

High-level compressed air purification at EKTAM

| Compressed Air | Filling Technology | Filtration | Liquid Aerosols | Ultrapac™ Smart |

An integrative solution for filling technology

Founded in 1977, EKTAM MAKINE SANAYI VE TIC. A.S. has developed into a leading manufacturer of turnkey filling plants in the Mediterranean. In the main plant of the company based in Izmir on the Aegean coast, equipments for the filling technology of carbonated and non-carbonated beverages, fruit juices and mineral waters are being developed and built. Customer-specific solutions that can flexibly adapt to the rapid change in market conditions and offer maximum productivity are characteristic of this system technology. This is also a challenge for the manu-



Fig. 1: Provision of compressed air of defined quality at the point of consumption in EKTAM filling lines with Ultrapac™ Smart. The use of the compact compressed air treatment system enables flexible integration into plant technology and reduces installation and maintenance costs.

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facturers of plant components. Donaldson, a leading manufacturer of filters for sensitive applications in the food and beverage industry, supplies compact heatless regenerated adsorption dryers providing high-purity process air as point-of-use dryers in EKTAM filling lines. Since September, the new Ultrapac™ Smart compressed air purification system has been in use (Fig. 1) - continuing the successful cooperation at a higher integrative technology level.

Special demands are placed on the components for the treatment of compressed air in the filling lines. A wide range of compressor technologies need to be considered. And not only the pressure level and the volume flows from the central compressed air stations are important factors, but also the climatic conditions have a great influence on the moisture content of the compressed air. It must be available in continuous operation as safe high-purity process air for the pneumatic controls and as energy for a variety of actuators. With the modular Ultrapac Smart system (Fig. 2), the compressed air is cleaned in three stages:

- The integrated pre-filter retains solid particles and suspended particles as well as liquid aerosols (oil/water).
- The adsorption dryer stage adsorbs the moisture in the compressed air up to a pressure dew point of - 70 °C /- 94 °F, at 70 % rated load (standard - 40 °C/- 40 °F).
- In the final step, remaining solid particles up to 0.01 microns are retained in the integrated afterfilter.

This three-stage purification system reliably ensures compressed air quality in accordance with ISO 8573-1:2010, which corresponds to the quality classes 1-2:1-2:1-2 and 0, specified according to application and better than Class 1. This is a crucial prerequisite for EKTAM, as the compressed air must be dry according to the application-specific requirements.

Stable pressure dew point

Donaldson tested the compliance of a wide variety of dryer designs with their brochure specifications over a longer

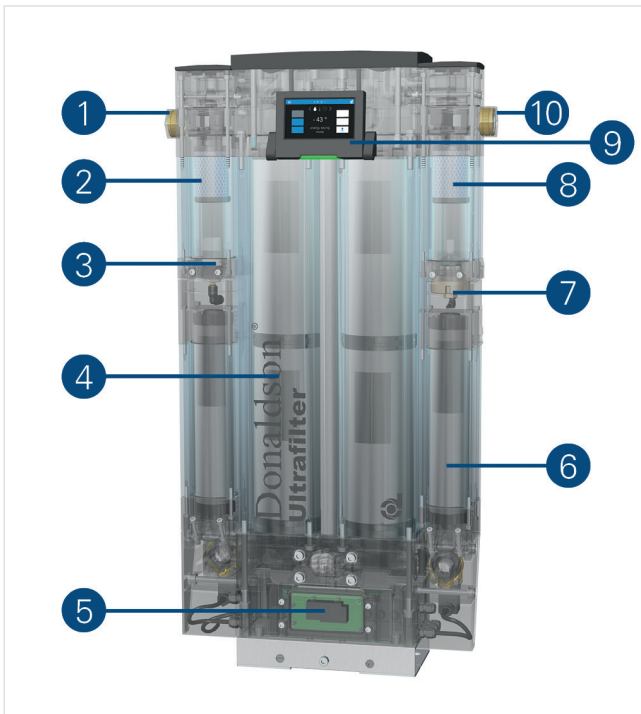


Fig. 2: Construction of the compressed air purification system Ultracac™ Smart: 1. Dryer inlet, 2. Integrated UltraPleat™ prefilter, 3. Condensate drain, 4. Desiccant cartridge, 5. Electronic control, 6. UltraSilencer, 7. Dew point transmitter (Superplus version), 8. Integrated UltraPleat™ afterfilter, 9. Touch display (Superplus version), 10. Dryer outlet
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period of time. Large deviations have been found. For the Superplus version of the Ultracac™ Smart system, the Ultraconomy dew point control was developed to achieve stable compliance with the specified pressure dew point during continuous operation. This is of particular importance as the dew point temperature changes with changing pressure.



