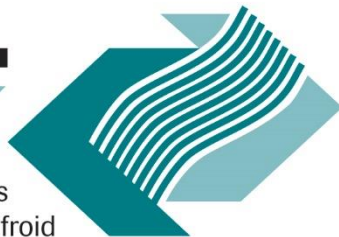


FORUM RÉFRIGÉRATION

THÉORIE | PRATIQUE | MISE À JOUR

CCTAF

Corporation des entreprises
de traitement de l'air et du froid



Chapitre de
Montréal



Agenda

- | | |
|---|--|
| 1 | Protocole de Montréal contexte et amendement |
| 2 | Règlementation national et international |
| 3 | Réfrigérants: Normes et Codes |
| 4 | Mise à niveau des installations existantes |
| 5 | Tendance, architecture de système, HFO |
| 6 | Questions |

Please fill out

Les réfrigérants synthétique: Future et solutions

Presenter:
Alain Mongrain

alain.mongrain@emerson.com



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

1980

2019



Réfrigérants et règlementations

Couche d'ozone et effet de serre

Couche d'Ozone

- La Terre possède une atmosphère qui nous permet de vivre, la couche d'ozone est la partie de l'atmosphère se situant entre 20 et 50 kilomètres d'altitude (stratosphère), cette couche d'ozone nous protège en absorbant la plupart des rayons ultraviolets émis par le soleil.

Une dégradation importante de la couche d'ozone implique une action nocive des rayons ultraviolets directement sur la vie sur terre comme la réduction de la photosynthèse, destruction du plancton, cancers, certains dérèglements de notre système immunitaire, des mutations, et n'oublions pas que l'ozone participe aussi à l'équilibre des climats.

Effet de serre

- Quand les rayons du soleil atteignent la surface de la Terre, une partie de ces rayons sont renvoyés sous forme de rayonnement infrarouge vers l'espace, une autre partie est piégée par une couche de gaz située dans la basse atmosphère, contribuant ainsi à réchauffer la terre. Grâce à ce phénomène naturel, appelé effet de serre, la température moyenne de l'air à la surface de la Terre est d'environ + 15°C. Si la proportion des rayons qui réchauffent notre planète augmente considérablement, cela induira une hausse globale des températures terrestres, c'est le phénomène bien connu des serres de jardin.

“ PDO, PRP, et TEWI ”

- **ODP (Ozone Depletion Potential ou Potentiel d'appauvrissement de l'ozone)**

C'est un indice qui classe la nocivité d'un composé chimique par apport à la couche d'ozone. Cet indice est calculé par rapport à une molécule de référence, à savoir le R11 qui a un ODP = 1. Ne concerne que les fluides contenant du fluore (CFC, HCFC).

- **GWP (Global Warming Potential ou Potentiel de réchauffement planétaire)**

Cet indice caractérise l'action d'un composé chimique sur l'effet de serre. La molécule de référence est le CO₂ qui a un GWP = 1 pour des durées bien déterminées généralement 100 ans. Plus cet indice est élevé plus le composé est néfaste.

- **TEWI (Total Equivalent Warming Impact ou impact de réchauffement total équivalent)**

- C'est un concept qui caractérise l'impact global d'une installation sur le réchauffement planétaire durant sa vie opérationnelle.

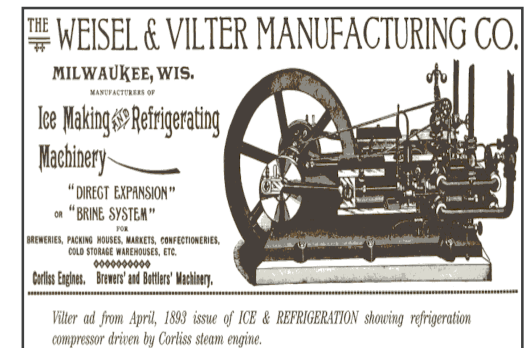
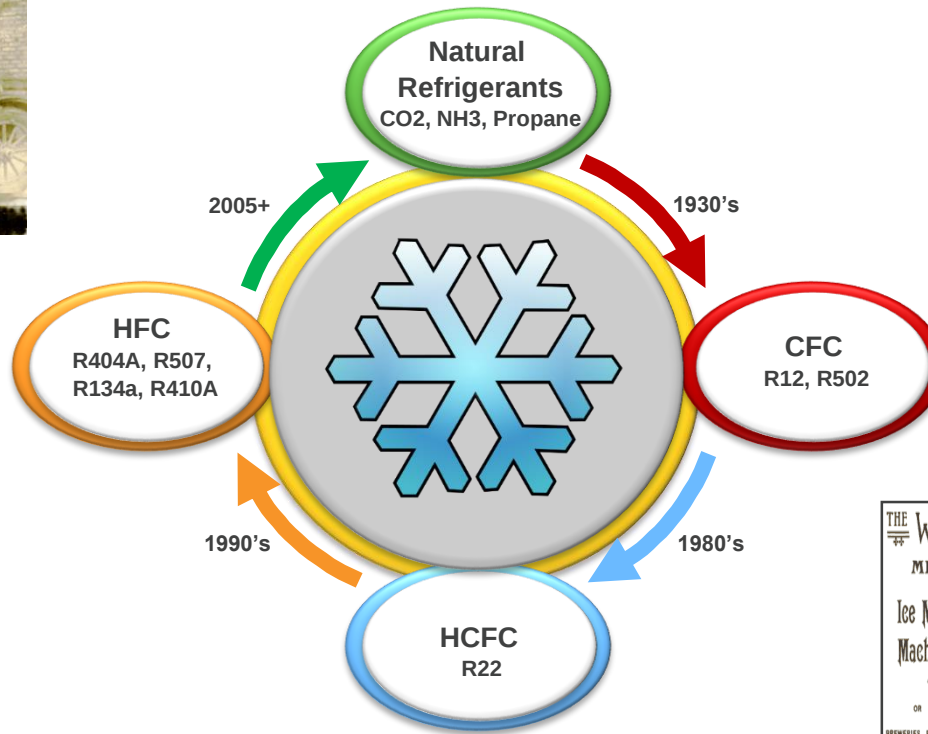
Cet indice comprend l'effet direct dû aux émissions par fuites dans les installations et l'effet indirect provenant des émissions de CO₂ dues à la consommation d'énergie requise pour faire fonctionner l'installation. Le TEWI s'exprime en Kg de CO₂.

- **Formule de calcul du TEWI :**

- $TEWI = D + I = [GWP_{100} \times m \times f \times n] + [E \times n \times A]$
m : charge en fluide frigorigène. (Kg)
f : Taux annuel de fuite. (%)
n : durée de vie de l'équipement. (an)
E : consommation d'énergie / an. (KWh / an)
A : Émission de CO₂ par KWh. (kg CO₂ / KWh)

Protocole de Montréal contexte et historique

Le retour des réfrigérants naturels



Réfrigérants (1756 à 1987)



Premier réfrigérants utilisés

- ❖ Ammoniaque (NH_3)
- ❖ Dioxyde de soufre (SO_2)
- ❖ Chlorure de méthyle (CH_3Cl)
- ❖ Dioxyde de carbone (CO_2)
- ❖ Éther diéthylique ($(\text{C}_2\text{H}_5)_2\text{O}$)
- ❖ Chlorométhane

Réfrigérateur toxique

In use [since the early 20th century](#), early consumer refrigerator designs relied heavily on ether, ammonia, and other toxic gases to help the cooling process. (Sulfur dioxide and methyl formate, flammable and corrosive to the eyes, were among the worst offenders.) So long as the material was encapsulated, there was no problem. But should the appliance fail due to eroding pipes—or if a repairman wasn't careful—owners would get a lungful. When Albert Einstein [read a newspaper story](#) about an entire family dying in just such a mishap, he and Leo Szilard teamed up to design a better refrigerator. Before they could change the world, Freon gas became the standard for coolers; inventor Tom Midgley even demonstrated its safety by [buffing it](#) in front of an audience during an awards ceremony. (Eventually, modern fridge makers would ditch Freon, too, after the gas was found to be bad for the environment.)



ACTUALITÉ

ENQUÊTES

SPORTS

SPECTACLES

ARGENT

MONDE

VIE

PORTE-MONNAIE

MAISON EXTRA

ÉVASION

GUIDE DE L'AUTO

OPINIONS

BLOGUES



EN DIRECT

ACTUALITÉ FAITS DIVERS



CATHERINE BOUCHARD

Lundi, 4 novembre 2019 11:34

MISE À JOUR Lundi, 4 novembre 2019 11:38

Un couple d'octogénaires, qui étaient en train de s'intoxiquer avec du dioxyde de soufre provenant d'un vieux réfrigérateur, a été pris en charge juste à temps, lundi matin.



New Brunswick

Classes resume at NBCC in Saint Andrews after hazardous material leak forced evacuation



2 people sent to hospital following sulphur dioxide gas leak, WorkSafeNB investigating

[Bobbi-Jean MacKinnon](#) · CBC News · Posted: Jun 06, 2019 3:30 PM AT | Last Updated: June 6

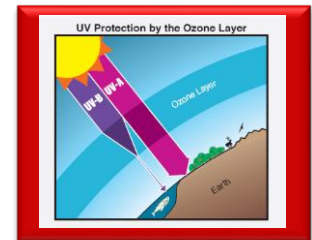
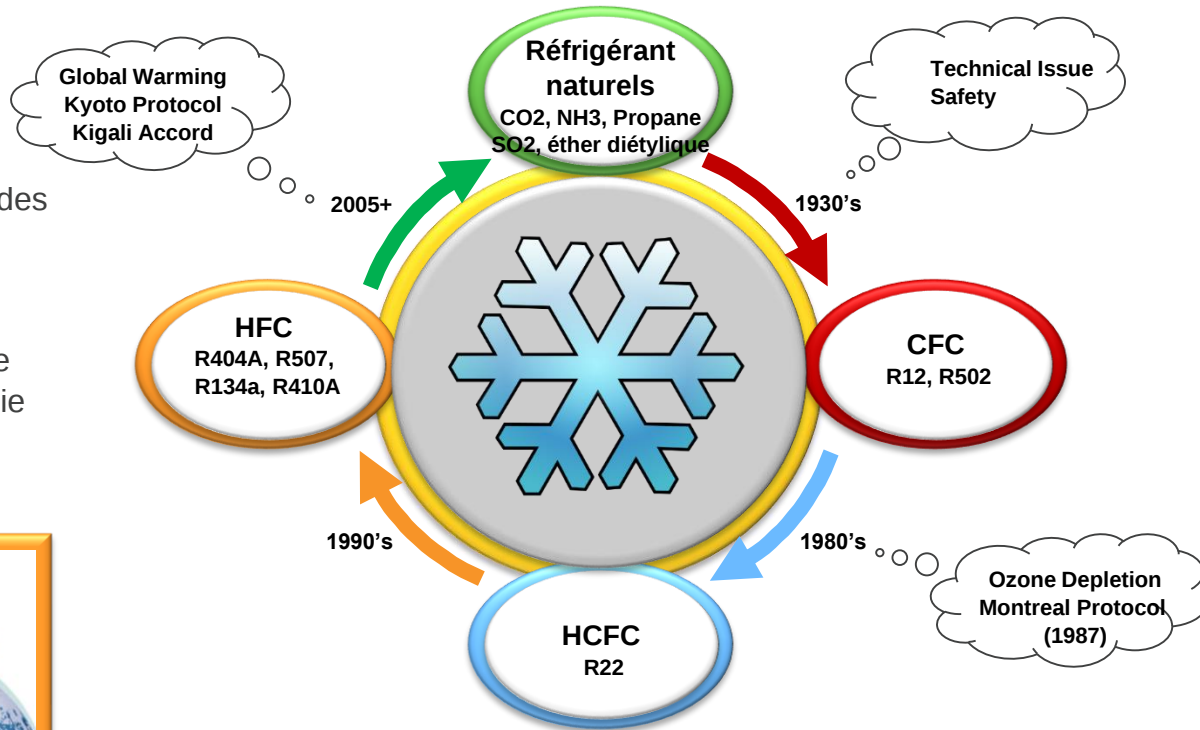


Le retour des réfrigérants naturels

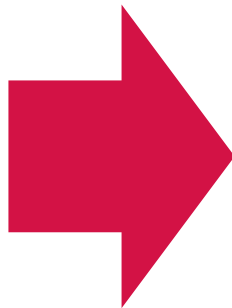
Défis actuels:

Règlement sur les fluides frigorigènes

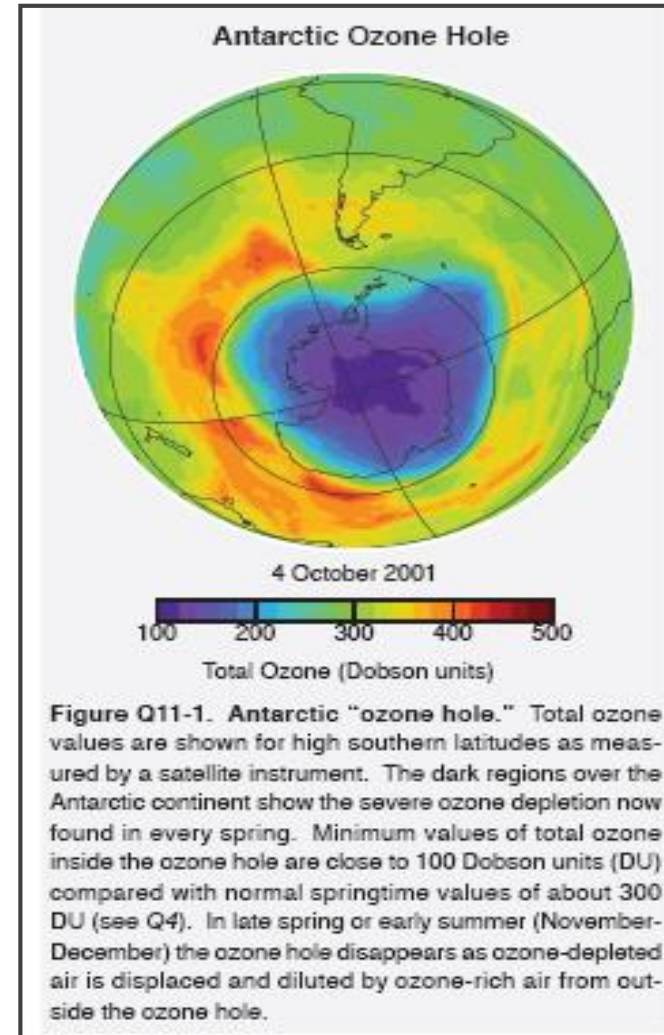
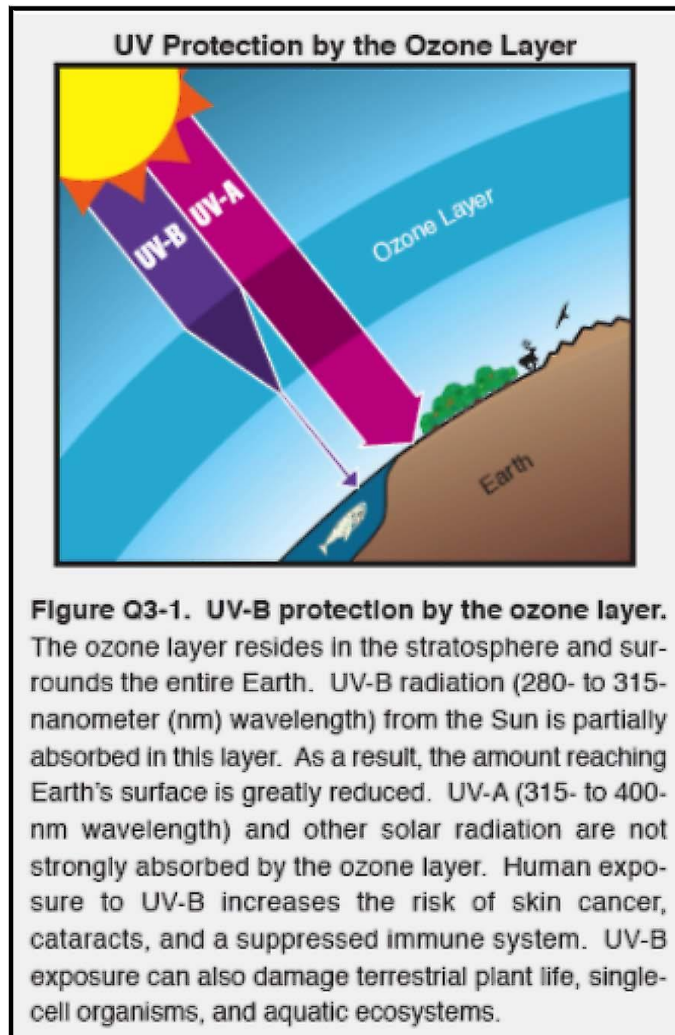
- Interdictions
 - Taxes
 - Bourse Carbone
- Règlement sur l'énergie



Le produit miracle !!!!

