WORKING DOCUMENT ON

Possible requirements for non-household washing machines, non-household textile dryers and non-household dishwashers

DRAFT ECODESIGN REGULATION

In Annex II, the wording of point 2
(regarding energy efficiency indices)
should be corrected:
points a), b) c), e), f) and g)
should read "shall not exceed 100"
d) should read "< 100"
(or in linguistic terms: "shall not exceed 100").

COMMISSION WORKING DOCUMENT

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-household washing machines, non-household textile dryers and non-household dishwashers

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products[1] and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

(1) Under Directive 2009/125/EC ecodesign requirements should be set by the Commission for energy-related products representing significant volumes of sales and trade, having a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact without entailing excessive costs.

(2) Article 16(2)(a) of Directive 2009/125/EC provides, that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission should, as appropriate, introduce implementing measures for products offering a high potential for cost-effective reduction of greenhouse gas emissions, such as for air heating products and cooling products.

(3) The Commission has carried out two preparatory studies covering the technical, environmental and economic aspects of non-household laundry equipment and non-household dishwashers typically used in the Union. The studies were devised together with stakeholders and interested parties from the Union and third countries, and the results have been made publicly available.

(4) The environmental aspects of non-household laundry equipment and non-household dishwashers that have been identified as significant for the purposes of this Regulation are energy and water consumption in the use phase.

(5) The preparatory studies show that requirements regarding the other ecodesign parameters referred to in Annex I, Part 1 to Directive 2009/125/EC are not necessary in the case of non-household laundry equipment and non-household dishwashers.

(6) The scope of this Regulation should include non-household washing machines, non-household textile dryers and non-household dishwashers designed to use gaseous fuels, liquid fuels or electricity.

(7) The annual energy consumption related to non-household laundry equipment and non-household dishwashers was estimated to have been 324 PJ (7.7 Mtoe) in the European Union in 2010 corresponding to 15.4 Mt CO_2 emissions. Unless specific measures are taken, the annual energy consumption related to non-household laundry equipment

[1] OJ L 285, 31.10.2009, p. 10.

and non-household dishwashers is expected to be 351 PJ (8.4 Mtoe) in 2020 and 377 PJ (9 Mtoe) for 2030.

(8) The annual water consumption related to non-household laundry equipment and non-household dishwashers was estimated to have been 416 million m^3 (in the European Union in 2010. Unless specific measures are taken, the annual water consumption related to non-household laundry equipment and non-household dishwashers is expected to be 449 million m^3 in 2020 and 480 million m^3 for 2030.

(9) The energy and water consumption of non-household laundry equipment and non-household dishwashers can be reduced by applying existing, non-proprietary technologies without the increase of the combined costs of purchasing and operating these products.

(10) The effect of the ecodesign requirements set out in this Regulation is expected to result by 2020 in estimated annual energy savings of about 21.3 PJ (0.5 Mtoe), with related emission reduction of CO_2 of 1 Mt emissions. Furthermore, taking into account the lifetime of the product and the replacement of the stock, it is estimated that in the year 2030 the annual savings will be approximately 37.5 PJ (0.9 Mtoe) corresponding to 1.8 Mt CO_2.

(11) The effect of the ecodesign requirements set out in this Regulation is expected to result by 2020 in estimated annual water savings of about 65.7 million m^3. Furthermore, taking into account the lifetime of the product and the replacement of the stock, it is estimated that in the year 2030 the annual savings will be approximately 96 million m^3.

(12) Ecodesign requirements should harmonise energy and water consumption requirements for non-household laundry equipment and non-household dishwashers throughout the Union, thus helping to make the internal market operate better and to improve the environmental performance of these products.

(13) The ecodesign requirements should not affect the functionality or affordability of non-household laundry equipment and non-household dishwashers from the final owner's perspective and should not negatively affect health, safety or the environment. In order to prevent such effects, this Regulation sets out requirements on washing, drying and cleaning performance.

(14) The ecodesign requirements should be introduced taking into account a sufficient timeframe for the manufacturers to redesign their products subject to this Regulation. The timing should be such that cost impact for manufacturers, in particular for small and medium-sized enterprises, is taken into account, while ensuring timely achievement of the objectives of this Regulation.

(15) Measurements of the relevant product parameters should be performed through reliable, accurate and reproducible measurement methods, which take into account the recognised state of the art measurement methods including, where available, harmonised standards adopted by the European standardisation organisations, as listed in Annex I to Regulation (EU) 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation[2].

(16) In accordance with Article 8(2) of Directive 2009/125/EC, this Regulation specifies which conformity assessment procedures apply.

[2] OJ L 316, 14.11.2012, p. 12.

(17) To facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC insofar as that information relates to the requirements laid down in this Regulation.

(18) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC,

HAS ADOPTED THIS REGULATION:

Chapter 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market and/or putting into service of:

   (a) non-household washing machines;

   (b) non-household textile dryers;

   (c) non-household dishwashers.

2. This Regulation shall not apply to:

   (a) non-household combined washer-dryers;
   (b) dry cleaning appliances;
   (c) pre- and after treatment equipment;
   (d) household washing machines currently covered by Commission Regulation (EU) No 1015/2010 of 10 November 2010 on Ecodesign requirements for household washing machines[3] and Commission Regulation (EU) No 1061/2010 of 28 September 2010 on energy labelling of household washing machines[4]
   (e) household tumble dryers currently covered by Commission Regulation (EU) No 932/2012 of 2 October 2012 on Ecodesign requirements for household tumble dryers[5] and Commission delegated Regulation (EU) No 392/2012 of 1 March 2012 on energy labelling of household tumble dryers[6]
   (f) household combined washer-dryers currently covered by Commission Directive 96/60/EC of 19 September 1996 on energy labelling of household combined washer-dryers[7]
   (g) household dishwashers currently covered by Commission Regulation (EU) No 1016/2010 of 10 November 2010 on Ecodesign requirements for household dishwashers[8] and Commission delegated Regulation (EU) No 1059/2010 of 28 September 2010 on energy labelling of household dishwashers[9]

[3] OJ L293, page 21-30, 11-11-2010
[4] OJ L 314, page 47-63, 30-11-2010
[5] OJ L 278, page 1-10, 12-10-2012
[6] OJ L123, page 1-26, 9-5-2012
[7] OJ L266 page 1-27, 18-10-1996
[8] OJ L 293, page 31-40, 11-11-2010
[9] OJ L314 page 1-16, 30-11-2010

Chapter 2

Definitions

In addition to the definitions set out in Directive 2009/125/EC, the following definitions shall apply:

1. 'washing machine', means a product that washes and rinses textiles by using water, which may have a spin drying function;
2. 'textile dryer' means a product that dries textiles by passage of air through a closed volume, which can be a rotating drum or a static cabinet; textile dryers can be condenser dryers or air-vented dryers.
3. ‘dishwasher’ means a product that cleans and rinses dishware, glassware, cutlery, or cooking utensils, pans and/or pots and may offer a drying function;
4. 'combined washer-dryer' means a product washes and rinses textiles by using water, which may have a spin drying function and a means for drying the textiles until cupboard dry, usually by heating, tumbling and ventilating;
5. 'dry cleaning appliance' means a product that uses a non-aqueous, non-polar solvent to clean textiles;
6. 'pre- and after treatment equipment' means laundry equipment providing in functions that are required preceding or following the actual washing, cleaning or drying cycles provided by washing machines and textile dryers. Such pre- and after-treatment equipment may include, but is not limited to, finishers, flat-work dryers and ironing presses;
7. 'household product' means a product intended for use in a single household;
8. 'non-household product' means a product intended for use other than in a single household;

For the purposes of the Annexes II to IV, additional definitions are set out in Annex I.

Chapter 3

Ecodesign requirements and timetable

1. The ecodesign requirements for non-household washing machines, non-household textile dryers and non-household dishwashers are set out in Annex II.
2. Each ecodesign requirement shall apply in accordance with the following timetable:
    1. Two years after the entry into force of this Regulation:
        non-household washing machines, non-household textile dryers and non-household dishwashers shall comply with the product information requirements as indicated in Annex II part 1.
    2. Four years after the entry into force of this Regulation:
        non-household washing machines, non-household textile dryers and non-household dishwashers shall comply with to the energy efficiency, water consumption, washing and cleaning requirements as indicated in Annex II parts 2 to 5.
3. Compliance with ecodesign requirements shall be measured and calculated in accordance with requirements set out in Annex III.

Chapter 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation file shall contain a copy of the calculation set out in Annex III to this Regulation.
3. Where the information included in the technical documentation for a model has been obtained by calculation on the basis of design, or extrapolation from other equivalent appliances, or both, the technical documentation shall include details of such calculations or extrapolations, or both, and of tests undertaken by manufacturers to verify the accuracy of the calculations undertaken. In such cases, the technical documentation shall also include a list of all other equivalent models where the information included in the technical documentation was obtained on the same basis.

Chapter 5

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure set out in Annex IV to this Regulation when performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC for compliance with requirements set out in Annex II to this Regulation.

Chapter 6

Review

The Commission shall review this Regulation in the light of technological progress no later than three years after entry into force and present the result of this review to the Ecodesign Consultation Forum. The review shall in particular include an assessment of the appropriateness of:

a) the requirements for the energy efficiency index set out in Annex II;
b) the requirements for the specific water consumption set out in Annex II;
c) the requirements for the washing and cleaning performance indices set out in Annex II;
d) introducing energy labelling of products within the scope;
e) the tolerances for verification.

Chapter 8

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union.*

It shall apply as set out in section Chapter 3.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, etc.

Annex I

Definitions applicable for Annexes II to IV

In addition to the definitions set out in Directive 2009/125/EC, the following definitions shall apply:

Definitions related to product types

1. 'Washer-extractor' means a non-household washing machine consisting of a single drum, with means of extracting excess water from textiles, and which may be loaded and unloaded from a single side or from opposite sides;
2. 'Tunnel washer' means a non-household washing machine consisting of more than one drum, which each can perform a different stage of a washing programme, e.g. pre-washing, washing, rinsing and spin-extracting;
3. ‘condenser textile dryer’ means a textile dryer which includes a device (either using condensation or any other means) for removing moisture from the air used for the drying process;
4. 'Air vented textile dryer' means a textile dryer that dries textiles by passage of heated air which is vented to the outside;
5. ‘Tumble dryer’ means a textile dryer that dries textiles by passage of heated air in a rotating drum, which is loaded and unloaded from the same side;
6. ‘Pass-through tumble dyer’ means a textile dryer that dries textiles by passage of heated air in a rotating drum, and which is loaded from one side of the drum and unloaded from the opposite side of the drum;
7. ‘Cabinet dryer 'means a non-household textile dryer that dries textiles by passage of air through a cabinet in which textiles hang suspended and which may include a device for removing moisture from the air used for the drying process or vents the moist air into the room or outside.
8. 'Water-change dishwasher' means a non-household dishwasher that for each cleaning cycle requires input of fresh water;
9. 'Single-tank dishwasher' means a non-household dishwasher that is equipped with a single tank of water or liquid and which allows for several cleaning cycles before being replenished;
10. 'Multi-tank dishwasher' means a non-household dishwasher that is equipped with multiple tanks of water or liquid and which allows for several cleaning cycles before being replenished;

Definitions related to ecodesign requirements and measurement & calculation

11. ‘Standard Rating Conditions’ means the conditions under which the parameters of non-household washing machines, textile driers and dishwasher shall be tested.
12. ‘Load type’ means the load of textiles which shall be washed during the test of a non-household washing machine.
13. ’Energy Efficiency Index Washer Extractor’ means the Energy Efficiency Index of a non-household washer-extractor calculated in accordance with Annex III.
14. ’Standard Energy Consumption Washer Extractor’ means the Standard Energy Consumption of a non-household washer-extractor, calculated in accordance with III.
15. ’Energy Consumption Washer Extractor’ means the Energy Consumption of non-household washer-extractor under standard rating conditions.
16. ‘Equivalent primary energy input’ means the total energy consumption of a non-household washing machine, dryer or dishwasher, expressed in the equivalent primary energy, calculated according to Annex III