Fig. 3: The desiccant cartridges can be replaced quickly and easily.
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The dryer cartridges (Fig. 3), filled with a highly adsorptive stable desiccant in a special process, are designed for long-life regeneration. The design with integrated dew point transmitter, measuring directly in the compressed air flow, proves to be particularly energy-saving. The switch between the two cartridges takes place only when the desiccant is saturated. The noise generated during the switching process could be reduced to the range of 60 dB(A) with the newly developed UltraSilencer.

High filtration performance at low differential pressure

The integrated UltraPleat™ energy-saving filters (Fig. 4) ensure optimum filtration performance at low differential pressure. When the compressed air enters, liquid and solid particles are effectively deposited or retained by the UltraPleat™ pre-filter before it flows into one of the two desiccant cartridges. The afterfilter, which removes solid particles up to 0.01 microns, is the effective securing element so that the dry compressed air is available according to the purity level specifications. The proportion of these



Fig. 4: UltraPleat™ energy-saving filter. 1. New filter media 2. Improved pleat (shape and structure) 3. Improved filter media coating 4. Outer stainless-steel support sleeve
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filters in the energy-efficient operation of the compressed air treatment system becomes clear when one considers how they work: The differential pressure generated by the filtering of compressed air is significantly influenced by the Ultracac™ filter medium. It consists of coated high-tech fibers, which are processed into a pleated filter medium with high separation efficiency of liquid particles and large absorption capacity for solid particles. The multi-layered structure has been designed in such a way that optimal conditions result from flow technology and at the same time a filter surface that is more than 400 % larger than wrapped filter media is available. For the separation of oil aerosols, an efficiency of ≥ 99.9 % according to ISO 12500-1:2007 is achieved. The filter performance data according to ISO 12500-1 and ISO 12500-3:2009 have

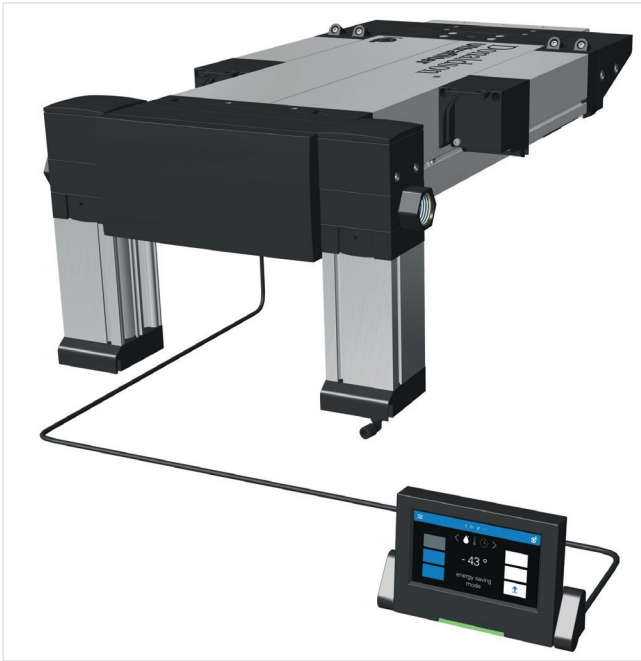


Fig. 5: The modular design allows a wide range of installations in machines and systems. For the Superplus version of the Ultrapac™ Smart system, the Ultraconomy dew point control was developed, with which a stable adherence to the predetermined pressure dew point is achieved in continuous operation.

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also been validated by an independent institute for energy and environmental research. The successful development of filtration technologies to increase energy efficiency and resource savings underlines the fact that this high filtration performance was achieved while reducing differential pressure by a further 50 %.

Conclusion: Providing high compressed air quality centrally for the entire compressed air network is usually not useful and contamination with aerosols cannot be ruled out in the often widely branched compressed air networks. Therefore, to ensure process and product integrity, especially in food and beverage production, it is not only necessary for economic reasons to use a processing stage directly at the place of consumption, as is exemplified in EKTAM plants. The new Ultrapac Smart compressed air purification system has been developed for these sensitive fields of application, in which the components for pre-filtration and drying and fine filtration are combined into one unit in order to constantly comply with defined compressed air classes at the point of consumption. This makes a compact stand-alone version available as a “plug & work” solution. The modular design also allows for a wide range of installation and installation possibilities in machines and systems (Fig. 5) and offers the prerequisites for digital control and maintenance integration and adaptation to the diverse installation and installation conditions in filling technology.



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