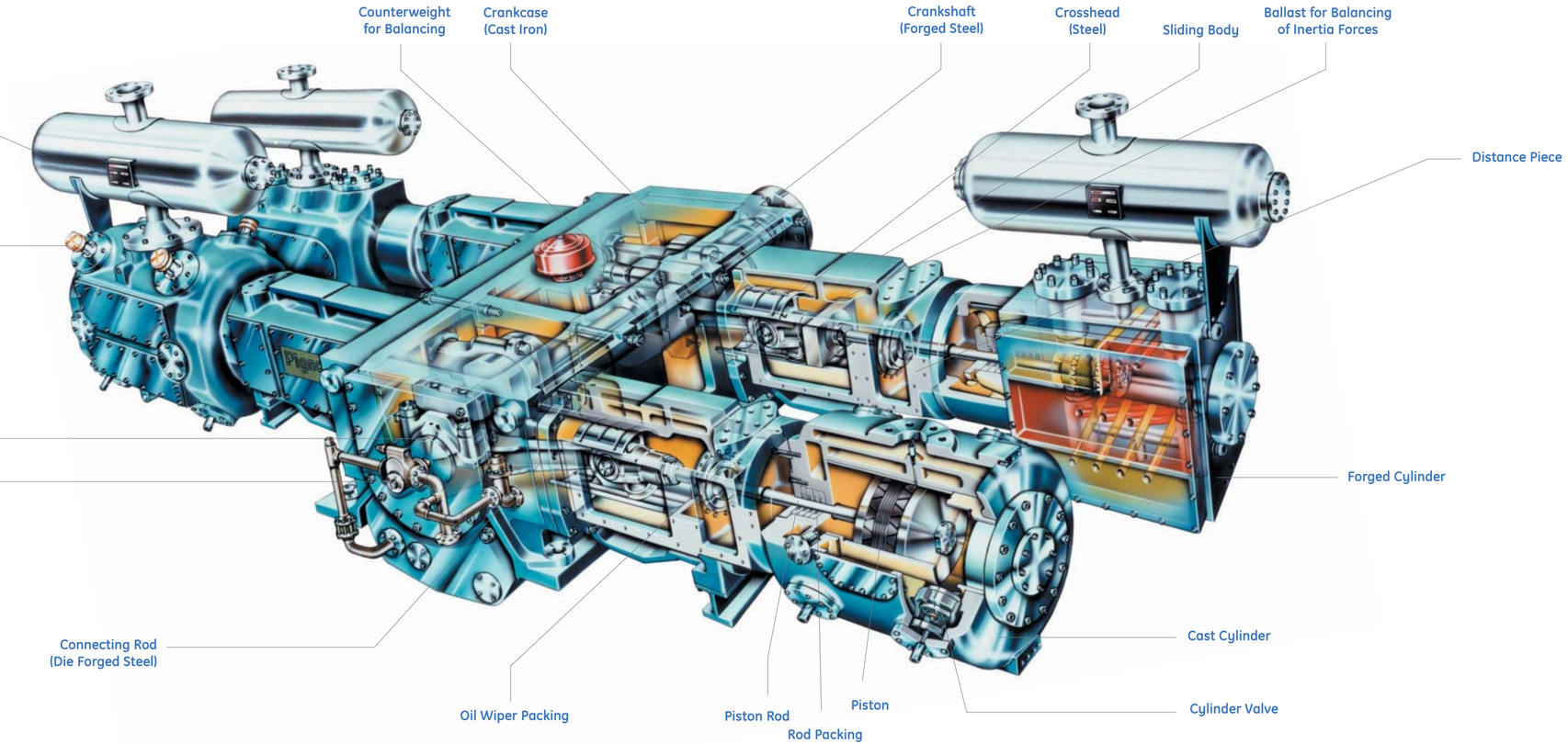
Today, GE is a world-leading manufacturer, with a complete line of technologically advanced and work-proven API 618 and API 11P machines. Over 20,000 reciprocating compressors have been installed worldwide, wherever reliability and long life are essential to business success. Process applications include refineries, petrochemicals, fertilizers, LDPE, boil-off, refrigeration, and air. Natural gas applications include wellhead gas gathering, vapor recovery, gas re-injection, gas lift, pipeline gas transmission, gas storage, and fuel gas boosting.

