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Commercial & Industrial Air Compressors

California Energy Commission 45-Day Language

January 3, 2019

Developed by Energy Solutions
on behalf of the California IOUs

January 3, 2019



Commercial & Industrial Air Compressor Regulations

- Pursued by U.S. DOE between 2012 and 2017
 - Test procedure finalized in January 2017
 - Standards advanced to final rule “pre-publication” but not finalized
- California Investor-Owned Utility participation:
 - Federal – Commented on rulemaking actions for both the test procedure and standards
 - Title 20 – March 2018 CASE Report
- The Statewide CASE Team supports the Energy Commission moving ahead with compressor energy efficiency standards

Title 20 Compressors 45-Day Language

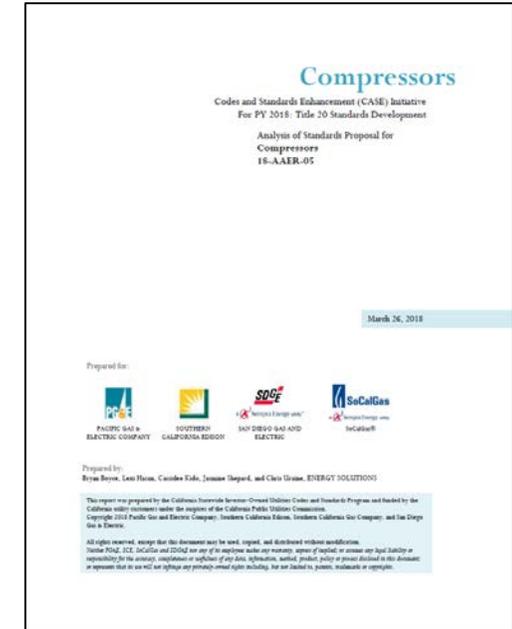
- Released: November 16 2018
- Comment Deadline: December 31 2018
- Public Hearing: **January 3 2019**

Energy Commission Proposed Express Terms

- Mirrored DOE scope (lubricated rotary compressors between 10-200 hp) and efficiency levels (TSL 2)
- Effective date 1/1/2022
- No test-and-list
- Allows AEDMs
- Allows older test results if the tests complied with the DOE test procedure

March 2018 CASE Report

- CASE Team recommended TSL 3 for DOE scope
- 1-year gap between adoption and effective date
- Test-and-list (EL 0) requirements for reciprocating, non-lubricated rotary, and 1-10 & 200-500 hp lubricated rotary

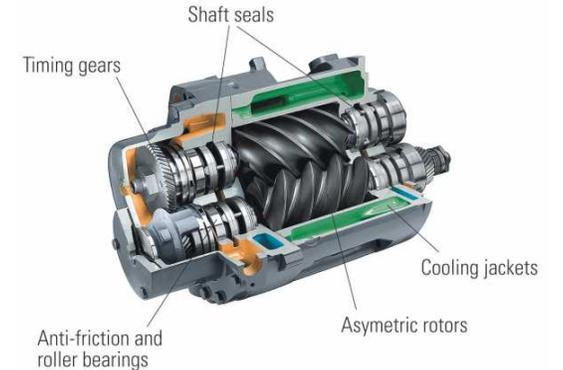


CASE TEAM COMMENTS ON 45-DAY LANGUAGE

TSL 3 is Cost Effective for Rotary Compressors

Though the CASE Team supports the Energy Commission moving forward with energy conservation standards for air compressors, we note that our proposal for TSL 3 is cost effective and delivers greater energy savings.

- DOE selected TSL 2, the Energy Commission has aligned with DOE's proposal
- Compared to the Energy Commission's proposal, our proposal would have resulted in 223 GWh/yr more of stock energy savings after stock turnover, 36,507 MTCO₂e/yr more stock GHG emissions reductions after stock turnover, and is still cost-effective



The Energy Commission Should Require Compliance In 2020

The CASE Team recommends a one-year period between standards adoption and compliance.

