



# Achieving DOE Compliance in Commercial Refrigeration Equipment

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*Emerson*



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# DOE Compliance for CRE

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- The Energy Policy Act of 2005 (EPACT 2005) directs the DOE to establish and enforce mandatory energy conservation standards for Commercial Refrigeration Equipment (CRE).
- Compliance with commercial refrigeration equipment standards was required beginning on January 1, 2010.
- The required compliance date for remote-condensing equipment, open cases and ice cream freezers was January 1, 2012, with a date of December 31, 2012 to submit certification reports.

**Source:** 10 CFR Part 431 “Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment”

# CRE Equipment Classifications

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- CRE equipment classification is based on the key physical characteristics of commercial refrigeration equipment:
  - Operating temperature
    - Medium-temperature (38 °F, refrigerators)
    - Low-temperature (0 °F, freezers)
    - Ice cream temperature (-15 °F, ice cream freezers)
  - Door type
    - Equipment with transparent doors (both hinged and sliding)
    - Equipment with solid doors (both hinged and sliding & drawers)
    - Equipment without doors (open cases)
    - Service over-counter (covered by transparent door energy standard)

## CRE Equipment Classifications *(continued)*

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- Orientation (air-curtain or door angle)
  - Horizontal (air-curtain angle of 80° to 90° from the vertical)
  - Vertical (air-curtain angle of 0° to 10° from the vertical)
  - Semi-vertical (air-curtain angle of 10° to 80° from the vertical)
- Type of condensing unit
  - Remote condensing
  - Self-contained





# The Eight CRE Equipment Families

Equipment Families	Designation	Description
Vertical Open	VOP	Equipment without doors and an air-curtain angle $\geq 0^\circ$ and $< 10^\circ$
Semi-vertical Open	SVO	Equipment without doors and an air-curtain angle $\geq 10^\circ$ and $< 80^\circ$
Horizontal Open	HZO	Equipment without doors and an air-curtain angle $\geq 80^\circ$
Vertical Closed Transparent	VCT	Equipment with hinged or sliding transparent doors and a door angle $< 45^\circ$
Vertical Closed Solid	VCS	Equipment with hinged or sliding solid (opaque) doors and a door angle $< 45^\circ$
Horizontal Closed Transparent	HCT	Equipment with hinged or sliding transparent doors and a door angle $\geq 45^\circ$
Horizontal Closed Solid	HCS	Equipment with hinged or sliding solid (opaque) doors and a door angle $\geq 45^\circ$
Service Over-counter	SOC	Equipment with sliding or hinged doors intended for use by sales personnel and a fixed glass or hinged glass for displaying merchandise

# CRE Equipment Classifications (continued)

## Commercial Refrigeration Equipment Allowable Energy Consumption

Equipment Family	Equipment Family Designation	Equipment Family Image	Operating Mode Designation	Temperature Designation	Equipment Class Designation	Maximum Daily Energy Consumption (kWh/day)
Vertical Open	VOP		RC	M (38°F)	VOP.RC.M	0.82 x TDA + 4.07
				L (0°F)	VOP.RC.L	2.27 x TDA + 6.85
				I (-15°F)	VOP.RC.I	2.89 x TDA + 8.70
			SC	M (38°F)	VOP.SC.M	1.74 x TDA + 4.71
				L (0°F)	VOP.SC.L	4.37 x TDA + 11.82
				I (-15°F)	VOP.SC.I	5.55 x TDA + 15.02
Semi-Vertical Open	SVO		RC	M (38°F)	SVO.RC.M	0.83 x TDA + 3.18
				L (0°F)	SVO.RC.L	2.27 x TDA + 6.85
				I (-15°F)	SVO.RC.I	2.89 x TDA + 8.70
			SC	M (38°F)	SVO.SC.M	1.73 x TDA + 4.59
				L (0°F)	SVO.SC.L	4.34 x TDA + 11.51
				I (-15°F)	SVO.SC.I	5.52 x TDA + 14.63
Horizontal Open	HZO		RC	M (38°F)	HZO.RC.M	0.35 x TDA + 2.88
				L (0°F)	HZO.RC.L	0.57 x TDA + 6.88
				I (-15°F)	HZO.RC.I	0.72 x TDA + 8.74
			SC	M (38°F)	HZO.SC.M	0.77 x TDA + 5.55
				L (0°F)	HZO.SC.L	1.92 x TDA + 7.08
				I (-15°F)	HZO.SC.I	2.44 x TDA + 9.00
Vertical Closed Transparent	VCT		RC	M (38°F)	VCT.RC.M	0.22 x TDA + 1.95
				L (0°F)	VCT.RC.L	0.56 x TDA + 2.61
				I (-15°F)	VCT.RC.I	0.66 x TDA + 3.05
			SC	M (38°F)	VCT.SC.M*	0.12 V + 3.34**
				L (0°F)	VCT.SC.L*	0.75 V + 4.10
				I (-15°F)	VCT.SC.I	0.67 x TDA + 3.29

