SUMMARY FOR POLICYMAKERS

With the phase-out of ozone depleting substances, there has been growing interest in the application of flammable refrigerants. Following the Kigali Amendment under the Montreal Protocol concerning the phase-down of hydrofluorocarbons, low GWP refrigerants will have to be broadly applied. The majority of these refrigerants will be flammable.

The RACHP industry, especially within non-Article 5 countries (which are subject to more rapid HFC phase-down schedules), must prepare to handle flammable refrigerants to a greater extent than they have done until now.

- There are a variety of technical, regulatory and infrastructural considerations that have to be addressed by a variety of stakeholders. It requires forethought of the entire lifetime of RACHP equipment and the obligations of the personnel involved.
- Flammable refrigerants possess a variety of characteristics that affect the likelihood that they are ignited and the type and severity of consequences in the event of ignition. It is appropriate to take these into consideration when designing RACHP equipment and also when carrying out risk assessments.
- The number and types of rules and regulations applicable to flammable substances in general and flammable refrigerants in particular is diverse, both within countries and internationally. It is a complex situation that necessitates a broad understanding of the topic. Appreciation of this information is required across many stakeholders, including design engineers, production staff, installation engineers, service and maintenance technicians and those involved with decommissioning and dismantling of RACHP equipment.
- Countries tend to have generic flammable gas regulations that govern the use and application of any flammable substance. Many adopt safety standards that prescribe how flammable refrigerant may (or may not) be applied. A number of countries have national building regulations, which limit the use of flammable refrigerants. It is critical for countries to assess their national rules and regulation and ensure they do not unnecessarily inhibit the application of suitable refrigerants.

- On-going research and development related to the safe application of flammable refrigerants will likely generate more robust and broadly applicable rules for the application of flammable refrigerants. Stakeholders, including those from industry, government and academia should involve themselves in the process to help minimise potentially undesirable outcomes.
- Some RACHP sector safety standards currently pose restrictions to some flammable refrigerants for some applications and these barriers need to be addressed to enable a wider and potentially more cost-effective choice of technical options. Since these RACHP sector safety standards often comprise requirements for flammable refrigerants that are inconsistent with the historical requirements within the generic safety standards flammable substances, it is recommended that closer working relationships are needed between standards groups to help resolve aspects on all sides, including consistency between the IEC 60079-series and the RACHP safety standards.
- Experience and also research on the safe application of flammable refrigerants remains relatively limited. There is a significant need for further research activities investigating the numerous aspects associated with flammability risk. All interested stakeholders are encouraged to consider contributing to this objective.

This IIR Informatory Note on flammable refrigerants will join the other notes recently published by the IIR to complete its refrigerants series: counterfeit refrigerants (**23rd Note)**; containment of refrigerants (**24th Note**); refrigerant charge reduction (**25th Note**); overview of regulations restricting HFC use (**26th Note**); alternative refrigerants and their possible applications (**31st Note**).

These Informatory Notes form a consistent set of documents with the aim of promoting refrigerants with a low environmental impact that use energy efficiently and in a safe manner. For the actors in the refrigeration sector, they are also an essential decision-making tool.