

"Designed for rapid assembly, easily customizable and ready for "Off-the-Grid (OTG)" use with solar and/or wind power. Your best solution for remote shelter requirements"

Tel: +1 613 755 4015 / +1 1-877-220-2027 | Fax: +1 613 744 2888 | info@NOMADIQshelters.com

NOMADIQ

www.NOMADIQshelters.com

Creamer Media's
MINING WEEKLY Online

New machine could slash smelters' reliance on Eskom power by 30% – Theisen

By: Leandi Kolver
Published: 5th October 2012



The new Theisen cooler disintegrator compressor (CDC) machine being developed by gas cleaning specialist company Theisen Engineering will assist the ferroalloy industry in reducing its dependence on Eskom power through cogeneration, while simultaneously complying with emissions legislation, says MD **Ebby Schubert**.

At a smelter complex, the carbon monoxide generated will typically be flared; however, with current power shortages and electricity price increases, it will be beneficial to reuse that gas to generate electricity, he says.

Mining Weekly reported last month that the price of electricity, which had increased by 170% in the last five years, currently represented 35% of the cost of production of ferrochrome in South Africa and that the price was poised to continue rising dramatically.

"The Theisen CDC machine would enable smelters to, instead of flaring the gas, use it to fuel a gas motor, which can be used to drive a generator, reducing a smelter's dependence on Eskom power by about 30%," Schubert says.

As a smelter's offgas passes through the CDC machine, spraying water is introduced, which cools, cleans and scrubs the gas while the dust is captured in the water. This takes place in the cooling and disintegrator section of the CDC machine. The cleaned gas then enters the liquid ring compressor section, which compresses the gas and makes it suitable for use in a gas motor.

Gas motors have stringent requirements for the cleanliness level and the pressure and relative humidity that are required of the fuel gas, Schubert states.

The cleanliness level is based on the energy value of the gas and would usually have to be between 10 mg/Nm³ and 15 mg/Nm³, he says, adding that Theisen Engineering is confident in this area, as levels of cleanliness are below 10 mg/Nm³ at existing Theisen plants using disintegrator technology.

He explains that, with regard to relative humidity, gas motors have a maximum content of moisture that is allowed and the easiest way to reduce the moisture is to cool the gas.

"The Theisen CDC machine makes use of water to clean the gas and by cooling the water the machine also cools the gas, which causes some of the moisture to drop out, resulting in a reduced relative humidity when the gas is reheated."

A gas motor also produces heat and, subsequently, an abundance of energy from its exhaust; therefore, additional energy is not needed to reheat the gas, he adds.

Meanwhile, gas motors require pressure of about 25 kPag. However, as the gas contains hydrogen in varying degrees, it is thin and extremely high-speed fans would be needed to compress the gas.

High-speed fans are dangerous as they could cause the gas to combust spontaneously and risk an explosion under certain conditions, which is why Theisen opted for a liquid ring compressor, a safe wet technology, to achieve the required pressure.

"The liquid ring compressor works in a similar way to a fan with blades, but it is permanently sealed and cooled with water and allows for a sparkproof operation," he explains.

"With the Theisen CDC, we have combined a liquid ring compressor and a disintegrator into one machine. Traditionally, the gas would be cleaned, after which a boosting fan would have to be used to generate the supply pressure required," Schubert adds.

Further, as this machine uses Theisen's disintegrator technology, which produces a particulate matter (SPM) emission level of about 10 mg/Nm³, it is also compliant with emissions legislation which requires SPM emission levels to be less than 50 mg/Nm³, he points out.

Currently, there are still many smelters in South Africa that do not comply with this legislation, he says.

"Theisen can assist these smelters in meeting the requirements, as its equipment can easily be slotted into an existing plant without interfering with any of the exiting control systems and operations," he says.

Theisen is currently building a prototype of the CDC machine, with in-house testing expected to start towards the end of 2012 and to be completed in the first quarter of 2013.

The prototype is designed for a volume of about 2 500 Nm³/h to 3 000 Nm³/h of gas, which is sufficient to fuel one gas motor. As the machine is developed, greater volumes will also be considered, he adds.

"Currently, there is no other machine like this on the market and we expect to see significant interest from the ferroalloy industry as the Theisen CDC machine replaces multiple pieces of equipment with one machine, which reduces its footprint. This will be beneficial, as these projects are mostly retrofits and the space may be limited," Schubert says.