Equipment Family	Equipment Family Designation	Equipment Family Image	Operating Mode Designation	Temperature Designation	Equipment Class Designation	Maximum Daily Energy Consumption (kWh/day)
Vertical Closed Solid (Opaque)	VCS		RC	M (38°F)	VCS.RC.M	0.11 V + 0.26
				L (0°F)	VCS.RC.L	0.23 V + 0.54
				I (-15°F)	VCS.RC.I	0.27 V + 0.63
			SC	M (38°F)	VCS.SC.M*	0.10 V + 2.04***
				L (0°F)	VCS.SC.L*	0.40 V + 1.38***
				I (-15°F)	VCS.SC.I	0.38 V + 0.88
Horizontal Closed Transparent	HCT		RC	M (38°F)	HCT.RC.M	0.16 x TDA + 0.13
				L (0°F)	HCT.RC.L	0.34 x TDA + 0.26
				I (-15°F)	HCT.RC.I	0.40 x TDA + 0.31
			SC	M (38°F)	HCT.SC.M*	0.12 V + 3.34
				L (0°F)	HCT.SC.L*	0.75 V + 4.10
				I (-15°F)	HCT.SC.I	0.56 x TDA + 0.43
Horizontal Closed Solid (Opaque)	HCS		RC	M (38°F)	HCS.RC.M	0.11 V + 0.26
				L (0°F)	HCS.RC.L	0.23 V + 0.54
				I (-15°F)	HCS.RC.I	0.27 V + 0.63
			SC	M (38°F)	HCS.SC.M*	0.10 V + 2.04
				L (0°F)	HCS.SC.L*	0.40 V + 1.38
				I (-15°F)	HCS.SC.I	0.38 V + 0.88
Service Over Counter	SOC		RC	M (38°F)	SOC.RC.M	0.51 x TDA + 0.11
				L (0°F)	SOC.RC.L	1.08 x TDA + 0.22
				I (-15°F)	SOC.RC.I	1.26 x TDA + 0.26
			SC	M (38°F)	SOC.SC.M*	0.12 V + 3.34
				L (0°F)	SOC.SC.L*	0.75 V + 4.10
				I (-15°F)	SOC.SC.I	1.76 x TDA + 0.36

V = Volume, AV = Adjusted Volume, TDA = Total Display Area

\*These equipment classes have standards established by EPACT 2005 (DOE 2010). The rest are covered under the new 2009 rulemaking (DOE 2012) \*\*Self-contained refrigerators with transparent doors designed for pull down temperature applications = 0.126V + 3.51 \*\*\*Self-contained refrigerator/freezers (38°F/0°F) = the greater of (0.27AV-0.71) or 0.70.

# Test Standards

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- The latest test standards should be utilized. As noted below, some have been updated since 2010:
- ANSI/AHRI 1200-2010 has been adopted as the new DOE test procedure (has been superseded by ANSI/AHRI 1200-2013)
  - References ANSI/ASHRAE 72-2005 as the method of test (has been superseded by ANSI/ASHRAE 72-2014)
  - References ANSI/AHAM Standard HFR-1-2008 for measuring refrigerated compartment volume (was amended with an Errata in 2012)



# Basic Models

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- Manufacturers can group individual models as a “basic model” such that the certified rating for the basic model matches the represented rating for all the included models. Self-certification compliance must be supported by testing and can also involve an approved alternative method of calculating efficiency.
- Basic models are models within the same basic group that have essentially identical energy use characteristics. The least-efficient energy usage configuration of a basic model is utilized to certify the group.
- “Basic model” means all units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical and functional characteristics that effect energy consumption and/or energy efficiency.

## Basic Models *(continued)*

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- A basic model:
  - May contain multiple models/model numbers
  - Is manufactured by a single manufacturer, although it may be distributed under different brand names
  - Is made up of models that contain the same primary energy source (i.e., electric, gas)
  - Is made up of models that have essentially identical electrical, physical and functional characteristics that affect energy consumption and/or efficiency
  - May not contain models from multiple product classes
  - Can be made up of only one model; there is no requirement for multiple models within a basic model
  - Must contain individual certified ratings that are identical and be based on the least efficient model

# Product Sampling Plan

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- To certify compliance, the determination that a basic model complies with the applicable energy conservation standard must be based on a minimum of two sample units tested. This is implicit in the requirement to calculate a mean (an average), which requires at least two values.
- For each basic model, a sample shall be randomly selected and tested to ensure that any value of energy consumption of a basic model shall be greater than or equal to the higher of the mean sample, where the upper 95% confidence limit (UCL) of the true mean is divided by 1.1, and any represented value of the energy consumption of a basic model value shall be less than or equal to the lower of the mean of the sample, where the lower 95% confidence limit (LCL) of the true mean is divided by 0.90.

# DOE Certification

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- The steps to certification and compliance include:
  - Determine the basic model
    - Manufacturers must identify in their certification report the individual models that are included in each basic model.
  - Test at least two units of a basic model using the DOE test procedures:
    - Tests must be conducted in an ISO 17025 third party lab or in a manufacturer's own lab, proven that its equipment can meet the testing tolerances required.
    - Maximum number of units is at the discretion of the manufacturer.
    - DOE has implemented the AHRI 1200/ASHRAE 72 test procedures.
  - Determine which conservation standard applies to the product
    - DOE utilizes various tables covering allowable energy consumption for the various equipment classes.

