



INSTITUT INTERNATIONAL DU FROID
INTERNATIONAL INSTITUTE OF REFRIGERATION

Careers in Refrigeration “CaRe” IIR Working Group of all Commissions

TERMS OF REFERENCE

BACKGROUND

The refrigeration industry plays a major and increasing role in today’s global economy, with significant contributions made in food, health, energy and environmental domains, which policy makers need to better take into account. Refrigeration is used in everything from manufacturing to medicine, and this vast technology needs engineers to develop, research and repair it.

It is estimated that approximately 4 workers out of 1000 have a job linked to the manufacturing, installation, maintenance and servicing of refrigeration equipment.

Refrigeration is a thriving industry, which offers excellent career opportunities for individuals with all kinds of interests and skills, such as working in a laboratory developing new kinds of refrigerants, a technical studio designing the refrigeration systems of the future or out on the road as an engineer installing and repairing equipment; there are career prospects for everyone.

At the 24th International Congress of Refrigeration in Yokohama, Japan, the IIR organized the second “Reception for Students and Young Researchers”, a student and senior researchers speed networking event and the first Women in Refrigeration networking workshop. Those two events inspired a new initiative: to create a “Careers in Refrigeration” working group and an IIR “Women in Refrigeration” subworking group.

REASONS FOR ESTABLISHING A 'CAREERS IN REFRIGERATION' WORKING GROUP (WG)

UNESCO^[1] has identified issues, challenges and opportunities for development in more than 50 fields of engineering and focused on its contributions to sustainable human, social and economic development. An acute and growing shortage of engineers worldwide has become a threat to global development, revealed a UNESCO report. More than ever, the world needs creative engineering solutions to face its biggest challenges, from poverty to climate change. Yet many countries are seeing a decline in the enrolment of young people, especially women, in engineering studies. The slump endangers future engineering capacity, particularly in developing countries where brain drain is an additional problem.

For those reasons, the IIR is supporting the initiative to create a “Careers in Refrigeration” working group and an IIR “Women in Refrigeration” sub-working group to address the following issues:

1. **Visibility:** In comparison to other disciplines refrigeration is invisible. Its low profile means that there is not much information available what careers in refrigeration involve. The limited number of courses available further exacerbates this problem.
2. **Remuneration:** Refrigeration is perceived to be less well paid than other areas. Generally speaking, in the EU mechanical engineers are less well paid than economists. This can create an interest in disciplines and industries other than refrigeration, where it is perceived more money can be made
3. **Language:** ‘Mechanical’ engineering and similar words used in some course descriptions are perceived as dirty and can put women off. Conversely, descriptions like ‘environmental’ engineering are appealing to the younger generation, are not perceived as dirty, manually laborious and simultaneously speak to sustainability aspirations.
4. **Career opportunities and paths:** Refrigeration does not seem to have a defined career path. People from many different disciplinary backgrounds move into refrigeration; according to one attendee “80% of them as a result of learning on the job”. Diverse qualifications and backgrounds contribute to the development of the profession and are therefore encouraged to the younger generation at an early stage.
5. **Cultural issues:** Cultural issues can impact the uptake of refrigeration careers in a number of ways. For example the status (and pay) of engineering is lower in some countries compared to others (e.g. it is high in Germany), which some felt impacted the quantity and calibre of individuals entering the profession. However, it was also argued by others that remuneration alone was perhaps

¹ United Nations Educational, Scientific and Cultural Organization (UNESCO), 2010. Engineering: issues challenges and opportunities for development. ISBN 978-92-3-104156-3.

less of a consideration for women. The research showed that communist and ex-communist countries already have a higher percentage of women working in engineering and refrigeration. Similarly, the liberation of women within new democracies was also seen as a way of offering them greater freedom of career choice.

6. **Role models:** There was some agreement that women have more opportunities in engineering and refrigeration now than ever before but that the need for more female role models was paramount. Some suggestions were made on how the IIR could ensure this was achieved.

OBJECTIVES

The objectives of the WG on Careers in Refrigeration are:

- to reverse the predicted shortage of engineers, particularly in the refrigeration field;
- to raise general awareness and increase the visibility of the importance of the refrigeration industry and particularly to the younger generation;
- to contribute to the creation of employment for the younger generation, including women, in refrigeration;
- to identify problems and obstacles that hinder the younger generation aspiring and envisaging a career in refrigeration;
- to develop and put forward an international and national strategic plan to promote careers in refrigeration to the younger generation, including women;
- to develop synergies and co-ordinations between the different stakeholders in the refrigeration field;
- to provide the necessary recommendations to attract more young people, including women, to careers in refrigeration, considering the social, economic, technical and environmental aspects of the different countries.

