MKE's Notification 2010-124

Regulation on Energy Efficiency Labeling and Standards

16 June 2010

Ministry of Knowledge Economy

Korea Energy Management Corporation

Remark: This translated English version is only for reference, it is not effective.

MKE(Ministry of Knowledge Economy)'s Notification 2010-124

The revision notifies "Regulation on Energy Efficiency Labeling and Standards" (MKE's Notification 2009-317, 28 Dec. 2009) based on the Act Chapter 15 and others of Rational Energy Utilization Act of Korea.

16 June 2010
The minister of knowledge economy (hereinafter "MKE")

Regulation on Energy Efficiency Labeling and Standards

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Note :
MORE : Ministry of Resource and energy
MOTI : Ministry of Trade and Industry
MOCIE : Ministry of commerce, industry and energy

Chapter 1. The general

Article 1. (Purpose) The purpose of this regulation is to define the energy saving equipments and to regulate the monitoring program for the energy saving equipments by the rational energy utilization Act Chapter 15, 16, 24, 66, 68, and 69.

Article 2. (Scope) All related, target energy performance standard, target energy performance standard level, minimum energy performance standards and minimum energy performance level, energy efficiency, energy consumption, energy label, grade, test methods are defined in this regulation except the export products.

Article 3. (Definitions) For the purpose of this regulation the definitions apply ;

1. Appliances with energy efficiency label : Appliances which have the high market penetration and much energy consumption defined in Article 4 are adopted to save energy by the Minister of MKE
2. Energy Efficiency : Energy efficiency or Energy consumption which is measured as test procedures in this regulation by Independent testing laboratories or self-certify testing laboratories qualified
3. Minimum Energy Performance Standards (MEPS) : The Standards are to promote and expand the high energy efficiency appliances in the case that the low efficiency appliances can be limited to produce and sell.
4. Accomplishment ratio for MEPS : A ratio which measured energy efficiency as test procedure in this regulation divides by MEPS.
5. Energy Efficiency Level : The rating (1^{st} ~ 5^{th} level) is granted that energy efficiency is measured as test procedure in this regulation.
6. Model : Design or structure which many copies or reproduction are to be made by manufacturer or importer, and to report test results of each Model to KEMCO from manufacturer or importer.
7. Derivative Model : The model which has the same energy efficiency and the same energy efficiency level to the reported model but has different color, production date, and very slight change without performance difference. In a case of 3 phase induction motor, it is accepted if the rated output is between the leveled value. But, in the case that electrical or mechanical redesign is adopted, manufacturers or importers shall report as a new model.
8. Independent testing laboratories : The Minister of MKE designates the testing laboratory as Independent testing laboratories.
9. Self-certify testing laboratories : The Minister of MKE designates the manufactures or importer who can be qualified with the requirements as self-certify testing laboratories.
10. High efficiency lamp : Fluorescent lamps, and Associated lamps obtain the 1^{st} level of energy efficiency rating as according to this regulation. But Fluorescent lamps ballasts shall be met with TEPS(Target Energy Performance Standard).

11. Rated Thermal Efficiency for heating : Energy efficiency in household gas boiler is less than the heating thermal efficiency (hereinafter "Measured thermal efficiency for heating") measured by "The Liquefied petroleum Gas safety and business management law" Act Chapter 20, Article 4 or measured in the independent testing laboratory and shall be shown by manufacturers or importers.
12. Rated Thermal Efficiency for water heater : Energy efficiency in household gas water heater is less than the water heating thermal efficiency (hereinafter "Measured thermal efficiency for water heater") measured by "The Liquefied petroleum Gas safety and business management law" Act Chapter 20, Article 4 or measured in the independent testing laboratory and shall be shown by manufacturers or importers.
13. Standby power : Power consumption by machinery and tools, when connected to the external power supply, while not performing their primary functions or while awaiting instructions to provide full services.

Chapter 2. Scope, Items and Technical Standards

Article 4. (Scope, Items, and Standards) ① According to this Act Chapter 15, clause 1 and Chapter 7, clause 1, the scope, items, and technical standards are defined in followings (see Annex 1), and testing items, the number of testing samples, test standards, and the number of sample failed are defined in Annex 2.

1. Refrigerator
   - Household electric refrigerator and refrigerator-freezer of storage volume 1000L or less with the cooling system of less 500W electric power consumption by KS C ISO 15502
   - Monthly electric power consumption shall be measured by the test method of KS C ISO 15502, where is defined as followings ;
     - Monthly electric power consumption = Measured power consumption x 365/12

2. Freezer
   - Household electric freezer of storage volume 80L ~ 400L
   - Monthly electric power consumption shall be measured by the test method of KS C ISO 15502, where is defined as followings ;
     - Monthly electric power consumption = Measured power consumption x 365/12

3. Kimchi Refrigerator
   - Household electric refrigerating appliances of total storage volume 1000L or less, and Kimchi storage compartment is much than 50% of the whole storage volume with a function maturing which it will be able to take effect the foodstuffs of the Kimchi artificially, and with a compression type refrigerating machine and storage cabinet integrated in one body.
   - Monthly electric power consumption shall be measured by the test method of KS C 9321

4. Air-conditioner
   - Air-conditioners of rated cooling power consumption of not more than 7,500W and the rated cooling capacity of not more than 23,000W
   - If it has heater, the rated power consumption of heater shall be not more than 5,000W.
   - Exclude water cooling, duct-type, portable, multi-split type
   - Cooling Energy Efficiency Ratio (hereinafter "EER) shall be measured by the test method of KS C 9306, which is obtained from the cooling capacity divided by the cooling power consumption.

5. Washing machine
   - By KS C 9608 washing machine in which the textiles are substantially immersed in the washing water, the mechanical action being produced by a device moving, which are defined the agitator washing machine, and impeller washing machine with the rated capacity of 2 kg ~ 20kg
   - But, washing only, spin extraction only and separated spin extraction are excluded.
   - Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from energy consumption (Wh) divided by the rated capacity (kg) in a specified cycle.

6. Horizontal drum washing machine
   - Horizontal drum washing machine which is defined the household washing machine with the rated capacity of 2 kg ~ 20kg, and has the heater, spin extractor, and dryer.
   - But, non-detergent type is excluded, and the type with the heater is only available to boil or to dry is also excluded.

- Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from energy consumption (Wh) divided by the rated capacity (kg) in a specified cleaning cycle

7. Dishwasher
   - By Annex 1 a machine which washes rinses, and dries (when drying process is include) dishware, glassware, cutlery and, in some cases, cooking utensils by chemical, mechanical and/or electrical means with the rated capacity 20 person or less.
   - Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from total energy efficiency ratio (EERt) multiplied by electrical energy efficiency ratio (EERe) and water energy efficiency ratio (EERw).

8. Dish drier
   - A machine which only dries dishware, glassware, cutlery and, in some cases, cooking utensils by electrical means with the rated capacity 10 person or less after washing, and has the top or front door or sliding door.
   - Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from energy consumption (Wh) for 20 minutes divided by TEPS(Target Energy Performance Standard).

9. Electrical Cooler and Heater for Drinking-Water Storage
   - By Annex 1 Electrical cooler and heater for drinking-water storage shall be designed the vapor-compressor cooler, heater, and water storage in a cabinet. (Water purifier is included) Rated cooling power consumption of not more than 500W and rated heating power consumptions of not more than 1000W.
   - Energy Efficiency shall be measured by the test method in Annex 1, which is defined as power consumption/m^3 to be obtained from power consumption (P1), cool water correction factor(Cp), and hot water correction factor (Hp) totally divided by total water storage volume (0.35xsurface of cold water storage (m^3)+surface of hot water storage).

10. Rice cooker
    - By Annex 1 household electric rice-cooker and rice-warmer with a rated capacity 20 person or less.
    - Power consumption per person shall be measured by the test method in Annex 1, which is obtained as
      - (Total power consumption (Wh) x 150) / the mass of rice (kg)

11. Vacuum cleaner
    - Vacuum cleaner of rated power consumption of 800W ~ 2,500W, and shall be moveable (dry only)
    - Energy Efficiency (Suction power efficiency) shall be measured by the test method in KS C IEC 60312 which is obtained from maximum suction power rate divided by power consumption.

12. Electric Fan
    - By KS C 9301 household electric fan (desktop or stand) which has the diameter of wing of 20~41 cm and the axial single wing run by induction motor to be used in general (table, stand, etc) .
    - Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from standard air flow divided by power consumption.

13. Air cleaner
    - By the scope of KS C 9314 the mechanical and combined air cleaner which has less 200W power consumption, and the single power 220V and 60Hz.
    - But, the type is used to collect dust, deodorize, and remove gas with water spray without filters and only industry use, and the internal type in building are excluded.
    - Energy Efficiency shall be measured by the test method in Annex 1, which is obtained from energy consumption (W) divided by the standard area (m^2).

14. Incandescent lamp
    - By KS C 7501 the white tungsten bulb at 220V of rated power consumption of 25~150W, which includes the colorless transparent bulb, the inner frosting bulb, the bulb coated with white, and the bulb coated with thin film.
    - Energy Efficiency (lm/W) shall be measured by the test method in KS C 7501, which is obtained from lumen divided by power consumption.

15. Fluorescent lamp
    - By KS C 7601 Fluorescent lamps which are the tubular type of rated power consumption of 20W, 28W, 32W, and 40W, the circular type of rated power consumption of 32W, and 40W, and the compact type of rated power consumption of FPX 13W, FDX 26W, FPL 27W, FPL32W, FPL 36W, FPL 36W, FPL 45W, and FPL 55W

- By K 61195, K 61199 Fluorescent lamps which are the tubular type of rated power consumption of 20W and 32W, the compact type of rated power consumption of FPL 36W, and the commercial used type (which is more than 7100K of color temperature, and can be used in the conventional lamp)
- Energy Efficiency (lm/W) shall be measured by the test method in KS C 7601, which is obtained from lumen divided by power consumption. But, FPL 32W and FPL 45W shall be measured by the test method in "Safety Certification".

16. Fluorescent lamps ballast
    - By KS C 8100 and KS C 8102 Fluorescent lamps ballasts which are the tubular type of rated power consumption of 20W, 28W, 32W, and 40W, the circular type of rated power consumption of 32W, and 40W, and the compact type of rated power consumption of FPX 13W, FDX 26W, FPL 27W, FPL32W, FPL 36W, FPL 36W, FPL 45W, and FPL 55W
    - Energy Efficiency (lm/W) shall be first measured with reference ballast, and then measured with test sample ballast by the test method in KS C 8102. Two results shall be compared. But, FPL 32W and FPL 45W shall be measured by the test method in "Safety Certification".

17. Associated ballast
    - By KS C 7621 Associated ballasts which all components are in one, and any parts are not allowed to change, and the rated power consumption of 5 W~60W. But globe type is excluded.
    - Energy Efficiency (lm/W) shall be measured by the test method in KS C 7621, which is obtained from lumen divided by power consumption.

18. 3 Phase Induction motor
    - By Annex 1 3 Phase Induction motor shall be the rated output of 0.75kW ~ 200kW.
    - Test method is defined in KS C IEC 61972, "Method for determining losses and efficiency 3 phase cage induction motor" as full load efficiency(%).

19. Household Gas Boiler
    - By KS B 8109 and KS C 8127 Gas water heating boiler of rated gas consumption of 69.5 kW or less, and the total heat capacity is defined by KS B 8101
    - Energy Efficiency (%) shall be measured by the test method in KS B 8109 and KS B 8127, which is heating thermal efficiency.

- Standby power shall be measured by the test method of KS C IEC 62301

20. Adapter·Charger
    - An adapter under 150W(nameplate output power) and a charger of input 20 W with Li-Ion Battery as a single voltage external power supply
    - Test method shall be measured by Annex 1 as running efficiency

21. Electric driven heatpump
    - Electric driven heatpump of rated cooling power consumption of not more than 7,500W and the rated cooling capacity of not more than 23,000W
    - If it has heater, the rated power consumption of heater shall be not more than 30,000W.
    - Exclude water cooling, duct-type, portable, multi-split type
    - Averaged Energy Efficiency Ratio (hereinafter "EER") shall be measured by the test method of KS C 9306, which is obtained from CSPF(Cooling Seasonal Performance Factor) and HSPF(Heating Seasonal Performance Factor).

22. Commercial Refrigerator
    - Commercial electric refrigerator-freezer of storage volume 300L ~ 2000L with the cooling system of less 1000W electric power consumption by KS C ISO 15502. Exclude the freezer only, the showcase, the table type, and the specified type.
    - Monthly electric power consumption shall be measured by the test method of KS C ISO 15502, where is defined as followings ;
        - Monthly electric power consumption = Measured power consumption x 365/12
        - No using wall partition

23. Gas water heater
    - By KS B 8116 Gas water heater of rated gas consumption of 70.0 kW or less, and the total heat capacity is defined by KS B 8101
    - Energy Efficiency (%) shall be measured by the test method in KS B 8116, which is heating thermal efficiency for water heater.

② Standby power shall be measured by KS C IEC 62301.

Article 5. (Appliances with energy efficiency label) ① Appliances with energy efficiency label are defined in Article 4 shall be covered with MEPS and Energy Efficiency Rating

standards. But, Fluorescent lamps ballast, 3 Phase Induction motor, and Adapter·Charger are only covered with MEPS.

② MEPS and Energy Efficiency Rating standards are in Annex 3.

Chapter 3. Independent testing laboratories or Self-certify testing laboratories

Article 6. (Designate independent testing laboratories and Items) ① Independent Testing Laboratories and Items by Article 4 are designated in Annex 4.

③ By paragraph ① KEMCO shall make and manage the listed testing laboratories, and publish the listed testing laboratories in KEMCO web site.

Article 7. (Designate the self-certify testing laboratories) ① A partner who wants to be designated as the self-certify testing laboratories can apply for the Minister of MKE with Annex Form 1 if they can be qualified to test for any items by Annex 5.

② By paragraph ① the importer can apply the self-certify testing laboratories with Annex form 1 if they can be qualified with all requirements listed in Annex 1

③ Nevertheless paragraph ① and ②, the refrigerator importer can apply with the test result from the self-certify testing laboratories in local if they can be qualified with the following requirements

1. The self-certify testing laboratories shall be recognized by ILAC's MRA, and test with this regulations
2. The self-certify testing laboratories shall make a contract with the importer to provide the test results.

④ If there are cases of paragraph ② and ③, according to ① of Article 66, and ② of Article 33 the applicants shall pay all expense to confirm the contact between the manufacture and the self-certify testing laboratories.

Article 8. (Cancel the self-certify testing laboratories) ① The minister of MKE can cancel the a self-certify testing laboratory to designate or suspend a business within 6 months with following reasons. But, 1 or 2 reason shall be canceled to designate.

1. Who is designated in improper way
2. Who is on business during suspending business
3. Who is delaying or rejecting a test without a proper reason.
4. Who is violated to a test method of Article 4.
5. Who is not qualified with the requirements of testing laboratory

② The minister of MKE shall cancel the a self-certify testing laboratory to designate with following 1 or 2 reason, and cancel a designation or suspend a business within 6 months with following 3 or 4 reason.

1. Who is designated in improper way
2. Who is on business during suspending business
3. Who is violated to a test method of Article 4.
4. Who is not qualified with required test facilities and man power in Annex 5

③ The minister of MKE can monitor the independent testing laboratory and the self-certify testing laboratory through the president of KEMCO and the government officials. When they request to monitor, the independent testing laboratory and the self-certify testing laboratory shall support them.

Chapter 4. Issue a test report from independent testing laboratories or Self-certify testing laboratories

Article 9. (Issue a test report) ① Independent testing laboratories and self-certify testing laboratories can issue a test report.

② Independent testing laboratory shall not reject to test for appliances with energy efficiency label from applicant, and shall test prior a sample applied by the president of KEMCO. But, the case that Independent testing laboratory may not test in proper reason and reports it to the Minister of MKE is acceptable.

③ The test report of household gas boiler or gas water heater shall follow Article 4 of Act Chapter 21, “The Liquefied petroleum Gas safety and business management law” or shall be issued by the independent testing laboratory.

Article 10. (A test report) ① A test report for each items shall show following results and the mark when it is issued.

1. Refrigerator

   Monthly power consumption, Storage Volume of fresh compartment, Storage Volume of freezer compartment, Adjusted volume, Auto defrost function, dispenser, the length of the actual sealing perimeter of the homebar door of fresh compartment, the length of the actual sealing perimeter of the homebar door of freezer compartment, any records for KS C ISO 15502 requirements, MEPS, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

2. Freezer

   Monthly power consumption, Storage Volume of freezer compartment, Adjusted Volume, MEPS, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

3. Kimchi Refrigerator

   Monthly power consumption, Storage Volume of Kim-chi preserving compartment, Storage Volume of freezer compartment, Storage Volume of other compartments, Storage volume of Kim-chi preserving container, Adjusted volume, the length of the actual sealing perimeter of the homebar door of Kim-chi preserving compartment, MEPS, the number of Kim-chi preserving compartment, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

4. Air-conditioner

   Energy Efficiency Ratio, Monthly electric power consumption, Cooling Capacity, Cooling electric power consumption, Standby power, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

5. Washing machine

   Power Consumption per 1 kg, Water extraction ratio, Rinsing Index, Rated Washing Capacity, Power Consumption during a complete cycle, Standby power, Power consumption per 1 hour, CO2 emission per a cycle, Annual power consumption, Annual energy cost, Energy Efficiency Level

6. Horizontal drum washing machine

   Power Consumption per 1 kg, Washing efficiency index, Water extraction ratio, Rated Washing Capacity, Power Consumption during a complete cycle, Water Consumption during a complete cycle, Standby power, Power consumption per 1 hour, CO2 emission per a cycle, Annual power consumption, Annual energy cost, Energy Efficiency Level

7. Dishwasher

Washing performance, Monthly electric power consumption, Monthly Water Consumption, Rated Washing Capacity, Standby power, Power consumption per 1 hour, CO2 emission per a cycle, Annual power consumption, Annual energy cost, Energy Efficiency Level

8. Dish drier

   Power consumption for 20 minutes drying process, Rated Capacity, Drying performance, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

9. Electrical Cooler and Heater for Drinking-Water Storage

   Power consumption per 1 m^3, Monthly power consumption, Surface of cool water storage (m^3), Surface of hot water storage(m^3), Capacity of cool-water storage tank, Capacity of hot-water storage tank, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

10. Rice cooker

    Power consumption per a person, Rated Power Input, Type, Total power consumption (Warming and Cooking) per 1 cycle, Warming and Cooking time per 1 cycle, Maximum cooking capacity, Standby power, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency level

11. Vacuum cleaner

    Suction Power Efficiency, Measured Power Input, Maximum Suction Power, dust emission, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

12. Electric Fan

    Energy Efficiency Ratio, Power consumption, Standard Air flow rate, Maximum air velocity, Standby power, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

13. Air cleaner

    Power consumption per 1m^2 , Measured power consumption, Standard room size, Deodorization efficiency, Standby power, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

14. Incandescent lamps

    Energy Efficiency Ratio, Luminous flux, Rated power consumption, lifetime, Power consumption per 1 hour, CO2 emission per 1 hour, Energy Efficiency Level

15. Fluorescent lamps

Energy Efficiency Ratio, Luminous flux, Rated power consumption, color of luminous source, Power consumption per 1 hour, CO2 emission per 1 hour, Energy Efficiency Level

16. Fluorescent lamps ballasts

Compared Energy Efficiency Ratio, Luminous flux, Power input(In a case of high frequency lamps ballast, it shall be power output), Efficiency of luminous flux for reference ballast, Efficiency of luminous flux for tested ballast

17. Associated ballasts

Efficiency of luminous flux, Power input, color of luminous source, Luminous flux, the endurance of on-off cycle, Power consumption per 1 hour, CO2 emission per 1 hour, Energy Efficiency Level

18. 3 phase induction motor

Full load efficiency, Type, Rated output power, Number of Pole, Rated voltage, Rated ampere, Minimum efficiency in samples, Number of tested samples, Power consumption per 1 hour, CO2 emission per 1 hour,

19. Household Gas Boiler

Measured thermal efficiency, Type, Gas consumption, Heating capacity, Standby power, Energy Efficiency Level

20. Adapter·Charger

Running efficiency, Classification, the rated output, Measured input, Standby power

21. Electric driven heatpump

Energy Efficiency Ratio, CSPF(Cooling Seasonal Performance factor), HSPF(Heating Seasonal Performance factor), the rated cooling capacity, the rated heating capacity, the rated cooling power consumption, the rated heating power consumption, make-up heater, Energy Efficiency Level

22. Commercial refrigerator

Monthly power consumption, Storage Volume of fresh compartment, Storage Volume of freezer compartment, Adjusted volume, any records for KS C ISO 15502 requirements, MEPS, Power consumption per 1 hour, CO2 emission per 1 hour, Annual power consumption, Annual energy cost, Energy Efficiency Level

23. Gas water heater

Measured thermal efficiency for water heater, Gas consumption, Standby power, Energy Efficiency Level

② By paragraph ① A test report shall be reported to the president of KEMCO with a comment when any test result is not satisfied with MEPS(5 samples for 3 phase induction motors), “it is not allowed to produce or sell a model which are not satisfied with MEPS by Article 2, Act Chapter 16 and when it violates, it can be fined for 20,000,000 KRW or less”.

③ By paragraph ① the test report shall show “non-passed” when test results are not satisfied with standards in Annex 2.

④ When a test report is issued by ② and ③, a test report shall show “Pass or non-passed for MEPS” in remarks.

Article 11. (Test items) Deleted

Article 12. (Record) ① By Article 6 and Article 7 the testing laboratories shall record Model name, EK certificate number or KS certificate number, and etc in plate of test model, and all test results in Annex 2 in a test report.

② A test report shall show the mean value of all test results for MEPS, energy efficiency level or energy efficiency. Except of “Number of non-passed samples” in Annex 2, all samples shall be passed.

③ The end of round off the place of decimal of value for measured data, energy efficiency, and energy efficiency level in a test report is in Annex 6.

Article 13. (Report) ① Manufacture or importer shall report a test report in Article 9 and 10 to the president of KEMCO within 60 days when a test report is issued.

② By paragraph ① a test report shall be a original or a copy to be approved, and a figure of tested sample shall be attached.

③ When the same model is reported repeatedly, the last reported model is validate. If energy efficiency improves, it shall show the proper reason in detail.

Article 14. (Maintain a test report and submit) Independent test laboratory and self-certify testing laboratory shall maintain a listed test report with Annex Form 2, and shall report a listed test report and test reports to the president of KEMCO 25th of every month.

Chapter 5. Energy Efficiency Mark for Manufacturer (Importer) and etc.

Article 15. (Liability to represent and verification of declaration for energy efficiency and energy efficiency level) ① Manufacturer and importer shall mark energy efficiency and energy efficiency level by each model according to the test results following product test conducted by designated test laboratories or self-certifying laboratories. However the energy efficiency and energy efficiency level can be marked lower than the measured, and the rated thermal efficiency (MEPS) of household gas boiler shall be marked.

② Manufacturer and importer shall report the changed model, and derivative model to the president of KEMCO with Annex Form 4(available www.kemco.or.kr), and they can mark energy efficiency and energy efficiency level

③ According to ② Manufacturer and importer shall report the model canceled to import or stopped producing with Annex 7 to the president of KEMCO.

Article 16. (Mark) ① By Article 15, when manufacturers and importer want to mark energy efficiency or energy efficiency level, they have to follow instruction in Annex 7, paragraph ② and ③.

② By paragraph ① label shall include the followings.

1. Refrigerator
   Monthly power consumption, Volume, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level
2. Freezer
   Monthly power consumption, Storage Volume of freezer compartment, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level
3. Kimchi Refrigerator
   Monthly power consumption, Volume, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level
4. Air-conditioner
   Energy Efficiency Ratio, Cooling Capacity, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level
5. Washing machine
   Power Consumption per 1 kg, Duration per a cycle, CO2 emission per a cycle, Annual energy cost, Energy Efficiency Level
6. Horizontal drum washing machine

Power Consumption per 1 kg, Duration per a cycle, CO2 emission per a cycle, Annual energy cost, Energy Efficiency Level

7. Dishwasher

   Washing performance, Power consumption per a cycle, CO2 emission per a cycle, Annual energy cost, Energy Efficiency Level

8. Dish drier

   Power consumption for 20 minutes drying process, Drying performance, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level

9. Electrical Cooler and Heater for Drinking-Water Storage

   Power consumption per 1 m^3, Monthly power consumption, Capacity, CO2 emission per 1 hour, Energy Efficiency Level

10. Rice cooker

    Power consumption per a person, Total power consumption (Warming and Cooking) per 1 cycle, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency level

11. Vacuum cleaner

    Suction Power Efficiency, Dust emission, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level

12. Electric Fan

    Energy Efficiency Ratio, Standard Air flow rate, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level

13. Air cleaner

    Power consumption per $1m^2$, Standard room size, Annual energy cost, CO2 emission per 1 hour, Energy Efficiency Level

14. Incandescent lamps

    Energy Efficiency Ratio, Rated power consumption, CO2 emission per 1 hour, Energy Efficiency Level

15. Fluorescent lamps

    Energy Efficiency Ratio, Rated power consumption, CO2 emission per 1 hour, Energy Efficiency Level

16. Fluorescent lamps ballasts

    Compared Energy Efficiency Ratio, MEPS

17. Associated ballasts

    Efficiency of luminous flux, Power input, CO2 emission per 1 hour, Energy Efficiency Level

18. 3 phase induction motor

    Full load efficiency, Type, Rated output power, Number of Pole, CO2 emission per 1 hour,

19. Household Gas Boiler

Measured thermal efficiency, Heating capacity, Energy Efficiency Level

20. Adapter·Charger
    MEPS
21. Electric driven heatpump
    Energy Efficiency Ratio, the rated cooling capacity, the rated heating capacity, make-up heater, Energy Efficiency Level
22. Commercial refrigerator
    Monthly power consumption, Volume, CO2 emission per 1 hour, Annual energy cost, Energy Efficiency Level
23. Gas water heater
    Measured thermal efficiency for water heater, Gas consumption, Energy Efficiency Level

③ By paragraph ① label shall be properly adhered to stated spot.

1. Refrigerators
   The front
2. Freezers
   The front
3. Kimchi refrigerators
   The front
4. Air-conditioner
   The front or the side (only in case that it not possible to adhere the label on the front)
5. Washing machine
   The front or the top
6. Horizontal drum washing machine
   The front or the top
7. Dish washers
   The front
8. Dish drier
   The front or the side
9. Electrical Cooler and Heater for Drinking-Water Storage
   The front
10. Rice cookers
    The front or the top
11. Vacuum cleaners
    The front or the top
12. Electric fans

The stand or the supporter

13. Air cleaner
    The front
14. Incandescent lamps
    The cover
15. Fluorescent lamps
    The single cover or group cover
16. Fluorescent lamps ballasts
    The top or the side (only in case that it not possible to adhere the label on the top)
17. Associated ballasts
    The single cover or group cover
18. 3 phase induction motor
    The front
19. Household gas boilers
    The front
20. Adapter-Charger
    The front or the top
21. Electric driven heatpump
    The front
22. Commercial refrigerator
    The front
23. Gas water heater
    The front

④ By paragraph ① the time to represent is that the date of production is for manufacture, and the date of customs clearance is for importer, only just in case that the product needs assemble after customer's place, it can be adhered after final assembling. Also, energy efficiency is that the date of production is for manufacture, and the date of customs clearance is for importer.

⑤ Advertisement shall include energy efficiency or energy efficiency level when manufacturer, importer and seller advertise their product through the medium mentioned as follows

1. Daily newspaper, special version of daily newspaper, and the magazine issued a month according to Article 12 "Law of the registration of periodical publications"
2. Brochure or catalogue

Article 17. (Report) Manufacturers or importer shall report yearly to the president of KEMCO regarding previous year's the sales record of import & producing with Annex Form 3 by the end of January.

Chapter 6. Monitoring Program

Article 18. (Monitoring Program, etc) ① The president of KEMCO is able to conduct factory (warehouse) inspection, and product-testing for manufacturers, importer and sellers as monitoring program. In case of factory (warehouse) inspection is only allowed when a sample is difficult to get in the market.

② According to paragraph ① the monitoring program is indicated with each case as follows

1. To check the conducting of liability to representation according to Article 15
2. To check the identifying energy efficiency or energy efficiency level with the result of monitoring program
3. To check including energy efficiency or energy efficiency level on advertising according to paragraph ④, Article 16
4. To check producing, import and sale of product that does not meet MEPS
5. in cases that MKE requests

③ By paragraph ① the product testing implies to identify energy efficiency and energy efficiency level on the label with measured result of random sample in independent testing laboratory for monitoring program.

④ By paragraph ③ the product testing shall be followed by testing items and tolerance in Annex 7. If only at least one item is not appropriate, action is necessary according to Article 19.

⑤ It is possible to adopt the test results from other regulation, for instance "Safety Certification" or others. Only the testing is accepted that testing laboratory, testing items and the number of sample are followed by this regulation.

⑥ The president of KEMCO can test with ①, Article 18 when he is requested to check test with ④, Article 18.2

Article 18.2 (Stakeholders participate in Monitoring Program) ① Manufactures, importers, dealers, and any persons involved in EELSP (hereinafter "Stakeholders") can request for check test with his own expenses.

② The test shall be done with Annex 8, if the test result is met with any requirements of ①, Article 19, the stakeholders can require the follow-up conducting to the president of KEMCO with submission of test report within 60 days from the independent test lab issues the test report.

③ By paragraph ② the president of KEMCO shall do the follow-up conducting with Article 19

④ By paragraph ③ of Article 7 the self-certified test lab can test with Annex 8, if the test result is met with any requirements of ①, Article 19, the stakeholders can require the check test of ①, Article 18 to the president of KEMCO with submission of test report within 60 days.

Article 19. (Follow-up conducting by monitoring result and opinion hearing) ① By paragraph ② Article 10, if any failures in checking test or ② of Article 18.2 the president of KEMCO shall give the opportunity to state the opinion to a manufacturer or importer and stakeholder before taking proper action within 30 days. Provided that there is no opinion to refute it regards as consent.

1. In case that the result of testing sample is under MEPS
2. In case that the energy efficiency level of testing sample is under energy efficiency level on the product.
3. In case that the test result is not met with tolerance in Annex 8
4. In case that the added model has any parts to influence the performance of basic model.
5. In case that label is represented without proper testing of energy efficiency and energy efficiency level according to Article 15.
6. In case of the mark of energy efficiency level or energy efficiency that is higher than designated level on test report

② The paragraph and 1 paragraph 5 shall be reviewed with the test report issued by independent testing laboratory.

③ In cases of paragraph 2 ~6 of ① are illegal representation.

④ By paragraph ① in the case that the tested model is not complied with the technical standard in monitoring program, the president of KEMCO shall hear the partner's opinion first by Article 20 before they request the minister of MKE. And, if manufacturer or importer's proper reason is accept by KEMCO, they can test a sample selected by KEMCO in independent testing laboratory once. All expenses shall be charged by manufacturer or importer.

⑤ By paragraph ④ if the test result is met with any requirements of ①, the president of KEMCO shall request proper action to the minister of MKE within 15 days from a test report issues.

Article 19.2 (Correction by monitoring result) By paragraph ④ of article 16 the minister of MKE can order the correction to stakeholders within 90 days.

Article 20. (Maintenance and analysis of statistics) The president of KEMCO shall maintain and analyze all data from testing laboratories, and apply statistics to upgrade MEPS or energy efficiency level.

Article 21. (Establishment of an inside regulation) ① The president of KEMCO can establish the inside regulation to accomplish this regulation efficiently.

② By paragraph ① the president of KEMCO shall submit and report an inside regulation to MKE when they make it newly or change it.

*Addenda (MORE 1992-71, **17 August, 1992**)*

Article 1. (Enforcement date) This regulation shall enter into force after the date of its promulgation.

Article 2. (The date to represent level, etc) A seller who produces or imports appliances with energy efficiency label shall mark the level on product manufactured or imported by Annex 3 after the date of 1st September, 1992 (1st October, 1992 for lighting equipments, 1st January 1993 for air-conditioner) in accordance with Article 3. It is also applied to put an advertisement through medium in accordance with paragraph ④ Article 8. In case that refrigerator and lights which is not same as previous model needs to represent the level through extra testing or when testing is not completed, manufacturer or importer requests forbearance to the president of KEMCO with evidence for requested the testing.

Addenda (MOCIE 1993-25, 1 June, 1993)

Article 1. (Enforcement date) This regulation shall enter into force after 1st of March, 1993.

Article 2. (Amendment of name) In MORE Notification 92-91 "Regulation on Energy Efficiency Standards and Program" the Minister of MORE changes to the Minister of MOCIE.

Addenda (MOCIE 1993-130, 7 January, 1994)

Article 1. (Enforcement date) This regulation shall enter into force after 1st of February, 1994.

Article 2. (The date to represent grade, etc) A seller who produces or imports Fluorescent lamps ballasts shall represent the level on product manufactured or imported by Annex 3 after 1st of July, 1994 in accordance with Article 3. It is also applied to put an advertisement through medium in accordance with paragraph ③ Article 7.

Addenda (MOTI 1995-125, 29 December, 1995)

Article 1. (Enforcement date) This regulation shall enter into force after 1st of June, 1996.

Article 2. (Amendment of name) In MOCIE Notification 1993-130 "Regulation on Energy Efficiency Standards and Program" the Minister of MOCIE changes to the Minister of MOTI.

Article 3. (The date to represent level, etc) ① A seller who produces or imports appliances with energy efficiency label shall represent the level on product manufactured or imported by Annex 2 and Annex 3 after 1st of January, 1996 (1st of April, 1996 for Refrigerator with non-CFC refrigerant and foam, and 1st of September, 1996 for air-conditioner with non-CFC refrigerant) in accordance with Article 3. In case of refrigerator with non-CFC refrigerant and foam can represent the level before enforcement date by Annex 2 and Annex 3.
② It is also applied to put an advertisement through medium in accordance to paragraph ③ Article 7.

Article 4 (Interim Measure concerning marking of energy efficiency level, etc.) The previous energy efficiency level standard in Annex 2 and the representation of level in Annex 3 as well as is able to accept to use after force this regulation within 3months.

Article 5 (Interim Measure Concerning reporting of energy efficiency level, etc.)
Despite of Article 8 the test report issued before enforcement date of this regulation is acceptable in accordance with previous regulation. Only testing result that is issued after 25th of September, 1995 for refrigerator is to accept in accordance with IAA "Program on representing energy efficiency and energy consumption of household electric appliances" which is amended.