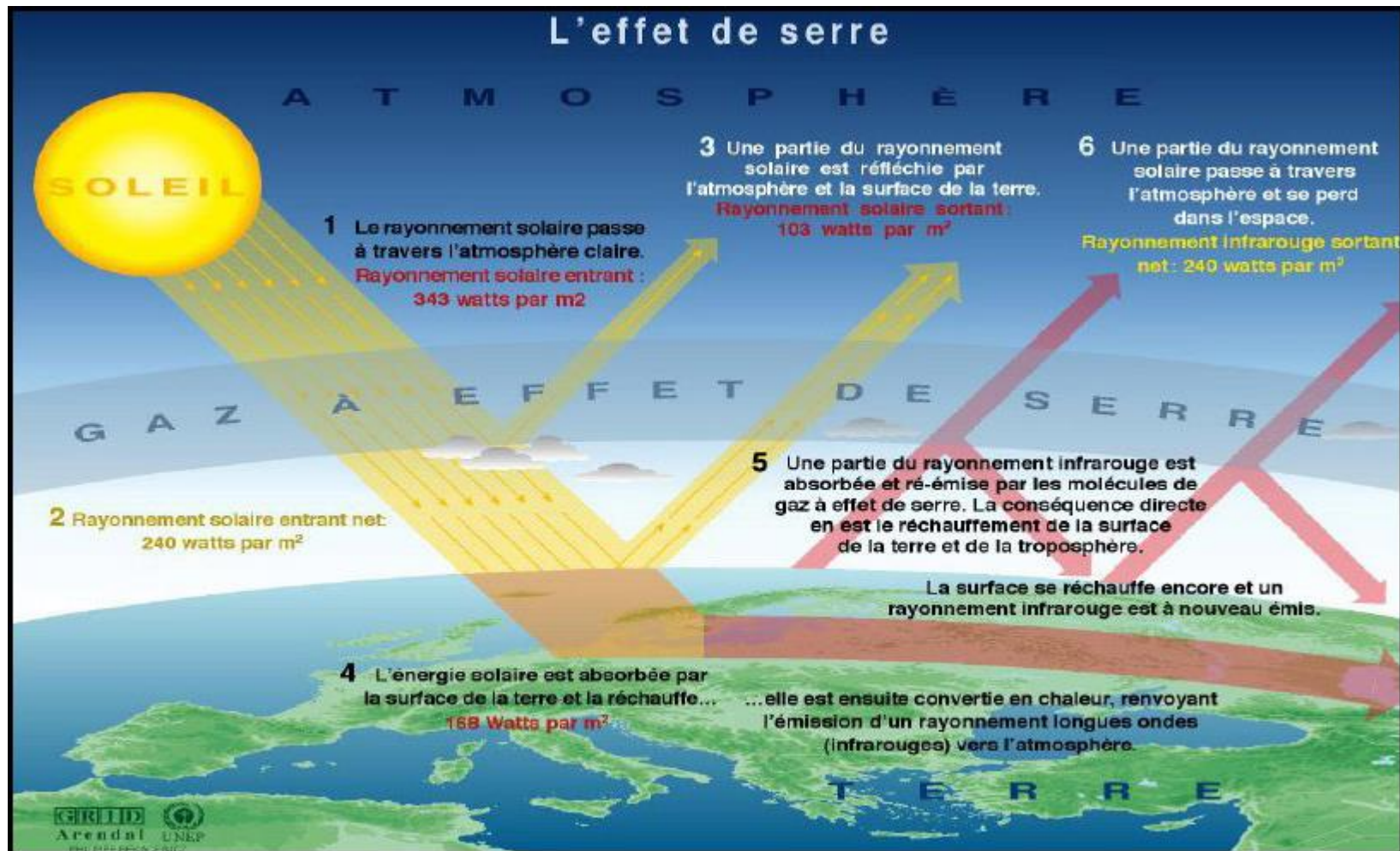


Trou dans la couche d'ozone: Motif de l'élimination du R-12 et R-22 (Exposition au rayonnement UV conduit au cancer de la peau)



Protocole de Montréal, signé le 16 sept. 1987, élimine CFCs and HCFCs

Une nouvelle préoccupation: les changements climatiques, la motivation des changements des HFC



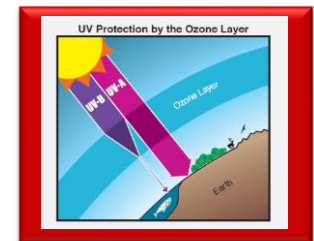
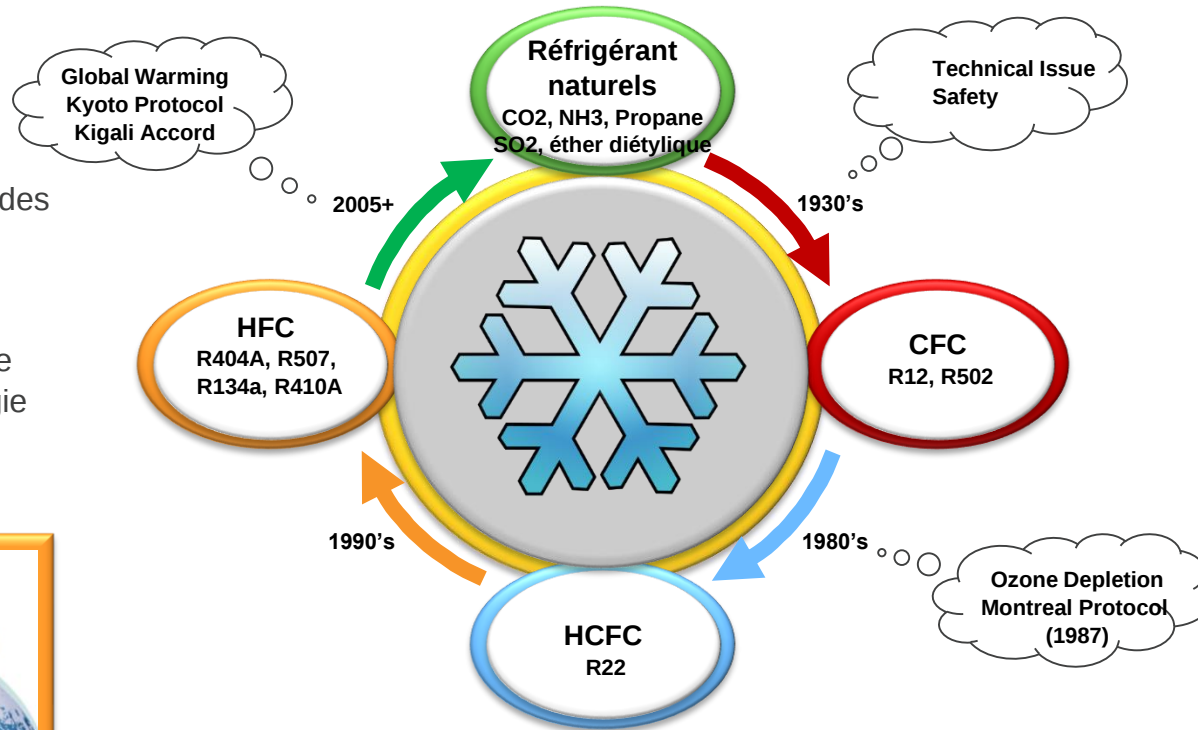
Le retour des réfrigérants naturels

Défis actuels:

Règlement sur les fluides frigorigènes

- Interdictions
- Taxes
- Bourse Carbone

Règlement sur l'énergie

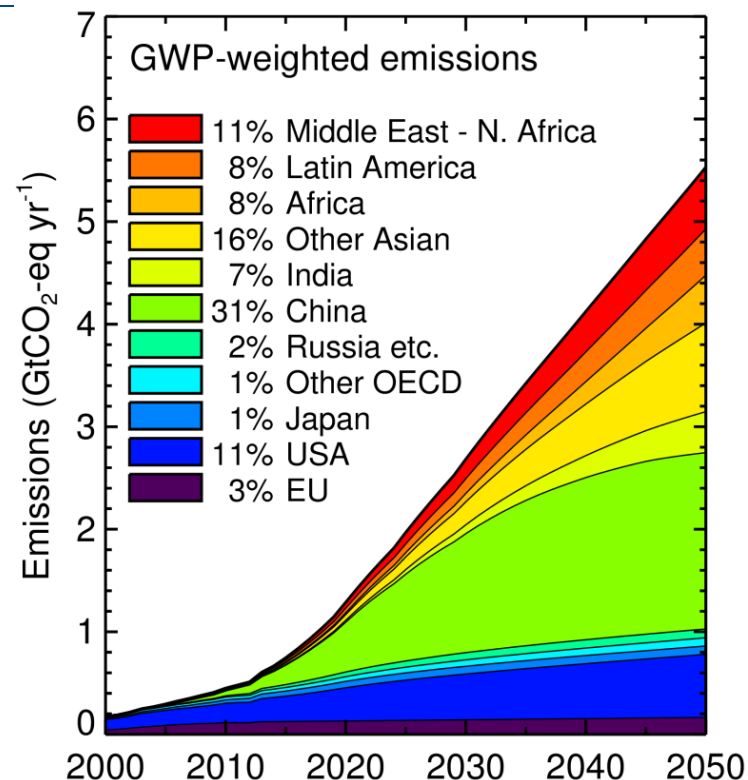


Incidence du Protocole de Montréal positif sur le changement climatique

Emission reductions by policies/actions, bn tonnes CO₂ equivalent

Policy/Action	Cumulative emissions	Period	Annual emissions*
Montreal protocol ¹	135.0bn	1989-2013	5.6bn
Hydropower worldwide ²	2.8bn	2010	2.8bn
Nuclear power worldwide ²	2.2bn	2010	2.2bn
China one-child policy ³	1.3bn	2005	1.3bn
Other renewables worldwide ²	600m	2010	600m
US vehicle emissions & fuel economy standards ⁴	6.0bn	2012-25	460m
Brazil forest preservation ⁵	3.2bn	2005-13	400m
India land-use change ⁶	177m	2007	177m
Clean Development Mechanism ⁷	1.5bn	2004-14	150m
US building & appliances codes ⁴	3.0bn	2008-30	136m
China SOE efficiency targets ⁸	1.9bn	2005-20	126m
Collapse of USSR ⁹	709m	1992-98	118m
Global Environment Facility ¹⁰	2.3bn	1991-2014	100m
EU energy efficiency ¹¹	230m	2008-12	58m
US vehicle emissions & fuel economy standards ⁴	270m	2014-18	54m
EU renewables ¹¹	117m	2008-12	29m
US building codes (2013) ¹²	230m	2014-30	10m
US appliances (2013) ¹²	158m	2014-30	10m
Clean technology fund ¹³	1.7bn	project lifetime	na
EU vehicle emission standards ¹⁴	140m	2020	na

CATEGORIES:
 Energy production
 Transport
 Other regulations
 Global treaties
 Land & forests
 Other



Protocole de Montréal a le plus grand Impact sur les changements

climatique! *

... Mais, la croissance des pays en développement pourrait éclipser les gains, **.

* Economist, January 2014

**Velders et al, OEWG35, Bangkok, April 22, 2015

De nombreux pays ont commencés à prendre des mesures indépendantes - potentiel pour une réglementation mondiale

Walmart Launches Project Gigaton to Reduce Emissions in Company's Supply Chain



Through release of a sustainability toolkit, Walmart asks suppliers to reduce greenhouse gas emissions by one gigaton – the equivalent to taking more than 211 million passenger vehicles off of U.S. roads for an entire year

BENTONVILLE, Ark., April 19, 2017 – Today, during [Walmart's annual Milestone Summit](#), the company launched a [sustainability platform](#) inviting suppliers to join Walmart in committing to reduce greenhouse gas emissions resulting from their operations and supply chains. Dubbed Project Gigaton, this initiative will provide an emissions reduction toolkit to a broad network of suppliers seeking to eliminate

Digital Press Kit

View and download related reports and documents



Rapport 2016 sur les émissions de gaz à effet de serre de Bell Canada

INTRODUCTION

Le présent rapport sur les émissions de gaz à effet de serre (GES) repose sur les principes et exigences stipulés dans la norme ISO 14064-1 et dans le Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard (Revised Edition) (*Protocole des gaz à effet de serre : Une norme de comptabilisation et de déclaration destinée à l'entreprise (édition révisée)*). Il a servi à la production du rapport de Bell sur les émissions de GES au CDP et à d'autres initiatives de divulgation de l'entreprise. Bell a déclaré un total de 310 971 tonnes d'équivalents en dioxyde de carbone (« CO₂e »), qui comprennent les émissions de portée 1, 2 et 3 pour la période du 1^{er} janvier au 31 décembre 2016.

LIMITES ORGANISATIONNELLES

Bell adopte l'approche du contrôle opérationnel pour déterminer la portée de déclaration s'appliquant à ses filiales et divisions. Les unités d'affaire et filiales comprises dans les limites organisationnelles sont les suivantes :

- BCE Nexxia
- Bell Aliant
- Bell Canada
- Bell Média
- Bell Mobilité
- Canaux de distribution de Bell Mobilité
- Bell Solutions techniques
- Expertech
- Northwestel
- La Source



Le tableau ci-dessous rend compte des émissions de portée 1, 2 et 3 de Bell pendant 31 décembre 2015 et le 31 décembre 2016.

Émissions en tonnes de CO ₂ e ¹	Limite opérationnelle	2015	2016	Hausse (baisse)
Portée 1	Émissions directes contrôlées par Bell et comprenant les rejets accidentels de substances appauvrissant la couche d'ozone provenant des équipements de refroidissement, ainsi que de la combustion de mazout et de gaz naturel dans les immeubles, de diesel pour les tours de télécommunications et l'équipement de transmission, de propane pour l'équipement d'entretien et de diesel et d'essence pour les véhicules et les génératrices.	133 566	128 878	(3,5 %)
Portée 2	Émissions indirectes associées à l'utilisation d'énergie correspondant à la production et à la transmission de l'électricité requise par les activités de Bell dans ses immeubles et autres installations.	221 662	174 043	(21,5 %)
Portée 3	Autres émissions indirectes découlant des voyages d'affaires des employés de Bell (par avion, train, véhicules loués et véhicules personnels des employés).	8 522	8 050	(5,5 %)
Total		363 749	310 971	(14,5 %)

2015 CORPORATE SUSTAINABILITY REPORT CANADA

Brookfield
Global Integrated Solutions

ENVIRONMENT ENVIRONMENTAL IMPACT

CALCULATION METHODOLOGY

Our greenhouse gas (GHG) emissions are calculated following the ISO 14064-1 standard and we use the Operational Control approach, which accounts for all GHG emissions based on the control of operations. Our GHG inventory includes direct, indirect, and other indirect emissions from our corporate facilities, our vehicle fleet of over 400 vehicles, and business travel. This includes emissions from electricity and steam consumption, fugitive refrigerant emissions, and travel; looking forward, we hope to integrate emissions from purchased paper into these calculations.

Congruent with our previous Corporate Sustainability Reports, our base year is the 2013 fiscal year; this report will compare values with our base year as well as the 2014 year. Energy and GHG data accounts for all 17 of our corporate offices, and our water data accounts only for our head office in Markham, Ontario. The intensity values in the below chart are calculated on a per square metre basis of the facilities specific to each data set. We have proudly driven our energy, GHG, and water intensities down by 9 per cent, 27 per cent, and 2 per cent from the base year, respectively.

ENERGY, WATER & GHG INTENSITIES

	2013 (BASE YEAR)	2014	2015	% CHANGE FROM 2014	% CHANGE FROM BASE YEAR
TOTAL ENERGY INTENSITY (MJ / m ²)	928.3	867.1	849.4	▼ -2%	▼ -9%
TOTAL WATER INTENSITY (m ³ / m ²)	0.553	0.632	0.54	▼ -15%	▼ -2%
TOTAL GHG INTENSITY (t CO ₂ e / m ²)	0.029	0.032	0.022	▼ -31%	▼ -27%

GREENHOUSE GAS EMISSIONS

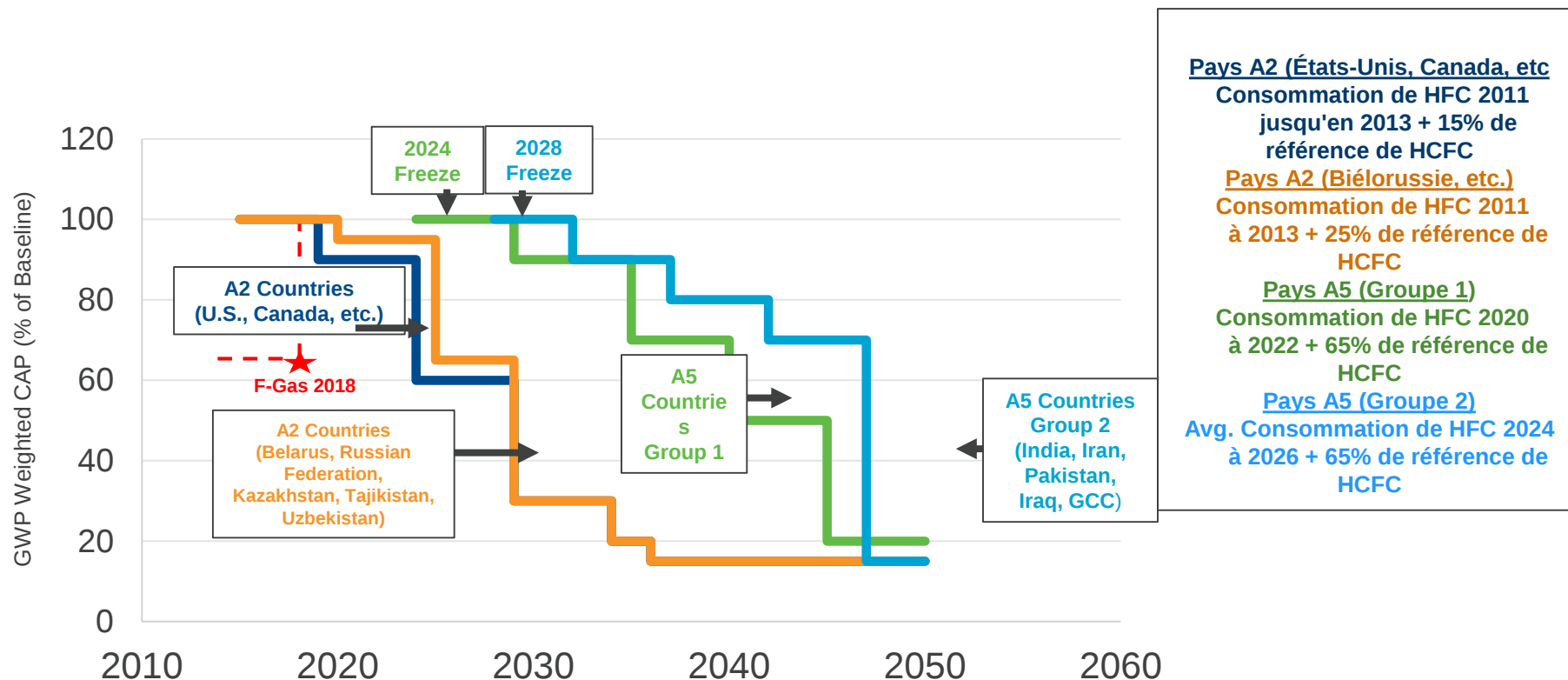
Since 2013, Brookfield GIS has been committed to reducing the GHG emissions of our fleet by 50 per cent by 2020. In 2015, we reduced the GHG emissions of our fleet by 22.5 per cent, taking us a substantial step closer to our 2020 goal. However, our total GHG emissions rose slightly in 2015 due to our expansion in company size and corporate travel, while our GHG intensity decreased.

