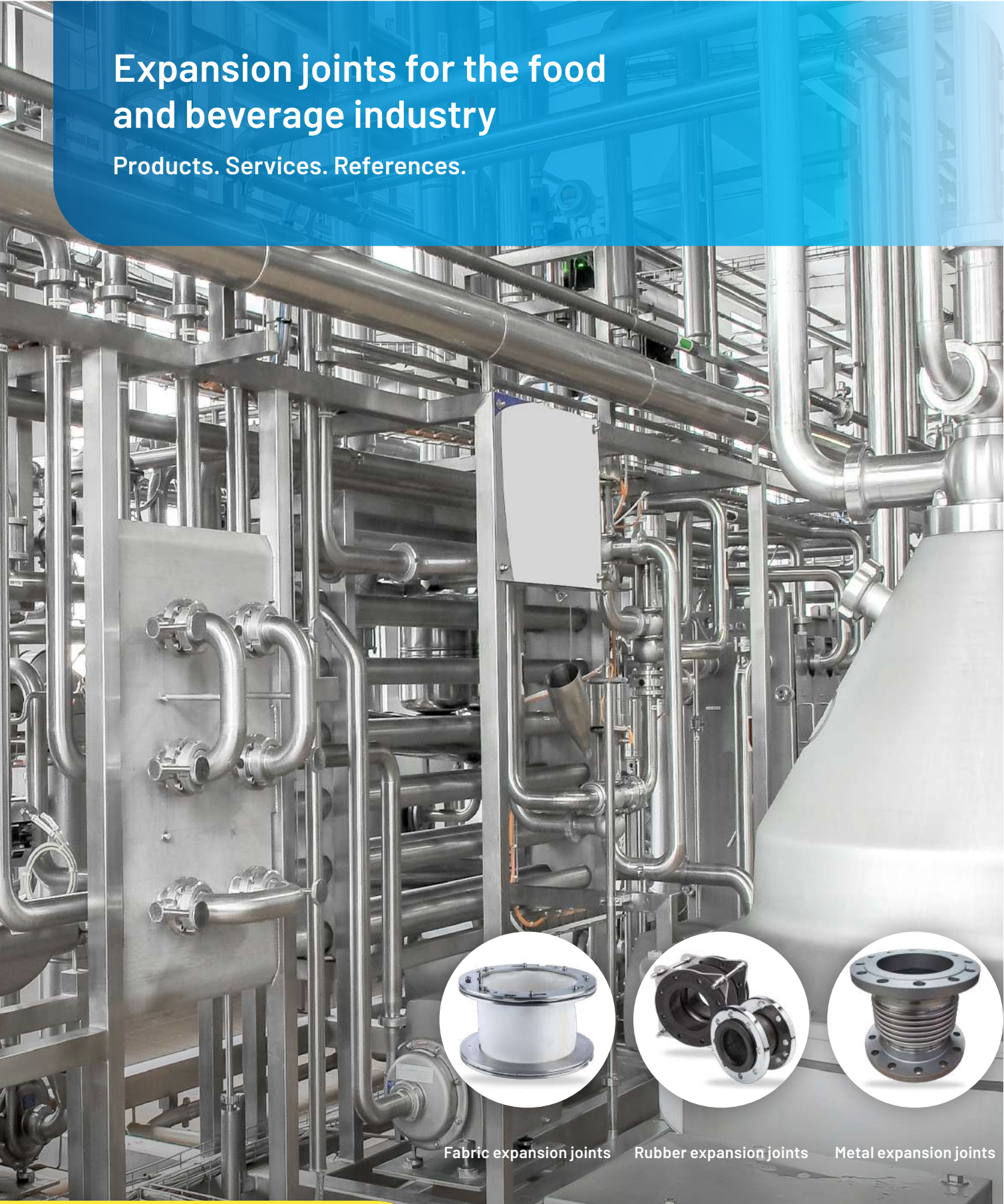


RELY ON EXCELLENCE

## Expansion joints for the food and beverage industry

Products. Services. References.



