

هيئة الإمارات للمواصفات والمقاييس
EMIRATES AUTHORITY FOR STANDARDIZATION AND METROLOGY
(ESMA)



المواصفة القياسية الإماراتية

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بطاقة البيان - بطاقة بيان كفاءة الطاقة للأجهزة الكهربائية
الجزء 2: غسالات الملابس و المجففات

**LABELING – ENERGY EFFICIENCY LABEL FOR ELECTRICAL APPLIANCES
PART 2: WASHING MACHINES AND DRYERS**

دولة الإمارات العربية المتحدة
UNITED ARAB EMIRATES

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جميع حقوق الطبع محفوظة لهيئة الإمارات للمواصفات والمقاييس

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PART 2: WASHING MACHINES AND DRYERS**

المواصفات القياسية لدولة الإمارات العربية المتحدة
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FOREWORD

The Emirates Authority for Standardization and Metrology (ESMA) has a national responsibility for standardization activities. One of ESMA's main functions is to issue Emirates Standards/Technical Regulation through specialized Technical Committees.

ESMA through the "Technical Committee for Energy Efficiency and Labeling" has updated the standard UAE.S 5010-2:2013 Labeling – Energy Efficiency for Electrical Appliances Part 2: Washing Machines and Dryers.

This Technical Regulation has been approved by Decree of UAE Cabinet No. ###:2018, held on ###/###/1439H, ###/###/2018
The approved Standard will replace and supersede the UAE.S 5010-2:2013.

INTRODUCTION

With the UAE's commitment to consumer safety, energy conservation and environment protection, this regulation is developed to ensure that washing machines and dryers are registered and monitored for their continuous compliance to the set specifications on:

- Energy Consumption;
- Water Consumption;
- Spin Extraction Performance for Washing Machines;
- Condensation Efficiency for Condenser Dryers.

This regulation along with its precedents and accompanying requirements detailed in this document is set to take effect fully six (6) months following its publication in the Official Gazette of the United Arab Emirates.

The requirements set are based on accepted international specifications. These are aligned with other countries in order for the manufacturer to easily comply with the star rating of washing machine and dryers.

1 Scope

This regulation deals with methods for measuring the energy and water consumption of clothes washing machines for household use, with or without heating devices and for cold and/or hot water supply. It also deals with appliances for water extraction by centrifugal force and is applicable to appliances for both washing and drying textiles (washer-dryers). This standard also applies to household electric tumble dryers, automatic and non-automatic type, with or without a cold water supply and incorporating a heating device.

This document covers the requirements related to:

- Energy Consumption;
- Water Consumption;
- Spin Extraction Performance for Washing Machines;
- Condensation Efficiency for Condenser Dryers.

This document also applies to washing machines for communal use in block of flats or in laundrettes up to 20kg capacity. Washing machines intended for commercial purposes are not included.

2 Terms and Definitions

For the purpose of this document, the following terms and definitions apply:

- 2.1 ESMA – Emirates Authority for Standardization & Metrology, the national authority mandated to implement this regulation
- 2.2 Washing Machine – appliance for cleaning and rinsing of textiles using water, which may also have, means of extracting excess water from the textiles.
- 2.3 Agitator Washing Machine – washing machine in which the textiles are substantially immersed in the washing water, the mechanical action being produced by a device moving about or along its vertical axis with a reciprocating motion (an agitator). This device usually extends above the maximum water level.
- 2.4 Air-vented Tumble Dryer – tumble dryer that draws in fresh air which is passed over the textiles and where the resulting moist air is exhausted into the room or vented outside.