- The Energy Commission is only statutorily required to provide a one-year gap between standard adoption and compliance
- The Energy Commission has already made concessions to manufacturers by allowing older test data and AEDMs to represent compressor energy efficiency
- A one-year delay would mean enforcement in early 2020, depending on when exactly the standard is adopted

DOE Has Already Addressed Manufacturer Concerns

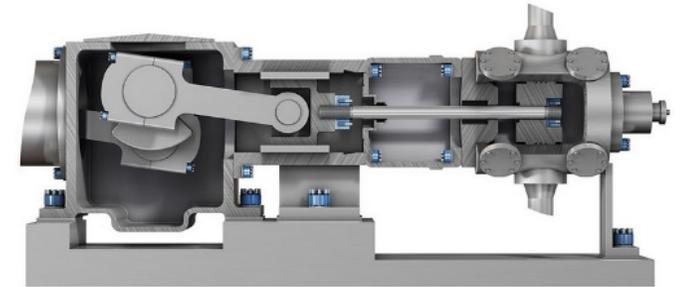
The Department of Energy addressed manufacturer concerns by changing the energy use analysis between its NOPR and final rule stages. Specifically, DOE altered its annual operating hours (AOH) distribution to better align with manufacturer recommendations.

- In response to DOE's May 2016 NOPR, manufacturers pointed to what they perceived as flaws in DOE's analysis. In particular, compressor AOH was criticized
- In its pre-published Final Rule, DOE adjusted the AOH to account for data provided by manufacturers
- Evidence of this change is shown in the annual energy consumption of fixed-speed air-cooled rotary compressors, which declined by 18% between the NOPR and Final Rule analysis. Annual energy consumption directly arises from AOH
- This is evidence that issues from the NOPR have been addressed by DOE

Test-and-list for Additional Classes of Compressors

Our CASE proposal included EL 0 (test-and-list) for reciprocating, non-lubricated rotary, and 1-10 and 200-500 hp lubricated rotary air compressors. Test-and-list would generate valuable data on these types of compressors for use in incentive programs and potential future energy conservation standards.

- The Energy Commission employs test-and-list for other products such as evaporative coolers, whole-house fans, residential exhaust fans, ceiling fans, and heat pump water-heating packages.
- Utility programs would benefit greatly from having isentropic efficiency data and a QPL for the different types of air compressors not in the Energy Commission's scope for an efficiency standard
- The Energy Commission could use this test-and-list data to easily set a future standard for these types of air compressors



Basic Model and AEDM Rules

The CASE Team agrees with the Energy Commission's decision to align with DOE's proposal to require lab testing for basic models of compressors and allow AEDMs to manage test burden.

- DOE had been proposing basic models be tested in a laboratory and similar products could use AEDMs to derive isentropic efficiency ratings
- The Energy Commission will use the same strategy that DOE planned to use
- This is a reasonable approach to manage manufacturer test burden

Use of Existing Compressor Test Results for Compliance

The CASE Team supports the Energy Commission's decision to allow previously tested air compressors to submit these test results if the tests comply with the DOE air compressors test procedure

- After reviewing the DOE test procedure against ISO 1217 and the CAGI program, the CASE Team concluded that it's reasonable to allow older data assuming it meets the more stringent DOE testing requirements
- DOE planned to allow this if its energy conservation standard final rule had been published
- Should reduce manufacturer test burden while also not impacting energy efficiency or consumers **assuming the tests were conducted to the more stringent DOE requirements (manufacturers must prove this to be allowed this privilege, which the Energy Commission specifies)**

In Summary

- The CASE Team supports air compressor efficiency standards and applauds the Energy Commission's decision to move forward with 45-day language
- Higher efficiency levels (TSL 3) are cost effective for rotary compressors and would result in greater energy savings
- Standards enforcement should begin in 2020
- Manufacturer concerns around issues such as annual operating hours have been addressed by DOE between its NOPR and Final Rule stages
- A “test-and-list” requirement would generate meaningful data on reciprocating and other categories of rotary compressors
- The Energy Commission is pursuing a reasonable policy by allowing basic models and AEDMs
- Old test data must be shown to meet the new DOE test procedure before it can be used for Title 20 compliance