Fabric expansion joints



Rubber expansion joints



Metal expansion joints

# Value engineering built on global experience

Overcoming more than 50 years of changing challenges in the expansion joint industry proves that EagleBurgmann is one of the world's most experienced and innovative expansion joint manufacturers.

Experience is sourced from all continents and various market sectors to provide our customers with the latest technologies and solutions.

Expansion joints from EagleBurgmann are flexible connections installed in piping and ducting systems to accommodate expansion and vibration caused by changes in temperature, pressure and media composition.

## EagleBurgmann major areas of focus:

- Value engineering to decrease operational downtime
- Lean manufacturing to reduce costs
- 3D smart design to maximize overall service life

## EagleBurgmann comprehensive service:

- Evaluations and troubleshooting
- Initial dimensional measurements
- Installation and refurbishment
- Supervision and training
- Plant surveys
- Emergency services
- Final inspection by experienced Service Engineers

## EagleBurgmann is approved according to:

- PED 2014/68/EC
- ISO 3834-2
- ISO 9001
- ISO 14001
- OHSAS 18001
- Other approvals are available upon customer request

## EagleBurgmann is a respected member of:

- The European Sealing Association (ESA)
- Expansion Joint Manufacturers Association (EJMA)
- Euro-Qualiflex

EagleBurgmann is proud of the appreciation given from hundreds of customers around the world.



Customer care





## Support function



Design  
Engineering  
R&D



Technical  
sales support



Services

## Production and service units

### Fabric expansion joints

- Bekasi, Indonesia
- Broken Arrow, USA
- Campinas, Brazil
- Chennai, India
- Congleton, UK
- Cuautitlan, Mexico
- Johannesburg, South Africa
- Singapore, Singapore
- Tuzla, Turkey

### Rubber expansion joints

- Congleton, UK
- Johannesburg, South Africa
- Madrid, Spain
- Singapore, Singapore

### Metal expansion joints

- Congleton, UK
- Johannesburg, South Africa
- Ringkøbing, Denmark
- Singapore, Singapore

## Competence in food and beverage processing

The provision, conveying and processing of raw materials and active ingredients in production lines requires the highest hygiene and safety standards. The food and beverage industry is strongly regulated and has high standards for suppliers of fabric, metal and rubber based products.

The product portfolio of EagleBurgmann is approved for the food and beverage industry. It covers single as well as multi-layered designs and includes expansion joints, which are typically used in all process plants within the food and beverage industry, for example in milk powder plants.





### Rules and regulations

In the food and beverage industry, different media, e.g. raw foods are processed. This requires compliance with high levels of hygiene and safety regulations. National as well as regional authorities control regulations on Food Contact Materials (FCM) and require all materials and articles, which come into contact with foods, to comply with specific and strict rules. These rules cover direct and indirect food contact, Good Manufacturing Practice (GMP), traceability as well as declaration of compliance for plastic and rubber materials.



### Requirements for expansion joints

Expansion joints installed in food and beverage process systems must be resistant to temperatures up to approximately 300 °C, vibration and chemicals. Other requirements concerning the properties of expansion joints are for example:

- Limiting migration from and to the material
- Smooth joining to avoid accumulation of media
- Minimizing creases in the design to avoid accumulation of media
- Using leakproof materials and solutions
- Resistant to cleaning agents



### Areas of application

EagleBurgmann provides a full range of expansion joints which are approved for the food and beverage industry according to various standards. Our expansion joint solutions cover a wide range of industries:

- Dairy, ingredients, oils & fats
- Starch & sweeteners
- Bakery & confectionery
- Sugar
- Beverage
- And many others like chemical, pharmaceutical, biotech, cosmetics

## Plug & Run

Plug & Run represents the next generation of fabric expansion joints including reduced downtime, easy installation and hygienic-friendly design. The new fastening mechanism no longer requires loosening and tightening of fasteners. Instead, installing and uninstalling of these expansions joints is performed in less than a minute: simply plug, twist and run.



