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Written and Oral Comments Received:
Commercial and Industrial Fans and Blowers
Title 20, Sections 1802, 1860 through 1870
February 25, 2022, through April 29, 2022
&
Public Hearing Comments April 12, 2022

Commenter(s) Name(s)	Comment type	Organization	Assigned number
Michael Ivanovich	Public hearing comment	Air Movement and Control Association (AMCA)	1
Patrick Eliert	Public hearing comment	Pacific Gas and Electric Company (PG&E)	2
Laura Petrillo-Groh	Public hearing comment	Air Conditioning, Heating, and Refrigeration Institute (AHRI)	3
Armin Hauer	Public hearing comment	Ebm-papst	4
Jeremy Dunklin	Public hearing comment	Appliances Standards Awareness Project (ASAP)	5
Tom Catania	Public hearing comment	Consultant for AMCA	6
Laura Petrillo-Groh and Michael Ivanovich	Joint written comment	AMCA and AHRI	7
Jeremy Dunklin and Amber Wood	Joint written comment	Associate Standards Awareness Project (ASAP) and American Council for an Energy-Efficient Economy (ACEEE).	8
Michael Ivanovich, Laura Petrillo-Groh, and Nicole Dunbar	Joint written comment	AMCA, AHRI, and Northwest Energy Efficiency Alliance (NEEA)	9
Karen Klepack, Kate Zeng and Patrick Eilert	Joint written comment	Southern California Edison, San Diego Gas and Electric Company, and PG&E. (CAIOUs)	10

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
1.1	… AMCA respectfully requests that CEC extend the review/comment period for three weeks, from April 11, 2022, to May 2, 2022. …	Comment acknowledged. Comment accepted. Comment period was extended to April 29, 2022.
2.1	… PG&E respectfully requests that the deadline for submitting comments to Docket Number 22-AAER-01 be extended to April 26, 2022, two weeks after the public hearing scheduled on April 12, 2022. …	Comment acknowledged. Comment accepted. Comment period was extended to April 29, 2022.
3.1	… The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) respectfully requests that the California Energy Commission (CEC) extend the public comment period for an additional 21 days, to Monday, May 2, 2022, to provide stakeholders adequate time to properly respond to the regulatory package and 45-day language regarding Appliance Efficiency Regulations for Commercial and Industrial Fans and Blowers issued February 25, 2022. …	Comment acknowledged. Comment accepted Comment period was extended to April 29, 2022.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
4.1	**greater or equal FEI** Highly efficient fans of certain aerodynamic characteristics or of limited structural strength may not be operable where FEI equals 1.00. The "equal sign" therefore ought to be substituted with the "equal or greater sign" in (a) the illustration, (b) regulatory language § 1606 Filing by Manufacturers, and (c) § 1607. Marking of Appliances. - see my markup of today's presented illustration attached AMCA 214 Annex H describes all related scenarios well.	Table X in section 1606 and the labeling requirements in section 1607 have been revised to no longer require the demonstration of a specified FEI. Instead, the CEC has added definitions derived from Annex H of the test procedure for the Maximum airflow, Maximum Pressure, and Maximum fan speed with a minimum FEI requirement equal or greater than 1.
5.1	This is Jeremy Dunklin with the Application Standards Awareness Project. We are pleased CEC has moved forward with proposed regulations for commercial and industrial fans and blowers. CEC's staff report estimates that the proposed regulations will result in energy savings of nearly 1,800 gigawatt hours per year after full stock turnover and will result in a net benefit of over $5 billion for California businesses and industry. CEC's proposal is generally consistent with the 2017 joint proposal we submitted along with AMCA and other efficiency advocates. We support CEC's approach that focus is primarily on improved fan selection to increase efficiency. We will provide more specific comments and any recommended edits to the regulatory language in our written comments	Comment acknowledged.
1.2	AMCA has been carefully reviewing the draft regulatory language. And although we are not ready to submit comments, we would like to make a few clarifications for the record and mention a few areas that we believe need some additional work. The clarifications are that the staff report refers to two and possibly three labels that could be required in the	The express terms reflect the operative proposed regulatory language and supersede concepts identified in the Staff Report. The proposed language includes a simple single label.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	regulation. However, the draft clearly requires one label and that is what we call a nameplate or a permanent label. We ask that CEC clarify that only the nameplate or its equivalent are needed.	
1.3	Another minor clarification is in the requirement that manufacturers provide test reports for a subject fan to the Commissioner within five days of being asked. Because the regulated language will allow calculated ratings per Annex E of AMCA 214, it would be helpful for CEC to stipulate that for calculated ratings, documentation of the calculations would be permissible.	Staff is not proposing to make any changes to section 1608(c)(1) in this rulemaking and, therefore, this comment is outside of the rulemaking scope. Staff notes that manufacturers are responsible for keeping and maintaining up-to-date records of products sold or offered for sale in California and certified to the CEC's database. Manufacturers should be prepared to provide the information used as the basis for a product's certification within 5 calendar days to the Executive Director. This requirement applies to all products sold or offered for sale in California.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
1.4	Another part of the regulation that AMCA will comment on is the requirement that language that prohibits manufacturers from providing performance data for any duty point where the FEI is less than one. The ability to see the entire curve allows the engineer to answer important questions about the fan selection with respect to the other air systems components, such as dampers and ducts, with respect to maximum pressure and how close is the design operating point to the stall point. Stall points are a safety issue because if the installed operating pressure is greater than the designed operating pressure the fan could shift operation into stall, resulting in increased sound, unstable operation, or even catastrophic failure of the fan.	CEC has removed Section 1607(d)(16)(B) from the proposed regulatory language.
3.2	But for those situations, it is helpful to have information that may be below FEI of one as it relates to the operation and safety of equipment, and, also, I think it helps for the same literature to be more broadly used across the country. So we would support that publication for FEI below one.	CEC has removed section 1607(d)(16)(B) from the proposed regulatory language. See response to comment 8.1 for additional information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
3.3	Staff had very excellent insight in the report, noting that replacement embedded fans would also need to be able to continue to be installed in products that are in the field and that those are intended within the staff report to be excluded from regulation. And we would like to see the regulatory language also reflect that situation as well.	Embedded fans are not included in the regulation and not subject to this section. The definitions for Commercial and industrial fan or blower does not include embedded fans as defined in ANSI/AMCA 214-21. Units sold exclusively as replacement embedded fans fall under the embedded fan category and are exempt, consistent with the commenter's recommendation.
6.1	And I would encourage California, in this case, to continue that same practice. You know, the president announced a month ago, I believe, the Clean Air in Buildings Challenge. And we've participated actively and created white papers describing the important role that air movement plays in healthy buildings. And we would hope that California would help to lead the way in the process of developing not only a national but a statewide strategy in doing the retrofits, and also adjusting building codes to continue to drive as much air movement as possible to not only make	Comment Noted. The comment is outside the scope of the rulemaking and relates to air quality in buildings and incentive programs, not to minimum testing and disclosure standards.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	the buildings efficient and the systems that are attached to them, which this regulation addresses, but also as healthy as possible. California, obviously, led the way on some things like the economizer systems bringing in outdoor air, and so forth. And you know, to the extent that federal or state resources might be available for closer monitoring of those systems, ensuring that they're effective, and then bringing in new systems that make our buildings healthier, as well as more efficient, we think that's a real win-win.	
4.2	Ebm-papst is a manufacturer of motorized fans. Our global headquarters is in Germany. Locations of our factories include Connecticut and Tennessee. Broadly speaking, we are in favor of CEC's approach to the application regulation for commercial and industrial fans. I agree with Mike Ivanovich's explanations and talk earlier today. We agree to using the fan energy index, FEI, as a metric for regulation. But there's an elephant in this room. We have to point out that the manufacturer's expectations is that CEC adopts fan performance tolerance allowances according to established standards. We encourage the CEC to acknowledge Standard 13348 of the International Standards Organization, ISO, or AMCA publication 211. AMCA 211 is especially helpful because it specifies how tolerance limits of fan output performance and tolerance limits for fan electrical power are intertwined. The draft regulatory language does not touch that subject at all.	CEC staff has concluded that the purpose of AMCA 211-22 is for AMCA's fan re-certification program by conducting a check-test for the CIFB. Because of the scope of AMCA 211-22 and ISO-13348 and because the tolerances of both would loosen the duty points for certification, CEC staff has decided to not include AMCA 211-22 nor ISO-13348:2007 as part of the proposed regulation because it would not effectively achieve the goals of the rulemaking.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
1.5	I think the one thing I could offer at this point, if this is an opportunity for any kind of discussion on this topic at all, beyond the regulation itself that was in the regulatory language, AMCA and its members, we've had several meetings and always the question arises, you know, since this is our first time being regulated, you know, as an industry for commercial and industrial fans, we're not certain of what we know. We don't know what we don't know sort of thing. And we were wondering if the CEC has resources that they could provide on some kind of organized scheduled basis to work with AMCA staff and members to help let us know about what's in Title 20 that, you know, that's not in the draft or the regulatory language that we have in front of us? You know, we can read it, but that doesn't necessarily mean we know exactly what it means or how to comply with the regulation once it's enforced. Does CEC have those kinds of resources that they could make available to AMCA?	This comment does not specifically address the text of the proposed regulatory language but relates more to CEC compliance support and education. The purpose of staff outreach, workshops on the proposed regulations and public comment periods is to obtain stakeholder feedback to ensure clear regulatory language. Staff has made multiple changes to the regulatory text in response to comments from the three separate comment periods to eliminate ambiguous text. The CEC provides outreach and education and has a unit responsible for developing information on how to comply with the proposed regulations. After adoption, the CEC will prepare fact sheets and provide workshops for interested stakeholders 1 to 2 months prior to the effective date of the regulation. All outreach and education information of current and past regulations can be found at the bottom of our webpage: "Appliance Efficiency Regulations- Title 20". In addition, the CEC offers continued assistance to stakeholders on adopted regulations through our appliance regulations certification assistance unit. Their webpage "Appliance Regulations Certification Assistance" provides information and training and education for

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
		CEC's Modernized Appliance Efficiency Database System (MAEDbS).