Typically, the API 618 compression systems are engineered and offered directly by GE's Oil & Gas business, while high-speed API 11P units are available through a network of authorized packagers and distributors that provide complete cost-effective compression packages including a driver (often a direct coupled reciprocating gas engine) and all necessary auxiliaries.

The success of the current generation of process compressors is the result of constant technological innovation that draws on the global resources and unmatched experience of GE. For example, an ethylene hyper-compressor rated for continuous duty with delivery pressure of up to 3500 bar requires the rigorous application of both modern design tools and proven product experience. These capabilities and technologies are employed throughout our lines of reciprocating compressors to provide greater efficiency, reliability, and safety.

The modular construction of GE reciprocating compressors is based on the use of standardized, well proven components. Ease of maintenance is one benefit, full customization at a reasonable cost is another. Our compressors are designed and manufactured using the Six-Sigma Quality system to deliver products with the highest level of performance, reliability and availability. All of our reciprocating compressors are backed by GE's Oil & Gas Global Services operation, which has a staff of experts that can provide installation, start-up and maintenance services anywhere in the world.

API 618 Design



API 618 Features

Crankcase
The compressor crankcases are single piece cast iron castings. All medium and high power frames and 4 or 6 cylinder small power frames are equipped with tight-tolerance transverse spacers, fitted above the bearing housings between the two sides of the frame. This solution creates an extremely stiff, closed body, with an even distribution of stresses and strains. Large openings are provided in the crankcases, to cut the time and cost of maintenance procedures.

Crosshead Extensions
Crosshead extensions are made of cast iron and machined to exacting tolerances, to ensure optimum alignment of crosshead, cylinders and piston assemblies. The crosshead extensions are integral with the crankcase for the small OA, OC, HA, HB and all high speed models, while in larger frames they are separate components.

Crankshaft
All crankshafts are single-piece steel forgings. All feature balancing counterweights to minimize free inertia forces and moments. Counterweights of high-speed machines are integral with the shaft, while others are bolted-on.

Longer working life.

Crosshead extension before assembly on the crankcase.

Crosshead extensions of HF frame.

6HG crankcase with transverse spacers in place.

API 618 Features

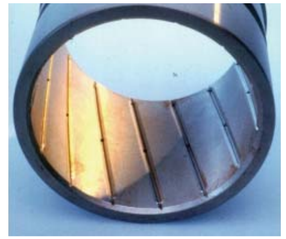
Bearings
Proprietary design Al-Sn (Aluminum-Tin) bi-metallic main and big end bearings are standard on all machines. They feature a much higher load capacity than the older tri-metallic bearings and do not require any adjustment at installation. The traditional central circumferential groove is replaced by two oil feeders positioned at 90 degrees with respect to the area where the maximum pin load occurs. The main bearings are split in the vertical plane to relieve the most heavily loaded area of surface discontinuities, increasing load capability and reliability still further.

Bearings can be replaced without removing the shaft: big end and frame main bearings are identical in all machines with an open top frame.

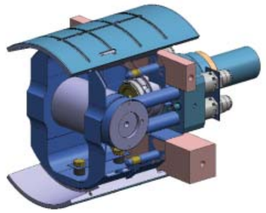
Connecting rod
The connecting rods are made of die-forged steel. Small end bushings are of the tri-metallic type (steel shell, leaded bronze layer, galvanic white metal flash). An internal axial channel through the rod ensures reliable lubrication at both big and small ends.

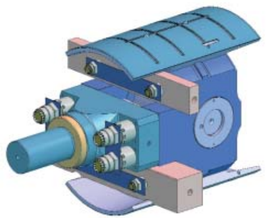
Crosshead
Crossheads are made of steel and equipped with amply-sized replaceable shoes. Specific loads are kept to a minimum, resulting in an extremely high working life. Shoes are completely machine-finished and interchangeable. They do not require any manual adjustment or shimming.