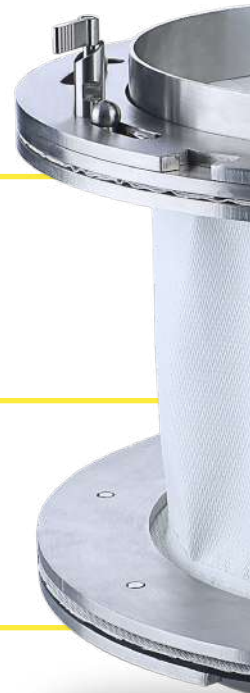
Fabric expansion joint (FEJ) with quick lock system



Next generation of patented flange design



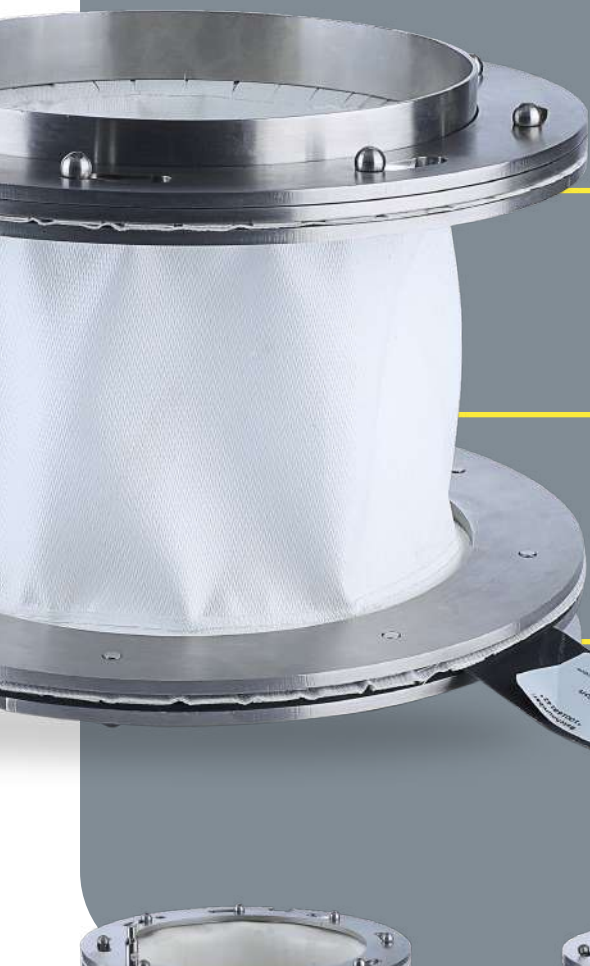
Available in hygienic-friendly design



Get more



Product features	Plug & Run KE-flex Food HS1	Plug & Run KE-flex Nitrile 235
Color	translucent	black
Operating temperature	-35 ... 260 °C	-30 ... 110 °C
Pressure	-0.05 ... 0.05 bar	0.05 ... 0.05 bar
Acid resistance	very good	average
Base resistance	very good	good
Oil resistance	very good	very good
Wear resistance	very good	good
Resistance to vibration	very good	good
Gas tight resistance	very good	very good
Approvals	EC 1935/2004; EC 10/2011; FDA	EC 1935/2004; FDA CFR 21; BfR
Applications	food processing, dairy, pet food, oil & fats, starch and sweeteners, bakery, confectionery, beverage, ...	pharmaceutical, drug processing, biotech, hygiene, cosmetics



Efficient



- Extra fast
- Easy to install and uninstall
- Reduction of downtime
- Suitable for standardization

High-quality design



- Approved plastic and rubber materials
- Leak-proof design up to 2 bar (explosion tested)
- Hygienic-friendly design with minimized creases and no crevices
- Resistant to cleaning fluids

Suitable applications



- In which FEJ are changed permanently from one connection to another
- In places where fast FEJ exchange is needed at any time
- As plant standard for higher efficiency