3.4	Just to sort of supplement Mike's question on education for not only the trade organizations that regularly work with members to help certify and, in some cases, submit ratings on their behalf, I think understanding CEC's – you know, for stakeholders to understand CEC's expectations regarding compliance with Title 20 may be particularly helpful for an industry, you know, where the significant portion has not experienced regulations before, so really going through those educational aspects of, you know, what manufacturers are expected to retain in terms of data, submit to CEC, the schedule on which they submit, what the templates/data templets look like might be something that would be – that I can see being helpful. And I would just want to offer that suggestion, that if CEC would hold additional compliance sessions, that I think that there would be manufacturers that would be interested in attending since, you know, fans are global commodity and, you know it is. And the associations will certainly do all we can to help with our members' compliance to these rules. However, not all manufacturers are members and not all of our members use to certify equipment through us. So making sure, broadly, manufacturers have the accessibility to that information would be helpful as you finalize this rule.	The CEC provides outreach and education and has a unit responsible for developing information on how to comply with the proposed regulations. See response to comment 1.5 above.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
4.3	A little bit on a topic that Michael already touched on. How do we deal with international catalogs? You know, there might be some people operating on a Canadian catalog or like a British-English catalog. How would California be able to control information in the state that's coming from abroad or somewhere?	CEC has removed section 1607(d)(16)(B) from the proposed regulatory language. See response to comment 8.1 for more information.
7.1	Problematic regulations of one component product can have ramifications to other components. AMCA and AHRI, along with the Northwest Energy Efficiency Alliance (NEEA). We fully support the comments and would like to raise one additional concern on the matter: Replacement fans in HVACR and water heating equipment also warrant a scope exemption. HVACR and water-heating equipment is built, tested, and certified as a completed design that is reliant on a specific set of components. Changing these components in turn changes the performance of the equipment. In many cases, such as supply-air fans with air flow through gas fired heat exchangers, hot-water, coils or electric resistance units, a variety of safety standards in addition to performance standards are affected. The testing of all legacy equipment because of a fan change will be cost- and resource-prohibitive. If a replacement fan is not compliant then, in most cases, an unsafe, engineered-to-fit substitution would be required. The costs, risks, and time required to retest the HVACR and water-heating would all be prohibitive. Testing would also be impractical if the HVACR and water heating equipment is out of production. Manufacturers would be forced to rebuild an out-of-production unit solely for the purpose of testing a new fan. There may be instances in such part	Comment acknowledged; no change made. Fans or blowers sold as an "embedded fan", as defined in AMCA 214-21, either if new or a replacement, are not subject to the proposed requirements under the regulation since all fans sold as "embedded fans" are excluded from the proposed definition for a commercial and industrial fan or blower. CEC staff believes the proposed definition is sufficiently clear that replacement embedded fans are exempt from the regulation.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	substitution makes sense, but that is not a reasonable basis for a broad, minimum standard. AHRI recommends that CEC clearly exempt fan blades, impellers, wheels, and other components used to repair/replace fans in existing HVACR and water heating equipment by modifying the proposed definition of “Commercial and industrial fan and blower” in Title 20, CCR Section 1602, Definitions, shown as highlighted and underlined, below: (1) Commercial and industrial fans and blowers do not include: (G) embedded fans as defined in ANSI/AMCA 214-21, including embedded fans sold for replacement purposes Although our belief is that while CEC did not intend to target replacement fans with this proposal, we are very concerned that significant impacts will result if no changes are made to the regulatory text. CEC acknowledges in Chapter 3 of the Staff Report that: Embedded fans are exempt from the proposed regulations because the fan is either manufactured by an OEM who embeds the fan in a piece of equipment where the main function is something other then the movement of air, or because it is manufactured for the purpose of being embedded into an appliance after market.	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
7.2	We understand this as CEC recognizing that replacement embedded fans must also be clearly exempted from this proposed regulation. It cannot be overstated that there would be significant safety issue if one tried to replace a fan in a product with seismic certification or gas or electric heat with a different fan. This would void all safety listings based on safety standards and the warranty.	See above response to comment 7.1.
7.3	We understand this as CVEC recognizing that replacement embedded fans must also be clearly exempt from this proposed regulation. It cannot be overstated that there would be significant safety issues if one tried to replace a fan in a product with seismic certification or gas or electric heat with a different fan. This would void all safety listing based on safety standards and the warranty. AMCA and AHRI would also like to propose changes regarding the subject of post-certification surveillance – specifically, the results of a post-certification test compared to published data developed from a previous test. As referenced in the proposed regulatory language, ANSI/AMCA Standard 214-21, Test Procedure for Calculating Fan Energy Index (FEI) for Commercial and Industrial Fans and Blowers, provides a method of calculating the FEI metric and developing ratings from those test values. For background, a test requires a series of measurements resulting in data sets called determinations. A determination consists of volumetric flow rate, fan pressure, fan air density, input power, and speed. The results of a fan test are represented as plots. Test results typically are “corrected” (converted) to a similar density for comparison across	CEC staff has concluded that the purpose of AMCA 211-22 is for AMCA’s fan re-certification program, and chapter 10 of AMCA 211-22 does not include a comparison method for certification, rather it specifies that the tolerances of AMCA 211-22 are used to compare the test results to of AMCA 211-22 to the catalog data, a different scope than the proposed test procedure. In addition, the tolerances of AMCA 211-22 would loosen the duty points and reflect a different maximum efficiency boundary than that of proposed test procedure AMCA 214-21. Therefore, CEC staff has decided to not include or reference AMCA 211-22 as part of the proposed regulation for CIFB.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	determinations using equations from physics commonly referred to as the “fan laws”. Converting determinations to the same density communicates the other components (flow, pressure, power) in an equivalent manner and enables comparison. With some fan motors, it is common for the speed to change significantly across the fan curve. Fans in these cases typically are tested in a wire-to-air manner. For a non-wire-to-air test, determinations typically are corrected to a single speed value using the fan laws. This allows the highest degree of comparison across determinations and allows data to be plotted on an industry-standard flow-pressure plot. Additional information (e.g. speed) is not required for the determinations. When a different fan is tested for comparison to ratings developed from the original test, the test determinations are not likely to match identically, even though all the determinations may be compliant when FEI is calculated. The primary reason for this challenge is that, for two determinations to be compared, their flow and pressure need to be identical. With matching flow and pressure values, corresponding FEI values can be compared directly. Despite his or her best efforts, the individual conducting a test is unlikely to be able to match both flow and pressure because the fans will have slight manufacturing differences that result in slight variances in performance. This point is well-illustrated in figures 10.2 and 10.2 of AMCA Publication 211-22, Certified Ratings Program Product Rating Manual for Fan Air Performance, which are reproduced below. A detailed explanation of a performance test passing within tolerance is explained	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	in Section 10 of AMCA Publication 211-22. A PDF copy of AMCA Publication 211-22, which is available at no cost to the public at www.amca.org/store, is provided with these comments. The resulting question, thus, is how can one compare the determinations of a test to those of a previous test? AMCA proposes using the compliance mechanism in AMCA Publication 211-22, specifically Section 10, "Check Tests" AMCA Publication 211-22 recently was updated to include several AMCA members' recommendations for data accuracy and validity using the ANSI/AMCA standards 210/ASHRAE Standard 51, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating, test procedure. The test tolerances identified in AMCA Publication 211-22 are a simple yet powerful means of accounting for manufacturing and test uncertainties. AMCA recommends the addition of a provision referencing AMCA Publication 211-22 Section 10 to provide a mechanism for making a determination regarding a tested product's performance in accord with the performance certified by the manufacturer but defers to CEC regarding the best way and the best place in California regulatory language to incorporate this change.	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
8.1	We are pleased that the Energy Commission has moved forward with proposed regulations for commercial and industrial fans and blowers. The staff report estimates that the proposed regulations will result in energy savings of nearly 1800 GWh/yr after full stock turnover and will yield net benefits of over $5 billion for California businesses and industries. CEC's proposal generally consistent with the 2017 joint proposal for standalone fans that we submitted along with AMCA and other efficiency advocates. We support CEC's approach that focuses primarily on improved fan selection to increase efficiency. However, we encourage CEC to address several issues in the proposed regulations. Specifically, we encourage the Energy Commission to ensure that manufacturer selection software is addressed under the proposed requirements regarding marketing information. As noted above, improved fan selection is the primary driver for the anticipated energy savings from the proposed regulations. Thus, we believe that it is important to require that manufacturer selection software only return fan selections that are compliant at the user's design point that is input into the software. In the proposed regulations, CEC is proposing that "No marketing or catalog information shall provide performance data for any duty point where the FEI is less than 1.0." However, it is not clear that this requirement applies to selection software. Therefore, we encourage CEC to ensure that manufacturer selection software is addressed under the proposed requirements regarding marketing information to help ensure that purchasers are selecting compliant fans at the design point.	CEC staff removed Section 1607(d)(16)(B) from the proposed regulatory language. Staff determined that the marketing and catalogue requirements will not result in significant efficiency savings, whether implemented for physical catalogs or for online product catalogues or directories.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
