Energy Efficiency Regulations in the Asia Region

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AMCA European Fan Symposium 2024

Presentation Outline

01	02	03
China	Taiwan	Malaysia
04	05	06
Thailand	India	Korea
07	08	09
Indonesia	Vietnam	Hong Kong/Philippines

CHINA

GB 19761-2020 : Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Fans (Mandatory)

Energy Efficiency in Asia - China

- **National Standard : GB 19761 – 2020 (Superseded GB 19761 – 2009)**
  - "Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Fans"
  - Changes Include:
    - From "Air conditioning centrifugal fan" to "centrifugal fan for HVAC, forward curved centrifugal fan"
    - Added GB/T3235 on basic of fan types, size parameters and performance curves
    - Range of pressure coefficient and efficiency ratings reduced

Energy Efficiency in Asia - China

- **National Standard : GB 19761 – 2020**
  - Energy efficiency grades, test methods and technical requirement of fans
  - Applicable for Centrifugal fans and Axial fans for industrial boilers, power station, centrifugal fans for HVAC, forward curved centrifugal fans
  - Not applicable to ducted fans for HVAC, cabinet fans, plenum fans and fans with special structures.

Energy Efficiency in Asia - China

- **National Standard : GB 19761 – 2020**
  - Test methods
    - GB/T 10178 – Industrial fan performance testing in situ
    - GB/T 1236 (ISO5801:2007) – Industrial fan performance testing using standardized airways
    - Motor efficiency must be provided for test using direct power measurement
  - Uses pressure coefficient and specific speed to categorize the different types of fans into 3 grades
  - Grade 1 being most efficient and Grade 3 being least efficient

Energy Efficiency in Asia - China

- **New GB/T 43080.3-2023 on "Fans – Efficiency Classification for Fans – Part 3 : Fans without drives at max operating speed" was published by AQSIQ and implemented on 1st April 2024 (Recommended)**

- ISO 12759 part 3 is fully adopted on FEG with minor changes in Annex A, A.2 and A.3 – with formula for defining the upper efficiency limit of FEG

- ISO 12759 part 6 is under review since publication in May 2024

Energy Efficiency in Asia - China

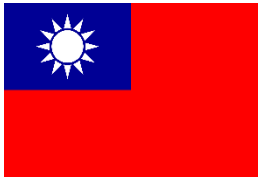
- **National Standard : GB 18613 – 2020 (Superseded GB 18613 – 2012)**
  - "Minimum Allowable Values of Energy Efficiency and Values of Efficiency Grade for Motors"
  - Categorizes Motor Efficiency Grade into 3 Grades, from Grade 1 to Grade 3
  - IEC 60034-2 IE2 equivalent to Grade 3 in GB18613-2012 has been changed to IE3 in GB18613-2020

IEC 60034-2 International Standard	GB 18613 – 2020 China New Standard	GB 18613 – 2012 China Old Standard
IE 5	Grade 1	
IE 4	Grade 2	Grade 1
IE 3	Grade 3	Grade 2
IE 2		Grade 3

TAIWAN

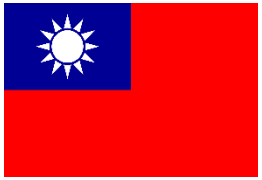
Ventilator allowable energy consumption standards, labeling matters and inspection methods

Energy Efficiency in Asia – TAIWAN



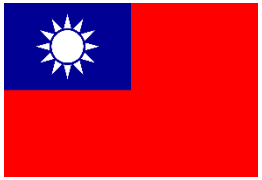
- Issued by Taiwan DOE in 2023“Ventilator allowable energy consumption standards, labeling matters and inspection methods”
    - Applicable to Centrifugal fan, Axial fan and Mixed Flow Fan
    - Testing must comply to CNS 7778, or ISO 5801, or AMCA 210
    - Suitable to axial fan, centrifugal fan using 3 phase AC motors
    - Motor must be tested to CNS 14400, or IEC 60034-2-1 or IEEE 112 Method B, minimum IE3 ≤ 75kW, minimum IE4 ≥ 75kW

Energy Efficiency in Asia – TAIWAN



- Range of products to be certified,
  - Motor kW from 0.75kW – 200kW
  - Impeller diameter from 125mm – 2000mm
  - Pressure from 15mmAq – 1000mmAq
  - Capacity from 10CMM – 3000CMM
  - Exception – Fire fighting smoke extraction fan, Cooling tower fan, jet fan and induced flow fan

Energy Efficiency in Asia – TAIWAN



- Industrial Technology Research Institute (ITRI) confirmed to regulate Fan Efficiency with FMEG and implementing it mandatory in July 2024
    - Manufacturers or importers must register their products
    - Test reports must be submitted
    - Recognize test results from laboratories recognized by International Laboratory Accreditation Cooperation (ILAC)
    - AMCA International, Asia AMCA and KTC Lab are recognized by ILAC which is acceptable by ITRI
    - Annual sales volume shall be submitted by end February yearly
    - Annual check test is required, failure to do so will render removal of listing

MALAYSIA

MS 2578-1:2014
Code of Practice on Energy Efficiency and Conservation for Industrial Electrical Equipment – Part 1 : Fans

Energy Efficiency in Asia – Malaysia

- MS 2578 – 1 : 2014 Part 1, Issued by Department of Standards Malaysia
  - Applicable to fans with input power range from 0.125kW to 500kW
  - Not applicable to fans for smoke extraction, industrial processes, automotive application, trains and planes, explosive atmospheres, roof ventilators and jet fans
  - Follow ISO 12759-2010 guidelines