Addenda (MOTI 1996-393, 18 November, 1996)

Article 1 (Enforcement date) This regulation shall enter into force after its promulgate.

Article 2 (The date to represent level, etc) ① A seller who produces or imports air-conditioner with cooling capacity 9,000 kcal/h ~ 15,000kcal/h represent the level on product manufactured or imported by Annex 2 and Annex 3 after 1st of September, 1997 in accordance with Article 3.
② It is also applied to put an advertisement through medium in accordance to paragraph ③ Article 7.

Addenda (MOCIE 1999-24, 8 March, 1999)

Article 1 (Enforcement date) This regulation shall enter into force after 1st of July, 1999.

Article 2 (Interim Measure) The result that achieved before 30th of June, 1999 is inured in accordance with this regulation.

Article 3 (Energy efficiency and energy efficiency level testing) A seller who produces or imports appliances with energy efficiency label is able to test for energy efficiency and energy efficiency level before force this regulation in accordance with Article 17.

Article 4 (Time to test and publish standard for washing machine, etc) The date for testing of model in market, energy efficiency standard as well as the date for notification of

energy efficiency standard, and representation of energy efficiency level as well as application of MEPS are as follows.

1. Model in market : until 30th of September, 1999
2. Notification of energy efficiency standard and the representation energy efficiency level : January 2000
3. Representation of energy efficiency level : From 1st of July, 2000
4. Application of MEPS : From 1st of January, 2001

Addenda (MOCIE 2000-101, 23 September, 2000)

Article 1 (Enforcement date) This regulation shall enter into force after 1st of January, 2001. Only household gas boiler shall enter into force after 1st of August, 2001.

Article 2 (Interim Measure) The result that achieved before 31st of December, 2000 is inured in accordance with this regulation.

Article 3 (Energy efficiency and energy efficiency level testing) A seller who produces or imports appliances with energy efficiency label is able to test for energy efficiency and energy efficiency level before force this regulation in accordance with Article 15.

Article 4 (The date to represent level, etc) ① The date for testing of model in market, representation of energy efficiency level and application of MEPS for washing machine are as follows.

1. Model in market : until 30th of September, 2000
2. Representation of energy efficiency level : From 1st of January, 2001
4. Application of MEPS : From 1st of January, 2001

② In case that refrigerator and air-conditioner providing that IAA's Notification "Program on representing energy efficiency and energy consumption of household electric appliances" (hereinafter "Energy efficiency program") is abrogated before this regulation enters into force, items, scope, and technical standards (for only air-conditioner) in Article 4, and Annex 5 in Article 16 (only for refrigerator and air-conditioner) from the date "Energy efficiency program" is abrogated to the date this act enters into force are as follows.

1. Refrigerator

- Household electric refrigerator and refrigerator-freezer of storage volume 1000ℓ or less with the cooling system of less 500W electric power consumption by KS C 9305
- Monthly electric power consumption shall be measured by the test method of KS C 9305

2. Air-conditioner
   A. From the date of IAA "Energy efficiency program" is abrogated to 30th of September, 2000
      - Air-conditioners of rated cooling power consumption of not more than 7,500W and rate cooling capacity of not more than 17,500W
      - If it has heater, the rated power consumption shall be not more than 5,000W.
      - Exclude water cooling, duct-type, portable, multi-split type
      - Cooling Energy Efficiency Ratio (CEER) shall be measured by the test method of KS C 9306, which is obtained from the cooling capacity divided by the cooling power consumption.
   B. From 1st October, 2000 to 31st of December, 2000
      - followed by paragraph ② Article 4

3. Contents on Energy efficiency or Energy efficiency level
   deleted "the representation with Safety Certification law"

Article 5 (foreshadow new appliances with energy efficiency label etc) Electrical cooler and heater for drinking-water storage, Dish washers, gas water heater, ballast for PL, and ballast for HID can be designated as new product for appliances with energy efficiency label, those are able to be registered as a appliance with energy efficiency label after discussing with related organizations.

Addenda (MOCIE 2002-20, 16 February, 2002)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. Only dish washer and electrical cooler and heater for drinking-water storage shall enter into force after 1st of July, 2002.

Article 2 (Interim Measure) The result that achieved by previous regulation is inured in accordance with this regulation.

Article 3 (Energy efficiency and energy efficiency level testing) Dish washer and electrical cooler and heater for drinking-water storage are able to test for energy efficiency and energy efficiency level before force this regulation.

Article 4 (Time to adjust and apply MEPS, etc) ① MEPS and effective date of refrigerator, air-conditioner, Incandescent lamps, Fluorescent lamps, Fluorescent lamps ballasts, Associated ballasts, Household Gas Boiler are as follows

1. Refrigerator

A. MEPS (Minimum Energy Performance Standard)

(unit :kWh/month)

Items	MEPS
Refrigerator only	P ≤ 0.037AV+16.75
Refrigerator-freezer whose compensated cubic volume is less than 500 liter	P ≤ 0.025AV+29.45
Refrigerator-freezer whose compensated cubic volume is no less than 500 liter	P ≤ 0.043AV+16.19

B. Effective date of MEPS : From 1st of January, 2004

2. Air-conditioner

A. MEPS (Minimum Energy Performance Standard)

(unit : W/W)

Type		MEPS (W/W)
Window type room air conditioner		2.88
Split type	RCC < 4.0 kW	3.37
	4.0 kW ≤ RCC < 10.0 kW	2.97
	10.0 kW ≤ RCC < 17.5 kW	2.76

Remark) Rated Cooling Capacity (RCC)

B. Effective date : From 1st of January, 2004

3. Incandescent lamps

A. MEPS (Minimum Energy Performance Standard)

(unit : lm/W)

Type	Rated Power	MEPS
110V	30W	10.2
	60W	13.0
	100W	14.3

220V	30W	8.0
	60W	11.0
	100W	12.7

B. Effective date : From 1st of January, 2003

4. Fluorescent lamps

A. MEPS (Minimum Energy Performance Standard)

(unit : lm/W)

Type		MEPS
Tubular	20W	58.0
	40W	80.0
	32W	86.0
Circular	32W	58.0
	40W	64.0

B. Effective date of MEPS : From 1st of January, 2004

5. Fluorescent lamps ballast

A. MEPS (Minimum Energy Performance Standard)

Type		MEPS
Tubular	20W	0.85
	40W	1.00
	32W	0.98
Circular	32W	0.98
	40W	0.98

B. Effective date of MEPS : From 1st of January, 2004

6. Associated ballast

A. MEPS (Minimum Energy Performance Standard)

(unit : lm/W)

Type	Rated Power (W)	MEPS
Basic	RP < 10	45.0
	10 ≤ RP ≤ 15	50.0
	15 < RP ≤ 20	58.0
	RP>20	60.0

B. Effective date of MEPS : From 1st of January, 2003

7. Household Gas Boiler

A. MEPS (Minimum Energy Performance Standard)

(unit : %)

Type	MEPS
Household Gas Boiler	80.0

B. Effective date of MEPS : From 1st of January, 2003

② Refrigerator, air-conditioner, and household gas boiler shall not mark energy efficiency level after effective date of MEPS in paragraph ①.

Article 5 (foreshadow new appliances with energy efficiency label etc) Kimchi refrigerator, rice cooker, compact type fluorescent lamps can be designated as new product for appliances with energy efficiency label, those are able to be registered as a appliance with energy efficiency label after discussing with related organizations.

Addenda (MOCIE 2003-40, 14 May, 2003)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. Only rice cooker and compact type fluorescent lamps shall enter into force after 1st of January, 2004, and Kimchi refrigerator shall enter into force after 1st of October, 2004.

Article 2 (Energy efficiency and energy efficiency level testing) Kimchi refrigerator, rice cooker and compact type fluorescent lamps are able to test for energy efficiency and energy efficiency level in Article 17 before force this regulation.

Article 3 (Interim measure concerning energy efficiency test) The result that achieved with the previous regulation is inured in accordance with this regulation. Only Kimchi refrigerator tested in refrigerator test method shall be tested for energy efficiency until 30th of September, 2004.

Article 4 (Interim measure concerning energy efficiency of household gas boiler) ① The manufacturer shall report the nominal thermal efficiency of household gas boiler which has been achieved with the previous regulation to the president of KEMCO to 31st of May, 2003 by Article 5 and 15.

② For household gas boiler energy efficiency level in the previous regulation and in this regulation, both can be represented to 31st of May, 2003.

Addenda (MOCIE 2003-88, 30 December, 2003)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. Only washing machine shall enter into force after 1st of July, 2004, and freezer and vacuum cleaner shall enter into force after 1st of October, 2004.

Article 2 (Energy efficiency and energy efficiency level testing) Freezer and vacuum cleaner are able to test for energy efficiency and energy efficiency level in Article 17 before force this regulation.

Article 3 (Interim measure concerning energy efficiency test) The result that achieved with the previous regulation is inured in accordance with this regulation.

Article 4 (Interim measure concerning the self-certify testing laboratory) A self-certify testing laboratory for washing machine designated with the previous regulation shall apply to designate with Annex 2 to 31st of March, 2004 by Article 7.

Addenda (MOCIE 2004-37, 30 March, 2004)

Article 1 (Enforcement date) This regulation shall enter into force after 1st of April, 2004.

Article 2 (Interim measure) Nevertheless Article 6 the result that achieved with the previous regulation is inured in accordance with this regulation.

Addenda (MOCIE 2005-50, 6 May, 2005)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. Only horizontal drum washing machine and electric fan shall enter into force after 1st of January, 2006.

Article 2 (Energy efficiency and energy efficiency level testing) A seller who produces or imports horizontal drum washing machine and electric fan in Article 15 is able to test for energy efficiency and energy efficiency level before force this regulation in accordance with Article 17.

Article 3 (The date to represent level, etc) Horizontal drum washing machine and electric fan are able to test for energy efficiency and energy efficiency level in Article 17 before force this regulation.

Article 4 (Adjustment of energy efficiency standards, etc) MEPS of tubular 40W Fluorescent lamps ballasts and TEPS and energy efficiency level of Associated ballasts are upgraded as follows.

1. Fluorescent lamps ballast

A. MEPS (Minimum Energy Performance Standard)

Type		MEPS
Tubular	40W	1.18

B. Effective date of MEPS : From 1st of January, 2006

2. Associated ballast

A. TEPS (Target Energy Performance Standard)

(unit : lm/W)

Type	Rated Power (W)	TEPS
		To 31st of December, 2007
Basic	RP < 10	52.0
	10 ≤ RP ≤ 15	58.0
	15 < RP ≤ 20	67.0
	RP>20	69.0

B. Energy Efficiency Level

R	Level
R ≤ 1.00	1
1.00 < R ≤ 1.04	2
1.04 < R ≤ 1.08	3
1.08 < R ≤ 1.12	4
1.12 R ≤ 16	5

C. Effective date : From 1st of January, 2006

Addenda (MOCIE 2006-26, 13 March, 2006)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. Only Dish drier shall enter into force after 1st of January, 2007.

Article 2 (Interim measure concerning energy efficiency test) The result that achieved with the previous regulation is inured in accordance with this regulation. Washing machine, and dishwasher which are already tested before regulation shall be tested additionally for standby power test to be 1st level from 1st January , 2007.

Article 3 (Energy efficiency and energy efficiency level testing) A seller who produces or imports dish drier is able to test for energy efficiency and energy efficiency level before force this regulation in accordance with Article 17.

Article 4 (The date to represent level, etc) Dish drier is able to test for energy efficiency and energy efficiency level in Article 17 before force this regulation.

Article 5 (Adjustment of energy efficiency standards, etc) MEPS and energy efficiency level of washing machine and energy efficiency level of dishwasher are upgraded as follows.

1. Washing machine

A. MEPS

(unit : Wh/kg)

Type	MEPS
Washing Machine	23.0

B. Energy Efficiency Level

R	Standby power (Off mode)	Level
$R \leq 14.5$	≤ 1.0 W	1
$R \leq 14.5$	-	2
$14.5 < R \leq 17.0$	-	2
$17.0 < R \leq 20.0$	-	3
$20.0 < R \leq 23.0$	-	4

C. Effective date of MEPS : From 1st of January, 2007

2. Dishwasher

A. Energy Efficiency Level

1) Rated Capacity ≤ 6

R	Standby power (Off mode)	Level
20.00 < R	≤ 1.0 W	1
20.00 < R	-	2
16.00 < R ≤ 20.00	-	3
12.00 < R ≤ 16.00	-	4
8.00 < R ≤ 12.00	-	5

2) Rated Capacity > 6

R	Standby power (Off mode)	Level
25.00 < R	≤ 1.0 W	1
25.00 < R	-	2
20.00 < R ≤ 25.00	-	3
15.00 < R ≤ 20.00	-	4
10.00 < R ≤ 12.00	-	5

C. Effective date of MEPS : From 1st of January, 2007

Addenda (MOCIE 2007-70, 25 May, 2007)

Article 1 (Enforcement date) ① This regulation shall enter into force after promulgate. However for air cleaner, refrigerator, air conditioner and rice cooker shall enter into force after 1st of January, 2008, for 3 phase induction motor of the rated output of more than 37kW and of not more than 200kW shall enter into force after 1st of July, 2008, for 3 phase induction motor of the rated output of more than 15kW and of not more than 37kW shall enter into force after 1st of January, 2010 and for 3 phase induction motor of the rated output of not less than 0.75kW and of not more than 15kW shall enter into force after 1st of July, 2010.

② New energy efficiency label in Annex 5 shall enter into force after 1st of January, 2008. If manufactures and importers have old energy efficiency label in stock after 1st of January, 2008, they can use them.

③ In Annex 7 the allowed monthly power consumption of refrigerator, Freezer, Kimchi-refrigerator shall be within 115% to the rated monthly power consumption, and the allowed EER of air-conditioner shall be more than 90% of the rated EER until 31st of December, 2007.

Article 2 (Interim measure concerning energy efficiency test) ① The result that achieved with the previous regulation is inured in accordance with this regulation. Rice cooker which is already tested before regulation shall be tested additionally for standby power test to be 1st level from 1st January , 2008.

② A 3 phase induction motor certified in "The regulation for expanding the high-efficiency Equipments" is also accepted for this regulation.

Article 3 (Cancellation of registration) The manufacture or importer shall report the model canceled to import or stopped producing with Annex 7 to the president of KEMCO.

Addenda (MOCIE 2007-149, 26 December, 2007)

Article 1 (Enforcement date) ① This regulation shall enter into force after 1st of January, 2008. Only refrigerator shall enter into force with followings.

1. MOCIE 2006-26(13 March 2006) will cover to 29 April 2008 except Article 10, Annex 3, 4, 6, 7 and, paragraph ① of Article 1, Addenda of MOCIE 2007-70(25 May 2007)
2. The enforcement date of refrigerator in Annex 5 and paragraph ② of Article 1, Addenda of MOCIE 2007-70(25 May 2007) would be changed to 30 April 2008.
3. Article 4, 10, and Annex 3, 4, 6, 7 of this regulation shall enter into force after 30st of April, 2008. Manufactures or importer of refrigerator shall declare a new energy efficiency label as according to KS C ISO 15502 to 29 April 2008.

② The enforcement date of air cleaner in paragraph ① of Article 1, Addenda of MOCIE 2007-70(25 May 2007) would be changed to 1 July 2008.

Addenda (MKE 2008-99, 31 July 2008)

Article 1 (Enforcement date) ① This regulation shall enter into force after 28 August 2008. Only the extended scopes of Adapter·Charger, Electric driven heatpump, Kim-chi refrigerator, Air-conditioner, Washing machine, Horizontal drum washing machine, Vacuum cleaner, Electric fan, Incandescent lamps, Fluorescent lamps, Fluorescent lamps ballast shall enter into force after 1st of January, 2009.

② Independent test laboratory in Annex 4 shall enter into force after the day the Ministry of MKE designates or the regulation is designated.

Article 2 (Interim measure concerning self-certify testing laboratory) Self-certify testing laboratory who was achieved with article 7 of the previous regulation is inured in accordance with this regulation.

Article 3 (Interim measure concerning energy efficiency test) ① The result that achieved with the previous regulation is inured in accordance with this regulation. Only Electric cooler and heater for drinking water storage shall be tested for energy efficiency with a new test method until 31st of December 2008. Horizontal drum washing machine, Electric fan shall be tested for standby power in order to get 1st grade of energy efficiency level from 1st of January, 2009, and Associated ballast shall be tested for the endurance of on-off in order to get 1st grade of energy efficiency level from 1st of January, 2009.

② The registered Model of Adapter and Charger for Mobile phone for ”Standby program” is inured in accordance with this regulation.

Article 4 (Relation with other regulation) Any parts of this regulation used in other laws shall be accepted.

Addenda (MKE 2009-26, 10 February 2009)

Article 1 (Enforcement date) ① This regulation shall enter into force after promulgate. But, Article 16, ④ and Annex 1 (Adapter and Charger) shall enter into force after 1st of January, 2009. By Article 10, 16, Annex 2, 6, and 7 Refrigerator, Kim-chi refrigerator, Washing machine, Horizontal drum washing machine, dish drier, vacuum cleaner, electric fan, air cleaner, Incandescent lamps, associated lamps, and adapter-charger shall be entered into force after 1st of July, 2009 for new production, and freezer, air-conditioner, dish washer, Electric cooler and heater for drinking water storage, rice cooker, Fluorescent lamps, Fluorescent lamps ballast, 3 phase induction motor shall be entered into force after 1st of January, 2010.

② Article 9, ③ shall enter into force until 31st of December, 2009.

Article 2 (Interim measure concerning Standby power) Adapter or charger for mobile phone endorsed by the Ministry of MKE until 31 December 2008 according to Article 12 of "Standby power program (MKE 2008-116, 28 August 2008)" shall be endorsed with self-certified from 1st January 2009.

Addenda (MKE 2009-158, 30 July 2009)

Article 1 (Enforcement date) ① This regulation shall enter into force after promulgate. But, commercial refrigerator, freezer, air-conditioner, dish washer, Electric cooler and heater for drinking water storage, rice cooker, , rice cooker, Fluorescent lamps, Fluorescent lamps ballast, household gas boiler, electric driven heatpump shall be entered into force after 1st of January, 2010, and for 8 poles of 3 phase induction motor the rated output of 37kW~110kW shall be entered into force after 1st of January, 2010, and the rated output of 0.75kW~37kW shall be entered into force after 1st of January, 2011. For energy efficiency level label Article 10, 16, Annex 2, Annex 6, and Annex 7 are considering to revise currently, and washing machine, horizontal drum washing machine, and dishwasher will be effective after 1st July 2009.

Article 2 (Interim measure concerning energy efficiency test) ① The result that achieved with the previous regulation is inured in accordance with this regulation. Only freezer, and rice cooker shall be tested for energy efficiency with a new test method until 31st of December 2009. Air-conditioner, and Household gas boiler shall be tested for standby power in order to get 1st grade of energy efficiency level from 1st of January, 2010.

Addenda (MKE 2009-304, 11 December 2009)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate.

Addenda (MKE 2009-317, 28 December 2009)

Article 1 (Enforcement date) This regulation shall enter into force after promulgate. But, Article 10, Article 16, Annex 2, and Annex 6 shall be entered into force after 1st of July, 2010.

Addenda (MKE 2010-124, 6 June 2010)

Article 1 (Enforcement date) ① This regulation shall enter into force after promulgate. But, gas water heater, refrigerator, kimchi refrigerator, horizontal drum washing machine, dish drier, air cleaner shall be entered into force after 1st of January, 2011, and for incandescent lamp the rated output of 70W~150W shall be entered into force after 1st of January, 2012, and the rated output of 25W~70W shall be entered into force after 1st of January, 2014.

Article 2 (Interim measure concerning energy efficiency test) ① The result that achieved with the previous regulation is inured in accordance with this regulation. Only kimchi refrigerator shall be tested for energy efficiency with a new test method until 31st of December 2010. Dish drier shall be tested for standby power in order to get 1st grade of energy efficiency level from 1st of January, 2011.

< Annex 1> Test procedures for appliances with energy efficiency label (Article 4)

1. Washing machine

- Power consumption per 1 kg shall be measured by the test method in KS C 9608, which is obtained from energy consumption (Wh) divided by the rated capacity (kg) in a specified cycle. [Power consumption per 1 kg : Wh/kg/1 cycle at standard cycle]

1. Instrumentation and method

A. Instrumentation

1) Thermometer

① Accuracy shall be within ± 0.5℃ or minimum measuring unit shall be 1℃ or less.

② Install one thermometer in cold water line.

2) Electric energy

① Power meter: Minimum measuring unit shall be 1Wh or less, and measuring error shall be within 1% of measuring value.

② Voltmeter: Measuring error shall be within 1% of measuring value.

3) Water volume

① Minimum measuring unit shall be 0.2 ℓ /min or less and measuring error shall be within 2% or less of measuring value.

② Install one thermometer in cold water line.

4) Water-pressure

① Minimum measuring unit shall be 5KPa or less and measuring error shall be within 5% or less of measuring value.

② Install one thermometer in cold water line.

5) Load scale : Minimum measuring unit shall be within 1g.

B. Test condition

1) Ambient temperature: 15℃~30℃

2) Load : "Annex 1" of KS C 9608.

3) Water temperature : At standard water volume the water temperature shall be ambient water temperature to supply at start, and recorded temperature in a test report.

4) Measurements of water volume : "Annex 2" of KS C 9608.

5) Program time and test number

① Program time and test number shall be followed to “8. Test in KS C 9608".

② Only, in monitoring program the energy consumption shall be not more than 115% of the rated value.

6) Mean performance value : Water extraction ratio, and rinsing index shall be get to average for 4 times.

7) Specified program : It is defined as one washing cycle, one water spin extraction cycle, and two rinsing cycle. (Only, in case of automatic type and full automatic type, the manufacturer indicates the specified program.)

2. Performance requirements

- As long as there is no special standard, the results tested by KS C 9608 shall be met as follows.

A. Water extraction ratio shall be not less than 45%.
B. Rinsing ratio shall be not less than 1.00.
C. Repeatability : All test results for 4 times shall be within 10% of mean value.

3. Energy consumption test

- Energy consumption test shall be conducted at the rated washing load and water volume at 220V±2%, and 60Hz±1% in a standard cycle. The value of 3 tests shall be averaged.
- Only, Washing machine with the electric heater is not included in energy consumption test.

2. Horizontal drum washing machine

1. Scope

- Horizontal drum washing machine which are defined the household washing machine with the rated capacity of 2~20kg, and has the heater, spin extractor, and dryer.
- But, non-detergent type is excluded, and the type which has the heater is only available to boil and dry is also exclude.
- Energy Efficiency shall be measured by the test method in Annex 8, which is obtained from energy consumption (Wh) divided by the rated capacity (kg) in a specified cleaning cycle (Water temperature 40℃)

2. Reference

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS C IEC 60456 Clothes washing machines for households use – Methods for measuring the performance

KS C 9608 Electric washing machines

3. Definitions

For the purposes of this standard, the following terms and definitions apply, and others apply KS C IEC 60456 and KS C 9608.

a) Horizontal drum washing machine

Washing machine in which the textiles are placed in a horizontal drum and partially immersed in the washing water, the mechanical action being produced by rotation of the drum about its axis, the movement being either conditions or periodically reversed.

b) Rated washing capacity

Maximum mass of dry textiles which the manufacturer declares can be treated in a specific program.

c) Water volume

Maximum water volume which the manufacturer declares can be treated in a specific program.

d) Base load

Textile load without strips of standardized soiling by KS C IEC 60456.

e) Test load

Base load plus strips of standardized soiling by KS C IEC 60456.

f) Test strip

Test load for performance test by KS C IEC 60456 .

g) Detergent

By KS C IEC 60456 a cleaning agent in powder, granular or liquid form, manufactured for use in household electric washing machine to aid in removal of soiling by chemical means.

h) General conditions

General conditions refer to basis condition that shall be kept while testing and shall be maintained that ambient temperature is 20±5℃, room humidity is 60±20%, water supply is 15±2℃, electrical supply is 220V±2%, and frequency is 60Hz±1% throughout the test. General condition shall be reported.

4. Test

4.1 Test condition

4.1.1 General

Test sample shall be offered with manual, and it must be inspected certainly that acts rightly before measurement.

4.1.2 Installation

Test sample shall be installed according to manufacturer's direction, and ambient temperature shall be measured when it begins to measure.

4.1.3 Electric supply

The supply voltage shall be maintained at the rated voltage 220V ± 2% throughout the test. The supply frequency shall be maintained at the rated frequency 60 Hz±1%.

4.1.4 Water supply

A water hardness ($CaCO_3$) of 80 ㎎/ℓ or less shall be used for all program. The temperature of the supply water shall be 15±2℃ for cold water, and the dynamic pressure of the water supply at each water inlet shall be maintained at 240±50kPa throughout the test.

4.1.5 Detergent

Detergent shall be used by KS C IEC 60546, and the amount of detergent shall be determinate in accordance as follows.

The amount of detergent : 54g + 16g × Rated washing capacity (kg)

4.1.6 Base load and test strips

Base load and test strips shall be used for prescribed by KS C IEC 60456 and number of the test load for rated washing capacity (kg) is given in [Table 1]. If the test load is not specified in [Table 1], the number of sheet and pillowcase are loaded at lower level and the rest load needed is loaded with hand-towels.

[Table 1] Test load for rated washing capacity.

Capacity	Rated capacity(kg)																
load	13.0	12.0	11.0	10.0	9.0	8.0	7.0	6.5	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0
test strips	8	8	8	8	8	8	7	7	6	6	5	5	4	4	3	3	2
hand-towels	31	26	26	23	23	23	23	23	23	18	18	14	14	11	11	9	6
pillowcases	30	28	24	22	18	14	12	10	8	8	6	6	4	3	4	3	2
sheets	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	1	1

[Table 2] Loading order of test load for rated washing capacity

load order	Items	13.0	12.0	11.0	10.0	9.0	8.0	7.0	6.5	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0
1	pillowcase	5	4	4	3	2	1	1	1	1	1	1	1	1				
2	hand-towel	6	5	5	4	4	4	4	4	4	3	3	2~4	2~5	3			
3	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1	1	1	1				
4	pillowcase	5	5	4	4	4	3	3	2	2	2					1	1	1
5	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1				1			
6	Sheet	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
7	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	pillowcase	5	5	4	4	3	3	2	2	1	1	2	2	1	1	1		
9	hand-towel	1~6	1~4	1~4	1~4	1~4	1~4	1~4	1~4	1~5	0~3	0~4				2~4	2~3	2~3
10	hand-towel+ test strip	1	1	1	1	1	1	1	1			1	1					
11	Sheet	1	1	1	1	1	1									1	1	1
12	hand-towel+ test strip	1	1	1	1	1	1									1	1	1
13	hand-towel	1~5	1~4	1~4	1~3	1~3	1~3	1~4	1~4	1~4	0~3	0~3				2~4	3	1
14	pillowcase	5	5	4	4	3	3	2	2	1	1	2	2	1	1	1	1	
15	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
16	Sheet	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
17	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1				1			
18	pillowcase	5	5	4	4	4	3	3	2	2	2				1	1	1	1
19	hand-towel+ test strip	1	1	1	1	1	1	1	1	1	1	1	1	1				
20	hand-towel	6	5	5	4	4	4	4	4	4	3	3	2~5	2~5	1~4			
21	pillowcase	5	4	4	3	2	1	1	1	1	1	1	1	1				

4.2 Instrumentation

4.2.1 Thermometer

Accuracy shall be within ± 0.5℃ or minimum measuring unit shall be 1℃ or less.

4.2.2 Electric energy

① Power meter: Minimum measuring unit shall be 1Wh or less, and measuring error shall be within 1% of measuring value.

② Voltmeter: Measuring error shall be within 1% of measuring value.

4.2.3 Water volume

Minimum measuring unit shall be 0.2 ℓ /min or less and measuring error shall be within 2% or less of measuring value.

4.2.4 Water-pressure

Minimum measuring unit shall be 5KPa or less and measuring error shall be within 5% or less of measuring value.

4.2.5 Load scale : Minimum measuring unit shall be within 1g.

4.2.6 Optical reflectance or photocolorimeter

It shall measure the range of the surface reflectance of 400~600nm , and measurements aperture shall be 20 nm or less. Also, it shall have the self- calibration function.

4.3 Performance Test

There are washing performance test, spin extraction test, energy consumption test, and water consumption test.

4.3.1 Washing performance

a) Washing performance test is attended under 4.1 Test condition.

b) There is the test load in [Table 1] and loading order in [Table 2].

c) The test load shall be evenly spread in washing machine.

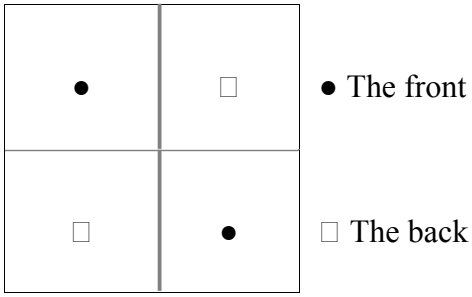
d) The test sample should be tested at specified program by the water temperature of 40℃, and in case that it can not set by 40℃, a program the manufacturer indicates is to be used, and shall be the nearest 40℃. Other conditions follow with the manufacturer's instructions.

e) Reference washing machine in KS C IEC 60456 shall be tested with test load of 5 ㎏ and at COTTON 40℃ program, at the same time the test sample shall be tested.

f) After the completion of the washing program, all test strips are dried by ironing using a method which avoids surface "shine"(i.e. ironed between two pieces of fabric, or with an ironing appliance or press).

g) The reflectance measurements are carried out with a minimum of four layers of the same washed soiled type specimen as backing for the specimen being measured. Every

washed specimen is measured twice on both sides, at the positions indicated in [Figure1]. The average value of the four readings is reported as the value for that soiled test specimen.



[Figure 1] Indication of positions for measuring soiled test specimens

h) The following calculation is carried out for each type of soiled test specimen.

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where

x_i is the average of the individual readings for each soiled test specimen;

n in the number of test strips in the wash.

The sum of the soiling values in each wash, C, for each wash the four soiling types are calculated as follows:

$$C = \sum \bar{x}$$

The average sum of the soiling values for each of the four soiling types for all cycles C.

$$\bar{C} = \frac{\sum_{1}^{k} C}{k}$$

k is the number of cycles.

i) Ratio, q, between the washing machine under test, $C_{test,}$ and the reference washing machine, C_{ref} is calculated as follows :

$$q = \frac{\bar{C}_{test}}{\bar{C}_{ref}}$$

j) The washing performance shall be more than 0.60 of washing efficiency index.

4.3.2 Spin extraction test

a) Spin extraction test is attended with washing performance test by 4.3.1. at the same time.

b) Water extraction ratio (S) is calculated as follows.

$$S(\%) = \frac{M}{M_r} \times 100$$

M is the conditioned mass of the base load (exclude test strips)

M_r is the mass of the base load after extraction (exclude test strips)

c) The spin extraction performance shall be more than 0.40 of water extraction ratio.

4.3.3 Power consumption test

a) Power consumption is determined during typical operations of washing, rinsing and spin extraction in "4.3.1 Washing performance" condition for a program the manufacturer specified. Electrical energy (E_e) is accumulated for a complete cycle, and expressed in kWh.

b) Power consumption is expressed in kWh to two decimal places.

c) Correction factor

If the inlet temperature of the cold water deviates from 15℃, the cold water energy correction factor shall be determined using the following formula:

$$E_c = \frac{Q_C \times (t_c - 15)}{860}$$

Where,

E_c is the cold water energy correction in kWh during a complete test

t_c is the measured inlet temperature of the cold water in degree Celsius, 13~17℃

Q_c is the volume of the cold water used during the prewash and main wash only, in ℓ

d) The total energy consumption (E_t) is calculated as follows;

$$E_t = E_e + E_c$$

4.3.4 Water consumption test

a) Water consumption is determined during typical operations of washing, rinsing and spin extraction in "4.3.1 Washing performance" condition for a program the manufacturer specified. Water consumption is accumulated for a complete cycle, and expressed in ℓ.

b) Water consumption is expressed to the nearest integer.

5. Calculation of Energy Efficiency

a) It shall be recorded test result in [Table 3].

[Table 3] Record of performance test of electric drum washing machine

Test sample	Number of Test	Washing efficiency index	Water extraction ratio [%]	Dried Load weight [kg]	Load weight after Spin extraction [kg]	Energy consumption [kWh]	Water consumption [ℓ]
1	1						
	2						
	3						
	Average						
2	1						
	2						
	3						
	Average						
Average							

b) The test sample is 2 units per model and is tested 3 times each unit.

c) Energy efficiency level index is as follows

$$\text{R (Energy efficiency level index)} = \frac{\text{Electric Power Consumption during a complete cycle [Wh]}}{\text{Rated washing capacity [kg]}}$$

6 .Marking and marking method

Marking includes at least the next items and should be placed at backside or side of each product that consumer is apt to see. However, if marking items in energy efficiency label duplicates in KS standard level and others certificates, it can be excepted.

a) Model Name
b) Rated washing capacity
c) Rated voltage (V)
d) Power consumption (kWh)
e) Manufacturer or the code
f) Dimension and weight
g) Address and telephone number for A/S

3. Dish washer

1. Scope

- A machine which washes rinses, and dries (when drying process is include) dishware, glassware, cutlery and, in some cases, cooking utensils by chemical, mechanical and/or electrical means with the rated capacity 20 person or less.

Remark : The units and numerical values given in ( ) in this standard are in accordance with the previous standard and are appended for reference.