8.2	We encourage the Energy Commission to remove “at FEI=1.0” in the manufacturer filing and marking requirements regarding maximum speed, maximum airflow, and maximum pressure. Sections 1606 and 1607 of the proposed regulatory language specify manufacturer filing and marking requirements, respectively, that include maximum speed at FEI=1, maximum airflow at FEI=1, and maximum pressure at FEI=1. We are concerned that including the phrase “at FEI = 1.0” could be interpreted as allowing manufacturer to include higher speed, airflow, and/or pressure values on the label in addition to those values at FEI=1. For example, we are concerned that under CEC’s proposal, a manufacturer could include both the maximum speed at FEI = 1 as well as some higher maximum operating speed on the label, which would undermine the intent of the standards. In addition, we believe it makes sense to allow manufacturers to report conservative values for maximum speed, airflow, and pressure (i.e., values associated with an FEI greater than 1). AMCA 214 defines “maximum fan speed” as the maximum reported value for fan speed that meets or exceeds the required minimum FEI for at least one duty point. AMCA 214 also includes similar definitions for “maximum airflow” and “maximum pressure.” Consistent with our proposed definitions for “maximum rated speed”, “maximum rated airflow”, and “maximum rated pressure” in our joint comments submitted with AMCA on the draft staff report, we encourage CEC to use the terms in Annex H of AMCA 214 for the manufacturer filing and marking requirements. Specially, we suggest that CEC use the following	After review of all the comments received under this subject, Table X has been revised and will not reflect the FEI = 1.00 as part of the table or required information for certification. Rather, the CEC has added definitions derived from Annex H for the Maximum airflow, Maximum Pressure, and Maximum fan speed with a minimum FEI requirement equal to or greater than 1.00. References to these definitions have been included in section 1606, Table X, and section 1607. Additionally, staff changed the data required for certification and the data required on the label to be consistent with these definitional changes. See responses to comments 9.14 and 9.13 below for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	terms and definitions based on AMCA 214 and our previous joint comments: - Maximum airflow means the maximum manufacturer-declared value for airflow in cubic feet per minute at standard air density that meets or exceeds an FEI of 1.0 for at least one duty point. - Maximum pressure means the maximum manufacturer-declared value for fan pressure in inches water gauge at standard air density that meets or exceeds an FEI of 1.0 for alt least one duty point. - Maximum fan speed means the maximum manufacturer-declared value for fan speed in revolutions per minute that meets or exceeds an FEI of 1.0 for at least one duty point. In summary, we propose that the terms “maximum air flow (SCFM) at FEI=1.0”, maximum speed (RPM) at FEI=1.0”, and “maximum pressure (inches water gauge) at FEI=1.0” in Section 1607 be replaced with “maximum airflow”, “maximum pressure”, and “maximum fan speed” respectively, with these terms, based on our proposed definitions above, defined in Section 1602. We also propose that the same terms be sued in section 1606. We believe this clarification would help advance the goal of improved fan selection by attempting to ensure that the maximum fan speed, airflows, and pressures listed on labels correspond to values associated with an FEI of at least 1.0.	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
8.3	We encourage the Energy Commission to consider changes to the manufacturer filing and marking requirements pertaining to operating point information relevant to the reported FEP, maximum speed, maximum airflow, and maximum pressure. CEC is proposing to include “FEP at FEI=1.0” in both the manufacturer filing and marking requirements. However, many fans and blowers on the market will be compliant at multiple operating points. Thus, it is unclear how the section 1606 and 1607 requirements for reporting FEP at FEI = 1.0 would be reported for fans with multiple compliant operating points. In addition, absent additional operating point information beyond maximum speed, maximum airflow, and maximum pressure, it may be difficult for CEC to verify that the maximum values are indeed compliant operating points (i.e. FEI >= 1.0). However, if for example, the pressure and FEP were reported at the maximum airflow, then compliance at this reported maximum airflow could be easily verified. Furthermore, we believe that reporting FEP at both maximum airflow and maximum pressure may be more useful and feasible than reporting FEP at FEI=1.0. Specifically, CEC could consider removing FEP at FEI=1.0 filing requirement and adding the following to the required filing information: - Fan pressure at the maximum airflow operating point as defined above - Fan FEP at the maximum airflow operating point as defined above - Fan airflow at the maximum pressure operating point as defined above - Fan FEP at the maximum pressure operating point as defined above	After review of all comments received for proposed changes to the data required for certification on Table X, CEC staff has modified Table X to address and clarify the data required for certification. Additionally, CEC staff has updated the information required for the label pursuant to section 1607. See responses to comments 9.13, 9.14, and 9.22 below for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	Additionally, CEC could consider removing the FEP at FEI=1.0 marking requirement and adding the following to the required marking information: - Fan FEP at maximum airflow operating point as defined above - Fan FEP at the maximum pressure operating point as defined above.	
9.1	All representations of fan energy index (FEI) should be expressed to two decimal places (e.g., 1.0 should be 1.00). AMCA realizes the two-decimal-place representation is specified in neither ANSI/AMCA Standard 214-21, Test Procedure for Calculating Fan Energy Index (FEI) for Commercial and Industrial Fans and Blowers, nor its parent standard, ANSI/AMCA Standard 208-18, Calculation of the Fan Energy Index. AMCA staff have submitted comments on the matter for both standards, and, thus, in the standards' next review cycle, the two-decimal-place representation will be stipulated. For further reasoning on this change, in the comments to DOE Docket: EERE-2012-BT-STD-0045, RIN 1904-AE9(Aug. 6, 2021), AMCA stated it supports the rounding of ceiling-fan-energy-index (CFEI) values to the rearrest hundredth. The U.S Department of Energy (DOE) proposed that CFEI values be rounded to the nearest hundredth in the proposed rule.	All reference to the FEI=1.0 in the regulatory language has been changed to reflect 1.00 rather than 1.0, consistent with the commenter's recommendation. See responses to comments 9.14 and 9.13 for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.2	AMCA asks that CEC admit an interpolation method that is not yet in ANSI/AMCA Standard 214-21 Annex H but was developed for the recently issued in AMCA publication 211-22, Certified Ratings Program Product Rating Manual for Fan Air Performance. For calculating a fan rating based on data from a fan of another size, Annex H allows only calculation of the performance of a larger fan from a test of a smaller fan (i.e., smaller fans can be sued to rate larger fans). Publication of ANSI/AMCA Standard 214-21 preceded that of AMCA publication 211-22 which now has the option of standardized interpolation between two tested sizes. Believing manufacturers should have access to all tools of AMCA publication 211-22, AMCA advises CEC to add the new interpolation method to the Title 20 fan regulation. This can be done by referencing the interpolation in AMCA Publication 211-22 and adding the publication citation to the referenced documents in the standard. Alternatively, the exact language of interpolation could be added to the regulatory language. For convenience, AMCA provided a copy of AMCA publication 211-22 with this comment submission AMCA believes adding this interpolation will require a small change to the compliance filing parameters which are addressed in comments on Section 1606 below. AMCA notes that if this recommendation to add the interpolation method is granted and the way the interpolation will be utilized is by referencing AMCA publication 211-22, then a reference to AMCA Publication 211-22 will be needed in the appropriate sections of Title 20.	CEC staff did not find there to be a need to include the interpolation method described in AMCA 211-22 Annex I. Annex I clearly indicates that the method is used to convert tested fan data to published performance ratings which is a different scope and intent than the proposed regulatory language. See response to comments 7.3 and 4.2 above for more information. Therefore, CEC staff did not include AMCA 211-22 in the proposed regulations.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.3	Comment 1601.1 In embedding the scope of the regulation with respect to fan sizes and exclusions within the definition of "commercial and industrial fans and blowers", CEC veered from the DOE definition of "fans and blowers" contained in a notice of final determination published in the Federal Register on Aug. 19, 2021. After reviewing CEC definitions of other regulated product is optional. AMCA recommends that CEC use a separate scoping statement to define the power of fans that are covered and list the exclusions. With DOE appearing to fully intend to complete the fan rulemaking it started in 2021, harmonizing with DOE on the definition of covered product seems practical. Similarly, in the commentary within the final determination, DOE rationalizes that fans and blowers are equivalent terms and, thus, can be used interchangeably. DOE also rationalizes that the terms "commercial" and "industrial" do not provide utility, as they are application-based terms with no distinguishing definitions. Thus, "commercial and industrial fans and blowers" can be simplified to "fans" or "fans and blowers." Given that the determination is final, AMCA recommends CEC adopt the same practice. Following are relevant excepts from DOE's final determination: *Consistent with DOE's acknowledgement, the Working Group commented that the terms "fan" and "blower" are used interchangeably in the U.S. market and suggested eliminating the term "blower" to avoid potential confusion. (Docket No. EERE-2013-BT-STD-0006; Public Meeting Presentation, No. 106, at p. 47)* *To the extent that a blower would meet the criteria in the proposed definition, it is a fan. As such, DOE is not considering further a separate definition for "blower".*	Federal regulations issued by the DOE, which covers fans and blowers, include the terms "commercial and industrial" as sections of their regulations, California Code of Regulations, title 20, do not contain specific "commercial" and "industrial" sections. To ensure clarity, CEC staff is proposing in section 1602, a specific definition of "commercial and industrial fan or blower" to describe the specific products that are subject to or exempt from the regulations. CEC staff has incorporated the language provided in part 431.172 of title 10 of the Code of Federal Regulations for "fan or blower" in addition to the limits and the list of exclusions to the definition for a commercial and industrial fan or blower. Therefore, CEC staff will continue to use "commercial and industrial fans and blowers" as the covered equipment set forth in the scope of the regulations at section 1601, and the term "Commercial and industrial fan or blower" for what defines the appliance in section 1602.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	… In this final rule, DOE is no longer including the description "commercial and industrial" with the term "fan", since DOE has determined that this language is redundant, given the statutory definition of "industrial equipment" in 42 U.S.C. 6311(2). In addition, as noted above, comments also raised questions as to whether including "commercial and industrial" would provide more clarity and provoke more uncertainty. The definition of "industrial equipment" explicitly excludes covered products, other than a component of a covered product. (42. U.S.C. 6311(2)(A)(iii)) Therefore, the inclusion of "commercial and industrial" is not necessary to clarify the exclusion of ceiling fans and furnace fans, both covered products defined at 10 CFR 430.2. Should CEC accept DOE's rationale and seek consistency with the final determination, the term "commercial and industrial fans and blowers" can be simplified as "fans" throughout the regulation. AMCA defers to CEC as to how best to integrate this recommendation into the language of 1601.	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.4	1601 Scope [Add the following where CEC determines it best fits] Fans shall have a rated fan shaft power greater than or equal to 1 horsepower or, for fans without a rated shaft input power, an electrical input power greater than or equal to 1 kW and a fan output power less than or equal to 150 horsepower. (1) Commercial and industrial fans and blowers do not include: (A) safety fans as defined in Section 1602(d) of this Article, (B) ceiling fans as defined in 10 CFR 430.2, (C) circulating fans, (D) induced-flow fans, (E) jet fans, (F) cross-flow fans, (G) embedded fans as defined in ANSI/AMCA 214-21, (H) fans mounted in or on motor vehicles or other mobile equipment, (I) fans that create a vacuum of 30 in. wg or greater, (J) air-curtain units as defined in Section 1602(d) of this Article.	To maintain the existing structure of the CEC's appliance regulations covering the scope and definitions set forth in California Code of Regulations, title 20, sections 1601 and 1602, the requested edits providing product details are contained in the definition section. Thus, no changes to the proposed regulations are necessary.