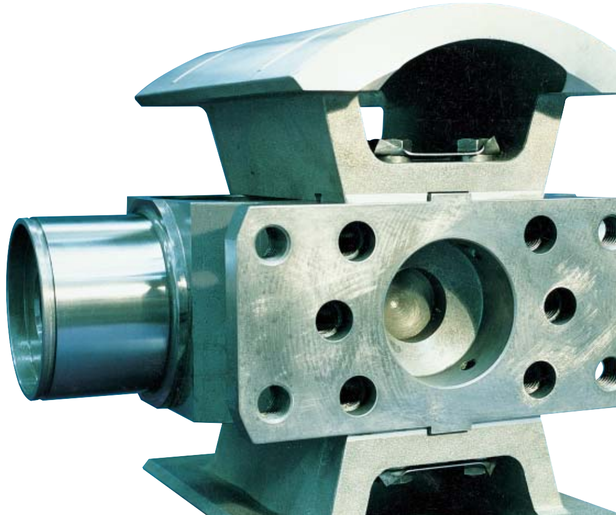
Main bearing split in the vertical plane.



Tri-metallic small-end bearing.







API 618 Features

Hydraulic tightening devices

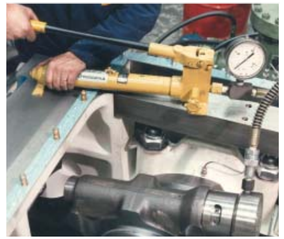
Depending on machine size, the main threaded connections (piston to piston rod, piston rod to crosshead, connecting rod to big end tie rods, frame crosspieces, anchor bolts, high pressure cylinder bolting) are hydraulically tightened. This method has many advantages including simple and safe operation, the highest resistance to loosening, simultaneous tightening of parallel tie rods, repeatability, and the absence of secondary bending or torsion effects on bolting.

Distance piece

All compressors are equipped with distance pieces between the crankcase and the cylinders. The distance pieces are available in many different configurations, among them single or double, pressurized or purged with inert gas, and vented to the atmosphere. The optimum configuration is selected in accordance with the process needs and Customer specifications.

Frame lubrication

The crank gear is lubricated by a forced feed system. A main mechanical pump driven by the compressor shaft and an auxiliary electric pump with similar flow are standard. On request, twin electric motor driven pumps may be supplied. All lube oil filters are of the twin type with changeover valve, to allow filter maintenance during machine operation. Standard lube oil coolers are single, shell and tube; once again a twin arrangement or different types of coolers may be supplied on request.



Connecting rod hydraulic tightening.

Lube oil console.

Higher safety & reliability.

API 618 Features

Compressor cylinders

The cylinders are designed to achieve the highest reliability. Available materials are cast iron, nodular cast iron, cast steel and forged steel to accommodate pressure and process requirements. Key features include:

- Ability to house different types of valves for maximum efficiency and life of valve internals.
- Wide gas passages to minimize pressure drop.
- Optimization of cooling passages to reduce thermal stress and distortion, and to control operating temperature.
- Replaceable liners, in a wide range of materials, for specific applications.

Cylinder valves

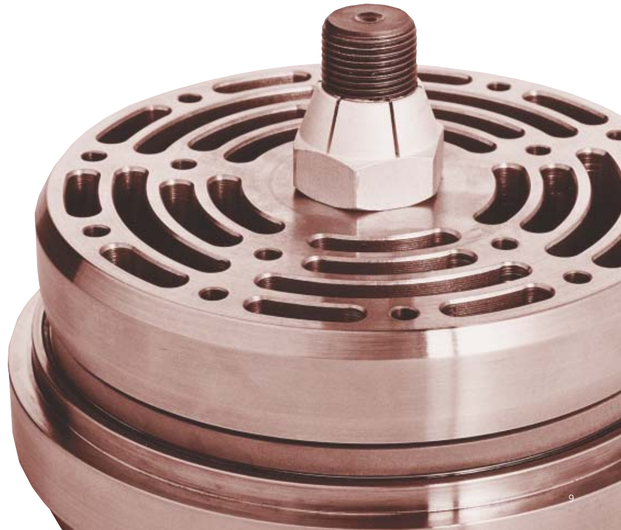
GE's proprietary valves are designed to hold power losses to a minimum, while ensuring the longest possible life for internal parts. PEEK is the standard material for rings up to 350 bar. Finger or plug type valve unloaders are available on request. A dynamic simulation of the behavior of cylinder valve rings is carried out for each application; it takes into account all aspects of working conditions, including piping pressure pulsations when required. The results of this simulation provide direction for final valve trimming; a complete range of standard interchangeable valve internals is available for this purpose.

Large bore cylinder during assembly.

Cast steel cylinder before assembly of internals.

Suction valve assembly.

Suction valve components including PEEK rings and finger unloader.



