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DOE Case Standards Update

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DOE Case Standards Update

- What's happened?
- What's the impact on retailers?
  - Display Case impact – what's out, what's in
  - Energy consumption
- Summary on Walk-ins

DOE Case Standards Update

Energy Policy Act 2005 - How it all began.

- **AHRI worked with Energy Advocacy Groups to pass this Federal legislation and prevent individual state actions.**

- **Maximum energy limits were mandated for display & storage cases.**
  - Closed, self-contained door case limits took effect Jan 1, 2010
  - Recent update of service-over-counter threshold by Congressional action
  - DOE set limits for remaining products effective Jan 2012

So energy limits are set … Then what?

DOE Case Standards Update

- **DOE undertook the energy consumption compliance and enforcement role for commercial refrigeration products**
- **Most of 2013 was spent negotiating an Alternative Efficiency Determination Method (AEDM) process**
  - An independent arbitrator was retained to manage the convening sessions to an amicable conclusion.
  - A cross-section of interested parties were chosen to participate (DOE, manufacturers, trade associations, energy advocates and end users).
  - Two full-day meetings were held at DOE every other week over 5 months.
  - Teleconference participation was encouraged for interested parties.
  - The final AEDM consensus document was published by DOE on Dec 31, 2013 defining rules for substantiating, verifying and reporting energy consumption data to DOE (as well as enforcement actions).

The AEDM made compliance possible!