9.5	Comment 1601.2 AMCA notes that, in the proposed regulatory language, under the referenced documents in Section 1601, the words "Air Movement and Control" are missing from the reference to AMCA International.	CEC has changed the reference language for section 1601 to reflect the Air Movement and Control Association International, Inc.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.6	Comment 1602.1 As explained in the comments on scope, AMCA recommends inserting the exact definition of “fan” established by DOE in the final determination so there is a single and legally enforceable definition of “fan” in all U.S. fan regulations. That definition is: “Fan” means a rotary bladed machine used to convert electrical or mechanical power to air power, with an energy output limited to 25 kilojoule (kJ)/ kilogram (kg) of air. It consists of an impeller, a shaft and bearings and/or driver to support the impeller, as well as a structure or housing. A fan or blower may include a transmission, driver, and/or motor controller.	Due to the CEC’s regulations set forth in Title 20 not containing specific sections covering “industrial” and “commercial” products, the proposed regulations include these descriptors directly in the scope and definitions sections. However, CEC staff has incorporated the language provided in the federal definition of fan to the definition for Commercial and Industrial fan or blower. See response to comment 9.3 for more information.
9.7	Comment 1602.2 The AMCA Air Curtain Engineering Committee reviewed the proposed definition of “air curtain unit” and recommends adding “minimum width-to-depth aspect ratio” to distinguish air-curtains from other products appearing to have a similar use, application, or appearance as follows: “Air curtain unit” means equipment ~~providing~~ that produces a directionally controlled stream of air with a minimum width-to-depth aspect ratio of 5:1 and a discharge that is not intended to be connected to unitary ductwork. The controlled stream of air spans ~~moving across~~ the entire height and width of an opening ~~that~~ and reduces the infiltration or transfer of air from one side of the opening to the other and/or inhibits the passage of insects, dust, or debris.	Comment accepted, CEC staff has made the necessary edits to the definition for air curtains unit to the proposed regulations for commercial and industrial fans and blowers.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.8	Comment 1602.3 AMCA recommends modifying the definition of "centrifugal unhoused fan" to account for the fact that fan arrays do not always have partition walls separating individual fans: "Centrifugal unhoused fan" means a fan with a centrifugal or mix-flow impeller in which airflow enters through a panel and discharges into free space. Inlets and outlets are not ducted. This fan type also includes fans designed for use in fan arrays that <u>may or may not</u> have partition walls separating fans from one another. Because the definition of centrifugal unhoused fan in Title 20 is similar to the one in ANSI/AMCA Standard 214-21, AMCA staff will suggest the change to be made during the next revision of ANSI/AMCA Standard 214.	Comment acknowledged; no change made.
9.9	Comment 1602.4 AMCA notes the need for an editorial correction under the definition of "Power roof ventilator (PRV)": "Power roof ventilator (PRV)" or "power wall ventilator (PWV)" means a fan with an internal driver and a housing to prevent precipitation from entering the building. It has a base designed to fit over a ~~rood~~ roof or wall opening, usually by means of a roof curb.	Comment accepted, CEC staff has made the necessary edits to the definition of power roof ventilator or power wall ventilator to the proposed regulations for commercial and industrial fans and blowers.
9.10	Comment 1602.5 The definition of "safety fan" used by CEC was developed about four years ago in response to the draft staff report and has been a source of contention for much longer. Since the 2018 report, the thinking of AMCA members has evolved. As a result, AMCA	CEC staff has implemented the requested change to item 1 and has removed the word "only" since it is not needed. CEC staff has accepted the addition of item 2 and has removed the word "conditions" and substitute it with the word "condition".

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	recommends the draft regulatory language be revised as follows: "Safety Fan" means: (1) A fan that is designed and marketed to operate at or above 482 degrees Fahrenheit (250 degrees Celsius); (2) A reversible axial fan in cylindrical housing that is designed and marketed for use in ducted tunnel ventilation that will reverse operations under emergency ventilation condition; (3) A fan bearing an Underwriter Laboratories or Electric Testing Laboratories listing for "Power Ventilators for Smoke Control Systems"; (4) A laboratory exhaust fan; (5) A fan for use in explosive atmospheres tested and marked according to EN ISO Standard 80079-36:2016, Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements; or (6) an electric-motor-driven Positive Pressure Ventilator as defined in ANSI/AMCA Standard 240-22 Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating. The rationale for removing the word "only" from item 1 is that fans designed to operate at elevated temperatures – as referenced by this definition – are designed to operate at a wide variety of temperatures during the normal operating cycle. For example, in oven system, a fan must be able to operate at or above 482 degrees Fahrenheit because the system is expected to operate at or above that temperature for at	Due to potential ambiguities with the original proposed regulatory text covering the item 3, Power Ventilators for Smoke Control Systems, CEC staff removed the language from the proposed regulation. In, addition CEC staff is removing item 3 from the proposed language since there is no clear difference between a Power Ventilator and a Power roof or wall ventilator. Further, the UL certification is a design feature with no impact to the performance of the commercial and industrial fan or blower. CEC staff did not include the proposed language for item 4. CEC staff removed the language for item 4 due to potential clarity issues and because it was not the intent of the staff to exclude laboratory exhaust fans as part of the definition of "safety fans". Since CEC staff removed item 4 from the definition of Safety fan, the proposed definition for "laboratory exhaust fan" was not be included into the proposed regulatory language. The CEC has implemented the edits listed as item 5 of the comment received and included the changes in the 15-day language as new proposed language in item 3. Item 3 of the new proposed language correctly references EN ISO standards 80079-36:2016 as written in item 5 of the comment. CEC staff agrees with the

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	least part of its operating cycle. During non-heat segments of the operating cycle, it is common for the fan to operate well below the high-temperature design requirement. Consequently, AMCA requests the word "only" be removed from the definition. The rationale for changing Item 4 is that AMCA believes the proposed regulatory language is vague and open-ended and was intended to describe a "laboratory exhaust fan" without naming it. The 3,000-fpm discharge velocity with integral discharge nozzles appears to reference similar verbiage in ANSI/AIHA Z9.5, Laboratory Ventilation, and recommended exhaust velocities for safely exhausting contaminants without re-entrainment. It seems that laboratory exhaust fans would be considered safety fans regardless of exhaust velocity for the simple fact they service laboratories requiring numerous safety protocols for the protection of occupants and the surrounding area. AMCA, thus, believes the proposed regulatory language and supporting information indicate laboratory exhaust fan should be excluded and proposes using the term "laboratory exhaust fan". Additionally, AMCA recommends adding the ANSI/AMCA standard 214-21 definition: "Laboratory exhaust fan" means a fan designed and marketed specifically for exhausting contaminated air vertically away from a building using a high-velocity discharge. The rationale for removing item 5 is that AMCA recognizes the spark-resistant-construction types defined in ANSI/AMCA Standard 99-16, Standards	rationale of removing item 5 from the current proposed language due to the loophole explained in the comment and because it is a design requirement that will not impact the performance of the commercial and industrial fan or blower. The proposed language for item 5 referencing ACMA Standard 99-16 was removed at the end of section. CEC staff has reviewed the definition provided for Positive Pressure Ventilator (PPV) in the comment and the definition in ANSI/AMCA standard 240-15 and in pending AMCA 240-22 which has not been published. CEC staff incorporated the definition from AMCA 240-22 identified in the comment into the proposed regulation. CEC staff edited the proposed langue item 7 and remove the phrase "electric-motor driven" since it is only a descriptor of how the Positive Pressure Ventilator is driven and moved the phrase into Item 4 of the definition for Safety Fans.