2. Reference

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS A ISO 1966-3 Acoustics－Description and measurement of environmental noise －Part 3：Application to noise limits
KS C 1502 Sound level meters
KS C 1505 Integrating-averaging sound level meters
KS M 5000 Testing method for organic coatings and their related materials
KS H 2114 Instant coffee
KS L 1002 Bone china table ware
KS L 9202 Bone porcelain and bowl of soup
KS H 3005 Milk
KS H 2170 Method of test of kimchi
KS H 2169 Kimchi
KS H 2002 Margarine
KS G 2103 Artists water color brushes
KS C IEC 60436 Methods for measuring the performance of electric Dishwasher
IEC 60436 Methods for measuring the performance of electric Dishwasher
EN 50242 Electric dishwashers for household use - Test methods for measuring the performance
DIN 44 990 Elektrische Geschirrspülmaschinen für den Hausgebrauch
AS/NZS 2007.1 Performance of household electrical appliances – Dishwashers ; Part 1 Energy consumption and performance
AHAM DW-1, A 197.5 Household Dishwashers
CAN/CSA-C373 Energy consumption test methods for household Dishwashers

US DOE CFR 430 Appendix C Test Procedure of household dishwashers
IEC 59A/96/DC Technical Committee N^{o} 59 Performance of household electrical appliances Subcommittee 59A : Electric dishwashers

3. Definitions

For the purposes of this standard, the following terms and definitions apply,

a) Dishwasher
A machine which washes, rises and dries (when drying process is included) dishware, glassware, cutlery and, in some cases, cooking utensils by chemical, mechanical and/or electrical means.

b) Rated dishwasher capacity
The rated dishwasher capacity is the number of place settings together with the serving pieces (see [Table 3] and [Table 4]) stated by the manufacturer when the dishwasher is loaded in accordance with the manufacturer`s instructions.

c) Total water supply volume
Total water supply volume is accumulated for a complete cycle, and expressed in ℓ.

d) Water supply and water supply volume
Water supply is come from outer to wash and rinse, and volume is quantity for one supply.

e) Temperature of supply water
To improve washing performance the temperature reaches being heated by heating appliances or others methods.

f) Cycle
The sequence of event occurring in the dishwasher during the washing, rinsing and drying process (Where the latter is included). The test shall be with the standard mode (Auto or default setting mode for shipping), if there is no standard mode, it shall be operated with a similar mode. A complete cycle does not include a preserving mode after drying mode.

g) Dispenser
1) Automatic
A device activated automatically which injects or dispenses detergent, rinse agent, etc., one to more times into the dishwasher at predetermined intervals throughout the

dishwasher cycle.

2) Non – automatic
A device, usually a fixed cup or cavity on the dishwasher door, cover or dish rack, which deposits previously measured amount of detergent, rise agent, etc, into the dishwasher at the is closed, or requires water circulation to flush the detergent from the dispenser.

h) Water softener
A device which reduces the hardness of water

i) Cutlery basket
Container for holding cutlery in the dishwasher.

j) Rack
Support for holding dishware and glassware in the dishwasher.

k) Cutlet
Implements used in eating : knives, forks and spoons.

l) General conditions
General conditions refer to basis condition that shall be kept while testing and shall be maintained that ambient temperature is 20±2℃, room humidity is 65±5%, water supply is 15±2℃, electrical supply is 220V±1%, and frequency is 60Hz±1% throughout the test. General condition shall be reported.

m) Soil material
A material makes dishware, glassware, and cutlery dirty in order to evaluate washing performance.

n) Test load
Soiled dishware, glassware, and cutlery for evaluating washing performance

o) Detergent
A cleaning agent in powder, granular or liquid form, manufactured for use in household electric dishwashers to aid in the removal of food soils by chemical means.

p) Rinse agent

A chemical agent sometimes added to the last rinsing water to improve the drying effect and reduce water marks.

q) Water supply pressure
Water pressure is supplied from outer.

r) Standard program
A program is that the manufacturer specified for performance test.

s) Standby Power
Power consumption without any operations when a unit has been plugged in to a live power line.

4. Test conditions

4.1 General
The dishwasher manufacturer`s instructions regarding installation and use of the dishwasher should be followed. These instructions are those provided with the dishwasher in the form of instruction pages and/or user information booklets. Before commencing measurements, the dishwasher shall be checked to ensure that it is operating properly. This standard provides reliability for comparative testing when tests are conducted in the same laboratory, at one time, using the same operators.

4.2 Installation
The dishwasher shall be installed in accordance with the manufacturer`s instructions and shall be at ambient temperature at the start of each measurement.

4.3 Electrical supply
a) Frequency : 60 Hz±1%.
b) Voltage : 1 phase, 220V ± 1%

4.4 Cycle
The test shall be with the standard mode (Auto or default setting mode for shipping), if there is no standard mode, it shall be operated with a similar mode.

4.5 Ambient conditions
Temperature shall be 20 ± 2℃ with a relative humidity of 65± 5% .

4.6 Water supply

a) Temperature

1) 60 ± 2℃. (Machines designed for hot water supply only)

If the manufacturer recommends a lower temperature, it may be used so long as it noted in the report.

2) 15 ± 5℃. (Machines designed for cold water supply only)

For a single series of tests and while determining time and energy consumption for machines with water heaters, the tolerance should be maintained at ± 2℃ for the cold water supply.

3) Measurement at both temperatures is recommended for machines designed to use both the hot and cold water supply only in those countries where both conditions are common.

b) Pressure

The pressure shall be 240± 20kPa

c) Hardness

Dishwashers with water softeners are tested using a water hardness 1.5 mmol/ℓ (Ca+Mg) only. Dishwashers without water softeners are tested at manufacturer's recommended water hardness.

4.7 Detergent

The standard test detergent A or B described in [Table 1] is to be used. The quantity shall be as recommended by the manufacturer. If no recommendation is given use :

a) 2.0g/l place setting for rated dishwasher capacity of 10 or more

b) 2.5g/l place setting for rated dishwasher capacity of 10 less

For another water hardness, the concentration of detergent to be used should be proportional to the water hardness using the above values. Detergent should be stored in a waterproof bag in quantities of no more than 1 kg in a cool atmosphere ; it should be used within three months.

[Table 1] Standard detergent ingredient

Ingredient		Parts by weight (%)
A	Thermphos NW	24.0
	Plurafac LF 403	1.0
	Sodium Dichlorisocyanurate	2.3
	Sodium Carbonate	10.7
	Sodium Metasilicate	25.0
	Sodium Metasilicate Pentahydrate	37.0
B	Trisocdium Citrate Dihydrate	30.0
	Sokalan CP5 Compound(50% Active Substance)	12.0
	Plurafac LF 403	2.0
	Sodium Disilicate	25.0
	Sodium Carbonate	23.0
	Sodium Perborate Monohydrate	5.0
	TAED	2.0
	Amylase	0.5
	Protease	0.5

4.8 Rinse agent

One of the standard rinse agents is to be used in [Table 2]. If the dishwasher is equipped with an automatic dispenser which is not adjustable, the quantity added is determined by this device. For machines with as adjustable automatic dispenser, the quantity used shall be as recommended by the manufacturer. In the absence of such an indication, 0.3mℓ/ ℓ will be added. For machines without automatic dispenser, the rinse agent shall be added manually when so recommended by the manufacturer and in accordance with his instructions.

[Table 2] Standard rinse agent ingredient

Ingredient	Formula “Ⅳ”(neutral)
Plurafac LF 221	15.0
Cumene Sulfonate(40% Soln.)	11.5
Citric Acid(Anhydrous)	-
Deionized water	73.5
Viscosity[mpas]	11.0
pH(1% in Water)	6.3

5. Performance

There are followings ;

a) Washing performance

b) Drying performance

c) Energy consumption : Electric and water

There are 3 performances

a) Washing and drying performance
b) Washing Capacity
c) Energy consumption : Electric and water

These are so important and dependent that they should be reported together for consumer information.

5.1 Washing performance

The value shall be more than 94% of the rated value when tested with method 6.3

5.2 Electric power consumption

The value shall be not more than 110% of the rated value when tested with method 6.3.

5.3 Standby power consumption

Standby power consumption measured according to 6.7 shall be not more than 0.1W for 1st energy efficiency level, and other levels are not applicable to standby power consumption.

5.4 Water consumption

The value shall be not more than 110% of the rated value when tested with method 6.3.

5.5 Drying performance

The value shall be more than 90% of the rated value when tested with method 6.5.

6. Test method

6.1 General

The dishwasher manufacturer`s instructions regarding installation and use of the dishwasher should be followed. These instructions are those provided with the dishwasher in the form of instruction pages and/or user information booklets. Before commencing measurements, the dishwasher shall be checked to ensure that it is operating properly.

6.2 Test procedures and test conditions

a) 1 Step : The dishwasher shall be operated at least for two complete cycles using a clean dish load and without detergent and rinse agent. There shall be no interrupt cycle during running.

b) 2 Step : Conduct 6.3 washing performance test and 6.4 energy consumption test.

c) 3 Step : Conduct 6.5 drying performance test

d) 4 Step : Conduct 6.6 Acoustic noise test

e) 5 Step : Conduct 6.7 Standby power test

6.3 Washing performance test

6.3.1 General

This describes to evaluate washing performance for the soiled tablewares, and it shall be tested twice with two samples per a model. The test load used in this test is according to [Table 3] and [Figure 1], and soiled materials for washing performance are prepared in 6.3.3. The test procedure and condition are prepared in 6.3.4.

6.3.2 Standard place setting and serving pieces for test load

a) Requirement

The tableware should be glossy without any crack or scratch. To prepare the tableware (whether they are new or not) for the test, they should be completely cleaned with hot and clean water, and dried before the test. Putting papers or the like between them, the tableware should be prevented from a scratch.

b) Standard place setting and serving pieces

One place setting shall consist of the pieces shown [Table 3]. The shapes and the sizes of the rice bowl and the soup bowl should be prepared based on [Table 2 convex shape], [Table 3 square shape] in KS L 9202. The others are based on IEC 60436 [Table 3]. The standard tableware should be evenness on the surface and white china. Spoons, chopsticks, and teaspoons should be stainless according to [Table 3].

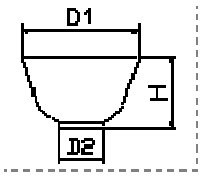
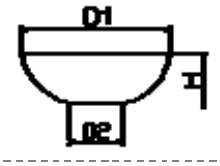
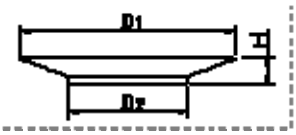
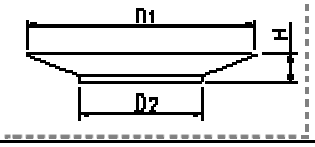
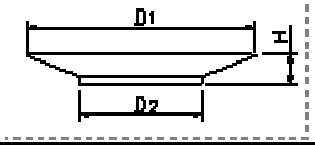
c) Test load

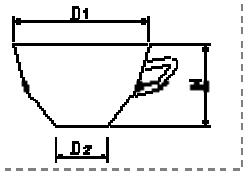
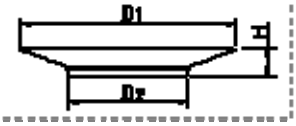
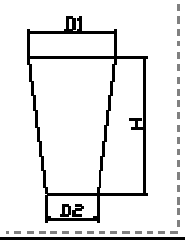
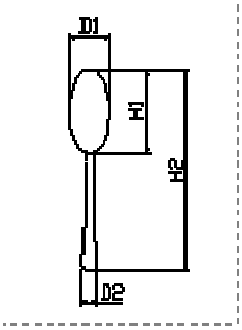
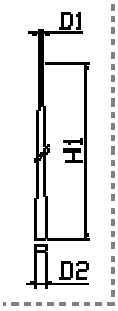
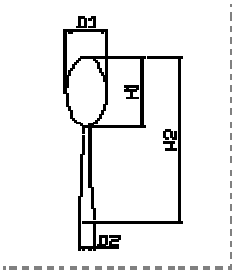
It means the amount based on [Table 5], which washing capacity, the sizes and shapes are based on [Table 3]. Rated washing capacity is based on Korean traditional cooking.

[Table 3] Shape and kind of tableware

Item	Dimension(㎜)
Rice bowl	120~0 × 60
Soup bowl	150~85 × 50
Dessert dish	Diameter 160
Dinner plate	Diameter 220
Oval platter	Diameter 265
Coffee cup	Diameter 90
Saucer	Diameter 145
Glass	Diameter 65, Capacity 250 ㎖
Spoon	[Figure 1] reference
Chopsticks	[Figure 1] reference
Teaspoon	[Figure 1] reference

[Figure 1] Shape and kind of tableware

Classification		Divisions of dimensions	Dimensions (㎜)
Rice bowl		D1 D2 H	120±10 70±5 60±5
Soup bowl		D1 D2 H	150±10 85±10 50±5
Dessert dish		D1 D2 H	160±10 - 20±5
Dinner plate		D1 D2 H	220±10 - 25±5
Oval platter		D1 D2 H	265±10 - 30±5

Coffee cup		D1 D2 H	90±10 - 60±5
Saucer		D1 D2 H	145±10 - 20±5
Glass		D1 D2 H Capacity	65±10 - 110±10 250㎖
Spoon		D1 D2 H1 H2	40±5 10±2 60±5 200±10
Chopsticks		D1 D2 H1	3.5±1 6.5±1 205±10
Teaspoon		D1 D2 H1 H2	20±2 7±2 40±5 135±5

[Table 4] Tableware of the test load by one person.

No.	Item	Number of pieces	Remarks
1	Rice bowl	1	[Figure 1] reference
2	Soup bowl	1	
3	Dessert dish	1	
4	Dinner plate	0.5	
5	Oval platter	[Table 5] reference	
6	Coffee cup	0.5	
7	Saucer	0.5	
8	Glass	0.5	
9	Spoon	1	
10	Chopsticks	1	
11	Teaspoon	0.5	

[Table 5] Test load

Division	4 person below	6 person	8 person	10 person	12 person	14 person above
Rice bowl	4	6	8	10	12	14
Soup bowl	4	6	8	10	12	14
Dessert dish	4	6	8	10	12	14
Dinner plate	2	3	4	5	6	7
Oval platter	1	2	3	3	4	5
Coffee cup	2	3	4	5	6	7
Saucer	2	3	4	5	6	7
Glass	2	3	4	5	6	7
Spoon	4	6	8	10	12	14
Chopsticks	4	6	8	10	12	14
Teaspoon	2	3	4	5	6	7
Total	31	47	63	78	94	110

6.3.3 Soiling agents

All soiling agents should be prepared newly for all the test, and soiling agents shall be satisfied the following

a) Rice

1) The rice is the superlative quality (Do not past six months after polished)

2) Cooking condition : ratio of rice and water shall be by 1:1.1

3) Way to make steamed rice are following two ways.

(a) Rice kettle

(1) Pour enough water to rice and mix quickly. And throw away water, rub strongly and wash out three or four orders until water becomes clean.

(2) Pour enough water and, extract moisture in wicker basket after 30 minutes in the summer and hours in the winter.

(3) Put rice and water in rice cooker, begin to boil with intermediate fire, and reduce by weak fire for 4~5 minutes to not overflow.

(4) After 15 minutes with the very weak fire and boil with the strong fire for 5 seconds to remove water of remainder before put out the fire.

(5) Remain for 10～15 minute with the lid covering and mix well.

(b) Electric rice cooker

(1) The same procedure with rice kettle

(2) Cook according to manufacturer's instructions.

4) Grain of steamed rice used in test : it shall be used within 8 hour after cooking. Only, 24 hours must not pass in electric rice cooker.

b) Egg yolk

1) Use standard top-grade eggs within effective use period weighing 50~65g which have been stored in a refrigerator.

2) Upon removal from the refrigerator 1 hour before use.

3) At least Break four egg shells and separate the yolks from the whites.

4) Place the yolks in a suitable container and stir well with a fork.

c) Margarine

1) Use only low fat household margarine with less 60% fat.

2) Store in a refrigerator before use.

3) Use margarine within effective use period.

d) Kimchi

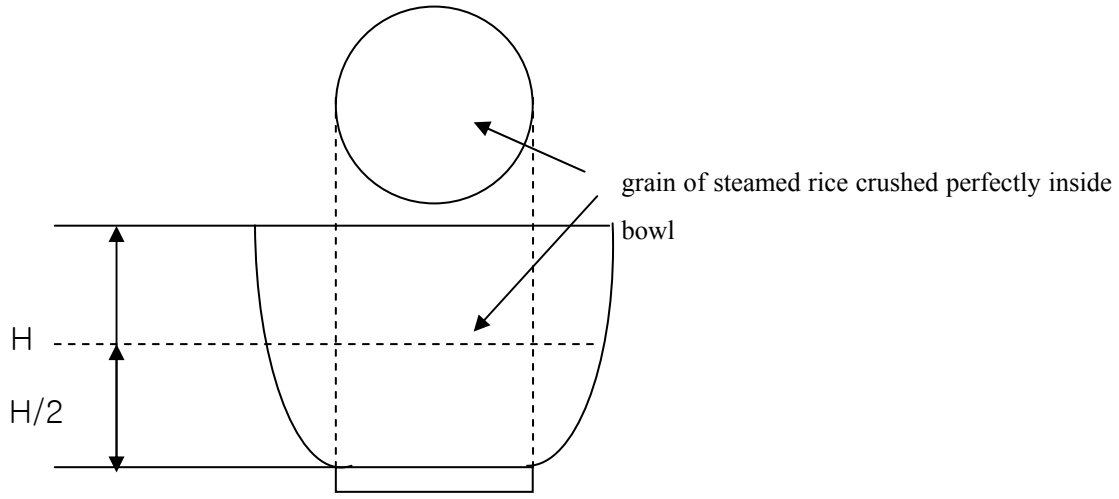
1) Kimchi shall be satisfied with KS H 2169.
2) Fermentation shall not be considered.
3) Use 0.3g cayenne after filtering with standard screen of KS A 5101(Mesh 10, screen size 1.4~1.7㎜, and 0.3g).

e) Milk
1) Homogeneous liquid milk with an 1.5~2.0% fat.
2) Store in a refrigerator before use.
3) Use margarine within effective use period.

f) Coffee
1) Freeze-drying instant coffee shall be satisfied with KS H 2114-1998.
2) Put 70㎖ water that boils at 90℃ higher, mix 1.8g instant coffee, 5.8g sugar, and 4.4g primer well.
3) Instant coffee, sugar and primer shall be store in a refrigerator.
4) Use Instant coffee, sugar and primer within effective use period.

6.3.4 Preparation and application

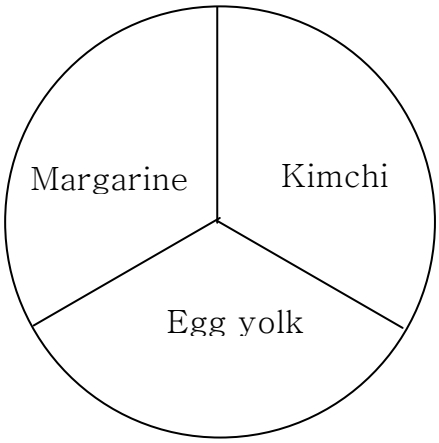
6.3.4.1 Soiling
a) Grain of steamed rice
1) For rice bowl grain of steamed rice 20 crushed perfectly inside bowl is left at ambient temperature more than 2 hours.



[Figure 2] Position of grain of steamed rice in rice bowl

b) Egg yolk

1) Use a pastry brush (KS G 2103, writing brush No. 28) to smear 2g of egg yolk per plate evenly over the top surface of each oval and dinner plate and dessert dish so as to cover a sector of the sunken surface equal to one-third of its area (see [Figure 3]).
2) Each plate shall be left more than 2 hours at ambient temperature (laboratory temperature) after staining egg yolk evenly.



[Figure 3] Application position of soiled plate

c) Margarine
1) After left at ambient temperature, use a pastry brush to smear 1g of margarine per plate evenly over the top surface of each oval and dinner plate and dessert dish so as to cover a sector of the sunken surface equal to one-third of its area.
2) Use a pastry brush to smear 1.5g of margarine per soup bowl evenly over the top surface of soup bowl.
3) All plates and soup bowls shall be left more than 2 hours at ambient temperature (laboratory temperature) after staining margarine evenly.

d) Kimchi
1) Use a pastry brush (KS G 2103, writing brush No. 28) to smear kimchi juice per plate evenly over the top surface of each oval and dinner plate and dessert dish so as to cover a sector of the sunken surface equal to one-third of its area (see [Figure 3]).
2) Provide 0.3g cayenne equally on oval and dinner plate and dessert dish dessert plate.
3) Each plate shall be left more than 2 hours at ambient temperature (laboratory temperature) after provide kimchi juice and cayenne.

e) Milk
1) After shake enough milk kept in a refrigerator (more than 30 seconds), 10㎖ of milk

shall be removed after soiling all insides glass (250㎖)
2) Leave more than 2 hours at ambient temperature (laboratory temperature).

f) Coffee
1) 70㎖ of coffee shall be removed from coffee cup after soiling all insides coffee cup (250㎖)
2) Leave more than 2 hours at ambient temperature (laboratory temperature).
3) 10㎖ of coffee shall be removed from saucer after soiling the top surface of saucer, and leave more than 2 hours at ambient temperature (laboratory temperature).

6.3.4.2 Loading
Load the dishwasher in accordance with the manufacturer`s recommendations without stacking the dishware or nesting the cutlery. Only, without the manufacturer`s recommendations arrange well without stacking the dishware or nesting the cutlery. Also, the arrangement of tableware shall be at equal position for each test.

6.3.4.3 Operating
a) The dishwasher shall be operated at least for two complete cycles using a clean dish load and without detergent and rinse agent at program specified by the manufacturer. The amount of detergent and rinse agent shall be specified by the manufacturer.
b) After above operating, operate the dishwasher through one complete cycle with load twice.
c) The test sample is 2 units.

6.3.5 Washing performance
Washing performance shall be evaluated at a standard mode or similar mode specified by the manufacturer.

6.3.6 Evaluation
a) At the completion of the cycle, carefully remove one piece of the ware at a time and inspect all surfaces visually for any soil. Each piece shall be examined visually in all well-lighted area using diffused light giving an intensity of 1000 to 1500lx measured at the work area where the evaluation is to be made.
b) It is suggested that the observation of each piece shall be limited to about 10s.
c) Rating Value is according to the rating system in [Table 6].

[Table 6] Evaluation point for washing Performance

Number of soiled particle	Total soiled area ㎟	Point
n=0	A=0	5
0<n≤4	0<A≤4	4
4<n≤10	4<A≤20	3
10<n	20<A≤50	2
N/A	50<A≤200	1
N/A	200<A	0

[Table 7] Evaluation table for washing Performance

No (z)	Soiling Agent	Tableware	Number of Tableware (n_z)	Point a_b number of tableware, b point						Total point $C_z = \sum_b^5 a_b \times b$
				5	4	3	2	1	0	
1	Boiled rice	Rice bowl								
2	Margarine	Soup bowl								
3	Kimchi Margarine Egg yolk	Dessert dish								
4	Kimchi Margarine Egg yolk	Dinner plate								
5	Kimchi Margarine Egg yolk	Oval plate								
6	Coffee	Coffee cop								
7	Coffee	Saucer								
8	Milk	Glass								
	Total tableware number N =									$\Sigma C_z =$
Remark :			Test number :							

d) Assessment of washing performance index

After each piece has been judged according to the above rating system, the total value of the scores assigned is divided by the maximum possible score (the total pieces used in the washing measurement multiplied by two). The quotient obtained with following formula is the “washing performance index” for the washing measurement.

$$C_{T,i} = \frac{1}{5N} \sum_{z=1}^{Nn} C_z \times 100$$

Washing performance index is expressed to one decimal places from the maximum of 100% to minimum of 0%.

6.4 Energy consumption test

a) Power consumption test (kW)

1) Power consumption is determined with table wares in clause 6.3 at rated voltage and frequency after power consumption becomes stable, and expressed in kW.

2) Power consumption is expressed in kW to two decimal places.

b) Power quantity consumption test (kWh)

1) Power consumption is determined during operations of washing performance test in clause 6.3 condition for a program the manufacturer specified. Electrical energy (E_e) is accumulated for a complete cycle, and expressed in kWh.

2) Power consumption is expressed in kWh to two decimal places.

3) Correction factor

(a) If the inlet temperature of the cold water deviates from 15℃, the cold water energy correction factor shall be determined using the following formula:

$$E_c = \frac{Q_C \times (t_c - 15)}{860}$$

Where,

E_c is the cold water energy correction in kWh during a complete test

t_c is the measured inlet temperature of the cold water in degree Celsius, 13~17℃

Q_c is the volume of the cold water used during the prewash and main wash only, in ℓ

(b) If the inlet temperature of the hot water is supplied, the hot water energy correction factor shall be determined using the following formula:

$$E_h = \frac{Q_h \times (t_h - 15)}{860}$$

Where,

E_h is the hot water energy correction in kWh during a complete test

t_c is the measured inlet temperature of the hot water in degree Celsius

Q_h is the volume of the hot water used during the prewash and main wash only, in ℓ

4) The total energy consumption (E_t) is calculated as follows;

$$E_t = E_e + E_c + E_h$$

c) Water consumption test

1) Water consumption is determined during operations of washing performance test in clause 6.3 for a program the manufacturer specified. Water consumption is accumulated for a complete cycle, and expressed in ℓ.

b) Water consumption is expressed in kWh to one decimal places.

d) Length of cycle

1) Length of cycle is determined during operations of washing performance test in clause 6.3 for a program the manufacturer specified, and is measured for a complete cycle, and expressed in minute, and second.

6.5 Drying performance test

a) The drying performance test may be made in conjunction with the washing performance test or it may be made independently from the washing measurement. If it is made in conjunction with the wash measurement, the drying measurement is made before the washing performance measurement, 30min after the completion of the cycle. If the test sample has plural number of dish racks, the evaluation should be done from the lower dish rack to higher.

b) If drying performance is measured independently, the drying measurement is made 30min after the completion of the cycle.

c) The test load shall consist of the same number and type of place setting and serving pieces as are used to measure washing performance (see clause 6.3).

d) Evaluation

1) After 30min, the dishware shall removed one piece at a time, beginning with pieces in the lower dish rack if possible as follows.

2) Drying effect is evaluated by visual inspection and judged to be “dry”, “intermediate” or “wet”.

3) “Dry” is defined as an article being completely free of moisture. In this case, the article will be given a score of 2. “Intermediate” is defined as an article having one or two drops of water, or one wet streak (run). In this case, the article will be given a score of 1. “Wet”

is defined as an article having more than two drops of water or on trop and one streak or two streaks or water in glass or cup cavity. In this case, the article will be given a score of 0.

4) It is suggested that the average time to examine an individual piece should not exceed 3s. The total evaluation time for handing any evaluation should not exceed 8 sec per each dish. (include all procedures, take-out, inspection, evaluation, put-down, and record)

[Table 8] Evaluation point for drying performance

Grade	Test point	Dry of tableware
Dry	2	When there is no entirely drop or moisture
Intermediate	1	When there is one or two drops of water, or one wet streak.
Wet	0	When there is more than two drops of water or on trop and one streak or two streaks or water in glass or cup cavity

[Table 9] Evaluation table for drying performance

Number z	Tableware	Number of Tableware, n_z	Tableware point a_c tableware, C point			Total point $D_z = \sum_{c} a_c \times c$
			2	1	0	
1	Rice bowl					
2	Soup bowl					
3	Dessert dish					
4	Dinner plate					
5	Oval plate					
6	Coffee cup					
7	Saucer					
8	Glass					
9	Spoon					
10	Chopsticks					
11	Tee spoon					
	Total tableware number N=					$\sum D_z =$
Remark :		Test number :				

5) Assessment of drying performance index

After each piece has been judged according to the above rating system, the total value of the scores assigned is divided by the maximum possible score (the total pieces used in the washing measurement multiplied by two). The quotient obtained with following formula is the “drying performance index” for the drying measurement.

$$C_{T,i} = \frac{1}{2N} \sum_{z=1}^{Nn} D_z \times 100$$

Drying performance index is expressed to one decimal places from the maximum of 100% to minimum of 0%.

6) Only, a tableware contacts with dish rack or is placed in lower column of dish rack with filled water can be excepted for assessment.

e) Product with nature convection drying shall be conducted manufacturer’s recommendation.

6.6 Data to be recorded in the test report

A following data shall be recorded after test.

a) Program at test
b) Test condition : Power source, condition of laboratory, water supply, rated washing capacity
c) Detergent and rinse agent
d) Measured power consumption, correction factor of cold water, correction factor of hot water (applicable if using hot water), total power consumption
e) Water consumption
f) Number of tableware
g) Washing performance index
h) Drying performance index
i) Length of cycle (wash and dry)

7. Tolerance of test result

a) Washing performance index shall be not less than 94% of the rated value of manufacturer.
b) Drying performance index shall be not less than 90% of the rated value of

manufacturer.

c) Power consumption shall be not more than 110% of the rated value of manufacturer.

d) Water consumption shall be not more than 110% of the rated value of manufacturer.

e) Length of cycle shall be not more than 110% of the rated value of manufacturer.

8. Calculation of energy efficiency

a) Test results shall be recorded as follows.

Test sample	Number of test	Noise (dB)	Washing performance index (%)	Drying performance index (%)	Water consumption (ℓ)		Power consumption (kWh)			
					Hot water	Cold water	E_c	E_h	E_e	E_t
1	1									
	2									
	Average									
2	1									
	2									
	Average									
Average										

b) The test sample is 2 units per model.

c) Mean value of washing performance index shall be more than 60.0%, and drying performance shall be more than 50.0%.

d) Mean value of noise shall be not more than 60dB.

e) Monthly power consumption

1) Monthly power consumption

$$PMEC = \frac{E_t \times 365}{12} \qquad \text{(kWh/month)}$$

PMEC : Monthly power consumption (kWh/month), one decimal place

E_t : Total power consumption (kWh), two decimal place

12 : month/year

2) Monthly water consumption

$$PMWC = \frac{Q_c \times 365}{12} \qquad (\ell/\text{month})$$

PMWC : Monthly water consumption (ℓ/month), one decimal place

Q_c : Total water consumption (ℓ), one decimal place

12 : month/year

f) Calculation of energy efficiency index

Test sample	Noise (dB)	Washing performance index (%)	Drying performance index (%)	Monthly water consumption PMWC(ℓ/month)	Monthly power consumption PMEC(kWh/month)
1					
2					
Average	P/N	P/N	P/N		

*Remarks : P -Pass, N-Non Pass

1) Electrical energy efficiency ratio

$$EER_e = \frac{RC \times 10}{PMEC}, \qquad \text{two decimal places}$$

Where,

RC : Rated washing capacity

2) Water energy efficiency ratio

$$EER_w = \frac{RC \times 10}{PMWC}, \qquad \text{two decimal places}$$

Where,

RC : Rated washing capacity

3) Total Energy Efficiency ratio

$$EER_t = EER_e \times EER_w, \qquad \text{two decimal places}$$

9 .Marking

9.1 Marking and marking method

Marking includes at least the next items and should be placed at backside or side of each product that consumer is apt to see. However, if marking items in energy efficiency label duplicates in KS standard level and others certificates, it can be excepted.

a) Model Name
b) Rated washing capacity
c) Monthly water consumption (PMWC, ℓ/month)
d) Monthly power consumption (PMEC, kWh/month)
e) Washing performance index (%)
f) Drying performance index (%)
g) Noise (㏈)
h) Program at test
i) Water consumption (ℓ)
j) Power consumption (kWh)
k) Test laboratory
l) Length of cycle (minute)
m) Detergent (g)
n) Rinse agent (㎖)
o) Manufacturer or the code
p) Producing date or producing number
g) Address and telephone number for A/S

9.2 Caution on use and installation

When dishwasher is installed and used, in case of special caution, it shall be marked on product or manual.

4. Dish drier

1. Scope

- A machine which only dries dishware, glassware, cutlery and, in some cases, cooking utensils by electrical means with the rated capacity 10 person or less after washing, and has the top or front door or sliding door.

Remark : The units and numerical values given in ( ) in this standard are in accordance with the previous standard and are appended for reference.

2. Reference

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS C IEC 60335-1 Safety of household and similar electrical appliances－Part 1：General requirements
KS C IEC 60335-2-5 Household and similar electrical appliances－Safety－Part 2-5：Particular requirements for dishwashers
KS C IEC 60704-2-3 Household and similar electrical appliances－Test code for the determination of airborne acoustical noise－Part 2－3：Particular requirements for dishwashers
KS C IEC 60436 Methods for measuring the performance of electric Dishwasher
KS L 9202 Bone porcelain and bowl of soup

3. Definitions

For the purposes of this standard, the following terms and definitions apply,

a) Dish drier
A machine which only dries dishware, glassware, cutlery and, in some cases, cooking utensils by electrical means.

b) Rated capacity
The rated capacity is the number of place settings together with the serving pieces (see [Table 2]) stated by the manufacturer when the dish drier is loaded in accordance with the manufacturer`s instructions.

c) Top or front door type

A dish drier has the top or front open door which can open less 1/6 of storage compartment.

d) Sliding door type

A dish drier has the sliding open door which can open more than 50% of storage compartment.

e) Power consumption

Electric power consumption shall be measured for 20 minutes drying process.

f) Test load

Dishware, glassware, and cutlery for evaluating drying performance

4. General conditions

The dish drier manufacturer`s instructions regarding installation and use of the dish drier should be followed. These instructions are those provided with the dish drier in the form of instruction pages and/or user information booklets. Before commencing measurements, the dish drier shall be checked to ensure that it is operating properly. This standard provides reliability for comparative testing when tests are conducted in the same laboratory, at one time, using the same operators.

4.2 Installation

The dish drier shall be installed in accordance with the manufacturer`s instructions and shall be at ambient temperature at the start of each measurement.

4.3 Electrical supply

a) Frequency : rated frequency ±1%.

b) Voltage : rated voltage ± 2%

4.4 Ambient conditions

Temperature shall be 20 ± 2℃ with a relative humidity of 45%~65% .

2. Performance

There are as follows ;

a) Power consumption : Electric
b) Drying performance

5.1 Electric power consumption
The value shall be not more than 110% of the rated value when tested with method 6.3.

5.2 Drying performance
The value shall be more than 90% of the rated value when tested with method 6.4.

3. Test method
6.1 General
The dish drier manufacturer`s instructions regarding installation and use of the dish drier should be followed. These instructions are those provided with the dish drier in the form of instruction pages and/or user information booklets. Before commencing measurements, the dish drier shall be checked to ensure that it is operating properly.

6.2 Test procedures and test conditions
a) 1 Step : Before test all load and sample shall be maintained at clean and dry conditions.
b) 2 Step : Conduct 6.3 power consumption test.
c) 3 Step : Conduct 6.4 drying performance test

6.3 Power consumption test
a) Power consumption is determined with table wares in clause 6.4 at rated voltage and frequency for 20 minutes after 5 minute of all tableware loading, and expressed in Wh. All loads shall be put in water (20 ± 2℃) for 5 minutes, and loaded.
b) Power consumption is expressed in Wh to two decimal places.
c) Each sample shall be tested twice with the same procedure.
d) The test sample is 2 units per model.

6.4 Drying performance test
6.4.1 General

This describes to evaluate drying performance for the table wares, and it shall be tested twice with two samples per a model. The test load used in this test is according to [Table 1] and [Figure 1].