17. ‘Electric Energy Input’ is the total amount of electric energy necessary for performance of a cycle of non-household washing machine, textile dryer or dishwasher, calculated according to Annex III
18. ‘Fuel Energy Input’ is the total amount of gas and oil necessary for performance of a cycle of non-household washing machine, textile dryer or dishwasher, calculated according to Annex III
19. ‘Heat Energy Input’ is the total amount of heat for performance of a cycle of non-household washing machine, textile dryer or dishwasher, calculated according to Annex III
20. ’Rated Capacity Washer Extractor’ means the rated capacity of a non-household washer extractor as declared by the manufacturer under standard rating conditions.
21. ’Energy Efficiency Index Tunnel Washer’ means the Energy Efficiency Index of a non-household tunnel washer calculated in accordance with Annex III.
22. ‘Standard Energy Consumption Tunnel Washer’ means the Standard Energy Consumption of a non-household tunnel washer in kWh/kg (final energy), calculated in accordance with Annex III.
23. ’Energy Consumption Tunnel-Washer’ means the Energy Consumption of non-household tunnel-washer in final energy measured under standard rating conditions.
24. ’Rated Capacity Tunnel Washer’ means the rated capacity of a non-household tunnel washer as declared by the manufacturer under standard rating conditions.
25. ‘Washing Performance Index’ means the washing performance index of non-household washing machines calculated in accordance with Annex III
26. ‘Washing Performance’ means the washing performance of non-household washing machine measured under standard rating conditions.
27. ‘Reference Washing Performance’ means the washing performance of a non-household washing machines calculated in accordance with Annex III
28. ‘Specific Water Consumption for non-household washing machines’ means the water used by non-household washing machines for the washing process and the rinsing process, calculated in accordance with Annex III
29. ‘Specific Washing Water Consumption’ means the water used by non-household washing machines for the washing process, calculated in accordance with Annex III
30. ‘Specific Rinsing Water Consumption’ means the water used by non-household washing machines for the rinsing process, calculated in accordance with Annex III
31. ‘Main Washing Process’ means the part of the operations during the cycle of a non-household washing machine during which textiles are cleaned by using water, detergents and agitation at a set temperature.
32. ‘Rinsing Process’ means the part of the operations during the cycle of a non-household washing machine during which the detergents are rinsed from the washed textiles.
33. ’Minimum washing temperature’ means the minimum peak temperature of the washing water which shall be reached during the washing process.
34. ‘Cycle Duration’ means the period in which a complete washing, rinsing and spinning process is performed by a non-household washing machine.
35. ’Energy Efficiency Index Non-household Textile Dryer’ means the Energy Efficiency Index of a non-household textile dryer calculated in accordance with Annex III.
36. ’Standard Energy Consumption Non-household Textile Dryer’ means the Standard Energy Consumption of a non-household textile dryer in kWh/kg (final energy), calculated in accordance with III.
37. ’Specifc Energy Consumption Non-household Textile Dryer’ means the energy consumption of non-household textile dryer under standard rating conditions.

38. ’Cycle Time’ means the duration of the drying programme of a non-household textile dryer, calculated in accordance with Annex III.
39. ‘Initial Moisture Content’ means the moister content of textiles before they are dried in a non-household tumble dryer.
40. ‘Maximum Drying Cycle Temperature’ is the maximum temperature of textiles during the drying programme of a non-household textile dryer.
41. ‘Final Moisture Content’ means the moisture content of textiles after a completed drying cycle of a non-household textile dryer.
42. ’Energy Efficiency Index Water Change Dishwasher’ means the Energy Efficiency Index of a non-household water change dishwasher calculated in accordance with Annex III.
43. ’Standard Energy Consumption Water Change Dishwasher’ means the Standard Energy Consumption of a non-household water-change dishwasher, calculated in accordance with III.
44. ‘Cleaning Performance Index Dishwasher’ means the cleaning performance index of a non-household dishwasher calculated in accordance with Annex III.
45. ’Energy Efficiency Index One Tank Dishwasher’ means the Energy Efficiency Index of a non-household one tank dishwasher calculated in accordance with Annex III.
46. ’Standard Energy Consumption One Tank Dishwasher’ means the Standard Energy Consumption of a non-household one tank dishwasher, calculated in accordance with Annex III.
47. ’Energy Efficiency Index Multiple-Tank Dishwasher’ means the Energy Efficiency Index of a non-household multiple-tank dishwasher calculated in accordance with Annex III.
48. ’Standard Energy Consumption Multiple-Tank Dishwasher’ means the Standard Energy Consumption of a non-household multiple-tank dishwasher, calculated in accordance with Annex III.
49. ’Dishwasher capacity’ is the rated load of a non-household one tank or multiple-tank dishwasher as declared by the manufacturer.
50. ‘Cleaning load’ means the load of plates which shall be used during the test of a non-household dishwasher.
51. ’Cleaning Temperature’ means the temperature of the load of a non-household dishwasher during a cleaning cycle, calculated in accordance with Annex III.
52. ’Cleaning Cycle Duration’ is the duration of a complete cleaning cycle of a non-household dishwasher under standard rating conditions.
53. ‘Specific Water Consumption for a non-household dishwasher’ means the water used by non-household dishwasher machines for the complete cleaning process, calculated in accordance with Annex III.

Annex II

Ecodesign requirements

1. REQUIREMENTS FOR PRODUCT INFORMATION

Two years after entry into force, the following product information on non-household washing machines, non-household textile dryers and non-household dishwashers shall be provided:

1. The instruction manuals for installers and end-users, and free access websites of manufacturers, their authorised representatives and importers shall contain the following elements:

(a) for non-household washing machines, the technical parameters set out in Table 1.a, b and c , measured and calculated in accordance with Annex III;
(b) for non-household textile dryers, the technical parameters set out in Table 2.a, b and c, measured and calculated in accordance with Annex III;
(c) for non-household dishwashers, the technical parameters set out in Table 3.a, b and c, measured and calculated in accordance with Annex III;
(d) any specific precautions that shall be taken when the product is assembled, installed or maintained;
(e) information relevant for disassembly, recycling and/or disposal at end-of-life;

2. The technical documentation for the purposes of conformity assessment pursuant to Article 4 shall contain the following elements:

(a) the elements specified in point 1.;
(b) for products where the information relating to a specific model has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model.

Table 1.a – Information for non-household washer-extractors with a rated capacity below 40 kg

Model(s): [information identifying the model(s) to which the information relates]			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
	Symbol	**Value**	**Unit**
Rated capacity	C	X	kg/cycle
Wash cycle duration acc. standard rating conditions		X	min
Productivity			kg/h
Average wash temperature acc. standard rating		X	ºC

conditions			
Energy consumption acc. standard rating conditions	$SEC_{WE<40}$	X.XX	kWh/kg
Energy Efficiency Index Washer-Extractor	$EEI_{WE<40}$	X.X	-
Specific water consumption of the wash cycle	$WC_{WM,w}$		
Specific water consumption of the rinse cycle	$WC_{WM.R}$		
Washing performance index	WPI	X	-

Table 1.b – Information for non-household washer-extractors with a rated capacity equal to or above 40 kg

Model(s): [information identifying the model(s) to which the information relates]			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
	Symbol	**Value**	**Unit**
Rated capacity	C	X	kg/cycle
Wash cycle duration acc. standard rating conditions		X	min
Productivity			kg/h
Average wash temperature acc. standard rating conditions		X	ºC
Energy consumption acc. standard rating conditions	$SEC_{WE>40}$	X.XX	kWh/kg
Energy Efficiency Index Washer-Extractor	$EEI_{WE>40}$	X.X	-
Specific water consumption of the wash cycle	$WC_{WM,w}$		
Specific water consumption of the rinse cycle	$WC_{WM.R}$		
Washing performance index	WPI	X	-

Table 1.c – Information for non-household tunnel washers

Model identification:			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
	Symbol	**Value**	**Unit**

Rated capacity	C	X	kg/h
Wash cycle duration acc. standard rating conditions	-	X	min
Productivity	-	X	kg/h
Average wash temperature acc. standard rating conditions	-	X	ºC
Energy consumption acc. standard rating conditions	EC_{TW}	X	kWh/kg
Energy Efficiency Index Tunnel Washer	EEI_{TW}	X	-
Specific water consumption of the wash cycle	$WC_{WM,w}$	X	l/kg
Specific water consumption of the rinse cycle	$WC_{WM.R}$	X	l/kg
Washing performance index	WPI	X	-

Table 2.a – Information for non-household tumble dryers

Model identification:			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
Registration of drying cycle average temperature: (by air / from laundry surface temperature)			
Type of tumble dryer: (condenser / air vented)			
	Symbol	**Value**	**Unit**
Rated capacity	C	X	kg/batch
Initial moisture content acc. standard rating conditions		X	%
Final moisture content (related to bone dry) acc. standard rating conditions		X	%
Average drying cycle temperature acc. standard rating conditions		X	ºC
Drying cycle duration acc. standard rating conditions		X	min
Productivity			kg/h
Specific energy consumption acc. standard rating conditions	EC	X	kWh/kg (primary)
Energy Efficiency Index Tumble Dryer	EEI_{TD}	X	

Table 2.b – Information for non-household cabinet dryers

Model identification:			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
	Symbol	**Value**	**Unit**
Cabinet volume	V	X.XX	m^3
Rated capacity	C	X	kg/batch
Initial moisture content acc. standard rating conditions		X	%
Final moisture content (related to bone dry) acc. standard rating conditions		X	%
Drying cycle duration acc. standard rating		X	min

conditions			
Productivity			
Energy consumption acc. standard rating conditions	EC	X	kWh/kg (primary)
Energy Efficiency Index Cabinet Dryer	EEI_{CD}	X	

Table 2.c – Information for non-household pass-through tumble dryers

Model identification:			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
	Symbol	**Value**	**Unit**
Rated Capacity	C	X	kg/h
Initial moisture content acc. standard rating conditions		X	%
Final moisture content (related to bone dry) acc. standard rating conditions		X	%
Drying cycle duration acc. standard rating conditions		X	min
Productivity			
Energy consumption acc. standard rating conditions	EC	X	kWh/kg (primary)
Energy Efficiency Index Pass-through tumble dryer	EEI_{PD}	X	

Table 3.a – Information for non-household water-change dishwashers

Model identification:			
Optimised for: glassware / dishes / cutlery / utensils-pots-pans / mixed items			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
Suitable for hot-fill: (yes/no)			
	Symbol	**Value**	**Unit**
Rated capacity	C	X	#
Cycle duration	t_{cycle}	X	min
Energy consumption per cycle acc. standard rating conditions	EC_{WCWW}	X	kWh/100 dishes
Energy Efficiency Index	EEI_{WCWW}	X	-
Specific water consumption acc. standard rating conditions	WPI_{WW}	X	l/100 dishes
Cleaning performance acc. standard rating conditions	x_{res}	X	%

Table 3.b – Information for non-household single-tank dishwashers

Model identification:			
Type of non-household dishwasher: (water change / one tank / multiple tank)			
Loading mechanism with conveyor belt: (yes/no)			
Optimised for: glassware / dishes / cutlery / utensils-pots-pans / mixed items			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
Suitable for hot-fill: (yes/no)			
	Symbol	**Value**	**Unit**
Rated capacity	C	XX	#
Cycle time	t_{cycle}	XX	min
Energy consumption per cycle acc. standard rating conditions	EC_{STWW}	XX.X	kWh/100 dishes
Energy Efficiency Index	EEI_{OCWW}	X.X	-

Specific water consumption acc. standard rating conditions	WPI_{WW}		l/100 dishes
Cleaning performance acc. standard rating conditions	CPI		-

Table 3.c – Information for non-household multi-tank dishwashers

Model identification:			
Type of non-household dishwasher: (water change / one tank / multiple tank)			
Loading mechanism with conveyor belt: (yes/no)			
Optimised for: glassware / dishes / cutlery / utensils-pots-pans / mixed items			
Heat or energy sources: [electricity, gaseous fuel, liquid fuel or steam]			
Suitable for hot-fill: (yes/no)			
	Symbol	**Value**	**Unit**
Rated capacity	C	XX	#
Cycle time	t_{cycle}	XX	min
Energy consumption per cycle acc. standard rating conditions	EC_{MTWW}	XX.X	kWh/100 dishes
Energy Efficiency Index	EEI_{MTWW}	X.X	-
Specific water consumption acc. standard rating conditions	WPI_{WW}	XX.X	l/100 dishes
Cleaning performance acc. standard rating conditions	CPI		-

2. REQUIREMENTS FOR THE ENERGY EFFICIENCY INDEX

Four years after entry into force, the energy efficiency index of the products listed shall not be less than the following values:

(a) The $EEI_{WE<40}$ for a non-household washer extractor of a rated capacity of less than 40 kg shall not be less than 100;

(b) The $EEI_{WE>40}$ for a non-household washer extractor of a rated capacity of 40 kg or more shall not be less than 100;

(c) The EEI_{TW} for non-household tunnel washers shall not be less than 100;

(d) The EEI_{TD} for non-household textile dryers shall be:

i. For condenser tumble dryers: ≥ 100

ii. For air-vented tumble dryers: ≥ 100
iii. For pass-through tumble dryers: ≥ 100

(e) The EEI_{WCWW} for non-household water-change dishwashers shall be no less than 100;

(f) The EEI_{OTWW} for non-household one-tank dishwashers shall be no less than 100;

(g) The EEI_{MTWW} for non-household multi-tank dishwashers shall be no less than 100.