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	Handbook, are not consistent industry standards. Exempting spark-resistant fans also is somewhat of a loophole in that a fan should be able to be designed to different types of spark-resistant construction with no impact on performance. For these reasons, AMCA recommends striking this item along with the ANSI/AMCA Standard 99-16 mention in the referenced-documents portion of this section. ~~ANSI/AMCA Standard 99-16 Standards Handbook~~ AMCA's comment on CEC's proposed Item 6 (AMCA's Item 5) is as follows: The reference to UNE-EN 13463-1:2001, Non-electrical equipment for use in potentially explosive atmospheres – Part 1: Basic method and requirements, no longer is valid. The 2001 edition was replaced with the 2009 edition and later the EN 13463 series of standards was replaced with a series of EN ISO 80079 standards. UNE-EN 13463-1 essentially was replaced with BS EN ISO 80079-36:2016, Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements. Additionally, AMCA found that BS EN 14986:2017, Design of fans working in potentially explosive atmospheres, seems to have the most relevant information about the characteristics of explosion-proof fans; however, that standards refer to BS EN ISO 80079-36:2016 for the correct way to mark explosion-proof fans. Because the proposed definition of safety fan is concerned with marking only explosion-proof fans, BS EN ISO 80079-36:2016 is the correct citation. The rationale for changing CEC's proposed Item 7 (AMCA's Item 6) is that an updated version of	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	ANSI/AMCA Standard 240, Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating, should be released in 2022, and AMCA believes it is best practice to refer to updated standards whenever possible. Additionally, to provide clarity regarding what "positive pressure ventilators" are, AMCA proposes adding the definition from ANSI/AMCA Standard 240-22: "Positive pressure ventilator (PPV) means a portable fan that can be positioned relative to an opening of an enclosure and cause it to be positively pressurized by discharge air velocity. It is principally used by firefighters to mitigate the effect of smoke and is also used to assist in inflating hot air balloons.	
9.11	Comment 1604.1 AMCA notes that this section references Section 1608(c)(1). AMCA asks CEC to amend 1608(c)(1) language requiring manufacturers to provide test reports when requested by the Commission to make "calculation reports" permissible as well, because the subject fan has a rating calculated in accordance with Annex E of ANSI/AMCA Standard 214. AMCA is unsure precisely how to word this change in regulatory language, but the intent of the proposed change in the language shown below is to allow calculation reports as applicable to how a fan was rated. Also, given that the Code of Federal Regulations (CFR) Section 429.144 gives manufacturers 30 days to respond to a "request of records" for a covered product, AMCA requests that CEC align its records-request provision with the CFR. Given the surge in Department of Energy (DOE) activity on its commercial/industrial fan rulemaking, it seems very	Staff is not proposing to make any changes to section 1608(c)(1) in this rulemaking and, therefore, this comment is outside of the rulemaking. However, staff notes that manufacturers are responsible for keeping and maintaining up-to-date test reports covering the models of products sold or offered for sale in California and certified to the CEC's database. Manufacturers should be prepared to provide the test reports used as the basis for a product's certification within 5 calendar days to the Executive Director which has been the standard for many years. This requirement applies to all products sold or offered for sale in California. In the alternative, entities certifying a product can submit the full test report of the product at the time of certification.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	likely that DOE will publish a federal test procedure before California's regulation takes effect. In this light, for fans, CEC alignment on records requests with CFR 429.124 seems reasonable. Additionally, most AMCA members that make fans are small companies. CEC's requirement for a 5-day response to the Executive Director's (ED) request for information regarding a potential non-compliance issue is not reasonable for general business evaluation, especially for small companies. First, the problem reporting needs to be received and funneled to the appropriate authority for evaluation. If any in the chain are out for vacation or otherwise occupied, a delay could happen. Then the authority would need to review the ED's report to ensure it is clear and understood. Subsequently, a review of the appropriate documents for the subject product would begin. For some companies, the fan products offered number in the thousands and some cases, the hundred thousand range, the quantity records are enormous. But even for small companies, the information then would need to be retrieved, reviewed, and processed for presentation to the ED's office in an official manner. Five-day response is not a reasonable timeframe for an official response, and we would strongly recommend the 30-day response time that the CFR provides to ensure the response has the quality necessary for a serious inquiry. If this were a problem of safety where there are life and death issues, then a rapid response would be more expected and reasonable. Relevant excerpt from Section 1608(c)(1): If the Executive Director includes with the request information that, in his or her opinion, constitutes substantial evidence that the appliance or the	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	manufacturer is not in compliance with an applicable provision of this Article, or that the energy or water performance of the appliance is not as certified under section 1606(a)(3)(C) of this Article or is not as required by an applicable standard in section 1605.1, 1605.2, or 1605.3 of this Article, then the manufacturer shall provide a copy of the applicable test report to the Executive Director within 5 days 30 days of the manufacturer's receipt of the request. If the subject product has ratings calculated from interpolations allowed by Section 1604, rather than ratings calculated from test data, a report documenting the calculations leading to the rating may be provided in lieu of a test report. ***For informational convenience: Code of Federal Regulations:*** ***§ 429.144 Records request.*** *(a) DOE must have reasonable belief a violation has occurred to request records specific to an ongoing investigation of a violation of central air conditioner regional standards.* *(b) Upon request, the manufacturer, private labeler, distributor, dealer, or contractor must provide to DOE the relevant records within 30 calendar days of the request.* *(1) DOE, at its discretion, may grant additional time for records production if the party from whom records have been requested has made a good faith effort to produce records.* *(2) To request additional time, the party from whom records have been requested must produce all records gathered in 30 days and provide to DOE a written explanation of the need for additional time with the requested date for completing the production of records.*	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.12	Comment 1604.2 AMCA advises that the following editorial corrections to the referenced-documents portions of this section are needed: ~~(ANSI)~~AIR-CONDITIONING, HEATING AND REFRIGERATION <u>INSTITUTE</u> (AHRI)	The change has been implemented into the document.
9.13	Comment 1606.1 (a) Add fan model number to table X, this item is missing from the proposed regulatory language and is expected to be required. AMCA considers this to be the most important piece of information to identify a given fan product from another	CEC staff would like to clarify that although the model number is not present on the proposed table, it is a requirement that all appliances must provide in accordance with section 1606(a)(3)(C)(1) of the California Code of Regs, Title 20.
9.14	Comment 1606.1(b) Change the Maximum fan speed (RPM) at FEI=1.00 to read “Maximum fan speed (RPM) at FEI≥1.00. To be clear, AMCA proposes replacing the “equal” sign (=) with “greater than or equal” sign (≥). This change is for alignment with ANSI/AMCA Standard 214-21 Annex H. If a fan’s maximum speed is limited by the capacity of the installed motor or the structural strength of the fan’s mechanical components, then the fan may reach its maximum pressure or its maximum airflow without FEI dropping as low as 1.00. The three duty points describing the boundary for compliant operation, therefor, are defined as maximum fan pressure, maximum speed, and maximum airflow at FEI greater than or equal to 1.00. For further explanation refer to Comment 1606.2 below.	After review of all the comments received under this subject, Table X has been revised and will not reflect the FEI = 1.00 as part of the table or required information for certification. Rather, the CEC has added definitions derived from Annex H for the Maximum airflow, Maximum Pressure, and Maximum fan speed with a minimum FEI requirement equal or greater than 1.00. References to these definitions have been included in section 1606, Table X, and section 1607.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.15	Comment 1606.1(c) Change “Maximum pressure (inches water gauge) at FEI=1.0” to read: “Maximum pressure (inches water gauge) at FEI≥1.00” To be clear, AMCA proposes replacing the “equal” sign (=) with “greater than or equal” sign (≥). Please see the explanation for maximum fan speed (RPM) at FEI≥1.00 in the cell above.	After review of all the comments under this subject, CEC staff has added definitions of “maximum airflow,” “maximum fan speed,” and “maximum pressure” as defined in Annex H of the proposed test procedure. Additionally, the CEC changed the data required for certification and the data required on the label to be consistent with these definitional changes.
9.16	Comment 1606.1(d) Change “Maximum compliant air flow (SCFM) at FEI=1.0” to read “Maximum airflow (SCFM) at FEI≥1.00.” To be clear, AMCA proposes replacing the “equal” sign (=) with “greater than or equal” sign (≥). Please see the explanation for maximum fan speed RPM on comment 1606.1(b).	CEC staff changed the data required for certification and the data required on the label. See responses to comments 9.14, 9.13, 8.2 and 8.3 above for more information.
