

DOCKETED

Docket Number:	19-BSTD-03
Project Title:	2022 Energy Code Pre-Rulemaking
TN #:	237095
Document Title:	Joint Committee on Energy and Environmental Policy (JCEEP) Comments - Comments on Draft 2022 Energy Code Express Terms (TN # 236876) and Draft 2022 Reference Appendices Express Terms (TN # 236874)
Description:	N/A
Filer:	System
Organization:	Joint Committee on Energy and Environmental Policy (JCEEP)
Submitter Role:	Public
Submission Date:	3/9/2021 4:52:49 PM
Docketed Date:	3/9/2021

*Comment Received From: Joint Committee on Energy and Environmental Policy
(JCEEP)*

Submitted On: 3/9/2021

Docket Number: 19-BSTD-03

**Comments on Draft 2022 Energy Code Express Terms (TN #
236876) and Draft 2022 Reference Appendices Express Terms (TN #
236874)**

Additional submitted attachment is included below.

ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6209

tenslow@adamsbroadwell.com

SO. SAN FRANCISCO OFFICE

601 GATEWAY BLVD., SUITE 1000
SO. SAN FRANCISCO, CA 94080

TEL: (650) 589-1660
FAX: (650) 589-5062

DANIEL L. CARDOZO
CHRISTINA M. CARO
THOMAS A. ENSLOW
KELILAH D. FEDERMAN
ANDREW J. GRAF
TANYA A. GULESSERIAN
KENDRA D. HARTMANN*
KYLE C. JONES
DARIEN K. KEY
RACHAEL E. KOSS
AIDAN P. MARSHALL
WILLIAM C. MUMBY

MARC D. JOSEPH
Of Counsel

*Not admitted in California.
Licensed in Colorado.

March 9, 2021

VIA DOCKET SUBMITTAL

Docket No. 19-BSTD-03
California Energy Commission
Dockets Office MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Comments on Draft 2022 Energy Code Express Terms (TN # 236876)
and Draft 2022 Reference Appendices Express Terms (TN# 236874)

Dear Commission Staff:

The following comments are submitted on behalf of the Joint Committee on Energy and Environmental Policy (“JCEEP”) in response to the Draft 2022 Energy Code Express Terms (TN # 236876) and Draft 2022 Reference Appendices Express Terms (TN# 236874), both docketed on February 22, 2021. The JCEEP is made up of the California sheet metal workers’ local unions and more than 25,000 technicians working for over 600 contractors throughout California.¹ JCEEP’s mission is to promote responsible environmental, indoor air quality and energy policy in California as it pertains to and impacts the heating, ventilation and air conditioning (“HVAC”) industry. JCEEP’s members have over 15 training facilities throughout the State and thousands of workers being trained daily in HVAC specialties, such as testing, adjusting and balancing, commissioning, green building design, energy efficiency, sound and vibration control, and indoor air quality.

¹ The sheet metal workers unions are locals of the International Association of Sheet Metal, Air, Rail & Transportation Workers (“SMART”).

4003-053j

March 9, 2021

Page 2

The sheet metal workers' unions have long advocated for and participated in the development of building standards for mechanical systems in order to safeguard the public health, achieve energy efficiency and ensure performance and durability of systems. JCEEP was established to continue this tradition of advocacy in California. JCEEP was formed on the premise that HVAC systems need to be designed not just to manage comfort levels of indoor air, but also to protect against contaminants and health threats, to ensure reliability and quality, and to ensure energy efficiency.

I. OPPOSITION TO REMOVAL OF HIGH-RISE RESIDENTIAL BUILDINGS FROM STANDARDS APPLICABLE TO HOTEL/MOTEL BUILDINGS AND NONRESIDENTIAL BUILDINGS

The Draft 2022 Energy Code Express Terms propose a major shift in the historic format of the California Building Energy Efficiency Standards by proposing to remove high-rise residential buildings from standards applicable to hotel/motel buildings and nonresidential buildings. JCEEP opposes this format change for three reasons.