- 2.5 Automatic Tumble Dryer – tumble dryer which switches off the drying process when a certain moisture content of the load is reached. This may include systems that use conductivity or temperature sensing.
- 2.6 Base Load – textile load without soiled test strips.
- 2.7 Test Load – base load plus soiled test strips.
- 2.8 Condenser Tumble Dryer – tumble dryer which includes a device for removing moisture from the air used for the drying process.
- 2.9 Cycle – complete washing process, as defined by the program selected, consisting of a series of different operations (wash, rinse, spin, etc.)
- 2.10 Horizontal Drum Washing Machine – washing machine in which the textiles are placed in a horizontal or inclined 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 continuous or periodically reversed.
- 2.11 Impeller Washing Machine – washing machine in which the textiles are substantially immersed in the washing water, the mechanical action being produced by a device rotating about its axis continuously or which reverses after a number of revolutions (impeller). The uppermost point of this device is substantially below the minimum water level.
- 2.12 Non-automatic Tumble Dryer – tumble dryer which does not switch off the drying process when a certain moisture content of the load is reached, usually controlled by a timer, but may also be controlled manually.
- 2.13 Program – series of operations which are pre-defined within the washing machine and which are declared as suitable for washing certain textile types.
- 2.14 Rated Capacity – maximum mass in kg of dry textiles of a particular defined type, declared by the manufacturer that can be treated in a program.
- 2.15 Rated Voltage – means the voltage shown on the nameplate of the equipment.
- 2.16 Spin Extraction – water extracting function by which water is removed from textiles by centrifugal action.
- 2.17 Spin Extractor – water-extracting appliance in which water is removed from textiles by centrifugal action.
- 2.18 Tumble Dryer – appliance in which textiles are dried by tumbling in a rotating drum, through which air is passed.
- 2.19 Twin-Tub Type – washing machine that has two tubs. One tub is for washing clothes in, and the other is for spinning the clothes dry. You manually move the clothes from the washing tub to the spinning tub once the washing cycle has finished.

- 2.20 Volume of an agitator or impeller-type washing machine – means the inside volume, in liters, of the tub available for the movement of the textiles up to the nominal water level as determined by the machine controls or the manufacturer instructions.
- 2.21 Volume of a drum-type washing machine or spin-extractor – means the inside volume, in liters, of the drum in which the textiles are placed, after the subtraction of ribs of other inward forms, etc.
- 2.22 Washer-Dryer – washing machine, which includes both a water extraction (spin) function and a means for drying the textiles, usually by heating and tumbling.

For other terms and definitions, details mentioned in specific UAE standards per product scope shall apply.

3 Product Requirements

Products covered by this Technical Regulation shall comply with the requirements stipulated under this section.

3.1 Electrical Safety

This section of this Technical Regulation gives reference to the requirements set by the Emirates Conformity Assessment Scheme (ECAS) for Low Voltage Equipment (LVE).

Products covered by this Technical Regulation shall comply with the requirements set by the referenced Scheme for Low Voltage Equipment (LVE).

3.2 Performance: Energy Efficiency

4.2.1 Specific products (washing machines, washer-dryers and dryers) shall comply with the requirements mentioned in this regulation.

4.3 UAE National Deviations

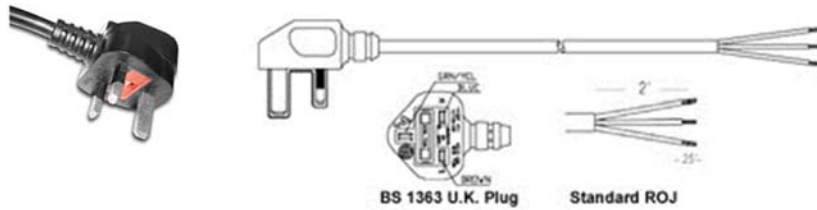
4.4.1 Voltage and Frequency Rating

Table (1)

VOLTAGE RATING	FREQUENCY RATING
230V	50Hz

4.4.2 Plug Requirements

Products covered by this regulation, if supplied with an electrical plug, shall be supplied with an electrical plug of BS 1363 type design that complies with the UAE.S IEC 60881-1 standard.



4.4.3 Instruction Manual and Markings

Instruction manuals and cautionary and/or safety warnings shall be in Arabic and English language.

5 Rated Capacity

The manufacturer shall declare the rated capacity at 0.5kg intervals for each relevant textile type. Relevant textile types are cotton and synthetic/blends.

The rated capacity for any textile type shall not exceed the maximum mass of dry laundry, in kilograms.

