

Non-CO₂ Greenhouse Gases: High-GWP Gases

Source/Sectors: Substitution of ODS/Foam Sector

Technology: Replace HFC-245fa in sprays with water-blown CO₂ (C.1.4.4)

Description of the Technology:

In this technology, water and polymeric isocyanate react to generate CO₂ blowing agent *in situ* that is then used in foam blowing (IEA, 2003; UNEP, 1998). During manufacture, no ODS or high GWP gases are emitted; there are limited health and safety risks during processing (USEPA, 2006b).

Effectiveness: Fair

Implementability: Fair

Reliability: Foams produced using the CO₂/water blowing agents have performance limitations in thickness, conductivity, dimensional stability, and density, when compared to HCFC- and HFC-blown foams (UNEP, 2002; IEA, 2003).

Maturity: Research ongoing; research is needed in order to further develop and improve the technology.

Environmental Benefits: HFCs emission reduction

Cost Effectiveness:

Technology	Lifetime (yrs)	MP (%)	RE (%)	TA (%)	Capital cost	Annual cost	Benefits
Replace HFC-245fa in sprays with water-blown CO ₂ ¹	25	5	100	0-26	\$2.23	\$23.97	\$0.00

Note: MP: market penetration; RE: reduction efficiency; TA: technical applicability; costs are in year 2000 US\$/MT_{CO₂-Eq.}
1: USEPA (2001), IEA (2003), USEPA (2004), & UNEP (2002)

Industry Acceptance Level: CO₂/water blown foam applications are widely used in Europe (IEA, 2003).

Limitations: The final products of the CO₂ blowing agent are poor in water proofing quality. This can be improved by increasing the amount of polymeric isocyanurate, which is not suitable for many existing equipments (IEA, 2003).

Sources of Information:

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