As part of our commitment to sustainable living, we track and report on our carbon footprint on an annual basis. Our GHG emissions are calculated following the ISO 14064-1 standard, and we use the Operational Control approach – this approach accounts for GHG Emissions based on the control of operations. CO₂, CH₄, N₂O, as well as refrigerants R-22, R-122, and R-134a, were all accounted for in the GHG calculations.

Our GHG inventory includes our direct and indirect emissions from our corporate facilities and vehicle fleet. This includes emissions from fossil fuel consumption, fugitive refrigerants, electricity and steam consumption. We also calculated our Other Indirect emissions from corporate air travel, and we are working to include purchased paper as an Other Indirect emission source in the future.

Règlementation National et International

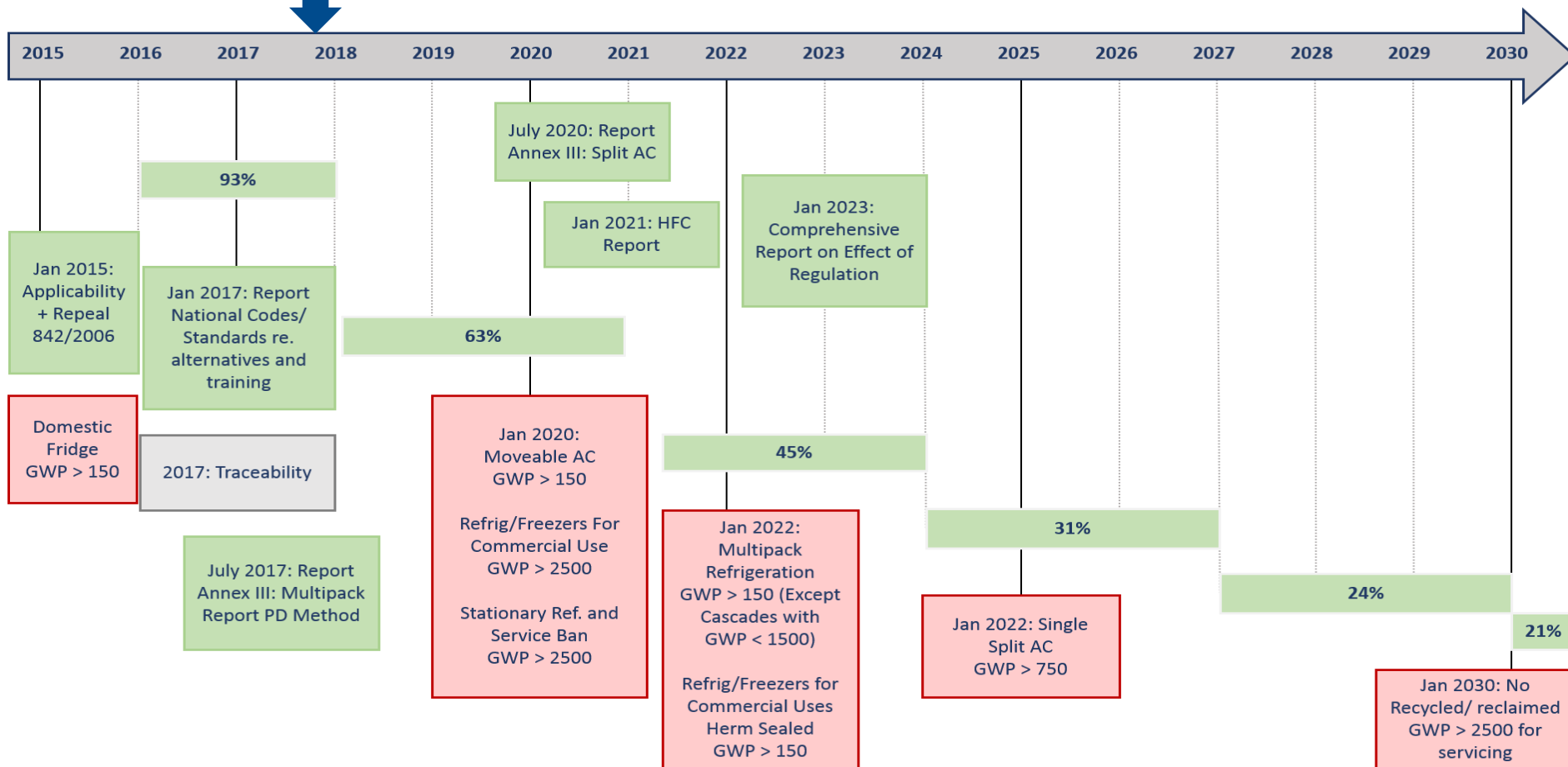
Amendement de Kigali du protocole de Montréal



Ref: conf.montreal-protocol.org/meeting/mop/mop-28/crps/English/mop-28-crp10.e.docx

Accord mondial sur la réduction des HFC ratifié par 197 pays, à Kigali, au Rwanda, le 15 octobre 2016

Règlementation Européenne F-Gaz



la mise en œuvre F-gaz en cours augmente
la croissance des systèmes de CO2 et de propane dans cette région

EPA règlement final ???



Final Rule: July 20, 2015									Proposed Rule: April 18, 2016 [^]			
Phase-out refrigerant	Super-market (New ^{**})	Super-market (Retrofit ^{***})	Remote condensing unit (New)	Remote condensing unit (Retrofit ^{***})	Stand-Alone				Refrigerated food processing and dispensing equipment (New)	Cold storage warehouses (New)	Ice machines (New)	Very low-temp refrigeration (New)
					MT < 2,200 BTU/hr. and not contain flooded evap. (New)	MT ≥ 2,200 BTU/hr. with or without flooded evap. (New)	LT (New)	LT and MT (Retrofit ^{***})				
R-404A/507A	Jan. 1, 2017	July 20, 2016	Jan. 1, 2018	July 20, 2016	Jan. 1, 2019	Jan. 1, 2020	Jan. 1, 2020	July 20, 2016	[^] Jan. 1, 2021	[^] Jan. 1, 2023	OK	OK
R-410A	OK	-	OK	-	Jan. 1, 2019	Jan. 1, 2020	Jan. 1, 2020	-	[^] Jan. 1, 2021	[^] Jan. 1, 2023	OK	OK
R-407A/C/F	OK	OK	OK	OK	Jan. 1, 2019	Jan. 1, 2020	Jan. 1, 2020	OK	[^] Jan. 1, 2021	R-407C/F OK R-407A: [^] Jan. 1, 2023	OK	R-407C only
HFC-134a	OK	OK	OK	OK	Jan. 1, 2019	Jan. 1, 2020	OK	OK	OK	OK	OK	-
Likely alternatives (Emerson perspective)												
R-448A/449A	OK	OK	OK	OK	Neither SNAP-approved, nor banned	Neither SNAP-approved, nor banned	OK	OK for LT only	-	-	OK	-
R-450A/513A	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	-
R-290	-	-	-	-	OK	OK	OK	-	-	-	[^] Pending	[^] Pending
R-744	OK	-	OK	-	OK	OK	OK	-	OK	OK	-	OK
R-717	OK (in primary loop of secondary system)	-	OK (in primary loop of secondary system)	-	OK (in primary loop of secondary system)	OK (in primary loop of secondary system)	OK (in primary loop of secondary system)	OK (in primary loop of secondary system)	OK (in primary loop of secondary system)	OK	OK	-

^{**} Includes ice machines connected to a supermarket rack refrigeration system.

^{***} EPA uses term "retrofit" to indicate the use of a refrigerant in an appliance that was designed for and originally operated using a different refrigerant.

Term does not apply to upgrades to existing equipment where the refrigerant is not changed.

* Abbreviated – For Complete Listing, see EPA final rule; go to: <https://www.gpo.gov/fdsys/pkg/FR-2015-07-20/pdf/2015-17066.pdf>

<https://www.gpo.gov/fdsys/pkg/FR-2016-04-18/pdf/2016-08163.pdf>

La décision de la Cour d'appel du 8 août déclare que l'EPA n'a pas le pouvoir d'éliminer progressivement les frigorigènes HFC

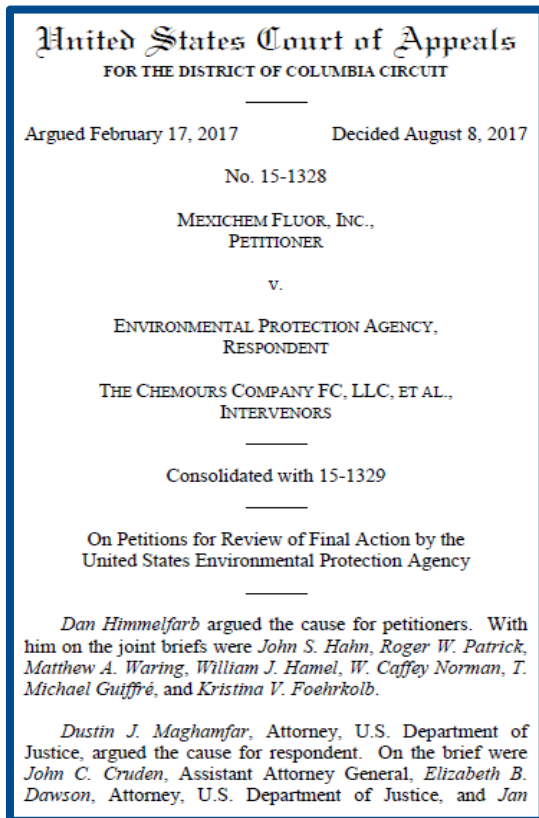
Décision de la cour :

- La décision SNAP 2015 (Règle 20) qui a radié certains HFC comme le R404A a été annulée par le tribunal.

La Cour a jugé que l'EPA avait le pouvoir d'éliminer les substances qui appauvrissent la couche d'ozone, mais pas les HFC qui ne sont pas appauvrissant la couche d'ozone.

Si la décision du tribunal est maintenue, la Règle 20 du SNAP 2015 est totalement annulée.

La Cour a rendu une ordonnance refusant la décision, de sorte que la règle SNAP Juillet 2015 EPA est en place jusqu'à ce que la pétition de répétition est résolue.



Appel:

Le 22 septembre 2017, Honeywell et Chemours ont déposé une requête auprès de la Cour pour demander une nouvelle audience de l'affaire. La Cour pourrait refuser la nouvelle audience ou réentendre l'affaire.

Il n'y a pas de calendrier pour la décision de réentendre ou non une affaire, mais la Cour pourrait fournir une indication de la manière dont elle se penche en demandant un briefing supplémentaire.

Réponse & prochaine étape:

Dans les prochaines semaines nous aurons une indication

Restez à l'écoute pour les détails futurs sur le processus judiciaire. Des États comme la Californie peuvent agir pour combler le vide et éventuellement créer une réglementation sur les HFC.

Stationary Refrigeration and Air Conditioning

Managing Refrigeration and A/C Equipment

- [Venting Prohibition](#)
- [Service Practice Requirements](#)
- [Leak Repair](#)
- [Technician Certification](#)
- [Refrigerant Sales and Distribution](#)
- [Refrigerant Reclamation](#)
- [Safe Disposal](#)
- [Recordkeeping](#)
- [Overlap between Section 608 and Section 609](#)

Greenhouse Gas Reporting Requirements for Refrigerants

- [Greenhouse Gas Reporting Requirements](#)

Section 608 Technician Certification

- [Types of Technician Certification](#)
- [Technician Certification Test Topics](#)
- [Section 608 Technician Certification Programs](#)
- [Steps For Replacing a Lost Section 608 Technician Certification Card](#)
- [Resources for Stationary Refrigeration and Air-Conditioning Equipment Technicians](#)

What's New

- [Proposal to Amend the Section 608 Refrigerant Management Regulations](#)

Related Topics

- [Ozone Layer Protection](#)
- [Enforcement](#)
- [Ozone-Depleting Substances](#)
- [Alternatives to Ozone-Depleting Substances](#)

Information Equipment C

- [Resources for](#)
- [Resources for](#)

Mainstream Engineering Corporation
Technician Certification



HVAC Technician Certification
EPA Clean Air Section 608
Program Certification Date: Today

YOUR NAME HERE
P000E0000000B00000

has been certified as Technician Type: Universal
as Required by 40CFR Part 82, Subpart F



<https://alaska-native-news.com/u-s-settles-with-trident-seafoods-corporation-to-reduce-ozone-depleting-emissions/40221/>

U.S. Settles with Trident Seafoods Corporation to Reduce Ozone-Depleting Emissions

[Suzanne Skadowski](#) | [EPA-Region 10](#) Feb 19, 2019.

Seattle – Trident Seafoods Corporation has agreed to reduce emissions of ozone-depleting substances from refrigeration equipment on its vessels, under a proposed settlement with the U.S. Environmental Protection Agency and U.S. Department of Justice to resolve alleged violations of the Clean Air Act. **Under the settlement, Trident will spend up to \$23 million to reduce coolant leaks from refrigerators and other equipment, use alternative refrigerants, and improve company-wide compliance. The company will also pay a \$900,000 civil penalty.**

EPA alleged that Trident violated the Clean Air Act by failing to promptly repair leaks of the refrigerant R-22, an ozone-depleting hydrochlorofluorocarbon (HCFC). Trident's failures allowed its appliances to leak refrigerant at high rates for thousands of days, **causing over 200,000 pounds of harmful refrigerant to be released into the atmosphere.**

Trident will retrofit or retire 23 refrigeration appliances used on 14 marine vessels to use an alternative refrigerant that does not harm the ozone layer compared to typical refrigerants.

Autre activité de réglementation des réfrigérants



F-Gas (EU): effective May 20, 2014

Commercial application	GWP limit	Date
Service and Maintenance Ban	2,500	2020
Self-contained refrigeration	2,500	2020
Stationary refrigeration	2,500	2020
Self-contained refrigeration	150	2022
Centralized refrigeration	150	2022
– Except top side of cascade	1,500	2022



CARB: Short-lived climate pollutant reduction strategy —Draft Regulations Oct.24, 2017
(Comments, Nov.10, 2017)

Commercial application	GWP limit	Date
• All refrigerant sales	2,500	2020
• All refrigerant sales	1500	2024
• Non-residential refrigeration(>50lbs)	150	2021
• Non-residential refrigeration(>20-50lbs)	1500	2021
• Chiller (Refrig or A/C)	150	2021
• AC (non-residential and residential) (2 or more lbs)	750	2021

AHRI Asks California for More Time on GWP Changes

Trade group also wants to change CARB's definition of new equipment so that it doesn't impact retrofits, and seeks stakeholder input.

— by Michael Garry

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI), based in Arlington, Va., on September 20 submitted an updated proposal to the California Air Resources Board (CARB) asking for a deadline extension and other changes in CARB's proposed refrigeration regulations on GWP limits for refrigerants in commercial refrigeration.

AHRI believes the regulations would be burdensome to HVAC&R end users.

These regulations — expected to influence the regulatory direction of other states — include a 150GWP cap on refrigerants used in new systems containing more than 50lbs (23kg) of refrigerants by January 1, 2022. It also includes a ban on the sale of virgin refrigerants with a GWP above 1,500 by that date; and a proposed 750GWP cap for new stationary air-conditioning systems by January 1, 2023. CARB plans to submit a final ruling to its board in May 2020.

AHRI is asking for a "two-step approach, which gives us a bit more time to comply with current regulations," said Lauren MacGowens, Sector Lead — Refrigeration Technology for AHRI, in a presentation at the Food

Marketing Institute's (FMI) Energy & Store Development Conference in Dallas, Texas, U.S. on September 10. AHRI also wants more time to "get safety standards in place so A2L and A3 refrigerants can safely be used in these applications," she said.

Under its two-step approach, AHRI is asking, according to MacGowens' FMI presentation, that medium-size commercial refrigeration units with 50-300lbs (23-136kg) of refrigerant be capped at 1,500GWP in 2021 but not capped at 150GWP until 2024, contingent on the adoption of safety standards in the California State Code.

