



20 February 2014

OSHD/SPECS/MHI/PS/01-2014

To : All companies involved in, or have the potential to be involved in Hydrocarbon (HC) Refrigerants

Joint Circular on Safe Handling and Use of Hydrocarbon Refrigerants

Hydrocarbon (HC) refrigerants used in building air-conditioning will be phased out by end 2016 due to the hazards posed by their flammability¹. In the interim period, various stakeholders have the responsibility to ensure that operations, maintenance, repair and decommissioning works involving HC refrigerants are safe.

2 Since the initial circular was issued by SCDF in December 2011, there have been incidents involving HC refrigerants with two of the incidents involving casualties. The first accident involved a case of flash fire when air-con servicemen were carrying out decommissioning work, resulting in one fatality and two workers injured. In the second accident, HC refrigerant leaked from an AHU during normal operation and resulted in a flash fire. Two workers were injured in this accident

3 In the wake of these accidents, we would like to remind stakeholders to take actions to ensure the safety and health of all those who might be affected.

Flammable Hazard of HC Refrigerants

4 HC refrigerants pose a fire and explosion hazard in addition to those of conventional refrigerant. Workers who are not familiar with the aforesaid hazard may treat HC refrigerants in the same way that they handle conventional, non-flammable refrigerants. Inappropriate handling could result in the formation of a flammable atmosphere, which can escalate into a fire or an explosion.

Measures to mitigate risks associated with HC Refrigerants

5 Companies handling HC refrigerants should adopt necessary measures, including the following to reduce the risks associated with HC refrigerants:

- a) Ensure that workers handling HC refrigerants are fully aware of the fire and explosion hazard and the resulting consequence.
- b) Ensure that workers are able to identify the type of refrigerant in the refrigeration system and its associated hazards via Safety Data Sheets.

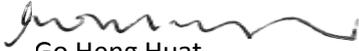
¹:SCDF Circular, Review on Use of Hydrocarbon Refrigerant in Singapore, 06 December 2011

- c) Develop and implement measures to prevent fire/explosion, which should include:
 - i. Removal or prevention of accumulation of HC refrigerant
 - ii. Exclusion or effective enclosure of possible sources of ignition
 - iii. Use of suitable flame-proof equipment
- d) No welding, brazing, soldering or cutting operation should be conducted on any system that contains or has contained HC refrigerants until all reasonably practicable steps have been taken to safely remove the HC refrigerant and the system has been certified by a competent person to be free of HC refrigerant. Any certificate issued by the competent person should be kept available at all times for inspection.
- e) HC refrigerant shall be kept, handled and disposed of in a safe manner as not to pose a risk to the safety and health of any person who may be affected.

6 Occupiers currently still using HC refrigerants should implement measures including, but not limited to:

- a) Disseminate adequate information on the hazards of HC refrigerant, including Safety Data Sheets.
- b) Display adequate warning notices specifying the flammability hazard of HC refrigerants at all entrances of any workroom containing HC refrigerants as well as all appropriate locations.
- c) Ascertain that the contractors engaged to handle refrigeration systems containing HC refrigerants:
 - i. Have sufficient expertise to carry out the work involving HC refrigerant.
 - ii. Have taken adequate safety and health measures regarding work involving HC refrigerants, including the conduct of risk assessments.
- d) Provide adequate ventilation to prevent HC refrigerant accumulation when HC refrigeration systems are located indoors.
- e) Remove all potential sources of ignition from areas where there is possible HC refrigerant accumulation.

7 For clarifications, please contact Soh Zi Quan at soh_zi_quan@mom.gov.sg or Ng Geok Meng at ng_geok_meng@SCDF.gov.sg



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