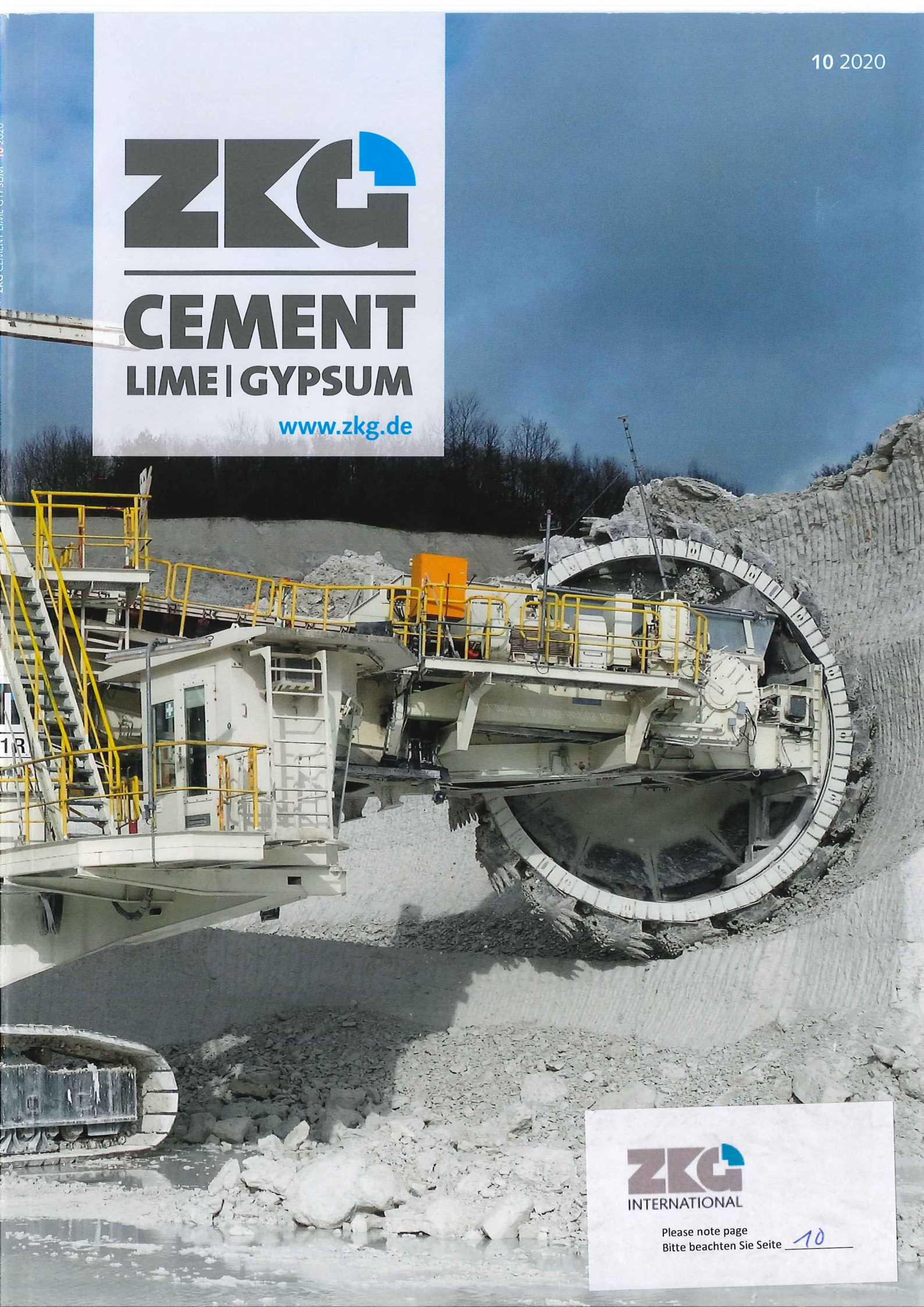


ZKG

CEMENT
LIME | GYPSUM

www.zkg.de



ZKG
INTERNATIONAL

Please note page
Bitte beachten Sie Seite

10

Clean, dry compressed air at the point of use



All Donaldson

1 Replacement of compressed air filter elements in the compressed air station of a cement plant. The SMF filter elements with the innovative filtration technology UltraPleat ensure high retention rates with minimum differential pressure

There are high demands on the processing of compressed air, which is required in large volume flows for cement production. In central compressed air stations, adsorption dryers and filters downstream of the compressors ensure that water, oil aerosols and solid particles do not get into the widely ramified compressed air network. Especially the compressed air lines, which are exposed to minus temperatures in the winter months, would freeze up if the compressed air is moist. The dryers must extract compressed air down to pressure dew points of up to -70°C residual moisture. High-performance filters (Figure 1) for volume flows of over $1000\text{ m}^3/\text{h}$ are installed downstream of the dryers.