First, this change occurs in so many places in the code that it creates confusion and requires more time than the comment period provided for stakeholders to assess whether this would result in any substantive changes in energy code requirements applicable to high-rise residential buildings. Prior to approving this change, Commission staff should clearly identify for the public whether current requirements for high-rise residential buildings will change at all as a result of the format change. Without such disclosure, it is unclear whether the proposed format change will, in fact be a substantive change that results in increased energy use in high-rise residential buildings or would impact protection of indoor air quality in such buildings. The current COVID-19 pandemic underscores the need to maintain strong standards for high-occupancy, high-rise residential buildings. JCEEP respectfully requests that staff provide a clear analysis of all changes in current requirements for high-rise residential buildings that this format change will create; and an opportunity for stakeholder comments on these changes.

Second, a mere format change is unnecessary and will create confusion. Currently, high-rise residential buildings, hotel/motel buildings and nonresidential buildings are subject to many of the same standards due to the fact that the HVAC, lighting control and other building systems they utilize tend to be more complex and

closer in type and size than the systems used in low-rise residential buildings. The Express Terms attempt to address the fact that high-rise residential buildings are different by including numerous new provisions in the multi-family residential building sections that add additional requirements for high-rise residential buildings. Builders in California are used to the current Energy Code format in which requirements for high-rise residential buildings are set forth separately from requirements for low-rise residential buildings. Changing the formatting now will simply cause short-term confusion with little tangible benefit.

Third, the proposed change makes it likely that energy standards for high-rise residential buildings will progress more slowly than if these standards remained connected to standards for hotel/motel buildings and nonresidential buildings. Affordable housing concerns limit the ability of the Commission to increase energy standards for low-rise residential buildings as quickly as hotel/motel buildings and nonresidential buildings. High-rise residential buildings, however, are different from low-rise residential buildings. Because of their height and high occupancy, they are already required to comply with numerous high-rise-specific provisions involving structural integrity, fire-life safety and other requirements. Because of their size, these buildings also use substantial amounts of energy and thus represent more efficient targets for energy reduction measures.

II. OPPOSITION TO REMOVAL OF BALANCING REQUIREMENTS FOR MULTIFAMILY BUILDING CENTRAL VENTILATION SYSTEMS

The Express Terms make a number of amendments to Section 120.1 (b)(2)(A)(v) (Multifamily Building Central Ventilation Systems) that delete current requirements to balance multifamily building central ventilation systems and replaces it with requirements to “adjust” these systems. This change has the effect of reducing the efficiency and performance of these systems. The term “balance” has a specific meaning within the California Mechanical Code and in field operations, and is defined at section 407.3 of the California Mechanical Code. Adjusting is only one of the procedures within the balance process. The appropriate terminology for this work should reference the term “Balance” or “Testing, Adjusting and Balancing (TAB).” By changing the terms in 120.1 (b)(2)(A)(v) from “balanced” to “adjusted,” the proposed code language eliminates critical steps in ensuring a system is running efficiently and effectively.

JCEEP recommends the following changes to the Express Terms Language:

Express Terms Language:

v. Multifamily Building Central Ventilation System Airflow

Adjustment. Multifamily building central ventilation systems that serve multiple dwelling-units shall ~~be balanced to provide ventilation airflow to have airflow rates adjusted~~ in each dwelling-unit served to meet or exceed at a design ventilation airflow rate specification that is equal to or greater than the rate specified by Equation 120.1-B., ~~but~~ The adjusted airflow in each dwelling unit shall be not no more than twenty percent greater than the specified design ventilation airflow rate. The design ventilation airflow rate for each dwelling unit shall be specified on the building design plans approved by the enforcement agency. These ventilation systems shall utilize flow adjustment ~~balancing~~ means to ensure each of the dwelling unit airflows can be adjusted to maintain the design ventilation airflow within this tolerance. ~~meet this balancing requirement.~~ These system airflow adjustment/~~balancing~~ means may include but not be limited to constant air regulation devices, orifice plates, and variable speed central fans.

Recommended Language:

v. Multifamily Building Central Ventilation System Airflow

Adjustment. Multifamily building central ventilation systems that serve multiple dwelling-units shall ~~be balanced to provide ventilation airflow to have airflow rates adjusted~~ in each dwelling-unit served to meet or exceed at a design ventilation airflow rate specification that is equal to or greater than the rate specified by Equation 120.1-B., ~~but~~ The adjusted airflow in each dwelling unit shall be not no more than twenty percent greater than the specified design ventilation airflow rate. The design ventilation airflow rate for each dwelling unit shall be specified on the building design plans approved by the enforcement agency. These ventilation systems shall utilize ~~flow adjustment~~ balancing means to ensure each of the dwelling unit airflows can be adjusted to maintain the design ventilation airflow within this tolerance. ~~meet this balancing requirement.~~ These system ~~airflow adjustment~~/balancing means may include but not be limited to constant air regulation devices, orifice plates, and variable speed central fans.