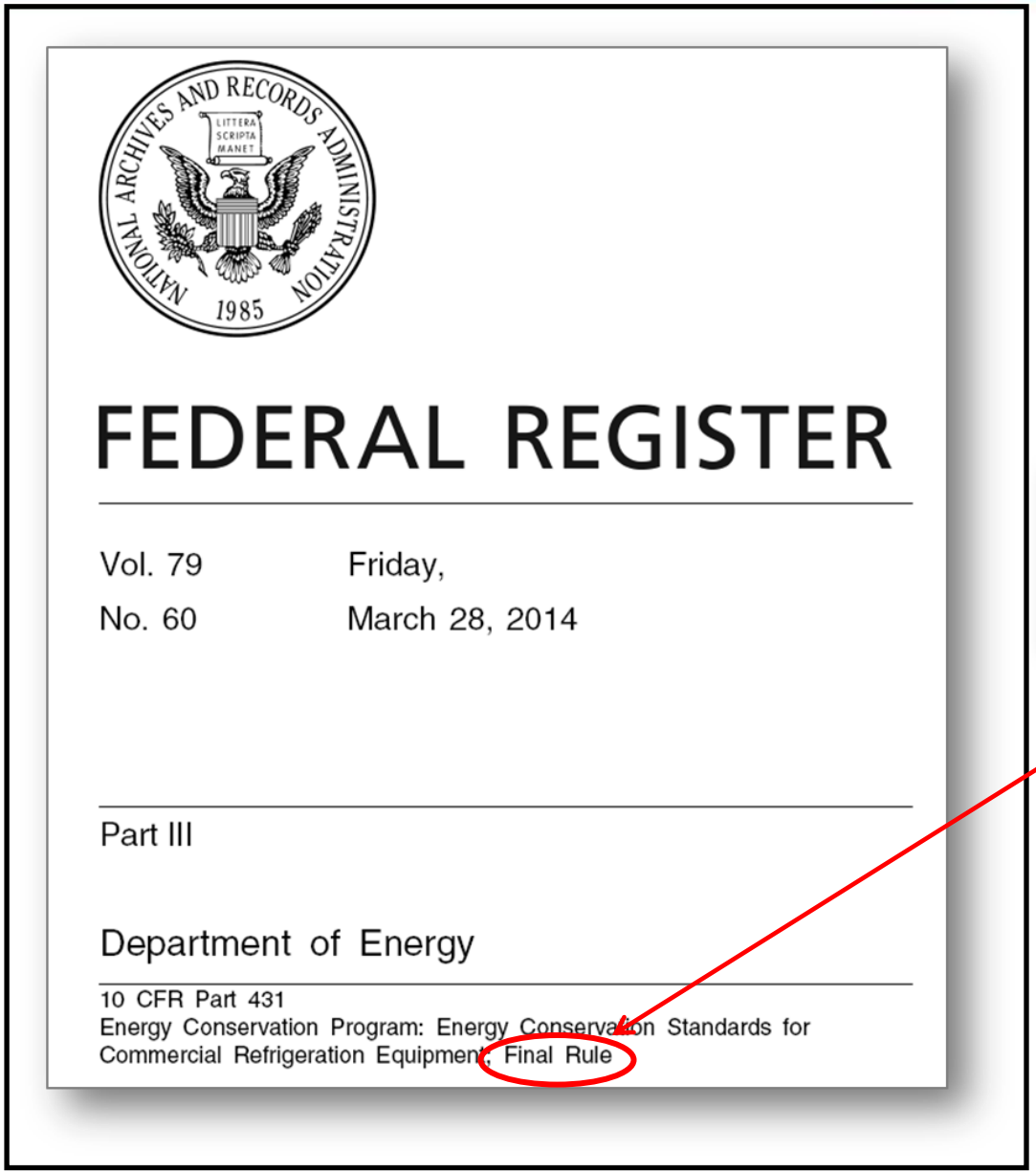
DOE Case Standards Update

- **DOE Effort to Reduce Reporting Burden**
  - Manufacturers can report only highest energy option configuration for each model length (fewer data records to upload; ~2,000)
  - Maximum 16 cases must be tested to validate the AEDM for all models (significantly more testing to develop the AEDM).
- **Critical Dates**
  - Certification data must be uploaded to DOE for all closed self-contained product model lengths by Dec 31, 2014.
  - Certification data must be uploaded to DOE for other product categories by July 1, 2015.
  - DOE enforcement testing begins 6 months after the data upload deadline (DOE purchases product to test at an independent lab).

DOE Case Standards Update

New DOE Energy Limits Proposed for 2017

- DOE released a comprehensive set of new lower energy limits with a proposed January 2017 effective date.
- Vertical, open multi-deck cases (dairy, etc.) - 20% lower energy limit
- Multi-deck, frozen door (self-contained) cases - 60% lower energy limit
- Initial meeting with DOE resulted in a 21 page summary of comments and analysis from us pointing out issues with the new proposed limits.
- AHRI and other equipment manufacturers responded in like fashion.
- Consensus was January 2017 date would be extended as additional discussion of an acceptable ruling continued.



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FEDERAL REGISTER

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Part III

Department of Energy

10 CFR Part 431
Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment; Final Rule

Final Rule
Released 3/28/2014
Effective 3/27/2017

DOE Case Standards Update

553 Pages of Reading Bliss + 712 Page Tech Support

- **Energy Conservation Standards for Commercial Refrigeration Equipment (Final Rule) – Effective March 2017**

- **Commercial Refrigeration Test Procedures - April 2014**
  - Clarified many issues BUT reduced TDA calculation on door energy allowance by ~5% (retroactive to imminent 2015 upload)

- **DOE Revision/Expansion of Certification Compliance Rules - May 2014**
  - Defined specific report content for uploading product certification data
  - Alternative Energy Determination Method (AEDM) reduces test burden
  - "Engineered-to-order" equipment – upload data before shipment rather than before taking the order

DOE made significant progress BUT fell short on several points that led AHRI & NAFEM to seek legal relief in the U. S. Court of Appeals (7th Circuit).

DOE Case Standards Update

Case Structure & Energy Nomenclature (2017)

Case Structure

VOP Vertical **Op**en
SVO **S**emi-**V**ertical **O**pen
HZO **H**ori**Z**ontal **O**pen
SOC **S**ervice **O**ver **C**ounter

VCT **V**ertical **C**losed **T**ransparent
HCT **H**orizontal **C**losed **T**ransparent

VCS **V**ertical **C**losed **S**olid
HCS **H**orizontal **C**losed **S**olid
PD **P**ull **D**own

Temps

M Medium
L Low
I Ice Cream

Condensing

RC Remote
SC Self-Contained

Energy Calculation (kW)

TDA Total Display Area (ft^2)
V Volume (ft^3)