3. REQUIREMENTS FOR THE SPECIFIC WATER CONSUMPTION

Four years after entry into force,

(a) the specific water consumption (WC_{WM}) for washer-extractors shall be no more than 10 l/kg.

(b) the specific water consumption (WC_{WM}) for tunnel washers shall be no more than 6 l/kg

(c) the specific water consumption (WPI_{WW}) for water change dishwashers shall be no more than 76 l/100 dishes.

(d) the specific water consumption (WPIww) for one tank dishwashers shall be no more than 14.9 l/100 dishes

(e) the specific water consumption (WPIww) for multi-tank dishwashers shall be no more than 10.2 l/100 dishes

4. REQUIREMENTS FOR THE WASHING PERFORMANCE

Four years after entry into force, the minimum washing performance index (WPI) for non-household washing machines shall be no less than 100.

5. REQUIREMENTS FOR THE CLEANING PERFORMANCE

Four years after entry into force, the minimum cleaning performance index (CPI) for non-household dishwashers shall be no less than 100.

Annex III

Measurement and Calculation

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the Official Journal of the European Union, or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods. They shall meet the conditions and technical parameters set out in this Annex.

For the purposes of the calculations set out in this Annex, the consumption of electricity shall be multiplied by a conversion coefficient CC of 2,5.

1. NON-HOUSEHOLD WASHING MACHINES

1.1. Method of calculation of the energy efficiency index

1.1.1. Washer-extractors with a rated capacity of less than 40 kg

The energy efficiency index ($EEI_{WE<40}$) shall be calculated as:

$$EEI_{WE<40} = \frac{EC_{WE<40}}{SEC_{WE<40}} \; x \; 100$$

Where:

- $EEI_{WE<40}$ is the Energy Efficiency Index of a non-household washer-extractor with a rated capacity of less than 40 kg
- $SEC_{WE<40}$ is the Standard Energy Consumption of a non-household washer-extractor in kWh/kg (final energy)
- $EC_{WE<40}$ is the Energy Consumption of a non-household washer-extractor as declared by manufacturer for standard rating conditions in kWh/kg (kWh in final energy)

And:

$$SEC_{WE<40} = 0.15 - (c_{WE} * F)$$

Where:

- c_{WE} is the rated capacity of the washer extractor in kg/cycle
  F is a constant = 0.00015

1.1.2. Washer-extractors with a rated capacity of 40 kg or more

The energy efficiency index ($EEI_{WE>40}$) shall be calculated as:

$$EEI_{WE>40} = \frac{EC_{WE>40}}{SEC_{WE>40}} \; x \; 100$$

Where:

- $EEI_{WE>40}$ is the Energy Efficiency Index of a non-household washer-extractor with a rated capacity of 40 kg or more
- $SEC_{WE>40}$ is the Standard Energy Consumption of a non-household washer-extractor in kWh/kg (final energy)
- $EC_{WE>40}$ is the Energy Consumption of a non-household washer-extractor as declared by manufacturer for standard rating conditions in kWh/kg (kWh in final energy)

And:

$$SEC_{WE>40} = 0.20 - c_{WE} * F$$

Where:

- c_{WE} is the rated capacity of the washer extractor
- F is a constant = 0.00015

1.1.3. Tunnel washers

The energy efficiency index (EEI_{TW}) shall be calculated as:

$$EEI_{TW} = \frac{EC_{TW}}{SEC_{TW}} \; x \; 100$$

Where:

- EEI_{TW} is the Energy Efficiency Index of a tunnel washer
- EC_{TW} is the Energy Consumption of a non-household tunnel washer as declared by manufacturer for standard rating conditions in kWh/hr (final energy)
- SEC_{TW} is the Standard Energy Consumption of a non-household tunnel washer in kWh/hr (final energy)

And:

$$SEC_{TW} = 0.20 - c_{TW} * F$$

Where:

- c_{TW} is the rated capacity of the tunnel washer (kg/hr)
- F is a constant = 0.00025

1.2. Method of calculation of the specific water consumption

The specific water consumption (WC_{WM}) shall be calculated as the sum of the specific washing water consumption ($WC_{WM,W}$) and of the specific rinsing water consumption ($WC_{WM,R}$).

1.2.1. Specific washing water consumption

The specific washing water consumption ($WC_{WM,W}$) shall be calculated as:

$$WC_{WM} = \frac{W_{WM,w}}{C} \; x \; 100$$

Where:

- $W_{WM,w}$ is the water consumption of the washing cycle[10]
- c is the rated capacity of the washing machine, being either c_{WE} or c_{TW} (kg/cycle)

1.2.2. Specific rinsing water consumption

The specific rinsing water consumption ($WC_{WM,R}$) shall be calculated as:

$$WC_{WM} = \frac{W_{WM,r}}{C} \; x \; 100$$

Where:

- $W_{WM,r}$ is the water consumption of the rinsing cycle
- c is the rated capacity of the washing machine, being either c_{WE} or c_{TW} (kg/cycle)

1.3. Method of calculation of the washing performance index

The washing performance index (WPI) shall be calculated as:

$$WPI = \frac{WP}{WP_{ref}}$$

Where:

- WPI = Washing Performance Index of a non-household washing machine

[10] Whether this includes 'pre-wash' should be discussed together with relevant industries and technical committees for standardisation.

- *WP* is the measured Washing Performance, which is the average of the reflectance values of the test strips after completion of the test cycle.
- WP_{ref} is the reference washing performance, ie. a reference reflectance value.

1.4. Standard rating conditions for non-household washing machines

The standard rating conditions that apply to the measurement of the energy efficiency index, the specific washing water consumption, the specific rinsing water consumption and the washing performance index of non-household washing are described in the table below.

Table 1 - Standard rating conditions of non-household washing machines

Non-household washer extractor	Minimum washing temperature	Cycle duration	Capacity	Load type
washer extractor with a rated capacity below 40 kg	60°C	45 minutes or as defined by manufacturer	rated	100% cotton
washer extractor with a rated capacity of 40 kg or more	70°C	20 minutes	rated	100% cotton
tunnel washer	70°C	30 minutes	rated	100% cotton

The test method shall, in addition to the above parameters, also specify the following parameters:

- Ambient temperature;
- Water inlet temperature;
- Drum temperature at start of test;
- Rated capacity (load size): given by the manufacturer (for cotton washing), if not specified: load ratio 10 l drum volume per kg dry textiles (related to bone dry cotton textiles);

Barrier washers mainly have divided drums (compartments) if they are side loaded machines; load per compartment given by the manufacturer

- Program: Normal drum agitation (not gentle), Minimum temperature, Time at minimum temperature, 3 rinses with intermediate spin, final spinning;

if a recommended program by manufacturer meeting the standard rating conditions exists: selection of program;

- Productivity (kg/h);
- program duration (min);
- Water hardness;
- Type and dosage of detergent;

The minimum washing temperature shall be measured as described in the test method. [11]

The energy consumption at standard rating conditions shall be expressed as the equivalent primary energy input:

- For products heated by electricity the equivalent primary energy input is equal to: electric energy input * conversion factor CC;
- for products with a fuel driven heat generator, the equivalent primary energy input is equal to: fuel energy input plus any auxiliary electric energy input *CC;
- for products without heat generator and thus receiving heat from an external heat source the equivalent primary energy input is equal to: heat energy input * 1.25 plus any auxiliary electric energy input *CC;
  The factor 1,25 (equal to dividing by 80%) refers to an average assumed heat generation efficiency for water heating.

The values for the energy efficiency index, the specific washing water consumption, the specific rinsing water consumption and the washing performance index to be declared by the manufacturer shall be the average values over the number of test runs required. The number of test runs shall be as defined in the test method.

2. NON-HOUSEHOLD TEXTILE DRYERS

2.1. Method of calculation of the energy efficiency index

The energy efficiency index for non-household textile dryers (EEI_{TD}) shall be calculated as:

$$EEI_{TD} = \frac{EC}{SEC_{TD}} \; x \; 100$$

Where:

- EEI_{TD} is the energy efficiency index of a non-household textile dryer
- EC is the specific energy consumption for standard rating conditions (in kWh/kg, final energy)
- SEC_{TD} is the standard energy consumption of a non-household textile dryer (in kWh/kg)

And:

$$SEC_{TD} = \{0{,}6 * C^{0.8}\} - \{F * \left(30 * \frac{t_{cycle}}{60}\right)\}$$

Where

C = the rated capacity of the drier, expressed in kg/cycle;

[11] Several methods for establishing the average washing temperature exist, such as determine the average of measurements by washing temperature sensing devices or as the average temperature established on the basis of extraction of washing liquid over the whole main washing process.

F = 1 for air vented driers, cabinet driers or pass through driers and F= 0 for condenser driers;

t_{cycle} = for air vented driers, cabinet driers or condenser dryers: the drying programme duration, expressed in min;

t_{cycle} =for pass-through tumble driers: the drying programme duration, expressed in min;:

$$t_{cycle} = \frac{60}{C_p}$$

Where

C*p* = the throughput of the pass through drier, expressed in kg/h

2.2. Standard rating conditions for non-household textile dryers

The standard rating conditions that apply to measurement of the energy efficiency index of non-household textile dryers are described in the table below. The temperature of the process air is fixed as it affects textile wear/damage.

Table 5 - Standard rating conditions for non-household textile dryers

non-household tumble dryer type	initial moisture content	maximum temperature of process air*	final moisture content (related to bone dry)	Load	Type
condenser dryer	50%	70°C	8%	rated capacity	100% cotton, terry towels
air vented dryer	50%	70°C	8%		
pass through dryer	50%	70°C	8%		
cabinet dryer	50%	70°C	8%		

* The requirement for the maximum temperature of the process air applies only to dryers that are not automatically (through textile surface temperature) controlled.

The relevant test method to be used for the test shall in addition to the above parameters also specify the following parameters:

- Ambient temperature;
- Air humidity;
- Filling mode;
- Machine temperature at start of test;

– Selection of program;
– Rated capacity;
– Productivity (kg/h);
– Program duration / cycle time;
– Load (material, types, etc.).

Values for moisture content relate to a reference ambient temperature of 20ºC and a relative humidity of ambient air of 65%.

The energy consumption at standard rating conditions shall be expressed as the equivalent primary energy input:

- For products heated by electricity the equivalent primary energy input is equal to: electric energy input * conversion factor CC;
- for products with an integrated heat generator, the equivalent primary energy input is equal to: fuel energy input plus any auxiliary electric energy input *CC;
- for products without heat generator and thus receiving heat from an external heat source the equivalent primary energy input is equal to: heat energy input * 1.25 plus any auxiliary electric energy input *CC;

The values for the energy efficiency index to be declared by the manufacturer shall be the average of values over the number of test runs required. The number of test runs shall be as defined in the test method.