**Plug & Run  
KE-flex Nitrile 300**

white  
-30 ... 110 °C  
-0.05 ... 0.05 bar

**Plug & Run  
KE-flex PUR 500/1000**

transparent  
-30 ... 70 °C  
-0.05 ... 0.05 bar

**Plug & Run  
KE-flex SKE**

white  
-35 ... 200 °C  
-0.2 ... 0.2 bar

average  
good  
very good  
good  
good  
very good

average  
poor  
very good  
very good  
very good  
very good

average  
good  
good  
very good  
good  
optional

EC 1935/2004; FDA CFR 21

EC 1935/2004; EC 10/2011; FDA CFR 21

EC 1935/2004; FDA CFR 21

pharmaceutical, drug processing, biotech, hygiene, cosmetics

chemical industry, basic chemical, fine chemical, paints and lacquers, fertilizer, industries with higher requirements

chemical industry, basic chemical, fine chemical, paints and lacquers, fertilizer, industries with higher requirements

# Expansion joints for the food and beverage industry

When installed in applications for the food and beverage industry, expansion joints come into contact with the process media. In this context, the term food contact materials (FCM) is often applied to describe all materials and articles with which the media come into contact throughout their production, processing and storage. The EagleBurgmann product portfolio covers a wide range of FCM expansion joints designed for different applications within the food and beverage industry.

## Fabric expansion joints



Product features	KE-flex Nitrile 235/600	Vibroflex Nitrile 235
Color	black	black
Operating temperature	110 °C	110 °C
Pressure	-0.05 ... 0.05 bar	up to 6 bar
Acid resistance	average	average
Base resistance	good	good
Oil resistance	very good	good
Wear resistance	good	good
Resistance to vibration	good	good
Gas tight resistance	yes	yes
Approvals	EC 1935/2004; FDA CFR 21; BfR	EC 1935/2004; FDA CFR 21; BfR
Applications	equipment with large vibrations/fluctuations, ventilation, aqueous food contact, process plants	all powder media with risk of explosion pressure over 0.5 bar, e.g. milk powder and flour, aqueous food contact

The single layer expansion joint is a homogeneous product which, thanks to the nature of the material, design and manufacturing method, eliminates "pockets" in the products. This minimizes the risk of bacteria build-up in areas not directly accessible for cleaning.

The KE-flex Nitrile 235/600 expansion joint is highly flexible while resistant to abrasive media, e.g. powder and large fluctuations which may occur during start/stop.

The sturdy Vibroflex expansion joint is a very flexible, pressure resistant solution that is designed to withstand an explosion pressure of up to 6 bar.

The Vibroflex Nitrile 235 is used in applications in which fine powders are transported and friction may cause minor explosions.





KE-flex PUR	KE-flex SKE 700	KE-flex HS foil
transparent	white	translucent
70 °C	200 °C	260 °C
-0.05 ... 0.05 bar		
average	average	good
poor	good	good
very good	good	good
very good	good	good
very good	good	average
yes	yes	yes
EC 1935/2004; EC 10/2011; FDA CFR 21	EC 1935/2004; FDA CFR 21	EC 1935/2004; EC 10/2011; FDA
loading cells on loading equipment, pipes and ducts with the requirement that the media must be seen	exposure to UV, exposure to salt mist, ventilation, high temperature, high pressure powder processing	food processing at high temperature, food processing during which CIP cleaning is used

KE-flex PUR is a homogeneous product which, thanks to the nature of the material, design and manufacturing method, eliminates "pockets" in the products. This minimizes the risk of bacteria build-up in areas not directly accessible for cleaning.

The transparent material makes this expansion joint ideal for installation in applications which require that the material can be seen during operation.

KE-flex SKE 700 is a fabric reinforced material for high temperature applications which require the product to be white.

SKE 700 expansion joints are tested for UV resistance according to DIN EN ISO 4892-3 and salt mist resistance severity level 3 according to DIN EN 60068-2-52.

The KE-flex HS foil expansion joint is manufactured in a translucent material which enables operators to observe the passing media. It is resistant to high temperatures as well as acidic and basic media.

The non-stick properties make the expansion joint ideal for oleaginous media. In addition, it is resistant to CIP.

## Fabric expansion joints



Product features	Baffles	Fluachem HD food
Color	transparent	black-red
Operating temperature	110 °C	260 °C
Acid resistance	very good	very good
Base resistance	very good	very good
Oil resistance	very good	very good
Wear resistance	very good	good
Resistance to vibration	very good	average
Gas tight resistance	yes	yes
Approvals	EC 1935/2004; EC 10/2011; FDA	EC 1935/2004; FDA; BfR
Applications	cooling towers, where water droplets are expected to come into contact after vapour condensates, acoustic booths	food processing at high temperature, pressure thrust, aggressive CIP

The primary function of Baffles is to reduce noise where wet cleaning occurs, e.g. in cooling towers and acoustic booths.