6.4.2 Standard place setting and serving pieces for test load
a) Requirement

The tableware should be glossy without any crack or scratch. To prepare the tableware (whether they are new or not) for the test, they should be completely cleaned with hot and clean water, and dried before the test. Putting papers or the like between them, the tableware should be prevented from a scratch.

b) Standard place setting and serving pieces

One place setting shall consist of the pieces shown [Table 1]. The shapes and the sizes of the rice bowl and the soup bowl should be prepared based on [Table 2 convex shape], [Table 3 square shape] in KS L 9202. The others are based on IEC 60436 [Table 1]. The standard tableware should be evenness on the surface and white china. Spoons, chopsticks, and teaspoons should be stainless according to [Table 1].

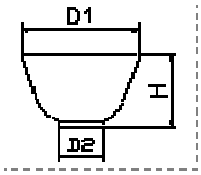
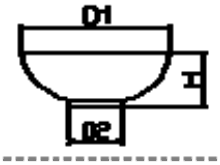
c) Test load

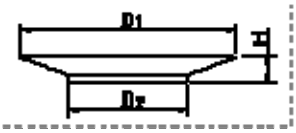
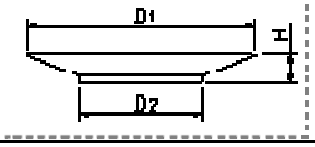
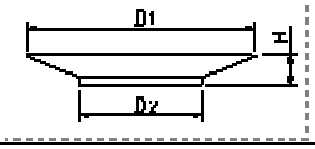
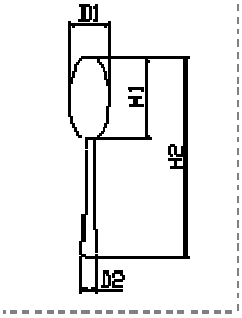
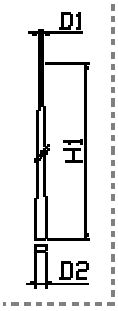
It means the amount based on [Table 3], which the rated capacity, the sizes and shapes are based on [Table 1].

[Table 1] Shape and kind of tableware

Item	Dimension(㎜)
Rice bowl	120~0 × 60
Soup bowl	150~85 × 50
Dessert dish	Diameter 160
Dinner plate	Diameter 220
Oval platter	Diameter 265
Spoon	[Figure 1] reference
Chopsticks	[Figure 1] reference

[Figure 1] Shape and kind of tableware

Classification		Divisions of dimensions	Dimensions (㎜)
Rice bowl		D1 D2 H	120±10 70±5 60±5
Soup bowl		D1 D2 H	150±10 85±10 50±5

Dessert dish		D1 D2 H	160±10 - 20±5
Dinner plate		D1 D2 H	220±10 - 25±5
Oval platter		D1 D2 H	265±10 - 30±5
Spoon		D1 D2 H1 H2	40±5 10±2 60±5 200±10
Chopsticks		D1 D2 H1	3.5±1 6.5±1 205±10

[Table 2] Tableware of the test load by one person

No.	Item	Number of pieces	Remarks
1	Rice bowl	1	[Figure 1] reference
2	Soup bowl	1	
3	Dessert dish	1	
4	Dinner plate	0.5	
5	Oval platter	RC ≤ 4 person : 1 RC = 6 person : 2 6 < RC ≤ 10 : 3	
6	Spoon	1	
7	Chopsticks	1	

[Table 3] Test Load

Category	Rice bowl	Soup bowl	Dessert dish	Dinner plate	Oval platter	Spoon	Chop sticks	Total
More than 8 persons	4	4	4	2	1	4	4	23
6~7 persons	2	2	2	1	1	2	2	12
Less than 5 persons	1	1	1	1	1	1	1	7

d) Loading

Test Load in [Table 3] shall be loaded the dish drier in accordance with the manufacturer`s recommendations without stacking the dishware. Also, the arrangement of tableware shall be at equal position for each test.

6.4.3 Drying performance

a) Evaluation of drying performance shall be conducted with unplugged 30 minutes later when power consumption test has been done.

b) Evaluation

1) After 30min, the dishware shall removed one piece at a time, beginning with pieces in the lower dish rack if possible as follows.

2) Drying effect is evaluated by visual inspection and judged to be “dry”, “intermediate” or “wet”.

3) “Dry” is defined as an article being completely free of moisture. In this case, the article will be given a score of 2. “Intermediate” is defined as an article having one or two drops of water, or one wet streak (run). In this case, the article will be given a score of 1. “Wet” is defined as an article having more than two drops of water or on drop and one streak or two streaks. In this case, the article will be given a score of 0.

4) It is suggested that the average time to examine an individual piece should not exceed 3s. The total evaluation time for handing any evaluation should not exceed 70 sec for all. (include all procedures, take-out, inspection, evaluation, put-down, and record)

5) Scores shall be recorded in [Table 5]. Drying performance index is expressed to one decimal places from the maximum of 100% to minimum of 0%.

6) Only, a tableware contacts with dish rack or is placed in lower column of dish rack with filled water can be excepted for assessment.

[Table 4] Evaluation point for drying performance

Grade	Test point	Dry of tableware
Dry	2	When there is no entirely drop or moisture
Intermediate	1	When there is one or two drops of water, or one wet streak.
Wet	0	When there is more than two drops of water, or more than two streaks.

[Table 5] Evaluation table for drying performance

Tableware	Number of Tableware, n_z	Tableware point $a_{c\ \text{tableware, C point}}$			Total point $D_z = \sum_{c=0}^{2} a_c \times c$
		2	1	0	
Rice bowl					
Soup bowl					
Dessert dish					
Dinner plate					
Oval plate					
Spoon & Chopsticks					
Total tableware number	N =				$\sum D_z =$
Drying performance = (Total points/(Number of Load x 2))x100 = %					Time : s

7. Tolerance of test result

a) Drying performance index shall be not less than 90% of the rated value of manufacturer.
b) Power consumption shall be not more than 110% of the rated value of manufacturer.

8. Calculation of energy efficiency

a) Test results shall be recorded as follows.

Sample	Test Number	Power consumption (Wh)	Drying Performance (%)
1	1		
	2		
	Average		
2	1		
	2		
	Average		
Average			(P/N)

[Remark] : P-Pass, N-Non-Pass

b) The test sample is 2 units per model.
c) Mean value of drying performance shall be more than 60.0%.

9 .Marking

9.1 Marking and marking method
Marking includes at least the next items and should be placed at backside or side of each product that consumer is apt to see. However, if marking items in energy efficiency label duplicates in KS standard level and others certificates, it can be excepted.

a) Model Name
b) Rated capacity (person)
c) Rated power consumption (W)
d) Manufacturer or the code
e) Producing date or producing number
f) Address and telephone number for A/S

9.2 Caution on use and installation
When dish drier is installed and used, in case of special caution, it shall be marked on product or manual.

5. Electrical Cooler and Heater for Drinking-Water Storage

1. Scope

This standard covers that electrical cooler and heater for drinking-water storage (hereinafter "ECHDS") shall be designed the vapor-compressor cooler, heater, and water storage in a cabinet. (Water purifier is included) Rated cooling power consumption of not more than 500W and rated heating power consumptions of not more than 1000W. The rated input voltage is DC 220V and the rated frequency is 60Hz for the device. The followings are exclusives.

a) Cold water only
b) Hot water only
c) Water purifier only
d) Cold water and water purifier only
e) Hot water and water purifier only
f) For automobile, vessel, and aircraft
g) For hot water or cold water vending machine
h) For a soft drink supplier as a vending machine
i) Using the electric thermal conduction semiconductor (N-P Module)
j) For designed for industry or business
k) For using other power sources (e.g.: gas, petroleum, solar heat etc)

Remark : The units and numerical values given in ( ) in this standard are in accordance with the previous standard and are appended for reference.

2. Reference

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS A 0006	Standard atmospheric conditions for testing
KS A 3251-1	Statistical interpretation of data－Part 1：Statistical presentation of data
KS A 0078	Humidity－Measurement methods
KS A 0511	Temperature measurement-General requirement
KS A 0801	General rules for determination of thermal efficiency
KS B 6365	Testing of refrigerant compressors

KS C 8308 Thermostats
KS C 8336 Automatic control for thermostat
KS C 9315 Drinking-water coolers
KS C 9803 Electric storage tank water heaters
KS C 9804 Electric-water heaters
IEC 60335-1 Household and similar electrical appliances safety. Part 1: General requirements
IEC 60335-2-15 Particular requirements for appliances for heating liquids
IEC 60335-2-21 Particular requirements for storage water heaters
IEC 60335-2-34 Particular requirements for motor-compressors
IEC 60335-2-35 Particular requirements for instantaneous water heaters
IEC 60335-2-75 Particular requirements for commercial dispensing appliances and vending machines
IEC 60379 Methods for measuring the performance of electric storage Water-Heaters for household purposes
Industrial Advancement Administration (the abbreviation is IAA)'s notification No. 95-375: Guide of administration according as consumption power and efficiency labeling by electric households appliances.

3. Definitions

For the purpose of this standard, the following definitions shall apply

a) General condition
ECHDS is operated under 5.1 General test condition with the rated voltage of 220V, and the rated frequency of 60Hz, by the general usage introduced by the manufacturer.

b) Steady condition
While ECHDS is being operated continuously under 5.1 General test condition, the mean temperature at each measuring points of the cold/hot water storage shall be fluctuated within 1℃ or less per 2 hours by 5.1.d).

c) Refrigerant leakage
There should not be leaking at any part of the refrigerant circuit tested by the acute leakage detector (e.g. Halogen electron tube type of leakage detector or higher performance device) while ECHDS is operated under general condition by clause a).

d) Water leakage

There should not be leaking at any part of the water pipe (from connector of the water supply to outlet) tested by unaided eye test, while ECHDS is operated under general condition by clause a).

e) Compressor

A machine driven by electric motor or electromagnetic (hereafter referred to as “electric motor”), which mechanically compresses the vaporized refrigerant form the cooler to a high pressure and high temperature. Acting it continuously and repeatedly, the machine should cool the refrigerant by the evaporative of latent heat.

f) Electric thermal conduction semiconductor

When different two kinds of N-P type of electric thermal conduction semiconductor element or joining metal are supplied with electric current, it can be seen phenomenon that temperature goes down or rises by both ends of joining point. Namely, it is to use phenomenon of endothermic or exothermic reaction, which mechanically compresses the vaporized refrigerant form the cooler to a high pressure and high temperature. Acting it continuously and repeatedly, the device should cool the refrigerant by the evaporative of latent heat.

g) Cooler

A heat exchanger in which the liquid refrigerant is vaporized at low pressure by absorbing heat from the medium to refrigerate the storage cabinet.

h) Pre-cooler

It is in advance cooling and heating appliances which wastewater from ECHDS is used to supply drinking water.

i) Electric heater

It is a device to heat water of the storage tank directly or indirectly with Ni -Cr or Fe-Cr resistance.

j) Automatic temperature control device

It is a device that keeps the temperature of water in storage at a certain value by detecting surface temperature of storage in case of chilled and hot water etc., while ECHDS is operated under general condition by clause a). (various and fixed temperature type)

k) Reducing valve

This valve is installed in the middle of water supply pipe that regulates the water pressure below required. At the same time, it prevents a back-ward flow of the water.

l) Relief valve

When water pressure occurs over required pressure at storage tank or water supply pipe, it automatically releases pressure of a storage tank for safety. It maintains the pressure below 0.1MPa (water head of 10m) at inside of tank.

m) The total volume of storage tank

This is a value that means the effective volume of tank that can store water in the hot and cold water tank, it must be expressed in ℓ separately for hot and cold water tank as the defined at (7). Summation of both volume is called the total volume of storage tank.

1) Measurement of the total volume of storage tank

First, fill water in the hot and cold water storage tank, and then measure the water flow from drain with precision electronic balance or measuring cylinder. It shall be within ±2% of the rated value. Here, assuming that specific gravity of water is 1.

n) Power consumption of electric motor

When ECHD is operated at (a) general condition and (b) steady condition, power consumption of electric motor shall be not more than 110% of the rated value (W) of manufacturer, which are the power consumption of compressor and ventilating fan totally.

o) Power consumption of heater

When ECHD is operated at (a) general condition and (b) steady condition, power consumption of heater shall be not more than 110% of the rated value (W) of manufacturer.

p) Monthly electric power consumption

When ECHD is operated at sub-clause 1) of 5.2 a), monthly electric power consumption is determined by 2) of 5.2 a), it shall be not more than 110% of rated value (kWh) of manufacturer.

q) Electric power consumption per $1m^3$

Electric power consumption per $1m^3$ is determined as 5.2.

4. Classification

ECHDS is classified as following according to water supplying way, water discharging way, and heat exchanging ways.

4.1 Water supply

a) Pressure type

A water supply pipe of ECHDS directly connects the water pipe of source, which is a kind of method that stores and supplies drinking water by water pressure.

b) Water storage tank type

A water supply pipe of ECHDS connects a water storage tank, which is a kind of method that stores and supplies drinking water by gravity.

4.2 Water discharge

a) Inlet valve control

Drinking water is discharged to control the inlet valve of ECHDS.

b) Outlet valve control

Drinking water is discharged to control the outlet valve of ECHDS.

4.3 Heat exchanger

a) Storage water

It has the water storage tank to do heating and cooling water in tank with insulation, where water is stored at specified temperature with automatic temperature control device.

1) Direct cooling method and direct heating method

To Cool and heat directly water that is stored in storage tank, cooling coil and electric heater are inserted in storage tank directly.

2) Indirect cooling method and indirect heating method

To Cool and heat directly water that is stored in storage tank, cooling coil and electric heater are wrapped outside storage tank.

b) Instant cooling and heating

It has no water storage tank to do heating and cooling, supply water is flowed in ECHWD from supply pipe. While it passes heat exchanger which is not insulated, momentarily water is cooled or heated at specified temperature with automatic temperature control device and reducing valve.

5. Energy efficiency test

5.1 General test condition

a) The installation of ECHWD in environmental chamber is as follows;

1) Test sample shall be installed on a flat floor surface horizontally and stably as manufacturer's instruction.

2) Test sample shall be installed far from the wall or the other sample more than 50 cm in order to not to be influenced from the others.

b) During the test, test sample shall stay until the inlet temperature becomes 25±0.5℃. And the test condition is that the ambient temperature of 25±1℃ and relative humidity of 75±5%.

1) In case of the ambient temperature fluctuates on test, the ambient temperature is determined by averaging the maximum temperature and minimum temperature. At this time, the deviation of the average temperature in the chamber shall be not more than ±3℃.

c) With setting control of temperature at the state of delivery of goods from a warehouse, test sample shall be operating for the 24 hours continuously with the rated voltage of 220V and the rated frequency of 60Hz.

1) Except the rapid load fluctuate of the start and stop of ECHWD, the rated voltage and the rated frequency shall be operated not more than ±1%.

d) The measuring points of water temperature in test sample (including water purifier) are as follows ;

Fro the cold water, the temperature of water is measured at the middle of 1/3 height from the bottom of the storage tank. For the hot water, the temperature of water is measured at the middle of 1/3 height from the top of the storage tank. But if the location of the water supply pipeline is coincided with the measuring point, refer to the following guide.

1) As the water supply pipeline is located at the middle of the cold water storage tank and the hot water storage tank.

(a) The measuring point of the water temperature is determined at the 1/2 of radius from the center of the tank by dividing into quarters of the inside of the storage tank uniformly.

(b) In this case that the height is 1/3 from the bottom of the storage tank in case of cold water and the height is 1/3 from the top of the storage tank in case of hot water.

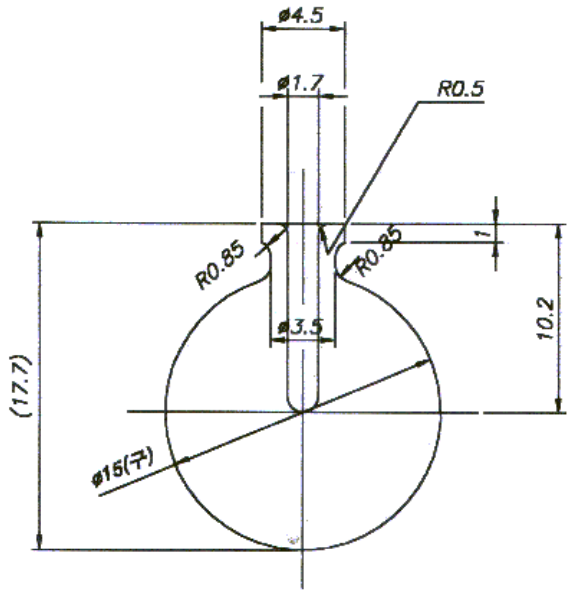
2) As the water supply pipeline is located at the side of the cold water storage tank and the hot water storage tank.

(a) The measuring point of the water temperature is determined at the 1/2 of radius from the center of the tank by dividing into quarters of the inside of the storage tank uniformly.

(b) The measuring point shall be set at the opposite side no matter where the water supply pipe is installed on the part of either sides (left or right) or any places.

(c) The measuring point shall be located at the 1/3 from the bottom of the cold water storage tank where as it should be located at the 1/3 from the top of the hot water storage tank.

3) In order to measure water temperature accurately in hot and cold water tanks, it is recommended that copper ball with the diameter of 15mm should be used for measuring water temperature. (see [Figure 1])



remark : General clearance ±0.1mm

[Figure 1] Copper ball to measure water temperature

e) The specified water temperature to calculate the compensate factor for water temperature of the tanks shall be set at 3℃ for the cold water, 85℃ for the hot water

f) The number of test samples is 2 units.

g) The average value shall be taken after testing twice for each sample.

h) A test report shall be issued for each test units, namely 2 test reports for each models shall be issued.

i) Averaging value of monthly electric power consumption in a test report shall be marked on the product. Also, energy efficiency level shall be marked.

5.2 Tests

a) Monthly power consumption (kWh/month)

1) Until each part of test sample is stable, it is operated. After stable, measure electric power consumption for 24 hour. (measure the value to 2 places of decimals) The measured value is called as "P1"(kWh), it shall be measured that 300 mℓ from cold water tank or hot water tank is released for 1 hour interval for the first 10 hours, and shall be left for 14 hours.

2) Calculate monthly power consumption as following equation. (Calculate to 2 places of decimals)

$$P_m = p_1 \times 365 \div 12 \,[\text{kWh/month}]$$

b) Measurement of the effective volume of a cold water storage tank and a hot water storage tank(ℓ)

1) After all tests, if there is no the independent cold water storage tank, eliminate the water supply tank and measure the effective volume for cold water storage tank (the base of a cooling water separator). If there is the independent cold water storage tank or hot water storage tank, measure the effective volume for storage tank. (the measured unit is ℓ and it is expressed to 2 places of decimals)

c) Measure Surface of cold water storage tank Sc[m^3] and Surface of hot water storage tank Sh[m^3] (measure the value to 4 places of decimals)

d) Calculation of energy efficiency index ("R")

1) Calculate the sum $\sum \Delta T_c = \Delta T_{C1} + \Delta T_{C2} + \Delta T_{C3} \bullet\bullet\bullet\bullet\bullet + \Delta T_{Cn}$ of the deviation of the cold water temperature, 3℃ for per cycle and he sum $\sum \Delta T_h = \Delta T_{h1} + \Delta T_{h2} + \Delta T_{h3} \bullet\bullet\bullet\bullet\bullet + \Delta T_{hn}$ of the deviation of the hot water temperature, 85℃ for per cycle for the measurement period of 12 hour in 5.2 a).

Calculate the deviation of the water temperature for the cold storage tank and hot storage tank as following equations.

(a) The deviation of the water temperature for the cold storage tank

△Tc = Tc - 3(℃)

(b) The deviation of the water temperature for the hot storage tank

△Th = 85 - Th(℃)

2) The compensation factor of the water temperature difference of the cold water storage tank and the hot water storage tank is calculated as follows;

(a) The compensation factor of the water temperature difference of the cold water storage tank (Cp)

$$C_p = KS_c \frac{\Delta T_C}{D} \times 24/1000[kWh]$$

Where,
K is the thermal conductivity of insulation, 0.05[W/(m℃)]
S_c is the surface of cold water storage tank [m^3]
D is the thickness of insulation, 0.02[m]
24 is 24 hour
1000 is conversion factor (kWh → Wh)

(b) The compensation coefficient of the water temperature difference of the hot water storage tank (Hp)

$$H_p = KS_h \frac{\Delta T_h}{D} \times 24/1000[kWh]$$

Where,
K is the thermal conductivity of insulation, 0.05[W/(m℃)]
S_h is the surface of cold water storage tank [m^3]
D is the thickness of insulation, 0.02[m]
24 is 24 hour
1000 is conversion factor (kWh → Wh)

3) Energy efficiency index (R) is defined as follows;

$$R(Energyefficiencyundex) = \frac{P_1 + C_p + H_p}{0.35 \times S_c + S_h}$$

Where,
energy efficiency index (R) is calculated to 2 places of decimal.

6 . Naming and marking

6.1 Name

a) Electrical cooler and heater for drinking-water storage

b) Electrical cooler and heater for drinking-water storage (including purifier)

6.1 Marking and marking method

Marking includes at least the next items and should be placed at backside or side of each product that consumer is apt to see. However, if marking items in energy efficiency label duplicates in KS standard level and others certificates, it can be excepted.

a) Model Name

b) Classification (pressure type or Water storage tank type)

c) The total volume of storage tank (L) : ex) 16.0 L

- volume of cold water storage tank (L) : ex) 8.0 L
- volume of hot water storage tank (L) : ex) 8.0 L

d) The volume of purifier storage tank (L) : it is only applicable to model which has a purifier.

e) Minimum temperature of the cold water (℃)

f) Maximum temperature of the hot water (℃)

g) Phase, frequency : ex) 1 phase 60Hz

h) Rated voltage (V)

i) Rated frequency (Hz)

j) Power consumption (W)

It shall be marked separately for cold water and hot water.

k) Monthly power consumption (PMEC, kWh/month)

l) energy efficiency level

m) Manufacturer or the code

n) Producing date or producing number

o) Weight(kg) of product and weight (kg) with filled water

p) Address and telephone number for A/S

6.3 Caution on use and installation

When ECHDS is installed and used, in case of special caution, it shall be marked on product or manual.

6. Rice cooker

1. Scope

This standard covers household electric rice-cooker and rice-warmer with a rated voltage 220V, and less than a rated power consumption of 2kW.

It does not apply to the testing and rating of :

a) over 20 persons
b) Warmer only
c) other energy sources

2. Normative reference

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS A 0006 Standard atmospheric conditions for testing
KS A 3251-1 Statistical interpretation of data－Part 1：Statistical presentation of data
KS A 0078 Humidity－Measurement methods
KS A 0511 Temperature measurement-general requirement
KS A 0801 General rules for determination of thermal efficiency
KS C 9310 Electric rice－Cookers
KS C 9312 Rice jars with electric thermal control
KS G 3602 Household pressure pans and pressure pots
KATS's regulation "Safety scheme for electric appliances"

3. Definitions

a) Electric Rice-cooker
   Appliance is that cooks rice with electric heat automatically, and can make warm.
b) Electric pressure Rice-cooker
   Appliance is that cooks rice with electric heat at over 0.5 kgf/cm^2
c) Maximum cooking capacity
   Maximum Capacity is that can cook at one time
d) Cooking capacity for one person : rice 150g is for one person
e) Plate Heating : Plate with electric heater
f) Rotary type
   To cook or be warm using mechanical timer or ON/OFF .

g) Micro-process method

To cook or be warm using MICOM automatically.

h) Induction Heating

Magnetic flux generated by high frequency current in coils generates eddy current in the surface of the inner pan. Eddy current loss changes to the Heat source for inner pan

i) Main Body

All except top cover and inner pan

j) Inner pan

It is put rice and water

k) Whole body

All included, main body, top cover, and inner pan

4. Classification

Rice cookers are classified as following according to heating ways.

4.1 Heating method

a) Plate Heating

b) Induction Heating

4.2 Pressure method

a) Pressure type

b) Non-pressure type

5. Test

5.1 Test instruments

a) Thermometer : Accuracy $\pm 0.5^{o}C$, and minimum scale $0.1^{o}C$ or less

b) Power meter : Accuracy ±1% at measuring data, and minimum scale 0.1Wh or less

c) Weight Scale : minimum scale 0.1g or less

d) Water contained measuring equipment : minimum scale 0.1% or less

5.2 Test condition

a) Ambient Condition

$20 \pm 2.0^{o}C$, and 45~75%

b) Rice

1) rice plant is `presumptions'.

2) The water contained in polished rice shall be between 12-14%.

c) Cooking Water

1) Distilled water or more than 2 hours of the settled service water.

2) Water volume shall be followed by manufacture's instruction.

3) Water temperature : 20±2.0°C at initial condition

4) Measuring : Use a weight scale to be round off to decimals points, and keep dry in inner pan.

d) Electrical supply

The rated voltage shall be single phase AC 220V with rated frequency of 60H±1%.

5.3 Test method and test times

a) Before cooking rice shall be washed 3 times. Also, once the washing rice does within 1 minute.

b) Test precondition is required within 1 minute from washing rice to cooking.

c) Before starting a test the temperature of inner pan and heater shall be 20al℃.

d) If there is on/off switch, a switch shall turn off.

e) The power consumption is almost stabilizes in the test from cooking commencement to cooking end. (Pressure type measured by polished rice pressure course and non-pressure type measured by a normal cooking course.) When the test of power consumption, quantity of rice shall be the appropriate values given in Table 1. Round off the number to decimal places.

[Table 1] The mass of rice of maximum cooking capacity

Max. cooking capacity (m)	mass of rice
1 persons (0.18L) ≤ m < 3 persons (0.54L)	150g
3 persons (0.54L) ≤ m < 5 persons (0.90L)	300g
5 persons (0.90L) ≤ m < 7 persons (1.26L)	450g
7 persons (1.26L) ≤ m < 9 persons (1.62L)	600g
9 persons (1.62L) ≤ m < 11 persons (1.98L)	750g
11 persons (1.98L) ≤ m < 13 persons (2.34L)	900g
13 persons (2.34L) ≤ m < 15 persons (2.70L)	1,050g
15 persons (2.70L) ≤ m < 17 persons (3.06L)	1,200g
17 persons (3.06L) ≤ m < 19 persons (3.42L)	1,350g
19 persons (3.42L) ≤ m < 20 persons (3.60L)	1,500g

f) The power consumption per 1 hour at warm condition shall conform to the followings.

1) After measuring cooking power consumption, immediately it starts keeping warm.

2) It shall measure a power consumption at warming for 24 hours, and calculate

power consumption per 1 hour, but if it complete before 24 hours, it shall be measured and calculated by duration.

g) Cooking power consumption and warming power consumption per 1 hour shall be measured 2 times respectively, and they shall be averaged. Only the average value of 2 measurements is placed more than 2% error, another test need to average, total 3 measurements is needed.

h) Test sample is two per model.

6. Total power consumption per a cycle (Cooking and warming)

$$E_l = E_C + E_l \times El$$

Where,

E_l : Total power consumption per a cycle (Cooking and warming) [Wh]

E_C : cooking mode power consumption [Wh]

E_l : warming mode power consumption [Wh]

7. Power consumption per a person

$$E_T = E_l \times Erson$$

Where,

E_T : power consumption per a person [Wh/person]

E_l : Total power consumption per a cycle (Cooking and warming) [Wh]

M : weigh of rice at cooking [g]

8. Naming and Marking

8.1 Naming

Naming is as follows, but only, Induction heating calls as 'IH' .

Example 1. 10 capacities of electric rice-cooker (1.8L)

Example 1. 10 capacities of electric pressure rice-cooker (1.8L)

Example 1. 10 capacities of IH rice-cooker (1.8L)

Example 1. 10 capacities of IH electric pressure rice-cooker (1.8L)

8.2 Marking and marking method

Marking includes at least the next items and should be placed at backside or side of each product that consumer is apt to see. However, if marking items in energy efficiency label duplicates in KS standard level and others certificates, it can be excepted.

a) Model
b) Classification
c) Rated Voltage(V)
d) Rated power consumption(W) and current(A) (warming and cooking)
e) Maximum cooking capacity
f) Operating pressure of pressure regulator (only electric pressure rice cooker)
g) Manufacturer or the code
h) Size and weight
i) Address and telephone number for A/S

7. Vacuum Cleaner

1. Scope

Vacuum cleaner of rated power consumption of 800W ~ 2,500W, and shall be moveable (dry only)

2. Normative reference and definitions

The definitions for terms and normative reference used in this standard are as follows KS C IEC 60312 and KS C 9101. Only Energy Efficiency means Suction power efficiency.

3. Test

3.1 Energy Efficiency Test

Energy Efficiency (Suction power efficiency) shall be measured by the test method in KS C IEC 9101, which is obtained from maximum suction power rate divided by power consumption.

Energy Efficiency (%) = maximum suction power rate[W]/Measured energy consumption[W]

3.2 Dust emission Test

According to test method of KS C IEC 60312, it shall be measured the averaged dust emission when the specified reference dust passes through the sample at maximum operating. The test result shall be following. (dust emission shall be measured with two decimal)

[Table 1] Dust emission

(unit: mg/m^3)

≤0.01	≤0.05	≤0.10	≤0.20	larger than 0.20

3.3 Test Data

All results shall be filled out in a following table.

[Table 2] Data sheet

	Mean	Sample 1		Sample 2	
		1st test	2nd test	1st test	2nd test
Measured energy consumption [W]					
maximum suction power rate[W]/					
Energy Efficiency (%)					
Dust emission (mg/ m^3)					

8. Electric Fan

1. Scope

By KS C 9301 household electric fan (desktop, stand, seat) which have the diameter of wing of 20~41 cm and the axial single wing run by induction motor.

2. Normative reference and definitions

The definitions for terms and normative reference used in this standard are as follows KS C 9301.

3. Test

3.1 Test condition

Test shall be achieved in ambient temperature 25±5℃, and other conditions follow KS C 9301.

3.2 Power consumption test

According to test method of KS C 9301, energy efficiency shall be calculated as follows after measured the maximum of air flow rate (standard air flow rate), the maximum of air velocity, and power consumption. Only, standard of air flow rate means the maximum of air flow rate at 25℃ of ambient temperature.

$$\text{Energy efficiency} = \frac{\text{Standard of air flow rate}[m^3/min]}{\text{Power consumption}[W]}$$

$$\text{Standard of air flow rate} = \text{Maximum of air flow rate } [m^3/min] \times \sqrt{\frac{1.178}{\nu}}$$

$$\text{The specific gravity of air (Y)} = \frac{10332}{29.44 \times (273 + \text{Temperature at test}[℃])}$$

3.3 Data to be recorded in a test report

Test result shall be recorded as follows.

[Table 1] Data to be recorded in a test report

Sample	Number of test	Standard of air flow rate (m^3/min)	Maximum air velocity (m/min)	Power consumption (W)
1	1			
	2			
	Average			
2	1			
	2			
	Average			
Average				

9. Air cleaner

1. Scope

Mechanical air cleaner and combined air cleaners in scope of KS C 9314 are which the rated power consumption is less than 200W, a rated input voltage is single AC 220V, and a rated frequency is 60 Hz

Only, the followings are excluded ;

a) It is not used with filter, but the water spray uses for collecting dust, deodorizing and removing gas.
b) It is being used only in industrial use.
c) It is built-in the building.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one.

KS B 6336 Light scattering automatic particle counter
KS C 9314 Air cleaners
KACK-1998-01 Room air cleaners

3. Definitions

For the purposes of this standard, the following terms and definitions apply, and others apply KS C 9311.

a) Air cleaner
An electrical cord-connected appliances with fan with function of collecting dust, deodorizing and removing gas etc from air in order to purify the indoor air.
There are three types of electrical, mechanical, and combined.

b) Electrical air cleaner

An air cleaning device which principally operates using the phenomenon of static electricity charge and catch dust particles. It consists of a dust collector, blower, and power supply, etc.

c) Mechanical air cleaner
An air cleaning device which uses a filter material to trap dust particles consists a dust collector, and blower etc.

d) Combined air cleaner
It is mixed with electrical and mechanical functions, it consists of a dust collector, fan, etc.

e) Dust collector
In the case of an electric air cleaner, an integrated unit consisting of an ionizer for electrically charging dust particles, a dust collecting unit for catching the dust particles and associated equipment. In the case of a mechanical cleaner, an integrated unit consisting of a filter material to trap dust particles and associated equipment.

f) Deodorization device
Deodorization device is to adsorb or decompose into the gas or smell, and is consisted of all in one body.

g) Power supply unit
A unit consisting of a power supply to provide electrical power to the dust collector, blower, etc. and a controller.

h) Rated airflow
The rate at which air flow through the air cleaner when it is operating at the rated frequency and voltage. In the case of air cleaner which has an airflow adjustment device it is the maximum airflow through the air cleaner.

4. Performance test

The performance test achieves particulate matter removal performance, deodorization performance, consumption power, standby power.
4.1 Test conditions
4.1.1 General condition

Air cleaner shall be provided with the manual, and be checked certainly whether it operates rightly before measuring.

4.1.2 Power supply

Rated frequency shall be controlled 60Hz±1% and rated voltage shall be controlled a single phase AC 220V±1%.

4.1.3 Environment condition

If there is no special regulation, the test carries out in place that keeps by ambient temperature 23±5℃, relative humidity 55±15%.

4.1.4 Operating condition

Air cleaner shall be operated with rated airflow without all additional functions. Only if manufacturer requires that turn on special function, air cleaner shall be operated with rated airflow with special functions.

4.2 Particulate matter removal performance test

4.2.1 Test particulate matter

Test particulate matter uses potassium chloride particle of solid poly disperse, it makes the solution of potassium chloride in distilled water to vaporize by a particle generator.

4.2.2 Particulate generator

Particulate generator shall be able to produce more than 10^7 particles per second when it vaporizes potassium chloride solution.

4.2.3 Processing of generated particulate

Particulate generator shall be designed to be dehydrated before potassium chloride particulate are entered to the test Chamber. Dried particles shall be neutralized with passing particle through neutralizer such as gamma radiation generator or corona discharge ionization device etc.

4.2.4 Evaluation of particulate diameter

Particulate diameter shall be 0.3 ㎛.

4.2.5 Particulate counter

Particulate counter shall have the same performance of light scattering automatic particle counter noted in KS B 6336 or higher performance. Particulate counter shall have a channel that can measure particulate concentration of 0.3 ㎛ diameters.

