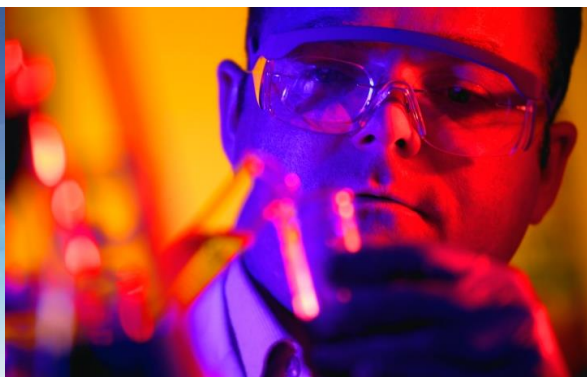




R-404A Replacement Refrigerants

DuPont™ SUVA® 407A

Properties and Applications



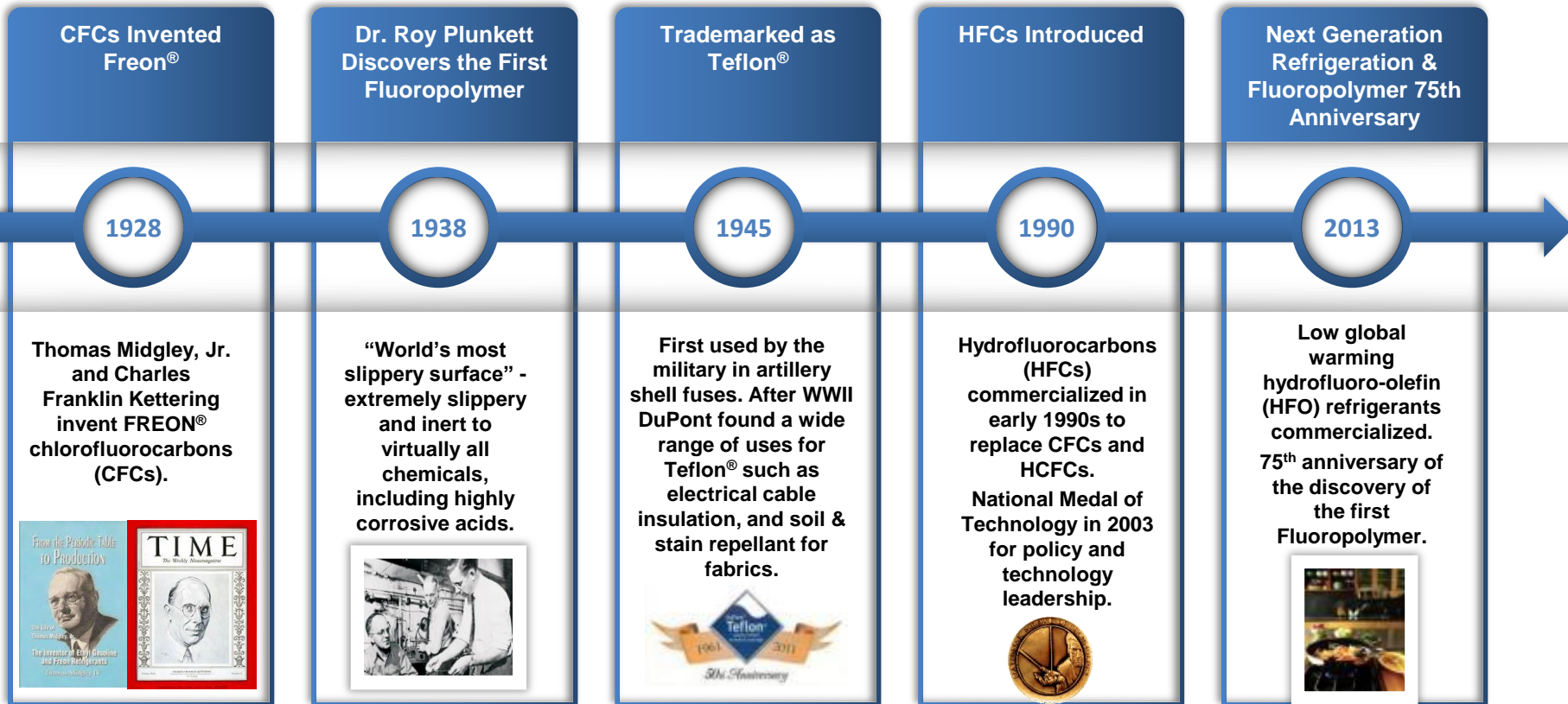
DuPont Refrigerants Vision

We will use our science and technology, market knowledge and global reach to provide sustainable materials