## DOE Certification *(continued)*

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- Calculate the product-specific certification statistics
  - Sample mean ( $\bar{x}$ )
  - Upper Confidence Limit (UCL)
- Determine minimum and maximum rating values
  - The certified rating must be  $\leq$  the mean or UCL, whichever is lower.
- Go online and fill out the CCMS (Compliance Certification Management System) product specific sheet
- Record retention
  - The test report doesn't have to be submitted; however, the manufacturer is required to keep the test data and any information pertaining to compliance as long as he is producing/selling the product.
  - After initial filing, it is required that the equipment be annually certified by submitting new CCMS and supplemental testing instruction forms. The deadline for the annual filing for commercial refrigeration equipment is August 1 of each year. The previous year's filing will be purged from the DOE listing site after that date (equipment no longer certified). No re-testing is required, just re-filing.

# DOE Enforcement

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- The DOE may monitor compliance by requesting data and testing products at any time, and initiate enforcement investigations and actions if they feel covered equipment may not be compliant with an applicable standard.
- The DOE may at any time test a basic model to assess whether it is in compliance with the applicable energy conservation standards:
  - It doesn't have to receive a written complaint alleging a violation of the standard before it can perform enforcement testing to determine a model's compliance.
  - The DOE can select models from distribution or manufacturer sources to ensure enforcement test results that are as unbiased, accurate and representative as possible.
  - The testing may take place at a third party's ISO 17025 approved facility. If this is impractical for low-volume, custom-built cases, the DOE may witness the testing at the manufacturer's approved facility.

## DOE Enforcement *(continued)*

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- If the DOE determines that a basic model is noncompliant with an applicable energy standard, it may issue a notice of noncompliance determination to the manufacturer.
- This notice of noncompliance determination will:
  - Notify the manufacturer of its obligation to immediately cease distribution of the basic model
  - Give written notice of noncompliance to all persons to whom the manufacturer has distributed units of the basic model manufactured since the date of the last determination of compliance
  - The manufacturer must provide the DOE within 30 days of the request documentation pertaining to the sale of a basic model determined to be in noncompliance.
  - Noncompliant equipment can be modified to pass the energy standard and must be certified as a new basic model and re-submitted.
- If a manufacturer fails to comply with the required actions in the notice of noncompliance, the general counsel for the DOE may seek injunctive action and civil penalties, where appropriate!

# DOE Certification Guidelines

## How to File

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# DOE Filing Requirements

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- General filing information

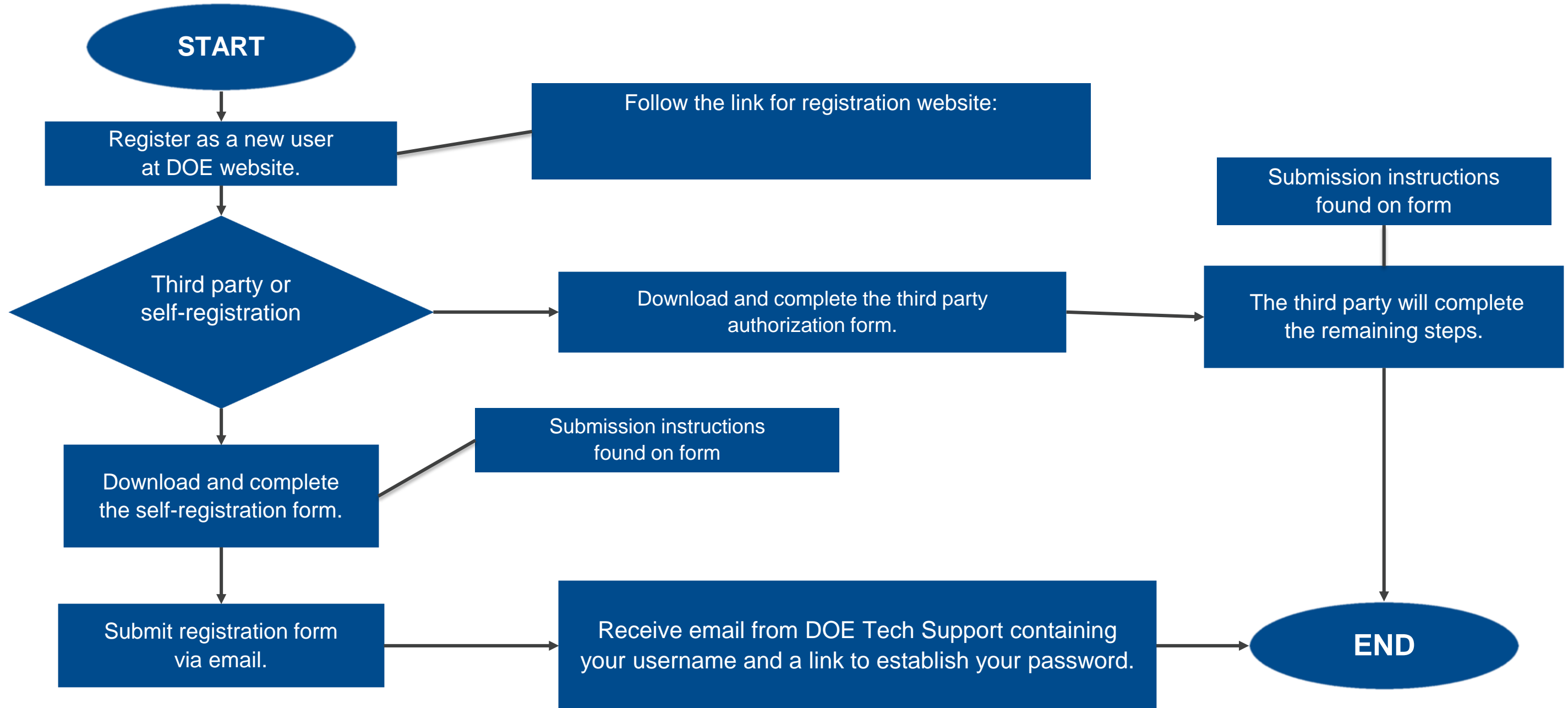
- **Initial certification:** Each manufacturer, before distributing in commerce any basic model of a covered product subject to an applicable energy conservation standard, shall submit a certification report to the DOE certifying that each basic model meets the applicable energy conservation standard(s).
- **Compliance dates:** For any product subject to an applicable energy conservation standard for which the compliance date has not yet occurred, a certification report must be submitted not later than the compliance date for the applicable energy conservation standard.
  - For CRE, the upcoming compliance date with updated, more stringent requirements is March 27.
    - Currently, January 1, 2010, for solid or transparent door closed refrigerators, freezers and refrigerator-freezers with self-contained condensing units
    - Currently, January 1, 2012, for self-contained units without doors, solid or transparent door closed refrigerators, freezers and refrigerator-freezers with remote condensing units, and SC or RC ice cream freezers.

