

Refrigerant Management Program & Efficiency Opportunities

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Refrigerant Management Program

- AB 32 Early Action Measure for high-GWP gases
- Stationary non-residential sources
- Systems with CFC, HCFC, HFC refrigerants
- Requirements:
 - Facility registration
 - Leak detection and monitoring
 - Leak repair, system retrofit and possible retirement
 - Other service practices
 - Reporting and recordkeeping for owners
 - Reporting and recordkeeping for supply chain

Ozone Depletion Potential Global Warming Potential

Refrigerant		(ODP)	(GWP)
R-11	CFC	1	4,000
R-12	CFC	1	2,400
R-502	CFC	0.283	4,300
R-22	HCFC	0.055	1,700
R-123	HCFC	0.02	120
R-134a	HFC	0	1,300
R-410A	HFC	0	1,975
R-404A	HFC	0	3,784
R-507	HFC	0	3,850
R-407A	HFC	0	1,990
R-407C	HFC	0	1,653
R-717 Ammonia - NH ₃	Natural	0	<1
R-744 Carbon Dioxide - CO ₂	Natural	0	1

RMP Timing

- Large systems
 - 2,000 lbs and above
 - Registration and reporting in 2012
- Medium systems
 - 200 lbs to <2,000 lbs
 - Registration and reporting in 2014
- Small systems
 - 50 lbs to <200 lbs
 - Registration in 2016, no reporting

Information

The screenshot shows the California Air Resources Board (ARB) website. At the top left is the CA.GOV logo and the California Environmental Protection Agency AIR RESOURCES BOARD name. Navigation links include Home, Programs, Rulemaking, Board Meetings, Laws & Regulations, Data & Statistics, Permits, Etc., and Events. A search bar is located at the top right. The main content area features the title "Stationary Equipment Refrigerant Management Program" in green text. Below the title is a date stamp: "Sunday, February 28, 2010". To the left of the main content is a sidebar with "UP LINKS" including "ARB Programs" and "Climate Change". A "ShareThis" button is visible. At the bottom of the main content area, it says "This page last reviewed February 10, 2010".

<http://www.arb.ca.gov/cc/reftrack/reftrack.htm>

California Environmental Protection Agency | AIR RESOURCES BOARD

FREQUENTLY ASKED QUESTIONS

Refrigerant Management Program

http://www.arb.ca.gov/cc/reftrack/refrigerant_management_program_faq.pdf

The screenshot shows a pamphlet titled "FACTS ABOUT Refrigerant Best Management Practices". The pamphlet is divided into two columns. The left column is titled "What are common Refrigerant Best Management Practices currently used?" and includes a small image of a grocery store shelf with produce. The right column is titled "How do Best Management Practices save money?" and includes a small image of a commercial refrigerator. Below the images, there is text that is partially obscured but appears to be "Facilities using commercial refrigeration".

http://www.arb.ca.gov/cc/reftrack/best_management_practices_pamphlet_electronic_version.pdf

Energy implications

- New construction
 - Direct refrigerant systems are most efficient option
 - Indirect design:
 - HFC primary system cooling a secondary circulation fluid
 - Reduces HFC charge to the compressor room & condenser
 - Extra heat exchange, pumping costs and heat gains
 - Less optimal overall system designs (less obvious)
 - Potential large increase in energy with glycol systems
 - Glycol only on applicable to medium temperature
 - CO₂ proven on low temperature, energy equal to DX HFC
- Savings By Design allows indirect system to be used for base case, within limits

Energy implications

- Retrofits
 - Opportunity: combine energy efficiency upgrades with leak detection and mitigation budgets
 - Caution on system conversions: if energy use increases, no incentives and adds to GHG
- Operations
 - Running low on charge increases energy use
 - Important message to owners: manage tendency to defer leak repairs and recharge
- Potential future seminar effort to promote efficient use of natural refrigerants in commercial systems

Natural refrigerants

- Carbon dioxide
 - CO₂ has high value as indirect phase-change fluid
 - Low temp demonstrated, medium temp emerging
 - Possible use in direct (compressorized) systems
- Ammonia
 - Potential to increase NH₃ applications by using indirect design and low-charge systems
 - High efficiency
 - Lacking small compressors, etc.
 - Concerns for toxicity and codes

ASHRAE natural refrigerants document:

http://www.ashrae.org/docLib/20090220_RefrigerantsPDAppbyBOD012809.pdf