

EPEE/JBCE/JRAIA position paper on European Commission report: HFCs and HFC alternatives in split air conditioning systems

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Introduction

This paper has been developed, with the support of JBCE and JRAIA, as a follow-up to the exchanges between EPEE and DG CLIMA on their report entitled “The availability of refrigerants for new split air conditioning systems that can replace fluorinated greenhouse gases or result in a lower climate impact” (C(2020) 6637).

The review process as set out under Article 21 of the EU F-Gas Regulation provides a useful framework to take stock and evaluate whether the current provisions work or require adaptation to market developments. Representing the majority of manufacturers active on the European market, EPEE welcomes the opportunity to provide feedback and share experience from the market. In this context, EPEE would like to recall the scope of Article 21.4 of the F-Gas Regulation, which refers to “**assessing whether cost-effective, technically feasible, energy-efficient and reliable alternatives exist**, which make the replacement of fluorinated greenhouse gases possible in [...] new small single split air-conditioning systems” as defined in Annex III.

EPEE, JBCE and JRAIA would like to stress again that there is no solid justification and assessment in the report to support the claim made by the European Commission in its report that the criteria of cost-effectiveness, technical feasibility, energy efficiency and reliability would currently be fulfilled by R-290 in split A/C below 7kW capacity. **Currently there are no “cost-effective, technically feasible, energy-efficient and reliable alternatives” available to safely replace fluorinated greenhouse gases in small single split air-conditioning systems as defined in Annex III.**

1. R-290 in Split type A/C is not a sufficiently safe alternative to HFCs

EPEE, JBCE and JRAIA are very concerned about the risk that could be posed by R-290 during the installation, servicing decommissioning and end of life treatment of split type equipment.

- The **EU General Product Safety Directive and Low Voltage Directive** require equipment manufacturers & importers to place safe products on the EU market. This includes not only the use phase but the whole life cycle of the equipment (including installation, service, decommissioning, end of life treatment). Typically, in the split A/C market, the manufacturers and importers provide installation & servicing instructions through manuals, but they have no direct control on the companies that are installing or servicing the equipment. It is even more challenging to have control on who does the final decommissioning and end of life treatment, which typically take place 10-15 years later, even when these products are part of a WEEE take back scheme. Furthermore, the connection, servicing and decommissioning of split A/C need to be done by disconnecting the refrigerant pipes. When the equipment is running with HFCs, F-Gas certified

installers only can take care of this process. As such requirement does not exist for R-290, there is a risk that non-qualified individuals manage this process, to the detriment of their safety.

- **Absence of mandatory certification scheme for the use of flammables:** There is no mandatory certification scheme in the EU for the installation, servicing, decommissioning and end of life treatment of non-HFC refrigerants such as propane/ R-290. A recent study by AREA, the European association of refrigeration, air conditioning and heat pump (RACHP) contractors, shows that out of all EU F-Gas certified installers, only between 3.5% and 7%¹ are trained to use alternative to HFCs, which demonstrates that the market is far from being ready to use R-290 in small split A/C.
- **Safety standards are not enough:** Safety standards are important references and are often used as practical guidance. In that sense, generic standard EN378 and product standard EN60335-2-40 can provide guidance to installers. However, because standards are not mandatory, not free of charge and often not always available in the local language, it is not a guarantee that they sufficiently protect installers & service technicians.

Safety during installation, servicing, decommissioning and end of life treatment falls under the **ATEX “Workplace” Directive 1999/92/EG**. This means an installation, servicing or waste treatment company has the duty to protect the safety of its employees, even if the company is self-employed. Since it is a Directive, the implementation at national level may not be the same in all countries. Due to the higher flammability characteristics of R290, the risk of a potentially explosive environment is higher, and more safety measures need to be taken. Despite precautions, the risks will not be possible to reduce to zero due to the human factor. Recent accidents have demonstrated that even well qualified people can make mistakes. In the case of hydrocarbons, such accidents have serious consequences.

- **Insurance cost for use of highly flammable substances:** Contractors and waste treatment facilities aiming to handle R-290 or other highly flammable substances may be confronted with higher insurance cost and/or limited insurance coverage. The associated safety risk will therefore most likely discourage them from handling equipment filled with R-290, slowing down and/or preventing its deployment in the market.
- The ATEX “Workplace” Directive also applies to the **safety of fire brigades**, and additional fire safety regulations may apply at national & regional levels. Buildings that contain split A/C with R290 pose a higher risk for the safety of firemen, even when the fire would not be caused by the A/C itself. This aspect has not been deeply evaluated yet thus we recommend that the European Commission and Member States study this aspect in more detail.

2. R-290 is restricted by national regulations

In addition to the possible different implementations of the ATEX “Workplace” Directive at national level, there are also national building safety regulations and codes that may not allow the application of R-290 split A/C. This is for example the case in Italy & France, to a certain extent. We also recommend that the European Commission and Member States study this in more detail.

