

Alberto Cavallini

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Bio

Professor Alberto Cavallini is the Honorary President of the International Institute of Refrigeration (IIR) Professor Emeritus of Energy Science with the Engineering Faculty of the University of Padova. He has been the Director of the Institute of Fisica Tecnica of the University of Padova and of the Refrigeration Institute of the Italian Research Council. He is the 2002 winner of the J&E Hall Gold medal, awarded by the U.K. Institute of Refrigeration for the most noteworthy contribution to the advancement of refrigeration. His research in the field of energy management, heat transfer, refrigeration and air-conditioning, with particular reference to problems related to the refrigerant substitution issue.

Abstract

Low-GWP Alternative Technologies in the Food Cold Chain: the European and Italian Perspective along the Various Sub-Sectors

Following the restrictions on the use of CFC/HCFC refrigerants according to the Montreal Protocol for the safeguard of the stratospheric Ozone layer, chemistry prompted a new family of synthesized products to substitute for the old working fluids, the non-ozone-depleting HFCs. At that time drop-in HFC single products or suitable blends have been made available for almost all refrigeration applications.

Since then, for commercial refrigeration applications in industrialized countries, the dominant refrigerant has been R-404A, a HFC blend (R-125/143a/134a,44/52/4 mass percent), with a limited temperature glide (0.8 K at normal pressure), and safety group A1.

All HFC fluids are strong greenhouse gases, and specially R-404A (GWP₁₀₀=3940); the use of all these products is going to be strongly restricted under international agreements (EUF-gas regulation; Kigali Amendment of the Montreal Protocol) to counteract the Global Warming issue.

In this never-ending refrigerant substitution issue, chemistry shows unable to offer a new family of fluids fully meeting all requirements asked for by a refrigerant: new synthesized refrigerants belong to the HFO family.