New Low GWP Innovations for Refrigeration, Air Conditioning and Heat Pumps

Eric P. Youngdale
Global Market Manager
Opteon™ Stationary Refrigerants

Chemours Opteon™ Refrigerants Press Conference
Chillventa 2016

~ 50,000 metric tonnes refrigerants (reported)

79% CO₂ equivalent reduction
We need nearly half of supermarket packs retrofitted by end 2017. 50,000 stores!!!

The future is here. The future is clear.
Opteon™ XP Series Refrigerants

- Low GWP
- Retrofit & new equipment
- Easy to use – close match to HFCs

Opteon™ XP Series Market Adoption

- Launch
- > 10X
- > 45X
**Opteon XP10**
Refrigerant (R-513A)

- Azeotropic R-134a replacement
- 56% GWP reduction vs R-134a
- Selected by major OEMs

---

**Opteon XP44**
Refrigerant (R-452A)

- Lowest discharge temperature replacement for R-404A
- 50% GWP reduction
- Selected by major OEMs – transport & hermetic refrigeration
Adoption of Opteon™ Low GWP Refrigerants Accelerates

Opteon™ XP40 Expected to be Used in More Than 1,000 Supermarkets Worldwide by End of 2016

WILMINGTON, Del.; December 7, 2015 – The Chemours Company (“Chemours”) (NYSE: CC), a global chemical company with leading market positions in titanium technologies, fluoroproducts and chemical solutions, announced today that it is seeing strong acceleration in adoption of Opteon™ XP40 (R-449A) in supermarket and other commercial refrigeration systems.

Opteon™ XP40 is the Chemours flagship low Global Warming Potential (GWP) replacement for R-404A refrigerant. It also provides an excellent direct replacement solution to supermarkets looking for a more sustainable R-22 replacement. Based on current orders and customer product testing, XP40 is on pace to be used in more than 1,000 supermarket systems worldwide by the end of 2016.
**Opteon™ XL Series Refrigerants**

- Very low GWP
- Equipment designed for class 2L mildly flammable refrigerants
- Required to meet F-gas goals

**Opteon™ XL Series**

10X Charge Size vs Hydrocarbons

<table>
<thead>
<tr>
<th>Room area (m²)</th>
<th>Charge size (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
</tr>
</tbody>
</table>

- Opteon™ XL40
- HFC-152a A2
- HC-290 A3
**XL20 (R-454C)  XL40 (R-454A)**

- Refrigeration – replace R-404A, 507, 407s
- < 150 GWP  < 250 GWP
- Lowest GWP  Closest match

**XL41 (R-454B)  XL55 (R-452B)**

- Replace R-410A - AC, heat pumps, chillers
- < 500 GWP  < 750 GWP
- Lowest GWP  Closest match
- Lowest 2L flammability
EN378 will be published End of 2016
New Standards list Safety Category A2L
Other standards from IEC will follow
The future is here. The future is clear.

Hall 7 / Booth 7-224
Opteon.com