The UltraPleat™ filter technology has a high dirt-holding capacity with low flow resistance and ensures the purity of the compressed air according to ISO 8573-1, which is required for a wide variety of tasks, e.g. as conveying air or as control air for valves and cylinders and for the “shock blowers”.

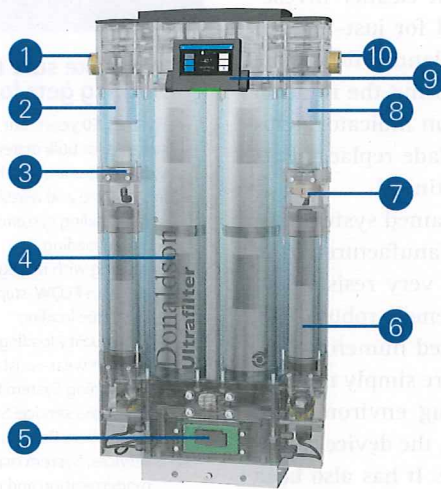
However, this central compressed air supply often does not reach all compressed air consumers in the widely spread plants or the compressed air quality is not sufficient for the special requirements. In order to provide absolutely pure dry compressed air at the point of use, e.g. in the test laboratories or for the supply of sensitive control units for coal dust dosing for kilns, Donaldson de-

veloped the Ultracac™ Smart compressed air purification system (Figures 2 and 3), in which all process steps are combined - from pre-filtration to drying to fine filtration and condensate removal. The compact stand-alone version can be used directly as a plug & work solution. The advantage: This means that the complex installation and piping of the individual components (pre and after-filters and separate adsorption dryer) and their control units is no longer necessary.

Compressed air purification with the autonomous Ultracac Smart system is carried out in three stages:

1. the integrated pre-filter retains solid particles and suspended matter as well as liquid aerosols (oil/water)
2. the adsorption dryer stage adsorbs the moisture in the compressed air up to a pressure dew point of -70°C , at 70% nominal load (standard -40°C)
3. in the last step, remaining solid particles up to $0.01\text{ }\mu\text{m}$ are retained in the integrated after-filter

This reliably ensures a compressed air quality according to ISO 8573-1:2010, which corresponds to quality classes 1-2:1-2:1-2 and 0, specified according to the application and better than class 1.



2 Design of the compressed air purification system: 1. dryer inlet, 2. integrated prefilter 3. condensate drain, 4. desiccant cartridge, 5. electronic control, 6. silencer 7. dew point transmitter (Superplus version), 8. integrated afterfilter 9. touch display, 10. dryer outlet

Sustainable energy saving and quiet: pressure dew point control and low differential pressure

During the development of the system, several requirements had to be met which are essential for direct use: Controlled and consistent quality of the compressed air in accordance with the specifications for the respective application, quiet and energy-efficient operation, easy maintenance and, finally, the possibility of integrating the control system into existing production lines. The continuous recording and control of the specified pressure dew point is of particular importance. The pressure dew point is fixed at -40°C as standard. This is important as the dew point temperature changes with changing pressure. The system version with integrated dew point transmitter, which measures directly in the compressed air flow, proves to be particularly energy-saving. Switching between the two cartridges - which are filled with a highly adsorptive stable desiccant - only takes place when the desiccant is absolutely saturated. This minimizes the compressed air requirement of this heatless regenerated adsorption dryer, which, in contrast to heat regenerated dryers, does not require any heating energy for



3 The Ultracac Smart series in its Standard, Plus and Superplus versions is designed for a wide range of applications. The compressed air is processed effectively and quietly in accordance with ISO 8573-1:2010

Table 1 Compressed air quality classes

Compressed air quality classes	Solid particles			Water	Oil (liquid and steam)
	Maximum particle count per m ³ [particle size, d in µm]			Pressure dew point	Concentration
	0.10 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0	[°C]	[mg/m ³]
0	Specified according to application and better than Class 1				
1	20000	400	10	≤ -70	≤ 0.01
2	400000	6000	100	≤ -40	≤ 0.1
3	n.a.	90000	1000	≤ -20	≤ 1
4	n.a.	n.a.		≤ +30	≤ 5
5	n.a.	n.a.		≤ +7	> 5

Compressed air quality classes according to ISO 8573-1:2010

n.a. = not specified

the regeneration process. The noise development during the change-over process could be reduced to the range of 60 dB(A) with a newly developed silencer. Ultracac Smart can therefore be used directly at the workplace without sound insulation or integrated into machines without increasing their noise level.

