



INSTITUT INTERNATIONAL DU FROID
INTERNATIONAL INSTITUTE OF REFRIGERATION

Electric vehicle thermal management systems

*IIR Working Group of Commission E1
with Commissions B1, B2, D1, D2 and E2*

TERMS OF REFERENCE

INTRODUCTION

In accordance with Article XIX of the International Agreement concerning the IIR and articles 15 to 18 of the Internal Regulations of the Scientific Council of the IIR, the setting up of a Commission E1 Working Group (WG) is proposed. The following Terms of Reference (ToR) further define the role of the WG.

BACKGROUND

The rapid development of new energy vehicles signifies great changes in the field of transportation industry. The trend towards electrification, intellectualisation, networking and sharing of the future vehicles presents more opportunities and challenges for the automotive thermal system. It has become one of the key technologies which covers air conditioning of passenger compartment, and temperature control of battery, motor, and electric control. Especially since the implementation of the Kigali Amendment, the low-carbon development of automotive thermal system with environment-friendly refrigerants has become a very urgent task.

In recent years, automotive thermal management has received widespread attention from international researchers. Some universities, research institutes and renowned companies such as Sanhua (China), Denso (Japan), Mahle (Germany), Valeo (France), etc. have been vigorously developing thermal management technology and have achieved many innovative results. Therefore, it is necessary to establish a working group to share advances in automotive thermal management technology.

OBJECTIVES

The objectives of the Working Group are: (1) to share the latest research advances in automotive thermal management technologies; (2) to promote the development of key components for automotive thermal management; (3) to demonstrate the benefits of improved thermal management technology in practice; (4) to disseminate knowledge related to automotive thermal management; (5) to provide technical services related to automotive thermal management.

WORK PLAN OF THE WORKING GROUP

The thermal management system of new energy vehicles, especially pure electric vehicles, involves coupling between multiple subsystems and multi-objective collaborative thermal management, which is much more complex than for traditional fuel vehicles. With the development of the new energy vehicle industry, the future development of automotive thermal management will be in the direction of low carbonisation, synergy, and intelligence. Therefore, the members of the working group will combine their strengths and closely focus their research work on the future development trend of automotive thermal management, and share their progress and discuss further work at the annual meeting, including: (1) the development of automotive thermal management architecture design, optimisation, and integration technology; (2) the progress of substituting refrigerants for automotive thermal management systems; (3) the progress of automotive compressor technology; (4) the development of core components such as automotive heat exchangers and valves.

The WG will vigorously promote cooperation between scientific research institutions and enterprises, provide technical services to enterprises while carrying out the demonstration application of research results, and further promote the development of the automotive thermal management industry. In addition, the WG will share knowledge and the latest research developments in automotive thermal management through various information dissemination methods, such as informatory notes, webpage push, and media reports.

WORKING GROUP OUTCOMES

The annual and final reports on automotive thermal management will be submitted to the IIR. A review paper and at least five high-quality research papers will be submitted to the International Journal of Refrigeration. In addition, an Informatory Note will be written for the IIR after the final report.

INVOLVEMENT OF IIR COMMISSIONS

Main commission: E1

Other Commissions: B1, B2, D1, D2 and E2

MEMBERSHIP

WG members are expected to be either Commission members, private members, or representatives of corporate members of the IIR, with a technical expertise enabling them to contribute to the work of the WG.

CHAIRMAN AND BUREAU

Chairman: Xianting LI

Secretary: Huiming ZOU

WORKING GROUP FUNDING

(A) *Technical activities: Technical activities will be supported by funding individually secured by the WG participants*

(B) *WG management: Project management costs will be covered by the team of Prof. Xianting Li*

MEETINGS

The WG will organise a workshop on automotive thermal management every four years at the IIR International Congress of Refrigeration.

The WG will hold an international academic Conference on automotive thermal systems every two years in China.

Minutes of the meetings shall be prepared by the Secretary and a copy shall be sent to the IIR head office, to the President of the Science and Technology Council, and to the President of Commission E1. If the meeting is enlarged to a workshop, the organisers will prepare proceedings of the papers presented.

WEBPAGE

A webpage, hosted by the IIR, will be set up in order to disseminate relevant information and to promote the activities of the Working Group and the IIR. It will be periodically updated under the responsibility of the Chair and Vice-Chair. It will be linked to the Commission E1 webpage and to the IIR website.