API 618 Features

Piston rod packing and piston sealing elements

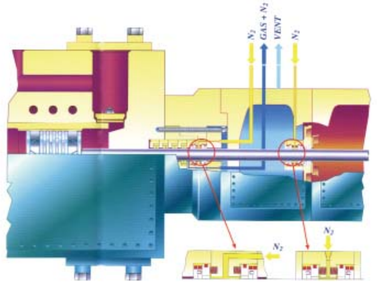
A complete range of state-of-the-art materials, including PEEK, is available to ensure the best performance under any condition, including non-lube applications or extremely high working pressures. Lubricated packings above 25 bar and all non-lubricated packings are cooled. Packing cups are made of stainless steel. The packing assembly may be configured with one or two gas recovery lines or with inert or sweet gas purging. A zero-leakage arrangement is available on request.

Pistons are equipped with plastic rings and rider bands, usually of the same material used for the packing rings. The proprietary design rider band grooves are eccentric with respect to the axis of the piston rod, so that there is a higher protrusion of the rider band in the bottom part of the piston. This feature has many advantages, among them a greater thickness available for wear, and a lower average rod run-out.

Cylinder lubrication

The cylinder bore and stuffing box may be lubricated, mini-lubricated or non-lubricated, according to process needs and Customer specification. Cylinder lubrication is of the forced feed type. Single pump to point, divider block or a combination of the two systems may be supplied, as preferred.

Cylinder lube oil console divider block type with a large capacity tank.



Double compartment piston rod packing with nitrogen buffering.

API 618 Features

Construction Materials

A wide range of materials is available to suit specific applications. For example, compressors can be manufactured in accordance with NACE standards for use in a sour gas environment. Different types of surface hardening and hard coatings, including tungsten carbide, are available for piston rods and cylinder liners.

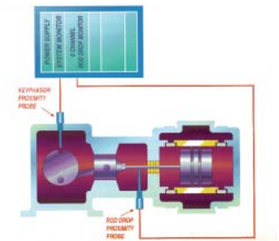
State-of-the-art materials.

API 618 Features

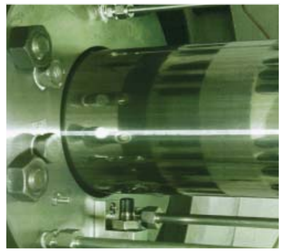
Instrumentation and controls

Provision for installation of a complete set of control and monitoring instrumentation (temperature, vibration, displacement etc.) is standard on all compressors; pressure indicator taps are provided on all cylinders. Actual instrumentation systems follow Customer specifications, and may range from single instruments to a complete diagnostic system, enabling confident predictive maintenance of the unit.

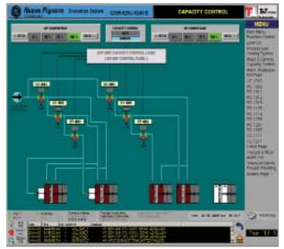
A proprietary design control panel (SCENETRON™) is also available on request, as is a wide selection of different step and/or continuous capacity control systems. Among them are valve unloaders, additional clearance pockets, recycle systems, and variable speed drivers. A special automatically and continuously operated additional clearance pocket has recently been developed to make possible very precise capacity control with virtually no variation in thermodynamic efficiency.



Piston rod drop scheme.



Piston rod packing flange with rod drop probe.



SCENETRON screen shot.

Advanced technology.

API 618 Features

Drivers

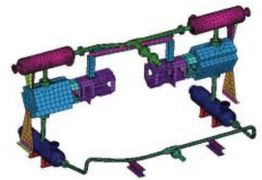
GE's Oil & Gas business has extensive experience with the use of every conceivable driver for a reciprocating compressor, in a wide range of applications. Among current installations are gas and steam turbines, variable and fixed speed electric motors, and gas engines. Over the years, the company has developed a unique in-house capability for the design of complete trains, including the specification of all components and the execution of both transient and steady-state torsional analysis.

Piping pulsation and vibration analysis and control

Piping pulsation and vibration analysis and control capabilities and experience have been under development at GE since 1965 when the first analogue simulator became available. Today, a team of world-class Oil & Gas specialists deals exclusively with piping acoustic pulsation and mechanical vibrations using one of the most advanced computer programs, developed entirely in house. Among its many capabilities, this program provides the input data for "cylinder-manifold analysis" using advanced finite element analysis of the cylinder/pulsation bottle assembly. Cylinder-manifold analysis has been a standard part of our pulsation and vibration studies since 2002. The Oil & Gas team is also able to conduct an analysis for a complete LDPE plant (pressures up to 3500 bar), including the primary-booster compressor, the hyper compressor, the reactor, the vessels and the complete interconnecting piping.