and solutions to enhance personal comfort, enable preservation of perishable items and improve industrial processing while reducing environmental footprints.

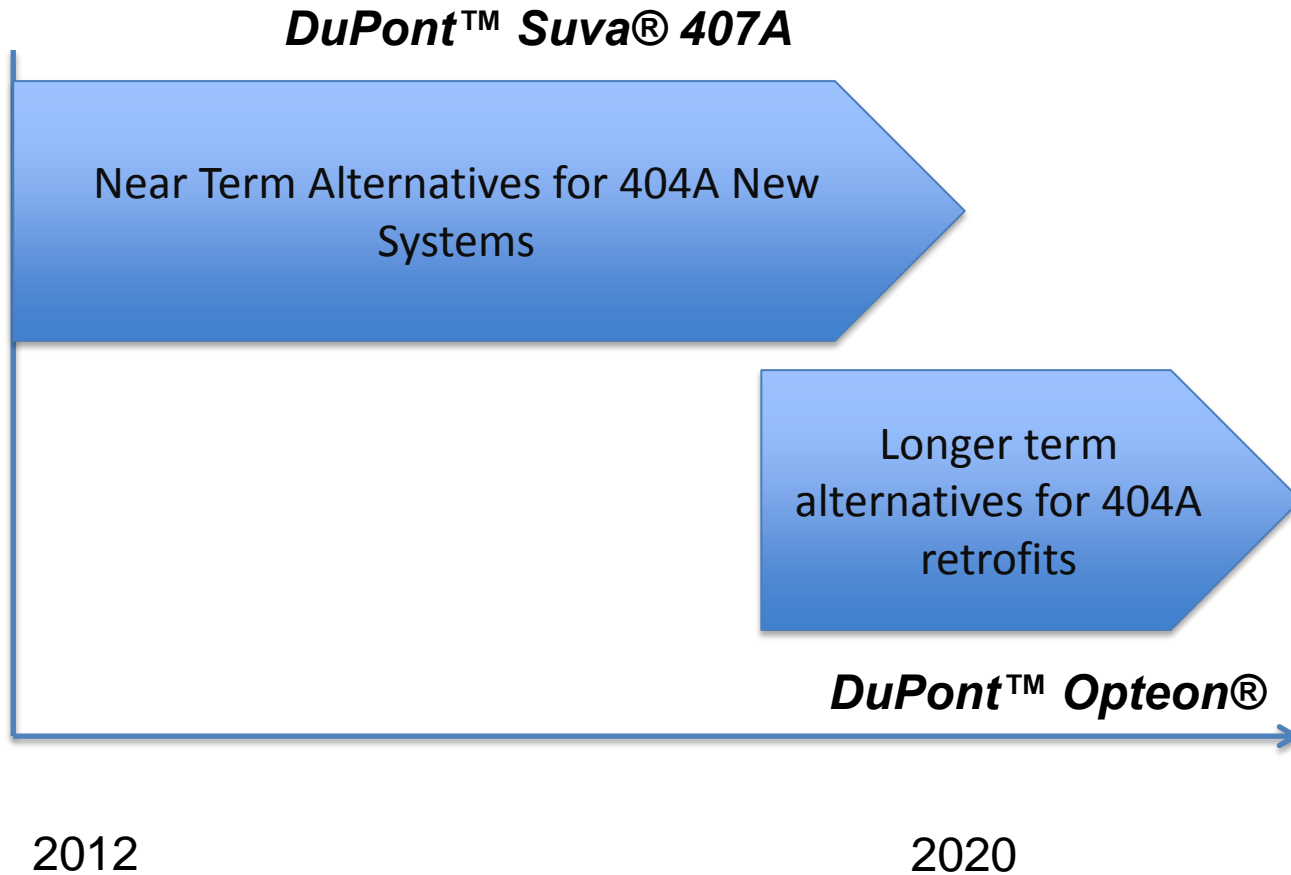
We are a leader in environmental business advocacy and sustainable innovation (ISCEON® and Next Gen HFOs)



