



**Significance of the proposed PFAS-regulation for the refrigeration industry**

**Members of the German Refrigeration Research Association, FKT, evaluate the consequences of the PFAS regulation under REACH**

The German Refrigeration Research Association (FKT) promotes technical and scientific research related to refrigeration and heat pumps and has focused for many years on research and development of material use, production processes and energy efficiency to meet the environmental and sustainable requirements for product developments and entire system design.

Following the publication of their chemical strategy for sustainability, the EU commission has announced plans to regulate per- and polyfluorinated alkyl substances (PFAS) due to the potential for them to harm human beings and the environment. FKT supports the goal to protect human beings and the environment against the risks associated with the unrestricted use of chemicals. However, a general prohibition of the entire PFAS group of materials would have considerable consequences for the manufacturing industry and hence also on the refrigeration and heat pump industry. The possible impact of the proposed regulation of PFAS materials is currently being investigated by FKT members in detail.

During the members meeting on 29th March 2023 all FKT members stated that they are affected by the proposed regulation since PFAS materials are used in their products and applications. A survey conducted throughout FKT members showed that the impact is related to four main sectors:

1. Construction and coatings of parts used for components which ensure safe and energy efficient function as well as reduction of material consumption and wear.
2. Gasket materials and sealing systems of many types which provide safe operation and allow easy exchange and repair of parts, thus preventing the release of harmful substances that can leak from the system and pollute the environment.
3. Electrotechnical and electronic components (i.e. motors, sensors, switches, cables) needed for drives and controls of components and systems.
4. Refrigerants that represent the best possible choice for refrigeration and heat pumps systems in particular applications under given circumstances, taking into account the material consumption, energy efficiency, system safety and ecological effect.

## **1. Construction and coatings of parts used for refrigerant and heat pump components**

Parts and coatings of components used in refrigeration and heat pump systems use substances containing polytetrafluoroethylene (PTFE) to meet the high specifications regarding wear, chemical and temperature resistance, dimensional stability at low temperatures and varying pressures and temperatures, as well as low gas permeability and electrical conductivity.

In particular, bearings, washers and shaft seals made from PTFE materials ensure that components are sealed to prevent leakage of refrigerants including HFCs, carbon dioxide and ammonia.

At the same time the low friction property of coated surfaces enables operation with reduced energy consumption. The good wear resistance of PFAS materials ensures the necessary functionality of components, including their longevity and reduces significantly the effort/cost of maintenance and repairs.

## **2. Gaskets and sealing systems**

O-Rings, packed glands, flat gaskets and other sealing systems made for example from PTFE- and FKM-based material combinations or other fluoroelastomers enable the correct operation of isolating and regulating valves at various locations within a refrigeration system.

The refrigeration and heat pump industry require the valves to be tight-sealing in order to meet safety requirements and reduce ecological damage (by reducing leakage of refrigerants to the environment) and make sure certain sections of the refrigeration systems can be isolated safely when needed.

Many of the materials used before 1950 have unacceptably high leakage rates or are no longer permitted because they do not meet modern safety standards (i.e. lead, asbestos).

Alternatives to PFAS-containing materials that are capable of meeting the very high performance requirements now required are not available at present. Research to find suitable alternatives and the rigorous laboratory and field testing required to prove their suitability for practical use in refrigeration will take many years.

## **3. Electrotechnical and electrical components**

Many refrigeration components, particularly refrigerant compressors, refrigerant pumps and regulating valves, require motors to drive them. Modern motor windings are often protected with fluorine-containing coatings.

Sensors, electrical components and controls are installed throughout refrigeration and heat pumps systems. Their function and durability rely on PFAS-containing materials that make energy efficient operation possible.

## **4. Refrigerants**

Fluorinated refrigerants and other gases that cause negative consequences for the environment when released unintentionally are already regulated under the EU-F-gas directive (EG517/2014).

The directive seeks to prevent the emission of F-gases by mandating leak tightness testing, documentation, refrigerant recovery and training and certification of personnel.

The negotiations for the revision of this directive are being concluded at the moment and will cover further extensions of these measures for substances listed in annex II and „Low GWP“ classified HFO refrigerants. These requirements already provide efficient and effective means of regulating refrigerants that are classed as PFAS.

The selection of refrigerant for a refrigeration system or heat pump requires a compromise between a range of factors including energy efficiency, safety, technical feasibility, reliability and cost of manufacture.

PFAS classified refrigerants may contribute to achieving the best selection. For example, the efficiency of small heat pumps using PFAS can enable faster and more efficient decarbonization of the heating sector.

### **Summary**

The members of the German Refrigeration Research Association (FKT) are convinced that without the use of PFAS-containing materials the safe and effective uninterrupted operation of refrigeration and heat-pump systems is not possible.

Refrigeration and air conditioning technology is needed for many critical infrastructure applications including hospitals, data centers, industry and energy plants as well as the entire cold chain for food distribution. The loss of refrigeration and air conditioning systems in these critical infrastructures, even for a short period of time, would have extreme adverse consequences in all areas of society.

Refrigeration plants are typically operated for more than 20 years and an uninterrupted supply of spare parts/repairs of components is therefore essential. Re-use and repair of components as well as recycling have always played an important role in this industry.

Without PFAS-containing materials the achievement of the European „Green Deal“ would be questioned and put at risk.

When evaluating the risks to the refrigeration and heat pump technology necessary to fulfill basic tasks for society, exemptions from the PFAS regulation are essential from the FKT's point of view.

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The following associations support the position statement of FKT:

**BIV – Bundesinnungsverband des Deutschen Kälteanlagenbauerhandwerks e.V.**

<https://biv-kaelte.de>

**Fachverband Gebäude-Klima e.V.**

<https://www.fgk.de>

**VDKF – Verband Deutscher Kälte-Klima-Fachbetriebe e.V.**

<https://www.vdkf.de>

**VDMA Fachverband Allgemeine Lufttechnik**

<https://www.vdma.org/allgemeine-lufttechnik>

**DKV – Deutscher Kälte- und Klimatechnischer Verein e.V.**

<https://www.dkv.org>

**IZW – Informationszentrum Wärmepumpen und Kältetechnik e.V.**

<https://www.izw-online.de>

**VDKL – Verband Deutscher Kühlhäuser und Kühllogistikunternehmen e.V.**

<https://www.vdkl.de>

**ZVKKW – Zentralverband Kälte Klima Wärmepumpen e.V.**

<https://www.zvkkw.de>



Fachverband  
Gebäude-Klima e.V.



#### Forschungsrat Kältetechnik e.V.

The German Refrigeration Research Association (FKT) promotes technical and scientific research related to refrigeration and heat pumps, including management of collaborative industrial research projects.

FKT's mission is to promote refrigeration technology through technical-scientific research.

The German Refrigeration Research Association connects representatives from industry with research institutions.

In particular, FKT covers research and development in the fields of:

- industrial refrigeration
- building air conditioning
- commercial refrigeration
- domestic refrigeration
- transport refrigeration
- heat pump technology
- cryogenics

The German Refrigeration Research Association allocates research contracts to institutes of universities and technical schools, but also to non-university research institutions.

Research is financially supported by the German Federal Ministry of Economy Affairs and Energy and from the members, either with membership fees or non-financial contributions.

The German Refrigeration Research Association FKT is open to a wide range of industry sectors in order to meet the challenges that the variety of interesting current refrigeration technology topics has to offer.

For more information, visit the website at [www.fkt.com](http://www.fkt.com).