Seamless teamwork with the rest of the Oil & Gas Engineering Department ensures an optimized integrated design of the plant and compressor components from the acoustic and vibration standpoint.

The ability of the compressor manufacturer to perform all necessary pulsation and vibration analysis activities gives the Customer the great benefit of a single-source of responsibility for this highly critical function.



Cylinder manifold model.

Three-stage gas engine driven reciprocating compressor for gas lift service.

4HG compressor for gas storage driven by GE PGT5 gas turbine.

4HG compressor with variable speed electric motor.

API 11P High Speed Reciprocating Compressors

Every year energy companies around the world choose high speed reciprocating compressors to meet their gas compression needs. Today's energy companies recognize that these compressors provide an economic, flexible and reliable method to develop their oil and gas resources.

To serve the needs of our Customers in the oil and gas industry, GE offers a full line of high speed reciprocating compressors, ranging from 30 HP (22 kW) to 9000 HP (6,700 kW), with a variety of piston rod load capacities and frame stroke combinations. Over 10,000 of our compressors can be found around the globe, working in gas boosting, gathering, lifting, fueling and injecting applications - operating 24 hours a day, seven days a week.

GE API 11P compressors are integrated into a package by a global network of authorized packagers and distributors. The compressor is matched with a driver, coolers, controls and piping onto a single skid, allowing the complete compressor package to be easily moved to a new location. This concept lowers your installation, site construction and re-application costs.

Our compressors are also designed to be direct connected via a flexible coupling to a variety of economical prime movers, including reciprocating natural gas engines (720 to 1800 RPM) and electric motors (750RPM to 1800 RPM). A variety of compressor frame strokes allows the compressor to be perfectly matched to the optimum driver.

Compressor Horsepower Selection Chart

BRAKE HORSEPOWER PER MILLION CUBIC FEET*

SUCTION PRESSURE PSIG	DISCHARGE PRESSURE (PSIG) 25	50	75	100	125	150	175	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	Stages
0	65	99	128	144	156	168	178	187	203	218	233	233	241	248	254	260	266	272	277	282	286	291	295	299	303	307	311	315	312	318	318	321	324	328	4
10	35	63	85	104	121	131	140	149	163	175	186	196	205	214	223	231	228	233	237	242	245	250	253	257	260	264	267	270	267	270	273	276	279	282	4
20		43	62	78	92	106	118	126	139	151	160	170	178	186	193	199	206	212	218	225	231	226	229	232	236	239	242	245	242	245	248	251	254	257	3
30		29	47	62	74	85	96	107	123	133	143	152	159	167	173	179	185	191	196	201	206	211	216	221	226	230	224	227	224	227	230	233	236	239	3
40			36	50	61	72	81	90	107	121	130	138	145	152	158	164	170	175	180	185	190	194	198	202	206	210	214	218	214	218	222	226	230	234	3
50			26	41	52	61	70	78	93	106	119	127	134	141	147	153	158	163	168	173	177	181	185	189	193	196	200	203	200	203	206	209	212	215	3
60				32	44	53	61	69	83	95	108	118	125	131	137	143	148	153	158	162	166	170	174	178	182	185	188	192	188	192	196	200	204	208	3
70				25	37	46	54	61	74	86	97	109	117	123	129	135	140	145	149	153	157	161	165	169	172	176	179	182	179	182	185	188	191	194	3
80					30	40	47	54	67	78	89	98	109	117	122	127	132	137	142	146	150	153	157	161	164	167	171	174	171	174	177	180	183	186	3
90					24	34	42	49	61	72	81	91	100	109	116	121	126	131	135	139	143	147	150	154	157	160	163	166	163	166	169	172	175	178	3
100						28	37	44	55	66	75	84	92	100	109	116	120	125	129	133	137	141	144	148	151	154	157	160	157	160	163	166	169	172	2
125							25	32	44	54	63	71	78	85	92	99	106	113	117	121	124	128	131	134	137	140	143	146	143	146	149	152	155	158	2
150								22	35	45	53	60	67	74	80	86	92	98	103	110	114	118	121	124	127	130	133	135	133	135	137	139	141	143	2
175									27	37	45	52	57	60	71	76	82	87	92	97	102	107	112	115	118	121	123	126	123	126	129	132	135	138	2
200										30	38	45	52	58	63	68	73	78	83	88	92	96	101	105	110	113	116	119	116	119	122	125	128	131	2
250											26	33	40	46	51	56	60	65	69	73	77	81	85	88	92	95	99	102	99	102	105	108	111	114	2
300												23	30	36	41	46	50	54	58	62	66	69	73	76	79	83	86	89	86	89	92	95	98	101	2
350													21	27	33	38	42	46	50	53	57	60	63	67	70	73	75	78	75	78	81	84	87	90	1
400															25	30	35	39	43	46	50	53	56	59	60	64	67	70	67	70	73	76	79	82	1
450																23	28	32	36	40	43	46	49	52	55	58	60	63	60	63	66	69	72	75	1
500																	22	26	30	34	38	41	44	46	49	52	54	57	54	57	60	63	66	69	1
550																		20	25	20	32	36	39	41	44	46	49	51	49	51	53	55	57	59	1
600																				23	27	30	34	37	39	42	44	46	44	46	48	50	52	54	1
650																					22	26	29	32	35	38	40	42	40	42	44	46	48	50	1
700																						22	25	28	30	33	36	38	36	38	40	42	44	46	1
750																							20	24	27	29	32	34	32	34	36	38	40	42	1

