

JRAIA comments to the F-Gas regulation (REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006)”

September 2015

JRAIA, representing the heating, cooling and refrigeration industry in Japan, supports the objectives of the F-Gas regulation (REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006) that has entered into force from the 1st of January 2015 and aims to control the supply of the fluorinated greenhouse gases and to prevent the global warming.

The regulation has just started to enter into force from the beginning of this year and the implementing acts will be expected to be clarified by publishing the guidelines and explanatory documents from now on. However, JRAIA would like to raise the concerns about the following issues.

1. The description regarding the refrigerants for the next generation in DG CLIMA's website “Climate-friendly alternatives to HFCs and HCFCs” (http://ec.europa.eu/clima/policies/f-gas/alternatives/index_en.htm)
2. Barriers of implementing the phase-down programme due to the standards and the legislation at Member States levels

EXECUTIVE SUMMARY

1. The description regarding the refrigerants for the next generation in DG CLIMA's website “Climate-friendly alternatives to HFCs and HCFCs”




JRAIA welcomes some of the points, e.g. there is no "one size fits all" solution which means no single alternative refrigerant can be applied for all HFCs and HCFCs equipment. The suitability of a certain alternative must be considered separately for each category of product and equipment.

However, we would like to raise serious concern about the traffic light analysis



in the website for some sectors, especially the analysis for stationary air-conditioning sector, which may lead misunderstanding and significantly impede the transition to mildly flammable refrigerants such as R32 which is necessary to achieve the target of phase-down programme.

Therefore, we would like to propose the following result of our analysis.

1. Single Split < 7kW

HC (direct), HC (indirect), HFO :	
R32 :	
R32-HFO blends :	

2. Split/Multi > 5kW

HC (direct), HC (indirect), HFO :	
R32 and R32-HFO blends :	

2. Barriers of implementing the phase-down programme due to the standards and the legislation at Member States levels

In the F-Gas regulation that has entered into force from the 1st of January 2015, phase down programme of HFCs is shown. JRAIA supports the objectives of the F-Gas regulation that aims to control the supply of the fluorinated greenhouse gases and to prevent the global warming.
















However, we concern about the current situation that the standards and the legislation in some of Member States discourage the transition of refrigerants which is needed to achieve the target of the phase down plan shown in the F-Gas regulation. For instance, the usage of mildly flammable refrigerants is prohibited or restricted by the standards and the legislation (such as building code and the regulation related to the transportation) in some of Member States, e.g. France, Italy and Spain.

We would like to propose the acceleration of the study for review and revision of such regulations and the harmonisation with the F-Gas regulation.




DETAILED COMMENTS

1. The description regarding the refrigerants for the next generation in DG CLIMA's website "Climate-friendly alternatives to HFCs and HCFCs"

The traffic light analysis for stationary air-conditioning sector in the website is as follows.

	HC (direct)	HC (indirect)	HFO	R32	R32-HFO blends
GWP	3	3	< 10	675	200-400
Portable/Windows					
Single Split < 7kW					
Split/Multi > 5kW					

According to the Icon description in the website, each colour of traffic light stands for the followings.

-  : Efficiency too low or cost too high compared to other alternatives
-  : Efficient. Safe. But costly and no short term availability
-  : Efficiency high. No or acceptable additional cost. Short term availability