In its new proposal, AHRI is also recommending that new remote condensing units and those used in new construction, with 50-300lbs of refrigerant, have a GWP cap of 1,500 in 2021, and a 300 (as opposed to 150) GWP for 2024. AHRI argues that a 150 GWP cap for condensing units would preclude all synthetic refrigerants and allow only CO₂ refrigerant; the trade group said CO₂ condensing units are not a practical option in the U.S. due to higher costs for energy-efficient models and an inadequate supply chain for components. CO₂ condensing units are widely used in Japan and are entering the European market; in the U.S. Efficiency

“

[AHRI's goal is to] increase allowable flammable refrigerants and update mitigation requirements so that we can safely transition to flammable refrigerants.

”

— Lauren MacGowens, AHRI

U.S. Climate Alliance (5 février 2019)

- U.S. Climate Alliance states likely to adopt similar HFC reduction goals/regulation
 - New Mexico, Illinois, and Michigan have joined or announced plans to do so.
 - This represents 47% of the population and over 50% GDP.



AHRI and NRDC have jointly asked for states to be consistent in approach to California.

CALIFORNIA	MARYLAND	NORTH CAROLINA	VIRGINIA
COLORADO	MASSACHUSETTS	OREGON	WASHINGTON
CONNECTICUT	MINNESOTA	PUERTO RICO	
DELAWARE	NEW JERSEY	RHODE ISLAND	
HAWAII	NEW YORK	VERMONT	

US senators introduce bill to phase down HFCs

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Environnement Canada



CANADA

CONSOLIDATION

CODIFICATION

Ozone-depleting Substances and Halocarbon Alternatives Regulations

Règlement sur les substances appauvrissant la couche d'ozone et les halocarbures de remplacement

SOR/2016-137

DORS/2016-137

Current to June 20, 2019

À jour au 20 juin 2019

Last amended on January 1, 2019

Dernière modification le 1 janvier 2019

Environnement Canada

3. Fiche RC FR avril 2018 FINAL.pdf - Adobe Acrobat Pro DC

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Environnement et
Changement climatique Canada

Environment and
Climate Change Canada



FICHE D'INFORMATION 2018-5 :
*Règlement modifiant le Règlement sur les
substances appauvrissant la couche d'ozone et
les halocarbures de remplacement :
réfrigération et climatisation*

Environnement Canada

5. Fiche RC FR avril 2018 FINAL.pdf - Adobe Acrobat Pro DC

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Règlement modifiant le Règlement sur les substances appauvrissant la couche d'ozone et les halocarbures de remplacement

Le Règlement modifiant le Règlement sur les substances appauvrissant la couche d'ozone et les halocarbures de remplacement vise à mettre en œuvre les obligations internationales du Canada énoncées dans le Protocole de Montréal.

Les modifications entrent en vigueur le 16 avril 2018.

Réfrigération et climatisation

Les interdictions de produits prévues dans les modifications visent à réduire la demande en hydrofluorocarbures (HFC) dans les produits fabriqués ce qui permettra d'éviter le rejet de ces derniers dans l'environnement.

À compter du 1^{er} janvier 2020, une nouvelle réglementation entrera en vigueur sur l'équipement de réfrigération et de climatisation contenant ou destiné à contenir des HFC. Les restrictions seront fonction du type d'équipement et de son utilisation. Les modifications n'empêchent pas l'utilisation et la vente d'équipement de réfrigération et de climatisation fabriqués ou importés avant la date d'interdiction.

Environnement Canada

[EXTERNAL] Webinaire concernant RSACOHR et interdictions à venir / Webinar on ODSHAR and Upcoming Prohibitions - Message (HTML)

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ven. 2019-11-29 12:10

GH Gestion Halocarbures / Halocarbons Management (EC) <ec.gestionhalocarbures-halocarbonsmanagement.ec@canada.ca>

[EXTERNAL] Webinaire concernant RSACOHR et interdictions à venir / Webinar on ODSHAR and Upcoming Prohibitions

To Gestion Halocarbures / Halocarbons Management (EC)

Retention Policy 76 Days Delete-Inbox (76 days) Expires 2020-02-13

RSACOHR fiche information_Canettes refrigerant HFC_FR.pdf 520 KB

5. Fiche R&C FR avril 2018 FINAL.pdf 908 KB

6. Fiche information_permis fin essentielle_FR.pdf 214 KB

ODSHAR Fact Sheet_HFC Refrigerant Cans.pdf 340 KB

5. Fact Sheet RAC EN Avril 2018 FINAL.pdf 607 KB

6. Fact Sheet_Essential Purpose Permit_EN.pdf 226 KB

Veuillez-vous joindre au webinaire du 17 décembre 2019, de 13h30 à 15h00 HNE en utilisant le lien suivant. Cette séance sera présentée en français.

Il y aura une séance en anglais le 18 décembre 2019 de 13h30 à 15h00 HNE.

Joindre la réunion Webex:
<https://pwgsc-nh.webex.com/join/marie-eve.boisvertcanada.ca/pwgsc-nh.webex.com> | 555 183 824

Joindre par téléphone:
Numéro d'appel : 1-613-960-7515
Numéro d'appel gratuit : 1-877-413-4791
Code d'accès participant : 379 017 9

Équipements de réfrigération et de climatisation

À partir du 1^{er} janvier 2020, il sera interdit de fabriquer ou d'importer au Canada les équipements suivants qui contiennent ou sont conçus pour contenir un réfrigérant au HFC, si le potentiel de réchauffement planétaire (PRP) du réfrigérant est supérieur à la limite spécifiée :

Équipement	PRP maximal du réfrigérant
Système de réfrigération autonome à température modérée	1 400
Système de réfrigération autonome à basse température	1 500
Système de réfrigération centralisé	2 200
Groupe de compresseur-condenseur	2 200

Ces interdictions s'appliquent uniquement aux catégories d'équipements mentionnées ci-haut destinées à un **usage commercial ou industriel**. Les interdictions concernant certains **équipements résidentiels** prendront effet le **1^{er} janvier 2025**. Le Règlement **n'empêche pas l'utilisation ou la vente** d'équipements de réfrigération et de climatisation et **n'exige pas le remplacement des équipements existants**.

Élimination de HCFC

La dernière **étape d'élimination des HCFC** au Canada commence en 2020. En vertu du Règlement, à partir du **1^{er} janvier 2020**, il sera interdit d'importer, d'exporter ou de fabriquer des HCFC en vrac, à l'exception du HCFC-123. Ceci inclut les HCFC **vierges, récupérés, recyclés ou régénérés**. Le HCFC-123 ne peut être importé au Canada que conformément à une allocation de consommation délivrée en vertu du Règlement. L'importation ou la fabrication de certains produits contenant ou étant conçus pour contenir des HCFC est déjà interdite en vertu du Règlement. Cependant, à partir du 1^{er} janvier 2020, l'importation ou la fabrication de **tous les produits contenant ou étant conçus pour contenir des HCFC** sera interdite.

Importation de canettes de réfrigérant non-rechargeables

Ce courriel sert également à rappeler qu'en vertu du Règlement, **il est interdit d'importer des canettes de réfrigérant non-rechargeables au Canada**. Cependant, certaines canettes de réfrigérant non-rechargeables, telles que les canettes jetables de réfrigérant HFC-134a (ou R134A) pour la maintenance des

Proposition et adoption Environment Canada

Environmental Canada (EC)**:
proposal March 23, 2016

Commercial application	GWP limit	Date
Refrigeration – centralized systems (MT/LT racks)	1,500	2020
Refrigeration – LT stand-alone	1,500	2020
Refrigeration – MT stand-alone	650	2020
Foams	150	2021
Mobile refrigeration	2,200	2025
AC – chillers	700	2025
Domestic refrigeration	150	2025

Environmental Canada (EC)

Reg. Oct.18, 2017

Commercial application	GWP limit	Date
Refrigeration – centralized (was 1500) systems (MT/LT racks)	2200	2020
Refrigeration – condensing units	2200	2020
Refrigeration – LT stand-alone	1,500	2020
Refrigeration – MT stand-alone (was 700)	1400	2020
Mobile refrigeration	2,200	2025
Chillers Refrig & AC (was 700)	750	2025
Domestic refrigeration	150	2025

Environnement Québec



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À jour au 1^{er} avril 2019
Ce document a valeur officielle.

chapitre Q-2, r. 29

Règlement sur les halocarbures

Loi sur la qualité de l'environnement
(chapitre Q-2, a. 31, 53.28, 53.30, 70.19, 115.27, 115.34 et 124.1).

TABLE DES MATIÈRES

CHAPITRE I

DISPOSITIONS GÉNÉRALES

SECTION I

CHAMP D'APPLICATION, OBJET ET INTERPRÉTATION..... **1**

Environnement Québec

Produits contenant ou conçu pour contenir un HFC utilisé comme réfrigérant

Colonne 1		Colonne 2	Colonne 3	Colonne 4
Article	Produit	Usage	Date	Potentiel de réchauffement de la planète maximal du réfrigérant utilisé dans le produit (PRP)
1	Système de réfrigération autonome à température modérée : système de réfrigération indépendant dont les composants sont intégrés dans la structure et qui est conçu pour maintenir une température interne $\geq 0^{\circ}\text{C}$	a) Commercial ou industriel b) Résidentiel	1 ^{er} janvier 2020 1 ^{er} janvier 2025	1 400 150
2	Système de réfrigération autonome à basse température : système de réfrigération indépendant dont les composants sont intégrés dans la structure et qui est conçu pour maintenir une température interne inférieure à 0°C mais ne dépassant pas -50°C	a) Commercial ou industriel b) Résidentiel	1 ^{er} janvier 2020 1 ^{er} janvier 2025	1 500 150
3	Système de réfrigération centralisé : système de réfrigération muni d'un évaporateur de refroidissement situé dans l'espace réfrigéré branché à un ensemble compresseur situé dans la salle des machines et à un condenseur situé à l'extérieur, et qui est conçu pour maintenir une température interne $\geq -50^{\circ}\text{C}$	Commercial ou industriel	1 ^{er} janvier 2020	2 200
4	Groupe de compresseur-condenseur : système de réfrigération muni d'un évaporateur de refroidissement situé dans l'espace réfrigéré branché à un compresseur situé à l'extérieur de cet espace et à un condenseur, et qui est conçu pour maintenir une température interne $\geq -50^{\circ}\text{C}$	Commercial ou industriel	1 ^{er} janvier 2020	2 200
5	Refroidisseur : système de réfrigération ou de climatisation comportant un compresseur, un évaporateur et un fluide secondaire de refroidissement, à l'exclusion du refroidisseur par absorption	Commercial ou industriel	1 ^{er} janvier 2025	750
6	Système de réfrigération mobile : système de réfrigération qui est normalement installé ou fonctionne dans, sur ou avec un moyen de transport ou qui est fixé à un moyen de transport	Commercial ou industriel	1 ^{er} janvier 2025	2 200

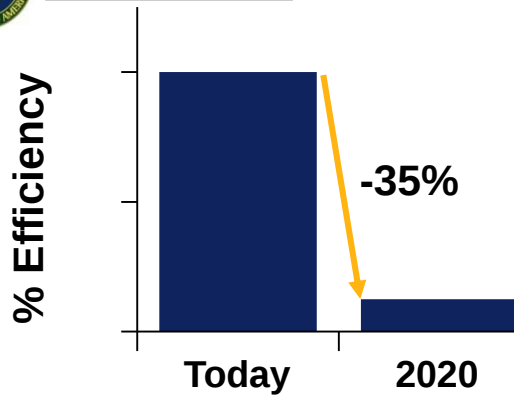
Règlements et Propositions

ECCC (Canada)					
	- Centralized Cond Units < 2200 GWP - LT Ref Stand alone < 1500 GWP - MT Ref Stand alone <1400 GWP				- Chiller < 750 GWP - Dom. Ref < 150 GWP - Mobile Ref < 2200 GWP
F- Gas (Europe)					
	- Self Contained Ref< 2500 GWP - Stationary refrigeration < 2500 GWP - Recycled, Permitted for Service < 2500 GWP		- Self Contained < 150 GWP - Centralized ref > 11.3 Tons(40 kW) < 150 GWP - Top Side Chiller <1500 GWP		
CARB (California)					
Adopted EPA SNAP Rule 20 & 21			Refrigeration> 50lbs < 150 GWP All New Refrigerant Sales < 50lbs < 1500 GWP	AC Resi. Split & RTU < 750 GWP	
2019	2020	2021	2022	2023	2025
CARB: Chiller < 750 GWP Starting 2024 Feb.05,2019					

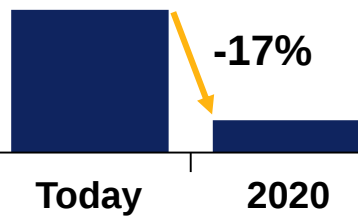
Encore plus de changement dans notre industrie....

Cabinet

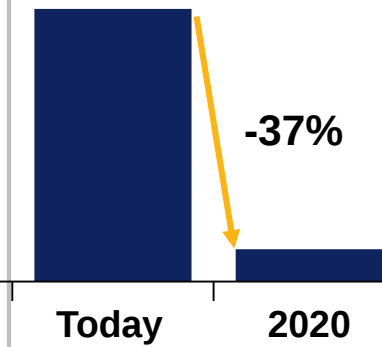
DOE Energy



Machine a glace

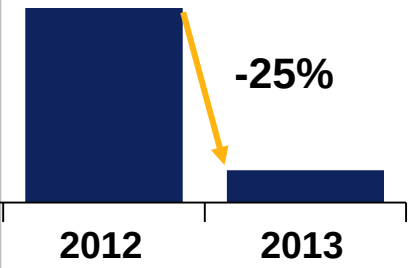


Chambre froide



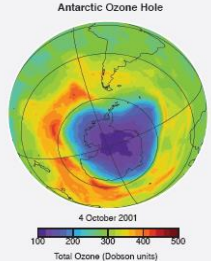
Supermarché

CA Title 24



Changement de réfrigérant entraîné par des réglementation et actions volontaires

Règlementation



Antarctic Ozone Hole

4 October 2001

Total Ozone (Dobson units)

100 200 300 400 500

Montreal Protocol
Targets Ozone
Depletion (R-22) Signed
in 1987



United Nations
Framework Convention on
Climate Change



North American Proposal
Targets CO₂ Emissions
(High Global Warming)



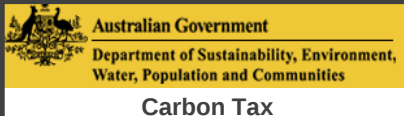
SNAP
SIGNIFICANT NEW SUBSTANCES
POLICY



California Environmental Protection Agency
Air Resources Board



Danish Ministry of the Environment
Environmental Protection Agency
HFC Ban & Tax



Australian Government
Department of Sustainability, Environment,
Water, Population and Communities
Carbon Tax



Environment
Canada



European
Commission
F-Gas
Regulation

Organisations



CCAC
CLIMATE AND CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS



The Consumer Goods
FORUM



ipcc
INTERGOVERNMENTAL PANEL
ON
climate change



U.S. ENVIRONMENTAL PROTECTION AGENCY
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ammonia
everything natural **21**



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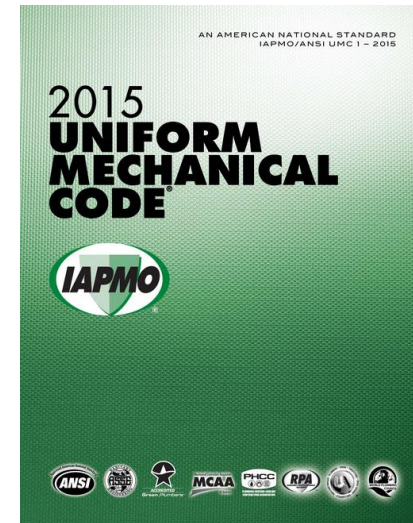
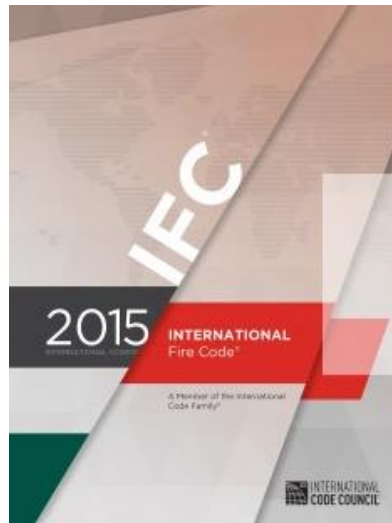
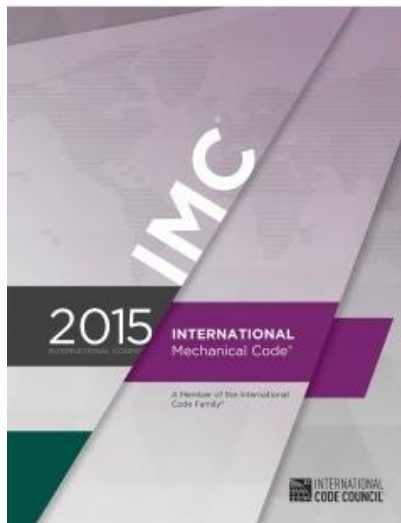


hydrocarbons
everything natural **21**

Réfrigérants: Normes et Codes

Codes Internationaux

- Les codes sont utilisés par les inspecteurs pour approuver les bâtiments et équipements
- Trois codes couramment utilisés qui affectent notre industrie:
- Code Machine International (IMC)
- Fire Code International (SFI)
- Uniforme Mechanical Code (UMC)



Changement de code pour intégrer des mises à jour A2L (2018-2021)

État des normes et codes – vision globale

United States

Classification Réfrigérant	Restriction	Application		
ASHRAE34 Refrigerant Designation & Safety Classification UL2182	ASHRAE15 Safety Standards for Refrigeration Systems 2015-2018	UL1995 Heating and Cooling Equipment 2014-2015	UL471 Commercial Refrigerators and Freezers 2015-2019	UL621 Ice Cream Makers 2015-2019
		UL606335-2-40 Heating and Cooling Equipment		

Europe

Classification Réfrigérant	Restriction	Application		
Based on ISO	EN378 Refrigeration System and HP 2014-2016	Based on IEC	Based on IEC	Based on IEC

International

Classification Réfrigérant	Restriction	Application		
ISO817 Refrigerant Designation & Safety Classification (2013-2014)	ISO5149 Safety and Environmental Requirements, Phase 1 Phase 2 2014-2015	IEC60335-2-40 Heating and Cooling equipment 2015-2017	IEC60335-2-89 Commercial Refrigerating Appliances 2015-2019	IEC60335-2-24 Refrigerating appliances Ice and Ice Cream Makers 2015-2019

complété

révision

Hausse des limites de charge pour les produits inflammables est une tendance mondiale
Modification des normes de sécurité en 2017; code et standard.

