

# Upcoming Regulations For Commercial and Industrial Air Compressors

Efficiency Division  
Appliances Office



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# Energy Efficiency Regulations for Commercial and Industrial Air Compressors

Our webinar will begin at the top of the hour.

This slide deck will be posted on  
our webpage after the presentation at  
[www.energy.ca.gov/appliances/forms/index.html#webdocs](http://www.energy.ca.gov/appliances/forms/index.html#webdocs).



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- Please use the chat feature or raise hand feature to ask questions or make comments
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# Goals of this Webinar

- Help manufacturers, retailers, distributors, contractors, and installers understand the upcoming appliance energy efficiency regulations for commercial and industrial air compressors
- Highlight the effective date of the regulations
- Explain testing requirements
- Identify additional resources
- Answer your questions



# Topic Areas

- Scope
- Definitions
- Test Methods
- Performance Requirements
- Marking and Certification Requirements

# Scope





# Scope

- Rotary Air Compressors, lubricated, water or air cooled with a fixed or variable speed brushless motor
- Full-load operating pressure greater or equal to 75 pounds per square inch gauge (psig) but less than or equal to 200 psig
- Effective date is January 1, 2022



# Definitions







# Definitions

## Title 20 section 1602(a)

**“Commercial and industrial equipment”** means an article of equipment, regardless of whether it is in fact distributed in commerce for industrial or commercial use, of a type which:

- (1) In operation consumes, or is designed to consume energy;
- (2) To any significant extent, is distributed in commerce for industrial or commercial use; and
- (3) Is not a consumer product, as defined in title 20 section 1602(a).



# Definitions

## Title 20 section 1602(s)

“**State-regulated compressor**” means commercial and industrial equipment that meets all of the following criteria:

- (1) is an air compressor,
- (2) is a rotary compressor,
- (3) is not a liquid-ring compressor,
- (4) is driven by a brushless electric motor,
- (5) is a lubricated compressor,
- (6) has a full-load operating pressure greater than or equal to 75 psig and less than or equal to 200 psig,
- (7 ) is not designed and tested to the requirements of The American Petroleum Institute standard 619, “Rotary-Type Positive-Displacement Compressors for Petroleum, Petrochemical, and Natural Gas Industries,”



# Definitions

## Title 20 section 1602(s)

Continued “state regulated compressor”

- (8) has full-load actual volume flow rate greater than or equal to 35 cubic feet per minute (cfm), or is sold or offered for sale with a compressor motor nominal horsepower greater than or equal to 10 horsepower (hp),
- (9) has a full-load actual volume flow rate less than or equal to 1,250 cfm, or is sold or offered for sale with a compressor motor nominal horsepower less than or equal to 200 hp,
- (10) is driven by a three-phase electric motor,
- (11) is manufactured alone or as a component of another piece of equipment; and
- (12) is one of the equipment classes listed in title 20 section 1605.3(s)(2) Table S-5.



# Definitions

## Title 20 section 1602(s)

“**Basic model**” of a state-regulated compressor means all units of a class of compressors manufactured by one manufacturer, having the same primary energy source, the same compressor motor nominal horsepower, and essentially identical electrical, physical, and functional (or pneumatic) characteristics that affect energy consumption and energy efficiency.



# Definitions

## Title 20 section 1602(s)

“**Air-cooled compressor**” means a compressor that utilizes air to cool both the compressed air and, if present, any auxiliary substance used to facilitate compression, and that is not a liquid-cooled compressor.

“**Liquid-cooled compressor**” means a compressor that utilizes liquid coolant provided by an external system to cool both the compressed air and, if present, any auxiliary substance used to facilitate compression.





# Definitions

## Title 20 section 1602(s)

“**Brushless electric motor**” means a machine that converts electrical power into rotational mechanical power without use of sliding electrical contacts

“**Fixed-speed compressor**” means an air compressor that is not capable of adjusting the speed of the driver continuously over the driver operating speed range in response to incremental changes in the required compressor flow rate.





# Definitions

## Title 20 section 1602(s)

“**Positive displacement compressor**” means a compressor in which the admission and diminution of successive volumes of the gaseous medium are performed periodically by forced expansion and diminution of a closed space(s) in a working chamber(s) by means of displacement of a moving member(s) or by displacement and forced discharge of the gaseous medium into the high-pressure area.