* Note: MMSCFD measured at 14.7 psia, and 60F, suction temp = 100F, Natural Gas K=1.26, SG=.65
Example: Given = P1 =70 Psig, P2=650 Psig, MMSCFD = 8.0 Result: 140 Bhp/ MMSCFD = 8 X 140 = 1200 Total BHP.

It is the nature of natural gas production that field pressures and flows often change. Therefore greater productivity can be attained if the compressor is easily adaptable to the new operating conditions. Many of our compressors feature field replaceable cylinder liners which allow the cylinder bore to be increased or decreased as conditions change. In many cases, there is no need to modify the on-skid piping and accessories, further lowering modification costs. Also, in case of damage to the cylinder bore, it is less expensive and less time consuming to replace a liner than a complete cylinder. A variety of capacity control devices are also available, including our standard variable volume clearance pockets, featuring generous clearance volumes. This ensures that horsepower is not wasted.

The modular design of GE high speed reciprocating compressors allows frames and cylinders to be matched and re-arranged with only minor changes to the skid. For example, many cylinders will fit on as many as three different frames. Also, cylinders are designed to have identical flange connections, helping to keep inventory levels for idle machinery and spare parts to a minimum.

Cylinder Pressure Ranges by Application

Cylinder Pressure Ranges	Barg	Psig
Natural Gas Reinjection	324	4700
CNG Fueling	414	6000
Gas Gathering	152	2200
Pipeline	124	1800
Fuel Storage	248	3600

Reliable

GE High Speed API 11P Reciprocating Compressors use a balanced opposed design to minimize vibration by equalizing the opposing reciprocating forces on the crankshaft. Heavy, ribbed frames distribute reciprocating stresses evenly for greater strength and longer life. Many compressor cylinders are water jacketed to lower operating temperatures, provide thermal stability, and improve valve life.

Packaged Pre-assembled Units

The need to install a complex compression plant at a remote site or in a hostile environment often presents logistical problems which require heavy outlays or extended schedules when using conventional techniques. A simpler solution can be found in pre-packaging. A complete factory-built and pre-tested unit, designed for ease of transport and final assembly, can achieve dramatic savings.

GE has developed unique in-house resources dedicated to the design, assembly and testing of complete compression packages. Solutions range from simple skid-mounted compressors for onshore applications to standalone modules ready to be installed on offshore platforms.

A 3-D CAD system is used to develop the plant layout. It is also capable of generating an accurate ergonomic design, detecting and correcting spatial interference, and automatically generating piping isometrics and the associated bill-of-materials.

Inspection and Testing

GE reciprocating compressors for oil and gas applications are subjected to thorough inspection and testing throughout the manufacturing process, in order to ensure the highest quality and a long, productive life. All machines receive a full speed run-in test with a shop motor. The standard Quality Control Plan can be integrated with particular Customer requests, from simple additional checks on components to a running test of complete compression plants, either no-load or full load. In carrying out these and other tests GE Customers can take advantage of some of the largest and most complete testing facilities in the compressor industry.