If the rated capacity is not declared by the manufacturer, the rated capacity shall be deduced from the clothes container volume as described below.

Where the manufacturer gives a range of values for the rated capacity for a particular textile type, the maximum value shall be used.

6 Determining the drum volume (test load mass) and Maximum Capacity

The maximum capacity of a washing machine declared by the manufacture is limited by drum volume. It is obtained by determining that volume and then applying a coefficient that is dependent on the washing system to it.

6.1 Determining the Drum Volume (test load mass)

The drum volume is determined as follows:

- After position the washing machine with the loading door upwards and leveled horizontally, place a polyethylene bag with a thickness of 0.05 mm so that it covers the whole volume of the drum. Top up with water at a temperature of $25 \pm 2^\circ\text{C}$ up to maximum volume without any spilling. The drum volume is:

$$V = \frac{m}{\rho}$$

Where:

V – drum volume, in liters;
 m – water mass, in kg;
 ρ – water density, (1kg/l).

- In the case of a washing machine with vibrator, the volume is determined in two phases:
 - a. Remove the vibrator from the machine and determine the volume using the procedure described above.
 - b. Seal all external openings and the inner face of vibrator and submerge it in a cylindrical container with a known diameter and calculate its volume based on the water displacement.

To determine the drum volume subtract the value obtained in (b) from the value obtained in (a).

6.2 Determining the Maximum Capacity

The washing machine capacity declared by manufacturer must not exceed the maximum capacity pursuant to the rounding off operation specification (d). This maximum capacity is calculated as follows:

$$C_r = \frac{V}{C_{on}}$$

Where:

C_r – Maximum capacity, kg;
 V – drum volume, in liters;
 C_{on} – constant volumetric coefficient depending on the washing system according table (2) below.

table (2)

Washing System	C_{on} (L/kg)
Washing Machine with a Horizontal Axis	6.7
Washing Machine with a Vertical Axis	8

The minimum discernible fraction for the maximum capacity declaration is 0.5kg, rounded off to the nearest value.

7 Test Conditions and Standards

7.1 Test Conditions

In carrying out the tests as specified above, the unit shall be tested at a voltage of $230V \pm 1\%$ and a frequency of $50Hz \pm 1\%$.

Moreover, the following test conditions shall be followed. The $60^{\circ}C$ cotton program shall be used without pre-wash in accordance with the manufacturer's instruction; if it's not there the manufacturer can declare it. And the cold water temperature should be $25 \pm 2^{\circ}C$

In cases of washing machines without any programs, the recommended times for Washing, rinsing, and spin extracting operations shall be in accordance with the manufacturer's instructions for the rated washing capacity to be tested.

7.2 Test Methodology and Standards

The tests specified in this regulation are required to be carried out, in accordance with UAE.S IEC to find out the energy efficiency and performance characteristics of a washing machine and dryer with hard water.

The tests are required to be carried out, in accordance with:

- UAE.S IEC 60456:2010 – Clothes washing machines for household use – Methods for measuring the performance;
- UAE.S IEC 61121:2012 – Electrical tumble dryers for household use;
- UAE.S IEC 62512:2012 – Electric clothes washer-dryers for household use – Methods for measuring the performance.

8 Measurements

8.1 Measurement of Energy Consumption

The methodology for measuring energy consumption (kWh) shall be based on UAE.S IEC 60456:2010, UAE.S IEC 61121: 2012 and UAE.S IEC 62512:2012

This measured energy consumption (E) shall be shown on the energy label after it is calculated to annual energy consumption based on 260 washes/year operation and 160 dryers/year.

In cases of washing machines combined with built-in dryers for drying textiles by means of heating, the energy consumption (E) of the washing machine and the drying function shall be measured

8.2 Measurement of Water Consumption

The water consumption (liters/cycle) shall be measured during the energy consumption test in accordance with UAE.S IEC 60456: 2010 and UAE.S IEC 62512:2012.

The water consumption shall not be more than the value in the table (3 and 4) .

C: Washing capacity (kg).

