Lighthouse project for energy-efficient use of industrial waste heat
– a groundbreaking technology

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This energy-efficiency project means to reduce carbon dioxide (CO₂) emissions by 20,000 t per year and at the same time give us a first look at innovative energy supply of tomorrow. Instead of generating heat for the new Hamburg district Hafencity East as usual through a power plant, the Hamburg company Aurubis AG will provide its industrial waste heat for the cause. This will be made possible by using eight state-of-the-art plate heat exchangers made from special Hastelloy materials because of the difficult operating conditions.

The last time the Hafencity, Hamburg’s newest district, was in the headlines was for their very visible landmark, the Elbphilharmonie. A different and not so visible project, yet nonetheless with lighthouse function, will be in the emerging eastern part of the district. After mid-2018, this part of the Hafencity shall receive its district heat from the industrial waste heat of a copper smelting company. A so-called contact plant will manage the “heat recycling”. Waste heat, which forms when gaseous sulfur dioxide is converted to sulfuric acid, will be extracted.

Instead of generating extra heat through a power plant, industrial waste heat will be used. It is a project for the future which is supported by the Aurubis AG in the industry and by the enercity Contracting Nord GmbH in the energy supply. Together these two partners are investing about 33 million Euros in a climate project where part of the recycled heat will also be re-used directly on the Aurubis plant premises. The Deutsche Energie-Agentur (dena) counts this project as one of the ten case examples of “lighthouses of energy-efficient use of industrial waste heat” within Germany. And rightly so, because the bottom line is that CO₂ emissions in Hamburg will be reduced by about 20,000 t of CO₂.

Groundbreaking technology to preserve environment and resources

On the Aurubis plant premises, especially the heat recovery poses technological challenges: The new intermediate absorber with heat recovery must deal with not only high pressure but also aggressive media because the waste heat forms during the conversion of sulfur dioxide to liquid sulfuric acid.
Therefore, we have installed state-of-the-art plate heat exchangers in the heart of the heat recovery plant that are manufactured by Alfa Laval, the international leader within key technology areas of heat transfer, separation and fluid handling. All together the company provides eight units. This specialization will show precise advantages here in Hamburg. The plate heat exchangers not only have an extremely high capacity but are also, due to corrosive fluids and the usage in copper smelting by Aurubis, mostly made from special Hastelloy materials which correspond almost perfectly with the difficult requirements.

Initially the innovative solution is much more complex than a “normal” heat exchanger. However, after only a short period it pays off because they guarantee a long lifetime and minimal maintenance, which in turn means a significant medium and long term reduction of waste heat recovery costs.