4.2.6 Test chamber

Test Chamber shall have a rectangular parallelepiped (regular hexahedron possibility) shape that has volume of 30±5m^3. Test chamber interior shall be manufactured with uninterruptible power panel, HEPA filter unit that can do to remove dust and air-conditioning equipments that can control air temperature and humidity in chamber. Mixing fan shall be installed so that test particulate may distribute homogeneous concentration in test chamber in early time.

4.2.7 Background particulate concentration

Background particulate concentration of test chamber shall be not more than 3×10^5 EA/ m^3 for a particle of 0.3 ㎛ diameter.

4.2.8 Air tightness

Air tightness of test chamber shall be met to have more than 80% of initial concentration for particulate of diameter 0.3 ㎛ after 20 minutes passage. The measuring procedure shall be followed with 4.2.12.

4.2.9 Test particulate concentration

When it is measured, initial particulate concentration shall be $10^8 \sim 10^{10}$ EA/ m^3 in test chamber.

4.2.10 Placement of air cleaner

Placement of air cleaner shall be followed with the instruction provided by manufactures. If the instruction is not provided, it shall be followed with subsequent conditions, and be careful that the outlet of air cleaner shall not head for the sampling probe of particulate counter.

a) Desktop type and desktop/wall hung combined type shall be adjoined in wall, placed on a table of 70 cm height.
b) Floor standing type shall be placed on bottom of wall.
c) Wall hung type shall be placed on the wall of 180 cm height.

4.2.11 Particulate sampling

Sampling for particle concentration measurement is in the center of test chamber for 1 point measurement of 120 cm height from the bottom, and sampling probe shall be fixed tightly against indoor air flow. During the test, sampling tube which connects sampling probe and particulate counter shall be used as the material which makes less the particulate loss in tube by static electricity.

4.2.12 Natural decay measurement

d) Using the chamber HEPA filter, allow the test chamber air to clean until the background particulate matter for particles in the size of 0.3㎛ to the size of 4.2.7 reaches a level of less than 3×10^5 EA/ m^3. Simultaneously operate the environmental control devices until the room conditions (temperature and RH as indicated in 4.1.3) are specified.
e) When an acceptable test chamber background level is achieved (as indicated in 4.2.7, and 4.1.3) record the background concentration, turn off the chamber HEFA filter and environmental control devices.
f) Particulate generator in 4.2.3 produces particle, and test particulate may distribute homogeneous concentration in test chamber with mixing fan.
g) When test particulate in test chamber reaches a level of 4.2.9, turn off the particulate generator and mixing fan.
h) Two minutes after turning off mixing fan, begin to acquire the particulate concentration. This test point is the initial chamber concentration (t=0).
i) Acquire particle concentration data at one-minute intervals for 20 minutes after the initial concentration measurement, and finish the test.

4.2.13 Decay measurement by air cleaner operating

a) Using the chamber HEPA filter, allow the test chamber air to clean until the background particulate matter for particles in the size of 0.3㎛ to the size of 4.2.7 reaches a level of less than 3×10^5 EA/ m^3. Simultaneously operate the environmental control devices until the room conditions (temperature and RH as indicated in 4.1.3) are specified.
b) When an acceptable test chamber background level is achieved (as indicated in 4.2.7, and 4.1.3) record the background concentration, turn off the chamber HEFA filter and environmental control devices.
c) Particulate generator in 4.2.3 produces particle, and test particulate may distribute homogeneous concentration in test chamber with mixing fan.
d) When test particulate in test chamber reaches a level of 4.2.9, turn off the particulate generator and mixing fan.
e) After check to turn off the mixing fan, operate air cleaner with the rated airflow.
f) Two minutes after turning off mixing fan, begin to acquire the particulate concentration. This test point is the initial chamber concentration (t=0).
g) Acquire particle concentration data at one-minute intervals for 20 minutes after the initial concentration measurement, and finish the test.
h) Turn off air cleaner and finish test.

4.2.14 Calculation of particulate matter removal performance

Particulate matter removal performance of air cleaner is calculated as follows;

$$CP = \frac{V}{t}\left(\ln\frac{C_{ci}}{C_{cf}} - \ln\frac{C_{ni}}{C_{nf}} \right)$$

CP : Particulate matter removal performance (m^3/min)
V : Volume of test chamber (m^3)
T : measurement time (min)
C_{ci} : particle concentration at initial point (t = 0) with operating air cleaner (EA/cm^2)
C_{ni} : particle concentration at initial point (t = 0) with natural decay (EA/cm^2)
C_{cf}: : particle concentration at ending point (t minutes) with operating air cleaner (EA/cm^2)
C_{nf} : particle concentration at ending point (t = 0) with natural decay(EA/cm^2)

4.2.15 Calculation of standard room size
Standard room size is defined that the concentration after air cleaner operates for 10 minutes reaches a half of initial concentration with natural ventilation once in an hour. The height of indoor room shall be 2.4m. Standard room size is calculated as follows;

A=7.9× CP

A: Standard room size (m^2)
CP: Particulate matter removal performance (m^3/min)

4.3 Measurement test of deodorization efficiency

4.3.1 Test gases are the followings

A) Ammonia (NH_3)
b) Acetaldehyde (CH_3CHO)
c) Acetate (CH_3COOH)

4.3.2 Test chamber
Test Chamber shall have volume of 4.0±0.1m^3 with air tightness. Air cleaner shall be installed in the center of test chamber, the desktop type shall be placed on the height of

75cm from bottom. The mixing fan shall be installed in test chamber to mix air flow homogenously.

4.3.3 Device to supply gas

Device to supply gas from gas tank or gas generator can supply a specified amount gas when it is mixed and diluted for test chamber.

4.3.4 Gas measuring instrument

Gas measuring instrument are followed or higher ;

A) Ammonia : Gasteckis product No.3La/No.3L(proper product)
b) Acetaldehyde : Gasteck's product No.92L(proper product)
c) Acetate : Gasteck's product No.81L(proper product)

4.3.5 Measurement condition

a) Test gas charges the specified amount minutely by needle valve.
b) When charging test gas, air cleaner shall be turned off.
c) Air cleaner shall be turned off-on without opening test chamber.
d) Mixing fan operates continuously, but suspends at air cleaner operating.

4.3.6 Measurement of the initial gas concentration

Initial gas concentration shall be measured after charging the specified amount and 2 - 5 minute passes. Initial concentration of each the test gas is by 10ppm±10%.

4.3.7 Measurement of operating gas concentration

a) It shall be operated air cleaner with rated airflow for 30 minutes.
b) After turning off air cleaner, and measure concentration of residual gas.

4.3.8 Calculation of deodorization efficiency

a) The removal rate of each pollution i gas is calculated as follows;

$$\eta_i = 1 - \frac{C_{i,30}}{C_{i,0}} \times 100$$

$C_{i,30}$: Concentration of i gas after operating 30 minutes (ppm)
$C_{i,0}$: Concentration of i gas at initial (ppm)

b) Deodorization efficiency of air cleaner is calculated as follows;

$$\eta_T = \frac{\eta_1 + 2\eta_2 + \eta_3}{4}$$

η_t : Deodorization efficiency(%)

η_1: The removal rate of ammonia (%)

η_2: The removal rate of acetaldehyde (%)

η_3: The removal rate of acetate (%)

4.4 Power consumption test

a) When measuring, temperature of test chamber shall be maintained 21±3℃.

b) After 30 operating with the rated air flow, it shall be measured at 10 minutes intervals for 3 times, and if the initial measurement and final measurement are within 5% of measuring power consumption, total 3 measurements shall be averaged.

c) Above measurements are 2 times, and be averaged.

d) In case of exceed of 5% of measuring value, power consumption is calculated that the integral power consumption for 10 minute is divided by 10 minutes.

10. Fluorescent lamp

1. Scope
   - By KS C 7601 Fluorescent lamps which are the tubular type of rated power consumption of 20W, 28W, 32W, and 40W, the circular type of rated power consumption of 32W, and 40W, and the compact type of rated power consumption of FPX 13W, FDX 26W, FPL 27W, FPL32W, FPL 36W, FPL 36W, FPL 45W, and FPL 55W
   - By K 61195, K 61199 Fluorescent lamps which are the tubular type of rated power consumption of 20W and 32W, the compact type of rated power consumption of FPL 36W, and the commercial used type (which is more than 7100K of color temperature, and can be used in the conventional lamp)

2. Testing Items for

   2.1 Color temperature : More than 7100 K

   2.2 Initial Readings

<table>
<tr><th rowspan="2">Type</th><th rowspan="2">Size</th><th rowspan="2">Rated Power
W</th><th rowspan="2">Rated input Voltage
V</th><th rowspan="2">Initial Input Voltage
V</th><th rowspan="2">Lamp power
W</th><th colspan="3">Initial Readings</th></tr>
<tr><th>Lamp Ampere
A</th><th>Lamp Voltage (reference)
V</th><th>Lumen
lm</th></tr>
<tr><td>FL 20</td><td rowspan="4">20</td><td rowspan="2">20</td><td rowspan="4">100</td><td rowspan="4">94</td><td rowspan="2">19.0</td><td rowspan="2">0.360gesInp</td><td rowspan="2">58</td><td rowspan="4">1200</td></tr>
<tr><td>FL 20S</td></tr>
<tr><td>FL 20S/18</td><td rowspan="2">18</td><td rowspan="2">18.0</td><td rowspan="2">0.350S/18np</td><td rowspan="2">59</td></tr>
<tr><td>FL 20SS/18</td></tr>
<tr><td>FLR 32SS</td><td>32</td><td>32</td><td>300</td><td>270</td><td>32</td><td>0.2652SS18p</td><td>137</td><td>2680</td></tr>
<tr><td>FHF 32SS</td><td>32</td><td>32</td><td>256</td><td>240</td><td>32</td><td>0.2552SS18p</td><td>128</td><td>2860</td></tr>
<tr><td>FL 40</td><td rowspan="4">40</td><td rowspan="2">40</td><td rowspan="4">200</td><td rowspan="4">180</td><td rowspan="2">39.5</td><td rowspan="2">0.4202SS18p</td><td rowspan="2">106</td><td rowspan="4">3050</td></tr>
<tr><td>FL 40S</td></tr>
<tr><td>FL 40S/37</td><td>37</td><td>37.0</td><td>0.410S/378p</td><td>108</td></tr>
<tr><td>FL 40SS/36</td><td>36</td><td>36.0</td><td>0.430SS/36p</td><td>103</td></tr>
<tr><td>FPL 36</td><td>36</td><td>36</td><td>200</td><td>180</td><td>36.0</td><td>0.4356S/36p</td><td>102</td><td>2590</td></tr>
</table>

   2.3 Mark

   Ex) FHF 32SS SIGN, FL 20SS/18 SIGN

11. Fluorescent lamps ballast

1. Scope

By KS C 8100 and KS C 8102 Fluorescent lamps ballasts which are the tubular type of rated power consumption of 20W, 28W, 32W, and 40W, the circular type of rated power consumption of 32W, and 40W, and the compact type of rated power consumption of FPX 13W, FDX 26W, FPL 27W, FPL32W, FPL 36W, FPL 36W, FPL 45W, and FPL 55W, and the tubular type of rated power consumption of 20W, 32W, and 40W and the compact type of rated power consumption of FPL 36W for the commercial used type.

2. Registration for the commercial used type

Registration for the commercial used type is the same procedure of the conventional fluorescent lamps ballasts, the manufactures shall register for the commercial used type.

3. Mark for in and out house

IP Code shall be marked as KS C IEC 60529, and the initial start at low temperature shall be applied.

4. Testing Items for the commercial used type

4.1 IPX 6 : Water flow rate 100ℓ/min

4.2 Initial start at low temperature

While a sample shall be placed at ambient temperature (20~27) and low temperature conditions for 2 hours, it shall be checked to light with 85% of the rated voltage and with increasing the rated voltage to 115%. It shall be lit within 10 seconds, and HID lamp shall be lit with 5 seconds. Only starter type lamps shall be lit with 3 times.

5. Mark

Marking on products

12. 3 Phase induction motor

1. Scope

1.1 General

Under a normal test condition in <Annex 1> and at refrigerant temperature under 50°C low voltage 3 phase cage induction motor at the rated frequency of 60Hz and under the rated voltage of 600V shall be satisfied with following requirements ;

- Type : Protector Type or Hermetic type
- Rated output : 0.75kW ≤ Rated output ≤ 200kW
- Number of pole :
  a) 2 and 4 : 0.75kW ~ 200kW
  b) 6 : 0.75kW ~ 160kW
  c) 8 : 0.75kW ~ 110kW
- Frame : General frame
- Speed : Constant
- Category : Foot mount or Plunge
- Torque : Design A or B in Annex

The scope is defined as category Ⅰ, and category Ⅱ in Annex 1, and as inverter-driven motor with continuous operating (fan, blower, pump). But, the efficiency test shall be at 60Hz.

1.2 Classification

3 phase induction motor divides into five categories as <Table 1>. Category I, and II shall be applied for MEPS.

< Category for MEPS >

1) Category I :

- The partly modified general electric motor which is satisfied with general requirements, and no influence in the performance or the efficiency.
- The general electric motor : A motor which is designed with the standard operating characteristic and the standard mechanical structure at normal operating condition.
  (Ex: Add a temperature sensor, expand a shaft, add a disk brake, and change a housing outside)

2) Category II :

- The special purpose electric motor which is satisfied with general requirements, and can

be used in general.

- The special purpose electric motor : A motor which is designed with the standard operating characteristic and the standard mechanical structure at abnormal operating condition.

(Ex: the electric motor which has a half of specified output, a roller bearing electric motor, and anti-explosion motor)

< Exception for MEPS>

3) Category III :

- The special purpose electric motor which is satisfied with general requirements, but can not be used in general.

(Ex: close coupled pump motor)

4) Category IV :

- The special purpose electric motor which is satisfied with general requirements.
- The special purpose electric motor : Except the general electric motor and the special purpose electric motor a motor which is designed with the special operating characteristic and the special mechanical structure at abnormal operating condition.

(Ex: electric motor for thrust bearing)

5) Category V :

- The electric motor which is not satisfied with general requirements

(Ex: multi-speed electric motor)

<Classification>

Special specification		Category					Remark
		I	II	III	IV	V	
		MEPS		Except MEPS			
A. Electric specification							
1	Altitude	O					Not applied for needing Center height up
2	Ambient temperature	O					Not applied for needing Center height up
3	Multi-speed					O	Only one speed
4	Special lead line	O					
5	Special insulation	O					
6	Encapsulation				O		For special wire
7	High service factor	O					Not applied for needing Center height up
8	Space heater	O					
9	Star-Delta start	O					
10	Partial winding wire start	O					
11	Limit to temperature increase	O					Not applied for needing Center height up
12	Protector for sensing temperature and ampere		O				
13	Thermostat/Thermostor	O					
14	Special voltage					O	By “The regulation of electrical equipments standard” only available for no more than 600V
15	Middle output		O				
16	Frequency	O					inverter-driven motor with continuous operating (fan, blower, pump)
17	Insulation for Tropical condition	O					
B. Mechanical Specification							
18	Special Balance	O					
19	Sensor for Bearing Temperature	O					
20	Special terminal	O					
21	Additional terminal	O					
22	Special painting/coating	O					
23	Drain	O					
24	Water-proof cover	O					
25	Earth terminal/hole						
26	Screen on ODP Enclosure	O					
27	Mounting (F1, F2,W1~4,C1,C2)	O					Bridge, stiff base, eleastic base

C. Bearing							
28	Bearing Cap	O					
29	Roller Bearing		O				Test with using standard bearing
30	Shield Bearing	O					
31	Sealed Bearing	O					Test with using standard bearing
32	Thrust Bearing				O		Special mechanical structure
33	Fixed Bearing	O					
34	Sleeve Bearing				O		Special mechanical structure
D. Special Bracket							
35	C face	O					
36	D flange	O					
E. Seal							
37	Contact seal	O					Including lip seal, taconite seal and slinger seal - test without seal
38	No Contact Seal	O					Including labyrinht seal - test without seal
F. Shaft							
39	Standard shaft	O					Including 편축, double, cylinder, tapered, single
40	Special material	O					
G. Fan							
41	Special material	O					
42	Low noise	O					
H. Others							
43	WASHDOWN	O					test without seal
44	Pump in a body (underwater pump)			O			Test with a special jig
45	Pump in a body (except underwater pump)		O				Test with a special jig
46	Gear motor in a body		O				Test with a special jig
47	SAW ARBOR				O		Special electric/mechanical design
48	TENV			O			
49	TEAO			O			
50	Fire extinguishing pump	O					
51	Operating at short time(S2)					O	Apply for continued operating
52	Brake motor in a body		O				Test with a special jig
53	Axial type motor				O		Special mechanical structure

2. Test conditions

Basically all products shall be met with MEPS at following normal conditions and abnormal conditions. But, it can not meet with MEPS as consumer uses at abnormal condition, the following plate shall be put on the product, “This product is not applied to MEPS because it uses at abnormal condition”

2.1 Steady-state

1) Ambient condition

① Ambient temperature : -15°C~ 50°C / 5°C ~ 50°C (with using refrigerant)
Exception) All equipments have the sleeve bearing and commentator that minimum ambient temperature is 0°C .
② The place is not higher than the sea level 1000m.
③ It is installed at stable place.
④ The place where ventilation is not disturbed or used a supplementary cover.

2) Operating condition

① Driving a V-belt
② Driving a plate belt, chain, gear and coupling

2.2 Unsteady-state

1) Circumference environment

① flammability, explosiveness, polishing, or conductive dust
② Piling Dust may obstruct to ventilate
③ Chemistry gas, flammable or explosive gas
④ Radioactive rays
⑤ The air which included a salt steam or oil steam
⑥ The place where is very wet and very dry, radiant heat, the infection of vermin or the air which is profitable to mushroom growth.
⑦ Extra-ordinary impact, vibration or mechanical load from the outside
⑧ Unsteady axle direction to be added to a motor axle or strength of side direction

2) Operating condition

① Inductor : more than ±10% of rated voltage, and ±5% of rated frequency
② Separation of AC voltage is more than 10%
③ AC voltage is to be unbalanced more than 1%
④ The low noise level is necessary
⑤ Power system is not put to earth

⑥ Driving with more than the maximum speed
⑦ Driving at insufficient ventilation, hollows or slanted toward place

3) Outside stimulation
① Twist load
② Recursive overload
③ Backlash or electric damping
④ Frequent starting
⑤ In the state that electric power is supplied with persistently, applications are a stopping or a momentary rating

3. Torque characteristic

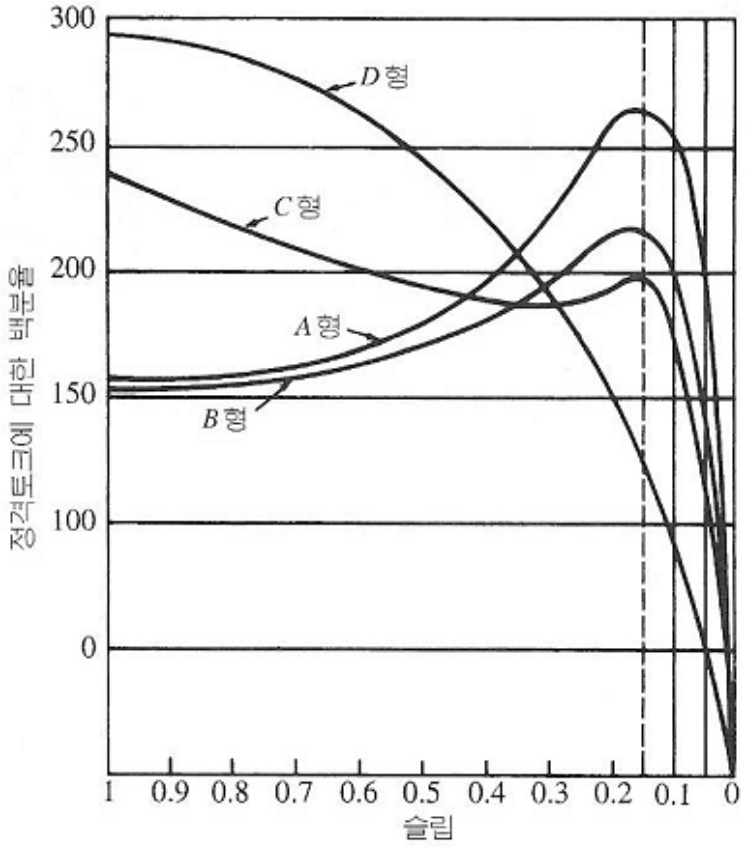
According to the torque characteristic, 3 phase induction motor divides into four types. <Figure 1> shows the comparison of the torque characteristic with slip of design A, B, C, D, and starting torque, stalling torque, and pull up torque of design A, B refer to value of <Table 1> (it indicate the standard value of a torque with percentage[%] for rating torque.)

1) Design A
It is similar with B type, but a stalling torque is larger than B type. A field of application is restricted that starting current is high.

2) Design B
- The most general, and large application
- Application : a centrifugal pump, fan, Air blower, power train
- It becomes a standard when it compares the performance with other type

3) Design C
- larger starting torque, but smaller stalling torque with B type
- Application : piston type pump, vibration screen

4) Design D
- It is very large starting torque
- Application : punch press, elevator



<Figure 1> Torque characteristic of 3 phase induction motor

<Table 1> Torque characteristic of design A, B(KS C 4202)

Rating capacity	Rate torque vs. torque (%)								
	Starting torque			Stalling torque			Pull up torque		
	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole
0.75 kW	180	190	170	200	200	180	120	130	120
1.5 kW	180	190	160	200	200	190	120	130	110
2.2 kW	170	180	160	200	200	190	110	120	110
3.7 kW	160	170	150	200	200	190	110	120	110
5.5 kW	150	160	150	200	200	190	100	110	110
7.5 kW	150	160	150	200	200	180	100	110	110
11 kW	140	150	140	200	200	180	100	110	100
15 kW	140	150	140	200	200	180	100	110	100
18.5 kW	130	140	140	190	190	180	90	100	100
22 kW	130	140	140	190	190	180	90	100	100
30 kW	120	130	130	190	190	180	90	100	100
37 kW	120	130	130	190	190	180	90	100	100
45 kW	110	120	120	180	180	170	80	90	90
55 kW	110	120	120	180	180	170	80	90	90
75 kW	100	110	110	180	180	170	70	80	80
90 kW	100	110	110	180	180	170	70	80	80
110 kW	90	100	100	170	170	170	70	80	80
132 kW	90	100	100	170	170	170	70	80	80
160 kW	80	90	90	170	170	160	60	70	70
200 kW	80	90	90	170	170	160	60	70	70

4 Full load efficiency

Test method is defined in KS C IEC 61972, “Method for determining losses and efficiency 3 phase cage induction motor”. By KS C 61972 the efficiency is determined in “1. Scope, method 1, for motor tested by a torque measurement device with additional load losses derived from measurement”, and the additional load losses is determined in “6.3 Additional load losses.

5. Test equipments

1) Transformer

According to KS C IEC 6044 it shall be 0.2 accuracy level.

2) Torque meter

According to KS C IEC 6044 it shall be ±0.2% of accuracy at maximum scale.

3) Frequency meter

According to KS C IEC 6044 it shall be ±0.1% of accuracy at maximum scale.

4) Speed meter

According to KS C IEC 6044 it shall be ± 1 min^{-1} accuracy level.

5) Thermometer

According to KS C IEC 6044 it shall be ± 1^{o}C accuracy level.

13. Adapter·Charger

1. Scope

- For using with mobile phone, notebook, speaker for computer, LCD monitor, printer, PDA, camcorder, digital camera, audio, DVD player, MP3, PMP, portable CD player, set-top box, wire-wireless phone, modem, all AC-DC or AC-AC external power supply shall be included.
- An adapter under 150W(nameplate output power) and a charger of input 20 W with Li-Ion Battery as a single voltage external power supply.

2. Classification

1) Adapter

AC-Dc or AC-AC adapter is to supply electric power to the end product. It shall be met with both standards, running efficiency and maximum standby power (no-load mode).

2) Charger

It is to supply electric power to the end products such as battery or battery pack or charger for battery. It shall be met with both standards, running efficiency and maximum standby power (no-load mode).

3. Test method

3.1 Load conditions

Percentage of output ampere on Name plate	
Condition 1	100%±2%
Condition 2	75%±2%
Condition 3	50%±2%
Condition 4	25%±2%
Condition 5	0%

3.2 Running efficiency test

a) Running efficiency test shall be measured at conditions 1 ~ 5 continuously. If there is two or more output devices, two devices shall be measured. (Others shall be disconnected)

b) The test sample shall be running at least at 100% output for 30 minutes before running efficiency test.

c) To verify the stability of adapter AC input ampere shall be measured fro 5 minutes after warming up. If the measured value is within 5% of maximum, it can be determined to be stable, and then it can be recorded the measured after 5 minutes.
d) Running efficiency shall be calculated at specified conditions, which is obtained from effective output power of adapter divided by AC input power. Averaged efficiency shall be calculated arithmetically from conditions 1,2,3,4.
e)Adapter power consumption at 4 conditions (1,2,3,4) is that AC input power subtracts DC output power. Adapter power consumption at condition 5 is AC input power.
f)The Data sheet is followed ;

<Required data from measured or calculated>

Value	remarks
Effective output ampere(mA)	Measure at conditions 1~4
Effective output voltage (V)	
Effective output power(W)	
Effective input ampere (V)	Measure at conditions 1~5
Effective input power(W)	
THD	
W/VA	
Adapter Power consumption(W)	Calculate at conditions 1~4 Measure at conditions 5
Running efficiency	Calculate at conditions 1~4
Averaged Running efficiency	Average arithmetically at conditions 1~4

< Test report (example)>

Name plate	Input	Output
Voltage(V)	85-265	6
Ampere(mA)		500
Power(W)		2.8
Frequency(Hz)	60	

<Measured and calculated data at 220V, 60Hz (example) >

	No load	Effective power at on-mode				
Percentage of name plate	0%	25%	50%	75%	100%	Average
DC output ampere(mA)		125	250	374	500	
DC output voltage(V)		6.9	6.5	6.0	5.7	
DC output power(W)		0.86	1.62	2.27	2.83	

AC input voltage(V)	220	220	220	220	220	
AC input power(W)	0.25	1.35	2.25	3.12	3.91	
THD		271.0%	256.2%	246.6%	233.1%	251.7%
W/VA		0.35	0.36	0.37	0.39	0.37
AC input frequency(Hz)	60	60	60	60	60	60

Power consumption(W)	**0.25W**	0.49W	0.63W	0.85W	1.08W	
Running efficiency		63.7%	72.0%	72.8%	72.4%	**70.2%**

14. Electric driven heatpump

1. Scope

- Electric driven heatpump of rated cooling power consumption of not more than 7,500W and the rated cooling capacity of not more than 23,000W
- If it has heater, the rated power consumption of heater shall be not more than 30,000W.
- Exclude water cooling, duct-type, portable, multi-split type
- Averaged Energy Efficiency Ratio (hereinafter "AEER) shall be measured by the test method of KS C 9306, which is obtained from CSPF(Cooling Seasonal Performance Factor) and HSPF(Heating Seasonal Performance Factor).

2. References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards shall be adopted new one

.

KS C 9306 Air-conditioner

KS C IEC 60335-2-34

KS C IEC 60335-2-40

AMCA standard 210 : 1985 laboratory Methods of Testing Fans for Rating

ANSI/ASHRAE 16 Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners

3. Definitions

For the purposes of this standard, the following terms and definitions apply, and others apply KS C 9306.

4. Test method of Energy efficiency

Test method for Energy efficiency shall be followed with Annex 5 in KS C 9306-2002, and test results shall be recorded with a following table.

Items	Results	
	1	2
Rated Cooling Capacity(W)		
Cooling power consumption (W)		
Cooling EER(CEER)		
Rated Heating Capacity(W)		
Heating power consumption (W)		
Heating EER(CEER)		
Make-up heater capacity(W)		
Average EER(EERa)		
Energy Efficiency Level(R)		

Remark) 1. If minimum capacity is less than a half of the rated capacity, the intermediate capacity test can be omitted.

2. The rated heating capacity test shall be without make-up heater.

<Annex 2> Testing Items, requirements, CO2 emission, Annual energy cost for energy efficiency level or energy efficiency (Article 4, Article 2, Article 12 ① and ②, Article 16 ②)

Products	No. of sample to test	No. of Failed sample to accept	Testing items	Requirements and CO2 emission standards
1. Refrigerator	2	0	Monthly power consumption	-
			Storage volume of fresh compartment	-
			Storage volume of freezer compartment	-
			Auto defrost function	-
			Adjusted volume	-
			Dispenser	-
			the length of the actual sealing perimeter of the homebar door of fresh compartment	-
			the length of the actual sealing perimeter of the homebar door of freezer compartment	-
			any records for KS C ISO 15502 requirements	-
			MEPS	-
			Power consumption per an hour (Wh)	-
			CO2 emission per an hour	Wh x 0.425
			Annual power consumption	kWh x 12
			Annual energy cost	kWh x 160
			Energy Efficiency level	-
2. Freezer	2	0	Monthly power consumption	-
			Storage Volume of freezer compartment	-
			Adjusted Volume	-
			MEPS	-
			Power consumption per an hour (Wh)	-
			CO2 emission per an hour	Wh x 0.425
			Annual power consumption	kWh x 12
			Annual energy cost	kWh x 160
			Energy Efficiency Level	-
3. Kimchi Refrigerator	2	0	Monthly power consumption	-
			Storage volume of Kimchi preserving compartment	-
			Storage Volume of freezer compartment	-
			Storage Volume of other compartments	-
			Storage volume of Kimchi preserving container	-
			Adjusted Volume	-
			MEPS	-
			No. of Kimchi preserving container	-
			Power consumption per an hour (Wh)	-
			CO2 emission per an hour	Wh x 0.425
			Annual power consumption	kWh x 12
			Annual energy cost	kWh x 160
			Energy Efficiency Level	-

4. Air-conditioner	2	0	Energy Efficiency Ratio (EER) Monthly power consumption Cooling Capacity Cooling power consumption Standby power Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency Level	- - - - - Remark 1) Wh x 0.425 kWh x 12 kWh x 160 -
5.Washing machine	2	0	Power consumption per 1kg Water extraction ratio Rinsing Index Rated Washing Capacity Electric Power Consumption per a cycle Duration per a cycle Standard capacity Standby power CO2 emission per a cycle Annual power consumption Annual energy cost Energy Efficiency Level	- ≥ 45% ≥ 1.00 - - - - - Wh x 0.425 kWh x 210 kWh x 160 -
6.Horizontal drum washing machine	2	0	Power consumption per 1kg Water extraction ratio Washing efficiency index Rated Washing Capacity Electric Power Consumption during a cycle Duration per a complete cycle Water Consumption during a cycle Standby power CO2 emission per a cycle Annual power consumption Annual energy cost Energy Efficiency Level	- ≥ 40% ≥ 0.60 - - - - - Wh x 0.425 kWh x 210 kWh x 160 -
7. Dishwasher	2	0	Washing performance Monthly electric power consumption Electric power consumption per a cycle Duration per a cycle Monthly Water Consumption Water Consumption per a cycle Rated Washing Capacity Standby power CO2 emission per a cycle Annual power consumption Annual energy cost Energy Efficiency Level	- - - - − − − − Wh x 0.425 kWh x 365 kWh x 160 -

8. Dish drier	2	0	Power consumption for 20 minutes drying Process (P20) Rated Drying capacity Drying performance Power consumption per an hour (Wh) Standby power CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency Level	- (person) ≥ 0.60 P20 x 3 - Wh x 0.425 kWh x 365 kWh x 160 -
9.Electrical Cooler and Heater for Drinking-Water Storage	2	0	Power consumption per 1 m^3 Monthly power consumption Surface of cool water storage (m^3) Surface of hot water storage(m^3) Capacity of cool-water storage tank Capacity of hot-water storage tank Power consumption per an hour (Wh) CO2 emission per an hour Energy Efficiency Level	- - - - - - - Wh x 0.425 -
10.Rice cooker	3	0	Power consumption per 1 person Power consumption Type Total power consumption (Warming and Cooking) per a complete cycle Duration per a complete cycle Maximum cooking capacity Standby power Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency level	- - - - Warming+Cooking time(6 hour) - - Remark 2) Wh x 0.425 kWh x 438 kWh x 160 -
11.Vacuum cleaner	2	0	Suction Power Efficiency Measured Power consumption (W) Maximum Suction Power Dust emission Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency Level	- - - - W x 1 hour Wh x 0.425 W x 21.6 x 0.333(h)x12x0.75 kWh x 160 -
12.Electric Fan	2	0	Energy Efficiency Ratio Measured Power consumption (W) Standard Air flow Maximum air velocity Standby power Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost	- - - - - W x 1 hour Wh x 0.425 W x 655(h) kWh x 160

			Energy Efficiency Level	-
13.Air cleaner	2	0	Power consumption per 1m^2 Measured power consumption (W) Standard room size Deordorization efficiency Standby power Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency Level	- - - - - W x 1 hour Wh x 0.425 Wx 8,760(h)x0.3 kWh x 160 -
14.Incandescent lamps	20	2	Efficiency Luminous flux Power consumption (W) Lifetime Power consumption per an hour (Wh) CO2 emission per an hour Energy Efficiency Level	- ≥Rated Luminous flux × 93% (White 88%) ≤(Rated power＋0.5W)×104% ≥KS annex table× 80% W x 1 hour Wh x 0.425 -
15.Fluorescent lamps	10	1	Efficiency Luminous flux Power consumption (W) Color Power consumption per an hour (Wh) CO2 emission per an hour Energy Efficiency Level	- ≥KS annex table× 92% ≤KS Annex table ± (Power input ×0.05＋0.5) - W x 1 hour Wh x 0.425 -
16.Fluorescent lamps ballasts	2	0	Compared Energy Efficiency Ratio Luminous flux Power input Luminous flux Efficiency of luminous flux for reference ballast Efficiency of luminous flux for tested ballast Energy Efficiency Level	- Tolerance of KS C 8100, 8102 “ - - - -
17.Associated ballasts	3	0	Efficiency of luminous flux Power input Color Luminous flux The endurance of on-off Power consumption per an hour (Wh)	≥KS rence Efficiency of luminous flux ≤Rated input × ±15% - - - W x 1 hour

			CO2 emission per an hour Energy Efficiency Level	Wh x 0.425 -
18.3 phase induction motor	5	-	Full load efficiency Type Rated output power The number of pole Rated voltage Rated ampere Minimum efficiency in tested samples No. of testing samples Power consumption per an hour (Wh) CO2 emission per an hour	- - - - - - - - Remark 3) Wh x 0.425
19.Household Gas Boiler	2	0	Measured thermal efficiency for heating Type Gas consumption Heating capacity Standby power Energy Efficiency Level	- - - - - -
20. Adapter·Charger	3	0	Running efficiency Classification the rated output Measured input Standby	- - - - ≤ 105%
21.Electric driven heatpump	2	0	Energy Efficiency Ratio CSPF(Cooling Seasonal Performance factor) HSPF(Heating Seasonal Performance factor) the rated cooling capacity the rated heating capacity the rated cooling power consumption the rated heating power consumption make-up heater Energy Efficiency Level	- - - - - - - - -
22.Commercial Refrigerator	2	0	Monthly power consumption Storage volume of fresh compartment Storage volume of freezer compartment Auto defrost function Adjusted volume any records for KS C ISO 15502 requirements MEPS Power consumption per an hour (Wh) CO2 emission per an hour Annual power consumption Annual energy cost Energy Efficiency level	- - - - - - - - Wh x 0.425 kWh x 12 kWh x 160 -
23. Gas Water heater	2	0	Measured thermal efficiency Gas consumption Standby power Energy Efficiency level	- - - -

Remark) 1. For constant compressor $\frac{monthly\ \ power\ \ consumption(kWh)\times 1000}{0.6(running\ \ rate)\times 12(hours)\times 30(days)}$

For two stages and variable capacity $\frac{monthly\ power\ \ consumption(kWh)\times 2\times 1000}{732(hours)}$

Ex) if monthly power consumption is 388.1 kWh, $\frac{388.1(kWh)\times 2\times 1000}{732(hours)} = 1{,}060Wh$

2. Power consumption per an hour is defined as

$$\frac{\text{Total power consumption (Warming and Cooking) per a cycle}}{\text{Duration per a complete cycle}}$$

3. Power consumption per an hour is defined as

$$\frac{\text{Rated output power}\times 1000\times 1\,\text{hour}}{\text{Full load efficiency}}$$

Ex) if rated output power is 37.0kW, and full load efficiency is 93.5%, then

$\frac{37.0\times 1000\times 1}{0.935} = 39{,}572Wh$

4. CO2 emission conversion factor, 1Wh = 0.425g
5. Power consumption per an hour or Power consumption per a cycle are based in Wh.
6. Annual energy cost = Annual power consumption x 160 Won (Korean dollar). It shall round off the 3nd place of decimal of the value.