## DOE Filing Requirements (*continued*)

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- ***Annual filing requirement:*** After initial filing, it is required that the equipment be annually certified by submitting new CCMS and supplemental testing instruction forms. The deadline for the annual filing for CRE is August 1 of each year. The previous year's filing will be purged from the DOE listing site after that date (equipment no longer certified). No re-testing is required, just re-filing.
  - Whether the annual submission is for a new model, a discontinued model, a correction to a previously submitted model, data on a carryover model, or a model that has been found in violation of a voluntary industry certification program, it is required that new CCMS and supplemental testing instruction forms be submitted.
- ***New model filing:*** After initial filing, in addition to the annual filing schedule shown in the previous paragraph, any new basic models after the annual filing must be certified pursuant to distribution in commerce. A modification to a model that increases the model's energy or decreases its efficiency resulting in re-rating must be certified as a new basic model.

# CCMS Registration and Authorization Flow Chart



# CCMS Registration Forms



## AUTHORIZATION FORM for a Third Party Representative to Submit Certification Report(s) – Consumer Products & Commercial and Industrial Equipment

The purpose of this form is for a regulated party to authorize a third party to prepare and submit certification reports to DOE under the provisions of 10 C.F.R. § 429.12(g).

To complete this form:

1. Type in the information for the company official responsible for submitting certification reports.
2. Type in the information for the third party representative – the party who will be using CCMS to submit reports (often the OEM, a trade group, or a test laboratory).
3. Print the form, then sign and date the compliance statement.
4. Form submittal method:
  - Scan and Email signed copy to: [CCMS.Support@ee.doe.gov](mailto:CCMS.Support@ee.doe.gov)

### Part I: Company (e.g., Manufacturer); Authorization

Name of Company Official who authorizes said third party representation ("Authorizing Official"):

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Email Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Facsimile Number: \_\_\_\_\_

I, the Authorizing Official identified above, authorize the following third party organization to submit certification reports to the U.S. Department of Energy on behalf of my company:

Third Party Organization: \_\_\_\_\_

Address: \_\_\_\_\_

Email Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Facsimile Number: \_\_\_\_\_

Product Type(s): \_\_\_\_\_

## NEW USER REGISTRATION FORM For Manufacturers and Importers of Consumer Products and Commercial and Industrial Equipment



To complete this form:

1. Type in the information for the company official (and other individual, if applicable) requesting a user account. The "Individual User" should be the person who will log into CCMS. The "Company Official" should be an officer of the company authorized to act on behalf of the corporation.
2. Print the form, then sign and date.
3. Form submittal method: Scan and Email signed copy to [CCMS.Support@ee.doe.gov](mailto:CCMS.Support@ee.doe.gov)

Pursuant to 10 C.F.R. § 429.12, you must complete the following compliance statement.

I certify that:

1. All certification reports I submit to DOE via CCMS are submitted in accordance with 10 C.F.R. Parts 429, 430, and 431 and the Energy Policy and Conservation Act, as amended;
2. The basic models listed in all certification reports I submit to DOE via CCMS comply with the applicable conservation standard(s);
3. All required testing has been conducted in conformance with the applicable test requirements prescribed in 10 C.F.R. Parts 429, 430 and 431, as appropriate, or in accordance with the terms of an applicable test procedure waiver;
4. All information reported in all certification reports I submit to DOE via CCMS is true, accurate, and complete; and
5. I am aware of the penalties associated with violations of (1) the Energy Policy and Conservation Act (Pub. L. No. 94-163), as amended by Pub. L. No. 95-619, Pub. L. No. 100-12, Pub. L. No. 100-357, and Pub. L. No. 102-486 (the Act) and the regulations thereunder, and (2) 18 U.S.C. § 1001, which prohibits knowingly making false statements to the Federal Government.