9.17	Comment 1606.1(e) Regarding FEP_{act} field: No change, but AMCA requests clarification from CEC on what the permissible answers “tested” and “calculated” mean.	CEC staff changed the data required for certification and the data required on the label. See responses to comments 9.14, 9.13, 8.2 and 8.3 above for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.18	Comment 1606.1(f) Change “Associated Series Tested Fan Model Number (if calculated)” to read “Associated Series Tested Fan Model Numbers (if calculated). AMCA recommends changing this field to allow for multiple inputs to support the ANSI/AMCA Standards 211-22 Annex H interpolation method as referenced in AMCA General Comment 2.	CEC staff changed the data required for certification and the data required on the label. See responses to comments 9.14, 9.13, 8.2 and 8.3 above for more information. Also see response to comment 7.3 above explaining why AMCA 211-22 will not be included as proposed by the comment.
9.19	Comment 1606.1(g) Add “Alternative Brand and Brand model numbers” AMCA recommends adding this field because manufacturers often sell identical products under different brand names and with different brand model names/numbers. This would allow manufacturers to include alternate brand names and brand model names/numbers in the same database entry, bringing simplicity and transparency to the database.	All certification data is tracked by the model number and the fields specify in accordance with section 1606(a)(3)(C)(1) of the California Code of Regs, Title 20. CEC staff will not be adding the “alternative brand” and “brand model numbers” as suggested. CEC staff has concluded that the additional fields are redundant and will not include them into the proposed language. The existing brand name field can already be used as a unique identifier field to list the same model number multiple times per the number of alternative brand names.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.20	Comment 1606.1(h) Remove FEP_{ref} at FEI=1.0 Remove FEP_{act} at FEI=1.0 AMCA recommends removing FEP_{ref} and FEP_{act} from the table because, for FEP_{ref} at FEI=1.00, there is a range of operating conditions where FEI=1.00 (i.e., a curve) that can exist. A single value of FEP_{ref} is not specified. Similarly, for FEP_{act} at FEI=1.00, there is a range of operating conditions where FEI=1.00 (again, a curve) that can exist. A single value of FEP_{act} is not specified. For further explanation, refer to comment 1603.3	After review of all the comments under this subject, CEC staff removed the FEP_{ref} and FEP_{act} data requirements from table X as a single data entry and has incorporated the FEP_{act} and FEP_{ref} associated with the three different efficiency boundaries for maximum airflow, pressure, and fan speed. See responses to comments 9.13, 9.14, 8.2, and 8.3 above for more information.
9.21	Comment 1606.2 The illustration below is derived from ANSI/AMCA Standard 214-21 Figure H.3. A certain fan is outfitted with motors of five different sizes: 1hp, 2hp, 5hp, 10hp, and 15hp. - All duty points of the fan with the 1-hp motor have an FEI higher than 1.00, even at shutoff (Duty Point a) and wide open (Duty Point b). - For the fan with the 2-hp motor, only the shutoff Duty Point (d) has an FEI of exactly 1.00. **(Figure included in comment)**	After review of all the comments under this subject, CEC staff has added definitions of “maximum airflow,” “maximum fan speed,” and “maximum pressure” as defined in Annex H of the proposed test procedure. Additionally, the CEC changed the data required for certification and the data required on the label to be consistent with these definitional changes. See responses to comments 8.2, 8.3, 9.13, and 9.14 above for more information.
9.22	Comment 1606.3 Regarding the removal of FEP_{ref} and FEP_{act} at FEI=1.0 in the table above, the conditions are shown in the figure H.2 and H.4 taken from ANSI/AMCA Standard 214-21 Annex H and marked up below. **(Figures provided in comment)**	See response to comment 9.20 above.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.23	1607 Marking Appliances 1607(d)(16)(A) From the label requirements, remove manufacturer name and FEP_{ref} at FEI=1.0. The information requirements listed should be: Brand name or brand code, model number, serial number or date of manufacture or manufacturer date code, maximum air flow (SCFM) at FEI≥1.00, maximum fan speed (RPM) at FEI≥1.00, and maximum fan pressure (inches water gauge) at FEI≥1.0.	CEC staff changed the data required on the label. The label will only require the FEI≥1.00 efficiency boundaries defined under the maximum air flow in SCFM, maximum fan speed in RPM and maximum pressure in inches water gauge and language indicating that operation outside the boundaries will result in an energy inefficient operation.
9.24	1607 Marking Appliances Change 1607(d)(16)(B) to read: Manufacturers shall clearly distinguish noncompliant fan selections from compliant fan selections in verbiage and/or graphics in printed or electronic catalogs and in search results and outputs associated with software for fan sizing, selection, or procurement online or installed on computers. Manufacturers, distributors, and retailers shall refrain from shipping noncompliant fans for installation in California regardless of where the buyer is located.	CEC has removed Section 1607(d)(16)(B) from the proposed regulatory language

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.25	Comment 1607.1 Regarding striking the 'manufacturer name' – AMCA believes that providing the manufacturer name is not necessary when the brand name or brand code, along with the model number and the other labeling information listed, are provided. AMCA recommends this change because manufacturers often sell identical product under multiple brand names and with different brand model names/numbers. The brand name or brand code and the model number sufficiently identifies the product for the consumer, while simplifying the labeling requirement for the manufacturer.	The manufacturer name is a requirement that applies to all appliances in accordance with section 1606(a)(3)(C)(1) of the California Code of Regs, Title 20. Since no changes to that section are proposed, CEC staff did not make the changes suggested under the comment.
9.26	Comment 1607.2 AMCA recommends adding "or manufacturer date code" to "date of manufacture" as an option to serial number. The format of dates of manufacture varies by manufacturer. Additionally, manufacturers often use date codes or integrate dates of manufacture into product serial numbers. "Date of manufacture" by itself is unclear. Allowing all forms of dating would improve clarity and ease compliance for the manufacturer. The current language is unclear regarding what formatting is acceptable and whether date codes are permitted. In combination with model number, either of these two values preclude the necessity of serial number.	CEC staff removed items 1, 2, 3, and 5 because those requirements on the label are the general requirements of section 1607(b). CEC removed the serial number from the proposed language because it is a number that has no relevance to the performance or tracking for compliance with the proposed regulations.
9.27	Comment 1607.3 AMCA recommends removing proposed Item 6 (FEPref at FEI = 1.0). FEPref is determined by ANSI/AMCA Standard 208 as a function of the selected flow and pressure. FEPref does not depend	CEC staff changed the labeling requirements and removed item 6. In addition to the label requirements established in n 1607(b), the label for commercial and industrial fans and blowers will reflect the FEI ≥ 1.00 efficiency

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	on the selected fan. The value of FEP_{ref} equals that of FEP_{act} if FEI equals 1.00.	boundaries: maximum air flow, maximum fan speed, and maximum pressure and language communicating that operation beyond these boundaries will result in an energy inefficient operation.
9.28	Comment 1607.4 For clarity concerning proposed items 7-9, AMCA proposes replacing "=" with "≥". This change is for alignment with ANSI/AMCA Standard 214-21 Annex H. If a fan's maximum speed is limited by the capacity of the installed motor or by the structural strength of the fan's mechanical components, then the fan may reach its maximum pressure or its maximum airflow without FEI dropping as low as 1.00. The three duty points describing the boundary for compliant operation, therefore, are defined as maximum fan pressure, maximum speed, and maximum airflow at FEI greater than or equal to 1.00. For further explanation and an illustration of this concept, refer to comment 1606.2 above.	CEC staff changed the data required for certification and the data required on the label to be consistent with the newly added definitions of "maximum airflow," "maximum fan speed," and "maximum pressure." See responses to comments 9.24 through 9.26 for more information.
9.29	Comment 1607.5 AMCA notes generally that, while the CEC staff report details the requirement of more than one label, AMCA has confirmed with CEC staff that the information is outdated and that, for the proposed regulatory language, only one "permanent" label is needed, as described in Section 1607, Marking of Appliances.	The express terms reflect the operative proposed regulatory language and supersede concepts identified in the Staff Report. The proposed language includes a simple single label, consistent with the commenter's recommendation.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
9.30	Comment 1607.6 For illustrative purposes, Appendix 1 to these comments shows examples of nameplates currently used in industry practice and compares mockups of the CEC-proposed parameters and AMCA-proposed parameters for a nameplate. Regarding “permanent” labels, AMCA asks: Can manufacturers supplement their standard nameplate (Appendix 1.1) with a sticker with the remaining parameters required by CEC, or must manufacturers have all required marking data on a single metal nameplate or sticker?	The proposed regulation only addresses the information required on the label. Manufacturers are free to decide if it can be added as a sticker, or if they choose to add it to the nameplate or metal plate as suggested in the comment. However, the label must include the information listed in the proposed language. See responses to comments 9.24 through 9.26 for more information.