WC: the water consumption of the default 60°C declared standard cycle. (Liter)

8.3 Measurement of Spin Extraction Performance

The spin extraction performance shall be measured and evaluated during the test period in accordance with UAE.S IEC 60456 : 2010, UAE.S IEC 61121:2012 and UAE.S IEC 62512 :2012.

9 Energy Efficiency Classes and Spin-Drying Efficiency Classes for Washing Machine

9.1 Energy Efficiency Classes

The energy efficiency class of a household washing machine shall be determined in accordance with its Energy Efficiency ratio (EER) as set out in Table 3 and Table 4.

The Energy Efficiency ratio (EER) of a household washing machine shall be determined in accordance with UAE.S IEC 60456:2010 and calculate as:

$$EER = \frac{E}{CR}$$

E: average of energy consumption for two units for average of three cycles for each unit.

$$E = (W_{total1} + W_{total2}) / 2$$

W_{total} (W_{total} is the average of the 3 cycles): is the energy consumed over a program, it's the sum of the electrical energy plus any cold water correction plus the energy embodied in any hot water. Its calculate according UAE.S IEC 60456:2010 based on (25°C) for cold water.

CR: rated capacity for the unit.

Table 3 : Energy and Water efficiency classes for drum type washing machine

Energy Efficiency Class	Energy Efficiency ratio Wh / Kg	Water efficiency classes WC (L / Cycle) Max
5 Star (most efficient)	EER < 70	5 * C
4 Star	70 ≤ EER < 90	5 *C + 5
3 Star	90 ≤ EER < 110	5 *C + 10
2 Star	110 ≤ EER < 130	5 *C + 15
1 Star	130 ≤ EER < 150	5 *C + 18

Table 4 : Energy and water efficiency classes for other (top load and twin tub type) washing machine

Energy Efficiency Class	Energy Efficiency Ratio Wh / Kg	Water efficiency classes WC (L / Cycle) Max
5 Star (most efficient)	EER <11	10*C+35
4 Star	11 ≤ EER < 14	12*C+35
3 Star	14 ≤ EER < 17	14*C+35
2 Star	17 ≤ EER < 20	16*C+35
1 Star	20 ≤ EER < 23	18*C+35

9.2 Spin –Drying Efficiency Classes

The spin-drying efficiency class of a household washing machine shall be determined in accordance with the remaining moisture content (RMC) as set out in Table 5. Accordance with UAE.S IEC 60456:2010

The calculation formula for RMC is:

$$RMC = \frac{M_r - M}{M} \times 100$$

M: mass of the conditioned load.

M_r: mass of the loose load after spin extraction

The determined RMC is the average for two unites of three cycles of each unit.

Table 5: Spin-drying efficiency classes for washing machine

Spin-drying efficiency class	Remaining Moisture Content (%)
5 Star (most efficient)	RMC < 50
4 Star	50 ≤ RMC < 60
3 Star	60 ≤ RMC < 70
2 Star	70 ≤ RMC < 80
1 Star	80 ≤ RMC < 90

10 Energy and Water labeling of household combined washers-dryers

1- Determination of the water and energy consumption for washer-dryers

The procedure and evaluation for the determination of water and energy consumption during washing spin extraction and drying. It also specifies the method for the determination of the duration of these cycles and of the complete operating cycle should be according:

- UAE.S IEC 62512:2012 - Electric clothes washer-dryers for household use - Methods for measuring the Performance

2- Energy and water efficiency classes for combined washers-dryers

The energy efficiency class of household washer-dryers shall be determined in accordance with its Energy Efficiency ratio (EER) as set out in Table 6.

The Energy Efficiency ratio (EER) of washer-dryers shall be determined in accordance with UAE.S IEC 62512:2012 and calculate as:

$$EER = \frac{E}{C_R}$$

Were :

$$E = E_w + E_d$$

E: average of energy consumption for two units for average of three cycles for each unit.

E_w = energy consumption for washing cycle

Ed= energy consumption for drying cycle

CR =: rated capacity for the unit

Water efficiency class of household washer-dryers shall be determined in accordance with water consumption (WC) as set out in Table 6.

The energy and water efficiency class of an appliance shall be determined in accordance with table 6.