The UltraPleat energy-saving filters used in this compressed air purification system ensure optimum filtration performance at low differential pressure. When the compressed air enters, the pre-filter effectively separates or retains

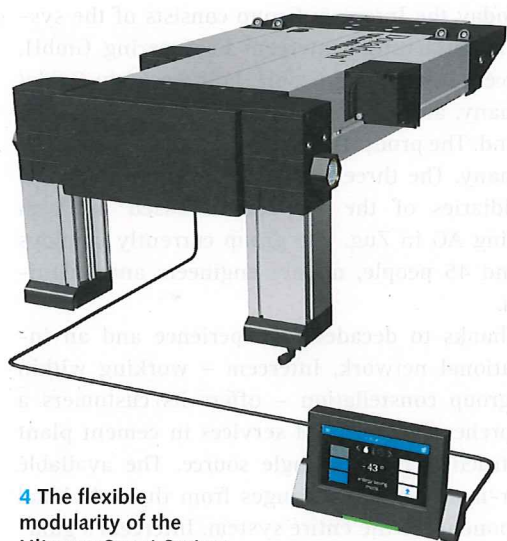
liquid and solid particles before the air flows into one of the two desiccant cartridges. The post-filter, which removes solid particles up to 0.01 µm, is the effective safety element to ensure that the dry compressed air is available in accordance with the purity specifications (Table 1).

For digital applications

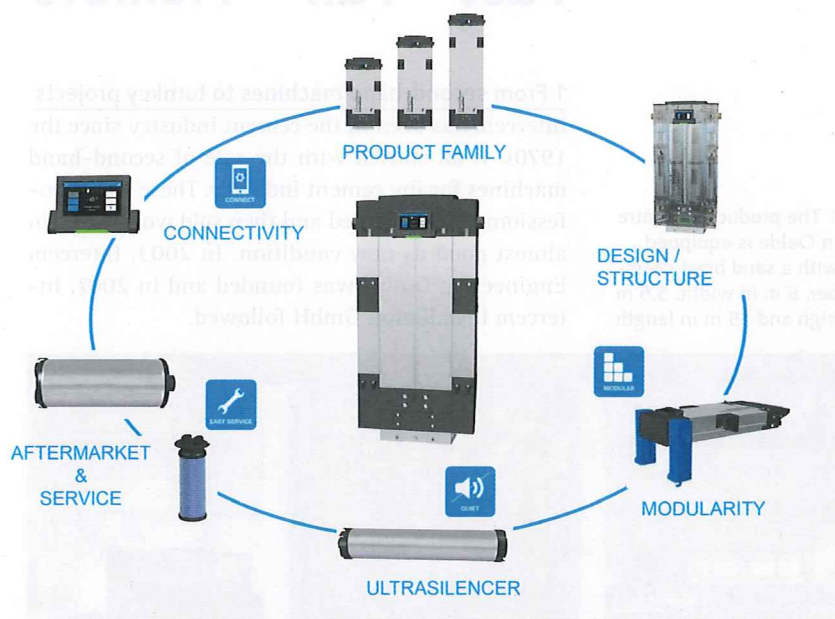
The greatest challenge in developing such a system was to make it compatible with existing plant technologies and processes for a wide range of applications while

maintaining the same performance - whether as a stand-alone solution or modular (Figure 4). This was achieved by the flexible design and compatible sensor and control technology. A removable display allows convenient monitoring even in tight spaces. For safe operation, it is crucial that a level of digitalization is achieved with this compressed air purification system that allows continuous monitoring of the functional sequences and predictive maintenance of the easily accessible components (Figure 5).

www.donaldson.com



4 The flexible modularity of the Ultracac Smart System allows for a variety of installation and mounting options



5 The Ultracac Smart compressed air purification system enables digital control and maintenance integration and adaptation to a wide range of installation and mounting conditions