9.31	Comment 1607.7 The proposed language in Part (B) prohibiting disclosure of fan-performance data for duty points where FEI is less than 1 needs to be reconsidered. As stated in the 2018 joint comments on the draft staff report: *Many fan suppliers also have selection software, which allows a user to input a design flow and pressure, and the software return a list of potential selections. Today, the operating points shown in catalogs and the fan selections returned by software are typically limited only by the surge region and the fan’s maximum speed (which is dependent on the structural integrity of the fan impeller). However, under the Energy Commission’s proposed standards, the compliant operating range of a given fan will likely be smaller than the currently-advertised operating range. In order for the proposed standards to be effectively implemented, it is important that there be requirements regarding all fan performance representations in order*	CEC has removed Section 1607(d)(16)(B) from the proposed regulatory language. For more information of label requirements see responses to comments 9.24 through 9.26 for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	to help ensure that purchasers are selecting fans that meet the standard at the design point. *For all fan performance representations, we recommend that a supplier must clearly distinguish performance that meets the California standards and performance that does not.* The proposed regulatory language goes much further to prohibit disclosure than it does to distinguish between compliant and non-compliant. The final draft of the staff report did not provide justification for the additional stringency. Because the comments did not anticipate higher-than-recommended stringency, there was little context as to why "distinguishing" would be preferred over "prohibiting." AMCA, thus, asks that the following rationale be considered toward softening the requirement. ANSI/AMCA Standard 214 Figure H.1 illustrates performance of a fan which meets the required minimum FEI with only a portion of its fan curve. Depending on the fan model and speed, the portion of the fan curve could be large, or it could be small. If the portion is small and the rest of the fan curve is not shown, it is impossible to judge where on the fan curve the portion lies. An engineer typically expects to see an entire fan curve, even if the fan is offered for sale only in the portion above the required minimum FEI. The ability to see an entire fan curve allows an engineer to answer some important questions about the selection of a fan: 1. What is the maximum pressure the fan develops at shutoff (zero airflow)? - Determining the maximum design pressure of a damper.	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	- Determining the maximum design pressure of the duct. 2. How close is the design operating point to the stall point? - If the installed operating pressure is greater than the design operating pressure, the fan could shift operation into stall, resulting in increased sound, unstable operation, or even catastrophic failure of the fan. 3. What is the maximum power the fan develops at the design speed? - Some fan types (forward-curved wheels, radial wheels, high-pitched axial fans) have their peak power at free air (zero pressure), which typically has a low FEI value. Motors often are selected at the maximum power on a fan curve.	
10.1	The CA IOUs are generally very supportive of CEC's NOPA and the inclusion of the Fan Energy Index (FEI) as the energy conservation metric. We appreciate the work that CEC has done to address our comments and those of the industry in this rulemaking. We ask that the CEC consider the following recommendations for clarifying and improving the reporting requirements for fans and blowers.	Comment noted, thank you, CEC staff appreciates the continued support and participation by sharing the recommendation of this letter.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.2	The CA IOUs recommend that the CEC remove the labeling requirement to report FEP_{ref} at FEI=1.0, and we propose that the label not include the phrase "at FEI=1.0" Fans do not have single values for FEP_{ref} and FEP_{act} at FEI = 1.0. Figure 1 shows an example fan curve with many duty points where FEI = 1.0. Each duty point has a different FEP_{ref} and FEP_{act}. For example, using Figure 1, we will assume that point A represents an airflow of 6,000 cubic feet per minute (cfm) and a pressure rise of 4.0 in. w.c., and Point B represents and airflow of 8,000 cfm at a pressure rise of 1.0 in. w.c. This fan would have an FEI of 1.0 at both points, but the FEP_{ref} of Point A is 6.22 kW, while the FEP_{ref} of Point B is 2.72 kW. FEP_{ref} is a higher value at point A than point B, even though both have an FEI = 1.0. Therefore, we suggest CEC not include "FEPref at FEI=1.0" as a required value for the label. Figure 1 is an example of fan curve where FEI=1. But FEP_{ref} is changing. FEP_{ref} at duty point A is higher than FEP_{ref} at duty point B. At all points along the curve representing FEI = 1.0, FEP_{ref} is equal to FEP_{act}. The CA IOUs also suggests that the phrase "at FEI=1.0" not be used for any of the labeling requirements. The reported value on the label may be at a pressure, airflow, or fan speed where FEI is greater than 1.0. For example, the maximum fan speed may not be limited by FEI but by a motor power or structural limitation. Instead, we propose using "compliant," as shown in the strikeout/underline text below. Proposed changes to Section 1607 – *Marking of Appliances* are in red text, with underlined text	CEC staff has changed the labeling requirements and has removed any reference to FEP_{ref} at FEI=1 as well as any reference to FEI=1.0. In addition to the established label requirements listed in 1607(b), the label for commercial and industrial fans and blowers will contain the FEI ≥ 1.00 efficiency boundaries for maximum air flow, maximum fan speed, and maximum pressure. CEC staff did not incorporate items 1, 2, 3, and 5 under the comment since those are general label requirements established under 1607(b) of the Cal. Code of Regs., Title 20. Additionally, staff did not include item 4 since the serial number does not provide valuable information for CEC's certification database and is not needed as part of the required label. CEC staff did not include FEP_{ref} at FEI=1.0 it does not contribute to communicating the efficiency of the fan. CEC staff has included items 7, 8 and 9 listed in the comment without including the "FEI=1.00" since the three terms for maximum airflow, maximum fans speed, and maximum pressure will be required to appear on the label and are defined as part of the new proposed regulatory language.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	indicating additions and strikeout text indicating deletions. In addition, the text includes editorial changes not discussed previously. "(16) Commercial and Industrial Fans and Blowers. Each commercial and industrial fan and blower shall be marked with a legible and permanently fixed label, which may be in tabular form (as shown below): (A) The label shall include the following information: 1. manufacturer name; and 2. brand name or brand code; and 3. model number; and 4. serial number; and 5. date of manufacture; and 6. FEPref at FEI=1.0; 7. maximum compliant air flowairflow (SCFM) at FEI=1.0; and 3 8. maximum compliant speed (RPM) at FEI=1.0; and 9. maximum compliant pressure (inches water gauge) at FEI=1.0."	For more information, please refer to the responses to comments 9.24 through 9.26 for more information.
10.3	The CA IOUs recommends the following changes to Table X in Section 1606 – Filing by Manufacturers; Listing of Appliances in MAEDbS: a. We suggest requiring additional information be provided in addition to the three reported FEI points. CEC must confirm that data supplied by manufacturers for the three regulated points – maximum compliant fan speed, maximum compliant airflow, and maximum compliant pressure – match the manufacturer's catalog data and that FEI is calculated correctly. To that end, we suggest that for each reported metric (fan speed, pressure, and airflow) the other two corresponding values be reported, along with FEP_{ref} and FEP_{act}.	CEC staff has made changes to Table X to require additional information for the maximum fan speed, maximum pressure, and maximum airflow, consistent with this comment. In addition, the table has been edited to clarify and address all of the comments received and communicate the necessary data for certification.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	For example, for the maximum compliant pressure, the manufacturer would report the corresponding airflow, fan speed, FEP_{ref}, and FEP_{act}. This information will allow CEC staff to quickly compare those values to results in the manufacturer's catalog or selection software. The proposed changes are shown in strikeout/underline format at the end of this section.	
10.4	The CA IOUs recommends the following changes to Table X in Section 1606 – Filing by Manufacturers; Listing of Appliances in MAEDbS: b. The CA IOUs recommends removing the requirement to report single values for FEP_{ref} and FEP_{act}. As described in Comment 1, a fan can be compliant at many duty points and reporting a single value for FEP_{ref} and FEP_{act} is not representative.	CEC staff has added additional data points required for certification and has edited Table X to remove the single values for FEP_{ref} and FEP_{act} previously suggested. After review of all the comments received regarding table X, CEC staff has changed the table and the data requirements needed for certification.
10.5	The CA IOUs recommends the following changes to Table X in Section 1606 – Filing by Manufacturers; Listing of Appliances in MAEDbS: c. We propose that the phrase "at FEI=1.0" be replaced with "compliant." As suggested in Comment 1, the FEI at one or more of the reported values may be greater than 1.0. Using "compliant" will prevent confusion in those cases.	CEC staff removed "at FEI=1.0" from Table X, consistent with this comment. CEC staff now proposes to use the terms for maximum fan speed, maximum pressure, and maximum airflow. The definitions for these terms incorporate the minimum level of the FEI requirements to be equal or above 1.00. Since this is not a minimum efficiency standard, the word "compliant" was found to potentially generate confusion and therefore CEC staff have removed it from Table X.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.6	Change permissible answers in Table X for “Motor model number (if fan is certified with motor)” to read: “Motor model number, if the motor and fan are sold under a single model number, enter the model number here.”	CEC staff did not use this permissible answer provided in the comment since the required information field clearly states the data to be introduced.
10.7	Change permissible answer in Table X for “Controller model number (if fan is certified with a controller) to read: “Model number of the controller. If the controller and fan are sold under a single model number, enter that model number here.”	CEC staff did not use this permissible answer provided since the required information field clearly states the data to be introduced.
10.8	Change required information field in table X “Maximum fan speed (RPM) at FEI = 1.0” to read: “Maximum compliant fan speed (RPM)”	CEC staff has defined the term Maximum fan speed. CEC staff has decided to use the terms for maximum fan speed, maximum pressure, and maximum airflow. The definitions for these terms incorporate the minimum level of the FEI requirements to be equal or above 1.00. Since this is not a standard regulation, staff concluded the word “compliant” would generate confusion, and therefore CEC staff did not use it in Table X.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.9	Add to table X required information (RI) and permissible answer (PA) fields: RI: “Airflow (SCFM) at the maximum compliant fan speed” PA: “If there are multiple duty points where this fan speed is compliant, select one.”	CEC staff has implemented part of the comment and has defined the terms for maximum fan speed, maximum pressure, and maximum airflow. The definitions for these terms incorporate the minimum level of the FEI requirements to be equal or above 1.00. Since this is not a standard regulation, the word “compliant” will generate confusion and therefore CEC staff will not use it in Table X. For more information, please refer to the responses to comments 9.24 through 9.26 for more information.
