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RH vacuum degassing plant with dry mechanical pump from Primetals Technologies receives FAC at AHMSA

- **Annual capacity around two million metric tons**
- **Dry mechanical pump solution saves operation costs**
- **Space saving combined vessel ladle lifting system (CVL) installed**
- **AHMSA expands product portfolio to steel grades for the oil and gas industries**

Recently, Mexican steel producer Altos Hornos de Mexico, S.A.B. de C.V. (AHMSA) issued the Final Acceptance Certificate (FAC) for a twin RH vacuum degassing plant supplied by Primetals Technologies. The 150-ton RH plant was installed in AHMSA's converter Steel Works # 2 in Monclova. It is able to handle 50 charges per day, the equivalent of about two million metric tons of liquid steel per year. The RH plant is operated with a dry mechanical pump solution. This saves operation costs and increases flexibility for integration in the production process. A space saving combined vessel ladle lifting system (CVL) is also part the RH plant. The new plant allows AHMSA to produce steels with very low hydrogen content, required for applications in the oil and gas industries.

For AHMSA's twin RH plant in Monclova, in the state of Coahuila, Primetals Technologies supplied the, mechanical vacuum pumps, the structural steel work and treatment station using a combined vessel ladle lifting system (CVL). This solution requires little space, enabling vessels to be lifted in places inaccessible to cranes. The scope of supply from Primetals Technologies also included the electrical and automation equipment for the RH plant. Introducing the technology of dry mechanical vacuum pump system into the RH process yields excellent metallurgical results in terms of degassing and decarburization,

Dry mechanical pumps are being used more frequently lately, mainly for tank degassing and smaller heat sizes. Meanwhile, this technology has been further developed and Primetals Technologies is one the first suppliers which can offer and implement the complete technology adapted to RH degassing systems, also for larger heat sizes. Main benefits of this technology are reduced operational cost as long

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as only electrical energy is used for vacuum creation instead of steam and large amounts of cooling water. Also, the vacuum pump only requires a short preparation time before production start, since the dry mechanical pump just needs to be switched on electrically versus a steam ejector pump used to heat up the boiler system and complete steam system before any vacuum treatment can be started. In addition, the water treatment plant only requires a small cooling system. In comparison, in case a steam ejector is used, intensive water cooling is required, including sludge handling for dust removal via condenser cooling water.

The main functions of RH degassing plants are the removal of hydrogen, natural and forced decarburization, chemical heating of the liquid steel and alloying adjustment, which are processed under vacuum conditions. Low hydrogen content is the main prerequisite for producing high-strength steel grades and grades intended for use in the oil and gas industries. The applied technology allows to achieve very low hydrogen contents in a short vacuum time.

During production, the operators are guided by a process automation system. This system uses a number of mathematical models in order to forecast metallurgical parameters and to create set-points, for example for steel temperature, cyclically calculated based on different received parameters and processing time, chemical composition by determining received steel samples and added materials through the process. Forecasts and set-points are also created for status of degassing functions like hydrogen and nitrogen removal depending on initial contents, degassing time, vacuum pressure curve, lift gas rate and others, status of decarburization by determining cyclically carbon and oxygen content of steel, and set-pointing for various functions like oxygen blowing, vacuum and lift gas patterns etc.

Furthermore, the level 2 system is connected to the production planning and the process automation of preceding and subsequent aggregates as well as with the laboratory, in order provide all relevant data to the operator. The data tracking is collecting all relevant data from level 1 system and process models for the creation of different heat and production reports. All these data are stored in a database to make the system ready for future data applications and Industry 4.0 features. AHMSA operates the largest integrated steelworks in Mexico and is the country's only producer of heavy plate. The company generates more than 5 million metric tons of crude steel every year. The company primarily produces flat rolled steel, including hot- and cold-rolled coils, heavy plates, tin-coated and tin-free sheets, and a variety of heavy sections.



RH vacuum degassing plant from Primetals Technologies installed in the converter Steel Works # 2 of Altos Hornos de Mexico (AHMSA) in Monclova, Mexico

This press release and a press photo are available at

www.primetals.com/press/

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Primetals Technologies, Limited headquartered in London, United Kingdom is a worldwide leading engineering, plant-building and lifecycle services partner for the metals industry. The company offers a complete technology, product and service portfolio that includes integrated electrics, automation and environmental solutions. This covers every step of the iron and steel production chain, extending from the raw materials to the finished product – in addition to the latest rolling solutions for the nonferrous metals sector. Primetals Technologies is a joint venture of Mitsubishi Heavy Industries (MHI) and Siemens. Mitsubishi-Hitachi Metals Machinery (MHMM) - an MHI consolidated group company with equity participation by Hitachi, Ltd. and the IHI Corporation - holds a 51% stake and Siemens a 49% stake in the joint venture. The company employs around 7,000 employees worldwide. Further information is available on the Internet at www.primetals.com.

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