

■ This Burckhardt Compression Hyper compressor is for installation in a low-density polyethylene (LDPE) plant that is part of the integrated ethylene and polyethylene (PE) complex at Al Jubail, Saudi Arabia. . It is expected to compress some 160 tons of ethylene/hour to a discharge pressure up to 38,400 psi (2650 bar).

GIANT HYPER COMPRESSOR DELIVERED FOR SAUDI ARABIAN POLYETHYLENE COMPLEX

Termed by Burckhardt Compression as the Most Powerful Single-Frame Compressor, its 350 ton (344 tonnes) Weight and 38,400 psi (2650 bar) Discharge Pressure Lends Support to This Claim

By Joe Kane

Compressor design, application and production are fascinating subjects at any level, but when the design reaches the "Hyper" level, imaginations tend to run wild and design innovation is at its most creative. A recent news item from Burckhardt Compression AG, Winterthur, Switzerland, trumpeted the "World's most powerful single-frame compressor delivered." When a number of dimensional and performance statistics are revealed, the claim as World's Most Powerful is certainly believable. For example, its 350 ton total weight includes a 180 ton motion work. This, in turn, includes a crankcase of approximately 86 tons and a 25 ton crankshaft. The compressor is designed as a two-stage unit with six cylinders in each of the two stages making a 12-cylinder machine.

The unit, recently delivered by

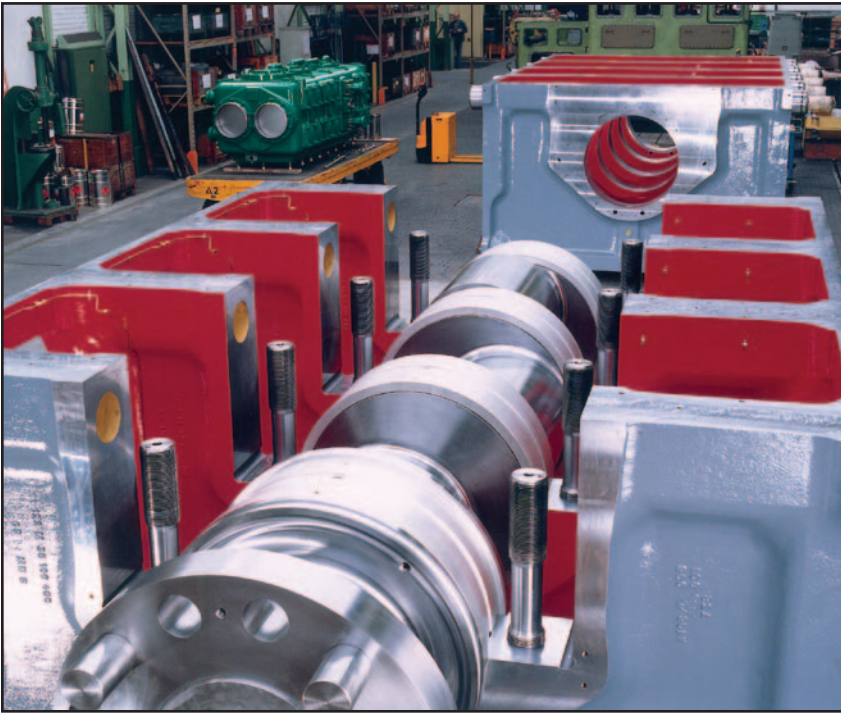
Burckhardt Compression, is driven by a directly coupled 200 rpm, 60 Hz, 36,900 hp (27,500 kW), 11,000 V, specially designed synchronous electric motor. The compressor is expected to compress some 160 tons of ethylene/hour to a discharge pressure up to 38,400 psi (2650 bar). Hyper compressors are high-pressure reciprocating compressors for low-density polyethylene plants up to 50,000 psi (3500 bar). These compressors are characterized by long life and high safety requirements because of their many design features.

The order was received in October of 2005 from National Petrochemical Industrialization NPIC (Tasnee) for the low-density polyethylene (LDPE) plant that is part of the integrated ethylene and polyethylene (PE) complex at Al Jubail, Saudi Arabia. The respon-

sible contractor for this project is Tecnimont. The compressor is to be installed in Al Jubail by mid-July of this year.

The new petrochemical complex includes a gas cracker and two 400,000 tons/year PE plants. One of these plants will produce LDPE, based on Basell's Lupotech T technology. The joint venture project was set up by Basell Polyolefins GmbH and Tasnee & Sahara Olefins Company. The project is scheduled to be completed in 2008.