85 years of innovation and development in fluorine science



HFC Alternatives for LT/MT Refrigeration Systems



Near Term Alternatives for 404A New Refrigeration Systems

DuPont™ Suva® 407A

Suva® 407A – The Basics

HFC Blend: R32/R125/R134a (20/40/40wt%)
Applications: Low and Medium Temp Refrigeration
Lubricant: Polyol Ester (POE)

Boiling Point: -45° C
Ozone Depletion Potential 0
Global Warming Potential 2110
ASHRAE Safety Classification A1
Temperature Glide ~4° C

R-407A – Where Does it Make Sense ?

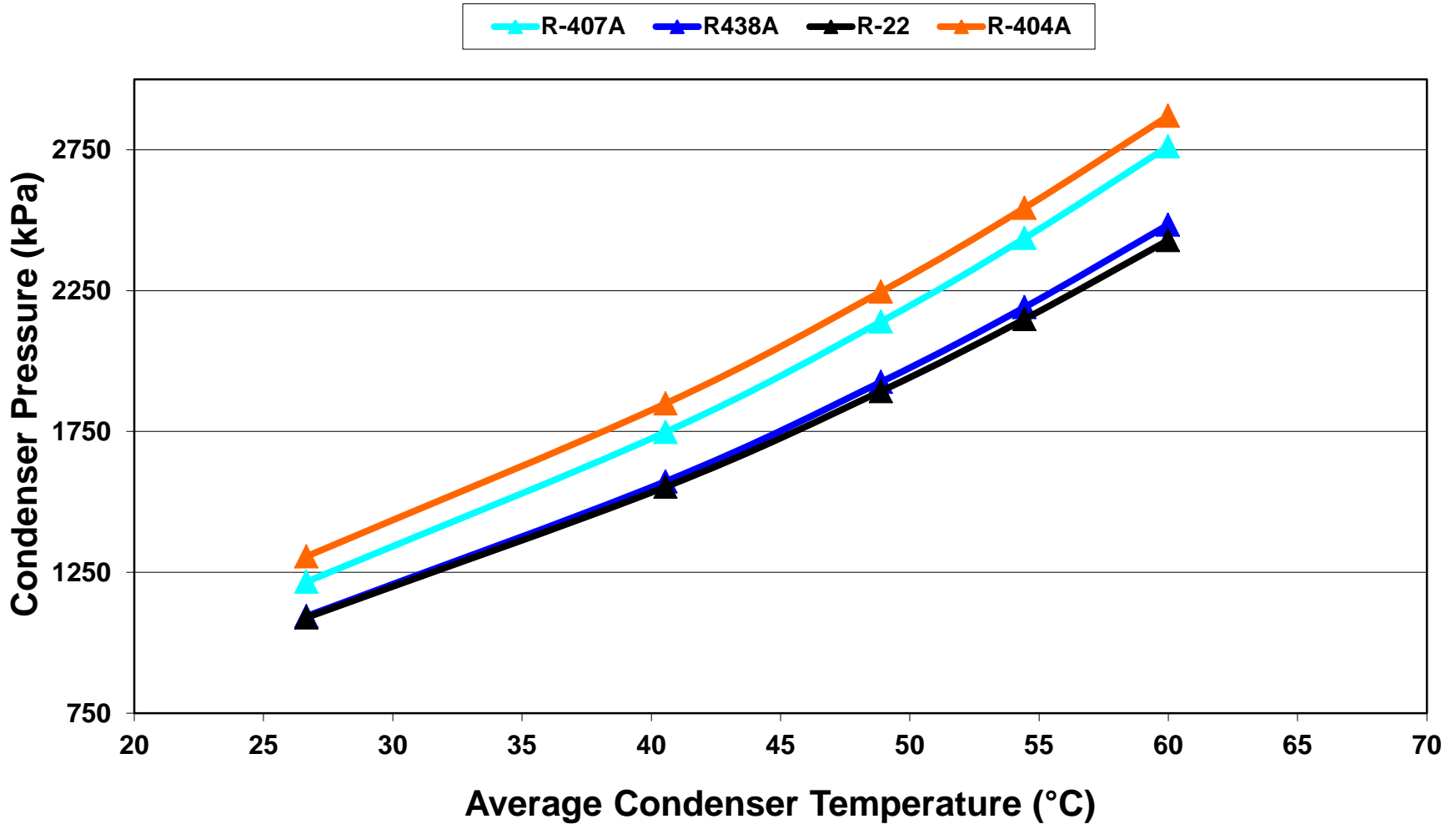
New Systems: A good choice when designing and installing new low/med temp refrigeration systems desiring a lower GWP option than R404A/R507