Résumé concernant les limites de charges - actuel et proposé

Réfrigération

- **UL471** (Commercial Refrigerators and Freezers incorporated or remote)
 - A2/A2L **500g** max. (17.7 oz) Remote units can have unlimited charge
 - A3 **150g** max. (5.3oz)
- **UL60335-2-89** (Particular requirements for commercial refrigerating appliance with an incorporated or remote refrigerated unit or compressor)
 - A2L **150g** Now, A3 **150g** Now
 - For Both A2L & A3 its **13 x LFL but 1.2kg map cap. (500g for Propane) being proposed**
 - Now Charges larger than **150g, use ISO5149**
- **UL60335-2-24** (Commercial refrigerator appliances - ice makers and ice cream appliance)
 - The second edition increased flammable refrigerants from 50g to **150g** to harmonized with IEC
- **UL1995** Heating and cooling equipment
 - Refrigeration condensing units use UL471
- **UL250** (Household refrigerators and freezers)
 - A2 **225g** (8.0oz)
 - A3 **57g**

Climatisation

- **UL1995** (heating and cooling equipment), UL 1995 merging into UL2-40, 2020 new products, 2022 all products (2022 all products will be replaced by UL2-24))
 - A2/A2L Not allowed
 - A3 Not allowed
- **UL60335-2-40** (particular requirements for electrical heat pumps, air conditioners and dehumidifiers)
 - A2/A2L/A3 Based on room size calculations and mitigation used
 - UL **3xLFL (2nd Ed.)** 1kg for A2L, 114 g for A3s
 - UL CRD for A2L's: **6xLFL, capped at 3kg**
 - IEC is aiming for **~ 60-80kg A2L and 1 kg A3**
- **UL484** (Room air conditioners), merging into UL2-40, 2020 new products , 2022 all products
 - **3 x LFL all refrigerants**
 - Based on room size calculation

REMARQUE:

Les réfrigérants inflammables ne sont autorisés que pour les nouveau équipements, pas Pour les "rétrofit" car une modification de la conception OEM est nécessaire.

A new fire safety guide published by the French government has increased the recommended charge limit on hydrocarbons in shops and shopping centres to 1.5 kg per circuit.



In a long-awaited move that may pave the way for wider uptake of hydrocarbon refrigerants in the French retail sector, the French government has increased the recommended charge limit for hydrocarbons used in shops and shopping centres to 1.5 kg per circuit.

The increased limit is enshrined in a new fire safety guide governing the use of flammable refrigerants in shops and shopping centres.

Published on 27 December, the ['Practical guide for fire safety in retail stores and shopping centres'](#) accompanies the implementation of updated regulations and promotes the harmonisation of practices across the French retail sector.

It is targeted at designers, building owners, building operators, equipment installers, technicians, safety officials, and administrative authorities.

The guide gives indications that govern the use of flammable refrigerants – A2L, A2 and A3 (hydrocarbons) – in cooling cabinets in areas of shops and shopping centres accessible to the public.

Under the new guidance, for instance, the maximum permitted propane (R290) charge per circuit is 1.5 kg in circuits located on the ground floor of the retail facility and 1 kg in circuits located in underground areas accessible to the public (in line with updated European standard EN 378-1).

Previously, the French HVAC&R sector had tended to adhere to the non-mandatory 150g charge limit recommended by the first iteration of European standard EN 378.



HC charge limit increase goes to final IEC vote

WORLD STANDARDS / REGULATIONS COMMERCIAL REFRIGERATION

By Mario Battisti, Oct 23, 2018, 05:12 GMT-4 · 1 minute reading

A draft HC charge limit increase will go to a final vote around the end of the year following its approval by an IEC subcommittee.



In a move that could widen the use of hydrocarbons as natural refrigerants worldwide, a crucial subcommittee of the International Electrotechnical Commission (IEC) last week approved increasing the charge limit on A3 (flammable) refrigerants like propane in commercial refrigeration equipment from 150g to 500g under the standard 60335-2-8g.

The draft charge limit increase under IEC standard 60335-2-8g will now go to a final vote in December or January.

"Most of the CDV comments [Committee Draft for Vote – the proposed new standard] proposed by [Working Group] WG4 were accepted, except the maximum charge of A2L that will remain 1.2 kg," said Marek Zgliczynski, who chairs the IEC SC61C subcommittee on adopting the proposed update.

"Now it will take 2-3 months [to move to the] final vote, where we will need the support of all," Zgliczynski, manager of commercial refrigeration product engineering for Embraco, told hydrocarbons21.com in an exclusive interview.

Zgliczynski has just returned from Busan, South Korea where the IEC SC61C subcommittee met to vote on the proposed changes. The vote represents the latest milestone in a lengthy standards process that will determine whether the higher charge limit is ultimately enacted as an international standard.

The vote is crucial for the hydrocarbons industry as national and regional standardisation bodies such as CEN/CENELEC in the European Union tend to harmonise their own standards with IEC and ISO benchmarks as much as possible.

Experts commonly accept that the 150g limit does not allow manufacturers or end users of HVAC&R equipment to fully exploit the safe application of hydrocarbon refrigerants in the commercial refrigeration sector. Hydrocarbon-based technology could therefore benefit from new market development opportunities worldwide.

Développement A2L - État de Washington

HARDI

MEMBERSHIP ▾

NETWORKING ▾

TALENT ▾

BENCHMARKING ▾

ADVOCACY ▾

ABOUT HARDI ▾

WA Code Council Paves the Way for Use of A2L Refrigerants

BY ALEX AYERS

11/13/2019 - HVAC Government Affairs

The [Washington State Building Code Council](#) has voted to fully adopt [ASHRAE 15-2019](#) and the 3rd edition of UL 60335-2-40. Adoption of these codes will allow the use of mildly flammable A2L refrigerants in refrigeration and air-conditioning including the use in occupied dwellings. Washington is the first state to bypass the model code organizations to directly adopt the updated ASHRAE and UL standards to allow the use of A2L refrigerants.

With this code adoption, the use of A2L refrigerants can begin on July 1, 2020, however market availability of equipment designed to use A2L refrigerants is not expected for several years. This code adoption will allow manufacturers to begin testing equipment in various conditions for use in a few years.

Washington is one of several states pushing forward with adoption of state level HFC phase downs, however none of the proposed changes by Washington state would require the use of HFC refrigerants. HARDI is tracking state level changes, and a full list of state level changes is available on our [HFC Phase-down webpage](#).



ASHRAE
STANDARD

ANSI/ASHRAE Standard 15-2019
(Supersedes ANSI/ASHRAE Standard 15-2016)
Includes ANSI/ASHRAE addenda listed in Appendix G

Safety Standard for Refrigeration Systems

Category

- HVAC NEWS
- HVAC NETWORKING

Code de protection incendie - État de New-York

Draft 2020 Fire Code of New York State Published June 2019 (SECURED) - Adobe Acrobat Pro DC

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605.15 Records.
A record of refrigerant quantities brought into and removed from the premises shall be maintained.

[M] 605.16 Electrical equipment.
Where *refrigerant* of Groups A2, A3, B2 and B3, as defined in the *Mechanical Code of New York State*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of NFPA 70.

Exceptions:

1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1106.3 of the *Mechanical Code of New York State*.
2. Machinery rooms for systems containing Group A2L *refrigerants* that are provided with ventilation in accordance with Section 605.17.

[M] 605.17 Special requirements for Group A2L refrigerant machinery rooms.
Machinery rooms with systems containing Group A2L refrigerants shall comply with Sections 605.17.1 through 605.17.3.

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210

/ 1203



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[M] 605.17.2 Emergency ventilation system.

An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 605.17.2. Shut down of the emergency ventilation system shall be by manual means.

**TABLE [M] 605.17.2
MINIMUM EXHAUST RATE**

REFRIGERANT	Q (m ³ /sec)	Q (cfm)
R32	15.4	32,600
R143a	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600

[M] 605.17.3 Emergency ventilation system discharge.

The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

Mise à niveau des systèmes existants

Remplacement de réfrigérant de système existant

SECTEURS INDUSTRIELS ▾

SERVICE ET ENTRETIEN

COMPAGNIE ▾

CARRIÈRES ET FORMATION ▾

CONTACTEZ NOUS



ÉLIMINATION PROGRESSIVE DU R-22 : ÊTES-VOUS PRÊTS?

Utilisez notre grille afin de déterminer la meilleure stratégie à adopter en fonction de vos installations.

EN SAVOIR PLUS



Remplacement de réfrigérant de système existant

Emerson bookmarks Google Images Google Google Traduction OPI Home Page Copeland Mobile Files - OneDrive Welcome to Net Co... StorySlab Web Vie... » Autres favoris

Quelles sont vos options?

Pour chacun des points, sélectionnez la description qui correspond le mieux à votre système et trouvez la valeur en points y étant associée.

1. A. TYPE DE SYSTÈME*

- ☐ Unité d'air d'appoint au toit
- ☐ Unité évaporateur et condenseur séparés
- ☐ Refroidisseur centrifuge
- ☐ Système central avec salle mécanique dédiée

B. ÂGE DU SYSTÈME*

- ☐ -5 ans
- ☐ 5-10 ans
- ☐ 10-15 ans
- ☐ 15-20 ans
- ☐ 20+ ans

C. ÉTAT DES INSTALLATIONS*

- ☐ Excellent – programme d'entretiens et inspections réguliers
- ☐ Bon – programme d'entretiens et inspections réguliers
- ☐ Correct – programme d'entretiens et inspections réguliers
- ☐ Mauvais – aucun programme d'entretiens et inspections réguliers

D. IMPACT SUR LES OPÉRATIONS*

- ☐ Les pannes peuvent être tolérées pour une semaine ou plus
- ☐ Les pannes de moins d'une semaine peuvent être tolérées
- ☐ Les pannes de moins d'une journée peuvent être tolérées
- ☐ Les pannes de quelques heures peuvent être tolérées
- ☐ Les pannes ne peuvent pas être tolérées

Calculate

Entrez la meilleure réponse ci-dessus

Logiciel de sélection

File Options View Tools Windows Help

Main Menu ::

Product Information

Compressors

Search Criteria

Model: 3DS3R17ME-TFE Refrigerant: R-448A Frequency: 60 Temperature Range: Medium Temp, Low Condensing (MD)

☐ Exclude Obsolete Models Product Type: R-404A R-507 R-22 R-407C R-407A R-448A R-449A R-407F

RLA (MCC/1.4) (Amps): 23.6 RLA (MCC/1.56) (Amps): 110.0 Voltage Code: TFE (575-3-60) HP: 10.0 Status: OEM Production

Settings

☒ Default Setting ☐ Const. Return

☒ Temperature ☐ Pressure ☒ Dew Point ☐ Mid Point

☒ Retain User Settings

System Fans

Evaporator (W): 0

Condenser (W): 0

Inputs		Results	
Evaporator Temperature (°F):	20.0	Compressor Capacity (Btu/hr):	116,500
Condensing Temperature (°F):	120.0	Net Refrigeration Effect (Btu/hr):	103,000
Return Gas Temperature (°F):	65.0	Power (W):	13,750
Evaporator Superheat (°F):	10.0	Compressor EER (Btu/Wh):	8.47
Compressor Superheat (°F):	45.0	Evaporator EER (Btu/Wh):	7.49
Total Subcooling (F):	0.0	Refrigerant Flow Rate (lb/hr):	1,788.0
		Current (Amps):	17.1
		Isentropic Efficiency (%):	73.6
		Liquid Temp. (°F):	112.0
		Discharge Temp. (°F):	207.0
		Cond. Heat Rejection (Btu/hr):	163,429

Reports

- [Performance: Full Matrix](#)
- [Operating Envelope](#)
- [Reference Drawing](#)
- [Wiring Diagram](#)
- [System Report](#)
- [Summary](#)
- [Estimate Electrical Current](#)
- [Condenser Heat Rejection](#)

Date: November 14, 2019 Engineering Units: English Version: 1.0.67.2 Days Remaining for Next Update: 75 Database Version: October 30, 2019

Close

Réfrigérant – Huile approuvé par OEM

	Refrigerants	Class*	Similar to	Application		Lubricant choices			Comments	
				Retrofit	New	Preferred	Alternate #1	Alternate #2		
Ozone depleting	CFC R-12			L,M		MIN	AB & MIN		Phased out in 1996	
	CFC R-502			L,M		MIN	AB & MIN	POE-32	Phased out in 1996	
	HCFC R-22			L,M,H		MIN	AB & MIN	POE-32	No new equipment 2010**	
	HCFC R-401A		R-12	M,H	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: Freon™ MP39		
	HCFC R-401B		R-12	L,M	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: Freon MP66		
	HCFC R-402A		R-502	L,M	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: Freon HP60		
	HCFC R-402B		R-502	L,M	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: Freon HP61		
	HCFC R-408A		R-502	L,M	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: FX10		
	HCFC R-409A		R-12	L,M	AB & MIN	POE-32 & MIN	POE-32	For service applications only, trade name: FX56		
Non-ozone depleting	HFC R-134a	A1	R-12	M,H	M,H	POE-32				
			R-12	L,M	L,M	POE-22B			Hatcol 4408/Savsyn 200KC for use with specific Copeland compressors designed for R-134a manufactured in India	
			R12	L,M	L,M	POE-22D			Compressors produced in Brazil	
			R12	L,M	L,M	POE-22A	POE-22D		Compressors produced in Slovakia	
	HFC R-404A		R-502	L,M	L,M	POE-32			Freon HP62, Forane™ FX70	
			R-502	L,M	L,M	POE-22C			For use with compressors manufactured in India	
			R-502	L,M	L,M	POE-22A	POE-22D		Compressors produced in Slovakia	
	HFC R-507		R-502	L,M	L,M	POE-32			Genetron™ AZ50	
	HFC R-407A		R-22	L,M	L,M	POE-32				
	HFC R-407C		R-22	L,M,H	L,M,H	POE-32				
	HFC R-407F		R-22	L,M	L,M	POE-32				
	R-448A		R-22/R-404A	L,M	L,M	POE-32			Freon 9000/KLEA 66	
			R-22/R-404A	L,M	L,M	POE-32			Discus™ and select refrigeration scroll models (ZF/ZB)	
			R-22/R-404A	L,M	L,M	POE-32	POE-22D		Solstice™ N40	
	R-449A		R-22/R-404A	L,M	L,M	POE-32			Compressors produced in Slovakia	
			R-22/R-404A	L,M	L,M	POE-22A	POE-22D		Opteon™ XP40	
			R-12/R-134a	M,H	M,H	POE-32			Compressors produced in Slovakia	
	R-450A		R12	L,M	L,M	POE-22D			Solstice N13 for refrigeration applications only	
			R-12/R-134a	M,H	M,H	POE-22A	POE-22D		Compressors produced in Brazil	
			R-12/R-134a	M,H	M,H	POE-32			Compressors produced in Slovakia	
	R-513A		R12	L,M	L,M	POE-22D			Opteon XP10 for refrigeration applications only	
			R-12/R-134a	M,H	M,H	POE-22A	POE-22D		Compressors produced in Brazil	
			R-22/R-404A	L,M	L,M	POE-32			Compressors produced in Slovakia	
	R-452A					Discus = L,M Scroll = M,H	POE-32			OPTEON™ XP44 for U.S. and European pre-approved applications only
	HFC R-410A					M,H	PVE-68			ZP & ZB KCP Copeland Scroll™ models and certain Discus models only
	HFC R-422A/D HFC R-427A HFC R-438A		R-22	L,M		POE-32	MIN	AB		For use with specific highside variable speed compressors manufactured in Suzhou.
			R-22	L,M		POE-32				Discus supermarket racks only
R-22		L,M		POE-32	MIN	AB		Discus supermarket racks only		
R-704 helium				Cryogenic	PAG			Discus supermarket racks only; Freon MO99		
R-744 CO ₂				Sub-critical	PAG-68	PAG-68		ZC Copeland Scroll models only		
				Sub-critical	PAG-68	POE-68		4MSLS Semi-Hermetic and ZO Copeland Scroll models for CO ₂		
				Trans-critical	PAG-68	POE-68		RFL68EP for CO ₂ compressor manufactured in Europe		
				Trans-critical	PAG-68	PAG-68		4MTLS semi-hermetic compressors for medium temp trans-critical applications		

Réfrigérant – Huile approuvé par OEM

	Refrigerants	Class *	Similar to	Application		Lubricant choices			Comments
				Retrofit	New	Preferred	Alternate #1	Alternate #2	
Non-ozone depleting	R-32	A2L	R410A	M,H	M,H	POE-46			New NXG5020 oil for new R32 scrolls launched starting 2018 & replacing SP32 (Asia products)
			R410A	M,H	M,H	POE-32B			For use with specific compressors designed for R-32 manufactured in Suzhou
	R-290 propane	A3			L,M,H	POE-68B			For use with specific Scroll Copeland compressors manufactured in North Ireland for R-290
						POE-22A			For use with specific Copeland compressors designed for R-290, excluding models manufactured in India
					L,M	POE-32			For use with specific Copeland compressors manufactured in India for R-290
						AB/POE-32			CPI 4708-32, ALP 360A-22 used in compressors produced in Brazil
						POE-10			Compressors produced in Mexico