III. REFERENCES TO UV-RATED DRAWBANDS AND UV-RESISTANT NYLON DUCT TIES SHOULD BE DELETED TO ENSURE CONSISTENCY WITH THE 2021 UNIFORM MECHANICAL CODE

The California Building Energy Efficiency Standards contains several outdated references to the use of UV-rated drawbands and UV-resistant nylon duct ties for flex ducts. Approval of these products for this use was withdrawn in the 2021 Uniform Mechanical Code per code section 603.4. These references must be deleted in order to prevent a conflict with the 2022 California Mechanical Code, which automatically adopts all Uniform Mechanical Code provisions unless expressly modified, deleted or replaced by a state amendment.

The reason for this withdrawal was the Iian Walker/Max Sherman study from Lawrence Berkeley National Labs (LBNL) that found nylon connectors regularly failed well before their stated life expectancy after being exposed to high heat. Discoloration of the nylon strapping was observed within one month of the start of testing and straps began breaking after four months. Strap failure is a major problem, because mechanical attachment thereafter is maintained only by the duct sealant. If ducts are not well supported, significant mechanical stress can occur to cause the sealant to fail after the strap fails. In extreme cases, the duct connection may separate. Straps made of these materials may have improved high-temperature durability. As an alternative, the authors recommend metal straps because they have no temperature degradation. The UV rating of these straps did not provide any protection from this heat-related degradation.

The following sections in the California Building Energy Efficiency Standards require amendment to avoid this conflict:

A. Section 120.4(b)(2)(E)(i).

Express Terms Language:

E. Drawbands used with flexible duct.

- i. Drawbands shall be either stainless-steel worm-drive hose clamps or UV-resistant nylon duct ties.
- ii. Drawbands shall have a minimum tensile strength rating of 150 pounds.
- iii. Drawbands shall be tightened as recommended by the manufacturer with an adjustable tensioning tool.

Recommended Language:

E. Drawbands used with flexible duct.

- i. Drawbands shall be ~~either~~ stainless-steel worm-drive hose clamps ~~or UV-resistant nylon duct ties.~~
- ii. Drawbands shall have a minimum tensile strength rating of 150 pounds.
- iii. Drawbands shall be tightened as recommended by the manufacturer with an adjustable tensioning tool.

B. Section 160.3(b)(5)(C)(v).

Express Terms Language:

- v. Drawbands used with flexible duct.
 - a. Drawbands shall be either stainless-steel worm-drive hose clamps or UV-resistant nylon duct ties.
 - b. Drawbands shall have a minimum tensile strength rating of 150 pounds.
 - c. Drawbands shall be tightened as recommended by the manufacturer with an adjustable tensioning tool.

Recommended Language:

- v. Drawbands used with flexible duct.
 - a. Drawbands shall be ~~either~~ stainless-steel worm-drive hose clamps ~~or UV-resistant nylon duct ties.~~
 - b. Drawbands shall have a minimum tensile strength rating of 150 pounds.
 - c. Drawbands shall be tightened as recommended by the manufacturer with an adjustable tensioning tool.

C. Section 160.3 (c)(2)(C)(ii)(e)(I).

Express terms Language:

- e. Drawbands used with flexible duct.
 - I. Drawbands shall be either stainless-steel worm-drive hose clamps or UV-resistant nylon duct ties.

Recommended Language:

- e. Drawbands used with flexible duct.
 - I. Drawbands shall be ~~either~~ stainless-steel worm-drive hose clamps ~~or UV-resistant nylon duct ties.~~

D. NA7.5.3 Air Distribution Systems.

Express Terms Language:

NA7.5.3.1 Construction Inspection

Prior to Functional Testing on new duct systems, verify and document the following

- (a) Duct connections meet the requirements of Standards §120.4.
- (b) **Specify choice of drawbands.**
- (c) Flexible ducts are not constricted in any way.
- (d) Duct leakage tests shall be performed before access to ductwork and connections are blocked.
- (e) Joints and seams are properly sealed according to the requirements of Standards §120.4.
- (f) Joints and seams are not sealed with cloth back rubber adhesive tape unless used in combination with Mastic and drawbands. Cloth backed tape may be used if tape has been approved by the CEC. Ducts are fully accessible for testing.