Key	M = Med Temp L = Low Temp I = Ice Cream	RC = Remote SC = Self-Contained	TDA = Display Area V = Volume

Case Structure	Equipment Class	2017 Energy Limits	2012 Energy Limits	
Vertical **OP**en	**VOP.RC.M**	**0.64 x TDA + 4.07**	**0.82 × TDA + 4.07**	← -20%
	VOP.RC.L	2.2 x TDA + 6.85	2.27 × TDA + 6.85	
	VOP.RC.I	2.79 x TDA + 8.7	2.89 × TDA + 8.7	
	VOP.SC.M	**1.69 x TDA + 4.72**	**1.74 × TDA + 4.72**	← -3%
	VOP.SC.L	4.25 x TDA + 11.82	4.37 × TDA + 11.82	
	VOP.SC.I	5.4 x TDA + 15.02	5.55 × TDA + 15.02	
Semi-**V**ertical **O**pen	**SVO.RC.M**	**0.66 x TDA + 3.18**	**0.83 × TDA + 3.18**	← -18%
	SVO.RC.L	2.2 x TDA + 6.85	2.27 × TDA + 6.85	
	SVO.RC.I	2.79 x TDA + 8.7	2.89 × TDA + 8.7	
	SVO.SC.M	1.7 x TDA + 4.59	1.73 × TDA + 4.59	
	SVO.SC.L	4.26 x TDA + 11.51	4.34 × TDA + 11.51	
	SVO.SC.I	5.41 x TDA + 14.63	5.52 × TDA + 14.63	
Hori**Z**ontal **O**pen	HZO.RC.M	0.35 x TDA + 2.88	0.35 × TDA + 2.88	
	HZO.RC.L	**0.55 x TDA + 6.88**	**0.57 × TDA + 6.88**	← -3%
	HZO.RC.I	0.7 x TDA + 8.74	0.72 × TDA + 8.74	
	HZO.SC.M	0.72 x TDA + 5.55	0.77 × TDA + 5.55	
	HZO.SC.L	1.9 x TDA + 7.08	1.92 × TDA + 7.08	
	HZO.SC.I	2.42 x TDA + 9	2.44 × TDA + 9	
Service **O**ver **C**ounter	SOC.RC.M	0.44 x TDA + 0.11	0.51 × TDA + 0.11	
	SOC.RC.L	0.93 x TDA + 0.22	1.08 × TDA + 0.22	
	SOC.RC.I	1.09 x TDA + 0.26	1.26 × TDA + 0.26	
	SOC.SC.M	0.52 x TDA + 1	0.60 x TDA + 1.00	
	SOC.SC.L	1.1 x TDA + 2.1	0.75 x V + 4.10	
	SOC.SC.I	1.53 x TDA + 0.36	1.76 × TDA + 0.36	

2017 vs 2012 Energy Limits

Energy Reduction Manageable, BUT Closed Cases More Difficult

		2017	Vs	2012
Vertical Closed Transparent	VCT.RC.M	0.15 x TDA + 1.95		0.22 × TDA + 1.95
	VCT.RC.L	0.49 x TDA + 2.61		0.56 × TDA + 2.61
	VCT.RC.I	0.58 x TDA + 3.05		0.66 × TDA + 3.05
	VCT.SC.M	0.10 x V + 0.86		0.12 x V + 3.34
	VCT.SC.L	0.29 x V + 2.95		0.75 x V + 4.10
	VCT.SC.I	0.62 x TDA + 3.29		0.67 × TDA + 3.29
Horizontal Closed Transparent	HCT.RC.M	0.16 x TDA + 0.13		0.16 × TDA + 0.13
	HCT.RC.L	0.34 x TDA + 0.26		0.34 × TDA + 0.26
	HCT.RC.I	0.40 x TDA + 0.31		0.40 × TDA + 0.31
	HCT.SC.M	0.06 x V + 0.37		0.12 x V + 3.34
	HCT.SC.L	0.08 x V + 1.23		0.75 x V + 4.10
	HCT.SC.I	0.56 x TDA + 0.43		0.56 × TDA + 0.43
Vertical Closed Solid	VCS.RC.M	0.10 x V + 0.26		0.11 × V + 0.26
	VCS.RC.L	0.21 x V + 0.54		0.23 × V + 0.54
	VCS.RC.I	0.25 x V + 0.63		0.27 × V + 0.63
	VCS.SC.M	0.05 x V + 1.36		0.10 x V + 2.04
	VCS.SC.L	0.22 x V + 1.38		0.40 x V + 1.38
	VCS.SC.I	0.34 x V + 0.88		0.38 × V + 0.88
Horizontal Closed Solid	HCS.RC.M	0.10 x V + 0.26		0.11 × V + 0.26
	HCS.RC.L	0.21 x V + 0.54		0.23 × V + 0.54
	HCS.RC.I	0.25 x V + 0.63		0.27 × V + 0.63
	HCS.SC.M	0.05 x V + 0.91		0.10 x V + 2.04
	HCS.SC.L	0.06 x V + 1.12		0.40 x V + 1.38
	HCS.SC.I	0.34 x V + 0.88		0.38 × V + 0.88
Pull Down	PD.SC.M	0.11 x V + 0.81		NA