Legend:

MIN: Mineral Oil (Copeland 46BWMO, Calumet R015, Chevron/Texaco Capella WF32, Sonneborn Suniso 3GS, 3GS-P, Savsol 3000, Sonneborn LP200 and Savsol LP200, KRP-32, KRW-35) Mineral oils are interchangeable for 'top off' purposes

AB: Alkyl Benzene Oil (AB46 Copeland Ultra 200, National NL AKB200R, Shrieve Zerol 200 TD, Sonneborn Suniso AKB200A, Shell 2212, CPI-4708-32)

POE-32: Polyolester Oil (Copeland Ultra 32-3MAF, Lubrizol Emkarate RL32-3MAF, Everest 32-3MAF, National NL PE32-3MAF, Parker EMKARATE RL32-3MAF/ (Virginia) LE323MAF, Nu Calgon 4314-66/EMKARATE RL32-3MAF, ALP 360A-22, Everest 22 CC, Copeland Ultra 22 CC, Mobil Arctic 22 CC) Last three are approved for 'top off' only, 32-3MAF preferred

POE-32B: SP32 for use with R-32 applications

POE-46: NXG5020 POE for use with R32 applications

POE-22A: Emkarate RL22H, RL22HB

POE-22B: Hatcol 4408, Savsyn 200KC

POE-22C: HXL-8828, Hatcol 4440

POE-22D: CP2922E

POE-10: CP 2910E

PAG: Polyalkylene Glycol Oil (Lubrizol RPAG 62, UCON LB300X)

PAG-68: RFL 68EP for use in R-744 CO₂

PVE-68: FVC 68D for high-side variable speed

POE-32 & MIN: Minimum 50% POE

AB & MIN: Minimum 50% Alkyl Benzene

POE-68: Emkarate RL68HB oil for use with R-744 CO₂ applications

POE-68B: Hatcol 4467 POE 68 (ISO 68 viscosity grade), Chemtura

L: Low Temperature Application (Refrigeration) for R-407A, R-407C, R-407F, R-422A/D, R-427A, R-438A, R-448A, R-449A Demand Cooling* or auxiliary cooling may be required for low temperature application - See AE guidelines for details

M: Medium Temperature Application (Refrigeration)

H: High Temperature Application (Air-Conditioning, Heat Pump, Refrigeration)

* ASHRAE Std. 34 Refrigerant Classification: A1=Non-Flammable/Non-Toxic; A2, A2L=Mildly Flammable/Non-Toxic; A3 = Flammable/Non-Toxic; B2, B2L = Mildly Flammable/Toxic. A2L and B2L are lower flammability refrigerants with a maximum burning velocity of ≤ 3.9 in/sec (10cm/s)

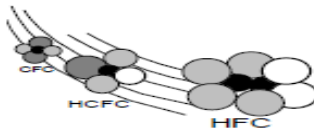
** A & R product lines with R-22 are only approved for use with AB oil.

Spectronics AR-GLO 4/E Fluorescent Leak Detection Dye is approved for HFC/POE and HCFC/ Mineral Oil usage at the manufacturer's recommended concentrations.

CAUTION: POE must be handled carefully and the proper protective equipment (gloves, eye protection, etc.) must be used when handling POE lubricant. POE must not come into contact with any surface or material that might be harmed by POE, including without limitation, certain polymers (e.g. PVC/CPVC and polycarbonate). Do not take internally. Avoid eye contact and prolonged or repeated skin contact. Safety Data Sheets are available at your supplier.

Procédure de mise-à-niveau

Refrigerant Changeover Guidelines HCF R-404A/R-407A/C/F to R-448A/R-449A for Medium and Low Temperature Applications



is operating properly, there is no technical reason to replace the CFC refrigerant. In fact, changing the refrigerant may void the U.L. listing of the system. However, once the decision has been made to make the change from 404A or 407a to R-448A or R-449A, the following guidelines are recommended.

CONSIDERATIONS

1. Retrofitting systems that employ compressors manufactured prior to 1973 is not recommended. This is due to the different materials used in motor insulation systems that have not been evaluated for compatibility with the new refrigerants and lubricants. Failure to heed this advice will violate the U.L. Standard For Field Conversion/Retrofit Of Alternate Refrigerants In Refrigeration and Air Conditioning Equipment (U.L.2170-2172).
2. Emerson lubricant recommendation for use with R-448A/R-449A is a Polyol Ester (POE). For a complete list of lubricants approved by Emerson refer to Form 93-11. These are the only POE lubricants approved for use in Copeland™ brand compressors and are available from all authorized Emerson wholesalers. The use of any other POE lubricant may void the compressor warranty.
3. R-448A/R-449A can be used in either low or medium temperature systems. R-448A/R-449A should not be mixed with any other refrigerant!
4. The expansion valve may need to be adjusted to have the correct evaporator superheat.

Emerson does not advocate the wholesale changeover of CFC refrigerants to HCFCs or HFCs. If a system is not leaking refrigerant to the atmosphere, and

6. Pressure regulators such as EPR valves may have to be reset. Contact the EPR manufacturer for the correct settings.

WARNING: IT IS POSSIBLE THAT EXCESS PRESSURE BUILD-UP ON MODELS INDICATED COULD RESULT IN THE COMPRESSOR BURSTING UNLESS THE PRESSURE RELIEF VALVE SPECIFIED HAS BEEN PROPERLY INSTALLED ON THE ORIGINALLY BUILT COPELAND™ COMPRESSOR.

7. Systems that use a low pressure controller to maintain space temperature may need to have the cut in and cut out points changed. Although R-448A/R-449A does exhibit "glide", the glide with R-448A/R-449A is approximately 8°F, please see PT Chart below for setting Cut-in and Cut-out pressures.
8. Mineral oil lubricants, such as 3GS, must not be used as the compressor lubricant with R-448A/R-449A. Polyol Ester (POE) lubricant, for a complete list of lubricants approved by Emerson, refer to Form 93-11, are the only lubricants that can be used in a Copeland brand compressor when using R-448A/R-449A. Before starting the changeover, it is suggested that at least the following items be readily available:
 1. Safety glasses
 2. Gloves
 3. Refrigerant service gauges
 4. Electronic thermometer
 5. Vacuum pump capable of pulling 250 microns
 6. Thermocouple micron gauge
 7. Leak detector
 8. Refrigerant recovery unit including

Principaux changements apportés aux produits en termes de performances avec les réfrigérants de remplacement

“Glide”

Refrigerant	Temperature Glide °F
R-404A	~1 °F
R-407A	~8 °F
R-448A	~7 °F
R-449A	~7 °F
R-134a	0 °F (azeotrope)
R-450A	~1 °F (quasi-azeotrope)
R-513A	0 °F (azeotrope)

Tests apportés aux modifications apportées à la capacité et à l'efficacité 404A et 134a

		Dew Point		Mid Point	
		Cap.	EER	Cap.	EER
Scroll M.T.	407A	-3.9%	-2.1%	+0.2%	-2.2%
	448A	-1.1%	-0.3%	+3.0%	-0.1%
Scroll L.T.	407A	-23.7%	-0.9%	-18.7%	+0.7%
	448A	-19.4%	-6.1%	-13.9%	-4.8%
Recip L.T.	450A	-14.1%	-0.5%		
	513A	+4.0%	-1.2%		

“Glide” crée des implications pour le dimensionnement des composants système

Programme RMC



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**REFRIGERANT
MANAGEMENT
CANADA**

Quel est le processus d'élimination du réfrigérant?

Industrie

Le CMR a mis en place un processus formel pour la collecte, le transport, le stockage et la mise au rebut des réfrigérants en excès d'équilibre, selon le système de régénération en vigueur.

Programme RMC

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RMC is a not-for-profit corporation established in 2000 by the [Heating, Refrigeration and Air Conditioning Institute of Canada \(HRAI\)](#) and the Canadian refrigeration and air conditioning industry. The program is an industry-led environmental care program committed to the responsible disposal of surplus Halocarbon refrigerants from the stationary refrigeration and air conditioning industry. The program does not receive government funding and is governed by a Board of Directors comprised of industry representatives from the refrigeration and air conditioning industry, equipment owners and environment/community groups.

RMC Mission:

Our mission is to provide an environmentally responsible program that:

- › Manages the environmentally responsible disposal of Canada's stocks of surplus Halocarbon refrigerants for the Canadian refrigeration and air conditioning industries;
- › Meets the objective of the Canadian Council of Ministers of the Environment (CCME) to minimize and avoid the ultimate release of these substances to the environment; and
- › Ensures that all surplus Halocarbon refrigerants will be managed in the most environmentally responsible manner to minimize the depletion of the ozone layer and reduce green house gas emissions.

Programme RMC

- Programme RMC fondé en 2000 , a ce jour :

- 8 756 732 tCO2e réduction

Équivalent à:

- 1 012 954 451 060 charge de cellulaire
- 2 770 824 T.e. de déchets recyclé
- 951 260 T.e. énergie pour une habitation résidentiel

The Amount of Preventable F-Gas Refrigerant Emissions¹

Global Emissions Avoidance Potential

96.5

gigatons of CO₂e between 2020 and 2050 by minimizing leaks and increasing end-of-life recovery²



U.S. Emissions Avoidance Potential

39,000

metric tons³ of recoverable HFCs and HCFCs in retired refrigeration and AC equipment in 2020

8,600

metric tons⁴ of reclaimed HFCs and HCFCs in 2017

22%

Rate of reclamation⁵

30,400

metric tons of unrecovered refrigerant⁶ (58.5 million metric tons of CO₂e, which is the same as that produced by 12.5 million cars)



U.S. Supermarket Emissions Avoidance Potential

13.9%

Average annual emissions (leak) rate of supermarkets in U.S. EPA GreenChill program (29% of all stores)

25%

Average annual emissions rate of other U.S. supermarkets⁷

30 million

metric tons of CO₂e Annual emissions reduction if all U.S. supermarkets' leak rate was 13.9%

\$156 million

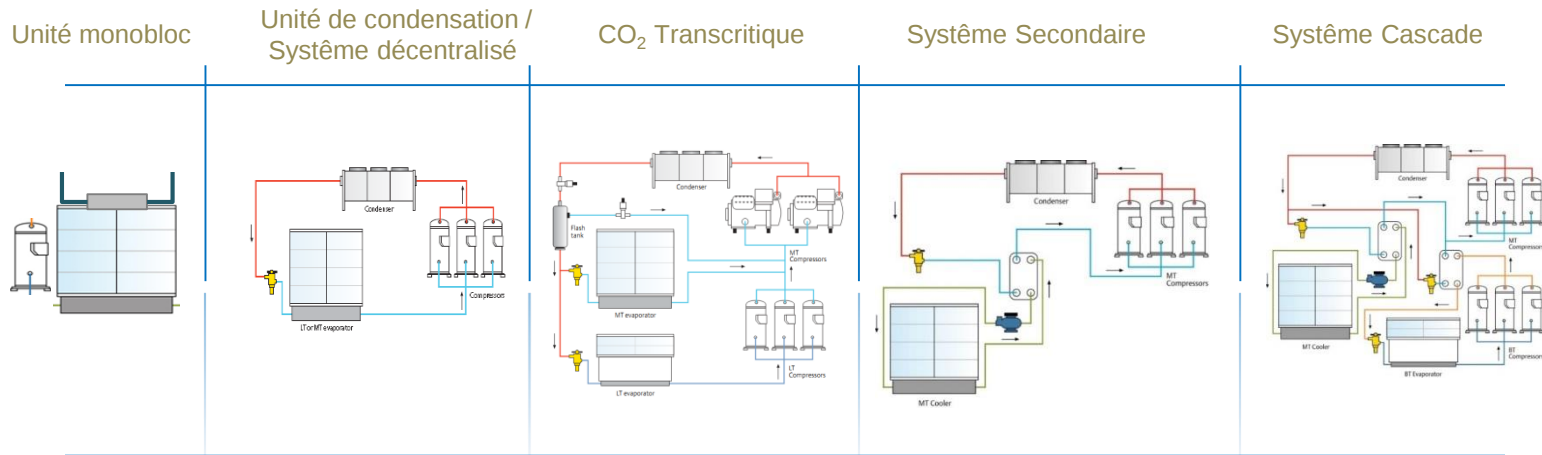
Annual refrigerant-replacement cost reduction if all U.S. supermarkets' leak rate was 13.9%⁸



1. F-gas refrigerants include HFCs, HCFCs and CFCs. / 2. Project Drawdown, Refrigerant Management: <https://www.drawdown.org/solutions> / 3. <https://bit.ly/26LAA2J> / 4 & 5. <https://www.epa.gov/eaction608/summary-refrigerant-reclamation-trends> / 6. U.S. EPA GHG Equivalency Calculator / 7. <https://www.epa.gov/sites/production/files/documents/GChillRetrofit.pdf> / 8. U.S. EPA GreenChill Program

Tendance des architectures de système en HVAC et R

Architecture de système, réfrigérant et conditions environnementales



Charge
réfrigérant

Intégration du
système

Infrastructure
Et
service

Durée de vie
Système

Politique
environnemental
corporate

Règlementation
et
politique

Condition
climatique

Les réfrigérants naturels gagnent du terrain en Amérique du Nord



H-E-B
Austin, TX
R290
Micro-Distributed



Sprouts
Dunwoody, GA
Transcritical CO₂
Booster



Piggly Wiggly
Columbus, GA
Ammonia/CO₂ Hybrid



Walgreens
Evanston, IL
Net Zero Store,
Geothermal, CO₂

Aldi
Buffalo, NY
Transcritical CO₂
Booster & Propane



IGA
Magog, QC
Transcritical CO₂
Booster



Metro
Montreal, QC
Ammonia / CO₂
Secondary



Whole Foods
Santa Clara, CA
Propane Chiller/CO₂
Secondary & Cascade





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des professionnels du froid

Réfrigération
Conditionnement d'air

laRPF.fr

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MON PANIER (0)

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RÉFÉRENCEZ-VOUS



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Actualités > Entreprises et marchés > Johnson Controls à l'heure des hydrocarbures

S'abonner au flux

Tout sur la F-Gas

ENTREPRISES ET MARCHÉS

Elise KUNTZELMANN | 21 décembre 2016 |



Le refroidisseur à air fonctionne au R 290. Photo : DR.

Le produit est disponible en 6 modèles standards pour des capacités allant de 170 à 450 kW. Par ailleurs il dispose des caractéristiques suivantes : revêtement époxy ; protection antigel ; détecteur de fuite et eau glacée (+ 7 à - 8 °C).

SABlight est un refroidisseur à condensation par air visant la climatisation, les chambres froides et la réfrigération industrielle.

Conçu pour une utilisation extérieure, le design de ce nouveau refroidisseur à condensation par air de Johnson Controls, est compact. Peu bruyant, il dispose d'un COP élevé grâce au système de variation de vitesse compresseur plus ventilateur. Grâce à l'utilisation du propane (R 290), son PRG n'est que de 3.

PARTAGER



INFORMATIONS

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3 fois par mois, recevez toute l'info de votre secteur : actualités, nouveaux services et produits, événements...

JE M'INSCRIS

**STOP AU R-404A,
Rétrofittez maintenant !**

Solstice® N40 (R-448A) :

- Le plus bas GWP du marché (1387).
- Le choix de l'industrie avec la meilleure efficacité combinée.

Honeywell | Refrigerants

climalife

FOCUS

Réglementation F-Gas

Tout voir



Actualités



Cool-Therm prescribes propane chillers

23 MAR 2016 COMMENTS: 0

UK: A pharmaceutical company's policy to move away from HFC refrigerants has prompted the installation of two propane chillers totalling 1MW.

The two 500kW Geoclima screw chillers replace a conventional cooling system based on R407C refrigerant, which had also become unreliable before reaching the end of its anticipated operational life.



"In addition to its low GWP characteristics, the design was chosen for its excellent energy efficiency and ability to meet the electrical load limitations of the site, which were an issue and a potential restriction on the higher cooling capacity required of the replacement system," commented Cool-Therm director Rob Young.

The plant is optimised to cool the building's two wings using one chiller, with the second chiller coming on-stream automatically when load and ambient temperature increase, ensuring peak demand is met. When conditions allow, and the load reduces, the system automatically reverts to default one-chiller mode.

The propane chillers were craned into position in a two-stage process, one from a public road at an extended radius which used a specialist mobile tower crane. "Given the time of year, we had some concerns about high winds given the succession of storms during the lead up period. However, on the day there was 90 minute period of calm, enabling us to safely complete the lift," Rob Young said.

The chillers are designed to operate on a low charge of propane given their size, and are equipped with high performance brazed plate heat exchangers, which boost efficiency further. They are also fitted with automatic water isolation valves to prevent water mixing across the system.

Following the success of this installation, Cool-Therm is now working on a second project on the site to replace an existing data centre cooling system which runs on HFCs. Because of the

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GOT 22?



THE USE OF **R-22** IN 2020 **AND BEYOND...**

R-22 is the best replacement for R-22.
R-22 will perform best in a system designed for R-22.

- ▷ Current Regulations state that new R-22 can not be manufactured as of January 1, 2020. Only the manufacturing of R-22 is effected, **not the use.**
- ▷ Existing R-22 inventory **CAN** be sold into the market in 2020 and beyond to service existing equipment.
- ▷ **United Refrigeration Inc.** has a sufficient supply of R-22 allowing you to service equipment into the future.
- ▷ Replacement parts for R-22 systems are available at United Refrigeration Inc.