<Annex 3> Energy Efficiency Standards and Energy Efficiency Level (Article 5 ②)

1. Refrigerator

1.1 MEPS (Minimum Energy Performance Standard)

Items	MEPS From 1st of January 2011
Refrigerator only	P ≤ 0.037AV+16.75
Refrigerator-freezer whose compensated cubic volume is less than 500 L	P ≤ 0.025AV+29.45
Refrigerator-freezer whose compensated cubic volume is no less than 500 L without ice-dispenser or homebar door	P ≤ 0.043AV+16.19
Refrigerator-freezer whose compensated cubic volume is no less than 500 L with ice-dispenser or homebar door	P ≤ 0.043AV+16.19 +2.6 (through-the-door ice dispenser) +0.022 (the length of the actual sealing perimeter of the homebar door of fresh compartment, cm) +0.036 (the length of the actual sealing perimeter of the homebar door of freezer compartment, cm)

Remark)

1. AV = compensated cubic volume = ∑{{cubic volume of the each compartment} × K × F }

    1) K value in the refrigerator only is 1
    2) K value in refrigerator-freezer is

$$\text{K (compensation coefficient)} = \frac{T_1 - T_C}{T_1 - T_2}$$

Where

T_1=ambient temperature in testing(25℃)

T_2=averaging indoor temperature of the fresh compartment(5℃)

3) F = 1.2 if it is auto defrost, otherwise F=1.0

2. P = Maximum power consumption (kWh/month)
3. 220V is priority if both voltages, 110V and 220V can be applied
4. To determine MEPS it shall round off the 2nd place of decimal of the value in accordance with KS 3251-1.

1.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{MEPS [kWh/month]}}{\text{Measured monthly power consumption [kWh/month]}}$$

B. Energy Efficiency Level

1) Refrigerator and Freezer-refrigerator with adjusted Volume less than 500 liter

R	Level
$1.60 \leq R$	1
$1.45 \leq R < 1.60$	2
$1.30 \leq R < 1.45$	3
$1.15 \leq R < 1.30$	4
$1.00 \leq R < 1.15$	5

2) Freezer-refrigerator with adjusted Volume no less than 500 liter

R	Level
$1.90 \leq R$	1
$1.75 \leq R < 1.90$	2
$1.60 \leq R < 1.75$	3
$1.45 \leq R < 1.60$	4
$1.00 \leq R < 1.45$	5

2. Freezer

2.1 MEPS (Minimum Energy Performance Standard)

Item	MEPS
	From 1st of January, 2010
Freezer	$P \leq 0.028AV+32.40$

Remark)

1. AV = compensated cubic volume = ∑{{cubic volume of the each compartment} × K × F }

$$K \text{ (compensation coefficient)} = \frac{T_1 - T_C}{T_1 - T_2}$$

Where

T_1=ambient temperature in testing(25℃)

T_2=averaging indoor temperature of the fresh compartment(5℃)

F = 1.2 if it is auto defrost, otherwise F=1.0

2. P = Maximum power consumption (kWh/month)
3. 220V is priority if both voltages, 110V and 220V can be applied
4. To determine MEPS it shall round off the 2nd place of decimal of the value in accordance with KS 3251-1.

2.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{MEPS [kWh/month]}}{\text{Measured monthly power consumption [kWh/month]}}$$

B. Energy Efficiency Level

R	Level
$2.20 \leq R$	1
$1.90 \leq R < 2.20$	2
$1.60 \leq R < 1.90$	3
$1.30 \leq R < 1.60$	4
$1.00 \leq R < 1.30$	5

3. Kimchi Refrigerator

3.1 MEPS (Minimum Energy Performance Standard) and effective date

Item	MEPS
	From 1st of January 2011
Kimchi Refrigerator whose compensated cubic volume is no less than 200 L with 2 or less Kim-chi preserving compartment	$P \leq 0.026AV+25.00$
Kimchi Refrigerator whose compensated cubic volume is no less than 200 L with 3 or more Kim-chi preserving compartment	$P \leq 0.040AV+27.00+0.022 \times$the length of the actual sealing perimeter of the homebar door of freezer compartment (cm)

Remark)

1. AV = compensated cubic volume = [{cubic volume of the freezing compartment × K_f} + {cubic volume of the kimchi preserving compartment × K_r}+ other compartment] × F(Auto defrost function)
   (measured volume to round off the 1st place of decimal of the value in accordance with KS 3251-1)

1) For a freezer

$$K_f \text{ (compensation coefficient)} = \frac{T_1 - T_f}{T_1 - T_2}$$

Where
T_1=ambient temperature in testing(25℃)
T_2=averaging indoor temperature of the fresh compartment(0℃)
T_f=averaging indoor temperature of the freezer compartment(℃)

2) For a kimchi preserving compartment

$$K_r \text{ (compensation coefficient)} = \frac{T_1 - T_r}{T_1 - T_2}$$

Where
T_1=ambient temperature in testing(25℃)
T_2=averaging indoor temperature of the fresh compartment(0℃)
T_r=averaging indoor temperature of the kimchi compartment(℃)

3) F = 1.1 if it is auto defrost, otherwise F=1.0. The defrost shall be more than one during 48 hours.

2. P = Maximum power consumption (kWh/month)

3. 220V is priority if both voltages, 110V and 220V can be applied
4. To determine MEPS it shall round off the 2nd place of decimal of the value in accordance with KS 3251-1.

3.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Measured monthly power consumption [kWh/month]}}{\text{MEPS [kWh/month]}}$$

B. Energy Efficiency Level

R	Level
$2.20 \leq R$	1
$1.90 \leq R < 2.20$	2
$1.60 \leq R < 1.90$	3
$1.30 \leq R < 1.60$	4
$1.00 \leq R < 1.30$	5

4. Air-conditioner

4.1 MEPS (Minimum Energy Performance Standard)

(unit : W/W)

Type		MEPS (EER) Effective date : From 1st of January, 2004
Window and Unitary Room air conditioner		2.88
Split type	RCC < 4.0 kW	3.37
	4.0 kW ≤ RCC < 10.0 kW	2.97
	10.0 kW ≤ RCC < 17.5 kW	2.76
	17.5 kW ≤ RCC < 23.0 kW	2.63

Remark) Rated Cooling Capacity (RCC)

4.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$EER = \frac{\text{Measured Cooling Capacity [W]}}{\text{Measured Power consumption [W]}}$$

For a constant speed compressor type CEER(Cooling Energy efficiency ratio) shall be used according to KS C 9306, and for a variable capacity and 2 and more compressors type and a inverter driven compressor type CSPF(Cooling Seasonal Performance Factor)) shall be used according to KS C 9306.

Standby power shall be tested in power-off with using remote controller, if a remote controller is not provided, it shall be tested in power-off in a tested sample.

B. Energy Efficiency Level

1) Window room type and unitary type

R	Standby power (Off mode power consumption)	Level
3.94 ≤ R	≤ 1.0 W	1
3.94 ≤ R	N/A	2
3.55 ≤ R < 3.94	N/A	3
3.20 ≤ R < 3.55	N/A	4
2.88 ≤ R < 3.20	N/A	5

2) Window room type and unitary type with network function

R	Standby power	Level
3.94 ≤ R	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
3.94 ≤ R	N/A	2
3.55 ≤ R < 3.94	N/A	3
3.20 ≤ R < 3.55	N/A	4
2.88 ≤ R < 3.20	N/A	5

3) Split type, RCC < 4.0 kW

R	Standby power (Off mode power consumption)	Level
4.36 ≤ R	≤ 1.0 W	1
4.36 ≤ R	N/A	2
4.00 ≤ R < 4.36	N/A	3
3.67 ≤ R < 4.00	N/A	4
3.37 ≤ R < 3.67	N/A	5

4) Split type, RCC < 4.0 kW with network function

R	Standby power	Level
4.36 ≤ R	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
4.36 ≤ R	N/A	2
4.00 ≤ R < 4.36	N/A	3
3.67 ≤ R < 4.00	N/A	4
3.37 ≤ R < 3.67	N/A	5

5) Split type, 4.0 kW ≤ RCC < 10.0 kW

R	Standby power (Off mode power consumption)	Level
4.40 ≤ R	≤ 1.0 W	1
4.40 ≤ R	N/A	2
3.86 ≤ R < 4.40	N/A	3
3.39 ≤ R < 3.86	N/A	4
2.97 ≤ R < 3.39	N/A	5

6) Split type, 4.0 kW ≤ RCC < 10.0 kW with network function

R	Standby power	Level
4.40 ≤ R	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
4.40 ≤ R	N/A	2
3.86 ≤ R < 4.40	N/A	3
3.39 ≤ R < 3.86	N/A	4
2.97 ≤ R < 3.39	N/A	5

7) Split type, 10.0 kW ≤ RCC < 17.5 kW

R	Standby power (Off mode power consumption)	Level
4.62 ≤ R	≤ 1.0 W	1
4.62 ≤ R	N/A	2
3.89 ≤ R < 4.62	N/A	3
3.28 ≤ R < 3.89	N/A	4
2.76 ≤ R < 3.28	N/A	5

8) Split type, 10.0 kW ≤ RCC < 17.5 kW with network function

R	Standby power	Level
4.62 ≤ R	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
4.62 ≤ R	N/A	2
3.89 ≤ R < 4.62	N/A	3
3.28 ≤ R < 3.89	N/A	4
2.76 ≤ R < 3.28	N/A	5

9) Split type, 17.5 kW ≤ RCC < 23.0 kW

R	Standby power (Off mode power consumption)	Level
4.11 ≤ R	≤ 1.0 W	1
4.11 ≤ R	N/A	2
3.54 ≤ R < 4.11	N/A	3
3.05 ≤ R < 3.54	N/A	4
2.63 ≤ R < 3.05	N/A	5

10) Split type, 17.5 kW ≤ RCC < 23.0 kW with network function

R	Standby power	Level
4.11 ≤ R	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
4.11 ≤ R	N/A	2
3.54 ≤ R < 4.11	N/A	3
3.05 ≤ R < 3.54	N/A	4
2.63 ≤ R < 3.05	N/A	5

C. Definitions

Without network function

With network function :
It has a network function in a body, which is enable to exchange data between a body and external network, or between indoor unit and outdoor unit by wire or wireless. If it is get to 1st level, standby power shall be less than 3 W for active standby mode, and 1W for off mode.

Off mode : The power state when the product is switched off or auto off.

Active standby mode :
When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals. In addition, it can also be activated into other power modes by receiving external signals or when it is receiving minimum level of data from service providers.

5. Washing machine

5.1 MEPS (Minimum Energy Performance Standard)

(unit : Wh/kg)

Type	MEPS
	From 1st of January, 2007
Washing Machine	23.0

5.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

Electric Power Consumption during a complete cycle [Wh] per Rated Washing Capacity [Standard program] and standby power.

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Electric Power Consumption during a complete cycle [Wh]}}{\text{Rated Washing Capacity [kg]}}$$

Standby power shall be tested in off-mode, which means a tested sample shall be in power-off manually or automatically.

B. Energy Efficiency Level

1) Without network function

R	Standby power (Off mode power consumption)	Water consumption per 1 cycle-1 kg	Level
$R \leq 12.0$	≤ 0.5 W	≤15.0 liter/kg	1
$R \leq 14.5$	N/A	N/A	2
$14.5 < R \leq 17.0$	N/A	N/A	3
$17.0 < R \leq 20.0$	N/A	N/A	4
$20.0 < R \leq 23.0$	N/A	N/A	5

2) With network function

R	Standby power	Water consumption per 1 cycle-1 kg	Level
R ≤ 12.0	≤ 0.5 W (off mode) ≤ 2.0 W (active standby mode)	≤15.0 liter/kg	1
R ≤ 14.5	N/A	N/A	2
14.5 < R ≤ 17.0	N/A	N/A	3
17.0 < R ≤ 20.0	N/A	N/A	4
20.0 < R ≤ 23.0	N/A	N/A	5

C. Definitions

Without network function

With network function :
It has a network function in a body, which is enable to exchange data between a body and external network by wire or wireless. If it is get to 1st level, standby power shall be less than 2.0 W for active standby mode, and 0.5W for off mode, in addition water consumption shall be no more than 15.0 liter/kg.

Off mode : The power state when the product is switched off or auto off.

Active standby mode :
When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals. In addition, it can also be activated into other power modes by receiving external signals or when it is receiving minimum level of data from service providers.

6. Horizontal drum washing machine

6.1 MEPS (Minimum Energy Performance Standard)

(unit : Wh/kg)

Type	MEPS
	From 1st of January, 2011
2kg≤The rated washing capacity≤8kg	82
8kg≤The rated washing capacity≤13kg	80
13kg≤The rated washing capacity≤20kg	78

6.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

Electric Power Consumption during a complete cycle [Wh] per Rated Washing Capacity [Water temperature 40℃]

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Electric Power Consumption during a complete cycle [Wh]}}{\text{Rated Washing Capacity [kg]}}$$

Standby power shall be tested in off-mode, which means a tested sample shall be in power-off manually or automatically.

B. Energy Efficiency Level

1) 2kg≤The rated washing capacity≤8kg without network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤42	≤ 0.5 W	≤12.0 liter/kg	0.99≥	1
R ≤ 52	N/A	N/A	0.90≥	2
52 < R ≤ 62	N/A	N/A	0.90≥	3
62< R ≤ 72	N/A	N/A	0.90≥	4
72< R ≤ 82	N/A	N/A	0.90≥	5

2) 2kg≤The rated washing capacity≤8kg with network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤42	≤ 0.5 W (off mode) ≤ 2.0 W (active mode)	≤12.0 liter/kg	0.99≥	1
R ≤ 52	N/A	N/A	0.90≥	2
52 < R ≤ 62	N/A	N/A	0.90≥	3
62< R ≤ 72	N/A	N/A	0.90≥	4
72< R ≤ 82	N/A	N/A	0.90≥	5

3) 8kg≤The rated washing capacity≤13kg without network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤40	≤ 0.5 W	≤12.0 liter/kg	0.99≥	1
R ≤ 50	N/A	N/A	0.90≥	2
50 < R ≤ 60	N/A	N/A	0.90≥	3
60< R ≤ 70	N/A	N/A	0.90≥	4
70< R ≤ 80	N/A	N/A	0.90≥	5

4) 8kg≤The rated washing capacity≤13kg with network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤40	≤ 0.5 W (off mode) ≤ 2.0 W (active mode)	≤12.0 liter/kg	0.99≥	1
R ≤ 50	N/A	N/A	0.90≥	2
50 < R ≤ 60	N/A	N/A	0.90≥	3
60< R ≤ 70	N/A	N/A	0.90≥	4
70< R ≤ 80	N/A	N/A	0.90≥	5

5) 13kg≤The rated washing capacity≤20kg without network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤38	≤ 0.5 W	≤12.0 liter/kg	0.99≥	1
R ≤ 48	N/A	N/A	0.90≥	2
48 < R ≤ 58	N/A	N/A	0.90≥	3
58< R ≤ 68	N/A	N/A	0.90≥	4
68< R ≤ 78	N/A	N/A	0.90≥	5

6) 13kg≤The rated washing capacity≤20kg with network function

R	Standby power (off mode)	Water consumption per 1 cycle-1 kg	Washing efficiency index	Level
R ≤38	≤ 0.5 W (off mode) ≤ 2.0 W (active mode)	≤12.0 liter/kg	0.99≥	1
R ≤ 48	N/A	N/A	0.90≥	2
48 < R ≤ 58	N/A	N/A	0.90≥	3
58< R ≤ 68	N/A	N/A	0.90≥	4
68< R ≤ 78	N/A	N/A	0.90≥	5

C. Definitions

Without network function

With network function :
It has a network function in a body, which is enable to exchange data between a body and external network by wire or wireless. If it is get to 1st level, standby power shall be less than 2.0 W for active standby mode, and 0.5W for off mode, in addition water consumption shall be no more than 12.0 liter/kg.

Off mode : The power state when the product is switched off or auto off.

Active standby mode :
When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals. In addition, it can also be activated into other power modes by receiving external signals or when it is receiving minimum level of data from service providers.

7. Dishwasher

7.1 MEPS (Minimum Energy Performance Standard)

(unit : kWh/ ℓ)

Type	MEPS
	From 1st of January, 2010
Rated Capacity ≤ 6	5.00
Rated Capacity > 6	10.00

7.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

R(Energy Efficiency Level Index) =	Electric Energy Efficiency Ratio(EERe) x Water Energy Efficiency Ratio(EERw)

Standby power shall be tested in off-mode, which means a tested sample shall be in power-off manually or automatically.

B. Energy Efficiency Level

1) Rated Capacity ≤ 6 without network function

R	Standby power (Off mode power consumption)	Level
50.00 < R	≤ 1.0 W	1
50.00 < R	N/A	2
35.00 < R ≤ 50.00	N/A	3
20.00 < R ≤ 35.00	N/A	4
5.00 < R ≤ 20.00	N/A	5

2) Rated Capacity ≤ 6 with network function

R	Standby power	Level
50.00 < R	≤ 1.0 W(off mode) ≤ 3.0 W(active standby mode)	1
50.00 < R	N/A	2
35.00 < R ≤ 50.00	N/A	3
20.00 < R ≤ 35.00	N/A	4
5.00 < R ≤ 20.00	N/A	5

3) Rated Capacity > 6 without network function

R	Standby power (Off mode power consumption)	Level
70.00 < R	≤ 1.0 W	1
70.00 < R	N/A	2
50.00 < R ≤ 70.00	N/A	3
30.00 < R ≤ 50.00	N/A	4
10.00 < R ≤ 30.00	N/A	5

4) Rated Capacity > 6 with network function

R	Standby power	Level
70.00 < R	≤ 1.0 W(off mode) ≤ 3.0 W(active standby mode)	1
70.00 < R	N/A	2
50.00 < R ≤ 70.00	N/A	3
30.00 < R ≤ 50.00	N/A	4
10.00 < R ≤ 30.00	N/A	5

C. Definitions

General products : Without network function

Products with network function :
It has a network function in a body, which is enable to exchange data between a body and external network by wire or wireless. If it is get to 1st level, R shall be met wit above tables and standby power shall be less than 3 W for active standby mode, and 1W for off mode.

Off mode : The power state when the product is switched off or auto off.

Active standby mode :
When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals. In addition, it can also be activated into other power modes by receiving external signals or when it is receiving minimum level of data from service providers.

8. Dish drier

8.1. Energy Efficiency Standards, TEPS, Effective date of MEPS

(unit : Wh/20 min)

Type	MEPS From 1st of January, 2011	Standard Power consumption (TEPS)
Top or Front Door Type	2.9N+68.15	2N+47
Sliding Door Type	3.625N+89.9	2.5N+62

Remark) N = Rated capacity

8.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index : Energy Efficiency shall be measured by the test method, which is obtained from energy consumption (Wh) for 20 minutes drying process divided by TEPS(Target Energy Performance Standard).

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Electric Power Consumption for 20 minutes drying process [Wh]}}{\text{TEPS}}$$

B. Energy Efficiency Level

R	Standby power	Level
$R \leq 0.50$	≤ 1.0 W(off mode)	1
$R \leq 1.15$	N/A	2
$1.15 < R \leq 1.25$	N/A	3
$1.25 < R \leq 1.35$	N/A	4
$1.35 < R \leq 1.45$	N/A	5

C. Definition

Off mode : The power state when the product is switched off or auto off.

9. Electrical Cooler and Heater for Drinking-Water Storage

9.1. MEPS (Minimum Energy Performance Standard)

(unit : kWh/ m^3)

Type	MEPS
	From 1st of January, 2010
Electrical Cooler and Heater for Drinking-Water Storage	18.0

9.2 Energy Efficiency Level Standards

Energy Efficiency shall be measured by the test method in Annex 1, which is defined as power consumption/m^3 to be obtained from power consumption (P1), cool water correction factor(Cp), and hot water correction factor (Hp) totally divided by total water storage volume (0.35xsurface of cold water storage (m^3)+surface of hot water storage(m^3)).

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{P1+Cp+Hp}{0.35\text{xsurface of cold water storage } (m^3)+\text{surface of hot water storage } (m^3)}$$

Where,
P1 : Measured electric power consumption for 24 hours after stabilized
Cp : Correction factor for cool-water tank
Hp: Correction factor for hot-water tank

B. Energy Efficiency Level

R	Level
$R \leq 8.0$	1
$8.0 < R \leq 10.0$	2
$10.0 < R \leq 12.0$	3
$12.0 < R \leq 15.0$	4
$15.0 < R \leq 18.0$	5

10. Rice Cooker

10.1 MEPS and Effective date of MEPS

(unit : Wh/person)

Type	MEPS	Standard Power consumption (TEPS)
	From 1st January 2010	
Maximum Cooking Capacity N< 6(1.08L)	P ≤ -13.9N+258.5	P ≤ -10.0N+186
Maximum Cooking Capacity 6(1.08L)≤N≤10(1.80L)	P ≤ -6.95N+216.8	P ≤ -5.0N+156
Maximum Cooking Capacity 10(1.80L)≤N≤20(3.60L)	P ≤ -5.56N+202.9	P ≤ -4N+146

Remark) 1. N = Maximum cooking capacity

10.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{power consumption per a person(Wh/person)}}{\text{TEPS(Wh/person)}}$$

B. Energy Efficiency Level

R	Standby power	Level
R<1.00	≤ 1.0 W(off mode) ≤ 3.0 W(active standby mode)	1
R<1.00	N/A	2
1.00 ≤ R ≤ 1.13	N/A	3
1.13 ≤ R ≤ 1.26	N/A	4
1.26 ≤ R ≤ 1.39	N/A	5

C. Definitions

No-load mode : Rice is not loading in inner pan.

11. Vacuum Cleaner

11.1. Energy Efficiency Standards, Date to accomplish TEPS, Effective date of MEPS

(unit : %)

Type	MEPS From 1st of October, 2004	TEPS
Vacuum Cleaner	17.8	37.0

11.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Measured Suction Power Efficiency}}{\text{TEPS}}$$

B. Energy Efficiency Level

R	Level
$1.00 < R$	1
$0.87 < R \leq 1.00$	2
$0.74 < R \leq 0.87$	3
$0.61 < R \leq 0.74$	4
$0.48 < R \leq 0.61$	5

12. Electric Fan

12.1. TEPS (Target Energy Performance Standard) and date to accomplish

Item	MEPS	TEPS
	From 1st of January, 2009	
Electric Fan	P ≤ 0.0193A+0.0972	P ≤ 0.0425A+0.2125

Remark)
1. A = Diameter of Wing (cm)
2. P = MEPS or TEPS
3. 220V is priority if both voltages, 110V and 220V can be applied
4. To determine TEPS it shall round off the 2nd place of decimal of the value in accordance with KS 3251-1.

12.2 Energy Efficiency Level Standards
A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{TEPS}}{\text{Measured Energy Efficiency}}$$

Where,

$$\text{Energy Efficiency (\%)} = \frac{SAF\ [m^3/\min]}{MeasuredPower\ [W]}$$

$$\text{SAF} = \text{Maximum Air Flow}\ [m^3/\min] \times \sqrt{\frac{1.178}{\gamma}}$$

$$\text{Specific gravity}(\gamma) = \frac{10332}{29.44 \times (273 + AmbientTemperature[°C])}$$

SAF : Standard Air flow

B. Energy Efficiency Level

R	Standby power (passive standby mode)	Level
R ≤ 1.00	≤ 1.0 W	1
R ≤ 1.00	N/A	2
1.00 < R ≤ 1.40	N/A	3
1.40 < R ≤ 1.80	N/A	4
1.80 < R ≤2.20	N/A	5

C. Definitions

Passive standby mode : Passive standby power mode: When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals.

13. Air cleaner

13.1.MEPS

(unit : W/m^2)

Type	MEPS
	From 1st of January, 2011
All	2.5

Remark) 26.4m^2 = 8 pyung

13.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{Measured Power consumption[W]}}{\text{Standard room size[m}^2\text{]}}$$

Standby power shall be tested in power-off with using remote controller, if a remote controller is not provided, it shall be tested in power-off in a tested sample.

B. Energy Efficiency Level

1) Standard room size < 26.4m^2

R	Standby power (Standby mode power consumption)	Level
$R \leq 0.5$	$\leq$ 1.0 W	1
$R \leq 1.0$	N/A	2
$1.0 < R \leq 1.5$	N/A	3
$1.5 < R \leq 2.0$	N/A	4
$2.0 < R \leq 2.5$	N/A	5

C. Definitions

Passive standby mode : Passive standby power mode: When an appliance is switched to off/standby and is not performing its primary functions while still connected to a power supply but can be activated by a remote control or other internal signals.

14. Incandescent lamps

14.1. Energy Efficiency Standards, TEPS, Effective date of MEPS

(unit : lm/W)

Rated Power (P)	MEPS		TEPS
	From 1st of January, 2012	From 1st of January, 2014	
25W≤P<40W	8.3	20.0	10.9
40W≤P<70W	11.4	20.0	15.0
70W≤P<150W	13.2	20.0	17.4

14.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{TEPS[lm/W]}}{\text{Measured Power consumption[lm/W]}}$$

B. Energy Efficiency Level

R	Level
$R \leq 1.00$	1
$1.00 < R \leq 1.08$	2
$1.08 < R \leq 1.16$	3
$1.16 < R \leq 1.24$	4
$1.24 < R \leq 1.32$	5

15. Fluorescent lamps

15.1 Energy Efficiency Standards

A. TEPS, MEPS, TEPS, and Effective date of MEPS

(unit : lm/W)

Type			TEPS	MEPS From 1st of January, 2010
Tubular (Starter type, Rapid Starter type, and HID type)	20W	EX-W EX-N EX-L	78.6	59.6
		EX-D and etc	75.9	57.5
	28W 32W	EX-W EX-N EX-L	97.0	77.6
		EX-D and etc	95.0	76.0
	40W	EX-W EX-N EX-L	102.5	82.0
		EX-D and tec	100.0	80.0
Circular type	32W	EX-W EX-N EX-L	69.6	60.0
		EX-D and etc	67.2	58.0
	40W	EX-W EX-N EX-L	76.5	66.0
		EX-D and etc	74.2	64.0
Compact type (With Starter, Without Starter)	FPX 13W FDX 26W	EX-W EX-N EX-L	66.2	53.0
		EX-D and etc	63.7	51.0
	FPL 27W	EX-W EX-N EX-L	73.7	59.0
		EX-D and etc	71.2	57.0
	FPL 32W FPL 36W FPL 45W FPL 55W	EX-W EX-N EX-L	85.0	68.0
		EX-D and etc	82.5	66.0

15.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{TEPS[lm/W]}}{\text{Measured Power consumption[lm/W]}}$$

B. Energy Efficiency Level

1) Tubular type (20W)

R	Level
$R \leq 1.00$	1
$1.00 < R \leq 1.08$	2
$1.08 < R \leq 1.16$	3
$1.16 < R \leq 1.24$	4
$1.24 < R \leq 1.32$	5

2) Tubular type(28W, 32W, 40W), compact type(FPX 13W, FDX 26W, FPL 27W, FPL 32W, FPL 36W, FPL 45W, FPL 55W)

R	Level
$R \leq 1.00$	1
$1.00 < R \leq 1.10$	2
$1.10 < R \leq 1.15$	3
$1.15 < R \leq 1.20$	4
$1.20 < R \leq 1.25$	5

3) Tubular type(32W, 40W)

R	Level
$R \leq 1.00$	1
$1.00 < R \leq 1.04$	2
$1.04 < R \leq 1.08$	3
$1.08 < R \leq 1.12$	4
$1.12 < R \leq 1.16$	5

16. Fluorescent lamps ballast

16.1 Energy Efficiency Standards, Effective date of MEPS

Type		TEPS (To 31st of December, 2012)	MEPS (From 1st of January, 2009)
Tubular (Starter, Rapid Starter)	20W	1.07	0.97
	32W	1.09	1.07
	40W	1.21	1.18
Tubular (T5, HID)	28W	0.92	0.88
	32W	0.92	0.88
Circular	32W	1.09	1.07
	40W	1.09	1.07
Compact type (With Starter, Without Starter)	FPX 13W	0.97	0.85
	FDX 26W	1.05	0.90
	FPL 27W	1.05	0.90
	FPL 32W	0.90	0.88
	FPL 36W	1.07	0.90
	FPL 45W	0.90	0.88
	FPL 55W	1.09	1.07

17. Associated ballast

17.1 Energy Efficiency Standards, Date to accomplish TEPS, Effective date of MEPS

(unit : lm/W)

Type		TEPS	MEPS
		To 31st of December, 2012	From 1st of October, 2004
5W ≤ P < 10W	EX-W, EX-N, EX-L	53.0	46.1
	EX-D and etc	51.9	45.2
10W ≤ P < 16W	EX-W, EX-N, EX-L	58.9	51.3
	EX-D and etc	57.9	50.4
16W ≤ P < 21W	EX-W, EX-N, EX-L	66.9	58.2
	EX-D and etc	66.0	57.4
21W ≤ P < 25W	EX-W, EX-N, EX-L	69.0	60.0
	EX-D and etc	67.9	59.1
25W ≤ P ≤ 60W	EX-W, EX-N, EX-L	70.9	61.7
	EX-D and etc	70.0	60.9

17.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R(\text{Energy Efficiency Level Index}) = \frac{\text{TEPS[lm/W]}}{\text{Measured Power consumption[lm/W]}}$$

B. Energy Efficiency Level

R	The endurance of on-off	Level
R ≤ 1.00	More than 10,000 times	1
R ≤ 1.00	N/A	2
1.00 < R ≤ 1.05	N/A	3
1.05 < R ≤ 1.10	N/A	4
1.10 < R ≤ 1.15	N/A	5

18. 3 Phase induction motor

18.1 MEPS and requirement

A. MEPS

MEPS for 3 phase induction motor is a following table, and the requirement for MEPS is a table in B. Basically the number of testing samples is 5, but a Model which is only produced or sold not more than 4 in a year, all samples shall be satisfied with the requirements of B. When the rated output power is between 2 values in a below table, if the rated output power is not less than the average value between upper value and lower value, it shall be followed MEPS at upper value, otherwise it shall be followed MEPS at lower value.

Rated output power	MEPS(%)							
	Protector type				Hermetic type			
	2 pole	4 pole	6 pole	8 pole	2 pole	4 pole	6 pole	8 pole
0.75kW	75.5	82.5	80.0	74.0	75.5	82.5	80.0	74.0
1.5 kW	84.0	84.0	85.5	85.5	84.0	84.0	86.5	82.5
2.2 kW	84.0	86.5	86.5	86.5	85.5	87.5	87.5	84.0
3.7 kW	85.5	87.5	87.5	87.5	87.5	87.5	87.5	85.5
5.5 kW	87.5	88.5	88.5	88.5	88.5	89.5	89.5	85.5
7.5 kW	88.5	89.5	90.2	89.5	89.5	89.5	89.5	88.5
11 kW	89.5	91.0	90.2	89.5	90.2	91.0	90.2	88.5
15 kW	90.2	91.0	91.0	90.2	90.2	91.0	90.2	89.5
18.5 kW	91.0	91.7	91.7	90.2	91.0	92.4	91.7	89.5
22 kW	91.0	92.4	92.4	91.0	91.0	92.4	91.7	91.0
30 kW	91.7	93.0	93.0	91.0	91.7	93.0	93.0	91.0
37 kW	92.4	93.0	93.0	91.7	92.4	93.0	93.0	91.7
45 kW	93.0	93.6	93.6	92.4	93.0	93.6	93.6	91.7
55 kW	93.0	94.1	93.6	93.6	93.0	94.1	93.6	93.0
75 kW	93.0	94.1	94.1	93.6	93.6	94.5	94.1	93.0
90 kW	93.6	94.5	94.1	93.6	94.5	94.5	94.1	93.6
110 kW	93.6	95.0	94.5	93.6	94.5	95.0	95.0	93.6
132 kW	93.6	95.0	94.5	-	94.5	95.0	95.0	-
160 kW	94.5	95.0	94.5	-	95.0	95.0	95.0	-
200 kW	94.5	95.0	-	-	95.0	95.0	-	-

B. Requirement for MEPS

Products	The number of sample to test	No. of Failed sample to accept	Tested items	Allowed
3 phase induction motor	5 [1)]	-	Averaged full load efficiency ($\overline{X}$)	$\overline{X} \geq \frac{100}{1+1.05\left(\frac{100}{RE}-1\right)}$ RE : MEPS
			Minimum efficiency in tested samples ($X_{\min}$)	$X_{\min} \geq \frac{100}{1+1.15\left(\frac{100}{RE}-1\right)}$ RE : MEPS

Remark 1) Basically the number of testing samples is 5

19. Household Gas Boiler

19.1 MEPS

(unit : %)

Type	MEPS Effective date of MEPS : From 1st of January, 2003
Household Gas Boiler	80.0

19.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

R(Energy Efficiency Level Index) =	Measured thermal efficiency for heating(%)

B. Energy Efficiency Level

R	Standby power (sleep mode)	Level
87.0% ≤ R	≤ 3.0W	1
85.0% ≤ R	N/A	2
83.0% ≤ R < 85.0%	N/A	3
81.5% ≤ R < 83.0%	N/A	4
80.0% ≤ R < 81.5%	N/A	5

C. Definitions

Sleep mode is defined as the reduced power state that the product is not running for a moment, and automatically goes back to run.

