

Energy & Store  
Development  
Conference

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# ASHRAE Standard 147

Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems

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## What has happened so far...

- First met June 2006 in Quebec City
- Membership – 16 Voting Members including 5 Producers, 5 Users and 6 General Interest, also 6 Non Voting members
- Emphasis on Supermarket Refrigeration
- Written with intent to be included in building codes
- 2 Public Reviews with a 3<sup>rd</sup> upcoming

## What's in it...

### Purpose –

This standard establishes practices and procedures that will reduce inadvertent release of halogenated refrigerants.

### Scope –

The practices and procedures in this standard cover release reduction of halogenated hydrocarbon and halogenated ether refrigerants in the following circumstances:

from stationary refrigerating, air-conditioning, and heat-pump equipment and systems;

during manufacture, installation, testing, operation, maintenance, repair, and disposal of equipment and systems.

## Highlights

- Single flare fittings not allowed
- 4.3.3 Tubing in a case must be supported
- Tethered caps
- 4.11 Systems over 500 Lbs need to “alert” owner of refrigerant release
- 6.1 Factory Leak testing & Leak rate spec
- Section 7 – Installation
- Section 8 – Service and Operation
- Annex – Not part of the Standard, but an FYI



## Where is it going from here...

- 3<sup>rd</sup> Public review...**should** complete the process
- ASHRAE then would publish the Standard and the intent is that Building Authorities and others could adopt and make it Code or part of Building Requirements

# DOE Commercial Refrigerator Energy Limits

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# Energy Policy Act (EPACT) 2005

## Definition and Origin

- AHRI negotiated EPACT language with Energy Advocacy Groups (primarily ACEEE<sup>1</sup>)
  - Why? Preempt individual states from enacting unmanageable regulations
- Mandates maximum energy limits for display cases & storage cabinets
  - Energy Limits on Closed, Self-Contained Cases are set **[ Jan 1, 2010 ]**
  - DOE was mandated to set energy limits for remaining products by 1/1/2009 **[ effective Jan 1, 2012 ]**
  - DOE contracted Navigant as a consultant to perform energy limit analysis/definition

<sup>1</sup> American Council for an Energy-Efficient Economy





## EPACT 2005 Impact

### Closed, Self-Contained Cases (Effective Jan 1, 2010)

Maximum daily energy consumption (kwh/day)

Refrigerators with solid doors .....	0.10V + 2.04
Refrigerators with transparent doors .....	0.12V + 3.34
Freezers with solid doors .....	0.40V + 1.38
Freezers with transparent doors .....	0.75V + 4.10

V = Volume of Case

**These energy limits represent a 30% to 50% reduction over current baseline product.**

# DOE Energy Limits are Assigned to Product Families

## DOE Naming Convention

“(Case Structure) . (Condensing Unit Configuration) . (Rated Product Temperature)”

### Case Structure

- Orientation
  - Vertical
  - Horizontal
  - Semi-Vertical
- Open
- Closed
  - Transparent
  - Solid (storage)

### Examples:







Door display case = **VCT**

Multi-deck dairy case = **VOP**

Island Freezer = **HZO**



# DOE Product Family Definitions – Case Structure Examples

- Vertical Open (**VOP**)      Dairy, Meat, Multi-deck Freezer → 
- Semi-vertical Open (**SVO**)      OxUM, Islands → 
- Horizontal Open (**HZO**)      Single deck → 
- Vertical Closed Transparent (**VCT**)      Door cases → 
- Horizontal Closed Transparent (**HCT**)      Island Freezer /w doors → 
- Service Over Counter (**SOC**)      Deli → 

Family Definitions were key to manageable rulemaking.





# Product Family Definitions

## Condensing Unit Configuration & Rating Product Temperature

### Condensing Unit Configuration

- Remote Condensing (**RC**)
  - DX only for now; secondary coolant excluded
- Self-contained (**SC**)

### Rating Product Temperature

- Medium Temperature (**M**) [38°F]\*
- Low Temperature (**L**) [0°F]\*
- Ice Cream Temperature (**I**) [- 15°F]\*
  - Does not apply to cases that can operate at frozen and ice cream temps by making set point adjustments

