Safety is for life.™

REMBE® at SOLIDS 2023: These are the highlights.

- REMBE® celebrates 50 years.
- Certified weather resistance of explosion vents.
- Inside the cockpit of the CO.Pilot.
- Quite fast: Active Explosion Isolation with Q-Bic™.

Dear media representatives,

below you will find an overview of all our highlights at SOLIDS 2023. If you are interested in further articles about explosion safety and pressure relief, I would be happy to assist you.

With best regards,

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REMBE® at SOLIDS 2023: Celebrate 50 years of REMBE® on over 100 sqm of stand space, with impressive live explosions and a REMBE® Safety Lounge in the outdoor area. The REMBE® trade fair team presented their latest product developments and and provides a real highlight in the explosion protection industry with the presentation of the CO.Pilot.

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50 years of REMBE® - With empathy and heart, at any time and worldwide.

After fifty years of business, people often look back at the history, at old pictures, brochures and reports. But in REMBE's anniversary year things are different, because here (today just as 50 years ago) it is the people who shape the corporate spirit and make REMBE® what it is today. Stefan Penno, Chief Executive Officer REMBE® GmbH Safety+Control explains: „We trust each other, see the best in people and believe in each person's individual strengths. Because humans are what matters to us."

Bernhard Penno founded the company in 1973 as a sales office for rupture discs – initially as a one-man business in his garage at home. Just a few years later, new rupture disc designs were being manufactured in the company's first production hall. In 2005, Stefan Penno, the son of the company founder, took the reins of the business. Today, REMBE® employs 340 „RFM" (REMBE® family members) in over 90 countries and with 10 subsidiaries. To mark its anniversary year, REMBE® has come up with some „special activities". This year's celebrations are entirely in keeping with the above motto. They will start with an international REX conference for all RFMs worldwide. After a long break due to the coronavirus pandemic, the conference can finally resume this year at the newly renovated company headquarters in Brilon, Sauerland. This will be followed by the REMBE® Family Day, thus ensuring that the anniversary year will be commemorated in style.

REMBE® rupture discs and explosion protection systems safeguard processes in all industries around the world and help to save lies every day. REMBE® wouldn't be REMBE® if we didn't think outside the box, says Stefan Penno. With this in mind, several initiatives have been launched in recent years. For example, the RFMs involved in the REMBE® green initiative are looking for improvement potential, determining which environmental aspects could be given greater attention to benefit customers and partners, and evaluating ways to ensure natural resources are handled responsibly – and are thus making a small contribution to protecting our planet. After the REMBE® WeltWald was launched last year as a major project of the initiative (8 hectares of forest are being reforested here), there is another campaign for the anniversary. 50 years - 500 trees.

For more information:

rembe-green.de/en

Explosion vents to protect the bulk materials from environmental influences.

Once again, REMBE® GmbH Safety+Control is challenging the status quo of autonomous protective systems. Thus, the globally increasing environmental influences and weather extremes prompted REMBE® engineers to test the protective effect of REMBE® explosion vents also against weather-related water and air permeability.

Particularly in plants and processes with high demands on water and air tightness, explosion vents that are directly exposed to weather conditions due to their installation position often represent a potential point of entry and thus a hazard for the bulk materials themselves. REMBE® therefore applies what is legally required for construction elements such as windows and doors to the various explosion vents in the explosion protection area. Within the framework of large-scale weather simulations, the REMBE® explosion vent types ODV, EDP, EGV-HYP, as well as the new vent duct cover KAD-LIC have been tested for their properties of air permeability, watertightness and their resistance to wind load. BS EN 14351-1, the product standard for windows and doors, served as the basis and classification. The results of the weathering test are extremely impressive. A comparison of the test results with real weather conditions shows that storms with wind forces of up to 14 on the so-called Beaufort scale (bft) - this corresponds to wind speeds of up to 166 km/h - have no influence on the protective effect of the explosion

vents. Even in heavy rain in conjunction with wind speeds approaching 120 km/h, the explosion vents exhibit a high degree of tightness. A comparison with the windows used in the construction industry illustrates the high weather resistance: The REMBE® explosion vents achieved the same and in some cases significantly better test results than the currently available windows for residential buildings.