(1) Single Split < 7kW

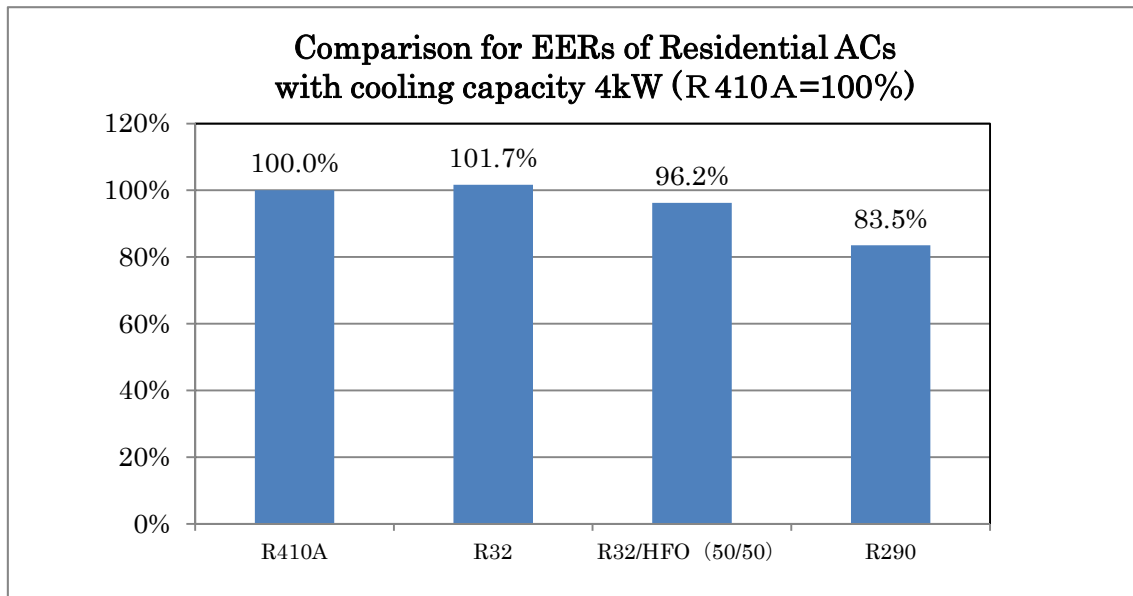
We are concerned about the “green light” of HC (direct) case. This may lead to the misunderstanding that HC (direct) is more efficient than R32. Regarding a single split system, it would be understandable that HC has advantage in the case of drop-in into the existing constant speed air conditioners mainly used with R22 in the developing countries, because the thermal property of HC is similar to that of R22. However, it is just one aspect. Safety and reliability must be considered technically.

We, JRAIA, have carried out the technical study of variable speed air conditioners, which are mainly used in EU and Japan, and will be mainly used in those developing countries near future due to higher efficiency than constant speed air conditioners.

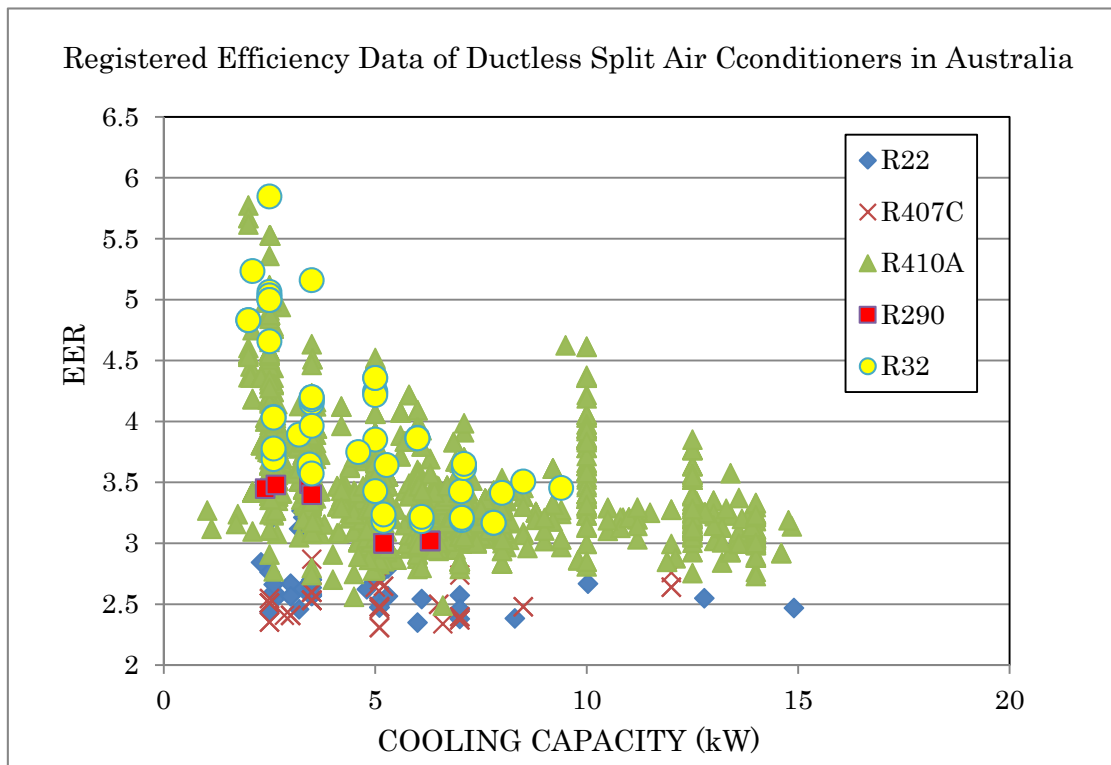
And we show the obtained results as follows:

Regarding EER, R32 > R410A > R32-HFO Blend (R32/HFO=50%/50%) > R290 as shown in the figure below. The efficiency of R32 and R32-HFO Blend is higher than that of R290, which is different from the description in the DG CLIMA’s website.




In this case, the study was done under the condition that the refrigerant charge amount of R290 is within the restricted limit by IEC 60335-2-40:2013. In the international standard, the charge limit of flammable refrigerant is determined depending on the flammability. One of the technical reasons for lower efficiency in air conditioners with R290 comes from the charge limit by the safety standard.



The EER data of registered air conditioners in Australia are also supporting our position. The figure below shows the registered EER data of air conditioners placed on markets in Australia. This shows the comparison of air conditioners with different refrigerants in market. From the figure, it is clear that the efficiency (EER) of the equipment with R32 is higher than that with R290.



Above these, we conclude the following results of traffic light analysis for Single Split <7kW.

HC (direct), HC (indirect), HFO :		
R32 :		
R32-HFO Blend :		(The market situation that equipments with this refrigerant is not available is considered.)



(2) Split/Multi > 5 k W

The capacity range of Split/Multi system is very wide.

In particular for the large capacity air conditioner (e.g. VRF), since the equipment needs to charge the large amount of refrigerant, the use of mildly flammable refrigerants including R32 requires the various safety measures. Therefore the cost evaluation for the equipment using mildly flammable refrigerant is not carried out enough yet.

In some of Member States, the application of flammable refrigerants to the air conditioner is prohibited in most of public access buildings by the building code. Under the circumstances, it is difficult to conclude the applicability of these refrigerants in short period. According to Article 21. 2 (c) of the F-Gas Regulation (EU) No 517/2014, the Commission will publish a comprehensive report on the issue no later than 2020.

By considering the above-mentioned points, we would like to suggest the following results of traffic light analysis.

HC (direct), HC (indirect), HFO :	
R32 and R32-HFO Blends :	

In addition, we also would like to comment regarding the evaluation of equipments with different refrigerants from the technical point of view. The results of evaluation are dominant with many factors and the results also highly depend on the evaluation methods. In order to avoid the misunderstanding and the consequent confusion, the details of conditions, assumption and the evaluation procedure must be mentioned clearly as well as the obtained results.

APPENDIX

Similar traffic light analysis of alternative refrigerants was carried out by consultant SKM and was reported in August 2012. The results, a table in the

report is shown below, are in lines with our position.

Each refrigerant is given a traffic light marker for each sub-sector, using the following rules:




-  Not suitable on safety, efficiency or cost grounds
-  Technically feasible but other options usually preferable in terms of capital cost and / or energy efficiency
-  Suitable for application

