

Compressed Air Systems

FACT SHEET

When do the Standards Apply?

The 2022 Building Energy Efficiency Standards (Energy Code) has requirements for all new compressed air systems and for all additions and alterations to compressed air systems where the total combined horsepower (hp) of the compressor(s) is 25 hp or more. Medical gas compressed air systems serving healthcare facilities are exempt from these requirements.

The Energy Code defines a compressed air system in Section 100.1 as a system of at least one compressor providing

compressed air at 40 psig or higher.

The requirements are mandatory and apply to the primary storage, compressors, and related controls that provide compressed air. They do not apply to any equipment or controls that use or process the compressed air.

Requirements for compressed air systems can be found in Title 24, Part 6, Section 120.6(e).

What Is Covered?

Controls

Compressed air systems with three or more compressors having a combined hp rating of more than 100 hp must operate with controls that are able to choose the most energy efficient combination and loading of compressors within the system based on the current compressed air demand.

Monitoring

Systems having combined horsepower rating ≥ 100 hp must have an energy and air demand monitoring system with the following minimum requirements:

- Measurement of system pressure.
- Measurement of amps or power of each compressor.
- Measurement of determination of total airflow from compressors in cfm.
- Data logging of pressure, power, airflow and compressed air system specific efficiency at intervals of 5 minutes or less..
- Maintain data storage of at least the most recent 24 months.
- Visual trending display of each recorded point, load, and specific energy.

Leak Testing of Compressed Air Piping

Compressed air system piping greater than 50 adjoining feet in length shall be pressure tested after being isolated from the compressed air supply and end uses. If dial gauges are used for the above test, they must conform to the California Plumbing Code Sections 318.3, 318.4 and 318.5. Piping less than or equal to 50 adjoining feet in length shall be pressurized and inspected. Connections shall be tested with a noncorrosive leak-detecting fluid or other leak-detecting methods at the discretion of the authority having jurisdiction.

Pipe Sizing

Compressed air system piping greater than 50 adjoining feet in length shall be designed to minimize frictional losses in the distribution network and shall meet the requirements of Section 120.6(e)5A and either 120.6(e)5B or 120.6(e)5C.

Compressed Air System Acceptance

Before an occupancy permit is granted for a compressed air system subject to Section 120.6(e), the equipment and the system must be certified as meeting the acceptance requirements for code compliance as specified by Reference Nonresidential Appendix NA7. A certificate of acceptance must be submitted to the enforcement agency that certifies the equipment and systems meet the acceptance requirements specified in Reference Nonresidential Appendix NA7.13.

Trim Compressor(s) and Storage

The compressed air system must be equipped with with an appropriately sized trim compressor(s) and primary storage to provide acceptable performance across the range of the system and to avoid control gaps. The trim compressor(s) and primary storage must comply with one of two options below:

- Option 1 includes one or more variable speed drive (VSD) compressors. Systems using VSD compressors must meet the following:
 - » For systems with more than one compressor, the total combined capacity of the VSD compressor(s) acting as trim compressors must be at least 1.25 times the largest net capacity increment between combinations of compressors.
 - » The compressed air system must include primary storage of at least one gallon per actual cubic feet per minute (acfm) of the largest trim compressor.
- Option 2 does not require a VSD compressor:
 - » The compressed air system must include a compressor or set of compressors with a total effective trim capacity no less than the largest net capacity increment between combinations of compressors, or the size of the smallest compressor, whichever is larger.
 - » The total effective trim capacity of single compressor systems must cover at least the range from 70 to 100 percent of the rated capacity. The effective trim capacity is the size of the continuous operational range where the specific power of the compressor (kW/100 acfm) is within 15 percent of the specific power at its most efficient operating point. The total effective trim capacity of the system is the sum of the effective trim capacity of the trim compressors.
 - » The system must include primary storage of at least 2 gallons per acfm of the largest trim compressor.

There are four exceptions to these trim and storage requirements:

Exception 1: Alterations where the total combined added or replaced compressor horsepower is less than the average per-compressor horsepower of all compressors in the system.

Exception 2: Alterations where all added or replaced compressors are VSD compressors and compressed air system includes primary storage of at least one gallon per acfm of the largest trim compressor.

Exception 3: Systems that have been approved by the Energy Commission that serve loads where typical air demand fluctuates less than 10 percent.

Exception 4: Alterations of existing compressed air systems that include one or more centrifugal compressors.



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