A number of features contribute to long life, ease of maintenance and the meeting of safety requirements for Burckhardt Compression's Hyper compressor. For example, to reach and sustain ultra-high pressures, special design considerations and material composition must be met. The plungers (the pistons in the Hyper compressors) con-



■ The massive crankshaft for the Hyper compressor is shown resting on its bearings in the lower half of the crankcase.

sist of solid tungsten carbide bars. The cylinders are special and are assembled of several high-pressure cups made out of special alloy steel and containing bronze sealing elements. The central valves (cylinder elements) also are made out of special alloy steel. Each cylinder is equipped with one central valve body in which both suction and discharge valves are combined.

Long life and ease of maintenance are enhanced by the 200 rpm driver motor speed, which accounts for low friction and consequently low wear. Also, the massive crankshaft construction without webs lends greater rigid-

ity and stiffness to this moving part. The compressor is equipped with large diameter bearings, providing exceptionally low specific loads. The massive design of the Hyper compressor enables Burckhardt Compression to manufacture machines using fewer cylinders than other basic designs. This feature enables Burckhardt Compression to design its machines with fewer moving wear parts, resulting in low operating costs.

Contributing to ease of maintenance is the construction of the crankcase. It is produced from a compound welded design with main walls

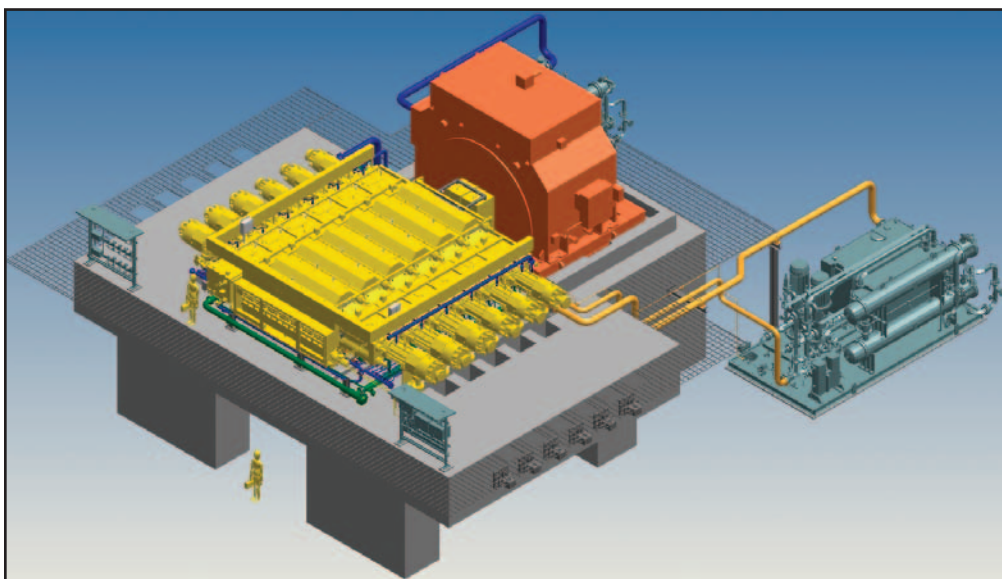
of cast steel along with steel plates to complete the construction. Large steel covers on top of the crankcase allow easy access to all internal components and contribute to easy inspection and dismantling for maintenance. A unique cartridge system enables rapid change-out of cylinders.

As a safety feature, the compressor is equipped with an additional distance piece so that ethylene gas will not enter the crankcase. Burckhardt Compression compressors are equipped with an auxiliary crosshead between the main crosshead and the plunger. This arrangement eliminates all undesired movements and lateral stress to the plunger. All cylinder materials and moving parts are made out of special alloy steel, contributing to long life.

According to a company spokesman, Burckhardt Compression is the only manufacturer that offers a complete range of Laby (labyrinth piston), process gas and Hyper compressors. These compressors are used in a wide range of applications in the chemical and petrochemical industry, in refineries, air separation systems and for gas transport and storage. They also are used to compress, cool or liquefy gas, for example hydrocarbon or industrial gases.

Burckhardt Compression says its global service network gives compressor operators, especially in remote locations, peace of mind. It enables Burckhardt Compression to offer comprehensive customer support services, such as delivery of top-quality components, servicing of compressor valves, complete system overhauls, engineering services and establishing and fulfillment of comprehensive maintenance contracts. ■

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■ Computer-generated installation of the Al Jubail Hyper compressor from Burckhardt Compression. View shows the operating components plus the foundation and auxiliary skid.