You CAN repair existing R-22 systems for as long as you determine it makes sense

WE DO!

Nat-R22-Flyer 2019 URI. pdf



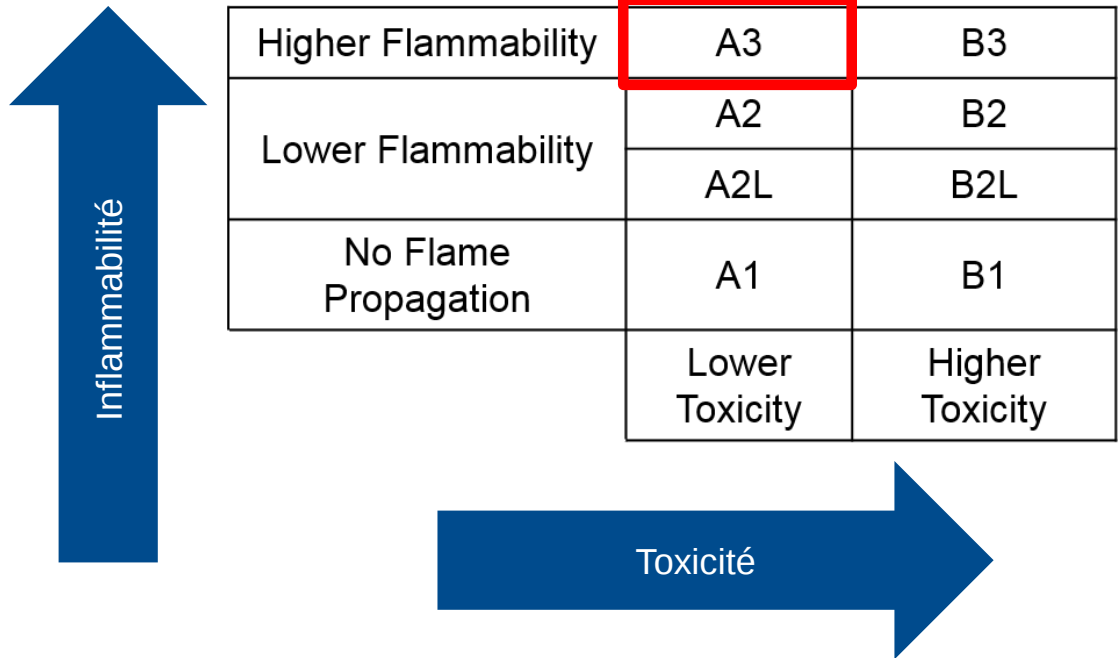
Réfrigération commerciale au R-290



Classification de sécurité et pureté du réfrigérant

Classification de sécurité A3 ASHRAE, sans odeur

- Le R-290 est classé comme réfrigérant A3 inflammable (toxicité inférieure / inflammabilité supérieure).
- Le R-290 est du propane de qualité réfrigérante. Le propane de qualité carburant ne convient pas à la réfrigération (taux d'humidité élevé et hydrocarbures insaturés).
- Aucun odorant ajouté au R-290.



Réfrigération commerciale au R-290

Pourquoi le propane (R-290)?

- Efficacité énergétique.
- Faible impact environnemental.
- Excellente propriété thermodynamique.
- À l'épreuve du future....

Défis....

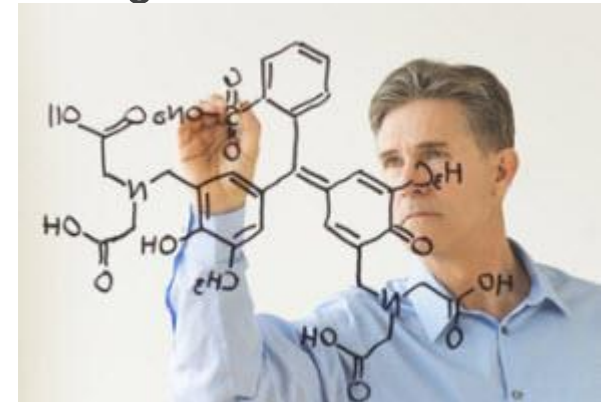
- Réfrigérant A3 inflammable.
- Faibles limites de charge.



Plus de 500 000 installations dans le monde. Des milliers d'installations partout en Amérique du Nord.

Les hydrocarbures comme réfrigérant

- Les hydrocarbures (HC) contiennent de l'hydrogène et du carbone, qui sont largement utilisés dans de nombreuses industries.
- Les HC les plus couramment utilisés dans la réfrigération sont:
 - Isobutane (R600a)
 - Propane (R290)
 - Propylène (R1270)
- R-290:
 - A été introduit dans l'industrie de la réfrigération dans les années 1900.
 - A été utilisé dans les années 1930, jusqu'à ce qu'il soit remplacé par des chlorofluorocarbures (CFC).
 - A regagné en popularité dans un large éventail d'applications depuis les années 2000.



Santé & Sécurité



R32



**Tips on Safe Use of
Mildly Flammable Refrigerant**



R600a



R290



DANGER

Risque d'incendie ou d'explosion. Le frigorigène R-290 (propane) est inflammable; le circuit de réfrigération doit être entretenu ou réparé uniquement par du personnel d'entretien qualifié. Ne PAS perforer la tuyauterie de frigorigène.

RÉFRIGÉRATION

Chaque comptoir réfrigéré autonome DD5X5FRW est doté de son propre compresseur; un par section de 4 pi. Le circuit de réfrigération est chargé et étanchéifié en usine. Chaque comptoir réfrigéré est doté d'un contrôleur électronique.

Les comptoirs réfrigérés autonomes utilisent du frigorigène R-290 (propane). Tous les modèles sont dotés de compresseurs. Les systèmes emploient des tubes capillaires pour la régulation du débit de frigorigène. Si les tubes capillaires sont obstrués ou endommagés, remplacer la totalité des tubes capillaires. Se reporter à la plaque signalétique du comptoir réfrigéré pour obtenir les renseignements sur la charge de frigorigène. L'illustration ci-dessous montre les détails du circuit de réfrigération.

AVERTISSEMENT

Mise en garde pour le personnel d'entretien qualifié : Les procédures d'entretien de sécurité obligatoires doivent être respectées pour toute intervention sur le circuit de réfrigération.

ACCÈS AU GROUPE COMPRESSEUR-CONDENSEUR

Les groupes compresseur-condenseur sont situés sur le dessus du comptoir réfrigéré. Les groupes compresseur-condenseur sont dotés d'un boîtier électrique pour le branchement des fils et l'entretien sur place. Tous les branchements électriques des comptoirs réfrigérés et des groupes compresseur-condenseur sont réalisés à l'usine.

AVERTISSEMENT

L'ouverture de la boîte de jonction électrique du groupe compresseur-condenseur expose le personnel à des dangers électriques et ne doit être effectuée que par un technicien de service qualifié!

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[Home](#) / [World News](#) / Fridge contractor dies following "pipe explosion"

Fridge contractor dies following "pipe explosion"

• 3 SEP 2019



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Santé et sécurité.....

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28 JUL 2017 0



Photo: Feuerwehr Bad Rothenfelde

GERMANY: Mystery still surrounds an explosion and fire at a refrigeration plant in Dissen in Osnabrück, Germany, in which two men suffered severe burns and six others were injured.

The explosion took place on Saturday morning (July 22) while engineers were carrying out work on the refrigeration system at a MUK/Transthermos refrigerated warehouse.

BRITISH COLUMBIA

Fernie Memorial Arena Ammonia Leak Kills 3 People

The area around the rink has been evacuated.

10/17/2017 22:08 EDT | Updated 10/18/2017 23:10 EDT



The Canadian Press



TRENDING

13 Great Secret Santa Gift

You're Precious The Worst



Latest News

Tesco confirms CO2 system failure at Walkden

TESCO has now confirmed that it was joint failure on a transcritical CO2 refrigeration system that caused the 'explosion' at the Tesco Extra supermarket in Walkden, Greater Manchester, yesterday.

A Tesco spokesman told ACR News: 'An examination of all the other joints in the store has been carried out and the offending joint has been sent off for examination.' He was, however, unable to confirm rumours that Tesco was reconsidering its planned roll-out of CO2 technology.

The incident on Sunday afternoon led to the evacuation of the store and a number of people were treated for minor injuries.

The 116,000ft², £25m store at the Ellesmere Centre was opened at the end of September.

14 December 2010

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Jobs

HVAC Senior

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sheet metal a
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Technician to
Bermuda...





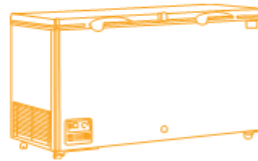
Futur de notre industrie.....



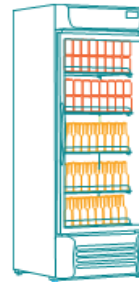
DOE 2017 – How does it impact the appliances?



**Upright Glass
Door freezers**



**Horizontal Solid Door Ice
Cream Freezers**



Bottle Coolers



**Professional
Kitchen**

57%

less energy consumption than current standard
(2010 DOE)

53%

less energy consumption than current standard
(2010 DOE)

48%

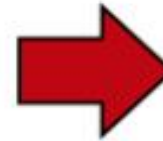
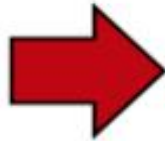
less energy consumption than current standard
(2010 DOE)

50%

less energy consumption than current standard
(2010 DOE)

The Department of Energy manages the United States' nuclear infrastructure and administers the country's energy policy. The Department of Energy also funds scientific research in the field.

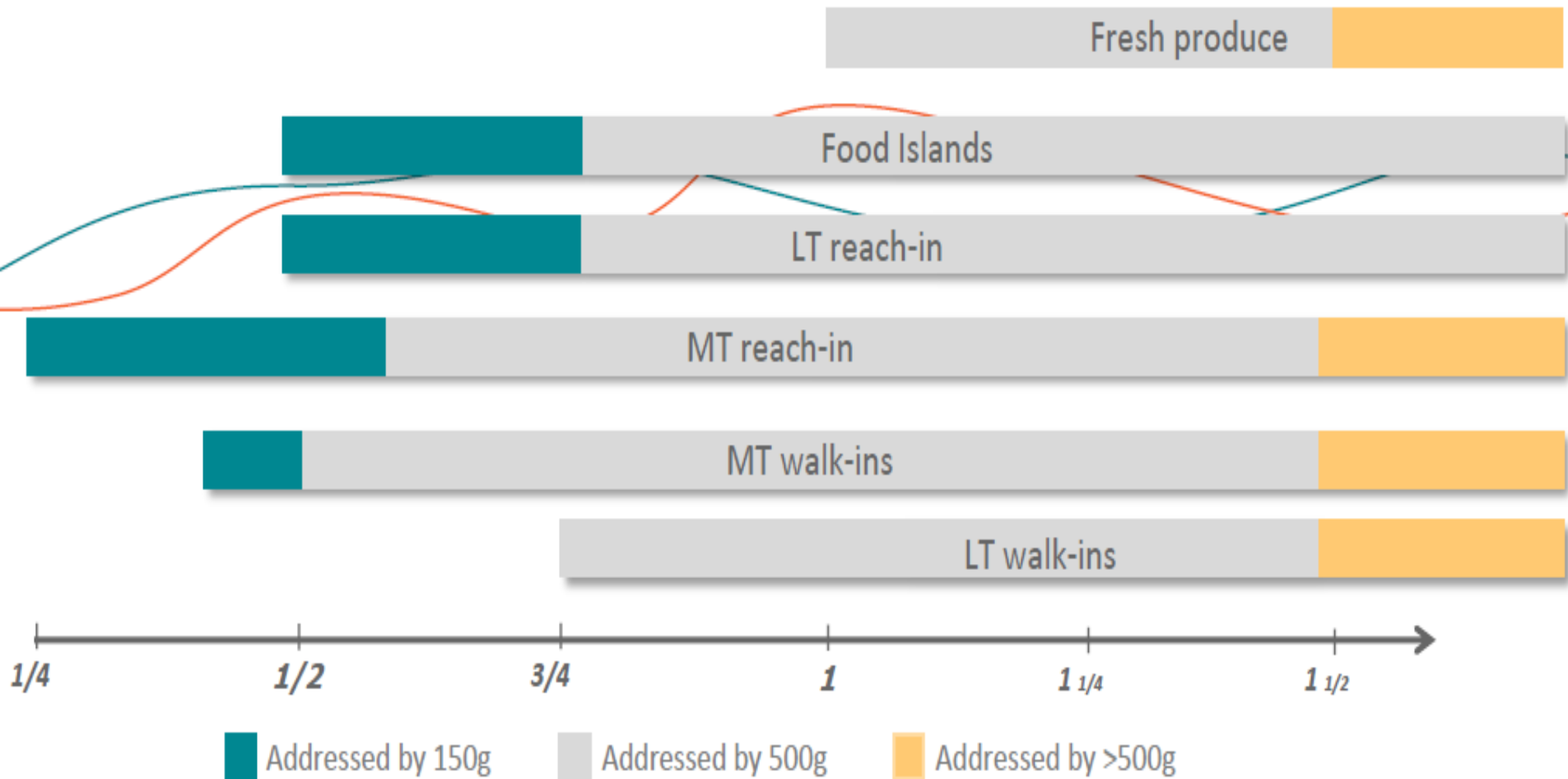
Comparaison énergétique HFC – CO₂ - HC



Beverage Cooler Test	R134a	R744 (CO ₂)	R290 (propane)
Power (kW)	0.092	0.069	0.043
Annual cost (@\$.10/kW-Hr)	\$ 80.59	\$ 60.44	\$ 37.67
Average Case Temp (°F)	40.4	39.9	39.7
Energy Savings	Baseline	↓ 25%	↓ 53%



R-290 : Limitation de la charge



Tendance commerciale et consommation

Dollar General has suddenly become one of the biggest retailers in the US by store count

Mary Hanbury Dec. 6, 2018, 12:07 PM



Dollar General is expanding rapidly across the United States. Shutterstock/Jonathan Moise

- [Dollar General](#) has 15,227 stores in the United States.
 - [McDonald's](#) has around 14,000 locations,
 - [Starbucks](#) has around 14,600.
-
- Dollar General has aggressive expansion plans. In 2017, it opened new locations at a rate of around four stores a day. In 2018, it is on track to open [900 new stores](#).
 - During a [call with investors](#) on Tuesday, the company said it plans to open 975 more stores in 2019. **(19 New Stores / week)**

Marché de proximité – petite surface



Unité monobloc réfrigérant R-290



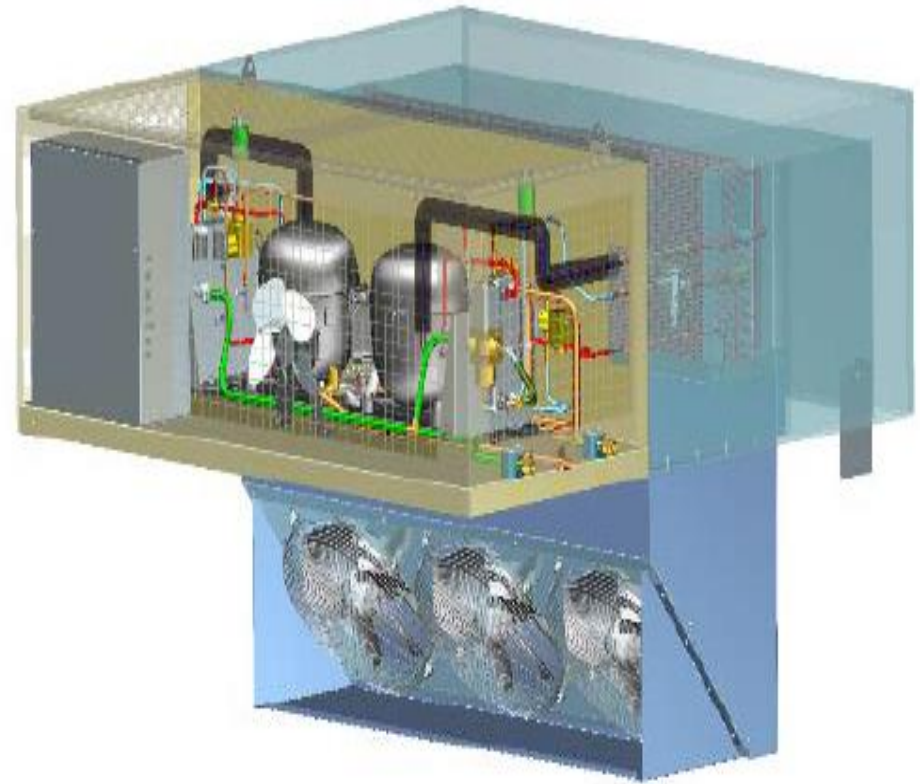
By Michael Garry, Feb 25, 2019, 10:44 GMT-5

Rivacold walk-in R290 unit

As more retail stores in the U.S. move toward installing propane (R290) display cases, Italian manufacturer Rivacold has begun selling its R290 ceiling-mounted packaged system for walk-in coolers and freezers in the U.S. market.

Rivacold has sold the R290 packaged units to more than 100 stores in Europe, and so far to two new stores operated by a single retailer in the U.S., said Doug Schmidt, president of Rivacold's U.S. division, based near Atlanta, Ga. (He could not name the retailer without their permission.)

"We expect to manufacture them in the U.S. later this year," he said, adding, "Almost everything we quote in the U.S. now is R290."



Godrej's R290 inverter AC is an example of a highly efficient unit needed to reduce global AC usage.