3. NON-HOUSEHOLD DISHWASHERS

3.1. Method of calculation of the energy efficiency index

3.1.1. Water change dishwashers

The energy efficiency index for water change dishwashers (EEI_{WCWW}) shall be calculated as:

$$EEI_{WCWW} = \frac{EC_{WCWW}}{SEC_{WCWW}} \times 100$$

Where:

– EEI_{WCWW} is the Energy Efficiency Index of a water change dishwasher
– EC_{WCWW} is the energy consumption for standard rating conditions in kWh/100 dishes (final energy)
– SEC_{WCWW} is the Standard Energy Consumption of a water change dishwasher in kWh/100 dishes (final energy)

And:

$$SEC_{WCWW} = 4 - C * F$$

Where:

- C = the rated capacity of the water change dishwasher, equal to 100 dishes
- F = a constant = 0.04

3.1.2. One tank dishwashers

The energy efficiency index for one tank dishwashers (EEI_{OTWW}) shall be calculated as:

$$EEI_{OTWW} = \frac{EC_{OTWW}}{SEC_{OTWW}} \; x \; 100$$

Where:

- EEI_{OTWW} is the Energy Efficiency Index of a one tank dishwasher
- EC_{OTWW} is the Energy Consumption for standard rating conditions in kWh/100 dishes(final energy)
- SEC_{OTWW} is the Standard Energy Consumption of a one tank dishwasher in kWh/100 dishes

And:

$$SEC_{OTWW} = \{(a * C) + b\} * F$$

Where:

- *C*= the rated capacity of the one tank dishwasher based on the number of plates per m^2 rack, equal to 100 dishes;
- *a* and *b* are constants [these need to be defined on the basis of forthcoming tests of the standard]
- F = a constant to correct for extra high pressure (pot/utensil washer) F=1.05 or low pressure (glass washers) F=0.95

3.1.3. Multi-tank dishwashers

The energy efficiency index for multi-tank dishwashers (EEI_{MTWW}) shall be calculated as:

$$EEI_{MTWW} = \frac{EC_{MTWW}}{SEC_{MTWW}} \; x \; 100$$

Where:

- EEI_{MTWW} is the Energy Efficiency Index of a multi-tank dishwasher
- EC_{MTWW} is the Energy Consumption for standard rating conditions in kWh/100 dishes(final energy)
- SEC_{MTWW} is the Standard Energy Consumption of a multi-tank dishwasher in kWh/100 dishes

And:

$$SEC_{OTWW} = \{(a * C) + b\} * F$$

Where:

- *C*= the rated capacity of the one tank dishwasher based on the number of plates per m^2 rack, equal to 100 dishes;
- *a* and *b* are constants [these need to be defined on the basis of forthcoming tests of the standard]
- F = a constant to correct for extra high pressure (pot/utensil washer) F=1.05 or low pressure (glass washers) F=0.95

3.2. Method of calculation of the specific water consumption

The specific water consumption for non-household dishwashers (WC_{WW}) shall be calculated as:

$$WC_{WW} = \frac{W_{WW}}{C} \, x \, 100$$

Where:

- W_{WW} is the water consumption of the dishwasher for cleaning 100 dishes
- *c* is the rated capacity of the washing machine (equal to 100 dishes)

3.3. Method of calculation of the cleaning performance index

The cleaning performance index for non-household dishwashers (CPI_{WW}) shall be calculated as:

$$CPI_{WW} = \frac{CP_{WW}}{SCP_{WW}}$$

Where:

CPI_{WW} = Cleaning Performance Index of a non-household dishwasher

CP_{WW} = Cleaning Performance of a non-household dishwasher for standard rating conditions, in %

SCP_{WW} = Standard Cleaning Performance of a non-household dishwasher, in %

The cleaning Performance (CP_{WW}) is the average percentage of cleaned plates over the complete test.

3.4. Standard rating conditions for non-household dishwashers

The standard rating conditions that apply to the measurement of the energy efficiency index, specific water consumption and cleaning performance are described in the table below.

Table 6 - Standard rating conditions for non-household dishwashers

non-household dishwasher type	cleaning temperature	cleaning cycle duration	last fresh water rinse temperature
water change	65°C	15 minutes or as defined by manufacturer	80°C
single tank	65°C	2 minutes	80°C
multi-tank	65°C	2 minutes	80°C

The test method to be used for the test shall, in addition to the above parameters, also specify the following parameters:

- Ambient temperature;
- Air humidity;
- Water inlet temperature and hardness;
- Filling mode;
- Machine temperature at start of test;
- Selection of program;
- Rated capacity;
- Productivity (kg/h);
- Program duration / cycle time;
- Type and dosage of detergent;
- Load (material, types, etc.).

The productivity of dishwashers with a conveyor belt shall be calculated as:

productivity = $V_{transport} * \frac{number\ of \frac{plates}{items}}{m\ length\ of\ conveyor\ band} * 0{,}8$ (in washed items/hour)

Where:

$V_{transport}$: velocity of band to achieve a contact time of 2 min (in m/hour)

For conveyer belt dishwashers the capacity shall be 18 plates per m conveyer band

The energy consumption at standard rating conditions shall be expressed as the equivalent primary energy input:

- For products heated by electricity the equivalent primary energy input is equal to: electric energy input * conversion factor CC;
- for products with an integrated heat generator, the equivalent primary energy input is equal to: fuel energy input plus any auxiliary electric energy input *CC;
- for products without heat generator and thus receiving heat from an external heat source the equivalent primary energy input is equal to: heat energy input * 1.25 plus any auxiliary electric energy input *CC;

For each test run the energy efficiency index, specific water consumption and cleaning performance shall be measured, simultaneously where possible. The number of test runs shall be as specified in the test method.

The values for the energy efficiency index, specific water consumption and cleaning performance to be declared by the manufacturer shall be the average values over the number of test runs required.

Annex IV

Verification procedures for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Article 3 and Annex I, using the measurement and calculation methods set out in Annex III.

1. PRODUCTS NOT MADE-TO-ORDER ON THE BASIS OF CUSTOMER SPECIFICATIONS

1. The Member State authorities shall test one single unit per model.
2. The model shall be considered to comply with the applicable requirements set out in Annex I to this Regulation if the values in the technical documentation comply with the requirements set out in that Annex and if testing of the relevant model parameters listed in Annex I and Table 7 shows compliance for all of those parameters.
3. If the result referred to in point 2 is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more different models which, in accordance with Article 4, have been listed as equivalent model in the manufacturer's technical documentation.
4. The model shall be considered to comply with the applicable requirements set out in Annex I to this Regulation if testing of the relevant model parameters listed in Annex I and Table 7 shows compliance for all of those parameters.
5. If the results referred to in point 4 are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

2. PRODUCTS MADE-TO-ORDER ON THE BASIS OF CUSTOMER SPECIFICATIONS

If the product does not come into existence before it is installed at the customers' site, surveillance authorities may request the technical file as mentioned in Annex II.1.2. regarding the technical documentation for the purposes of conformity assessment pursuant to Article 4.

For such products where this information relating to a specific model has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model shall be assessed by the authorities.

Upon request of these authorities a test may be performed at the customers' site. The test shall follow the standard developed for 'in situ' testing and the authorities shall ensure that the burden and possible downtime for the customer shall be kept as small as possible.

If the product fails to meet the required values within given tolerances, the manufacturer shall be allowed to modify the product at no expense of the customer, after which a second test shall be performed. If the product fails this second test as well, the product shall be considered not to comply with this Regulation.

3. VERIFICATION TOLERANCES

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer or the importer as an allowed tolerance to establish the values in the technical documentation.

Table 7 - Verification tolerances

Measured parameters*	Verification tolerances
Energy efficiency index non-household washing machines, textile dryers and dishwashers	The determined value shall not exceed the declared value by more than 5 %.
Washing performance index of washing machines	
Cleaning performance index of washing machines	
Specific water consumption	

(*) The arithmetic average of the values determined in the case of three additional units tested as prescribed in paragraph 1.3 of this Annex.

WORKING DOCUMENT ON

Possible requirements for non-household washing machines, laundry dryers and dishwashers

EXPLANATORY NOTES

Table of contents

1. CONTEXT OF THE PROPOSAL 4
   1.1. Grounds for and objectives of the proposal 4
   1.2. General context 5
   1.3. Scope 6
   1.4. Market significance 6
   1.5. Economic significance 9
   1.6. Market Structure 9
      1.6.1. Washing machines and dryers 9
      1.6.2. Dishwashers 11
   1.7. The market for lot 24 dishwashing equipment is almost entirely a 'commercial' segment. Contrary to laundry equipment there is no significant industrial segment. Environmental significance 13
   1.8. Improvement potential 14
   1.9. Existing legislation 16
2. PROPOSED MEASURES 17
   2.1. Consistency with other policies and objectives of the Union 18
   2.2. Limitations of scope due to other ecodesign studies and measures 19
   2.3. Form of implementing measures 19
3. LEGAL ELEMENTS OF THE PROPOSAL 20
   3.1. Scope of the proposed regulation 20
   3.2. Specific ecodesign requirements 21
      3.2.1. Energy efficiency 22
      3.2.2. Washing, cleaning (& drying) performance 23
      3.2.3. Water consumption 24
   3.3. Product information requirements 24
   3.4. Staged implementation of ecodesign requirements 24
   3.5. Measurements and calculations 25
   3.6. Conformity assessment 26
   3.7. Verification procedure for market surveillance purposes 26
      3.7.1. Products not made-to-order on the basis of customer specifications 26
      3.7.2. Products made-to-order on the basis of customer specifications 27
   3.8. Information requirements 27
   3.9. Benchmarks 29

3.10. Date for evaluation and possible revision 29
3.11. Legal basis 29
3.12. Subsidiarity principle 29
3.13. Proportionality principle 29
3.14. Entry into force 30
3.15. Choice of instruments 30
3.16. Impact on other EU legislation 30
4. BUDGETARY IMPLICATION 30
5. ADDITIONAL INFORMATION 30
5.1. Review clause/revision/sunset clause 30
5.2. European Economic Area 30

1. CONTEXT OF THE PROPOSAL

1.1. Grounds for and objectives of the proposal

The Ecodesign Directive 2009/125/EC establishes a framework for the setting of ecodesign requirements for energy-related products. It is a key instrument of European Union policy for improving the environmental performance of products in the Internal Market.

An ecodesign preparatory study was performed (referred to as "lot 24"), which concluded that ecodesign requirements should be in place for the following types of products:

1. Non-household laundry washing machines;

2. Non-household laundry dryers;

3. Non-household dishwashers.

This explanatory note recommends a draft Commission regulation for regulating the above products.

Household washing machines, household dryers and household dishwashers are outside the scope of the proposed regulation as these are covered by respectively Commission Regulation (EU) No 1015/2010 of 10 November 2010 on domestic washing machines, Commission Regulation (EU) No 932/2012 of 3 October 2012 on tumble dryers and Commission Regulation (EU) No 1016/2010 of 10 November 2010.

The scope of the preparatory study and of the proposed Regulation also excludes:

- Dry-cleaning appliances (using non-aqueous non-polar, mostly organic solvents), since they use a cleaning process which is incomparable with cleaning with water. Dry-cleaning can clean materials which are very sensitive to water, it provides shape permanence, discolouration is negligible and dry-cleaning can remove different stains.

- Finishers, since the primary function of a 'finisher' is de-wrinkling and re-shaping; drying is a secondary function;

- Flat-work dryers and ironing presses, since their function is a combination of drying and ironing.

In addition to the above, professional washer-dryers (identified as base case WM5 in the Lot 24 preparatory study) are proposed to be excluded from the scope, since the sales and the associated energy consumption are small. This would also mirror the exclusion of washer-dryers from the parallel measures on household washing machines and tumble driers.

Even with these exclusions, the major part of the environmental impact of the European industrial/professional textile cleaning equipment stock is still addressed by the planned measures.