Company Name:	
Company Official Name:	Name of Individual User, if applicable:
Title:	Title:
Address:	Address:
Telephone Number:	Telephone Number:
Fax Number:	Email Address:
Email Address:	
Product Type(s):	

Company Official Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Individual User Signature: \_\_\_\_\_ Date: \_\_\_\_\_

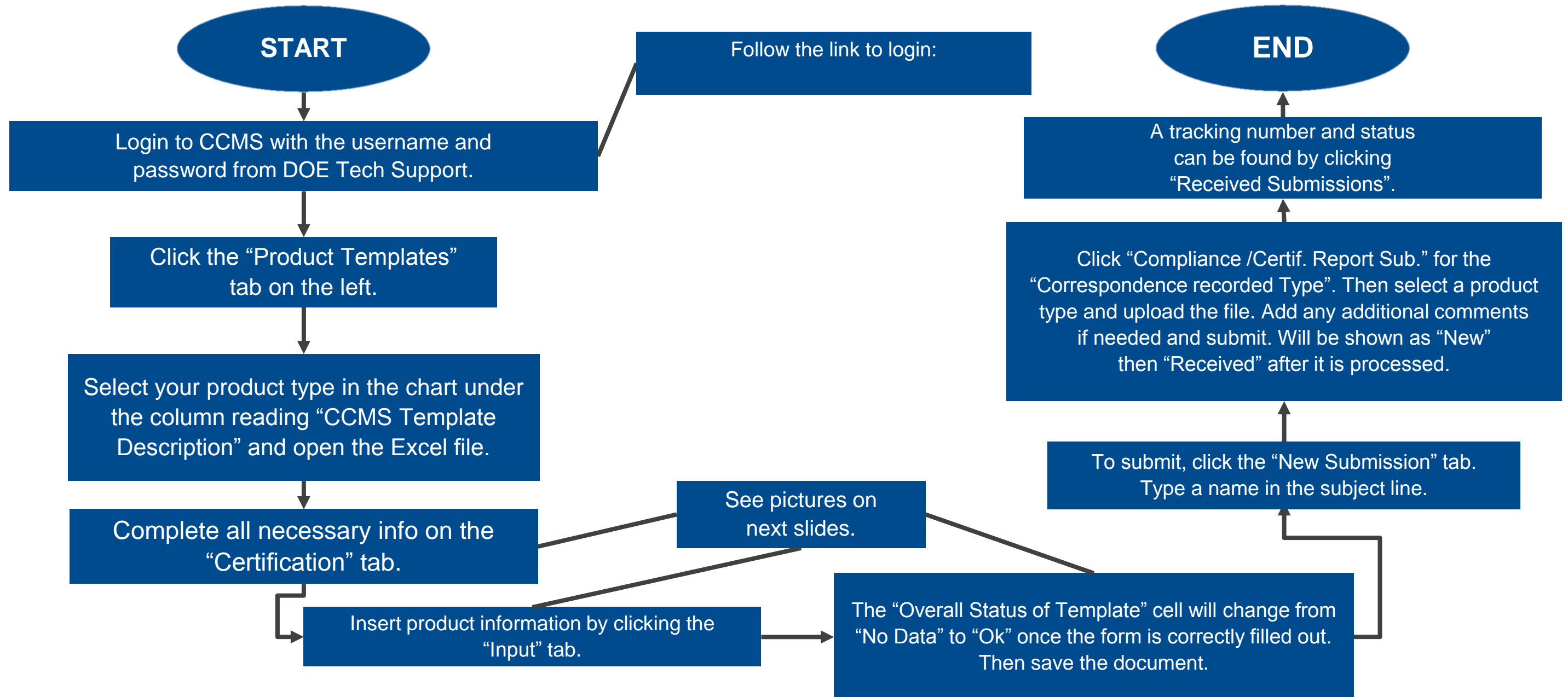
### Paperwork Reduction Act and OMB Burden Disclosure Statement

OMB Control Number: 1910-1400 Expiration: November 30, 2017

These data are being collected for manufacturers to certify compliance with DOE's energy conservation, water conservation, or design standards. The data you supply will be used by the Department to monitor compliance with the energy conservation, water conservation, and design standards and testing requirements for the consumer products and commercial and industrial equipment mandated by the Energy Policy and Conservation Act, as amended, and DOE regulations.

Under this Office of Management and Budget control number, the public reporting burden for collection of information in the certification process is estimated to average 30 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Of this total time, DOE estimates that new user registration will have an average public reporting burden of 0.25 hours. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of the Chief Information Officer, Records Management Division, IM-23, Paperwork Reduction Project (1910-1400), U.S. Department of Energy, 1000 Independence Ave. SW, Washington, DC, 20585-1290; and to the Office of Management and Budget (OMB), OIRA, Paperwork Reduction Project (1910-1400), Washington, DC 20503. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB control number. Submission of this data is mandatory.