Recommended Language:

NA7.5.3.1 Construction Inspection

Prior to Functional Testing on new duct systems, verify and document the following

- (a) Duct connections meet the requirements of Standards §120.4.
- (b) ~~Specify choice of drawbands.~~ Drawbands shall meet the requirements of the California Mechanical Code.
- (c) Flexible ducts are not constricted in any way.
- (d) Duct leakage tests shall be performed before access to ductwork and connections are blocked.
- (e) Joints and seams are properly sealed according to the requirements of Standards §120.4.
- (f) Joints and seams are not sealed with cloth back rubber adhesive tape unless used in combination with Mastic and drawbands. Cloth backed tape may be used if tape has been approved by the CEC. Ducts are fully accessible for testing.

IV. DUCT LEAK TESTING PROCEDURES SHOULD BE AMENDED FOR CONSISTENCY WITH THE SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL REQUIREMENTS AND THE 7.5.3.2.2 REQUIREMENTS

The proposed Express Terms language for NA7.5.3.2 (Functional Testing) should be amended to clarify that duct systems shall be tested in accordance with both CMC Section 603.10.1 and the additional Energy Code requirements set forth in NA 7.5.3.2.2, including the requirements for representative testing and the requirements to use trained duct air leakage test technicians or Testing, Adjusting and Balancing technicians to perform the tests. The failure to require testing in accordance with NA 7.5.3.2.2 appears to be a drafting error since it is both inconsistent with the recommendations set forth in the Codes and Standards Enhancement (CASE) Initiative on 2022 California Energy Code Air Distribution: High Performance Ducts and Fan Systems (2022-NR-HVAC2) and inconsistent with the fact that the Express terms include the addition of NA 7.5.3.2.2 without ever adding a requirement to follow this provision.

In addition, NA 7.5.3.2.2 should be amended to delete the pressure test procedures set forth in Sections (a) through (h). NA 7.5.3.2.2 requires compliance with the SMACNA HVAC Air Duct Leakage Test Manual, but procedures (a) through (h) are either redundant or contradictory to the procedures set forth in the SMACNA HVAC Air Duct Leakage Test Manual. This both creates confusion and undercuts the reliability of the reliance on SMACNA HVAC Air Duct Leakage Test Manual procedures.

For example, Section (a) allows testing at 25 Pa (0.1 in w.c.), while the SMACNA procedures require testing at normal operating pressures as provided by the designer. Leakage is partially a function of pressure. Testing at below operating pressures will not identify all leaks that could occur during normal operation.

In addition, Section (f) allows contractors to ignore leaks through the use of the notoriously unreliable smoke test. Reliance on the smoke test is not backed by solid data and is not accepted under the national SMACNA HVAC Air Duct Leakage Test Manual standards. Furthermore, smoke tests are highly subjective. This is inherently problematic because contractors have a strong financial incentive to claim that no smoke was visible so that they can avoid potentially costly duct leakage repairs. The CEC should not allow contractors to ignore leaks based on this unreliable test. A passing test should be dependent on the results of the test

procedure, outlined in the SMACNA HVAC Air Duct Leakage Test Manual and the parameters set by the designer.

Below are JCEEP's proposed amendments to address these issues. JCEEP's proposed changes are highlighted in yellow.

Express Terms Language

NA7.5.3.2 Functional Testing

Duct systems shall be tested in accordance with NA7.5.3.2.1 when they are either new duct systems that meet the criteria of Section 120.4(g)1 or they are part of a system that meets the criteria of Section 141.0(b)2Dii. All other duct systems shall be tested in accordance with CMC Section 603.10.1.

NA 7.5.3.2.1

Step 1: Perform duct leakage test as specified by Reference Nonresidential Appendix NA2 to verify the duct leakage conforms to the requirements of Standards §120.4(g)140.4(l)1 and §141.0(b)2Dii.

Step 2: Obtain HERS Rater field verification as specified in Reference Nonresidential Appendix NA1. Or at the discretion of the enforcement agency, field verification may be satisfied by the ATT as specified in Reference Nonresidential Appendix NA1.9.