What is the added value of weathering testing?
The REMBE® explosion vents thus not only protect the plant in the event of an explosion through targeted explosion venting, but also ensure effective protection of the bulk materials themselves from external environmental influences during normal operation. The risk of contamination by water, dust and air as well as collateral damage due to swelling or excess weight is thus minimised.

- ✓ Certified weather resistance
- ✓ Effective protection of the plant and its products from environmental influences
- ✓ Air leakage of < 0.75 m^3/h m joint length
- ✓ Impervious to driving rain up to a wind force of 12 bft (120 km/h) and a precipitation rate of 440 mm/h
- ✓ Wind stability up to a wind force of 14 bft (166 km/h)

CO.Pilot - Explosion Prevention in new spheres.

Drying processes in particular are used in many industries to produce material, for easier storage, more efficient transport and a longer shelf life. However, the combination of moisture extraction and high temperatures creates an increased risk of both, fires and explosions.

Operators of drying plants must combat a very special kind of ignition source: smouldering nests! These often result from excessive caking of material leading to spontaneous combustion. Caking occurs due to sub-optimal drying of the material and its initially high moisture content. The caked material is then insulated against the surrounding air by a build-up of moist material. The high temperatures ensure that the caked material is continuously heated until a biological reaction takes place involving protein, carbohydrate and water – known as the Maillard reaction. The Maillard reaction generates additional heat that cannot be dissipated due to the insulating layer of caked material. This process continues to accelerate until spontaneous combustion finally occurs.
Caking of this kind can build up both on the nozzles and the inner wall of the (spray) dryers. If the nozzle malfunctions, droplets may fall down into the fluid bed and cause further clumping. If a smouldering nest is able to form, this can ignite the explosive atmosphere inside the dryer or the downstream machinery.

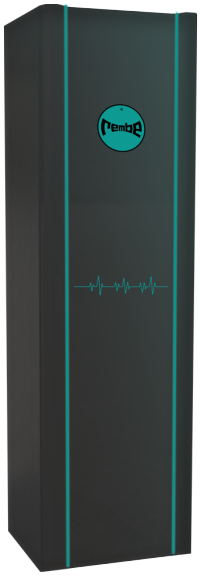

Fig. 1: REMBE® CO.Pilot

How can such conditions, which are frequently encountered in practice, be prevented?
Everything starts with the human factor, i.e. properly trained personnel for the respective processes. Optimal process control is also required to avoid caking. But without precise and reliable information/measurements, this is virtually impossible, even for specialists. Nowadays, humidity and one of the by-products of spontaneous combustion at early stages – carbon monoxide (CO) – are used as indicators to ensure a smooth and thus safe process. However, the fact that combined measurement systems cannot clearly distinguish between these two indicators is problematic and can result in inaccurate measurements.

The REMBE® CO.Pilot makes exactly this symbiosis possible! Via a permanent comparison of recorded data with a database of stored reference gases that serve as „fingerprints“ of the selected gases, it is possible to perform a one-time check in real time and thus permanently verify the measurement accuracy. At the same time, the real-time fingerprint analysis eliminates

the cross-sensitivity to other gases in the measurement spectrum that is common in commercial gas analysers. To ensure a reliable measurement of the operating status, samples are sucked in from all of the dryer's relevant supply and exhaust air ducts under very high vacuum. REMBE® calculates the delta CO value on the basis of the absolute values measured at the individual measuring points. This value is the mathematical difference between the CO content of the extract air and the CO content of the supply air. Thus, only events that actually occur in the respective process are detected. External factors that may disturb the process can thus be ignored.