# Definitions

## Title 20 section 1602(s)

“**Rotary compressor**” means a positive displacement compressor in which gas admission and diminution of its successive volumes or its forced discharge are performed cyclically by rotation of one or several rotors in a compressor casing.

“**Lubricated compressor**” means a compressor that introduces an auxiliary substance into the compression chamber during compression.





# Testing Requirements





# Test Procedure

## Title 20 section 1604(s)

- Uniform Test Method for Certain Air Compressors,  
10 CFR 431, Subpart T, Appendix A
- Allowance of Alternative Efficiency Determination Methods (AEDM) to reduce testing burden



# Testing Appliances (Number of units tested)

Only a single unit of the appliance needs to be tested for certification purposes except in the following instances:

- Enforcement testing may require two units to be tested if the first unit fails to meet the efficiency standards or efficiency levels reported to the Modernized Efficiency Database System (MAEDbS)
- When using the alternative efficiency determination method (AEDM), the U.S. Department of Energy (DOE) requires the testing of at least two units.

# Performance Requirements





# Performance Requirements

## Title 20 section 1605.3(s)(2)

Equipment Class	Minimum Package Isentropic Efficiency	$\eta_{Regr}$ (Package Isentropic Efficiency Reference Curve)	d (Percentage Loss Reduction)
Rotary, lubricated, air-cooled, fixed-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * \left(\frac{d}{100}\right)$	$-0.00928 * \ln^2(.4719 * V_1) + 0.13911 * \ln(.4719 * V_1) + 0.27110$	-15
Rotary, lubricated, air-cooled, variable-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * \left(\frac{d}{100}\right)$	$-0.01549 * \ln^2(.4719 * V_1) + 0.21573 * \ln(.4719 * V_1) + 0.27110$	-10



# Performance Requirements

## Title 20 section 1605.3(s)(2)

Equipment Class	Minimum Package Isentropic Efficiency	$\eta_{Regr}$ (Package Isentropic Efficiency Reference Curve)	d (Percentage Loss Reduction)
Rotary, lubricated, liquid-cooled, fixed-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * \left(\frac{d}{100}\right)$	$-0.00928 * \ln^2(.4719 * V_1) + 0.13911 * \ln(.4719 * V_1) + 0.27110$	-15
Rotary, lubricated, liquid-cooled, variable-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * \left(\frac{d}{100}\right)$	$-0.01549 * \ln^2(.4719 * V_1) + 0.21573 * \ln(.4719 * V_1) + 0.27110$	-15

# Marking and Certification Requirements





# Marking Requirements

## Title 20 section 1607(b)

### Name, Model Number, and Date

The following information shall be permanently, legibly, and conspicuously displayed on **an accessible place** on each unit;

- (1) manufacturer's name or brand name or trademark (which shall be either the name, brand, or trademark of the listed manufacturer specified pursuant to section 1606(a)(2)(A) of this Article);
- (2) model number; and
- (3) date of manufacture, indicating (i) year and (ii) month or smaller (e.g., week) increment. If the date is in a code that is not readily understandable to the layperson, the manufacturer shall immediately, on request, provide the code to the Energy Commission.





# Certification Requirements

## Title 20 section 1606

All models of covered commercial and industrial air compressors must be certified in MAEDbS to be sold or offered for sale in California.

Manufacturers **may** be able to start certifying products voluntarily 3 months before the effective date of January 1, 2022. Instruction packets and templates will also be available during this timeframe.



# Resources

## Title 20 Compliance Assistance Hotline

Toll free inside California      **(888) 838-1467**

From outside of California      **(916) 651-7100**

[appliances@energy.ca.gov](mailto:appliances@energy.ca.gov)

## Title 20 Compliance Assistance listserv

<http://www.energy.ca.gov/efficiency/listservers.html>

## Webinar documents

<http://www.energy.ca.gov/appliances/forms/index.html#webdocs>

## General Instructions for Submitting Appliance Data

[https://ww2.energy.ca.gov/appliances/forms/MAEDBS\\_General\\_Instructions.pdf](https://ww2.energy.ca.gov/appliances/forms/MAEDBS_General_Instructions.pdf)



# Questions?