NA 7.5.3.2.2

Ductwork shall be leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual and NA7.5.3.2.2, consistent with California Mechanical Code Section 603.10.1. Testing shall be performed by a Mechanical Acceptance Test Technician who is also certified as a Testing, Adjusting, and Balancing Technician (AABC, NEBB, or TABB) or as a Duct Air Leakage Technician by the International Certification Board (ICB) Representative sections totaling not less than 10 percent of the total installed duct area shall be tested. Where the tested 10 percent fails to comply with the requirements of this section, then 40 percent of the total installed duct area shall be tested. Where the tested 40 percent fails to comply with the requirements of this section, then 100 percent of the total installed duct area shall be tested. Sections shall be selected by the building owner or designated representative of the building owner. Positive pressure leakage testing shall

be permitted for negative pressure ductwork. The permitted duct leakage shall be not more than the following:

$$L_{\max} = CL \times P^{0.65}$$

Where:

L_{max} = maximum permitted leakage, (ft³/min)/100 square feet [0.0001 (m²/s)/m²] duct surface area.

CL = four or two, duct leakage class, (ft³/min)/100 square feet [0.0001 (m³/s)/m²] duct surface area at 1 inch water column (0.2 kPa). Rectangular and oval ductwork shall be tested to leakage class four and round ductwork tested to leakage class two.

P = test pressure, which shall be equal to the design duct pressure class rating, inch water column (kPa).

All vertical ductwork that is located in shafts and all horizontal ductwork upstream of a terminal box that is located above hard ceilings shall be tested and counted towards the 10% testing requirement. If more than 10% of the ductwork will be in shafts or above hard ceilings, this requirement will result in more than 10% of the total surface area having to be tested. In the case of supply-air systems without terminal boxes, 10% of the ductwork as determined by surface area shall be tested.

In the case of supply-air systems with terminal boxes, 10% of ductwork upstream and 10% of ductwork downstream of the terminal boxes as determined by surface area shall be tested and the leakage considered separately.

In the case of exhaust-air systems, 10% of the installed ductwork as determined by surface area shall be tested and the leakage considered separately from the supply-air system. In a building with multiple exhaust systems, at least two systems need to be tested to achieve the minimum 10% of surface area.

(a) Select test pressure equal to the lowest pressure class of any component or ductwork section of the assembly being tested

1. When testing downstream of VAV air valves, test at 25 Pa (0.1 i.w.c.)

2. When testing downstream of CAV terminal boxes or branch balancing dampers, test at 50% of the upstream pressure class

(b) When testing 10% of ductwork downstream of VAV air valves, section selection shall be representative of the downstream sections found in the

building (e.g., similar type and number of diffusers, similar design flow, similar total duct length)

(c) Calculate maximum permitted leakage according to 603.10.1 of the California Mechanical Code:

1. Maximum permitted leakage is calculated according to the following equation:

$$L_{max} = CL \times P^{0.65}$$

Where:

L_{max} = maximum permitted leakage, (ft³/min)/100 ft² of duct surface area

CL = four or two, duct leakage class (ft³/min)/100 ft² duct surface area at 1 inch water column. Rectangular/oval ductwork shall be tested to leakage class four and round ductwork tested to leakage class two.

P = test pressure, equal to the design duct pressure class rating, inch water column

2. The total leakage flow (ft³/min) at the pressure conditions specified in a. shall be equal to the sum of the leakage flows from all the sections being tested.

3. The total leakage flow shall be less than the product of the allowable percentage leakage multiplied by the design flow through the section being tested.

4. For VAV supply systems, the leakage calculation shall be performed separately for sections upstream and downstream of VAV air valves.

5. For CAV supply systems with terminal boxes (e.g., with reheat coils), the leakage calculation shall be performed separately for sections upstream and downstream of the terminal boxes.

(d) Connect blower and flow meter to duct or equipment section and temporarily seal open ends of ductwork or equipment.

(e) Prevent over pressurizing by starting with the test apparatus inlet damper closed or VFD set to low delivery. Carefully pressurize.

(f) Read flow meter and compare to allowed leakage from c. If it meets the allowed rate continue, otherwise:

1. Inspect for sensible leaks

2. Smoke test can be used to identify actual leaks. Soap solution can be applied if necessary:

i. Inject either theatrical or other non-toxic smoke into a fan pressurization device that is maintaining a duct pressure difference of 25 Pa (0.1 inches water) relative to the duct

surroundings, with all grilles and registers in the duct system sealed.

ii. Visually inspect all accessible portions of the duct system during smoke injection.

iii. The system shall pass the test if one of the following conditions is met:

A. No visible smoke exits the accessible portions of the duct system.

B. Smoke only emanates from the furnace cabinet which is gasketed and sealed by the manufacturer and no visible smoke exits from the accessible portions of the duct system.

