YORK®	Refrigerant Shift HCFC-123 to HFC-134a (3)	
MARKETING GUIDE	Supersedes: Nothing	160.00-MG3 (906)

FOR INTERNAL DISTRIBUTION TO YORK EMPLOYEES ONLY

INTRODUCTION

This is another update on current refrigerant trends (supplementing the Refrigerant Shift Marketing Guides released in May 2005, FORM 160.00-MG1, and in August 2005, FORM 160.00-MG2), giving you some additional information on current refrigerant developments. Please also refer to the two earlier guides for a more complete understanding of the global refrigerant development.

HCFC-123 REPLACEMENT APPROVED

1. EPA approved HFC-245fa as an alternative refrigerant to HCFC-123 under the SNAP program in mid 2005. Manufacture of HFC-245fa already started in 2003 by Honeywell in the USA for the foam blowing industry, with production quantities many times that of HFC-123.

2. One international chiller manufacturer has started using HFC-245fa in its centrifugal chillers in 2006.

HCFC-123 MARKET SHARE

3. Based on the current refrigerant-shift trend, our earlier prediction of HFC-123 global market share (centrifugals only) for 2005 & 2006 was correct. With an estimated 20% market share in 2005, it is anticipated to drop below 20% in 2006. It is driven by several factors: 1. Global shift away from HCFCs; 2. YORK no longer offering new HCFC-123 chillers; 3. Trane making more HFC-134a units internationally in response to market demand. HFC-134a centrifugal chiller demand and market share continue to grow globally.

REFRIGERANT PRODUCTION & PHASE-OUT

4. As HCFC-22 will be dropped from new products starting 2010, HCFC-123 will be regulated for production starting 2015. Here is a quote from an official EPA letter dated Feb 2006, reiterating EPA's position on HCFCs:

> There have been no changes in the phaseout schedule for any HCFC, including HCFC-123. As of January 1, 2015, EPA regulations ban the production or import of HCFCs except for use as refrigerants in equipment manufactured before January 1, 2020. EPA will complete the HCFC phaseout by completely banning their import or export as of January 1, 2030. EPA has no plans to extend or eliminate the 2015 or 2030 phaseout dates for HCFC-123, nor do we anticipate a change in the phaseout schedule for this substance at the international level.

5. Trane indicated HCFC-123 is a feedstock to another refrigerant. This is only partially true, but misleading. HCFC-123, HCFC-124 and HCFC-125 are all derived from the base materials trichloro-ethylene or Perchloro-ethylene. There is no necessity to produce HCFC-123 to feed production of HCFC-125. It is also important to note that, production for use as a feedstock neither results in the necessary refrigerant quality required for chiller applications nor gives it the legal right to be used separately as a refrigerant. Additionally, the decision on halting HCFC-123 refrigerant

production prior to the mandated deadlines will ultimately be to the discretion of the single US producer – DuPont. YORK believes it is in the *customer's* best interest to avoid this unnecessary risk when investing in capital equipment with a 30-year expected life.

ENERGY EFFICIENCY

6. Trane claimed in its publications that Trane's HCFC-123 centrifugal chillers are up to 18% more efficient than the next best (HFC-134a) chillers in the market. This exaggeration is grossly inaccurate for both full load and part load. Trane's advertised full load efficiency for many claims has been based either on one-of-a-kind SCF (Series Counterflow) applied chillers (not a single chiller and not certified by ARI), or a selection with very HIGH pressure drop (not commercially feasible). The theoretical-cycle efficiency advantage for HCFC-123 over HFC-134a (about 4%-5%) could result in higher design full load efficiency for an HCFC-123 chiller. However, full load at design conditions accounts for only 1% of chiller total operating hours. IPLV is the true benchmark for chiller energy efficiency and includes the 1% of operating hours spent at full load design conditions plus the 99% of operating hours spent at off-design conditions. With HCFC-123 theoretical cycle efficiency partially offset by its heat-transfer disadvantage, HFC-134a IPLVs can exceed those of HCFC-123 in many applications (especially operating with variable-speed drives). In a real world, most of the chillers, specified and installed, have been at energy efficiency levels called for by a certain building code or standard (such as ASHRAE 90.1). They tend to have equivalent efficiencies regardless of refrigerants used.

ENVIRONMENT AND CLIMATE

7. Trane continued to quote an obsolete 2002 United Nations Environment Program (UNEP) assessment report suggesting possible retention of HCFC-123 as a refrigerant. That report was not endorsed by the UNEP Technology and Economic Assessment Panel. Numerous subsequent reports (in 2003, 2004 and 2005) have not propagated this opinion.

8. The following quotes from the UNEP Executive Director and the accompanied press release in mid-2005 clearly stated UNEP's position on HCFCs:

"There can be no trade-offs between saving the ozone layer and minimizing climate change," said UNEP Executive Director Klaus Toepfer. "This report demonstrates that it is in our power to maintain the Montreal Protocol's momentum while achieving the Kyoto Protocol targets."

"HCFCs were successful in meeting the early CFC phase out goals but are generally considered undesirable for most new equipment because they do have some ozone depleting potential; they will eventually be phased out under the Montreal Protocol."

9. The Secretary General of the United Nations in a message on the International Day (Sept 16, 2006) for the Preservation of the Ozone Layer, made the following statements:

"….failure to comply with the Protocol would delay or could even prevent recovery of the ozone layer. I therefore urge all countries to reaffirm their commitment to implementation".
"The theme of this year's observance, Protect the Ozone Layer: Save Life on Earth, invites the international community to build on its achievements to date by accelerating the phase-out of ozone depleting substances".

10. Trane often insinuated possible bans on HFCs in Europe. The latest adopted European Union legislation allowed the continued use of HFCs for HVAC applications with recommended containment and control. The fact is that HFCs are now the mainstream refrigerants used throughout the world, with growing demand and with no phase-out schedule. The Kyoto Protocol

does not ban any refrigerants or any greenhouse gases. On the other hand, HCFC-123 has already been phased out in the European Union, and will soon be phased out in other parts of the world.

SAFETY

11. Trane's recent presentations also claimed safety for HCFC-123. The fact is that HCFC-123 is rated B1 for toxicity (as compared with A1 for HFC-134a), 9000 ppm for RCL, Refrigerant Concentration Limit, (5.5 times worse than HFC-134a), and 50 ppm for TLV-TWA, Threshold Limit Value – Time Weighted Average, (20 times worse than HFC-134a). RCL is designated by the International Mechanical Code – 2003, and also approved by the ASHRAE34 committee and ASHRAE board. TLV-TWA is a consistent occupational exposure limit assigned by the American Conference of Governmental Industrial Hygienists (ACGIH). The following table compares environmental and safety attributes for the 6 commonly used refrigerants.

Refrigerant	ODP	GWP	Toxicity	RCL (ppm)	TLV-TWA (ppm)
HCFC-22	0.05	1700	A1	25,000	**1000**
HCFC-123	**0.02**	**120**	**B1**	**9,100**	**50**
HFC-134a	**0**	**1300**	**A1**	**50,000**	**1000**
HFC-410A	0	2000	A1	55,000	1000
HFC-407C	0	1700	A1	69,000	1000
HFC-245fa	0	560	**B1**	34,000	**300**

You can help the environment and the industry by educating and convincing your customers to adopt HFC-134a for centrifugal and other chillers.