Optimal solutions.

6HM reciprocating compressor offshore module during transportation.

D6 API 11P gas engine driven packaged reciprocating compressor.

GE PGT5 gas turbine driven compressor during full load test.

Quality Assurance

To achieve and maintain the highest technological and quality level of our products, all design, procurement, manufacturing and testing activities are carried out in accordance with a rigorous Quality Management System (QMS) based on the most widely accepted international code, ISO 9001 Ed. 00. An internal Certified Calibration Center is used to calibrate all measuring and testing instruments in the company's plants.

The QMS in operation at GE's Oil & Gas business is certified by Lloyd's Register Certification.

Research and Development

GE Customers benefit from R&D capabilities unmatched anywhere in the world. GE's Oil & Gas business is an active member of this R&D community, both drawing on and contributing to the work of the GE Global Research Center in Schenectady, NY, and its European branch in Munich, Germany.

Innovative design techniques such as DFSS (Design for Six-Sigma), NPI (New Product Introduction) and robust design, pioneered and widely used by GE, are now an important part of our corporate culture and form the foundation of our standard design procedure. R&D specialists greatly enhance the company's ability to provide effective and innovative solutions to our Customers. Progress is also driven by a continuous exchange of data and experience with universities and institutions in North America, the EU and the rest of the world, and through multi-tasking projects aimed at the development of new technologies.

Crosshead compression test.

Crosshead tension test.

Global Services

Our Global Services group is dedicated to maintaining and servicing more than 3,000 installed GE reciprocating compressors. It serves as a single point of contact for Customers, providing easy and prompt access for both preventive and emergency maintenance.

The range of available services includes:

- Installation, commissioning and start-up (supervision or turnkey).
- Technical assistance; event analysis, troubleshooting, and advice on operational matters.
- Parts, overhauls and repairs; revamping/improvement of existing units; Conversions, Modifications and Uprates (CM&Us).
- On-condition maintenance through advanced monitoring and diagnostics programs.

GE's Oil & Gas business is constantly developing innovative solutions to put the latest technology and processes to work for our Customers. For example, we were among the first to offer a continuous monitoring system for small and big end bearings based on passive sensors (no power source necessary) mounted on the connecting rods, with the receiving unit installed in a small, robust container close to the compressor.

Advanced temperature monitoring probe based on radar technology.

Compressor field monitoring.

Training

GE offers training for the operation and maintenance of our complete line of machinery and equipment. Training can be provided either at the client's site or at the GE Learning Center, located at the Oil & Gas headquarters in Florence, Italy. Instructors are field-seasoned experts who combine their understanding of theory with extensive practical experience. The training they provide is valued by our Customers for improving the skills of their operations and maintenance personnel, to assure safety and superior equipment efficiency and availabily.

Close to the Customer

Courses and documentation are customized to meet the specific needs of our Customers, focusing on the GE machinery and equipment actually installed at their sites.

Effectiveness and efficiency

Traditional training tools are augmented with computer-based training and interactive multimedia technology. Courses and technical literature can be provided in a variety of languages.

CENTER OF EXCELLENCE FOR TRAINING

Florence Learning Center Facilities:

- 5600 m^2 of space
- More than 20 training rooms
- Speedtronic Mark V & Mark VI
- Bently Nevada simulators
- Laboratories
- Multimedia rooms
- Conference center
- Auditorium seating for 230 (upon completion)

TRAINING SOLUTIONS

- Suitable for all levels of personnel
- Tailored to your organization's specific needs
- Pre-scheduled offerings or on request
- Provided in various languages
- Formal classroom training and interactive learning

EQUIPMENT COVERED

Steam Turbines, Gas Turbines, Centrifugal Compressors, Reciprocating Compressors, Expanders, Pumps, Control Panels and other oil and gas industry equipment offered by GE.

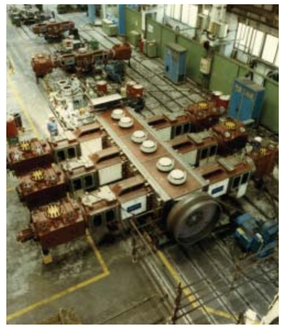
Personalized Customer training.