The study concluded that many inefficient products continue to be placed on the market, despite lower life cycle cost for products with higher efficiencies. The proposed Regulation aims at correcting this market failure.

The preparatory study has shown that:

- Products within the scope are placed in significant quantities on the internal market;

- The main environmental impacts in the life cycle of these products are the energy consumption (electricity or gaseous/liquid fuels) and water consumption during use.

- There is believed to be a wide disparity in the environmental impacts of the products currently on the market.

- Technically cost-effective solutions exist that could lead to significant improvements as regards their environmental performance.

Under Article 15 of Directive 2009/125/EC, these products should therefore be covered by an ecodesign implementing measure.

1.2. General context

On the basis of data presented in the preparatory studies and additional analysis it has been estimated that the annual energy consumption related to the products is some 324 PJ (7.7 Mtoe) in the European Union in 2009, corresponding to approximately 0.44 % of the total gross energy consumption of the EU-27[1] or corresponding e.g. to the total energy consumption of Estonia in 2009. The associated CO_2 emissions are estimated to be 15.3 Mt per year. If no specific measures are taken, the annual energy consumption is predicted to be 377 PJ in 2030.

The main reasons for the persistent sales of low efficiency products are market failures that fail to provide incentives for manufacturers to place high-efficiency products on the market (regulatory failure) and to guide buyers away from purchase decisions based on purchase costs rather than on the life cycle cost of the product (asymmetric information and negative externality or split incentives).

Asymmetric information refers to the situation that the buyer of a product generally does not have a complete perception of the energy consumption that can be expected from the product when operated, since available information about the relative energy consumption of different appliances and from different manufacturers is incomparable and imbalanced. Moreover the buyer can be focused on other important aspects, e.g. the part of labour costs on the total operation costs, reliability of production, performance or on life time of the appliance.

By negative externalities (or "external cost") is meant the current situation that the total costs of a product (purchase, operating etc.) do not include all environmental impacts or costs (such as mitigation or adaptation to climate change) associated with the purchase, use and disposal of the product. External costs are thus born by the society as a whole.

‘Split incentives’ refers to the situation that the responsibility for purchase is borne by another party then the party responsible for the operating costs. Cost-effective improvement potentials for the end-user are therefore often not realised.

[1] The total gross energy consumption of the EU-27 was 1792 Mtoe in 2007 according the Methodology for Ecodesign of energy-related products "MEErP 2011", Methodology report, Part 2: Environmental policies & data, page 52, by VHK, November 2011.

1.3. Scope

In this document product groups are defined that combine multiple base cases as defined in the preparatory study. These base cases have been combined, as the technical function is similar and the performance can be assessed using a common method.

Table 1-1: Sales of products within scope

Product group in Working Documents	**Corresponding base case in the preparatory study**
Washing machines	
Washer-extractors	WM1, 2, 3 , 4 and 6 (washer-extractors and barrier washers of various capacities)
Tunnel washers	WM7
Dryers	
Condenser tumble dryer	D1
Air vented tumble dryer	D2, D4 – D6 (professional and semi-professional tumble dryers of various capacities)
Cabinet dryer	D3
Pass-through dryer	D7
Dishwashers	
Water-change	DW1
One tank	DW2 – DW5 (undercounter, hood-type, utensil/pot, conveyor-type)
Multiple tank	DW6

1.4. Market significance

The market significance (in sales and resulting stock, based on information in the preparatory studies and supplemented/amended by further information from stakeholders) of the products is shown below. Data are presented for the years 1990 to 2030[2].

The overview below does not include washer-dryers.

[2] Note: Market data for years 1990-2030 are based on information provided in preparatory studies. Where such data were not available data have been estimated.

Table 1-2: Sales of products within scope

Sales (units per year)	1990	2000	2010	2020	2030
Washing machines					
Washer-extractors	67342	74387	82170	90766	100262
Tunnel washers	99	110	121	134	148
Dryers					
Condenser tumble dryer	2762	3051	3370	3723	4112
Air vented tumble dryer	21173	23388	25835	28538	31523
Cabinet dryer	4139	4572	5050	5578	6162
Pass-through dryer	1058	1169	1291	1426	1575
Dishwashers					
Water-change	16009	17684	19534	21578	23836
One tank	175079	193396	213629	235979	260668
Multiple tank	1175	1298	1434	1584	1750

Table 1-3: Stock of products within scope

Stock (installed units)	1990	2000	2010	2020	2030
Washing machines					
Washer-extractors	697123	770058	850623	939617	1037922
Tunnel washers	1217	1345	1485	1641	1812
Dryers					
Condenser tumble dryer	21347	23580	26047	28772	31782
Air vented tumble dryer	245389	271062	299421	330747	365351
Cabinet dryer	57957	64021	70719	78117	86290
Pass through dryer	12964	14320	15819	17474	19302
Dishwashers					
Water-change	181988	201028	222060	245292	270955

One tank	1374343	1518129	1676959	1852406	2046209
Multiple tank	18475	20407	22543	24901	27506

The data show that overall sales of products were 352400 units annually in 2010. The assumption by the preparatory study that sales for laundry equipment and dishwashers are increasing by 1% per year is adopted as this may be reasonable given the increase in hotel stays, average age of inhabitants (meaning more nursing homes) and also general increase in employment and turnover in the hospitality sector (hotels, restaurants, catering, etc.). On the other hand, there is also a trend in concentration of laundry services, which means fewer, but bigger, machines. Therefore, the assumptions regarding the volume of sales and stock of products made during the preparatory studies may be re-assessed during the Impact Assessment phase.

The values shown above deviate from earlier estimates as regards the sales of cabinet dryers and tunnel washers.

Tunnel washers

Recent consultation of experts indicated that the sales figures of tunnel washers is about 120 units per year in the EU, as opposed to the 300 estimated initially. The smaller sales estimate reduces the overall energy consumption of the equipment covered and the savings potential of the planned measures substantially, as tunnel washers are among the most energy-intensive products within scope. The Commission is seeking further information on the sales figure for the purposes of a more thorough analysis during the impact assessment, also in order to check the robustness of this estimate against sales figures of tunnel washers in other comparably developed countries of the world.

Cabinet dryers

As regards cabinet dryers, recent consultation of experts showed that they are largely applied in the commons of multi-apartment buildings. Non-household applications may be found in fire departments (drying of clothes), sports facilities, nursing homes or similar purposes. However, according a leading cabinet dryer manufacturer, the EU market is dominated by sales in Sweden, as in Sweden apartment houses are often equipped with cabinet dryers, alongside conventional tumble driers, to dry clothes unsuitable for tumble drying. This manufacturer estimated the total EU market to be between 4000 and 5000 units annually of which many would be domestic size cabinets (60 * 60 cm).

The energy consumption of cabinet dryers is highly dependent on whether cold or heated air is used and may vary from negligible (cold air) to 0.5 - 0.7 kWh/kg laundry (heated air). Earlier estimates assumed higher sales and the highest energy consumption values (90ºC air temperature), whereas they are likely to be operated at lower temperature settings too. These aspects will be further considered in the Impact Assessment phase. As there are no EN standards for performance testing comparable data is virtually non-existent. For this reason cabinet dryers are included only for information requirements.

1.5. Economic significance

The total expenditure for non-household washing machines, dryers and dishwashers combined is some 9.7 billion euro, of which the running costs make up for some 7.9 billion euro (some 81.5% of the total).

1.6. Market Structure

The scope of the product group of professional washing machines, textile dryers and dishwashers covers a very diverse range of products, each with distinct market characteristics. These are discussed below.

1.6.1. Washing machines and dryers

Manufacturers

Most of the professional washing machines and dryers placed on the EU market are produced within Europe with production facilities located primarily in Sweden, Spain, Belgium, Czech Republic and Germany.

Sales structure

Commercial washing machines and dryers, with relatively small capacity, are mainly sold from manufacturer via dealers to the final customers. This applies to (indicatively) about 80% of the appliances. Larger capacity machines, including industrial washing machines and dryers, are mainly sold directly from manufacturer to the final customers. Manufacturers assist the customers in definition of suitable washing and drying programmes.

Organisational structure

- At Member State level there are national associations active in Germany (VDMA (German Engineering Federation - “Garment and Leather Technology”) and in Spain (Spanish exporting manufacturers association for the hospitality industry (AFEHC);
- Active at EU level are CECED (European Committee of Domestic Equipment Manufacturers), ETCT (European Textile Care Technology, representing manufacturers of tunnel washers more specifically.

Standardisation structure

- The relevant technical committee on "non-industrial" (or commercial) washing machines and dryers is Cenelec TC59X, WG1, sub working group 12;
- The relevant technical committee on "industrial" washing machines and dryers is CEN TC 214 (e.g. responsible for ISO 10472:2008). CEN TC 214 work originates from ISO/TC 72, textile machinery and machinery for dry cleaning and industrial laundering, subcommittee SC5 (responsible for ISO 9398:2008). So far this Technical Committee has not yet produced drafts for standards that will allow performance testing of the industrial equipment (eg tunnel washers and dryers). This work will need to be aligned with the activities by ETCT (see above);

Buyers and users

One of the main differentiating parameters between household washing machines and dryers and the non-household washing machines and dryers described in Lot 24 is that for the Lot 24 products productivity (throughput per hour) is much more important. This is (for washing machines) reflected in the higher average wash temperatures and the shorter cycle durations. Only the smallest of equipment covered by Lot 24 has programmes that are somewhat comparable to household use. The appliances also differ in the amount of load handled per year, which is reflected in a sturdier design and more robust components to improve resistance to wear and tear (bearings, motors, hinges, etc.). A significant proportion of professional washing machines and dryers are heated not by electricity but by gas or oil-fired heat generators, or steam generators, that are usually not incorporated in the product itself, but are purchased from a different manufacturer.

All in all, the lot 24 products are much more energy- (and water) intensive than household appliances. The installed base however is much smaller.

Table 1-4: Washing machines use-phase description

Lot 24 basecases for washing machines	typical rated capacity (kg/cycle)	cycles per year	wash load (kg/year, based on real life capacity)	cycle duration (min)	Typical annual energy consumption if electric (indicative, kWh/yr)
WM1 semi-professional washer extractor	6	1795	7 000[3]	45	1 044
WM2 professional washer extractor <15 kg	10	2057	14 400	45	2 272
WM3 professional washer extractor 15-40 kg	24	2198	42 200	50	6 474
WM4 professional washer extractor >40 kg	90	2700	194 400	30	25 415
WM5 professional washer dryer	6	1897	7 400	75	8 989
WM6 professional barrier washer	32	2199	56 300	45	11 002
WM7 tunnel washer	1500 kg/hr	3000 hr/yr	3 825 000	30	97 572
for comparison:					
Typical household washing machine	6 kg (between 3 and 10 kg indicatively)	220 (some 4 cycles per week)	1 320	150 - 200	225 (energy efficiency A+)

[3] For comparison: A household washing machine is assumed to run some 220 cycles/year. Assuming a typical rated capacity of 6 kg, this is 1320 kg/yr, or less than 1/5th of the annual load of a semi-professional washing machine.

Table 1-5: Dryers use-phase description

Lot 24 basecases for dryers	typical rated capacity (kg/cycle)	cycles per year (indicative)	annual drying load (kg/year, based on real life capacity)	cycle duration (min)	Typical annual energy consumption if electric (indicative, kWh/yr)
D1 semi-professional dryer / condenser	6	1700	6 500	30-45	5924
D2 semi-professional washer / air-vented	6	1700	6 500	30-45	3692
D3 professional cabinet dryer	8	830	6 300	130	7176
D4 professional tumble dryer <15kg	10	2050	14 400	30	5941
D5 professional tumble dryer 15-40 kg	23	2200	40 500	20-30	14230
D6 professional tumble dryer >40 kg	70	3000	168 000	15-20	48916
D7 pass-through tumbel dryer	400 kg/hr	3000 hr	1 020 000	20	130840
for comparison:					
Typical household tumble drier (energy efficiency class B)	6 kg (between 3 and 10 kg indicatively)	160 (some 3 cycles per week)	960	150 - 200	446

The users of lot 24 washing and drying equipment are primarily professionals (specialised laundry services, or trained personnel in hotels, hospitals, elderly care facilities, other care centres, etc.) but some (smaller capacity) base-cases may be used by non-trained personnel (lay persons), such as communal laundry equipment (shared by tenants in an apartment building) or coin-and-card appliances (for launderettes, campings, etc.).