Table 4.3: Traffic Light Analysis of Refrigerant Alternatives

Code	Main Sector	Sub-Sector		Group 1 Very low GWP (<10)	Group 2 Low GWP (100 to 1,000)	Group 3 Medium GWP (1,000 to 2,200)
1.1	Domestic Refrigeration	Refrigerators	MT			
1.2		Freezers	LT			
2.1	Commercial Refrigeration	Hermetic Units (Medium Temp)	MT			
2.2		Hermetic Units (Low Temp)	LT			
2.3		Single condensing units (MT)	MT			
2.4		Single condensing units (LT)	LT			
2.5		Multi-pack centralised systems (MT)	MT			
2.6		Multi-pack centralised systems (LT)	LT			
3.1	Transport Refrigeration	Vans and light trucks	LT & MT			
3.2		Large Trucks and Iso-Containers	LT & MT			
4.01	Industrial Refrigeration	Small DX LT (low temp.)	LT			
4.02		Small DX MT (medium temp.)	MT			
4.03		Medium DX LT (low temp.)	LT			
4.04		Medium DX MT (medium temp.)	MT			
4.05		Large DX LT (low temp.)	LT			
4.06		Large DX MT (medium temp.)	MT			
4.07		Medium-size Industrial Chillers	MT			
4.08		Large Industrial Chillers	MT			
4.09		Large Flooded LT (low temp.)	LT			
4.10		Large Flooded MT (medium temp.)	MT			
5.01	Stationary Air Conditioning (SAC) and Heat Pumps	Small portable units, cooling only (air-to-air)				
5.02		Small split systems, cooling only (air-to-air)				
5.03		Small split systems, heating & cooling (air-to-air)				
5.04		Medium split systems, cooling only (air-to-air)				
5.05		Medium split systems, heating & cooling (air-to-air)				
5.06		Large split systems, cooling only (air-to-air)				
5.07		Large split systems, heating & cooling (air-to-air)				
5.08		Packaged systems, cooling only (air-to-air)				
5.09		Packaged systems, heating & cooling (air-to-air)				
5.10		VRF systems, cooling only (air-to-air)				
5.11		VRF systems, heating & cooling (air-to-air)				
6.01	Chillers & Hydronic Heat Pumps	Small - cooling only (scroll/screw, air-cooled)				
6.02		Medium - cooling only (scroll/screw, air-cooled)				
6.03		Large - cooling only (screw, air-cooled)				
6.04		Small - cooling only (scroll/screw, water-cooled)				
6.05		Medium - cooling only (scroll/screw, water-cooled)				
6.06		Large - cooling only (centrifugal, water-cooled)				
6.07		Domestic - heat only, air-source, hydronic				
6.08		Small - heat only, air-source, hydronic				
6.09		Small - reversible heating/cooling, air-source, hydronic				
6.10		Medium - reversible heating/cooling, air-source, hydronic				
7.1	Mobile AC	Cars, vans, cabs				
7.2		Buses, trains				

2. Barriers of implementing the phase-down programme due to the standards and the legislation at Member States levels

The air-conditioning industry in Japan understands the objectives of the F-Gas regulation and are making our best efforts to achieve the HFCs phase-down programme (hereinafter phase-down programme) by accelerating the replacement of R410A (non-flammable and GWP=2088) to mildly flammable refrigerants with lower GWP such as R32 (mildly flammable but GWP=675, which is approximately 1/3 of that of R410A's).