\* +/- 2°F

**Rating Prod Temp Can Differ from Application Temp**



# DOE Definitions

## Total Display Area (TDA)

**TDA is sum of the projected viewing areas for product**

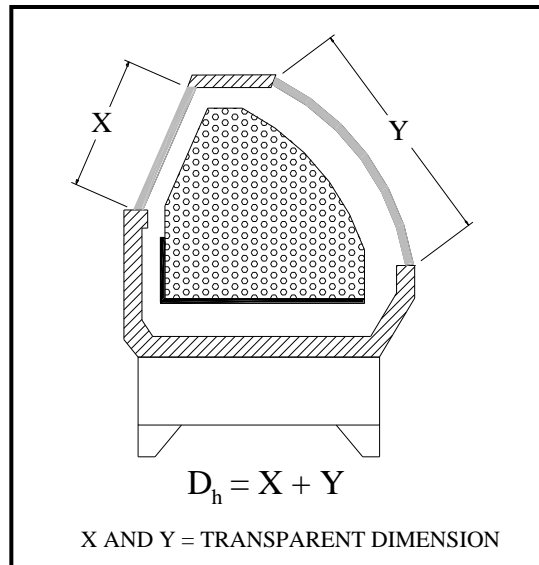
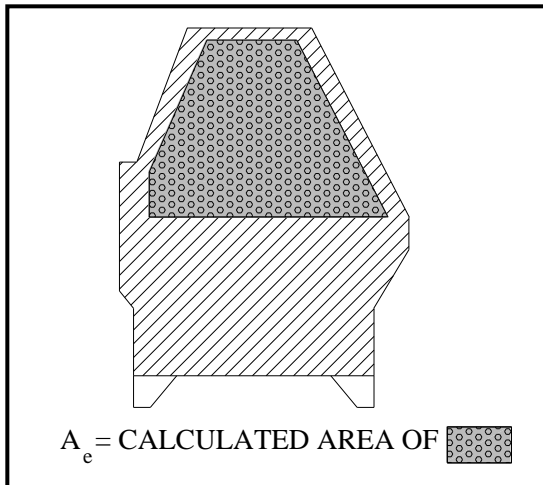
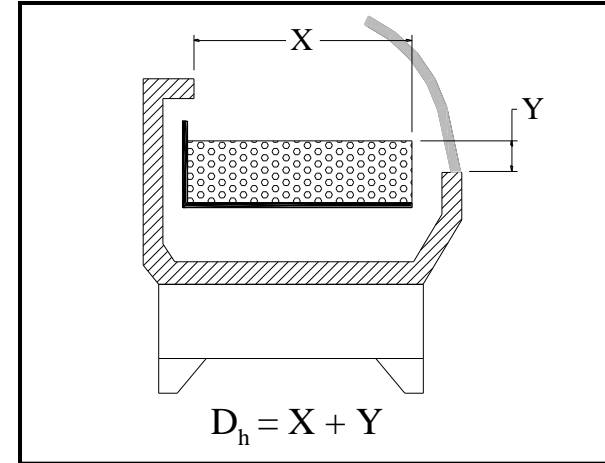
$$TDA = D_h \cdot L + A_e$$

Where

$D_h$  = projected area of visible product

L = Length of Merchandiser

$A_e$  = projected area of product through end walls



**Total Display Area**  
is “merchandising  
focused” allocation  
of energy.

### Examples of DOE Energy Limits

Equipment class <sup>2</sup>	Standard level* ** (kWh/day) ***
VOP.RC.M .....	$0.82 \times TDA + 4.07$
SVO.RC.M .....	$0.83 \times TDA + 3.18$
HZO.RC.M .....	$0.35 \times TDA + 2.88$
VOP.RC.L .....	$2.27 \times TDA + 6.85$
HZO.RC.L .....	$0.57 \times TDA + 6.88$
VCT.RC.M .....	$0.22 \times TDA + 1.95$
VCT.RC.L .....	$0.56 \times TDA + 2.61$
SOC.RC.M .....	$0.51 \times TDA + 0.11$
VOP.SC.M .....	$1.74 \times TDA + 4.71$
SVO.SC.M .....	$1.73 \times TDA + 4.59$
HZO.SC.M .....	$0.77 \times TDA + 5.55$
HZO.SC.L .....	$1.92 \times TDA + 7.08$
VCT.SC.I .....	$0.67 \times TDA + 3.29$
VCS.SC.I .....	$0.38 \times V + 0.88$
HCT.SC.I .....	$0.56 \times TDA + 0.43$
SVO.RC.L .....	$2.27 \times TDA + 6.85$
VOP.RC.I .....	$2.89 \times TDA + 8.7$
SVO.RC.I .....	$2.89 \times TDA + 8.7$
HZO.RC.I .....	$0.72 \times TDA + 8.74$

Excerpt from  
10 CFR Part 431

Manufacturer &  
Customer can  
choose **how** the  
energy limit is met!





## What Is the Impact on the Retailer?

- Some Higher Efficiency Options Become Standard
  - ECM motors in all products
  - LED lighting and high efficiency doors/frames (door cases – VCT)
  - Manufacturers will consult with customers on options that must change
- Frequently Asked Questions
  - Is equipment already in stores affected? NO
  - Can I still move my equipment among stores? YES
  - Can I still refurbish and reinstall equipment? YES
  - How do I know that the equipment I receive meets DOE regs?
    - Manufacturer will apply certification label to product.
  - What is required to prepare for this change?

**Nothing. The onus is on your supplier!  
Store environments are critical as always!**