DELIVERABLES

In order to reach the above objectives, the Careers in Refrigeration WG will have to:

- demonstrate the importance of the refrigeration industry to the younger generation by actively promoting dissemination activities e.g. career fairs, school visits, workshops, conferences, etc.;
- identify problems and obstacles that hinder the younger generation aspiring and envisaging a career in refrigeration;
- work closely with the different national associations of refrigeration to establish an qualification route directory;
- demonstrate the different career opportunity and advantages to the younger generation;

- examine existing initiatives that have been carried out or are in place (on a national level in targeted countries) to engage with the younger generation, including women;
- create and propose a national strategy for the development of an effective Careers in Refrigeration with the national associations;
- establish a preliminary plan of action to promote youth engagement in schools;
- develop a training programme on how to promote refrigeration in schools;
- act as a reference point and guide for activities related to careers in refrigeration;
- initiate and develop collaborative research projects;
- publish an information note;
- organise conferences, workshops and networks;
- publish publications, press releases;
- get involved in international and national events related to youth and female enrichment in engineering;
- assure communication and exchange of information about problems and solutions for the development of careers in refrigeration.

MEMBERSHIP

The members of the Working Group should be:

- Members of all Scientific and Technical Commissions;
- IIR private, juniors or collective members;
- experts or specialists whose knowledge or scientific input in this field would be considered beneficial for the Working Group.

The member's contributions will concern the following:

- sharing of information;
- promotion of the WG (website link);
- support and contribution to the WG activities and the development of the action plan;
- sponsorship of WG activities.

STATUS OF THE WORKING GROUP

The Working Group is based on voluntary contributions. There is no funding provided by the IIR to WG members (travel, accommodation and other expenses).

COMMISSIONS INVOLVED

The Working Group will involve all Commissions

CHAIRMAN AND BUREAU

President: Catarina Marques

Vice-Presidents: Judith Evans, Michael Kauffeld, Maria Gratiela Tarlea

Secretary: Ina Colombo from the IIR office

OPERATION OF THE WORK GROUP

The WG operates on a temporary basis and will carry out its activities through the exchange of electronic information for all members (electronic discussion group) or through physical meetings. With the aim of facilitating communication, a directory of members will be put on the website of the work group, which will allow direct contact via email.

The members of the WG will meet as many times as judged useful and possible, at least once a year as convened by the Chair to debate the issues raised on the established agenda, and communicated to members at least two weeks before the date of the meeting.

This committee will choose, during its first physical meeting, the member or the institution given permanent leadership among its members. This institution will ensure the permanent secretary and the motivation of the WG. The 3 Vice-Presidents will also be elected.

Each important decision will be sent to all the members of the working group by email, which is the responsibility of the working group presidents.

Decisions will be taken during long-distance or physical meetings by general consensus; if this process fails, the majority can be reached if the quorum of 2/3 among voters is met.

RUNNING – MEETINGS

The possibility of holding a meeting of members soon after the setting up of the Working Group will be examined. Such a meeting could be held during:

- A first meeting of the Working Group on Careers in Refrigeration, will be held during the 4th IIR Conference on Sustainability and the Cold Chain, 7-9 April 2016 (Auckland, New Zealand).
- A second meeting of the Working Group will be held 12th IIR-Gustav Lorentzen Conference on Natural Refrigerants – GL2016, 21-24 August 2016 (Edinburgh, UK).

SUB-COMMITTEES

The Working Group will set up a “Women in Refrigeration” sub-working group in order to address the underrepresentation of women in the fields of engineering and especially in the refrigeration industry.

WEB PAGE

A web page shall be set up in order to disseminate relevant information on “Careers in Refrigeration” and to promote the activities of the working group and the IIR.

The website will be periodically updated thanks to technical assistance from the head office of the IIR, under the responsibility of the President of the Working Group.

Also in order exchange documents, a Dropbox will be set-up to enable members to upload and download documents. This Dropbox will be administrated by the IIR, the chairman and bureau.

EXISTING IIR PUBLICATIONS

IIR News: The first Women in Refrigeration network in ICR2015. [\[See\]](#)

Women in the cold chain industry articles. 4th IIR Conference on Sustainability and the Cold Chain, 7-9 April 2016 (Auckland, New Zealand). [\[See\]](#)

Women in the Refrigeration Industry. The 2016 ASHRAE Annual Conference, 25-29 June 2016, St Louis, Missouri, USA.

CaRe: IIR working group with emphasis on women in refrigeration. 5th International Conference on Sustainability and the Cold Chain, 6-8 April 2018 (Beijing, China). [\[See\]](#)