20. Adapter· Charger

20. 1 MEPS and effective date

A. Adapter (External power supply without charging)

<table>
<tr><td colspan="4">MEPS</td></tr>
<tr><td colspan="4">From 1 January 2009</td></tr>
<tr><td>Output power on name plate (P_{no})</td><td>Running Efficiency</td><td>Output power on name plate (P_{no})</td><td>Maximum Standby Power (Power consumption on No-Load Mode)</td></tr>
<tr><td>0 <P_{no}≤1W</td><td>≥0.49×P_{no}</td><td rowspan="2">0 <P_{no}< 10W</td><td rowspan="2">≤0.5W</td></tr>
<tr><td>1W<P_{no}≤49W</td><td>≥[0.09×Ln(P_{no})]+0.49</td></tr>
<tr><td>49W<P_{no}≤150W</td><td>≥0.84</td><td>10W≤P_{no}≤150W</td><td>≤0.75W</td></tr>
</table>

Remark) It shall be met with both requirements, running efficiency and maximum standby power.

B. Charger (External power supply with charging function to charge Li-Ion Battery)

<table>
<tr><td colspan="2">MEPS</td></tr>
<tr><td colspan="2">From 1 January 2009</td></tr>
<tr><td rowspan="2">Measured Input Power(P_{in})</td><td>Maximum Standby Power</td></tr>
<tr><td>Power consumption on No-Load Mode</td></tr>
<tr><td>0 < P_{in} < 10W</td><td>≤0.5W</td></tr>
<tr><td>10W ≤ P_{in} ≤ 20W</td><td>≤0.75W</td></tr>
</table>

C. Definitions

Running efficiency = Total effective output power (AC or DC)/Effective input power(AC)

No-Load Mode : Adapter and Charger disconnect to line voltage

21. Electric Driven Heatpump

21.1 MEPS

(unit : W/W)

Type		MEPS
		From 1 January 2009
Non-ducted and ducted unitary(Including window type)		2.00
Split type	RCC < 4kW	2.40
	4kW ≤ RCC < 10kW	2.20
	10kW ≤ RCC < 23.0kW	2.00

Remark) RCC is the rated cooling capacity

21.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$R = \frac{\text{Cooling EER(CEER)+Heating EER(HEER)}}{2}$$

For CEER all types (Fixed Capacity Unit, Two (2) stage capacity units, and Variable capacity units) shall be applied to CSPF(Cooling Seasonal Performance Factor) in KS C 9306, and for HEER they shall be applied to HSPF(Heating Seasonal Performance Factor) in KS C 9306. If there is a make-up heater, it shall be operated in extra low temperature test.

B. Energy Efficiency Level

1) Non-ducted and ducted unitary (Including window type)

R	Level
3.20 ≤ R	1
2.90 ≤ R < 3.20	2
2.60 ≤ R < 2.90	3
2.30 ≤ R < 2.60	4
2.00 ≤ R < 2.30	5

2) Split type, RCC < 4kW

R	Level
4.00 ≤ R	1
3.60 ≤ R < 4.00	2
3.20 ≤ R < 3.60	3
2.80 ≤ R < 3.20	4
2.40 ≤ R < 2.80	5

3) Split type, 4kW ≤ RCC < 10kW

R	Level
3.80 ≤ R	1
3.40 ≤ R < 3.80	2
3.00 ≤ R < 3.40	3
2.60 ≤ R < 3.00	4
2.20 ≤ R < 2.60	5

4) Split type, 10kW ≤ RCC < 23.0kW

R	Level
3.20 ≤ R	1
2.90 ≤ R < 3.20	2
2.60 ≤ R < 2.90	3
2.30 ≤ R < 2.60	4
2.00 ≤ R < 2.30	5

22. Commercial Refrigerator

22.1 MEPS (Minimum Energy Performance Standard)

Items	MEPS From 1 January 2010
Refrigerator only	$P \leq 0.111AV+50.25$
Refrigerator-freezer	$P \leq 0.129AV+48.57$

Remark)

1. AV = compensated cubic volume = ∑{{cubic volume of the each compartment} × K × F }

   3) K value in the refrigerator only is 1
   4) K value in refrigerator-freezer is

$$\text{K (compensation coefficient)} = \frac{T_1 - T_C}{T_1 - T_2}$$

Where
T_1=ambient temperature in testing(25℃)
T_2=averaging indoor temperature of the fresh compartment(5℃)

3) F = 1.2 if it is auto defrost, otherwise F=1.0

2. P = Maximum power consumption (kWh/month)
3. 220V is priority if both voltages, 110V and 220V can be applied
4. To determine MEPS it shall round off the 2nd place of decimal of the value in accordance with KS 3251-1.

22.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

$$\text{R(Energy Efficiency Level Index)} = \frac{\text{MEPS [kWh/month]}}{\text{Measured monthly power consumption [kWh/month]}}$$

B. Energy Efficiency Level

1) Refrigerator only

R	Level
$4.20 \leq R$	1
$3.40 \leq R < 4.20$	2
$2.60 \leq R < 3.40$	3
$1.80 \leq R < 2.60$	4
$1.00 \leq R < 1.80$	5

2) Refrigerator-Freezer

R	Level
$3.40 \leq R$	1
$2.80 \leq R < 3.40$	2
$2.20 \leq R < 2.80$	3
$1.60 \leq R < 2.20$	4
$1.00 \leq R < 1.60$	5

23. Gas Water Heater

23.1 MEPS

(unit : %)

Type	MEPS Effective date of MEPS : From 1st of January, 2011
Gas Water Heater	73.0

23.2 Energy Efficiency Level Standards

A. Energy Efficiency Level Index

R(Energy Efficiency Level Index) =	Measured thermal efficiency for water heating(%)

For a instant gas water heater

$$\text{thermal efficiecny} = \frac{\text{Output}}{\text{Gas consumption}} = \frac{M \times C \times (tw2 - tw1)}{V \times Q} \times \frac{101.3(273 + ta)}{(B + Pm - S) \times 273} \times 100$$

Where,
M : Mass of water, kg
C : Specific heat of Water, 4.19 kJ/kg K
tw2 : temperature at hot water, ℃
tw1 : temperature of supply water, ℃
Q : Total energy, kJ/m^3N
V : gas consumption, m^3
B : barometer, kPa
t_a : temperature at gas meter, ℃
Pm : pressure at gas meter, kPa
S : pressure at t_a

B. Energy Efficiency Level

R	Standby power (sleep mode)	Level
93.0% ≤ R	≤ 3.0W	1
88.0% ≤ R	N/A	2
83.0% ≤ R < 88.0%	N/A	3
78.0% ≤ R < 83.0%	N/A	4
73.0% ≤ R < 78.0%	N/A	5

C. Definitions

Sleep mode is defined as the reduced power state that the product is not running for a moment, and automatically goes back to run.

<Annex 4> Independent Testing Laboratory (Article 6 ①)

1. Testing items for independent testing laboratory

Items	Testing Laboratory
1. Refrigerator	KTL, KETI, ERI, KRAAC, Busan TP, Intertek
2. Freezer	KTL, KETI, ERI, KRAAC, Busan TP, Intertek
3. Kimchi Refrigerator	KTL, KETI, ERI, KRAAC, Busan TP
4. Air-conditioner	KTL, KRAAC, Busan TP, ERI, Intertek
5. Washing Machine	KTL, KATRI
6. Horizontal drum Washing machine	KTL, KATRI
7. Dishwasher	KTL
8. Dish drier	KTL
9. Electrical Cooler and Heater for Drinking-Water Storage	KTL, KETI, ERI
10. Rice cooker	KTL, KETI, ERI, Digital EMC
11. Vacuum cleaner	KTL, KETI, Busan TP
12. Electric Fan	KTL, KETI, ERI, Digital EMC
13. Air cleaner	KTL, KICM, KIMM, Busan TP
14. Incandescent lamps	Kwangju-Chunnam SMBA, Chunbuk SMBA KTL, KETI, KERI, KILT, ERI
15. Fluorescent lamps	Kwangju-Chunnam SMBA, Chunbuk SMBA KTL, KETI, KERI, KILT, ERI
16. Fluorescent lamps ballasts	Kwangju-Chunnam SMBA, KTL, KETI, KERI, KILT, ERI
17. Associated ballasts	Kwangju-Chunnam SMBA, KTL, KETI, KERI, KILT, ERI
18. 3 phase induction motor	KERI, KTL, SBC, KETI
19. Household Gas Boiler	KGSC, KGPAA
20. Adapter Charger	KTL, ERI, TTA, KETI, One Tech, Digital EMC, SK Tech
21. Electric Driven Heatpump	KTL, KRAAC, Busan TP, Intertek
22. Commercial Refrigerator	KTL, KRAAC, Busan TP, Intertek
23. Gas water heater	KGSC

Remark :

1. The scope of test items for “Regulation on energy efficiency label and standards” shall be accredited by “National Standard Law Article 23”.
2. Kwangju-Chunnam SMBA : Kwangju-Chunnam Regional Small& Medium Business Administration
   Chunbul SMBA : Chunbuk Regional Small& Medium Business Administration
   KTL : Korea Testing Laboratory
   KETI : Korea Electric Testing Institute
   KERI : Korea Electrotechnology Research Institute
   KILT : Korea Institute of Lighting Technology
   KGSC : Korea Gas Safety Corporation
   ERI : EMC Research Institute
   SBC: Small Business Corporation
   Busan TP : Busan Techno Park

<Annex 5> Self-certify testing laboratory (Article 7 ①)

<table>
<tr><th>Items</th><th>Test Facilities and Man power</th></tr>
<tr><td>All items (except adapter-charger)</td><td>Persons and facilities are qualified with “Korea Laboratory Accreditation Scheme, Article 35” by “National Standard Law Article 23”</td></tr>
<tr><td>Adapter-charger</td><td>1. Test equipment
<table>
<tr><th>Test Equipments</th><th>Max Measuring range</th><th>Accuracy</th><th>Resolution</th><th>No.</th></tr>
<tr><td>Stop watch or timer</td><td>-</td><td>±5%</td><td>-</td><td>More than 1</td></tr>
<tr><td>Thermometer</td><td>50℃</td><td>±2%</td><td></td><td>More than 1</td></tr>
<tr><td>Powermeter</td><td>≤1W
1W~2000W</td><td>±20mW
±3%</td><td>-0.01W
for P≤ 10W

-0.1W
for10W<P≤100W

-1W
for100W<P≤1.5kW

-10W for P>1.5kW</td><td>More than 1</td></tr>
<tr><td>Voltage meter</td><td>600V</td><td>±1.5%</td><td></td><td>More than 1</td></tr>
<tr><td>Frequency meter</td><td>3kHz</td><td>±0.2%</td><td></td><td>More than 1</td></tr>
<tr><td>AVR</td><td>-</td><td>±1.5%</td><td></td><td>More than 1</td></tr>
</table>
2. Man Power : They shall have moth than 1 person qualified as following requirements
<table>
<tr><th></th><th>High school</th><th>Junior college</th><th>College or higher</th></tr>
<tr><td>Electric and Electronic test</td><td>3 year</td><td>2 year</td><td>1 year</td></tr>
</table></td></tr>
</table>

Remark) Importer can apply to be self-certify testing laboratory with equipments and man power in oversea factory, but they shall be qualified with Article 66, ①, and Article 33, ②, 2),and any expense shall be paid by applicants.

<Annex 6> Rounding off the place of decimal of the value in a test report (Article 2 ③)

(Test report shall be determined by rounding off the place of decimal of the value in accordance with KS 3251-1.)

Products	Items to indicate	Unit	Round off the place of decimal of value
1. Refrigerator	1.Monthly power consumption	(kWh/Month)	Second (x.xx)
	2.Storage volume of fresh compartment	(L)	First (x.x)
	3.Storage volume of freezer compartment	(L)	First (x.x)
	4.Auto defrost function	-	-
	5.Adjusted volume	(L)	First (x.x)
	6.Dispenser	-	-
	7.the length of the actual sealing perimeter of the homebar door of fresh compartment	(cm)	First (x.x)
	8.the length of the actual sealing perimeter of the homebar door of freezer compartment	(cm)	First (x.x)
	9.any records for KS C ISO 15502 requirements MEPS	-	-
	10.Power consumption per an hour (Wh)	(kWh/Month)	Second (x.xx)
	11.CO2 emission per an hour	(Wh)	Integer(x.)
	12.Annual power consumption	(g/hour)	Integer(x.)
	13.Annual energy cost	(kWh)	First (x.x)
	14.Energy Efficiency level	(Won)	Integer(x.)
		-	-
2. Freezer	1.Monthly power consumption	(kWh/Month)	Second (x.xx)
	2.Storage Volume of freezer compartment	(L)	First (x.x)
	3.Adjusted Volume	(L)	First (x.x)
	4.MEPS	(kWh/Month)	Second (x.xx)
	5.Power consumption per an hour (Wh)	(Wh)	Integer(x.)
	6.CO2 emission per an hour	(g/hour)	Integer(x.)
	7.Annual power consumption	(kWh)	First (x.x)
	8.Annual energy cost	(Won)	Integer(x.)
	9.Energy Efficiency Level	-	-
3. Kimchi Refrigerator	1.Monthly power consumption	(kWh/Month)	Second (x.xx)
	2.Storage volume of Kimchi preserving compartment	(L)	First (x.x)
	3.Storage Volume of freezer compartment	(L)	First (x.x)
	4.Storage Volume of other compartments	(L)	First (x.x)
	5.Storage volume of Kimchi preserving container	(L)	First (x.x)
	6.Adjusted Volume	(L)	First (x.x)
	7.MEPS	(kWh/Month)	Second (x.xx)
	8.No. of Kimchi preserving container	–	Integer(x.)
	9.Power consumption per an hour (Wh)	(Wh)	Integer(x.)
	10.CO2 emission per an hour	(g/hour)	Integer(x.)
	11. Annual power consumption	(kWh)	First (x.x)
	12.Annual energy cost	(Won)	Integer(x.)
	13.Energy Efficiency Level	–	–

4. Air-conditioner	1.Energy Efficiency Ratio (EER) 2.Monthly power consumption 3.Cooling Capacity 4.Cooling power consumption 5.Standby power 6.Power consumption per an hour (Wh) 7.CO2 emission per an hour 8. Annual power consumption 9.Annual energy cost 8.Energy Efficiency Level	(W/W) (kWh/Month) (W) (W) (W) (Wh) (g/hour) (kWh) (Won) -	Third (x.xxx) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer(x.) Integer(x.) First (x.x) Integer(x.) -
5.Washing machine	1.Power consumption per 1kg 2.Water extraction ratio 3.Rinsing Index 4.Rated Washing Capacity 5.Electric Power Consumption per a cycle 6.Duration per a cycle 7.Standard capacity 8.Standby power 9.CO2 emission per a cycle 10. Annual power consumption 11.Annual energy cost 12.Energy Efficiency Level	(Wh/kg) (%) - (kg) (Wh) (min) (ℓ) (W) (g/cycle) (kWh) (Won) -	First (x.x) First (x.x) Second (x.xx) Integer (x.) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer (x.) First (x.x) Integer(x.) -
6. Horizontal drum washing machine	1.Power consumption per 1kg 2.Water extraction ratio 3.Washing efficiency index 4.Rated Washing Capacity 5.Electric Power Consumption during a cycle 6.Duration per a cycle 7.Water Consumption during a cycle 8.Standby power 9.CO2 emission per a cycle 10. Annual power consumption 11.Annual energy cost 12.Energy Efficiency Level	(Wh/kg) (%) - (kg) (Wh) (min) (ℓ) (W) (g/cycle) (kWh) (Won) -	First (x.x) First (x.x) Second (x.xx) Integer (x.) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer (x.) First (x.x) Integer(x.) -
7. Dishwasher	1.Washing performance 2.Monthly electric power consumption 3.Electric power consumption per a cycle 4.Duration per a cycle 5.Monthly Water Consumption 6.Water Consumption per a cycle 7.Rated Washing Capacity 8.Standby power 9.CO2 emission per a cycle 10. Annual power consumption 11.Annual energy cost 12.Energy Efficiency Level	- (kWh/Month) (Wh) (min) (ℓ/ Month) (ℓ) (person) (W) (g/cycle) (kWh) (Won) -	Second (x.xx) First (x.x) First (x.x) Integer (x.) First (x.x) First (x.x) Integer (x.) First (x.x) Integer (x.) First (x.x) Integer(x.) -

8. Dish drier	1.Power consumption for 20 minutes drying 2.Rated Drying capacity 3.Drying performance 4.Power consumption per an hour (Wh) 5.CO2 emission per an hour 6. Annual power consumption 7.Annual energy cost 8.Energy Efficiency Level	(Wh/20min) (person) (%) (Wh) (g/hour) (kWh) (Won) -	First (x.x) Integer (x) Integer (x) Integer (x) Integer (x) First (x.x) Integer(x.) -
9. Electrical Cooler and Heater for Drinking-Water Storage	1.Power consumption per 1 m^3 2.Monthly power consumption 3.Surface of cool water storage (m^3) 4.Surface of hot water storage(m^3) 5.Capacity of cool-water storage tank 6.Capacity of hot-water storage tank 7.Power consumption per an hour (Wh) 8.CO2 emission per an hour 9.Energy Efficiency Level	(kWh/ m^3) (kWh/Month) (m^3) (m^3) (ℓ) (ℓ) (Wh) (g/hour) -	First(x.x) First (x.x) Fouth(x.xxxx) Fouth(x.xxxx) Second (x.xx) Second (x.xx) Integer (x) Integer (x) -
10. Rice cooker	1.Power consumption per 1 person 2.Power consumption 3.Type 4.Total power consumption (Warming and Cooking) per a complete cycle 5.Duration per a complete cycle 6.Maximum cooking capacity 7.Standby power 8.Power consumption per an hour (Wh) 9.CO2 emission per an hour 10. Annual power consumption 11.Annual energy cost 12.Energy Efficiency level	(Wh/person) (W) - (Wh) (hour) (person) (W) (Wh) (g/hour) (kWh) (Won) -	First (x.x) First (x.x) - First (x.x) Second (x.xx) Integer (x.) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer(x.) -
11. Vacuum cleaner	1.Suction Power Efficiency 2.Measured Power consumption (W) 3.Maximum Suction Power 4.Dust emission 5.Power consumption per an hour (Wh) 6.CO2 emission per an hour 7. Annual power consumption 8.Annual energy cost 9.Energy Efficiency Level	(%) (W) (W) (mg/m^3) (Wh) (g/hour) (kWh) (Won) -	Second (x.xx) First (x.x) First (x.x) Second (x.xx) Integer (x.) Integer (x.) First (x.x) Integer(x.) -
12. Electric Fan	1.Energy Efficiency Ratio 2.Measured Power consumption (W) 3.Standard Air flow 4.Maximum air velocity 5.Standby power 6.Power consumption per an hour (Wh) 7.CO2 emission per an hour 8. Annual power consumption 9.Annual energy cost 10.Energy Efficiency Level	((㎥/min)/W) (W) (㎥/min) (m/min) (W) (Wh) (g/hour) (kWh) (Won) -	Second (x.xx) First (x.x) First (x.x) First (x.x) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer(x.) -

13. Air cleaner	1.Power consumption per 1m^2 2.Measured power consumption (W) 3.Standard room size 4.Deordorization efficiency 5.Standby power 6.Power consumption per an hour (Wh) 7.CO2 emission per an hour 8. Annual power consumption 9.Annual energy cost 10.Energy Efficiency Level	(W/m^2) (W) (m^2) (%) (W) (Wh) (g/hour) (kWh) (Won) -	Second (x.xx) First (x.x) First (x.x) Integer (x.) First (x.x) Integer (x.) Integer (x.) First (x.x) Integer(x.) -
14. Incandescent lamps	1.Efficiency 2.Luminous flux 3.Power consumption (W) 4.Lifetime 5.Power consumption per an hour (Wh) 6.CO2 emission per an hour 7.Energy Efficiency Level	(lm/W) (lm) (W) (hour) (Wh) (g/hour) -	Second (x.xx) Integer(x.) First (x.x) Integer(x.) Integer (x.) Integer (x.) -
15. Fluorescent lamps	1.Efficiency 2.Luminous flux 3.Power consumption (W) 4.Color 5.Power consumption per an hour (Wh) 6.CO2 emission per an hour 7.Energy Efficiency Level	(lm/W) (lm) (W) - (Wh) (g/hour) -	Second (x.xx) Integer(x.) First (x.x) - Integer (x.) Integer (x.) -
16. Fluorescent lamps ballasts	1.Compared Energy Efficiency Ratio 2.Luminous flux 3.Power input 4.Efficiency of luminous flux for reference ballast 5.Efficiency of luminous flux for tested ballast	- (lm) (W) (lm/W) (lm/W)	Third (x.xxx) Integer(x.) First (x.x) Second (x.xx) Second (x.xx)
17. Associated ballasts	1.Efficiency of luminous flux 2.Power input 3.Color 4.Luminous flux 5.The endurance of on-off 6.Power consumption per an hour (Wh) 7.CO2 emission per an hour 8.Energy Efficiency Level	(lm/W) (lm) - (lm) No. (Wh) (g/hour) -	Second (x.xx) First(x.x) - Integer(x.) Integer(x.) Integer(x.) Integer(x.) -
18. 3 phase induction motor	1.Full load efficiency 2.Type 3.Rated output power 4.The number of pole 5.Rated voltage 6.Rated ampere 7.Minimum efficiency in tested samples 8.No. of testing samples 9.Power consumption per an hour (Wh) 10.CO2 emission per an hour	(%) - (kW) - (V) (A) (%) - (Wh) (g/hour)	First (x.x) - First (x.x) - First (x.x) First (x.x) First (x.x) - Integer(x.) Integer(x.)

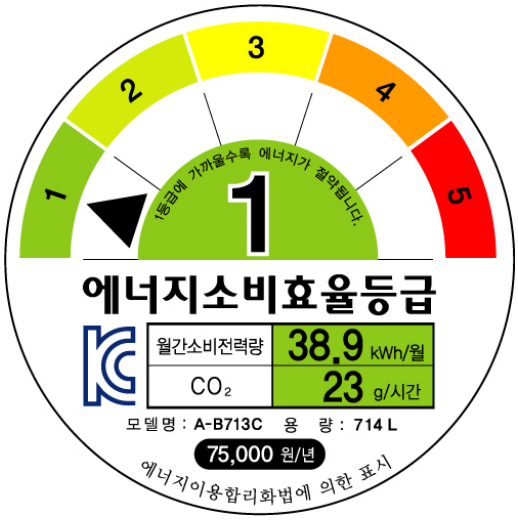
19. Household Gas Boiler	1.Measured thermal efficiency for heating	(%)	First (x.x)
	2.Type	-	-
	3.Gas consumption	(kW)	First (x.x)
	4.Heating capacity	(kW)	First (x.x)
	5.Standby power	(W)	First (x.x)
	6.Energy Efficiency Level	-	-
20. Adapter Charger	1.Running efficiency	(%)	First (x.x)
	2.Classification	-	-
	3.the rated output	(W)	First (x.x)
	4.Measured input	(W)	First (x.x)
	5.Standby power	(W)	Second (x.xx)
21. Electric Driven Heatpump	1.Energy Efficiency Ratio	(W/W)	Third (x.xxx)
	2.CSPF(Cooling Seasonal Performance factor)	(W/W)	Third (x.xxx)
	3.HSPF(Heating Seasonal Performance factor)	(W/W)	Third (x.xxx)
	4.the rated cooling capacity	(W)	First (x.x)
	5.the rated heating capacity	(W)	First (x.x)
	6.the rated cooling power consumption	(W)	Integer (x.)
	7.the rated heating power consumption	(W)	Integer (x.)
	8.make-up heater	(W)	Integer (x.)
	9.Energy Efficiency Level	-	-
22.Commercial refrigerator	1.Monthly power consumption	(kWh/month)	Second (x.xx)
	2.Storage volume of fresh compartment	(ℓ)	First (x.x)
	3.Storage volume of freezer compartment	(ℓ)	First (x.x)
	4.Auto defrost function	-	-
	5.Adjusted volume	(ℓ)	First (x.x)
	6.any records for KS C ISO 15502 requirements	-	-
	7.MEPS	(kWh/month)	Second (x.xx)
	8.Power consumption per an hour (Wh)	(Wh)	Integer (x.)
	9.CO2 emission per an hour	(g/hour)	Integer (x.)
	10. Annual power consumption	(kWh)	First (x.x)
	11.Annual energy cost	(Won)	Integer (x.)
	12.Energy Efficiency level	-	-
23. Gas Water Heater	1.Measured thermal efficiency	(%)	First (x.x)
	2.Gas consumption	(kW)	First (x.x)
	3.Standby power	(W)	First (x.x)
	4.Energy Efficiency level	-	First (x.x)

Remark) Annual energy cost shall round off the 3nd place of decimal of the value. (ex. 75,000 won)

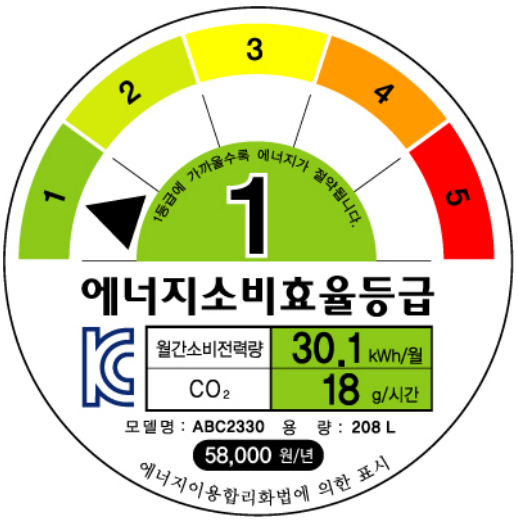
<Annex 7> Label Design for Energy Efficiency or Energy Efficiency Level (Article 16, ①)

1. Label

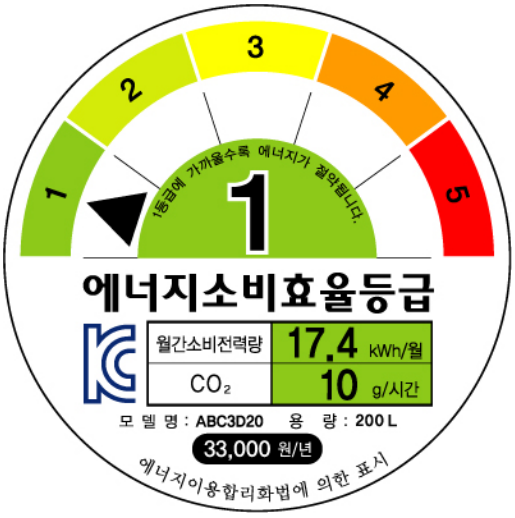
A. Refrigerator



B. Freezer



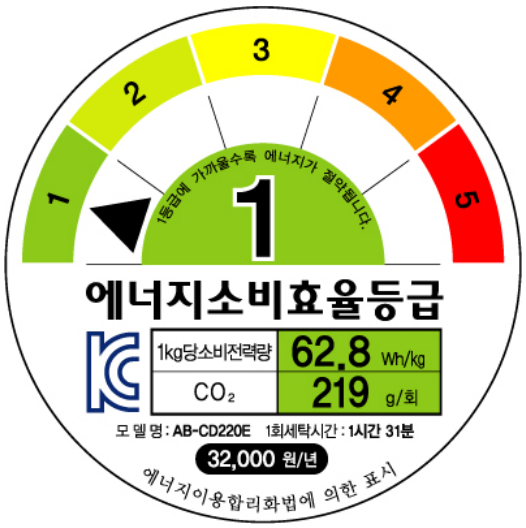
C. Kimchi Refrigerator



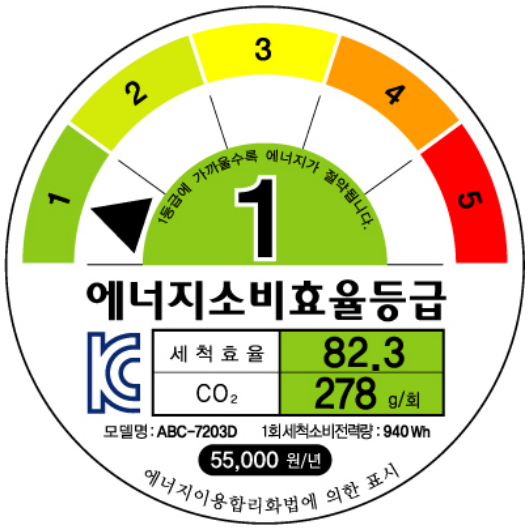
D. Air conditioner

E. **Washing Machine**

F. Horizontal drum washing machine



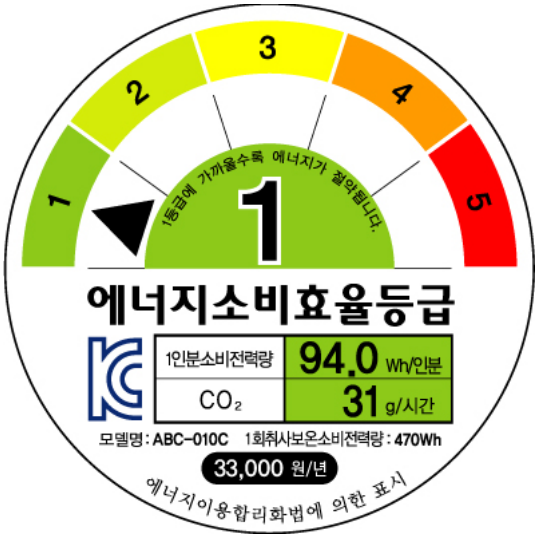
G. Dish Washer



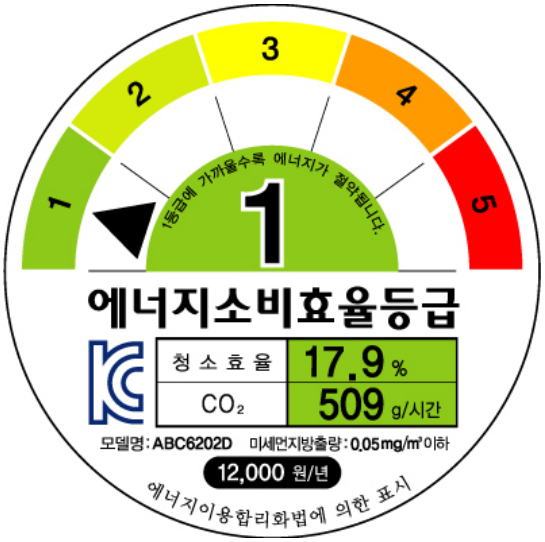
H. Dish drier

I. Electrical Cooler and Heater for Drinking-Water Storage

J. Rice cooker

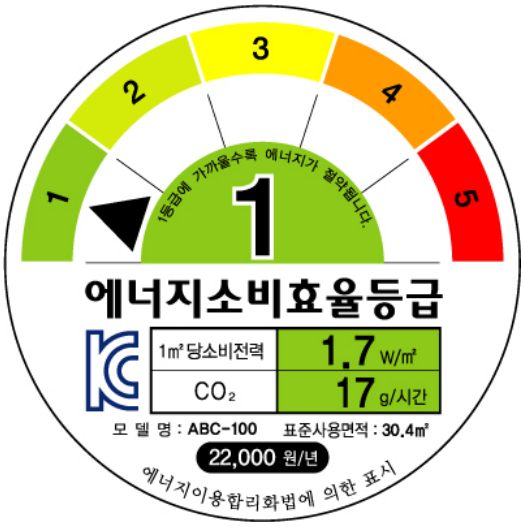


K. Vacuum cleaner

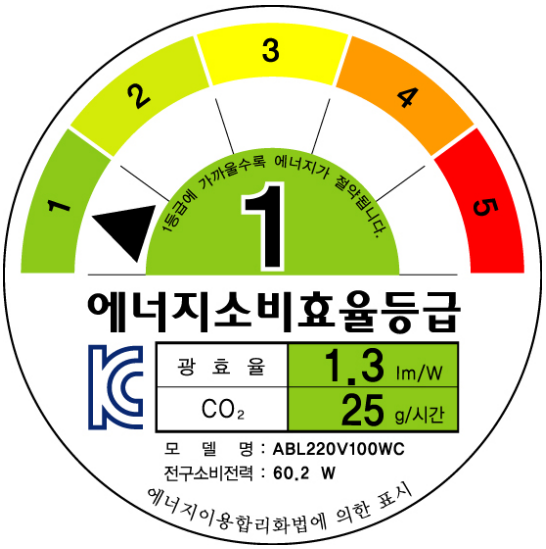


L. Electric Fan

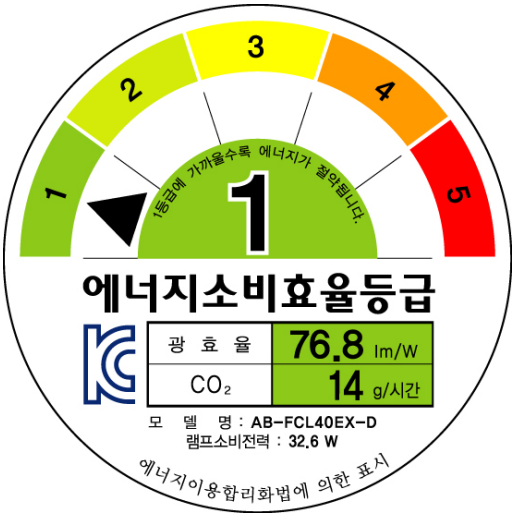
M. Air cleaner



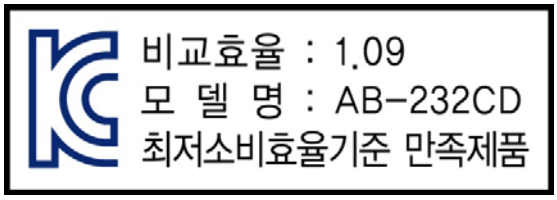
N. Incandescent lamps



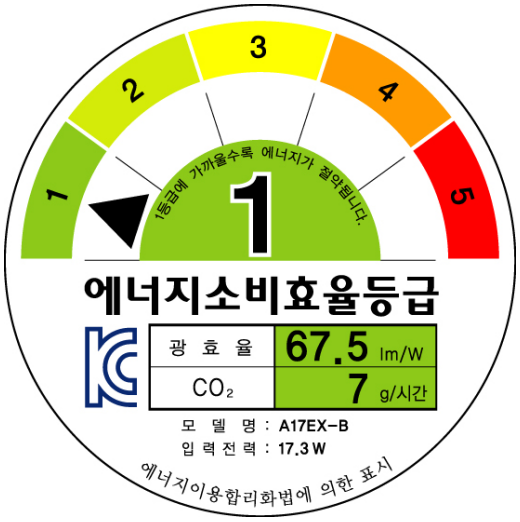
O. Fluorescent lamps



P. Fluorescent lamps ballasts



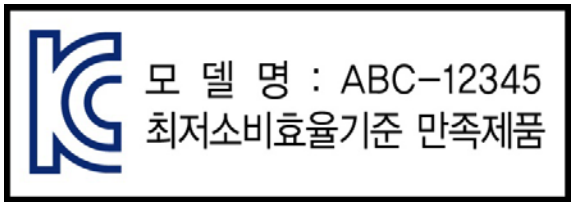
Q. Associated ballasts



R. 3 Phase Induction motor

S. Household Gas Boiler

T. Adapter-Charger



U. Electric Driven Heatpump

V. Commercial Refrigerator

W. Gas water heater

Remark)

1. CO2 : CO2 emission per an hour or Co2 emission per acycle
2. Refrigerator : Total volume = Storage volume of fresh compartment + Storage volume of freezer compartment
3. Freezer : Total volume = Storage volume of freezer compartment
4. Kimchi Refrigerator : Total volume = Storage volume of Kimchi preserving compartment + Storage Volume of freezer compartment + Storage Volume of other compartments
5. Air-conditioner : Rated cooling capacity is basically a measured value which is guaranteed by a manufacturer or an importer.
6. Electrical Cooler and Heater for Drinking-Water Storage : Total capacity = Capacity of cool-water storage tank + Capacity of hot-water storage tank
7. Electric driven heatpump : Rated cooling capacity and rated heating capacity are basically measured value which is guaranteed by a manufacturer or an importer. Make-up heater shall be not included rated heating capacity.
8. Commercial refrigerator : Total volume = Storage volume of fresh compartment + Storage volume of freezer compartment

2. Rounding off the place of decimal of the value in a label

(Label shall be determined by rounding off the place of decimal of the value in accordance with KS 3251-1.)