Existing Systems: Not recommended to replace R404A/R507; Requires engineering changes to manage reduced capacity, mass flow, and PT differences. May replace R-22 but will require complete change-out of lubricant to POE.



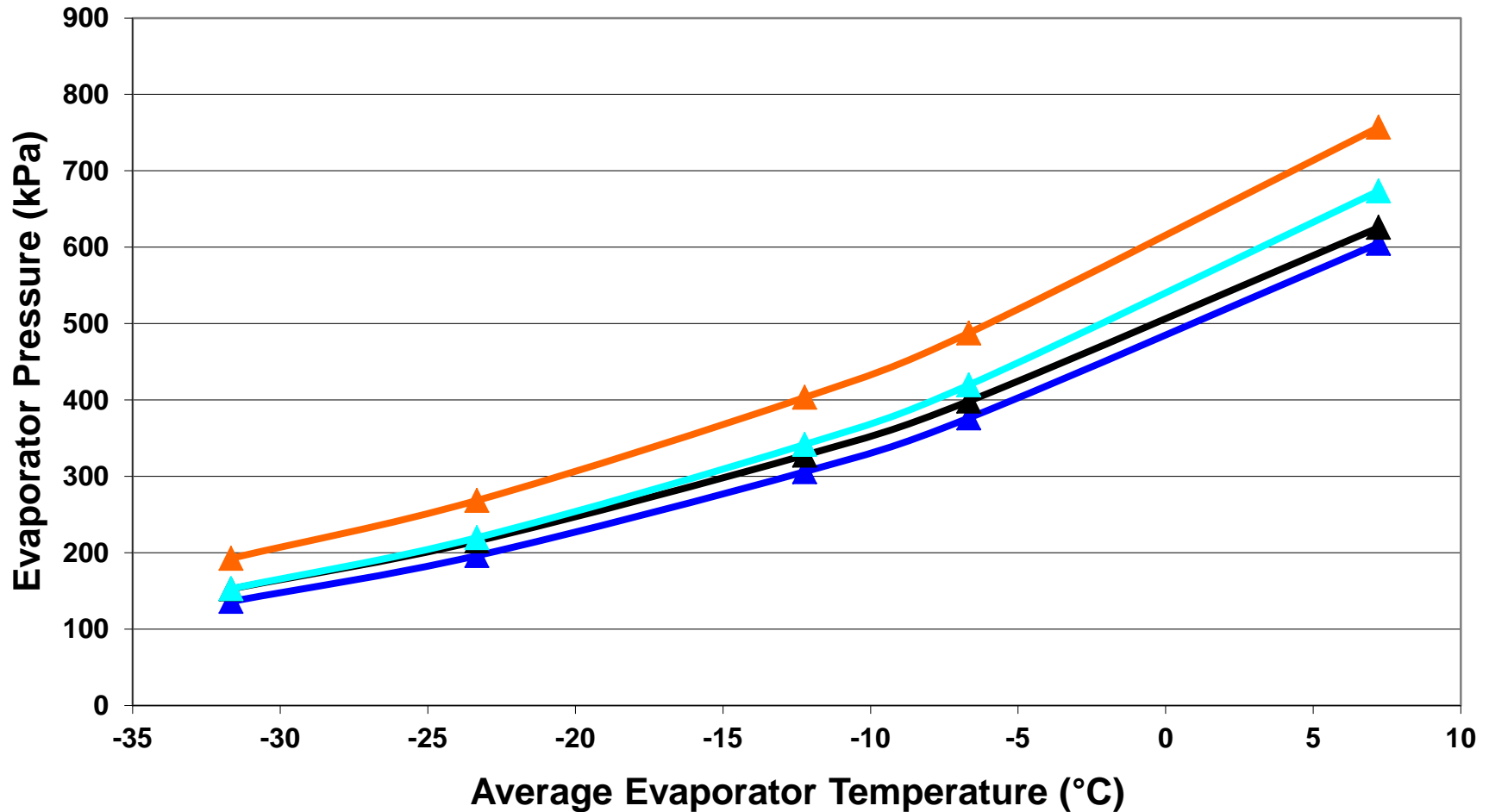
Condenser Pressure vs Condenser Temperature