3. Depressurize and repair leaks. If test pressure could not be reached and significant leak sites were not detected, consider smaller sections or larger test bigger apparatus.

4. Allow seals to cure and retest.

(g) Complete test report and obtain witness signature, if required.

(h) Remove temporary plugs and seals

JCEEP Recommended Language [JCEEP Changes Highlighted]

NA7.5.3.2 Functional Testing

Duct systems shall be tested in accordance with NA7.5.3.2.1 when they are either new duct systems that meet the criteria of Section 120.4(g)1 or they are part of a system that meets the criteria of Section 141.0(b)2Dii. All other duct systems shall be tested in accordance with CMC Section 603.10.1. **and NA7.5.3.2.2**

NA 7.5.3.2.1

Step 1: Perform duct leakage test as specified by Reference Nonresidential Appendix NA2 to verify the duct leakage conforms to the requirements of Standards §120.4(g)140.4(l)1 and §141.0(b)2Dii.

Step 2: Obtain HERS Rater field verification as specified in Reference Nonresidential Appendix NA1. Or at the discretion of the enforcement agency, field verification may be satisfied by the ATT as specified in Reference Nonresidential Appendix NA1.9.

NA 7.5.3.2.2

Ductwork shall be leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual and NA7.5.3.2.2, consistent with California Mechanical Code Section 603.10.1. Testing shall be performed by a Mechanical Acceptance Test Technician who is also certified as a Testing, Adjusting, and Balancing Technician (AABC, NEBB, or TABB) or as a Duct Air Leakage Technician by the International Certification Board (ICB) Representative sections totaling not less than 10 percent of the total installed duct area shall be tested. Where the tested 10 percent fails to comply with the requirements of this section, then 40 percent of the total installed duct area shall be tested. Where the tested 40 percent fails to comply with the requirements of this section, then 100 percent of the total installed duct area shall be tested. Sections shall be selected by the building owner or designated representative of the building owner. Positive pressure leakage testing shall be permitted for negative pressure ductwork. The permitted duct leakage shall be not more than the following:

$L_{max} = CL \times P^{0.65}$

Where:

L_{max} = maximum permitted leakage, (ft³/min)/100 square feet [0.0001 (m³/s)/m²] duct surface area.

CL = four or two, duct leakage class, (ft³/min)/100 square feet [0.0001 (m³/s)/m²] duct surface area at 1 inch water column (0.2 kPa). Rectangular and oval ductwork shall be tested to leakage class four and round ductwork tested to leakage class two.

P = test pressure, which shall be equal to the design duct pressure class rating, inch water column (kPa).

All vertical ductwork that is located in shafts and all horizontal ductwork upstream of a terminal box that is located above hard ceilings shall be tested and counted towards the 10% testing requirement. If more than 10% of the ductwork will be in shafts or above hard ceilings, this requirement will result in more than 10% of the total surface area having to be tested. In the case of supply-air systems without terminal boxes, 10% of the ductwork as determined by surface area shall be tested.

In the case of supply-air systems with terminal boxes, 10% of ductwork upstream and 10% of ductwork downstream of the terminal boxes as determined by surface area shall be tested and the leakage considered separately.

In the case of exhaust-air systems, 10% of the installed ductwork as determined by surface area shall be tested and the leakage considered separately from the supply-air system. In a building with multiple exhaust systems, at least two systems need to be tested to achieve the minimum 10% of surface area.

(a) Select test pressure equal to the lowest pressure class of any component or ductwork section of the assembly being tested

1. When testing downstream of VAV air valves, test at 25 Pa (0.1 i.w.c.)

2. When testing downstream of CAV terminal boxes or branch balancing dampers, test at 50% of the upstream pressure class

(b) When testing 10% of ductwork downstream of VAV air valves, section selection shall be representative of the downstream sections found in the building (e.g., similar type and number of diffusers, similar design flow, similar total duct length)

(c) Calculate maximum permitted leakage according to 603.10.1 of the California Mechanical Code:

1. Maximum permitted leakage is calculated according to the following equation:

$$L_{max} = CL \times P^{0.65}$$

Where:

L_{max} = maximum permitted leakage, (ft³/min)/100 ft² of duct surface area

CL = four or two, duct leakage class (ft³/min)/100 ft² duct surface area at 1 inch water column. Rectangular/oval ductwork shall be tested to leakage class four and round ductwork tested to leakage class two.