# CCMS Reporting and Certification Instructions





# Complete CCMS Reporting and Certification Form

Actions:

- N: New Model
- ETO: Engineered to order
- D: Discontinued model
- C: Correction to CCMS submission
- E: Submit report on existing model
- F: Failed industry certification program

Product Type: **Commercial Refrigeration Equipment - Single Compartment** Version 4.5

Status of This Input Sheet: **OK** Overall Status of Template **OK**

## Certification Report

- Please enter your data in the columns shaded in gray below, using a separate line for each model.
- Click on the column heading for instructions on how to complete cells in that column.
- Cells highlighted in yellow indicate an "Error." "Error" means that information is missing or there is an issue with the entry.
- If the "Status" for a row is "Error," you can see an explanation in the columns to the right of the Status column.
- Reports submitted with errors cannot be processed and will be returned for resubmission.

Line No.	Status	Manufacturer	For Third-Party Representatives, Company Number From Certification Sheet	Brand Name(s)	Basic Model Number	Enter Information in Only One of the Two Columns in Each Row		Action	Product Class	Sample Size (Number of Units Tested)	Is the Certification for this Basic Model Based on a Waiver of DOE's Test Procedure Requirements?	Date of Test Procedure Waiver, if Applicable	Is the Certification based upon an Exception Relief from an Applicable Standard by DOE's Office of Hearing and Appeals?	Date of Exception Relief, if Applicable	Is Certification Based on the use of an Alternative Efficiency Determination Method (AEDM)?	Name of AEDM (if Applicable)	Does the Manufacturer Elect the Witness Test Option for Verification Testing? (if Applicable)	Rating Temperature in Degrees Fahrenheit	Equipment Family	Condensing Unit Configuration	Total Display Area in square feet (ft <sup>2</sup> ), if Applicable	Chilled or Frozen Volume in cubic feet (ft <sup>3</sup> ), if Applicable	Calculated Daily Energy Consumption (MDEC) (kWh/day)	Supplemental Testing Instructions PDF Filename
						Individual Model Number Covered by Basic Model	Private Model Number Covered by Basic Model																	
1	ok	Freezerator Inc.	1	Freezerator	F100UAG	F100*AG*		N	5	2	n		n		n			0	SC		91.73	17.78	DOE001_Feez 1.pdf	
2	ok	Freezerator Inc.	1	Freezerator	F100UCS	F100*CS*		C	4	2	n		n		n			0	SC		93.35	5.77	DOE001_Feez 1.pdf	
3	ok	Freezerator Inc.	1	Freezerator	F075UCS	F075*CS*		E	4	2	n		n		n			0	SC		72.08	5.31	DOE001_Feez 1.pdf	
4	ok	Freezerator Inc.	1	Freezerator	F100UAS	F100*AS*		D	4	2	n		n		n			0	SC		92.13	9.61	DOE001_Feez 1.pdf	
5	ok	Freezerator Inc.	1	Freezerator	F075UAS	F075*AS*		N	4	2	n		n		n			15	SC		70.86	9.14	DOE001_Feez 2.pdf	
6	ok	Freezerator Inc.	1	Freezerator	F100UCG	F100*CG*		N	5	2	n		n		n			15	SC		93.35	8.25	DOE001_Feez 2.pdf	
7	ok	Freezerator Inc.	1	Freezerator	F060UCG	F60*CG*		N	5	2	n		n		n			15	SC		59.67	6.65	DOE001_Feez 2.pdf	
8	ok	Freezerator Inc.	1	Freezerator	R085UAG	R085*AG*		N	5	2	n		n		n			15	SC		82	14.61	DOE001_Feez 2.pdf	
9	ok	Freezerator Inc.	1	Freezerator	R075UAG	R075*AG*		N	2	2	n		n		n			38	SC		70.86	14.28	DOE001_Feez 3.pdf	
10	ok	Freezerator Inc.	1	Freezerator	R065UCG	R065*CG*		C	2	2	n		n		n			38	SC		61.36	6	DOE001_Feez 3.pdf	
11	ok	Freezerator Inc.	1	Freezerator	R065UAG	R065*AG*		E	2	2	n		n		n			38	SC		60.56	12.42	DOE001_Feez 3.pdf	
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13	ok	Freezerator Inc.	1	Freezerator	R030UAG	R030*AG*		N	2	2	n		n		n			38	SC		26.55	11.23	DOE001_Feez 3.pdf	
14	ok	Freezerator Inc.	1	Freezerator	R030UCG	R030*CG*		N	2	2	n		n		n			38	SC		27.34	4.4	DOE001_Feez 3.pdf	
15	ok	Freezerator Inc.	1	Freezerator	F085UCS	F085*CS*		N	4	0	n		n		y	Emerson AEDM Energy Calculation Software	n	0	SC		83.22	5.61	DOE001_Feez 1.pdf	
16	ok	Freezerator Inc.	1	Freezerator	F085UAS	F085*AS*		N	4	0	n		n		y	Emerson AEDM Energy Calculation Software	n	0	SC		82	9.51	DOE001_Feez 1.pdf	
17	ok	Freezerator Inc.	1	Freezerator	F085UCG	F085*CG*		N	5	0	n		n		y	Emerson AEDM Energy Calculation Software	n	0	SC		83.22	7.85	DOE001_Feez 1.pdf	