(based on -6.7°C Evaporator, 5.5K subcooling from avg cond T)



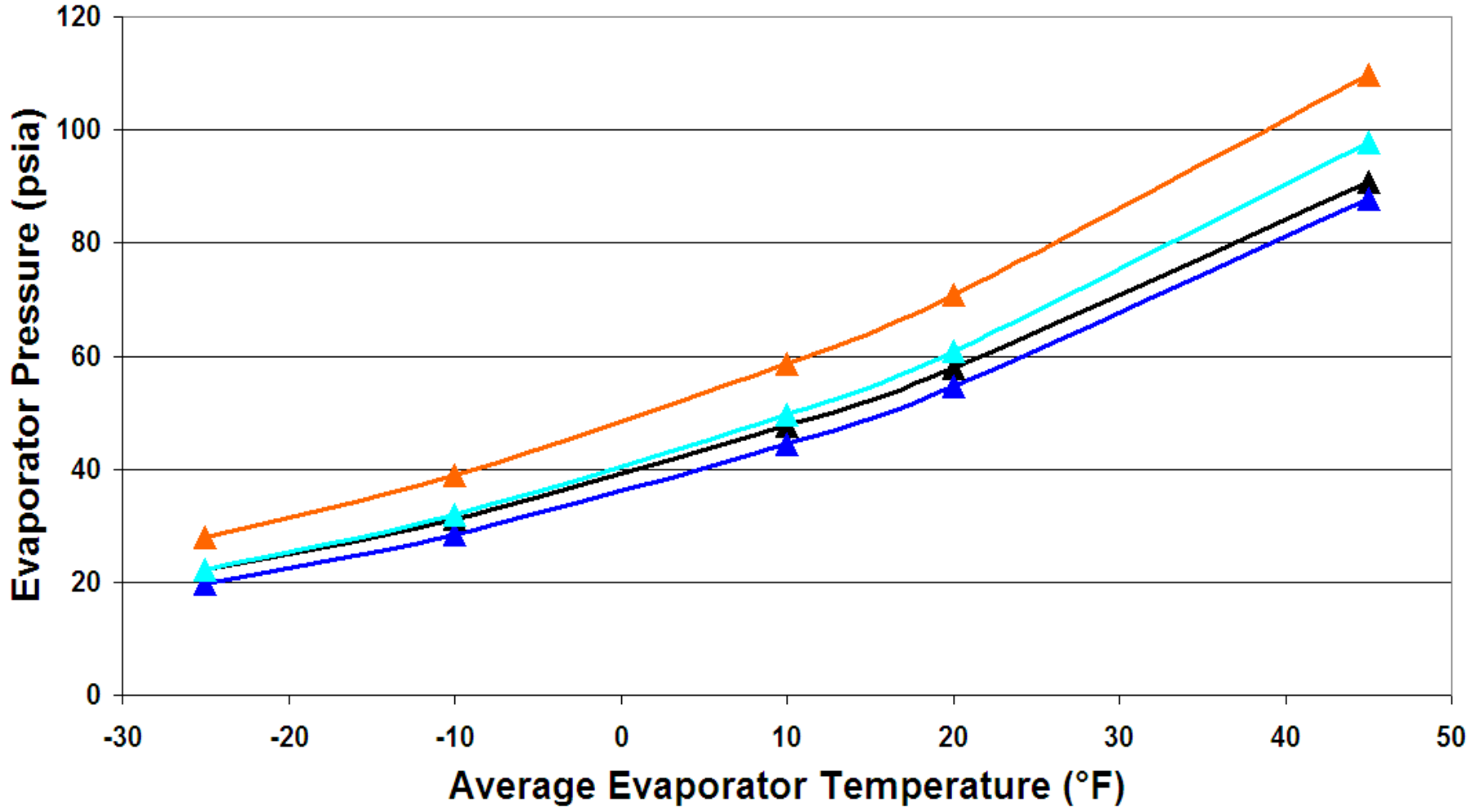
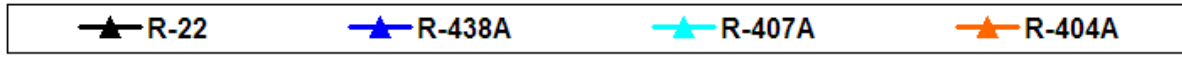
Evaporator Pressure vs Evaporator Temperature