The markets for lot 24 washing and drying equipment can be separated into a commercial segment (which includes for practical reasons communal equipment) and an industrial segment, which includes mainly laundry services that handle the laundry of large facilities. The technical borders between these markets segments have not yet been defined in detail and are therefore subject to discussion in the relevant standardisation organisations.

1.6.2. Dishwashers

Manufacturers

Almost all professional dishwashers placed on the EU market are produced within Europe with production facilities all over Europe. The key manufacturing Member States are Germany, Italy and Spain. According to the preparatory study and other anecdotal data at least some 20-40 SMEs are active in this market, in particular in Italy.

Sales structure

The majority of ware washing appliances, especially the smaller types, is sold via catering equipment dealers, partly with wholesale as intermediate step. Appliances which

are sold directly from manufacturers to the final customers tend to be the larger conveyor-type dishwashers.

Organisational structure

- Active at EU level are CECED (European Committee of Domestic Equipment Manufacturers) and EFCEM (the European Federation of Catering Equipment Manufactures, representing manufacturers of commercial kitchen equipment).
- At Member State level are national associations of commercial catering equipment manufacturing found in Germany, UK and Italy.

Standardisation structure

- The relevant technical committee on commercial dishwashers is Cenelec TC59X, subWG 2.1 on dishwashers for commercial use. This should include dishwashers with conveyor belts although these are currently not included in the scope of the draft standards being developed.
  The relevant committee on industrial laundry equipment is CEN TC 214. This working group is responsible for the EN-ISO 9398 (safety), but should also cover the performance of industrial laundry equipment as mandated in M/495 Annex A. The conveyor type single and multi-tank dishwashers (DW5 and DW6) are not yet covered by a standard, but this will be addressed in the mandate to the standardisation organisations.

Buyers and users

One of the main differentiating parameters between household dishwashers and the non-household dishwashers is that for the latter, productivity (throughput per hour) is much more important. This is reflected in the higher average clean and rinse temperatures, the re-use of washing suds and the shorter cycle durations. Only the smallest of equipment covered by Lot 24 has programs that are somewhat comparable to household use. The appliances also differ in the amount of load handled per year, which is reflected in a sturdier design and more robust components to improve resistance to wear and tear (bearings, motors, hinges, etc.).

All in all, the lot 24 products are much more energy- (and water) intensive than household appliances. The installed base however is smaller.

Table 1-6: **Dishwashers use-phase description**

Lot 24 basecases for dishwashers	typical rated capacity (dishes/hr)	hrs per year	cleaning load (dishes/year, based on real life capacity)	cycle duration (min)	Typical annual energy consumption, if electric (indicative, kWh/yr)
DW1 under-counter, water-change	200	520	24 000	16	1 522
DW2 under-counter, one-tank	550	2520	237 600	2	6 417
DW3 hood type	860	2250	345 600	2	10 340
DW4 utensil/pot type	20 cycles/hr	2220	9 000	2	11 676
DW5 one-tank conveyor type	1 750	2145	1 515 900	2	40 984
DW6 multi-tank conveyor type	3 600	1815	4 009 500	2	99 618
for comparison:					
Typical household dishwasher	12 couverts	280 (over 4 cycles per week)	(-)	90-120	290 kWh (energy efficiency A+)

The users of Lot 24 dishwashing equipment are to a large degree professionals (trained personnel in restaurants, hotels, hospitals, elderly care facilities, other care centres, etc.) but some (smaller capacity) base cases may be used by non-trained personnel (lay persons) as well, such as in smaller bars and restaurants.

1.7. The market for lot 24 dishwashing equipment is almost entirely a 'commercial' segment. Contrary to laundry equipment there is no significant industrial segment. Environmental significance

The preparatory studies have shown that for all products within scope energy consumption during use is the single most significant environmental parameter. The studies showed that washing machines and dishwashers are also a significant contributor to EU fresh water consumption.

The energy consumption of products is estimated to be some 329 PJ primary energy. Non-household dishwashers are responsible for some 52% of this energy consumption in 2010, being 170 PJ, which is expected to grow to 199 PJ in 2030 mainly due to a growth of the number of appliances in use.

Non-household laundry dryers are responsible for 36% of the total consumption or an energy consumption of 119 PJ (primary energy) in 2010 increasing to 137 PJ (primary) in 2030.

Non-household washing machines are responsible for 12% of the total consumption or an energy consumption of 39 PJ (primary energy) in 2010 increasing to 47 PJ (primary) in 2030.

The overall combined greenhouse gas emissions in 2010 by non-household washing machines, dryers and dishwashers were estimated to be some 15.4 Mt CO_2-eq, of which some 43% is estimated to originate from laundry dryers, 44% from dishwashers and 13% from washing machines.

The overall combined water consumption in 2010 by non-household washing machines and dishwashers was estimated to be some 416 mln m^3, of which some 68% is estimated to originate from non-household washing machines and 32% from non-household dishwashers.

1.8. Improvement potential

The preparatory study identified various improvement options that would result in lower overall energy consumption and related emissions and would be realisable at no excessive life cycle costs for the products within scope.

The technical saving potential as based on the best available technology identified in the Lot 24 preparatory study differs per product group: the energy consumption of washing machines could be reduced by 19% (WM3) to 35% (WM7) for the best available products. Dishwashers could be improved by 8% (DW1) to 37% (DW6). For dryers the improvements with the best available products are some 25% reduction (D2 D7) to 68% (D3).

The water consumption could be reduced by 5% to 25% for dishwashers and 22% to 50% for washing machines.

Targets however have been set at the level of least life cycle costs, in accordance with Annex II of Directive 2009/125/EC. For some of the products in the scope, i.e. the conveyor multi-tank dishwashers (BC6), pass-through dryers (D7), washer-extractors (WM4), tunnel washers (WM 7) the best available technology is at least life cycle costs level.

To make use of the improvement potential, this working document proposes ecodesign minimum energy efficiency requirements for these products.

The proposed ecodesign minimum efficiency requirements presented in this document are based on the scenarios developed in the preparatory studies and further analysis during the preparatory stages of this document.

Implementation of these measures would result in the following annual energy savings:

- For non-household washing machines some 4.3 PJ/yr in 2020 and 8.1 PJ/yr in 2030;
- For non-household laundry dryers some 7.6 PJ/yr in 2020 and 14.7 PJ/yr in 2030;
- For non-household dishwashers some 9.5 PJ primary energy in 2020 and 14.8 PJ/yr in 2030.

The implementation of the measures would result in the following annual water savings:

- For washing machines and dishwashers combined the savings would be 96 million m^3 in 2030.

The above sections on economic and environmental significance and improvement potential have been summarised in the table below.

Table 1-7: Estimated annual impacts and savings

Impact	**unit**	**BaU / Baseline**			**Scenario**		**Savings**	
	year	2010	2020	2030	2020	2030	2020	2030
Energy								
Washer extractors	PJ/yr	27.8	29.9	32.1	27.2	27.0	2.7	5.0
Tunnel washers	PJ/yr	11.7	12.6	13.6	11.0	10.5	1.6	3.1
Air vented tumble dryer	PJ/yr	32.6	35.1	37.6	33.1	33.7	2.0	3.9
Condenser dryer	PJ/yr	1.4	1.5	1.6	1.4	1.4	0.1	0.2
Pass-through dryer	PJ/yr	82.0	88.2	94.6	82.8	84.0	5.5	10.6
Water-change dishwasher	PJ/yr	3.0	3.2	3.5	3.2	3.4	0.1	0.1
One tank dishwasher	PJ/yr	144.5	157.5	168.7	149.1	156.6	8.3	12.1
Multiple tank dishwasher	PJ/yr	22.8	24.6	26.5	23.4	23.9	1.1	2.6
Total	PJ/yr	324	351	377	330	339	21.3	37.5
	Of which electric only (TWh/yr)	21.6	23.5	25.2	22.1	22.9	1.3	2.2
	Of which fuel only (PJ prim /yr)	99	106	114	99	99	7.4	14.4
Water Total	mln m3/yr	416	449	480	387	384	63	96

GHG Total	Mton CO2 eq/yr	15.3	15.8	16.5	14.9	14.7	1.0	1.7
Expenditure total	bln €/yr	9.5	12.0	16.4	12.0	15.8	0.0	0.5
Acquisition costs Total	bln €/yr	1.8	2.0	2.5	2.5	3.1	-0.5	-0.5
Energy costs Total	bln €/yr	2.9	4.3	6.9	4.1	6.2	0.3	0.7

From the above it can be concluded that the proposed measures will help to curb that trend of increasing energy consumption by products in the scope. The measures are estimated to level out the overall energy consumption from 2020 onwards.

The calculations presented in this document are mainly based on the preparatory studies, but also on additional analysis. The savings in energy consumption, emissions and costs will be verified and scrutinised by the Commission during the Impact Assessment following the consultation on the Working Document.

1.9. Existing legislation

The product group of professional laundry equipment and dishwashers is currently not subject to product specific EU environmental legislation. Relevant cross-sectoral EU environmental legislation and EU legislation in the field of product safety, both mechanical and electrical, applies.

In the field of safety, the European Commission issued mandates to the standardisation bodies to develop harmonised standards on Professional washing machines, dryers and dishwashers.

Other environmental legislation that may affect the products within scope are Directive 2002/95/EC of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment[4] (RoHS Directive) and Directive 2002/96/EC of 27 January 2003 on waste electrical and electronic equipment[5] (WEEE Directive).

Although the RoHS Directive does not apply directly to non-household laundry equipment and dishwashers, the electronics in many professional appliances are expected

[4] OJ L 37, 13.2.2002, p.19.

[5] OJ L 37, 13.2.2002, p. 24.

to be in compliance with this Directive due to "spill over" effects (through the implementation of the Directive in the general product portfolio of suppliers). The WEEE Directive also does not apply directly to commercial and industrial washing and drying and commercial dishwashing products, but as most products represent economically significant scrap value, most products will be taken up in existing (metal) recycling loops.

The equipment also has to meet safety requirements. Non-industrial appliances are covered by standards developed by CENELEC (and IEC) and the main safety directive is the Low Voltage Directive. Industrial equipment is covered by standards developed by CEN (and ISO) and the main safety directive is the Machinery Directive. An alignment of safety and performance standards (for energy and functionality) is currently being discussed at CEN and CENELEC.

As regards hygiene standards, no EN standards exist yet. For dishwashers two German standards appear relevant:

- DIN 10510, Commercial dishwashing with multi-tank dishwashing, hygiene requirements (2008)
- DIN 10512 commercial dishwashing with one tank dishwashers, hygiene requirements (2008)

DIN also published a specification, a non-official recommendation: DIN SPEC 10534 food hygiene requirements in commercial dishwashing.

Legislation in third countries

The US Department of Energy is developing energy efficiency standards for commercial clothes washers[6]. The capacity is however restricted to 3.8 and 4.0 cubic feet for front and top-loading machines. This relates to a maximum 114 liter drum volume, applicable to some 10-12 kg washing load (assuming 10 l drum volume per kg load). The scope is therefore not comparable to that of the proposal discussed in this document (washer extractors of more than 90 kg capacity, and tunnel washers of 2 000 kg/hr and beyond).

2. PROPOSED MEASURES

This Working Document proposes requirements for minimum energy efficiency, maximum water consumption, performance and for product information for the types of equipment shown in table 2-1:

[6] http://www1.eere.energy.gov/buildings/appliance_standards/standards_test_procedures.html

Table 2-1: Overview of parameters covered per product type.