# Certification Report

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- Supplemental testing instructions

- Supplemental testing instructions are for test points that the unit per design operates at that are not the same as the DOE test points, but the unit itself does fit DOE classifications and for which a waiver isn't required.
  - Example: an ice merchandiser is designed to operate with a 15 °F LAPT and not the 0 °F product temperature requirement of ASHRAE 72 for a freezer
  - LAPT (Lowest Application Product Temperature) means the lowest integrated average temperature at which a given basic model is capable of consistently operating (i.e., maintaining so as to comply with the steady-state stabilization requirements specified in ASHRAE 72) for the purposes of testing under the DOE test procedure.
- A supplemental testing instruction form has to be entered in the CCMS form and submitted to the DOE as a PDF file as a separate ticket from the CCMS, even if there are no exceptions to the standards.



## Certification Report *(continued)*

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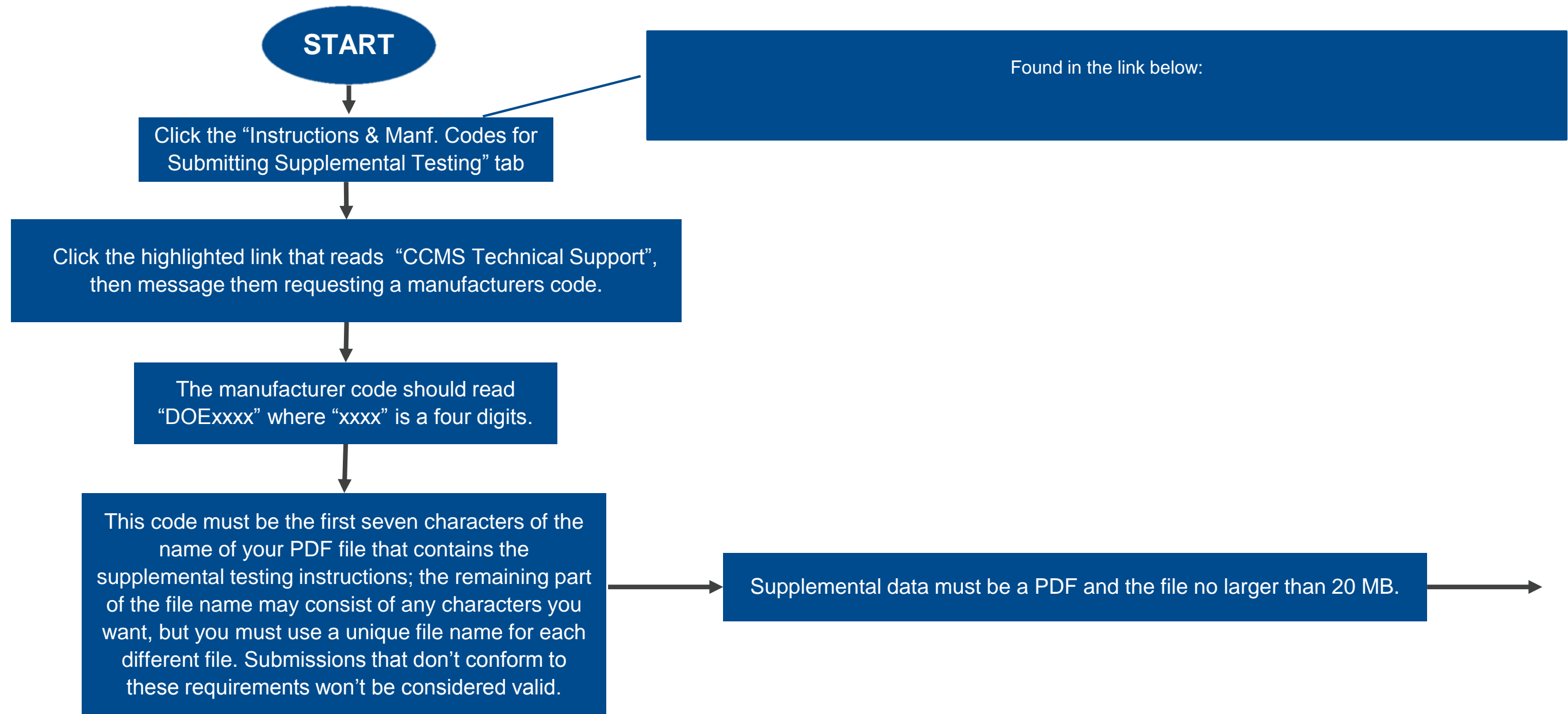
- AEDM general overview
  - AEDM (Alternate Efficiency Determination Method) can be used on certain basic models in place of testing.
    - AEDMs are computer modeling or mathematical tools that predict the performance of non-tested basic models. They are derived from mathematical and engineering principles that govern the energy efficiency and energy consumption characteristics of a type of covered equipment. Where authorized by regulation, AEDMs enable manufacturers to rate and certify the compliance of their basic models by using the projected energy use or energy efficiency results derived from these simulation models in lieu of testing.