(based on 40.5°C Avg Condenser, subcool liquid to 35°C)



Evaporator Pressure vs Evaporator Temperature

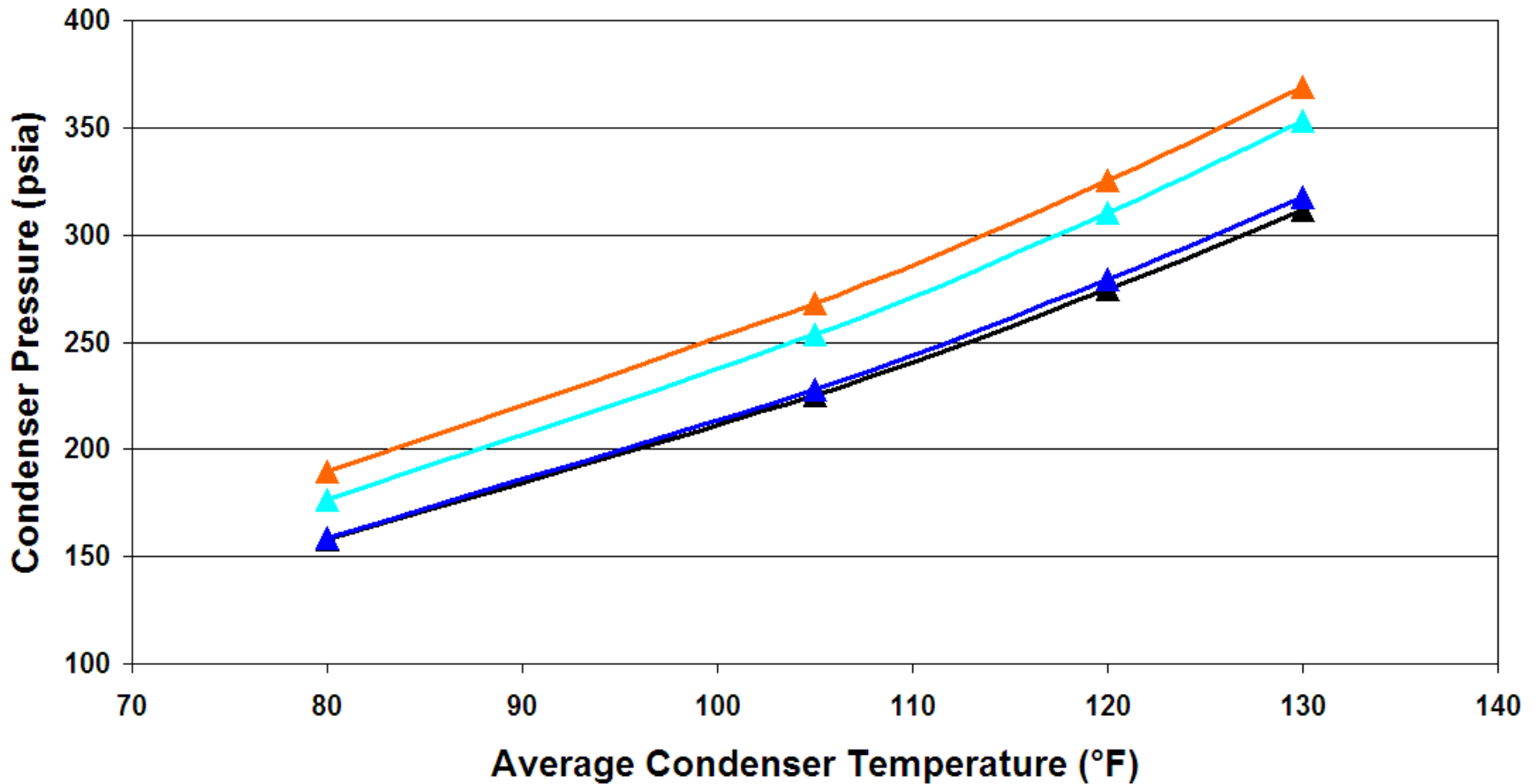
(based on 105°F Condenser, subcool liquid to 95°F)