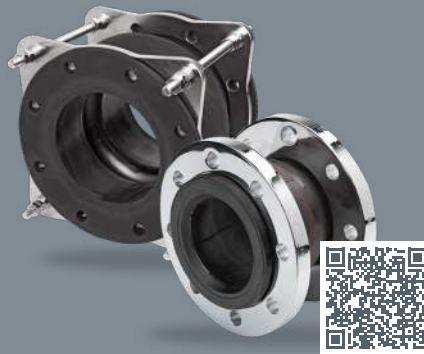
They consist of insulating pillows covered by HS foil to protect the insulation in wet environments, making them water resistant.

The Fluachem HD food expansion joint is a homogeneous reinforced PTFE product with a non-stick media side. The nature of the material, design and manufacturing method eliminates "pockets" in the products. This minimizes the risk of bacteria build-up in areas not directly accessible for cleaning.

The reinforcement ensures that the expansion joint can withstand pressure thrust from accumulation of the media, while its materials make it resistant to aggressive CIP.



## Rubber expansion joints



## Metal expansion joints



### KE-flex Nitrile 300

white

110 °C

average

good

very good

good

good

yes

EC 1935/2004; FDA CFR 21

equipment with large vibrations/fluctuations, ventilation, aqueous food contact, applications which require white material

In principle, the KE-flex Nitrile 300 expansion joint has the same characteristics as the KE-flex Nitrile 235 and 600 expansion joints. The main difference is that the Nitrile 300 is manufactured in white nitrile, which is a requirement in some food processing plants.

### Rubber expansion joints

- Material: NBR, FPM, silicon, EPDM, hypalon, neoprene
- Max. operating temperature\*: 180 °C
- Pressure\*\*: up to 10 bar
- DN: 25–4,000 mm
- Installation length upon request
- Oil resistance: very good
- Flange norms DIN, ANSI, EN, AWWA, BS, JIS, Special

\* Depends on DN, installation length, temperature and/or material selection.  
\*\* Higher pressure upon request.

WRAS; FDA CFR 21

foodstuffs, drinking water

Rubber expansion joints for high pressure applications are designed in accordance with Fluid Sealing Association guidelines and Pressure Equipment Directive PED 2014/68/EU. They can be built in various configurations (single or multiple-arch rubber bellows, with full faced rubber flanges or swivel metal flanges).

Flanges are supplied in one piece or split in sectors and in materials such as carbon steel (1.0038/S235JRG2, 1.0570/S355J2G3) or stainless steel (AISI 304L, AISI 316L). Other materials are available upon request.

### AX type metal expansion joint

- Typical materials: 304 (1.4301); 316 (1.4401); 304L (1.4306); 316L (1.4435)
- Max. design temperature\*: 550 °C
- Pressure\*: 100 barg
- DN\*: 25–5,000 mm
- Movements: axial, lateral, angular
- Design codes: EJMA, EN14917(PED), EN13445, EN13480
- Connections: Standard or custom flanges or weld end

\* Depending on combination of temperature, pressure and size.

EJMA; PED 2014/68/EU acc. to EN 13480; EN 13445; EN 14917; AD2000 and ASME B31.3

steam lines, heat exchangers, boilers, heat chambers and etc.

AX type metal expansion joints cover the mid temperature and pressure range for general process equipment and are designed to accommodate axial movements. The material of the bellows is typically 254 SMO or SS 321.

# Regulations in the food and beverage industry

The food and beverage industry is regulated by several authorities depending on the geographical market. There are several regulations in place for Food Contact Materials (FCM) depending on which materials and articles come into direct and indirect contact with the processed media.