MS 2578 – 1 : 2014 Part 1

- The Minimum Energy Performance Standards (MEPS) for bare shaft fans shall be FEG 71
- The MEPS for driven fans shall be FMEG graded as per EU 327 table 1
- All Bare shaft fans are to be certified by independent 3rd Party (AMCA or Eurovent or equivalent) and to bear the FEG certified performance seals

THAILAND

Building Energy Code – effective March 2023

Energy Efficiency in Asia - Thailand

- Building Energy Code 2023
  - Applies to 9 types of buildings with total area of 2000 square meter or more per floor
  - 9 types of buildings being identified into 3 groups
    - Group 1 – Office building, school (8hr/day)
    - Group 2 – Department store, exhibition building/convention hall, entertainment service, theater (12hr/day)
    - Group 3 – Hospital, condominium, hotel (24hr/day)
  - Draft of Fan Energy Efficiency Standard and Regulation was called to an halt during Covid Pandemic

INDIA

Bureau of Energy Efficiency - Energy Conservation and Sustainable Building Code (ECSBC)
Bureau of India Standards - National Building Code (NBC)

Energy Efficiency in Asia - India

- Bureau of Energy Efficiency – Energy Conservation and Sustainable Building Code (ECSBC)(Commercial and Office Buildings) :
- 3 levels of energy efficiency
  - ECSBC Building
  - ECSBC Plus Building
  - SuperECSBC Building
  - ISO 12759 Part 3 – FEG – will be replaced by ISO 12759 Part 6
  - ISO 12759 Part 6 – FEI – may be adopted in December 2024 (targeted)
    - Centrifugal ≥ 2.5kW, FEI shall be ≥ 1.1
    - Axial ≥ 2.5kW, FEI shall be ≥ 1.0

Energy Efficiency in Asia - India

Table 5-8 Mechanical and Motor Efficiency Requirements for Fans in ECSBC Buildings

System type	Fan Type	Mechanical Efficiency	Motor Efficiency (As per IS 12615)
Air-handling unit	Supply, return and exhaust	65%	IE 3

Table 5-9 Mechanical and Motor Efficiency Requirements for Fans in ECSBC+ Buildings

System type	Fan Type	Mechanical Efficiency	Motor Efficiency (As per IS 12615)
Air-handling unit	Supply, return and exhaust	70%	IE 4

Table 5-10 Mechanical and Motor Efficiency Requirements for Fans in Super ECSBC Buildings

System Type	Fan Type	Mechanical Efficiency	Motor Efficiency (As per IS 12615)
Air-handling unit	Supply, return and exhaust	75 %	IE 4

Energy Efficiency in Asia - India

- Bureau of Indian Standards – National Building Code Part 8 : Building Services, Section 3 Air Conditioning, Heating and Mechanical Ventilation 2015
  - Clause 4.2.1.2 – the design…of mechanical ventilation system shall take into account …e) energy efficiency
  - Clause 11.5 – a fan should be selected so that its efficiency at the required point of operation is the highest possible…
  - Clause 11.5.1 – FEG adopted currently

KOREA

High-Efficiency Appliance Certification Programs of Korea’s Energy Standard and Labelling

Energy Efficiency in Asia - Korea

- Test and Inspection methods for blowers based on KS B 6311
  - Direct and belt-driven centrifugal blower – KS B 0622 – terms and definitions of the term of blower
  - Applies to impeller diameter from 160mm to 1800mm
  - FEG is being applied and rating below FEG 50 will not be considered

Indonesia

Roadmap buildings and construction
Indonesia - 2022

Energy Efficiency in Asia - Indonesia

- Roadmap for an energy efficient, low carbon buildings and construction sector
  - Before 2025, National Building Code agreed but not implemented
  - National Building Code will be implemented in 2025 with voluntary targets of Net Zero Energy Building (NZEB)
  - Building Code will be changed to performance based and NZEB are made mandatory for public building by 2030
  - NZEB requirements are strengthened and mandatory for all buildings by 2050

Vietnam

National Technical Regulations on Energy Efficiency Building - 2017

Energy Efficiency in Asia - Vietnam

- AMCA 205 – Energy Efficiency Classification for fans
- ISO 12759 : 2010 – is referred
- Ventilation and air conditioning system fan with power greater than 3.7kW must have an efficiency rating greater than FEG 67
- The efficiency level of fans with FEG must be tested by independent laboratory

Hong Kong / Philippines

Hong Kong – Code of Practice for Energy Efficiency of Building Services Installation 2021

Philippines – Guidelines on Energy Conserving Design of Buildings – 2020 Edition

Energy Efficiency in Asia – Hong Kong

6.7 Air Distribution System Fan Power

6.7.1 The system fan motor power required for a constant air volume air distribution system for a conditioned space should not exceed a limit of 1.6 W per litre per second (L/s) of supply system air flow.

6.7.2 The system fan motor power required for a variable air volume air distribution system for a conditioned space should not exceed a limit of 2.1 W per L/s of supply system air flow.

Energy Efficiency in Asia – Philippines

B. Constant Volume Fan Systems

For fan systems that provide a constant air volume whenever the fans are operating, the power required by the motor of the combined fan system at design conditions shall not exceed 0.5 W/ m^3/h.

C. Variable Air Volume (VAV) Fan Systems

1. For fan systems that are able to vary system air volume automatically as a function of load, the power required by the motor of the combined fan system at design conditions shall not exceed 0.5 W/m3/h.

Thank you!

Do you have any questions?

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