Products	Items to indicate	Unit	Round off the place of decimal of value
1. Refrigerator	1. Monthly power consumption 2. CO2 3. Total Storage Volume 4. Annual Energy Cost	(kWh/Month) (g/hour) (L) (KR$/y)	First (x.) Integer (x.) Integer (x.) Integer (x.)
2. Freezer	1. Monthly power consumption 2. CO2 3. Total Storage Volume 4. Annual Energy Cost	(kWh/Month) (g/hour) (L) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
3. Kimchi Refrigerator	1. Monthly power consumption 2. CO2 3. Total Storage Volume 4. Annual Energy Cost	(kWh/Month) (g/hour) (L) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
4. Air-conditioner	1. Energy Efficiency Ratio (CEER) 2. CO2 3. Rated Cooling Capacity 4. Annual Energy Cost	(W/W) (g/hour) (W) (KR$/y)	Second (x.xx) Integer (x.) Integer (x.) Integer (x.)
5.Washing machine	1. Power consumption per 1kg 2. CO2 3. Duration per a cycle 4. Annual Energy Cost	(Wh/kg) (g/cycle) (min) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
6. Horizontal drum washing machine	1. Power consumption per 1kg 2. CO2 3. Duration per a cycle 4. Annual Energy Cost	(Wh/kg) (g/cycle) (min) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
7. Dishwasher	1. Washing performance 2. CO2 3. Power Consumption per a cycle 4. Annual Energy Cost	- (g/cycle) (Wh) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
8. Dish drier	1. Power consumption for 20 minutes 2. CO2 3. Rated drying capacity 4. Annual Energy Cost	(Wh/20min) (g/hour) (%) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
9. Electrical Cooler and Heater for Drinking-Water Storage	1. Power consumption per 1 m^3 2. CO2 3. Total capacity 4. Monthly power consumption	(kWh/ m^3) (g/hour) (L) (kWh/Month)	First (x.x) Integer (x.) Integer (x.) First (x.x)
10. Rice cooker	1. Power consumption per a person 2. CO2 3. Power consumption per a cycle 4. Annual Energy Cost	(Wh/person) (g/hour) (Wh) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
11. Vacuum cleaner	1. Suction Power Efficiency 2. CO2 3. Dust emission 4. Annual Energy Cost	(%) (g/hour) (mg/㎥) (KR$/y)	First (x.x) Integer (x.) Second (x.xx) Integer (x.)

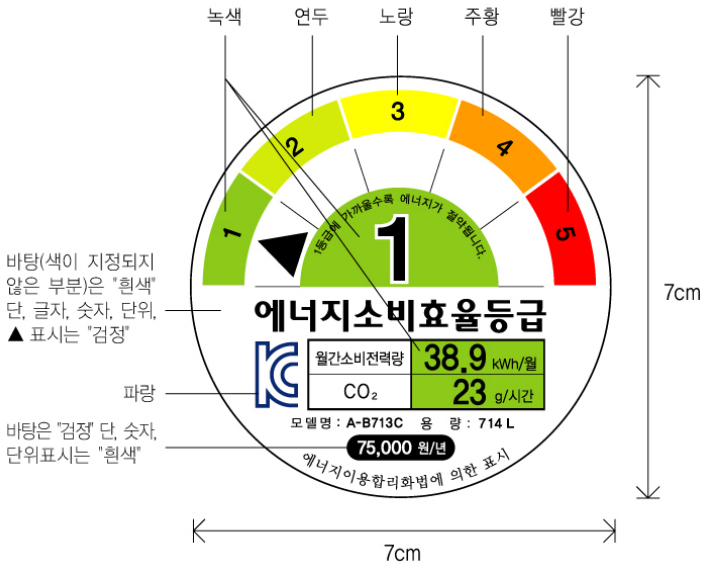
12. Electric Fan	1. Energy Efficiency Ratio 2. CO2 3. Standard Air flow rate 4. Annual Energy Cost	((㎥/min)/W) (g/hour) (㎥/min) (KR$/y)	First (x.x) Integer (x.) Integer (x.) Integer (x.)
13. Air cleaner	1. Power consumption per 1m^2 2. CO2 3. Standard room size 4. Annual Energy Cost	(W/ m^2) (g/hour) (m^2) (KR$/y)	First (x.x) Integer (x.) First (x.x) Integer (x.)
14. Incandescent lamps	1. Energy Efficiency Ratio 2. CO2 3. Rated power consumption	(lm/W) (g/hour) (W)	First (x.x) Integer (x.) First (x.x)
15. Fluorescent lamps	1. Energy Efficiency Ratio 2. CO2 3. Rated power consumption	(lm/W) (g/hour) (W)	First (x.x) Integer (x.) First (x.x)
16. Fluorescent lamps ballasts	1. Compared Energy Efficiency level index	-	Second (x.xx)
17. Associated ballasts	1. Efficiency of luminous flux 2. CO2 3. Power input	(lm/W) (g/hour) (W)	First (x.x) Integer (x.) First (x.x)
18. 3 phase induction motor	1. Full load efficiency 2. CO2 3. Type 4. Rated output power 5. The number of Pole	(%) (g/hour) - (kW) -	First (x.x) Integer (x.) - First (x.x) Integer (x.)
19. Household Gas Boiler	1. Rated thermal efficiency 2 Heating capacity	(%) (kW)	First (x.x) Integer (x.)
20. Adapter-Charger	-	-	-
21. Electric driven heatpump	1.Energy Efficiency Ratio 2.the rated cooling capacity 3.the rated heating capacity 4.make-up heater	(W/W) (W) (W) (W)	Second (x.xx) Integer (x.) Integer (x.) Integer (x.)
22. Commercial Refrigerator	1. Monthly power consumption 2. CO2 3. Total Storage Volume 4. Annual Energy Cost	(kWh/Month) (g/hour) (L) (KR$/y)	First (x.) Integer (x.) Integer (x.) Integer (x.)
23. Gas water heater	1. Rated thermal efficiency 2. Gas consumption	(%) (kW)	First (x.) First (x.)

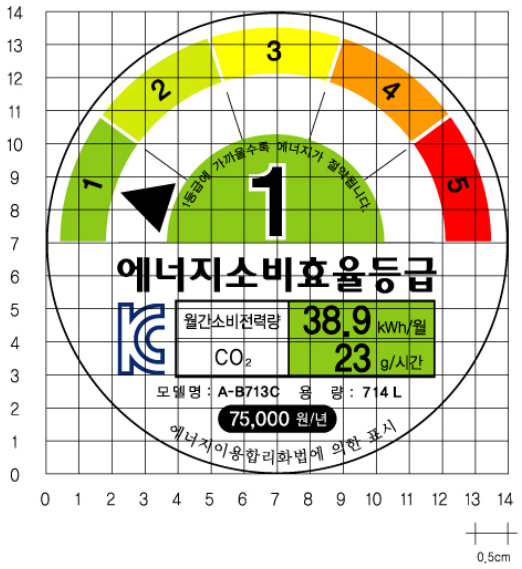
Remark) Annual energy cost shall be determined by rounding off the 3rd place of decimal of value. (ex. 75,000 KR$)

3. Design the energy efficiency label

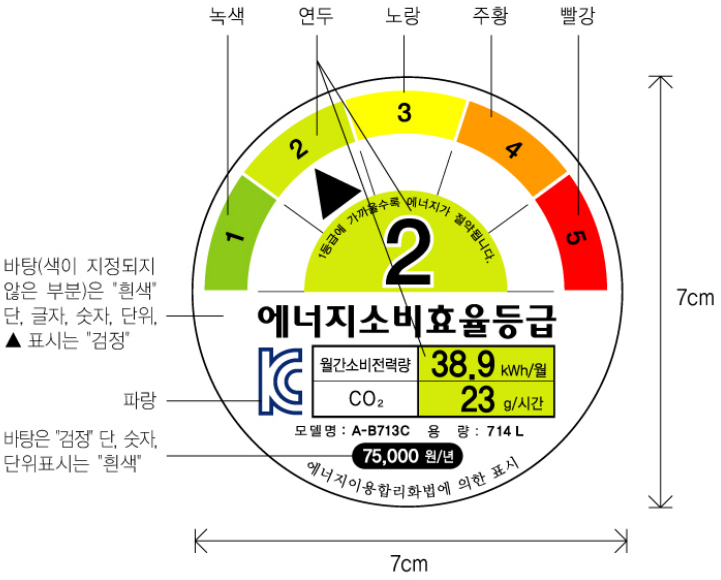
1) Label for Energy efficiency level

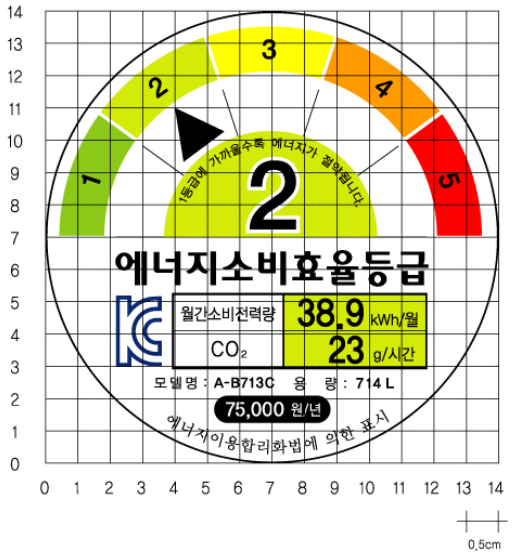
- 1st level (background color : green)



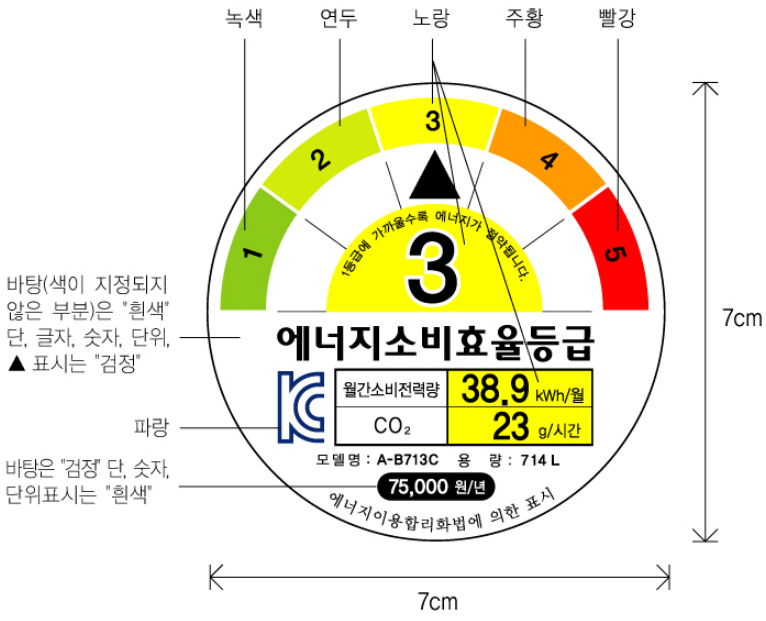


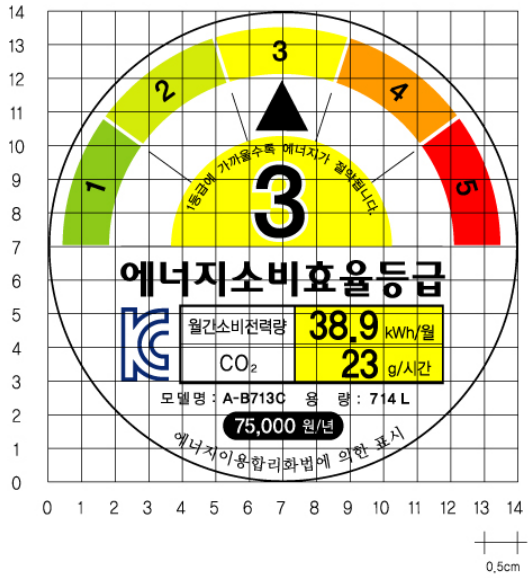
- 2nd level (background color : light green)



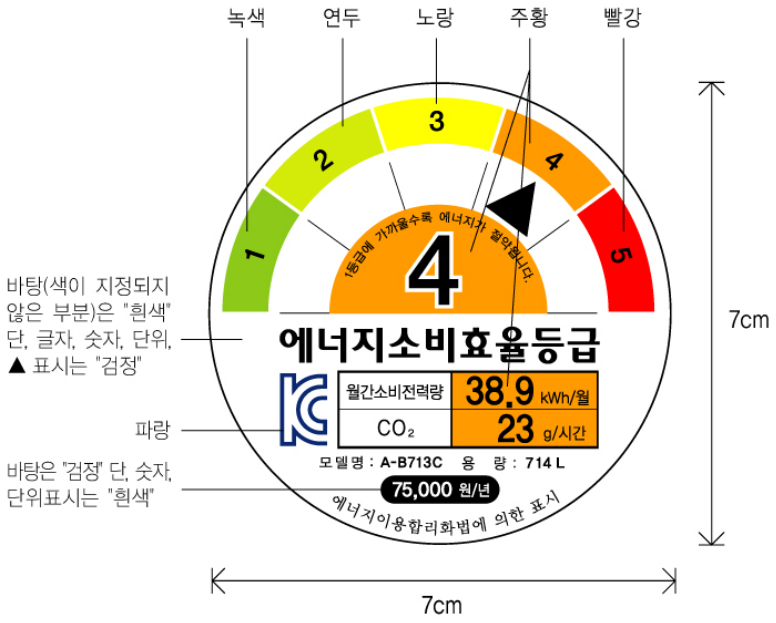


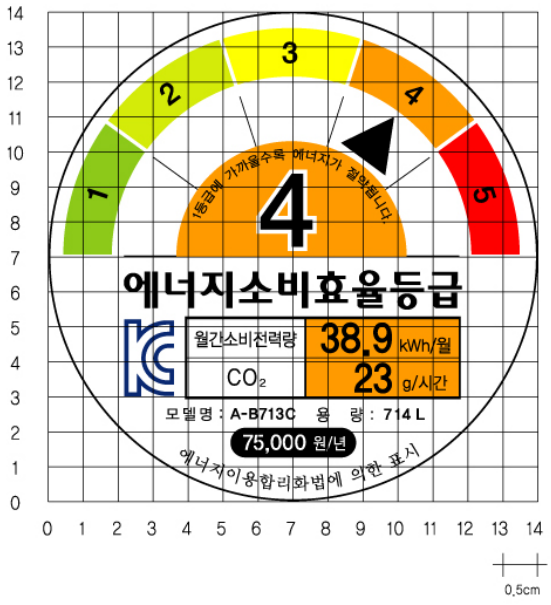
- 3rd level (background color : yellow)



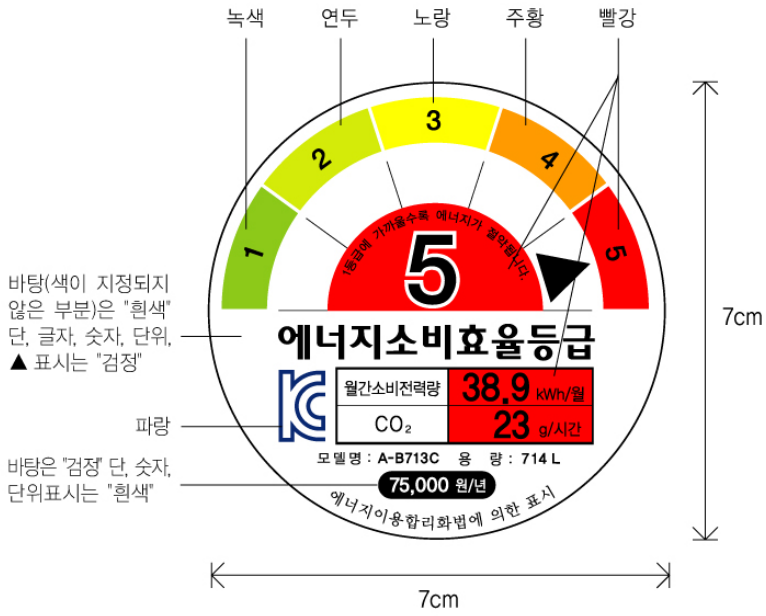


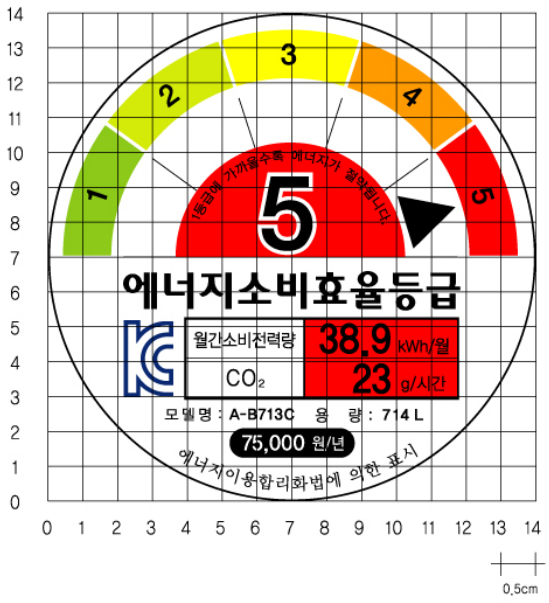
- 4th level (background color : Orange)





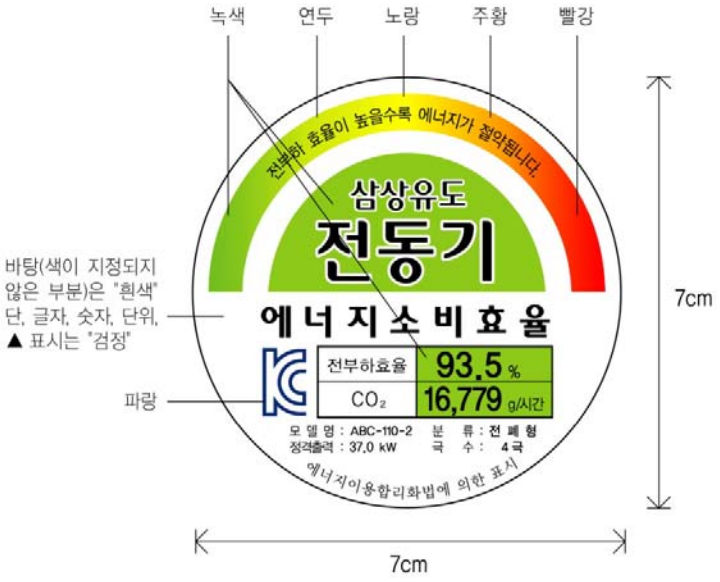
- 5th level (background color : Red)



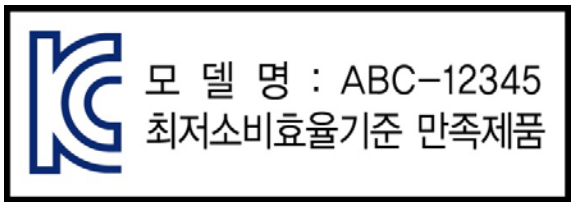


2) Label for Energy efficiency

A. 3 phase Induction motor



B. Fluorescent lamps ballasts and Adapter-charger



C. Color

- The color of energy efficiency level label and energy efficiency label shall be in pantone color, but it can be used with 4 origin colors. Fluorescent lamps and adapter-charger can be in a single color.

- The color of energy efficiency level label

Color	Pantone color	4 origin colors
Green	Pantone Process 376C	C45%, Y100%
Light Green	Pantone Process 389C	C17% Y100%
Yellow	Pantone Process Yellow C	Y100%
Orange	Pantone Process 1375 C	M40% Y100%
Red	Pantone Process Warm Red C	M100% Y100%
Black	Pantone Process Black C	K100%
Blue	Pantone Process 288C	C100%, M80%, K30%

D. Size

- The size of energy efficiency level label shall be 7cm(length) x 7cm(height), but it can be adjusted with the location.

Size	Items
7cm(length) x 7cm(height)	Refrigerator, Freezer, Kimchi Refrigerator, Air-conditioner(except wall mount split type), Washing machine, Horizontal drum washing machine, Dishwasher, Electrical Cooler and Heater for Drinking-Water Storage(higher 60cm), 3 phase induction motor(larger than 37kW), Household Boiler, Electric driven heatpump(exclude wall mount split type), Commercial refrigerator
Adjusted with 75%~100%	Air-conditioner(only wall mount split type), Dish drier, Rice cooker, Vacuum cleaner, Electric fan, Air cleaner, Electrical Cooler and Heater for Drinking-Water Storage(lower 60cm), 3 phase induction motor(less than 37kW), Electric driven heatpump(only wall mount split type), Gas water heater
Free adjusted	Incandescent lamps, Fluorescent lamps, Fluorescent lamps ballasts, Associated ballasts, Adapter-charger

Remark) Fonts can be bigger when label is made smaller

<Annex 8> Testing Items and requirements for Monitoring Program (Article 18 ④)

Products	No. of sample to test	No. of Failed sample to accept	Testing items	Requirements
1. Refrigerator	2	0	Monthly power consumption Storage volume CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% Within ±3% or 1 L ≤ 110% ≤ 110% -
2. Freezer	2	0	Monthly power consumption Storage Volume CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% Within ±3% or 1 L ≤ 110% ≤ 110% -
3. Kimchi Refrigerator	2	0	Monthly power consumption Storage Volume CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% Within ±3% or 1 L ≤ 110% ≤ 110% -
4. Air-conditioner	2	0	Energy Efficiency Ratio (EER) Cooling Capacity CO2 emission per an hour Annual energy cost Energy Efficiency Level	≥ 92% ≥ 95% ≤ 110% ≤ 110% -
5.Washing machine	2	0	Power consumption per 1kg Water extraction ratio Rinsing Index Duration per a cycle CO2 emission per a cycle Annual energy cost Energy Efficiency Level	≤ 110% ≥ 45% ≥ 1.00 ≤ 110% ≤ 110% ≤ 110% -
6.Horizontal drum washing machine	2	0	Power consumption per 1kg Washing efficiency index Water extraction ratio Duration per a cycle CO2 emission per a cycle Annual energy cost Energy Efficiency Level	≤ 110% ≥ 40% ≥ 0.90 ≤ 110% ≤ 110% ≤ 110% -
7. Dishwasher	2	0	Washing performance Electric power consumption per a cycle CO2 emission per an hour Annual energy cost Energy Efficiency Level	≥ 90% ≤ 110% ≤ 110% ≤ 110% -

8. Dish drier	2	0	Power consumption for 20 minutes drying Drying performance CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% ≥ 90% ≤ 110% ≤ 110% -
9.Electrical Cooler and Heater for Drinking-Water Storage	2	0	Power consumption per 1 m^3 Monthly electric power consumption Capacity CO2 emission per an hour Energy Efficiency Level	≤ 110% ≤ 110% Within ±2% - -
10. Rice cooker	2	0	Power consumption per 1 person Power consumption per a cycle CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% ≤ 110% ≤ 110% ≤ 110% -
11.Vacuum cleaner	2	0	Suction Power Efficiency Dust emission CO2 emission per an hour Annual energy cost Energy Efficiency Level	≥ 90% Not more than a registered value ≤ 110% ≤ 110% -
12.Electric Fan	2	0	Energy Efficiency Ratio Standard Air flow CO2 emission per an hour Annual energy cost Energy Efficiency Level	≥ 90% ≥ 90% ≤ 110% ≤ 110% -
13.Air cleaner	2	0	Power consumption per $1m^2$ Standard room size CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% ≥ 90% ≤ 110% ≤ 110% -
14.Incandescent lamps	20	2	Efficiency Luminous flux Power consumption Lifetime CO2 emission per an hour Energy Efficiency Level	≥ 93% ≥Rated Luminous flux×93% (White 88%) ≤(Rated power + 0.5W)×104 % ≥ KS annex table × 80% ≤ 110% -

15.Fluorescent lamps	10	1	Efficiency Luminous flux Power input CO2 emission per an hour Energy Efficiency Level	≥ 92% ≥KS annex table× 92% ≤KS Annex table ± (Power input ×0.05 + 0.5) - -
16.Fluorescent lamps ballasts	2	0	Compared Energy Efficiency Luminous flux Power input	≥ 100% Tolerance of KS C 8100, 8102 “
17.Associated ballasts	3	0	Efficiency of luminous flux Power input CO2 emission per an hour Energy Efficiency Level	≥95% ≤Rated input × ±15% - -
18. 3 phase induction motor	5	0	Averaged full load efficiency ($\overline{X}$) Minimum efficiency in tested samples ($X_{\min}$) Full load efficiency CO2 emission per an hour	$\overline{X} \geq \frac{100}{1+1.05\left(\frac{100}{RE}-1\right)}$ RE : MEPS $X_{\min} \geq \frac{100}{1+1.15\left(\frac{100}{RE}-1\right)}$ RE : MEPS ≥ 98% ≤ 110%
19.Household Gas Boiler	2	0	Measured thermal efficiency Heating capacity Energy Efficiency Level	≥ 100% ≥ 90% -
20. Adapter-Charger	3	0	Running efficiency Standby power	≥ MEPS ≤ 105%
21. Electric driven heatpump	2	0	Energy Efficiency Ratio Rated cooling capacity Rated heating capacity Make-up heater Energy Efficiency Level	≥ 92% ≥ 95% ≥ 95% ≤ 110% -
22. Commercial refrigerator	2	0	Monthly power consumption Storage volume CO2 emission per an hour Annual energy cost Energy Efficiency Level	≤ 110% Within ±3% or 1 L ≤ 110% ≤ 110% -
23. Gas water heater	2	0	Rated thermal efficiency Energy Efficiency Level	≥ 100% -

Remark)

1. The registered value means a value which is registered to KEMCO.

(**Annex Form 1)**

<table>
<tr><td colspan="4">Application Form for the Self-Certify (Change)</td><td>Within 30 working days</td></tr>
<tr><td colspan="2">Applicant</td><td></td><td>CEO</td><td></td></tr>
<tr><td rowspan="2">Address</td><td>Head Office</td><td></td><td>Telephone (E-mail)</td><td></td></tr>
<tr><td>Factory</td><td></td><td>Telephone (E-mail)</td><td></td></tr>
<tr><td colspan="2">Product</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Registration</td><td>Corporation Registration No.</td><td></td><td>Day/Month/year</td><td></td></tr>
<tr><td>Category</td><td colspan="3"></td></tr>
<tr><td colspan="2">Test Facility</td><td colspan="3"></td></tr>
<tr><td colspan="2">Man Power</td><td colspan="3"></td></tr>
<tr><td colspan="2">Reason to change</td><td colspan="3"></td></tr>
<tr><td colspan="5">Applicant requests for self-certify testing Laboratory for the above products or to change according to “Regulation on Energy Efficiency Labeling and Standards”.

Day/ Month/ Year

Applicant (sign)

The Minister of MKE</td></tr>
<tr><td>Attached</td><td colspan="4">1. List of facilities and figures
2. List of man power and the related documents
3.Any contracts to use facilities between an importer and oversea factory (if applicable)</td></tr>
</table>

(Annex Form 2)

Test Results

Testing Laboratory		Contact		Telephone	

Issued No.	Issued date	Manufacturer or Importer	Product	Model	Energy Efficiency	Energy Efficiency Level	Remark

Attached : Test report ( )

(Annex Form 3)

Report on production (import) and sale

Appli-cant	Corporation				
	Address	Head Office		Telephone Fax E-mail	
		Factory		Telephone Fax E-mail	
	CEO				

Applicant reports on the production (import) and sale for appliances with energy efficiency label according to "Regulation on Energy Efficiency Labeling and Standards".

Production (import) and sale

Test report No. (Testing Laboratory)	Product	Model	Energy Efficiency Level	( ) year			Plan ( ) year
				Unit	Production/ Import	Sale	Production/ Import

※ Please list product or model with downstream of energy efficiency level, and report exactly, because this shall be used only to analyze the energy-saving effect.

Day/ Month/ Year

Applicant (sign)

The president of KEMCO

■ Please report the end of every January.

(Annex Form 4)

Application Form to change or add the model name

Appli-cant	Corporation					
	Address	Head Office		Telephone Fax E-mail		
		Factory		Telephone Fax E-mail		
	CEO					
Corporation Registration No.				Day/Month/Year		
Energy Efficiency	Product					
	Specification					
	Testing laboratory					
	Test report No.			Day/Month/Year		
	Energy Efficiency or Energy Efficiency Level					
Model	Model	before		After		
	Use a origin Model	□ continue to use		□ stop using		
	Reason to change or add					

Applicant requests to change or add the name of model according to “Regulation on Energy Efficiency Labeling and Standards”.

Day/ Month/ Year

Applicant (sign)

The president of KEMCO

(Annex Form 5)

Application Form to register energy efficiency level through internet ID

Applicant	① Corporation		
	② Department	☎	
	③ Contact	(Email) (Security No.)	
Product	④ Items	ID	Password
	□ Refrigerator		
	□ Freezer		
	□ Kimchi Refrigerator		
	□ Air-conditioner		
	□ Washing machine		
	□ Horizontal drum washing machine		
	□ Dish washer		
	□ Dish drier		
	□ Electrical cooler and heater for drinking-water storage		
	□ Rice cooker		
	□ Vacuum cleaner		
	□ Electric Fan		
	□ Air cleaner		
	□ Incandescent lamps		
	□ Fluorescent lamps		
	□ Fluorescent lamps ballasts		
	□ Associated ballasts		
	□ 3 Phase Induction Motor		
	□ Household gas boiler		
	□ Adapter-Charger		
	□ Electric driven heatpump		
	□ Commercial refrigerator		
	□ Gas water heater		

Applicant reports to register energy efficiency level through internet ID according to "Regulation on Energy Efficiency Labeling and Standards", and all responsibility for registration are up to applicant.

Day/ Month/ Year

Applicant (sign)

The president of KEMCO

Attached : A proved documentation for contact person to work for applicant corporation

(Annex Form 6)

Application Form to change energy efficiency level through internet ID

Applicant	① Corporation				
	② Department			☎	
	③ Contact			(Email) (Security No.)	
Product	④ Items	Before		After	
		ID	Password	ID	Password
	☐ Refrigerator				
	☐ Freezer				
	☐ Kimchi Refrigerator				
	☐ Air-conditioner				
	☐ Washing machine				
	☐ Horizontal drum washing machine				
	☐ Dish washer				
	☐ Dish drier				
	☐ Electrical Cooler and Heater for Drinking-Water Storage				
	☐ Rice cooker				
	☐ Vacuum cleaner				
	☐ Electric Fan				
	☐ Air cleaner				
	☐ Incandescent lamps				
	☐ Fluorescent lamps				
	☐ Fluorescent lamps ballasts				
	☐ Associated ballasts				
	☐ 3 Phase Induction Motor				
	☐ Household Gas Boiler				
	☐ Adapter-Charger				
	☐ Electric driven heatpump				
	☐ Commercial refrigerator				
	☐ Gas water heater				

Applicant reports to change energy efficiency level through internet ID according to “Regulation on Energy Efficiency Labeling and Standards”.

Day/ Month/ Year

Applicant (sign)

The president of KEMCO

Attached : A proved documentation for contact person to work for applicant corporation

(Annex Form 7)

Cancellation form of Registration

Applicant	Corporation				
	Address	Headquarter		Tel Fax Email	
		Factory		Tel Fax Email	
	CEO				

Cancellation List

Product	Model	Date of registration	Energy Efficiency Level	Remark

Applicant reports to cancel energy efficiency level according to "Regulation on Energy Efficiency Labeling and Standards".

Day/ Month/ Year

Applicant (sign)

The president of KEMCO