¹ AREA survey: Training & certification on f-gases and alternative refrigerants, <http://www.area-eur.be/news/mandatory-certification-alternative-refrigerants-time-now>

3. Energy efficiency may be jeopardized for safety reasons

It is necessary to evaluate an alternative on its potential to further increase the energy efficiency, and not on a benchmark of products that are already on the market today. For example, the revision of Ecodesign Regulation 206/2012 (split A/C < 12kW) does not consider R290 for BAT/BNAT developments and will most likely increase the required minimum SEER efficiencies for split A/C. In addition, the energy labelling directive aims to stimulate the demand for products that perform much better than the minimum level. However, due to safety constraints, highly flammable refrigerants such as R-290 are more sensitive to charge in terms of energy efficiency versus safety limits. For example, in order to assure the maximum potential capacity range of a product, the charge amount of the equipment needs to be calibrated based on the installation location, piping length, safety constraints, which could eventually lead to lower energy efficiency levels.

HFCs/HFOS are essential for the deployment of heat pumps and decarbonization of the heating & cooling sector

Moreover, EPEE, JBCE and JRAIA would like to draw attention to the huge potential of heat pumps to reduce emissions from the heating and cooling sector, which, today, represents almost 50% of the total final energy consumption in the EU. Decarbonising the heating sector will only be possible by radically moving away from fossil fuels and heat pumps have an important role to play in that respect. However, currently they represent less than 5% of the total heating energy consumption in Europe, among others due to higher investment cost and lack of awareness in the market.

Split A/C falls in the category of air-to-air heat pumps as they can provide both, heating and cooling, and operate as heat pumps. Adding yet another layer of difficulty in the form of de facto imposing higher flammability refrigerants would almost certainly impact cost and slow down the crucial deployment of heat pumps. Considering that almost 80% of the total greenhouse gas emissions in Europe are related to CO₂, mainly due to energy use and production, whereas only approx. 2% are related to F-Gases, it would be disproportionate and counter-productive to jeopardize the uptake of heat pumps for the sake of forcing the market to adopt F-Gas alternatives when the market is moving to lower GWP refrigerants anyway.

4. R290 options don't address the market's needs

EPEE, JBCE and JRAIA would like to re-iterate that the report falls short in addressing and investigating crucial parameters, such as heating needs, indoor unit mounting types and piping lengths. The final refrigerant charge always depends on the installation, a parameter that has not been taken into in the report. For split system, the final charge of the system is affected by the piping length to connect the outdoor unit to the indoor unit. In many situations, the indoor unit cannot be placed in the vicinity of the outdoor unit (prohibition to install outdoor units on façade of buildings or other architectural limitation) and thus additional charge for the additional length of pipes is needed. For R-290, such necessary additional charge for top-up may not always make an installation feasible within the allowed charge calculated for the conditioned room area and all boundaries conditions. The same holds true for some mounting types of indoor units, such as floor standing units, where the maximum allowed charge by product safety standard in a given space is lower than for wall or ceiling mounted units. In

short, the availability of some limited range of models in other countries like China or India cannot simply be extrapolated to the entire application needs as required in the EU market.

5. Conclusions and recommendations

The claim made in the European Commission’s report that it seems “technically possible to avoid F-Gases today in new single split A/C with a cooling capacity below 7kW by using R-290” has not been substantiated by any solid justification nor life cycle safety assessment in the report.

There is no doubt that the transition towards refrigerants with a lower GWP in small split air-conditioning equipment below 3kg filling charge is making excellent progress. The main driver for this transition is the HFC phase-down as stipulated by the F-Gas Regulation.

Given that the transition is happening and that the broad introduction of R-32 has already been making a significant contribution to achieving the phase-down steps – as confirmed by the EEA data – EPEE strongly recommends **to focus on adapting building and fire safety codes, safety standards and training and certification measures to the increased use of flammable refrigerants** rather than introducing artificial, additional thresholds such as 7kW which would likely lead to confusion in the market without any tangible environmental benefits.

EPEE, JBCE and JRAIA would therefore like to re-iterate its strong support to the F-Gas Regulation and its current provisions, emphasizing that HFC emissions have been decreasing since 2014 and that the phase-down has proven to drive the transition to lower GWP refrigerants. Further strengthening the provisions under Annex III is therefore not necessary in order to achieve the goals of the F-Gas Regulation.



About EPEE

The European Partnership for Energy and the Environment (EPEE) represents the refrigeration, air-conditioning and heat pump industry in Europe. Founded in the year 2000, EPEE's membership is composed of over 50 member companies as well as national and international associations from three continents (Europe, North America, Asia). With manufacturing sites and research and development facilities across the EU, which innovate for the global market, EPEE member companies realize a turnover of over 30 billion Euros, employ more than 200,000 people in Europe and also create indirect employment through a vast network of small and medium-sized enterprises such as contractors who install, service and maintain equipment. Please see our website (<http://www.epeeglobal.org>) for further information.

About JBCE

Founded in 1999, the Japan Business Council in Europe (JBCE) is a leading European organization representing the interests of about 90 multinational companies of Japanese parentage active in Europe. Our members operate across a wide range of sectors, including information and communication technology, electronics, chemicals, automotive, machinery, wholesale trade, precision instruments, pharmaceutical, textiles and glass products. For more information: <https://www.jbce.org> /E-mail: info@jbce.org. EU Transparency Register: 68368571120-55

About JRAIA

The Japan Refrigeration and Air conditioning Industry Association (JRAIA) represents all the major Japanese manufacturers of refrigeration and air conditioning equipment. A significant majority of all air conditioning and refrigeration products sold in Europe are produced and marketed by member companies of JRAIA. Air conditioning and refrigeration technology was developed primarily in Japan. This know-how and expertise has been transferred to the EU and improves working and living conditions. The European investments and commitments of JRAIA companies are significant.