-28%

-12%

-47%

-60%

Greater than 80% Reduction

ENERGY STAR

Big Reductions on Closed Cases

Vertical Med Temp Remote
Vertical Self-Contained
Horizontal Self-Contained

DOE Energy Reduction Measures

Included in 2017 Ruling

- **High performance doors (noble gas, coatings, heat location)**
- **ECM evaporator fan motor**
- **Night curtains (open case only; 6hr max)**
- **LED lighting (optional: occupancy sensors 10.8, scheduled controls 8)**
- **Enhanced efficiency evaporator coil**
- **Additional ½" insulation**
- **Self-contained cases - High-efficiency**
  - **Condenser fan motor**
  - **Compressor**
  - **Condenser heat exchanger**

Must execute BEFORE 2017!

Impact on Retailers Approaching 2017

Significant Case Evolution

- **Reduced options on cases**
  - **Lower efficiency components gone**
  - **Many older product models gone**
  - **Designs increase TDA and/or decrease energy consumption**
- **Greater challenge to "add to" or replace cases in older stores**
- **Anti-condensate heat control on low and medium temp door cases**
- **Fewer pricing options $$**

Significant energy reduction.
Greater capital investment - Lower operating cost

U. S. DEPARTMENT OF ENERGY (DOE) FINAL RULE

ENERGY CONSERVATION STANDARDS
WALK-IN COOLERS AND FREEZERS (WICFs)

- **DOE adopted amended energy conservation standards**
  - **Insulated Panels**
  - **Doors**
  - **Refrigeration Systems**
- **Separate AEDM & test procedure final rule covering new component testing and reporting requirements**
- **Certification date - June 12, 2017**

WALK-IN DOE FINAL RULE

R-VALUE for WICF PANELS

- All tests per ASTM C518
- Cooler panels R-25 min core R-value
- Freezer panels R-32 min core R-value
- Freezer floor panels R-28 min core R-value

WALK-IN DOE FINAL RULE

Display, Passage and Freight Doors

Doors Segmented by Application and Size

- Glass display doors include low and medium temp
- Passage doors - smaller than 5’ X 8’
- Freight doors - 5’ X 8’ and larger
- Test Standard *NFRC 100 (National Fenestration Rating Council)
- Rated for max energy consumption (MEC) in kWh/day per ft^2 surface area
- DOE maximum limits

WALK-IN DOE FINAL RULE

Refrigeration Systems

- **Refrigeration system is defined as one of 10 classes based on**
  - **Condensing type (dedicated or multiplex serving multiple unit coolers)**
  - **Indoor or outdoor installation**
  - **Capacity (<9000 or ≥ 9000 Btu/h)**
  - **Medium or low temp operation**

- **Refrigeration systems rated based on test data calculation of the Annual Walk-in Energy Factor (AWEF) Btu/W-h with DOE min limit**

- **AWEF = ratio total heat removed / total refrigeration energy required**

- **Blast coolers and freezers are excluded from the Final Rule.**

Assistance of the U. S. Court of Appeals (5th Circuit) was engaged to resolve issues with the Final Rule.