A proprietary evaluation algorithm (RFA REMBE® Flow Algorithm) enables the measured supply and exhaust air values to be compared in real time. As a result, the REMBE® CO.Pilot is the first system on the market that makes it possible to adjust the individual alarm limits and gas run times for the individual measuring points in the dryer's various air throughputs without any delays. The ratios of the different supply air channels and the flexible operating hours are balanced via the software and calculated accordingly in the PLC. Thus, if an increased carbon monoxide concentration is detected due to spontaneous combustion during the process, countermeasures can be initiated immediately.

But what does this mean in detail?
This special sampling process eliminates the need for costly and error-prone gas treatment, thus ensuring that the CO.Pilot is less susceptible to faults and requires less maintenance. Furthermore, this measurement method can make recurring calibrations unnecessary. Due to the precise measurement technology and the reproducible results, false alarms and downtimes can also be avoided. And in combination with moisture measurements, the entire drying process can be optimally controlled, significantly increasing the energy efficiency of the system.

Explosion isolation – a must in every safety concept.

Explosion isolation is absolutely essential for comprehensive explosion protection. Without isolation, an explosion safety concept is not only incomplete, but is also a waste of money for operators as: In almost every production facility, individual plant components are interconnected by means of pipelines. The purpose of explosion isolation is to seal these pipelines in the event of an explosion to prevent the propagation of pressure and flames, thereby protecting the adjacent plant components. Precompression and flame jet ignition increase the severity of the explosion in the connected vessels. This leads to secondary explosions that can cause even more catastrophic damage. Isolation systems prevent an explosion from propagating, thereby reducing the effects of the explosion to a minimum. Adjacent system components are optimally protected .

Explosion Isolation System Q-Bic™

The explosion isolation system Q-Bic™ registers the emerging explosion and extinguishes the developing explosion flames within milliseconds by applying the extinguishing powder. The extinguishing powder is optimally distributed in the pipeline via a nozzle system and guarantees reliable isolation. The chemical barrier is particularly well-suited to applications in elevators and spray dryers.

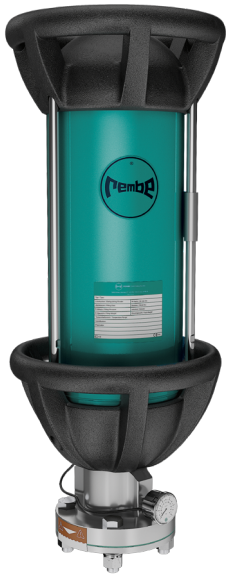

Fig. 2: REMBE® Explosion Isolation System Q-Bic™

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REMBE® at the SOLIDS 2023: Hall 7, Booth U09-7

About REMBE® – the REMBE® Alliance introduces itself.

Most people associate REMBE® with REMBE® GmbH Safety+Control, the specialist for explosion safety and pressure relief worldwide. The company offers customers cross-industry safety concepts for plants and equipment. All products are manufactured in Germany and meet the requirements of national and international regulations. REMBE® customers include market leaders in various industries, including the food, timber, chemical and pharmaceutical industries.

The company's engineering expertise is based on almost 50 years of application and project experience. As an independent, owner-managed family business, REMBE® combines expertise with the highest quality standards and is involved in various specialist committees worldwide. Short coordination paths allow for quick reactions and customer-specific solutions for all applications, from standard products to high-tech special designs.

In addition to REMBE® GmbH Safety+Control (https://rembe.de) with approx. 300 employees worldwide, headquartered in Brilon (Hochsauerland, Germany), and numerous subsidiaries worldwide (Italy, Finland, Brazil, USA, China, Dubai, Singapore, South Africa, Japan), four other companies operate under the REMBE® umbrella brand:

- REMBE® Research+Technology Center GmbH (https://rembe-rtc.de)
- Die REMBE® Advanced Services+Solutions GmbH (https://rembe-services.de)
- Die REMBE® Kersting GmbH (https://rembe-kersting.de)
- REMBE® FibreForce GmbH (https://.argusline.de)

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