P = test pressure, equal to the design duct pressure class rating, inch water column

2. The total leakage flow (ft³/min) at the pressure conditions specified in a. shall be equal to the sum of the leakage flows from all the sections being tested.

3. The total leakage flow shall be less than the product of the allowable percentage leakage multiplied by the design flow through the section being tested.

4. For VAV supply systems, the leakage calculation shall be performed separately for sections upstream and downstream of VAV air valves.

5. For CAV supply systems with terminal boxes (e.g., with reheat coils), the leakage calculation shall be performed separately for sections upstream and downstream of the terminal boxes.

- (d) Connect blower and flow meter to duct or equipment section and temporarily seal open ends of ductwork or equipment.
- (e) Prevent over pressurizing by starting with the test apparatus inlet damper closed or VFD set to low delivery. Carefully pressurize.
- (f) Read flow meter and compare to allowed leakage from c. If it meets the allowed rate continue, otherwise:
 - 1. Inspect for sensible leaks
 - 2. Smoke test can be used to identify actual leaks. Soap solution can be applied if necessary:
 - i. Inject either theatrical or other non-toxic smoke into a fan pressurization device that is maintaining a duct pressure difference of 25 Pa (0.1 inches water) relative to the duct surroundings, with all grilles and registers in the duct system sealed.
 - ii. Visually inspect all accessible portions of the duct system during smoke injection.
 - iii. The system shall pass the test if one of the following conditions is met:
 - A. No visible smoke exits the accessible portions of the duct system.
 - B. Smoke only emanates from the furnace cabinet which is gasketed and sealed by the manufacturer and no visible smoke exits from the accessible portions of the duct system.
 - 3. Depressurize and repair leaks. If test pressure could not be reached and significant leak sites were not detected, consider smaller sections or larger test bigger apparatus.
 - 4. Allow seals to cure and retest.
- (g) Complete test report and obtain witness signature, if required.
- (h) Remove temporary plugs and seals

V. PROPOSED CHANGES TO ATTCP ELECTRONIC DATABASE SYSTEM REQUIREMENTS

The proposed new section 10-103.2(c)3H (Electronic Database System) and the proposed modifications to NA1.9.3, subsections (d) and (e) should be modified to reduce costs, to ensure each ATTCP's system that will be compatible with a future single, central data registry and to eliminate duplication with current ATTCP annual report requirements.

JCEEP largely supports the proposal to require HVAC ATTCPs to maintain an electronic database system. However, JCEEP is concerned that the requirement for each ATTCP to create its own search and report system for Commission staff access will unnecessarily increase costs and could create a barrier to what should be the ultimate goals of having a single, central data registry for all CEC Title 24 compliance documents that is maintained and operated by the CEC.

JCEEP supports the recommendations contained in the California Energy Alliance (CEA) proposal submitted to the Commission in April of last year. This proposal recommended that each ATTCP directly provide the CEC specified electronic data and documents per an Application Programming Interface (API), and that the CEC would then aggregate this data in its own central database (e.g., a Central Nonresidential Data Registry/Repository platform (CNDR)). Having a single, central registry/repository run by the Commission would reduce costs, would increase AHJ enforcement by providing a single point of contact for AHJs to verify that Title 24 compliance documents have been completed for a project, and would allow for the future creation of an HVAC equipment serial number tracking system in order to address the widespread problem of HVAC systems being installed without pulling any permits and without any acceptance test compliance.

JCEEP is also unclear on the justification for requiring each ATTCP to add the ability for CEC staff to enter their database and create customizable reports. The Express Terms do not make clear what summary reports are needed that are not already provided pursuant to the requirement that ATTCPs provide summary annual reports. ATTCPs are required to provide annual summary reports in Part 1, Section 10-103.1, subsection (d)(1). This section clearly identifies what summary reports are required. If additional summary information is needed, it could be added to the requirements for the annual report.