## Certification Report *(continued)*

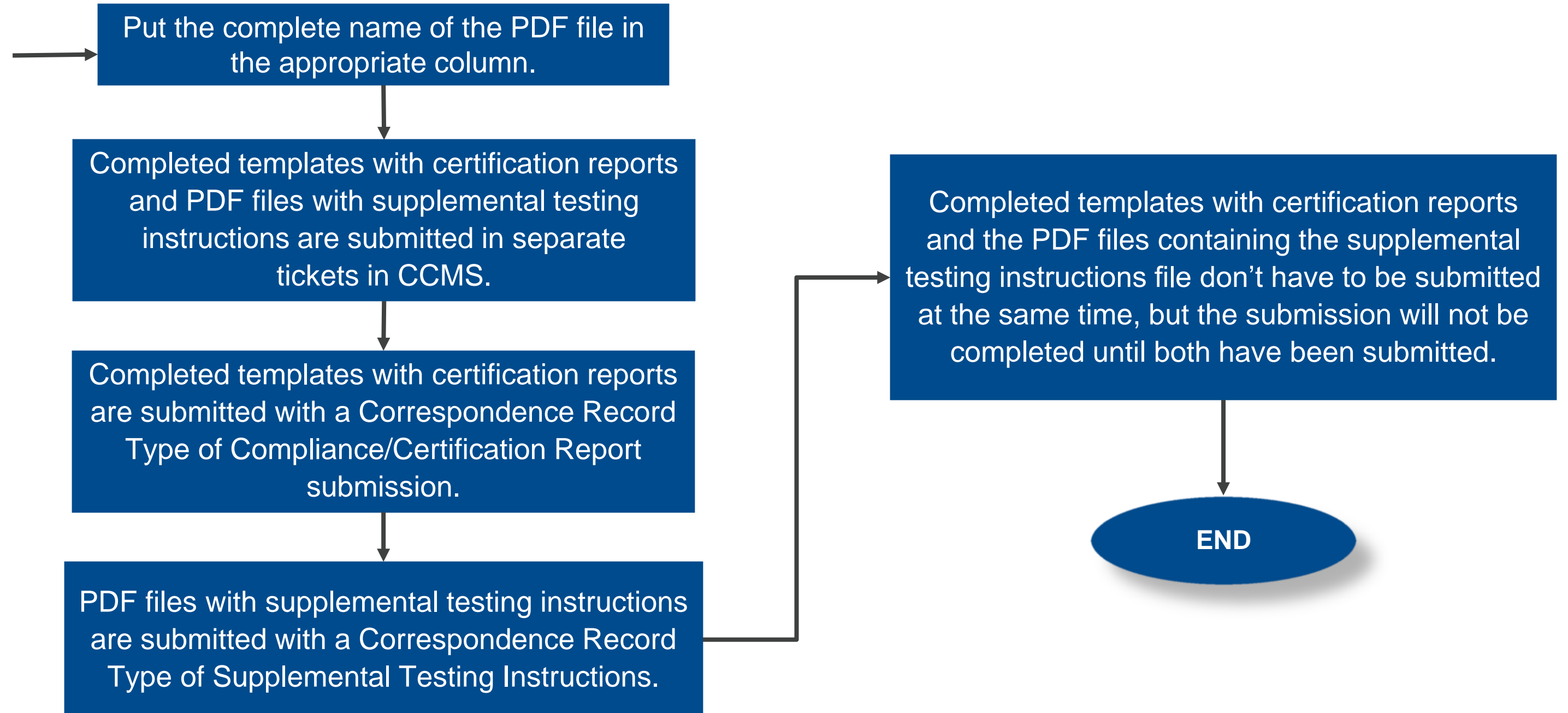
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- AEDMs have to be approved by being applied to already tested basic models of the type being calculated and be within 10% of the tested data for various capacities.
- When applying an ADEM to a basic model, the smallest capacity unit and within 10% of the largest capacity unit of that type have to be tested and used for the basis of the modeling.
  - Example: 5 cubic foot self-contained, solid door reach-in freezer and 10 cubic foot of same type and construction are tested and 7.5 cubic foot calculated, all having the same  $\frac{1}{3}$  hp refrigeration system

# Submitting Supplemental Test Data



# Submitting Supplemental Test Data *(continued)*



# Supplemental Test Data Examples

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## Supplemental Testing Instructions

There are no Supplemental Testing Instructions required for any of the Freezerator, Industries, basic models. All the basic model units were tested according to the procedures required per the DOE 10 CFR 431.64, which is ANSI/AHRI-1200-2010 test procedure (which references test procedure ANSI/ASHRAE 72-2005) and ANSI/AHAM-HRF-1-2008 was utilized to calculate the refrigerated volume.

## Supplemental Testing Instructions

There are no Supplemental Testing Instructions required for any of the Freezerator, Industries, basic models with the exception of the IPA requirement for models shown. All the basic model units were tested according to the procedures required per the DOE 10 CFR 431.64, which is ANSI/AHRI-1200-2010 test procedure (which references test procedure ANSI/ASHRAE 72-2005) and ANSI/AHAM-HRF-1-2008 was utilized to calculate the refrigerated volume. The units were tested as freezers but with a LAPT of 16°F.

Thank You!



**Questions?**