Conclusion

Potentiel de réchauffement planétaire (PRP)

R404A Eq.CO₂



=

8oz (227g.) de R404A

← → https://www.theglobeandmail.com/business/article-carbon-pricing-works-canadian-economists-say-as-national-debate/7l The Globe and Mail Inc. [CA] Q M AdChoices

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'Carbon pricing works,' Canadian economists say as national debate heats up

SHAWN MCCARTHY >
OTTAWA
PUBLISHED APRIL 4, 2018
UPDATED 3 DAYS AGO

A group of prominent Canadian economists have endorsed carbon pricing as a "powerful tool" to reduce greenhouse gas emissions as conservative politicians from across the country ratchet up criticism of federal and provincial climate policies.

In a report released on Tuesday, Ecofiscal Commission argued there is clear evidence that a carbon tax or cap-and-trade system is the most cost-effective way to reduce greenhouse gas emissions that cause climate change.

"Well-designed policies that put a price on carbon can reduce GHG emissions and can do so in a way that doesn't undermine our economic prosperity," the Ecofiscal Commission report concluded. "Carbon pricing works."

LATEST NEWS

Facebook to send Cambridge Analytica data-use notices Monday

Leafs to face Bruins in first round of playoffs

Canadian gymnasts add to their medal haul at Commonwealth Games

Viacom asks CBS to raise its bid by \$2.8-billion: sources

What prize lies behind the NAFTA do

Feedback

"Over time, there is still very strong reason to believe that carbon pricing is going to reduce GHG emissions and is going to do it in the lowest-cost way."

The report comes as the national debate over carbon taxes is heating up.

The Liberal government has introduced its carbon pricing legislation as part of its budget omnibus bill. The levy will kick in at \$20 a tonne of emissions next January and climb to \$50 in 2022. However, the federal "backstop" will only apply in provinces that refuse to adopt their own carbon pricing plan – either a tax or cap-and-trade – or do not meet a federal standard.

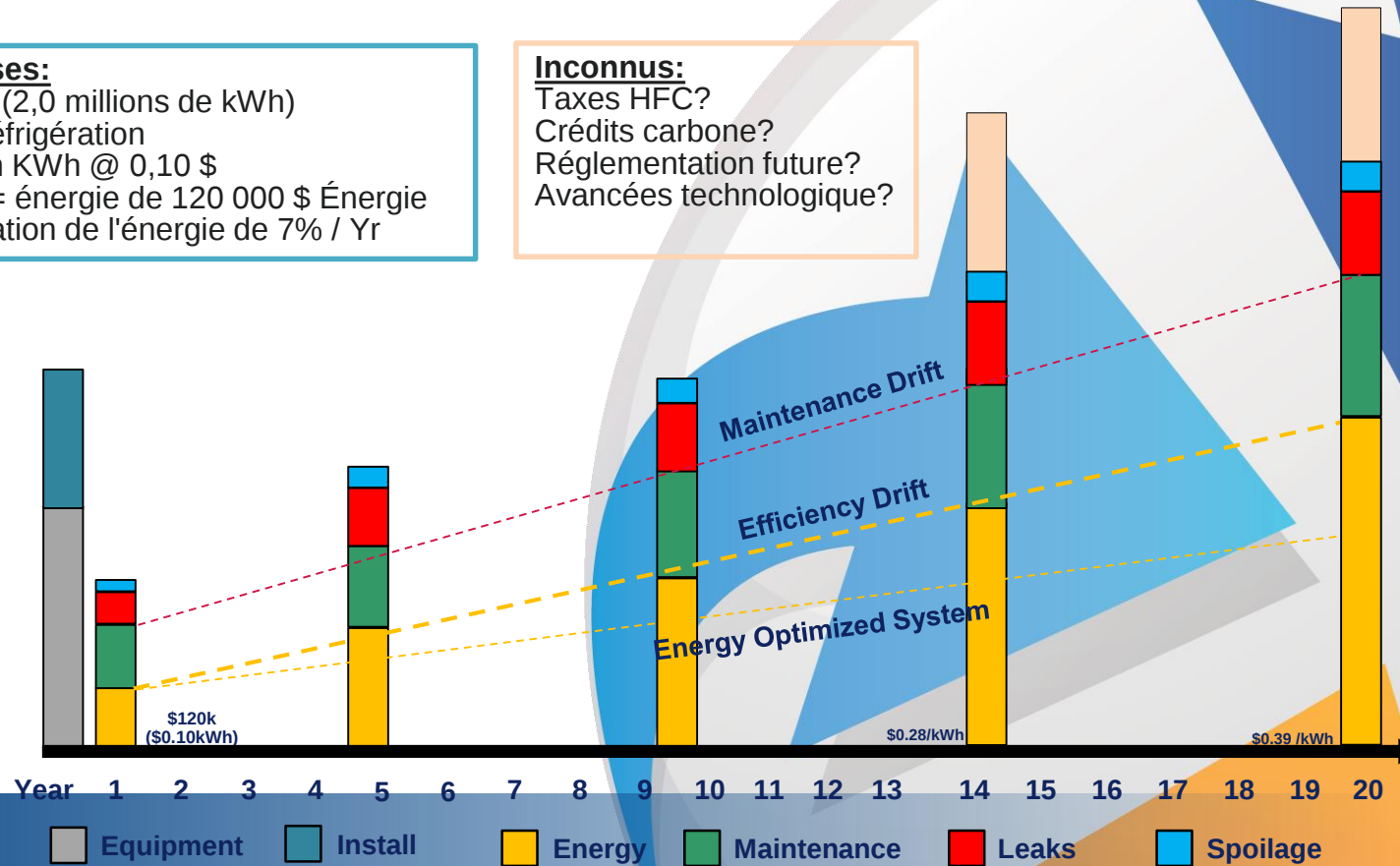
Développement de modèle de coût de possession (cycle de vie)

Hypothèses:

40,000ft² (2,0 millions de kWh)
60% de réfrigération
1,2 Million KWh @ 0,10 \$
Année 1 = énergie de 120 000 \$ Énergie
Augmentation de l'énergie de 7% / Yr

Inconnus:

Taxes HFC?
Crédits carbone?
Réglementation future?
Avancées technologique?

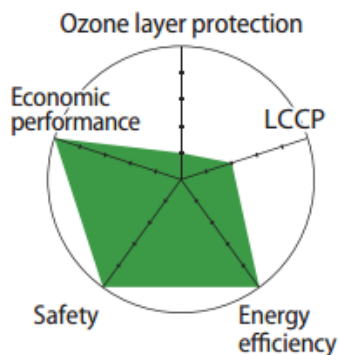


Prochaine génération de réfrigérant.....

Refrigerants currently
used in developing
countries

R22

(HCFC)

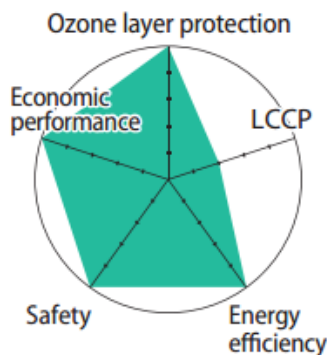


Global warming
potential (GWP) 1,810

Refrigerants currently
used in industrialized
countries

R410A

(HFC)

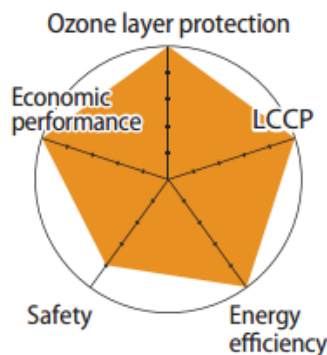


2,090

Next-generation refrigerants

R32

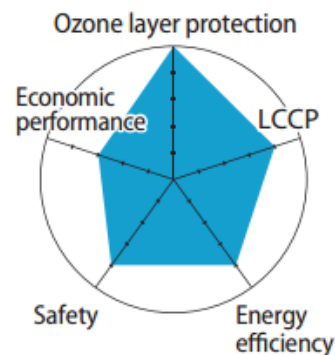
(HFC)



675

R1234yf

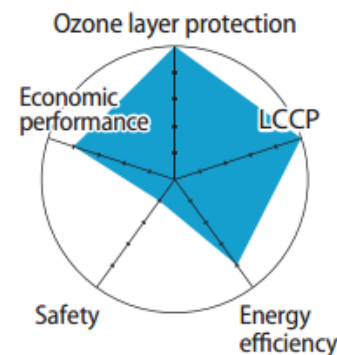
(HFO)



4

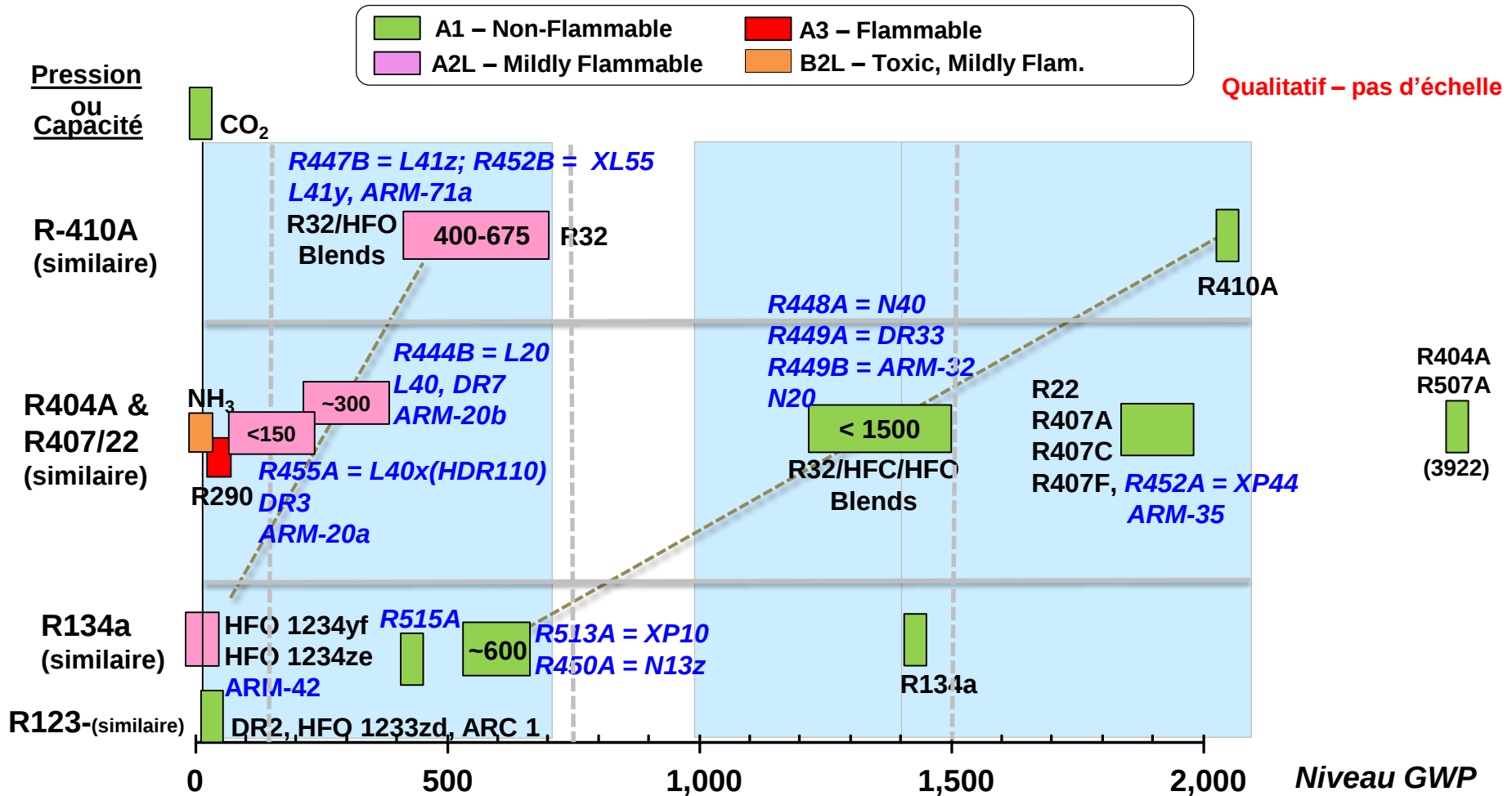
R290

(Propane)



3.3

État actuel des réfrigérants ? Alternatives à faible GWP sont inflammables ou à pression élevée.



Fluorspar price to impact refrigerants

14 MAY 2017 COMMENTS: 1



CHINA: Huge increases in the price of a vital component in the production of HFCs could place further pressure on global refrigerant gas prices.

The price of fluorspar, a mineral from which HFC component hydrofluoric acid is produced, has hit a four-year high in the home of the world's largest producer, China.

Fluorspar prices have risen by nearly 40% since February, leading to increases in China of around 60% in the price of R22 and R134a, a 130% increase in the price HFC component R125, and a massive 160% rise in the cost of R32.

The increases are blamed on new environmental constraints in China on both fluorspar mining and in the production of hydrofluoric acid. Since the end of 2016 China's environmental law enforcement efforts have been significantly strengthened. As a result, the production of products like hydrofluoric acid, a highly corrosive chemical, has come under new environmental protection and safety requirements.

With China supplying over 50% of the world demand for fluorspar, the increases are likely to put further pressure on refrigerant prices, particularly in Europe where the HFC phase-down is already impacting high GWP gases.

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Prix des réfrigérants



	<u>Janvier 2017</u>	<u>Novembre 2017</u>	<u>Décembre 2019</u>
R-404a	\$314.76	\$653.68	\$620.00 (57)
R-410a	\$320.00	\$674.00	\$758.76 (67)
R-22			\$1180.05 (87)
R-448/449a			\$1091.00 (96)

Prix de détails suggéré, Dollars CDN, toutes taxes extra

Vol. Capacity / Pressure	Naturals	Mildly Flammable (A2L) HFO and blends	Lowest GWP Non-Flammable (A1) HFC/HFO blends	Today's non-flammable (A1) / HFCs	
Elevated	R-744 (CO ₂) 1				
Medium "R-404A like"	R-290 (Propane) 3	R-455A (HDR-110) 146	R-449A (XP40) 1,282	R-407A 1,923	R-507A 3,985
	R-717 (Ammonia) 0	R-454C (DR3) 146	R-448A (N40) 1,273	R-407C 1,624	R-404A 3,943
		R-457A (ARM-20a) 139	R-449B (ARM-32) 1,296	R-407F 1,674	R-452A 2,140
Low "R-134a like"		HFO-1234yf <1	R-513A (XP10) 573	R-134a 1,300	
		HFO-1234ze <1	R-450A (N13) 547		
		ARM-42 131	R-515A 392		
GWP	0–5	0–150	350 –1,300	1,300–4,000	
	In Production	Not SNAP Listed, Next in Development	Approved or in Development	In Production	

Réfrigérants existant et nouvelles alternatives

The potential dangers of TFA

written by Pavel Makhnatch (under supervision of Rahmatollah Khodabandeh and Björn Palm)

Published Nov 01, 2015

There is a number of concerns regarding the safety of HFO refrigerants, including their flammability, potential of hydrogen fluoride formation and formation of trifluoroacetic acid (TFA). In our previous publications we discussed some of these concerns, however the problem of TFA formation was not discussed in detail. This article will therefore focus on TFA formation and its possible effect on environment.

What is TFA?

TFA is short for trifluoroacetic acid, $\text{CF}_3\text{C}(\text{O})\text{OH}$ (Figure 1), - the simplest perfluoroorganic acid available. It is characterized by strong acidity, high dielectric constant, miscibility with water and most organic solvents and relatively low boiling point. Due to its properties it is widely used in organic synthesis as a solvent, catalyst and reagent. Many chemical



Last week the German Federal Environment Agency (UBA) warned that the degradation of HFO R1234yf - which is widely used in mobile air-conditioning systems - into trifluoroacetic acid (TFA; the atmospheric by-product of HFOs) could contaminate the water supply as TFAs cannot be removed after contamination has taken place.



and pointed to natural refrigerants as the

R1234yf in car air conditioning systems and
nt, stated in an interview with Frankfurt-based

Refrigerants Expert Hafner: HFOs are 'Totally Unnecessary' in New Systems

BY TINE STAUSHOLM - NOVEMBER 20, 2019



Refrigeration expert Armin Hafner of the Norwegian University of Science and Technology (NTNU), in a recent presentation, described HFOs, the latest generation of fluorinated refrigerants, as “totally unnecessary” in new systems, adding, “If you just look at the GWP value, that tells you nothing.”

Hafner, Professor of Refrigeration in the Department of Energy and Process Engineering at NTNU, made these remarks at the ATMOSphere Europe conference in Warsaw, Poland, on October 16 during a presentation on the latest trends in natural refrigerant technology. (See [“NatRefs Expert Hafner Echoes Activist Greta Thunberg,” Accelerate Magazine, November-December 2019.](#))

Hafner did acknowledge that “for existing systems, yes, you may have a certain need [for HFOs or blends] in some areas.” HFOs and their blends have been designed to be lower in GWP than HFCs.

One of the problems with HFOs, according to Hafner, is that while some of these



SHARE



Formation, formation, information.....



Questions?

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Source:

- <http://test.ahrinet.org/site/514/Resources/Research/AHRI-Low-GWP-Alternative-Refrigerants-Evaluation>
- <http://www.noaa.gov/february-global-temperature-anomaly-sets-new-record-globe>
- <https://www.epa.gov/snap/refrigeration-and-air-conditioning>
- <http://www.unep.org/climatechange/>
- http://ec.europa.eu/clima/policies/f-gas/index_en.htm
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