Applications: Processing

LDPE hypercompressor - model 12PK/2

Syngas compressor - model 6HG/3

Polypropylene plant compressor package - model 2HA/2



Hydrogen Make-up compressor - model 6HG/4 during shop test.

Extensive experience in a broad range of processing applications

Hydrogen Make-up compressor - model 6HG/4

Applications: Natural Gas

Fuel gas boosting compressor - model B452 at 50 bar.

Re-injection compressor – model 4HE/2 at 370 bar.

Re-injection compressor – model 6HE/2 at 415 bar.

Offshore gas turbine driven compressor – model 4HE/2 at 280 bar.

Covering the needs of all Natural Gas applications

Gas gathering-engine driven high speed compressor - model 6HM/1 at 71 bar.

Gas storage compression unit - model 4HG/1 at 200 bar.

Frame Ratings

A full century experience, characterized by intensive and never ending focus on technology improvements, the broadest line of compressors, coupled with the most varied applications in all sectors, and the toughest records achieved, make GE an unquestionable world leader in oil and gas applications.

API 618 Series O and H Process Compressors

Designed in accordance with API 618, for heavy duty applications in process applications, these units fit the broadest and most stringent market requirements.

Frame Size	No. of Throws	Max. Power Capability (*) (kW)	Piston Rod Diameter (mm)	Stroke (mm)	Max. Speed (rpm)
OA	1	435	48	220	800
OC	1	700	57	300	650
HA	2-4	2,000	48	180	1200
HB	2-6	3,750	57	210-230	800
HD	2-8	10,400	75	240-280	700
HE	2-10	21,500	90	290-330	600
HF	2-10	28,500	110	320-360	470
HG	2-10	36,000	130	320-360-400	450

API 618 and vertical Natural Gas Compressor Series AVTN, BVTN, HM, SHM, SHMB

AVTN, BVTN: vertical standard compressors for fuel gas service.

HM, SHM: high speed API 618, heavy duty models, designed for continuous duty in the oil and gas industry. Onshore and offshore applications. Wide cylinder line, lubricated and un lubricated.

SHMB: fully balanced, designed for vibration-free applications, offshore and onshore.

Frame Size	No. of Throws	Max. Power Capability (*) (kW)	Piston Rod Diameter (mm)	Stroke (mm)	Max. Speed (rpm)
AVTN	2	135	25	150	1200
BVTN	1-4	800	41	175	1000
HM	2-6	3,600	57	135-150	1200
SHM	2-6	6,600	65	135-150	1200
SHMB	2-4	4,400	65	135-150	1200

Series P Hypercompressor

Unique, compact hypercompressors for the extremely demanding conditions of LDPE production.

Frame Size	No. of Cylinders	Max. Power Capability (*) (kW)	Piston Rod Diameter (mm)	Stroke (mm)	Max. Speed (rpm)
PK	4-24 (**)	60,000	–	400 max.	310

API 11P High Speed Reciprocating Compressors

Balanced opposed high speed compressors of rugged design for heavy duty service in oil and gas field applications.

Frame Size	No. of Throws	Max. Power Capability (*) hp (kW)	Piston Rod Diameter in. (mm)	Stroke in. (mm)	Max. Speed (rpm)
M	1-2	120 (90)	1.125 (28.6)	3 (76.2)	1800
H	1-2-4	400 (300)	1.125 (28.6)	3 (76.2)	1800
A	2-4	800 (600)	1.375 (34.9)	3.5 (88.9)	1800
B	2-4	1600 (1200)	1.75-2.0 (44.5-50.8)	3.5-4.5-5.0 (88.9-114.3-127.0)	1200-1500-1800
DS	2-4	2400 (1800)	1.5-2.0 (38.1-50.8)	4.25-5.0-6.0 (108-127.0-152.4)	1200-1500-1600
ES	2-4-6	7200 (5400)	2.25 (57.2)	5.0-6.0-7.0 (127.0-152.4-177.8)	1000-1200-1500
FS	2-4-6	7200 (5400)	2.5 (63.5)	5.0-6.0-7.0 (127.0-152.4-177.8)	1000-1200-1500
SHMB	2-4	5900 (4400)	2.5 (63.5)	6 (152.4)	1200
SHM	2-4-6	8800 (6600)	2.5 (63.5)	6 (152.4)	1200

* – at max. speed and max. number of cylinders
** – max. number of cylinders with twin 12 cylinder frames

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