Product type	category	efficiency	water	performance	Information
Washing machines					
	Washer extractors	x	x	x	X
	Tunnel washers	x	x	x	X
Dryers					
	Condenser tumble dryer	x			X
	Air vented tumble dryer	x			X
	Cabinet dryer				x
	Pass-through dryer	x			x
Dishwashers					
	Water-change	x	x	x	x
	One tank	x	x	x	x
	Conveyor loading	x	x	x	x

The proposed measures are to take the form of Ecodesign implementing measures. Energy labelling is not proposed as an instrument for the reasons explained in section 2.3.

No requirements for maximum sound power levels are proposed as the working conditions of persons using professional or industrial appliances have surrounding noise, for instance from conveyors, containers or tableware. The expected working conditions would render such requirements useless, since low noise equipment would not substantially reduce sound power levels experienced by personnel.

2.1. Consistency with other policies and objectives of the Union

The Ecodesign Framework Directive 2009/125/EC is an important instrument for achieving the objective of 20% energy savings compared with projections for 2020, and its implementation is one of the priorities in the Commission's Communication on Energy 2020 and Energy Efficiency Plan 2011. Furthermore, implementation of the Directive 2009/125/EC will contribute to the EU's target of reducing greenhouse gases by at least 20% by 2020, or 30% if there is an international agreement that commits other developed countries to comparable emissions reductions. The proposed Regulation is a

concrete contribution to this process and is in line with the Commission Action Plan on Sustainable Consumption and Production and Sustainable Industrial Policy.

2.2. Limitations of scope due to other ecodesign studies and measures

Excluded from the scope of the product groups covered by this proposal are household appliances, currently covered by:

- Commission Regulation (EU) No 1015/2010 of 10 November 2010 on Ecodesign requirements for household washing machines[7]
- Commission Regulation (EU) No 1061/2010 of 28 September 2010 on energy labelling of household washing machines[8]
- Commission Regulation (EU) No 932/2012 of 2 October 2012 on Ecodesign requirements for household tumble dryers[9]
- Commission delegated Regulation (EU) No 392/2012 of 1 March 2012 on energy labelling of household tumble dryers[10]
- Commission Directive 96/60/EC of 19 September 1996 on energy labelling of household combined washer-dryers[11]
- Commission Regulation (EU) No 1016/2010 of 10 November 2010 on Ecodesign requirements for household dishwashers[12]
- Commission delegated Regulation (EU) No 1059/2010 of 28 September 2010 on energy labelling of household dishwashers[13]

No overlaps with current (on-going or announced) preparatory studies have been identified.

2.3. Form of implementing measures

The working document describes implementing measures in the form of a Regulation setting minimum ecodesign requirements under the Ecodesign Directive 2009/125/EC. It is proposed to give the implementing measures the form of directly applicable Regulations.

A delegated Commission Regulation for energy labelling of the products within scope is considered to be inappropriate as many of these products are bought on specifications by trained personnel. Moreover, due to the lack of (harmonised) standards for the equipment concerned, the information on disparity in performances of the appliances is limited. At this moment it is not possible to define label categories to differentiate the products on the market in a fair manner. The effect of labelling would therefore be unknown, and would require a large effort of the legislator, manufacturers and national market surveillance authorities.

[7] OJ L293, page 21-30, 11-11-2010

[8] OJ L 314, page 47-63, 30-11-2010

[9] OJ L 278, page 1-10, 12-10-2012

[10] OJ L123, page 1-26, 9-5-2012

[11] OJ L266 page 1-27, 18-10-1996

[12] OJ L 293, page 31-40, 11-11-2010

[13] OJ L314 page 1-16, 30-11-2010

If the proposed ecodesign measure is adopted, the envisaged review, scheduled early (three years after entry into force), could reconsider the appropriateness and possibility for introduction of an energy labelling measure.

3. LEGAL ELEMENTS OF THE PROPOSAL

3.1. Scope of the proposed regulation

The scope of the proposed ecodesign regulation covers non-household washing machines and textile dryers varying in capacity from 6 kg per load for a typical small commercial washing machine or dryer, up to more than 500 kg/h for pass-through industrial tumble dryers and more than 2,000 kg/h for industrial tunnel washers. The dishwashers to be covered under this regulation range from a typical capacity of 200 dishes per hour for a single rack appliance to 6,000 dishes per hour for certain multi-tank dishwashers with conveyors.

Most of the products are equipped with heat generators using electricity, although some large appliances, especially for washing and drying of laundry, may use gas, oil or steam.

The scope will however not set limits on the form of energy used, or minimum or maximum capacity, and instead just refers to the type of products ("non-household"). The market segments they cover are both the commercial markets (launderettes, cafes, restaurants) and industrial markets (laundry service providers). The users can be designated as being either professional (in virtually all professional markets), but also lay people (for instance in public launderettes and communal laundry facilities in apartment buildings).

The proposal provides definitions for non-household washing machine types that each represent a main technology: Preparatory study washing machine base cases WM1-4, 6 and 7 are grouped into:

1) washer-extractors (WM1-4) including barrier washers (WM6);
2) tunnel washers (WM7).

Non-household laundry dryers are grouped into four main types:

1) condenser dryers (D1);
2) air vented dryers (D2, D4, D5 and D6);
3) pass through dryers (D7);
4) cabinet dryers (D3).

Non-household dishwashers are grouped into three main types:

1) water change dishwashers (DW1);
2) single tank dishwashers (DW2-DW5);
3) multi-tank dishwashers (DW6).

Single tank dishwashers may be used to clean rather different pieces of ware (dishes, glasses, cutlery, pots/utensils) and may be designed with different load/unload functionality (door, hood, conveyor) but the main functionality/performance is determined by its single tank feature.

Excluded from scope

It is proposed to exclude from the scope the following products:

- Combined washer-dryers (identified as base case WM5 in the Lot 24 preparatory study);
- Dry cleaning appliances (using non-aqueous non-polar, mostly organic solvents) as these were excluded from the scope of the preparatory study and no recommendations have been made regarding such appliances.
- pre- and after treatment equipment such as (but not limited to):
    - Finishers, since they were also excluded from the preparatory study. The primary function of a 'finisher' is de-wrinkling and re-shaping; drying is a secondary function;
    - Flat-work dryers and ironing presses, since they were also excluded from the preparatory study. Their function is a combination of drying and ironing.
- Household appliances, currently covered by:
    - Commission Regulation (EU) No 1015/2010 of 10 November 2010 on Ecodesign requirements for household washing machines[14]
    - Commission Regulation (EU) No 1061/2010 of 28 September 2010 on energy labelling of household washing machines[15]
    - Commission Regulation (EU) No 932/2012 of 2 October 2012 on Ecodesign requirements for household tumble dryers[16]
    - Commission delegated Regulation (EU) No 392/2012 of 1 March 2012 on energy labelling of household tumble dryers[17]
    - Commission Directive 96/60/EC of 19 September 1996 on energy labelling of household combined washer-dryers[18]
    - Commission Regulation (EU) No 1016/2010 of 10 November 2010 on Ecodesign requirements for household dishwashers[19]
    - Commission delegated Regulation (EU) No 1059/2010 of 28 September 2010 on energy labelling of household dishwashers[20]

3.2. Specific ecodesign requirements

Specific ecodesign requirements relate to energy efficiency, washing/cleaning performance, water consumption and are proposed to apply to:

1. Non-household washing machines:
    a. Washer-extractors, including barrier washers;
    b. Tunnel washers.
2. Non-household dryers:
    a. Condenser tumble dryers;

[14] OJ L293, page 21-30, 11-11-2010

[15] OJ L 314, page 47-63, 30-11-2010

[16] OJ L 278, page 1-10, 12-10-2012

[17] OJ L123, page 1-26, 9-5-2012

[18] OJ L266 page 1-27, 18-10-1996

[19] OJ L 293, page 31-40, 11-11-2010

[20] OJ L314 page 1-16, 30-11-2010

b. Air-vented tumble dryers;

c. Pass-through dryers;

d. Cabinet dryers.

3. Non-household dishwashers:

    a. Water change;

    b. One tank dishwashers;

    c. Multi-tank dishwashers.

The specific requirements are proposed to be mandatory from 4 years after entry into force of the proposed regulation. As the requirements for information apply after 2 years after entry into force and a review is scheduled before the ecodesign requirements come into force, there is the opportunity to amend the target values to take into account more recent information regarding energy efficiency, water consumption and other aspects for instance covered by information requirements.

3.2.1. Energy efficiency

The minimum energy efficiency requirement is proposed to be based on the energy consumption required to provide a 'typical service', divided by the reference energy consumption for this service.

The 'typical service' is proposed to be defined using standard rating conditions, which define typical wash or clean temperatures, initial and end of programme moisture content and cycle duration where relevant. For washer-extractors the requirements are proposed to be split into requirements for equipment of a rated capacity of less than 40 kg and equipment with a rated capacity of 40 kg or more as the standard rating conditions for these two groups of products are slightly different.

The approach involving 'standard rating conditions' is different to that of household equipment where a certain margin in setting temperatures and cycle duration exists. By setting standard rating conditions, effectively fixing temperature and cycle duration, this margin is reduced and differences in the energy efficiency of equipment will relate mainly to heat losses and electrical energy (of drives, controls, etc.). Allowing manufacturers to set temperatures and cycle duration could lead to machines being promoted as very efficient whereas the cycle duration would be unacceptable in practice. The requirement on energy efficiency has to be complemented with a requirement for a minimum washing performance, to avoid under-performing products being placed on the market.

Energy efficiency is expressed as an energy efficiency index where a measured energy consumption value is divided by a reference energy consumption. The reference energy consumption is based on values taken from the preparatory study, but introduces a capacity-dependent factor. This is to account of the 'economy of scale' effect that is believed to occur in non-household laundry and dish washing equipment. It must be stated however that neither the preparatory study, nor further stakeholder consultation has yet provided data for calculating this economy of scale effect. The capacity dependent factor in the reference energy consumption calculation is therefore based on expert judgement only, and should be verified by on-going and future testing of equipment using the proposed standard rating conditions. The values for specific energy consumption presented in the preparatory study do not show this 'economy of scale' effect, most likely because these values are derived from different testing conditions

(programmes, temperature, type of laundry, load ratio etc.) and may be more representative of real life values, instead of values that can be used for comparative assessment.

The energy efficiency index is not based on an annual consumption (as is currently the case for most household laundry equipment or dishwashers) as the inclusion of standby consumption is less relevant for non-household equipment. As operation is continuous for many industrial machines (representing the largest shares in energy consumption), only smaller machines, more similar to household, representing a smaller overall energy consumption segment would see benefits. Inclusion of such a basis would require establishing values for the annual service provided (cycles or annual throughput), power in off mode, power in left-on mode and programme time that add complexity and room for error, whereas the associated savings would be minimal.

3.2.2. Washing, cleaning (& drying) performance

For washing machines and dishwashers a minimum washing/cleaning performance would be specified. The performance requirement is expressed in terms of a washing/cleaning index, proposed to be calculated on the basis of soil tests, similar in approach to the testing of household appliances and in accordance to the standard rating conditions, which define typical wash or clean temperatures, initial and end of program moisture content and cycle duration where relevant.

The washing/cleaning performance index is the result of dividing the actual washing or cleaning performance by a reference washing or cleaning performance. The basis for the reference washing or cleaning performance is to be discussed with standardisation organisations and manufacturers and could be a reference machine (ie the Wascator as for domestic appliances) or a reference value. For setting this reference, aspects related to repeatability and reproducibility need to be taken into account.

For dishwashers, cleaning temperatures have a relation to hygiene performance. For dishwasher hygiene performance two specifications (not standards) may be relevant:

- CENELEC, TC59X/SWG2.1(Sec)0016; September 2013: Electric dishwashers for commercial use - test methods for measuring the performance;
- DIN SPEC 10534 (August 2012): Food hygiene - Commercial dishwashing - hygiene requirements.

DIN SPEC 10534 contains the following requirements as regards temperatures:

There is no single minimum temperature. The required temperature depends on the type of dishwasher and the programme step (e.g. cleaning/washing and rinse). DIN SPEC 10534 specifies that for hygiene reasons it is not permitted to switch off heating elements temporarily to avoid electrical peak loads (operation at partial load) as this would involve a reduction of the temperature.

