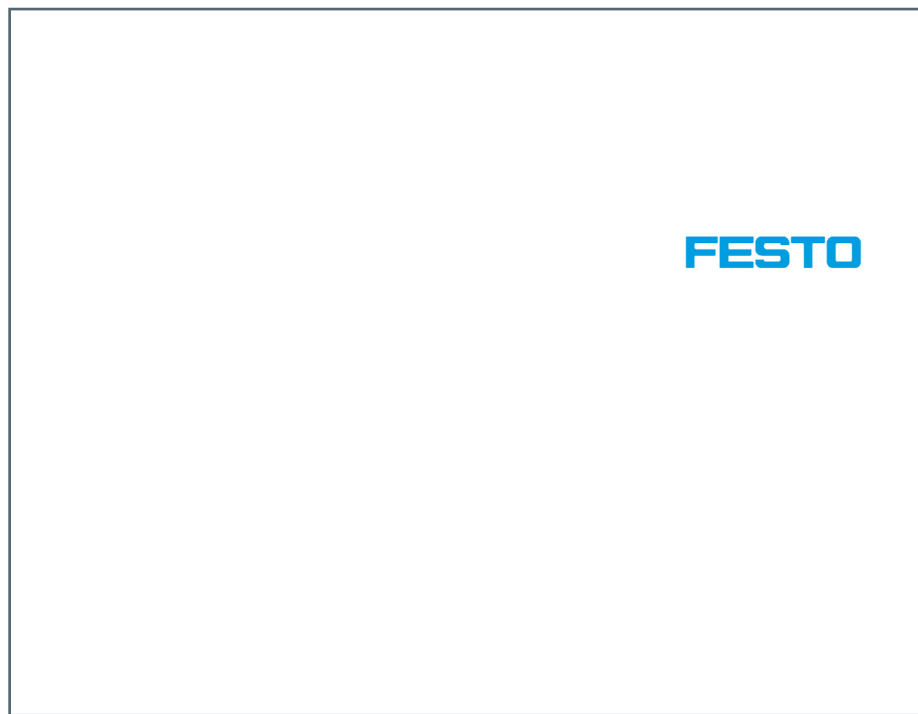


Compressed air quality in the food and beverage industry

FESTO

excerpt from:



Expert knowledge and solutions
for the food and beverage industry



Compressed air quality in the food and beverage industry



Care has to be taken wherever compressed air comes into contact with food because compressed air is not clean by nature. On the contrary, solids and particles in various concentrations are present almost everywhere in the form of dust. Water, in the form of natural humidity, is released in large quantities when the compressed air cools down. And thus compressed air quality in accordance with the requirements of the application provides the best possible safety for food, consumers and food producers.

→ Note

For more on this, see our Service → "Chapter Energy Saving Services" > "Compressed air quality analysis", page 89

Standards-compliant compressed air preparation

Extremely strict demands are made of the compressed air quality in the food and beverage industry. Adherence to them is important in order to ensure the best possible food safety, and thus reduce the risks for consumers as well.

International standards are helpful in this respect. ISO 8573-1:2010, for example, represents the key quality requirements for compressed air and specifies the maximum amount of contaminants and particle sizes that can be present in each class. At the same time, clear-cut and transparent standards provide us with the opportunity of penetrating global markets.

To make sure that compressed air preparation for automation solutions complies with the standard and is energy efficient, various parameters need to be observed, such as the quality classes for

- solid particles,
- water content and
- total oil content.

A definition of these parameters is included in ISO 8573-1:2010.

Compressed air quality classes to ISO 8573-1:2010

ISO 8573-1:2010	Solid particles			Mass concentration mg/m ³	Water		Oil
	Max. number of particles per m ³				Pressure dew point	Liquid	Total oil content (liquid, aerosol and vapour)
	0.1 ... 0.5 µm	0.5 ... 1 µm	1 ... 5 µm		°C	g/m ³	mg/m ³
0	In accordance with specifications by the device user, stricter requirements than Class 1						
1	≤ 20,000	≤ 400	≤ 10	–	≤ –70	–	0.01
2	≤ 400,000	≤ 6,000	≤ 100	–	≤ –40	–	0.1
3	–	≤ 90,000	≤ 1,000	–	≤ –20	–	1
4	–	–	≤ 10,000	–	≤ +3	–	5
5	–	–	≤ 100,000	–	≤ +7	–	–
6	–	–	–	≤ 5	≤ +10	–	–
7	–	–	–	5 ... 10	–	≤ 0.5	–
8	–	–	–	–	–	0.5 ... 5	–
9	–	–	–	–	–	5 ... 10	–
X	–	–	–	> 10	–	>10	>10

Compressed air quality in the food and beverage industry

Success factors for correct compressed air preparation

Different compressed air qualities are required at different points within the production system. This necessitates a carefully thought-out concept for the efficient use of compressed air preparation, which should take the special requirements for the production of each type of food into consideration. A combination of centralised, basic compressed air preparation and decentralised auxiliary preparation is advisable.

→ Compressed air as pilot air

In most cases, compressed air is used as pilot air, for example in order to control valves, cylinders and grippers. For this type of application, contamination only needs to be removed from the compressed air in order to protect the pneumatic components against corrosion and excessive wear. Class 7:4:4 is recommended in this case, which can be achieved by means of a central refrigeration dryer with oil separator and a coarse particle filter (40 µm).

→ Compressed air comes into direct contact with dry foods (e.g. cereal, milk powder)

The compressed air is used for transporting and mixing, as well as for food production in general. It comes into direct contact with the food. Because these foods are dry, even stricter requirements apply with regard to air humidity.

The following compressed air quality classifications in accordance with ISO 8573-1:2010 apply in this case:

- Solid particles: Class 1
- Water: Class 2
- Oil: Class 1



Filter cascade for compliance with class 1:2:1



EXAMPLE:

Adsorption dryer PDAD for targeted, decentralised compressed air drying

→ Compressed air as process air

Significantly higher levels of purity are required when compressed air is used as process air, e.g. for blowing out moulds, or when it comes directly into contact with food. However, this is usually limited to specific locations. Decentralised compressed air preparation, as close as possible to the consuming device, is advisable in this case. Therefore only the required amount of air is prepared to the higher purity level, thus resulting in energy savings. Close proximity of compressed air preparation to the consuming device also minimises the danger of recontamination of highly purified air in the piping network, for instance with rust particles.

Filter cascades for typical applications

The sole purpose of ISO 8573-1:2010 is to define quality classes. It makes no recommendations about the degree of compressed air purity that should be specified in the food industry. Guidelines and recommendations issued by, for example, the VDMA and the BCAS offer assistance in specifying suitable filter cascades.

→ Compressed air comes into direct contact with non-dry food (e.g. drinks, meat, vegetables)

The compressed air is used for transporting and mixing, as well as for food production in general. It comes into direct contact with the food.

The following compressed air quality classification in accordance with ISO 8573-1:2010 applies:

- Solid particles: Class 1
- Water: Class 4
- Oil: Class 1



Filter cascade for compliance with class 1:4:1



EXAMPLE:

Service unit combination MS6 from Festo for compliance with class 1:4:1

→ Important note

In special cases, it is advisable to use a sterile filter, if possible in direct proximity to the consuming device.

→ Tip

In packaging machines

The compressed air comes into direct contact with the materials in which the food will be packaged. This makes the packaging material part of the food zone.