Table 6: The energy efficiency class for combined washer-dryers

Number of stars	Energy efficiency Ratio in Wh per kg of load complete Operating (washing, spinning and drying) cycle using declared program.	Water efficiency classes WC (L / Cycle) Max
5	EER < 500	5 * C
4	500 ≤ EER < 600	5 *C + 5
3	600 ≤ EER < 700	5 *C + 10
2	700 ≤ EER < 800	5 *C + 15
1	800 ≤ EER < 1000	5 *C + 18

11 Energy labeling of household electric tumble dryers

11.1 Calculation of the Energy Efficiency Ratio

For the calculation of the Energy Efficiency Ratio (EER) of a household tumble dryer model, the weighted Annual Energy Consumption of a household tumble dryer for declare program at full load is divided by the rated capacity

The Energy Efficiency Ratio (EER) is calculated as follows and rounded to one decimal place:

$$EER = \frac{E_t}{C}$$

Where:

E t - weighted energy consumption, in Wh and rounded to two decimal places. Its average of energy consumption for two units for average of three cycles for each unit.

C - is the rated capacity of the household tumble dryer for the standard cotton program

The Annual Energy Consumption calculated as:

$$E = E_t \times 160$$

E - Weighted Annual Energy Consumption of the household tumble dryer.

160 - Total number of drying cycles per year.

The energy efficiency class of an appliance shall be defined in accordance with the following table 7 .

Table 7: Energy Efficiency ratio class (EER) of household electric tumble dryers

Number of Stars	Energy Efficiency Ratio in Wh/cycle per kg of load
5	EER < 250
4	250 ≤ EER < 375
3	375 ≤ EER < 500
2	500 ≤ EER < 625
1	625 ≤ EER < 750

10-2 Condensation efficiency

The condensation efficiency of a program is the ratio between the mass of moisture condensed and collected in the container of a condenser household tumble dryer and the mass of moisture removed from the load by the program, the latter being the difference between the mass of the wet test load before drying and the mass of the test load after drying.

Condensation efficiency C_e is calculated for all valid test runs and expressed as a Percentage:

$$C_e = W / (W_i - W_f) \times 100$$

Where:

W is the mass of water collected in the condenser reservoir during test run;

W_i is the mass of the test load used after wetting but before drying;

W_f is the mass of the test load after drying.

The average condensation efficiency C_e is calculated from the condensation efficiencies of at least five valid test runs and expressed as a percentage.

The Condensation efficiency C_e shall be defined in accordance with the following table 8 :

Table 8: The Condensation efficiency C_e of household electric tumble dryers

Number of Stars	Weighted Condensation Efficiency %
5	$C_e > 90$
4	$75 < C_e \leq 90$
3	$60 < C_e \leq 75$
2	$45 < C_e \leq 60$
1	$C_e \leq 45$

11 Energy labeling requirements

11.1 Label Location

The labels should be self-adhesive to the appliance at a prominent location. The client should ensure that the energy label appears on every registered appliance on display or sale and should be easily visible.

11.2 Color Scheme & Dimensions

The energy labels should be printed on white-colored self-adhesive sheet material and should have color schemes and dimensions according ESMA requirements (see annex 1). It should be printed in English and in Arabic.

11.3 Following information shall be included in the label

- Supplier's trade mark;
- Supplier's model identifier
- The energy efficiency class
- Annual Energy Consumption in kWh per year, rounded up to the nearest integer
- Annual Water Consumption in liters per year for washing machine and wisher-dryers, rounded up to the nearest integer
- The dryer type.
- The spin-drying efficiency class for a household washing machine
- Rated capacity, in kg, for the declare program at full load,

12 Surveillance and market monitoring

A test report on one sample of the model shall be submitted. However, if the test results of one sample indicate that any of the measured (energy consumption, water consumption , Condensation efficiency, spin-drying efficiency) is greater than the rated value by more than 10%, Two more tests is required. In such case, for each individual test the values shall not be greater than the rated values by more than 10 %. Also, the information on the energy label shall be based on the higher values (lower efficiency)

Annex – Energy Efficiency



Label Design