## EC 1935/2004

Regulation EC 1935/2004 provides a set of common rules with regard to the safety and inertness of materials or articles that come into contact with food, either directly or indirectly. These materials and articles are referred to as Food Contact Materials (FCM). The framework is issued by the European Parliament and is valid for products sold within the 28 EU member countries, Iceland, Liechtenstein and Norway.

EC 1935/2004 regulates several types of Food Contact Materials and articles, including rubbers. With regard to manufacturing and supplying expansion joints made from rubbers, the following articles are important for the compliance with EC 1935/2004.

### Water Regulations Advisory Scheme

The intention behind the Water Regulations Advisory Scheme (WRAS) is to prevent contamination of public water supplies. In order to demonstrate that a product complies with the Water Supply (Water Fittings) Regulations and Byelaws in Scotland, WRAS provides an approval scheme as well as processes and guidance. Products are considered suitable if they pass appropriate material and mechanical regulatory performance tests, which include checking that products won't affect the taste or smell of drinking water and do not promote the growth of microorganisms.

### Traceability

According to Articles 2 and 17 of EC 1935/2004, traceability must be applied. This means, it must be possible to trace or follow a material or an article throughout all stages of manufacturing, processing and distribution.

### Good Manufacturing Practice

Good Manufacturing Practice (GMP) describes a set of rules issued by the US Food and Drug Administration (FDA). In Europe, Article 3 of EN 2023/2006 must be applied with regard to Good Manufacturing Practice. These regulations stipulate that materials shall be manufactured in compliance with GMP so that under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities that could: (1) endanger human health, (2) bring about unacceptable change in the composition of the food or (3) bring about a deterioration in the organoleptic characteristics hereof.

### Declaration of compliance

Article 16 of EC 1935/2004 states that a written declaration of compliance must be issued for all materials covered by this regulation. It must declare that all materials comply with rules applicable for them. Appropriate documentation shall be available to demonstrate compliance.



## Food and Drug Administration (FDA)

Regulations for the US market are issued by the US authority responsible for food and drugs, the Food and Drug Administration (FDA). However, these regulations are also widely used outside the US. CFR Title 21, Subchapter B regulates direct and indirect Food Contact Materials.

### Direct food contact

CFR Title 21, Chapter 1, Subchapter B, Part 172.5 sets out general provisions for direct food contact and stipulates that GMP must be applied (1). This means, the quantity of the substance added to the food must not exceed the reasonable amount required to accomplish the intended physical, nutritive or other technical effect in the food. (2) Any substance intended for use in or on food has an appropriate food grade and is prepared and handled as a food ingredient.

### Indirect food additives - polymers

CFR Title 21, Chapter 1, Subchapter B, Part 177.1550 regulates which Perfluorocarbon/polymer components may come into contact with food surfaces (single or repeated) under which conditions.

### Rubber articles intended for repeated use

CFR Title 21, Subchapter B, Part 177.2600 describes circumstances under which rubber articles intended for repeated use may be safely applied in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting or holding food.

## BfR

The German federal institute for risk evaluation (Bundesinstitut für Risikobewertung - BfR) issues recommendations on the health assessment of FCM. These recommendations are not legal norms. They are much rather a representation of the current state of the scientific and technical knowledge regarding the conditions under which consumer goods made of high polymer substances such as plastics, silicones as well as natural and synthetic rubbers meet the requirements of EC 1935/2004, Article 3. BfR recommendations are mainly applied in the European region and in areas that are not harmonized on an EU level.

## (EU) EN 10/2011

This regulation is under the frame of EC 1935/2004 and contains specific regulations for plastic materials and articles intended to come into contact with food. It includes a positive list of chemicals which are allowed to be used in the production of these materials and articles and which are covered by EN 10/2011. According to Article 9, plastic layers in plastic materials and articles shall be subject to restrictions with regard to (a) specific migration limits, (b) overall migration limits, and (c) restrictions and specifications defined in the regulation.