According to DIN SPEC 10534 the required wash temperature should be 60-65ºC and the temperature of the last (fresh water) rinse is 80-85ºC. Deviation of these temperatures is allowed if the hygiene specifications can be met using another means (use of special treatment agents and methods). Exceeding these temperatures is permitted. The hygiene requirements must be fulfilled even when the shortest programme cycle and/or fastest conveyor speed is used. A contact time of 90s is considered suitable to obtain a hygienically safe washing result.

For practical reasons, as temperature has a considerable influence on the durability and serviceability of drinking glasses, the temperature of the detergent solution when washing should not significantly exceed 60°C and the temperature of the rinse aid solution should not exceed 65°C.

Following the above, the standard rating conditions for dishwashers specify wash temperatures and last rinse temperatures.

For dryers the performance is defined as the residual or final moisture content, combined with requirements regarding cycle duration and maximum temperatures, which are part of the dryer standard rating conditions.

3.2.3. Water consumption

A maximum specific water consumption value is identified for washing machines and dishwashers in order to reduce excessive water consumption levels. The water consumption is proposed to be measured under standard rating conditions.

The minimum water consumption requirement would be based on the water consumption of providing a 'typical service'. It is supplemented by information requirements for washing machines for water consumption for the washing and rinsing cycles separately.

The 'typical service' is proposed to be defined using the above mentioned standard rating conditions, which define typical loads and cycle duration where relevant.

3.3. Product information requirements

Product information requirements would apply to all products for which specific ecodesign requirements related to energy efficiency and water consumption would be set, as well as for the products within the scope for which no specific ecodesign requirements would be set, notably cabinet dryers.

Information requirements would apply to all products 2 years after entry into force of the regulation.

The combination of specific and generic requirements should realise the potential to reduce the use-phase energy and water consumption while attaining minimum wash or cleaning performance.

3.4. Staged implementation of ecodesign requirements

Harmonised standards are currently lacking and need to be / will be established in the coming years, meaning that there is also a lack of harmonised data on the performance of the products in scope. The proposed regulation therefore sets out a phased approach, with minimum requirements becoming applicable only after a first review of the regulation has re-assessed them in the light of data made available in-between. The approach has the advantage of sending a clear message to industry and standardisation organisations as to the direction in which both the market and the harmonised standards should develop, and by when.

Directly after entry into force of the regulation, the standardisation technical committees would be expected to continue working on (harmonised) test standards that lay down a procedure allowing a fair comparison of the performance of the products covered. These

standards should be ready when the first product information requirements become mandatory.

"N+2": Two years after entry into force, the first requirement to become mandatory would be on providing product information. This would allow consumers (users) and also market surveillance and other parties to create a set of data which would be based on agreed and uniform measurement and calculation methods.

"N+3": Three years after entry into force, the regulation is proposed to be reviewed with a view to determine whether the requirements set out for year N+4 are still appropriate, in the light of the product information published since year N+2.

"N+4": Four years after entry into force, the (potentially revised) requirements regarding energy, water and performance in the regulation(s) would become mandatory.

3.5. Measurements and calculations

In order to ensure an acceptable performance level, minimum performance requirements are proposed to be set for washing and cleaning. Performance would be assessed in the same test as used for assessing energy efficiency, so that no loopholes are created (optimising tests for either energy or washing/cleaning performance).

For non-household washing machines this means the rated capacity of the washing machine would be washed to determine the energy consumption per kg of laundry, the water consumption, the washing performance and the residual water content.

The Energy Efficiency Index would be calculated by dividing the measured energy consumption (in kWh per kg of laundry) with a reference standard energy consumption per kg laundry.

The temperature for washer extractors up to 40 kg capacity (base cases WM1, WM2 and WM3) is 60°C. Above 40 kg (base case WM4) the usual temperature is 70°C. The cycle durations would be respectively 45 minutes and 20 minutes.

The specific water consumption (WC) would be calculated by dividing the measured water consumption (in litres) by the typical service (kg load).

The Washing Performance Index (WPI) would be expressed as average reflectance value of the test strips after completion of the test cycle, divided by the standard reference washing performance measurement.

Rinsing would not be assessed, as the method is still of insufficient reproducibility.

The tunnel washer would run at 85% of the rated capacity with standard laundry to determine the output in kg of washed laundry per hour and the energy consumption per hour. In the same run, the water consumption, washing performance and residual water content would be measured.

For non-household textile dryers the rated capacity of the textile dryer would be dried to determine the energy consumption per kg of laundry and the residual water content.

The energy efficiency index would be calculated by dividing the measured energy consumption (in kWh per kg of dry laundry) by the reference standard energy consumption per kg laundry.

The maximum drying cycle temperature, the initial moisture content and the final moisture content is as defined in "Standard Rating Conditions Tumble Driers".

For non-household dishwashers the rated capacity of the dishwasher would be cleaned to determine the energy and water consumption.

The energy efficiency index would be calculated by dividing the measured energy consumption (kWh/100 dishes) by the standard energy consumption per 100 dishes.

The specific water consumption (WC) would be calculated by dividing the measured water consumption (in litres) by the load treated (100 dishes).

The cleaning performance would be expressed in percentage of cleaned plates.

For one tank dishwashers dedicated for specific purposes, the size of the test load would be dependent on the surface area of the rack.

(NOTE: possible corrections for extra high pressure (e.g. in dishwashers dedicated for pots) or low pressure (glass washers) could be included to compensate for the provided functionality.)

Standard racks with a load of rated capacity of the dishwasher would be conveyed into the appliance with nominal speed and cleaned to determine the energy and water consumption.

3.6. Conformity assessment

As required in Article 8 of Directive 2009/125/EC the proposed Regulation specifies the applicable conformity assessment procedures, which should be based on full quality assurance (module H as described in Annex IV) or type examination with product verification (modules B and F as described in Annex V).

For the purposes of conformity assessment, the technical documentation is proposed to contain the product information set out in point 1 of Annex II and the results of the measurements and calculations set out in Annex III.

3.7. Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of 2009/125/EC, the authorities of the Member States would apply the following verification procedure for the requirements set out in Article 3 and Annex I, using the measurement and calculation methods set out in Annex II.

3.7.1. Products not made-to-order on the basis of customer specifications

(1) The Member State authorities would test one single unit per model.

(2) The model would be considered to comply with the applicable requirements set out in Annex I to this Regulation if the values in the technical documentation comply with the requirements set out in that Annex and if testing of the relevant model parameters listed in Annex I and Table 7 shows compliance for all of those parameters.

(3) If the result referred to in point 2 is not achieved, the Member State authorities would randomly select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more different models which, in accordance with Article 4, have been listed as equivalent model in the manufacturer's technical documentation.

(4) The model would be considered to comply with the applicable requirements set out in Annex I to this Regulation if testing of the relevant model parameters listed in Annex I and Table 7 shows compliance for all of those parameters.

(5) If the results referred to in point 4 are not achieved, the model and all equivalent models would be considered not to comply with this Regulation.

3.7.2. Products made-to-order on the basis of customer specifications

If the product does not come into existence before it is installed at the customers' site, surveillance authorities would be allowed to request the technical file as mentioned in ANNEX II 1. b) regarding the technical documentation for the purposes of conformity assessment pursuant to Article 4.

For such products where this information relating to a specific model has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model is proposed to be assessed by the authorities.

Upon request of these authorities a test couldbe performed at the customers' site. The test would follow the standard developed for 'in situ' testing and the authorities would ensure that the burden and possible downtime for the customer shall be kept as small as possible.

If the product fails to meet the required values within given tolerances, the manufacturer would be allowed to modify the product at no expense of the customer, after which a second test would be performed. If the product fails this second test as well, the product would be considered not to comply with this Regulation.

3.8. Information requirements

In order to facilitate compliance checks, manufacturers would be requested to provide information in the technical documentation referred to in the conformity assessment procedures.

Information to be provided by the manufacturer:

Table 3-1: Information requirements overview

Product type		Washing machines		Textile dryers			Dishwashers		
parameters to be provided	unit	Washer extractors <40 / >40 kg	Tunnel washer	Tumble dryer (condensing and air vented)	Pass through dryer	Cabinet dryers	Water-change	one tank	Multi-tank
Energy source(s)		x	x	x	x	x	x	x	x
Rated capacity	kg/cycle, plates/cycle	x	x	x	x	x	x	x	x
Wash/clean cycle duration	min	x	x				x	x	x
Productivity	kg/hr, plates/hr	x	x	x	x	X	x	x	x
Energy consumption	kWh/kg, kWh/cycle	x	x	x	x	X	x	x	
Energy Efficiency index EEI…	-	x	x	x	x	X	x	x	x
Wash temperature	ºC	x	x						
Spec. water consumption_washing	l/kg	x	x						
Spec. water consumption_rinsing	l/kg	x	x						
Washing Performance Index (WPI)		x	x						
Drying cycle control	text			x	x	x			
Initial moisture content	%			x	x	x			
Final moisture content	%			x	x	x			
Drying cycle temperature	ºC			x	x	x			
Drying cycle duration	min			x	x	x			
Specific water	l/cycle						x	x	x

consumption cleaning									
Cleaning Performance Index (CPI)	-						x	x	x

3.9. Benchmarks

No information is currently available on benchmarks for high energy efficiency and low water consumption for best performing products. The standard test conditions need to be defined and a series of tests need to be undertaken before it is possible to identify benchmark products.

The values for 'Best Available Technology' can not be used in this respect as it is not know to what test conditions (temperature, duration, load, etc.) these values relate.

3.10. Date for evaluation and possible revision

The main issues for a possible revision could be :

- the appropriateness of setting ecodesign requirements on energy and water consumption and performance and information requirements for non-household washing machines, laundry dryers and dishwashers;
- the appropriateness of setting requirements for energy labels for non-household washing machines, laundry dryers and dishwashers;

Taking into account the time necessary to collect, analyse and complement the data in order to properly assess the technological progress on non-household washing machines, laundry dryers and dishwashers, a review could be presented to the Consultation Forum 3 years after entry into force of the proposed Regulation.

3.11. Legal basis

The proposed Regulation would be an implementing measure pursuant to Directive 2009/125/EC, in particular its Article 15(1). The Directive is based on Article 114 of the Treaty.

3.12. Subsidiarity principle

The adoption of ecodesign measures for non-household washing machines, laundry dryers and dishwashers by individual Member States' legislation would lead to obstacles to the free movement of goods within the Community. Such measures should therefore have the same content throughout the Community. In line with the principle of subsidiarity, it would be thus appropriate for the measure in question to be adopted at Community level.

3.13. Proportionality principle

In accordance with the principle of proportionality, the measure would not go beyond what would be necessary in order to achieve the objective. It would offer requirements which act as an incentive for technology leaders to invest in high-efficiency non-household washing machines, laundry dryers and dishwashers technology. It would also

lead to higher savings than any other conceivable option with minimum administrative costs.

3.14. Entry into force

The Regulation is proposed to enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.

The Regulation is proposed to be binding in its entirety and directly applicable in all Member States.

3.15. Choice of instruments

Proposed instruments: Regulation.

Other means would not be adequate for the following reason(s):

The proposed form of action is a Commission Regulation implementing Directive 2009/125/EC, because the objectives of the action can be achieved most efficiently by fully harmonised requirements throughout the EU (including the date for entry into force), thus ensuring the free movement of complying air heating products and cooling products. No costs arise for national administrations for transposition into national legislation.

3.16. Impact on other EU legislation

No EU legislation focusing specifically on energy efficiency and/or emissions of non-household washing machines, laundry dryers and dishwashers has been identified.

The measures proposed in this working document would help to harmonise these limit values as this is one of the goals of the Directive 2009/125/EC, Article 1(1).

4. BUDGETARY IMPLICATION

The proposal would have no implications for the Community budget.

5. ADDITIONAL INFORMATION

5.1. Review clause/revision/sunset clause

The proposal includes a review clause.

5.2. European Economic Area

The proposed act concerns an EEA matter and would therefore extend to the European Economic Area.