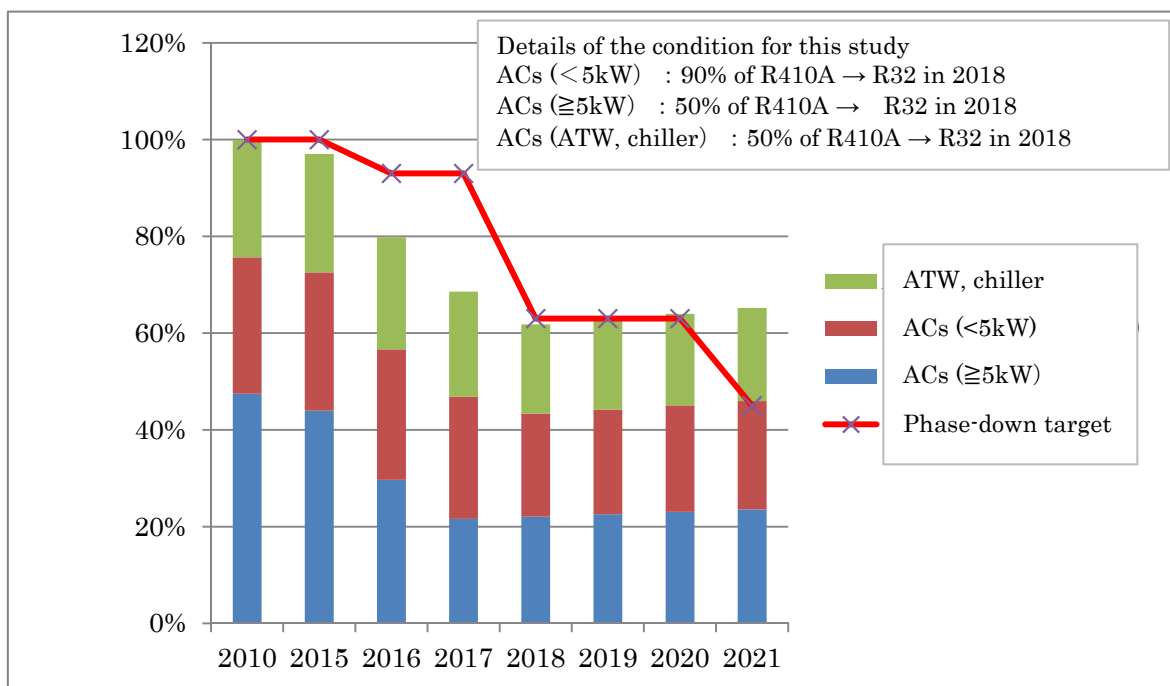
However, we recognise the existing barriers of implementing the phase-down programme due to the standards and the legislation in Member States.

Especially in Member States such as France, Spain, and Italy where the demand of air-conditioners are high, the application of flammable refrigerants are prohibited or the refrigerant amount are restricted in public access buildings such as hospitals, shopping malls, and hotels.

In the air-conditioning sector, the only practical solution in order to achieve implementing the phase-down programme is currently the selection of mildly flammable refrigerants such as R32 for the replacement of non-flammable refrigerants with higher GWP such as R410A. We believe it is the most realistic solution from the view point of efficiency and less economic impact on end-users.

Approximately 50% of air-conditioning equipment with middle and large capacity (such as middle size split air-conditioners, multi-split air-conditioners such as VRF, chillers, ATW (heat pumps for hot water supply) are used in the public access buildings. We have carried out the estimation of implementing the phase-down programme in the air-conditioning sector of EU under the condition that both the F-Gas regulation and the current regulation in Member States are strictly complied. With the assumption that the mildly flammable refrigerants, e.g. R32, cannot be used for public access buildings in the future as well, we estimated phase-down based on the data obtained from the study by the consultant SKM and obtained the results as shown below.

The transition from non-flammable R410A to mildly flammable R32 (whose GWP is about 1/3 of that of R410A) in AC sector except for the application in public access buildings.



As shown in the figure, even if the considerably high ratio of the equipment is switched to the lower GWP, it is very difficult to hit the phase-down target after 2020 without the switching in the public access buildings, i.e. as long as the use of mildly flammable gas is restricted because of the building code in Member States.

In order to comply the phase-down programme in the F-Gas regulation and to act as a leading role of the global environmental protection, the acceleration of application of mildly flammable refrigerants should be needed but the current building code in Member States will result in the loss of these opportunity.

Furthermore, about the half of the refrigerants for the AC equipment with middle and large capacity is charged during the installation in EU. The above-mentioned mildly flammable refrigerants with lower GWP are categorised mostly as flammable refrigerants under the current regulations in Member States and must be handled under the strict restriction including the storage and the transportation process. We are also concerned about these situation.

In the Article 11 of the F-Gas regulation,

6. The Commission shall collect, on the basis of available data from Member

States, information on national codes, standards or legislation of Member States with respect to replacement technologies using alternatives to fluorinated greenhouse gases in refrigeration, air-conditioning and heat pump equipment and in foams.

And in the Article 21 of the F-Gas regulation,

2. On the basis of information on the placing on the market of the gases listed in Annexes I and II, reported in accordance with Article 19, and on emissions of fluorinated greenhouse gases made available in accordance with Article 20 and on the basis of any relevant information received from Member States, the Commission shall monitor the application and effects of this Regulation.