## EagleBurgmann

The portfolio of EagleBurgmann includes food and beverage grade products compliant with EC 1935/2004, FDA regulations as well as BfR recommendations. These provisions and recommendations are implemented in our processes:

- Traceability in materials
- Traceability in production
- Separate clean room
- Test for NIAS by third party\*
- Risk assessment by third party\*\*
- Migration testing by third party\*\*
- UV resistance testing according to EN ISO 4892-3
- Salt mist testing, severity level 3 according to DIN EN 60068-2-52

\*Freudenberg New Technologies SE & Co. KG  
\*\*Eurofins Product Testing A/S

**Test report**  
F001 - Freudenberg, Deutschland  
03/06/2016  
Page: 1 of 2

**Freudenberg**  
INNOVATING TOGETHER

**Material:**  
The surface of a 100 cm<sup>2</sup> PUR sample was covered with clean Teflon powder.  
The migration test was carried out in accordance with EN 12172 for 24 hours.  
The migrated parts of the PUR sample were determined by HPLC-MS/MS of the Teflon powder.  
To get semi-quantitative results of the migration parts, the GC/MS was calibrated with BfR indicators of the migrated parts by HPLC-MS/MS.

**Results:**

substance	mg/100 cm <sup>2</sup> (BfR equivalent)	mg/kg (BfR equivalent)
Tetrahydrofuran	0.0048	0.34
Cyclohexane	0.014	0.99
Xylen (sum of isomers)	0.0019	0.13
n-Butanol	0.0018	0.13
n-Hexanol	0.0018	0.13

**eurofins**

**Risk Assessment**

**Sample information:**

description	test requirements or reference test results
Sample name	Sample name: PUR
Lot no.	Lot no.: 2016-00000001
Reference	Reference: 2102 / 1500
Test date	Test date: 2016-06-15

**Results:**  
Please see below for detailed results.



# Experience that counts!

## Customized solutions for food and beverage applications

Throughout the years, EagleBurgmann has been a preferred supplier with regard to developing new solutions and solving problems in design and material selection. Together with our customers, we pinpoint their challenges to find the right expansion joint as well as the right design for their unique equipment. These challenges are usually concerned with avoiding contamination caused by the expansion joint and eliminating all possibilities of accumulation of media or cleaning agents.

### Sanitary sealing solution for dampers

**Challenge:** a long-time OEM customer needed a sealing solution for the damper as the current solution left a potential risk of contaminating the media when opening, closing and cleaning the damper house. When the damper is in closed position, pressure is applied around the damper house ensuring sealing.

A vacuum keeps the expansion joint from interfering with the spade when opening the damper. The spade shaft penetrates the expansion joint through rubber bushings.

**Solution:** several options were discussed together with the customer. After testing prototypes (up to 7 bar), a V-flange expansion joint made from reinforced Nitrile, which would act as a gasket, was selected.



### Reference KE-flex

Product: KE-flex, LP Nitrile

Application: installed between cyclones

Plant: milk powder production

Location: Denmark



### Reference KE-flex

Product: KE-flex, type SKE 700

Application: fan

Plant: milk powder production

Location: Denmark





#### **Reference KE-flex**

Product: KE-flex, PUR(3)  
Diameter: DN 454 mm  
Size: 200 mm  
Application: silo  
Plant: milk powder production  
Location: Denmark



#### **Reference REJ**

Product: Rubber expansion joint  
Bellows: EPDM DW  
Diameters: DN 300 ... DN 1200  
Application: pumps  
Plant: desalination plant  
Location: Saudi Arabia



#### **Reference MEJ**

Product: Metal expansion joint type AXIS  
Bellows: 1.4571 (AISI 316Ti)  
Pressure: 12 barg  
Temperature: 170 °C  
Application: steam line  
Plant: tomato paste production, steam line  
Location: Italy



#### **Successful pilot installation FEJ**

Product: Fabric expansion joint  
Application: vibration feeder for loading whey in a buffer tank  
Challenge: time consuming dismantling and installation of FEJ  
Solution: exchange of FEJ with new Plug & Run quick lock system in 40 s  
Diameter: DN 350  
Plant: milk-processing plant  
Location: Germany

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of systems and components from  
EagleBurgmann

[www.eagleburgmann.com](http://www.eagleburgmann.com)



## EagleBurgmann – at the leading edge of industrial sealing technology

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, power, water and many more. About 6,000 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need. [Rely on excellence.](#)

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