10.10	Add to Table X required information (RI) and permissible answer (PA) fields: RI: “Pressure (inches water gauge) at the maximum compliant fan speed” PA: The resulting pressure at the selected airflow.	CEC staff agrees with the comment and modified Table X to include the pressure at maximum fan speed. CEC staff however did not use the word “compliant” since it is not a standard. For more information, please refer to the responses to comments 9.24 through 9.26 for more information.
10.11	Add to Table X required information (RI) and permissible answer (PA) fields: RI: “FEP_{act} (kW) at the resulting pressure” PA: “FEP_{act} in kW at the duty point at the maximum compliant fan speed.	CEC staff edited Table X to capture the values for FEP_{act} for the maximum pressure, maximum airflow, and maximum fan speed. CEC staff, however, did not include the permissible answer suggested since the required information field clearly communicates the type of data and units needed for certification.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.12	Add to Table X required information (RI) and permissible answer (PA) fields: RI: "FEP_{ref} (kW) at the resulting pressure" PA: "FEP_{ref} in kW at the duty point at the maximum compliant fan speed.	CEC staff agrees with the comment and has edited Table X to capture the values for FEP_{act} for the maximum pressure, maximum airflow, and maximum fan speed. CEC staff, however, did not include the permissible answer suggested since the required information field clearly communicates the type of data and units needed for certification
10.13	Change required information field for "Maximum pressure (inches water gauge) at FEI=1.0" to read: "Maximum compliant pressure (inches water gauge)	CEC has implemented part of the comment and has defined the term Maximum pressure. CEC staff has defined the terms for maximum fan speed, maximum pressure, and maximum airflow. Since this is not a standard regulation, staff concluded the word "compliant" would generate confusion, and therefore CEC staff did not use it in Table X.
10.14	Add to Table X required information (RI) and permissible answer (PA) fields: RI: "Pressure (inches water gauge) at the maximum compliant airflow" PA: "Resulting pressure (inches water gauge) at the maximum compliant airflow)	CEC staff has modified Table X to include the pressure at maximum airflow. CEC staff however will not use the word "compliant" since it can be misinterpreted and cause ambiguity. CEC staff, however, did not include the permissible answer suggested since the required information field clearly communicates the type of data and units needed for certification

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.15	Add to Table X required information (RI) and permissible answer (PA) fields: RI: “Fan Speed (RPM) at the maximum compliant airflow” PA: “Resulting fan speed (RPM) at the maximum compliant airflow	CEC has modified Table X to include all the related data for the three new terms maximum pressure, maximum fan speed, and maximum airflow. CEC staff, however, did not include the permissible answer suggested since the required information field clearly communicates the type of data and units needed for certification
10.16	Add to Table X required information (RI) and permissible answer (PA) fields: RI: “FEP_{act} (kW) at the maximum compliant airflow” PA: FEP_{act} in Kw at the resulting pressure at the maximum compliant airflow	CEC staff has modified Table X to include all the related data for the three new terms maximum pressure, maximum fan speed, and maximum airflow. CEC staff, however, did not include the permissible answer suggested since the required information field clearly communicates the type of data and units needed for certification
10.17	Add to Table X required information (RI) and permissible answer (PA) fields: RI: “FEPref (kW) at the maximum compliant airflow” PA: “FEPref in kW at the resulting pressure at the maximum compliant airflow	CEC has modified Table X to include all the related data for the three new terms maximum pressure, maximum fan speed, and maximum airflow. Since this is not a minimum efficiency standard, the word “compliant” was found to potentially generate confusion and therefore CEC staff have removed it from Table X.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.18	Remove the required information "FEP_{act}" and permissible answer "Tested, calculated" from table X	CEC staff has edited Table X and removed and changed the required field for FEP_{act} and substituted it inquiry to indicate if the fan is a tested or a calculated value. The data needed for certification now reflects the maximum pressure, fan speed, and maximum airflow as well as all the related data listed in table X.
10.19	Add to Table X required information (RI) and permissible answer (PA) fields: RI: "Is the model a Series Tested Fan?" PA: "Yes, No"	See response to comment 10.17 above.
10.20	Change required information "Associated Series Tested Fan Model Number (if calculated)" and permissible answer "Fan product line and model, (N/A if tested)" to read: RI: "Associated Series Tested Fan Model" PA: "Fan product line and model (N/A if not a Series Tested Fan)"	CEC staff has edited Table X to capture the data for the model number of the fan that was tested and that is the basis for the calculated value for a fan to which the efficiency is calculated.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
10.21	Remove from Table X required information (RI) and permissible answer (PA) fields: RI: “FEPref at FEI=1.0” PA: “Reference fan electrical power (kW)”	CEC staff did not include FEP_{ref} at FEI=1.0 as it does not contribute to communicating the efficiency of the fan. CEC staff has made various changes to the requirements under Table X. See the responses for comment 9.14 through 9.16 for more information.
10.22	Remove from Table X required information (RI) and permissible answer (PA) fields: RI: “FEP_{act} at FEI=1.0” PA: “Actual fan electrical power (kW)”	CEC staff has made different edits to Table X and removed the FEP_{act} at FEI=1.0 See responses to comments 8.2, 8.3, 9.13, and 9.14 above for more information. Also see responses to comments 10.1 through 10.21 above.
10.23	The CA IOUs ask CEC to reconsider the limitation on publishing fan performance data for duty points that are not compliant. Section 1607(B) states: *No marketing or catalog information shall provide performance data for any duty point where the FEI is less than 1.0. Performance data provided to consumers shall be provided only for the operation of the fan where the FEI is equal or greater then 1.0.* We understand and support the motivation driving this requirement. However, we believe that it will create problems for California consumers for three reasons. First, there are many existing fan installations where the fan was poorly selected and installing a larger fan	CEC staff has removed section 1607(d)(16)(B) and will only require the label under section 1607(d)(16)(A), consistent with this and other commenter recommendations.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	that operates inside the FEI ≥ 1.0 bubble will be impossible or prohibitively expensive. For example, if a fan is installed in an enclosed space, such as a machine room, that would have to be enlarged for a fan that meets FEI ≥1.0 at the design duty point, the costs may be many times the cost of simply replacing the fan. This problem will happen more often with low-pressure applications, where it would not be possible to achieve the needed efficiency without using a larger-diameter fan. Second, variable-speed fans in variable-air-volume systems typically do not operate along a single system curve. Typically, as airflow is reduced, system pressure does not decrease along a quadratic curve. Therefore, the fan operating duty point may fall outside of the FEI ≥ 1.0 bubble for low airflows. This is not an energy efficiency problem, since the fan's power at these low airflows is a small fraction of its full-design airflow power; however, designers need the fan performance information at these duty points. Finally, fan performance information is used for troubleshooting fan system problems. Technicians will typically measure two performance values (out of airflow, pressure, and fan speed) and use the published fan performance data to determine the third value. If the fan is running at an operating point outside the bubble, the technician will not be able to calculate the third point and diagnose the problem. Therefore, we suggest that manufacturers be allowed to publish fan performance data but clearly indicate inefficient values that are outside the FEI ≥1.0 bubble. We propose the following language for Section 1607(B):	

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	Marketing or catalog information that provides performance data for any duty point where the FEI is less than 1.0 shall include the statement “inefficient operating point.” We are aware that others have suggested phrasing like “not compliant with California Title 20.” However, we believe this is not accurate since compliance with Title 20 means that the manufacturer has tested the fan and reported the boundaries of the FEI≥1.0 bubble. Therefore, the fan can be compliant with Title 20 even if the performance at the duty point does not meet Title 20’s intent.	
10.24	The CA IOUs supports the use of the enforcement requirements in §1608. Compliance, Enforcement, and General Administrative Matters (Section 1608). During the public meeting held by CEC on April 12, 2022, one stakeholder suggested that instead of using the test tolerance laid out in Section 1608, CEC should use the tolerances provided in *AMCA 211-22 Certified Ratings Program Product Rating Manual for Fan Air Performance* (AMCA 211). The CA IOUs disagrees with this recommendation. The tolerances in AMCA 211 are very wide, allowing 7.5 percent on fan shaft power and 10 percent when the fan is tested with a motor. The tolerances from AMCA 211 would allow a fan tested with a motor to have an FEI of 0.91 and still be considered to pass an enforcement test. Though we appreciate the justification AMCA has put forth in AMCA 211 for their tolerances, however, we believe it would create market distortions. Manufacturers who make a good-faith effort to provide accurate data	Changes to the enforcement requirements contained in section 1608 are outside the scope of this rulemaking. Therefore, no changes were made to section 1608 of the California Code of Regulations, Title 20 in this proceeding. See response to comment 9.22 above for more information.

Commenter Number and Comment number	Comments/ Suggested Revisions	Response
	would have a disadvantage against those who take advantage of the extra margin. In addition, we believe that allowing the use of industry-defined tolerances would create a bad precedent and lead other manufacturers in other categories to demand the same.	