Condenser Pressure vs Condenser Temperature

(based on 20°F Evaporator, 10°F subcooling)

—▲— R-22 —▲— R-438A —▲— R-407A —▲— R-404A



DuPont Suva® 407A – Benefits

- **GWP reduction (46% vs. R-404A), Zero Ozone Depletion Potential**
- **Wide availability, multiple sourcing options**
- **Years of proven performance**
- **Specified by leading retailers for new stores**
- **Uses traditional POE lubricants (same as R404A)**
- **Comparable performance to R404A / R507 in new equipment**
- **Similar energy performance to R404A and R407F**
- **Can be combined with CO2 in cascading systems to achieve lower carbon footprint**
- **Compatible with common materials of construction/components**

Laboratory Calorimeter Data – New Systems

Relative Performance R-407A vs. R-407F

	<u>Refrg</u>	<u>GWP</u>	<u>Eff</u>	<u>Cap</u>	<u>Disch T</u>	<u>Mass Flow</u>
LT	R-407A	2107	1.0	1.0	----	-----
	R-407F	1825	0%	+3%	+2F	same
MT	R-407A	2107	1.0	1.0	---	----
	R-407F	1825	0%	+6%	+6F	same

Good Performance Match Possible in New Systems

Laboratory Calorimeter Data

Relative Performance R-407A & R-407F

R-404A Retrofit Conditions

	<u>Refrg</u>	<u>GWP</u>	<u>Eff</u>	<u>Cap</u>	<u>Disch T</u>	<u>Mass Flow</u>
LT	R-407A	-46%	-5%	-12%	+27F	-30%
	R-407F	-53%	-5%	-14%	+28F	-30%
MT	R-407A	-46%	-2%	-8%	+22F	-30%
	R-407F	-53%	-2%	0%	+28F	-30%

Engineering Concerns if Attempting Retrofits

Summary- Alternatives for 404A

Opteon® Low GWP HFO's in development (3-5 yrs)

Specify R-407A instead of R-404A for new systems

- **~50% reduction in GWP**
- **Equivalent Performance Achievable**
- **Proven Technology**
- **Widely Available**

Retrofit of Existing R-404A systems

- **Not generally recommended**
- **Engineering Assessment Required**
- **R-407A performance similar to R-407F**

For more information



@DuPontRefrig



Search DuPont Refrigerants



refrigerants.dupont.com

Copyright© 2013 DuPont or its affiliates. All rights reserved.
The DuPont Oval Logo, DuPont™, The miracles of
science™, MO99™ and ISCEON® are trademarks or
registered trademarks of E.I. duPont de Nemours and
Company or its affiliates.



The miracles of science™