Based on its consultation with other stakeholders, JCEEP proposes the following amendments to the Express Terms:

A. Express Terms for Title 24, Part 1 (Administrative Code) section 10-103.2(c)3H.

H. Electronic Database System. The ATTCP shall maintain, or by suitable contractual requirements cause to be maintained, an electronic database system approved by the CEC. The electronic database system shall be capable of all the following:

- i. Support all activities for the ATTCP to comply with its quality assurance program as required by Section 10-103.2(c)3F.
- ii. For no less than five years, record and preserve all certificates of acceptance offered for certification by the ATTCP and as performed by its own certified ATTs.
- iii. Allow the transmission of electronic copies of each completed certificate of acceptance to the ATT that performed the test, the ATE associated with that ATT, or both.
 - a. Each page of each certificate of acceptance shall bear the logo of the ATTCP or other identifying insignia as approved by the CEC.
 - b. The electronic copy shall be capable of being printed.
 - c. The ATTCP may apply to the CEC for approval to use alternative compliance documents that differ from those approved for use by the CEC but must demonstrate that these alternative compliance documents do not differ in format, informational order, or content from the CEC-approved compliance documents.
- iv. Provide a means of verifying any certificate of acceptance to the enforcement agency having jurisdiction as identified on the certificate of acceptance.
- v. Provide the CEC with any of the following project data or documents upon request: project address, permit numbers, acceptance test technician and acceptance test employee certification numbers, certificates of acceptance, compliance forms, installation forms, and record of quality assurance review. The CEC may adopt an Application Programming Interface (API) for providing data electronically. Within one year of development of an API, the ATTCP's electronic database system shall have the ability to

- transfer project data to the CEC through the API upon completion of the project or at established intervals no longer than monthly. ~~read-only access to the electronic database system with the authority to inspect and securely retrieve all compliance documents and quality assurance records.~~
- vi. ~~The CEC access to the electronic database system shall include a search function which returns summary reports as requested by the CEC.~~
- a. ~~The search function shall include all of the following filters:~~
- i. ~~The date range shall be customizable.~~
 - ii. ~~The Building Energy Efficiency Standards code compliance year shall be customizable.~~
 - iii. ~~The range of specificity for authorities having jurisdiction shall be from a single authority to all authorities in California.~~
 - iv. ~~Project location with fields for number, street name, city, and zip code~~
 - v. ~~The range of specificity for ATEs shall be from a single ATE to all ATEs certified by the ATTCP.~~
 - vi. ~~The range of specificity for ATTs shall be from a single ATT to all ATTs certified by the ATTCP.~~
 - vii. ~~The type of compliance document shall be customizable.~~
- b. ~~Each summary report shall include a list of all projects which meet the search criteria and include the following information:~~
- i. ~~The project name~~
 - ii. ~~The project address~~
 - iii. ~~The authority having jurisdiction~~
 - iv. ~~The project code compliance year~~
 - v. ~~A list of all compliance documents associated with the project~~
 - vi. ~~A list of all quality assurance documents associated with the project~~
- c. ~~Each summary report shall include the ability to download all the records for a single project listed on a summary report~~
- d. ~~Each summary report shall include the ability to download all the records for all projects listed on a summary report.~~

March 9, 2021

Page 19

B. 2022 Reference Appendices Express Terms, NA1.9.3

JCEEP recommends amending current NA1.9.3 Sections d and e as follows:

NA1.9.3, section d:

d. The ATTCP shall allow the Energy Commission staff access to any of the following project data or documents upon request: project address, permit numbers, acceptance test technician and acceptance test employee certification numbers, certificates of acceptance, compliance forms, installation forms, and record of quality assurance review. The CEC may adopt an Application Programming Interface (API) for providing data electronically. Within one year of development of an API, the ATTCP's electronic database system shall have the ability to transfer project data to the CEC through the API upon completion of the project or at established intervals no longer than monthly to its electronic system with the authority to visually inspect all records.

NA1.9.3, section e:

e. The ATTCP shall ~~provide all~~ submit annual summary reports regarding ~~duct leakage~~ acceptance test compliance documents ~~as requested by the Energy Commission staff~~ in compliance with Title 24, Part 1, Section 10-103.1, subsection (d)(1).

JCEEP appreciates the opportunity to provide these comments.

Sincerely,



Thomas A. Enslow
Counsel for the Joint Committee
on Energy and Environmental Policy

TAE:lj1