No later than 31 December 2022, it shall publish a comprehensive report on the effects of this Regulation, including in particular:

(c) an overview of European and international standards, national safety legislation and building codes in Member States in relation to the transition to alternative refrigerants;

As described above, the harmonization of the regulation in Member States and the F-Gas regulation for the transition of alternatives is expected to be proceeded and a comprehensive report on the effects of the regulation such as building code in Member States will be published before 31st December 2022.

However, three to five years are expected to be needed to develop AC products with the alternative refrigerants and to place them into market. Publishing the above-mentioned report in 2022 will be too late to comply the phase-down programme after 2021. Actions and measures would for this issue will be required no later than 2017.

In the Article 15 of the F-Gas regulation,

4. Following a substantiated request by a competent authority of a Member State and taking into account the objectives of this Regulation, the Commission may, exceptionally, by means of implementing acts, authorise an exemption for up to four years to exclude from the quota requirement laid down in paragraph 1 hydrofluorocarbons for use in specific applications, or specific categories of products or equipment, where it is demonstrated that:

- (a) for those particular applications, products or equipment, alternatives are not available, or cannot be used for technical or safety reasons; and
- (b) a sufficient supply of hydrofluorocarbons cannot be ensured without entailing disproportionate costs.

We would like to suggest to consider the application of this also to the cases mentioned above besides the acceleration of the harmonisation between the F-Gas regulation and the regulation, the study of the barrier to implement the

phase-down programme and the earlier actions to solve the barrier.

Appendix: Building code in Member States

The air-conditioning industry are concerned about the regulations especially in France, Spain, and Italy shown below because their AC market are large.

1) France: Fire protection rules for public access building

Article CH35 §2

Arrêté du 14 février 2000 portant approbation de dispositions complétant et modifiant le règlement de sécurité contre les risques d'incendie et de panique dans les établissements recevant du public.

2) Spain: Safety rule for refrigeration system (Flammable refrigerants are restricted their use no more than 2,5 kg)

ROYAL DECREE 138/2011

REGLAMENTO DE SEGURIDAD PARA INSTALACIONES FRIGORIFICAS

3) Italy: Ordinance of Home Affair Ministry published on 27th July 2010

Restriction for fire protection in commercial area over 400 m² regarding the technical related to design, construction and operation (The application of flammable is restricted in commercial area over 400 m²).

Ministero Dell 'Interno DECRETO 27 luglio 2010

Approvazione della regola tecnica di prevenzione incendi per la progettazione, costruzione ed esercizio delle attività commerciali con superficie superiore a 400 mq. (10A09806) (GU Serie Generale n.187 del 12-8-2010)

Appendix: Establishment of regulations in Member States

- (a) In some of Member States, they refer to EU standard EN378 (Refrigerating systems and heat pumps — Safety and environmental requirements) for the establishment of their building code. In the respect, the revision of the standard is the key point.

- (b) ISO817 (Refrigerants - Designation and safety classification) and ISO5149 (Refrigerating systems and heat pumps - Safety and environmental requirements) was revised and the category of mildly flammable gas, i.e. A2L, was newly introduced to the standards.
- (c) The review and the revision of building codes in Member States will start after publishing the revised standards mentioned above. The study for the revision of the international standard, ISO and IEC is currently being carried on. The conclusions is expected not to be available before the beginning of 2017. Therefore, EN standard should be revised before the revision of the above-mentioned international standard to ensure achieving the target of phase-down plan.

About JRAIA:

JRAIA, the Japan Refrigeration and Air Conditioning Industry Association, was originally established in February 1949 as the Japan Refrigerating Machine Manufactures Association which was thereafter reorganized in February 1969 to become an incorporated association and renamed as it is at present.

JRAIA is the trade association representing over 100 manufacturers of refrigeration and air-conditioning equipment in Japan. We, the members of JRAIA, have so far been dedicated to offering quality products to the markets of EU. JRAIA aims to promote and improve production, distribution and consumption of refrigeration and air conditioning equipment and their applied products, as well as auxiliary devices and components, automatic controls and accessories and thereby contribute to the steady development of HVAC&R industry and the improvement in people's standard of living. For more information, please see our website www.jraia.or.jp