



# Preparatory study for Kettles implementing the Ecodesign Working Plan 2016-2019

## Task 1: Scope

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2015-619 LOT1/05 in the context of the Framework  
Contract N° ENER/C3/2015-619 Lot 1

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# **Preparatory study for Kettles implementing the Ecodesign Working Plan 2016-2019**

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## 113 LIST OF ABBREVIATIONS AND ACRONYMS

114	BAT	Best Available Technology
115	BNAT	Best not yet available technology
116	CEN	Comité Européen de Normalisation
117	CENELEC	European committee for electrotechnical standardization
118	EEE	electrical and electronic equipment
119	ERP	Energy-related Products
120	EN	European Standard
121	EP	European Parliament
122	EPBD	Energy Performance of Buildings Directive
123	EPD	Environmental Product Declaration
124	ESO	European Standardisation Organisation
125	EU	European Union
126	FU	functional unit
127	ISO	International Organization for Standardization
128	LCA	life cycle assessment
129	LLCC	Least Life Cycle Cost
130	MEErP	Methodology for Ecodesign of Energy-related Products
131	MEPS	Minimum Energy Performance Standard
132	MS	Member States
133	MTP	Market Transformation Programme
134	NACE	Nomenclature statistique des Activités économiques dans la Communauté
135		Européenne (European Classification of Economic Activities)
136	NGO	Non-governmental organisation
137	PCR	Product Category Rule
138	RoHS	Restriction of Hazardous Substances
139	PRODCOM	Production Community
140	RC	Regulatory Committee <i>on the Ecodesign of Energy-related Products</i>
141	WEEE	Waste Electrical and Electronic Equipment
142	WTO	World Trade Organization
143		

144 **0. INTRODUCTION**  
 145

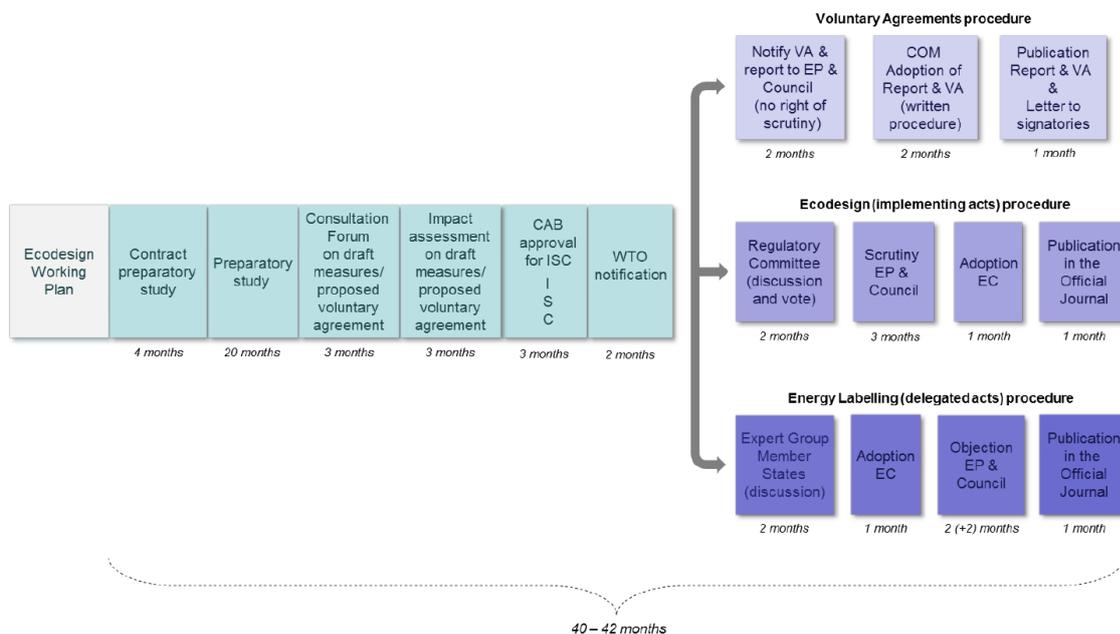
146 The Ecodesign Directive (Directive 2009/125/EC) establishes a framework for the setting of  
 147 Community Ecodesign requirements for energy-related products with the aim of ensuring the free  
 148 movement of such products within the internal market. This preparatory study has been carried out  
 149 in the framework of this Directive. Its aim is to provide the European Commission with a technical,  
 150 environmental and economic analysis of electrical kettles following the Methodology for ecodesign  
 151 of energy-related products (MEErP 2011). According to Article 15 of the Ecodesign Directive,  
 152 implementing measures can be proposed for products, which meet the following criteria:

- 153 • The product shall represent a significant volume of sales and trade, indicatively more than  
 154 200 000 units a year within the Community according to the most recently available  
 155 figures;
- 156 • the product shall, considering the quantities placed on the market and/or put into service,  
 157 have a significant environmental impact within the Community, as specified in the  
 158 Community strategic priorities as set out in Decision No 1600/2002/EC;<sup>1</sup> and
- 159 • The product shall present significant potential for improvement in terms of its  
 160 environmental impact without entailing excessive costs.  
 161

162 **0.1. Legislative process**

163 The process of making Ecodesign Regulations for specific product groups is represented in Figure  
 164 0-1.

165 **Figure 0-1: Process of making Ecodesign Regulations (indicative timing, source: EC**  
 166 **2015)**



167  
 168

169 Firstly, a preparatory study is conducted that gives recommendations on how to improve the  
 170 environmental performance of the product. The study then serves as a basis for the decision as to  
 171 whether, and if so which, Ecodesign requirements should be set out for that particular product. It  
 172 provides the Commission with the necessary information to prepare for the next phases in the  
 173 policy process (to be carried out by the Commission) and in particular the impact assessment, the  
 174 Consultation Forum, and the possible draft implementing measures laying down Ecodesign  
 175 requirements for products.

<sup>1</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002D1600&from=EN>

176 The scope of this study includes the technical properties of the product as well as its market data.  
177 This enables the determination of parameters such as for the Best Available Technology (BAT) and  
178 Least Life Cycle Cost (LLCC) of the product.

179 A working document is then prepared by the Commission based on the results of the preparatory  
180 study. Following the completion of the working document the Consultation Forum's first meeting is  
181 organised in which stakeholders are invited to give input on the working paper and the possible  
182 implementing measures presented in it. The Consultation Forum consists of representatives from  
183 Member States, industry and NGOs. An external impact assessment study is prepared in parallel to  
184 the meetings.

185 Afterwards, the final version of the proposed legislation is sent to the Regulatory Committee (RC)  
186 on the Ecodesign of Energy-related Products (ERP), which is made up of officials from all Member  
187 States. The committee is then allowed to adjust the proposal. It still has to reach a qualified  
188 majority for the Commission to present the proposal to the EP and the Council. After the RC has  
189 successfully voted for the proposal, the European Parliament (EP) and the Council have three  
190 months to apply scrutiny, in which they can review the final proposal and potentially still inhibit its  
191 introduction.

192 The World Trade Organization (WTO) is notified after 3 months and the implementing measure is  
193 officially legal after publication in the Official Journal of the European Union.

194 The result of the process can be a Commission Regulation implementing the Ecodesign Directive  
195 and/or the Energy Labelling Regulation. In some cases, the process can lead to a Voluntary  
196 Agreement with the industry or to no action, if the process is abandoned. In practice, the whole  
197 process typically takes 40 to 42 months, which is slightly longer than in Figure 0-1.

## 198 **0.2. Ecodesign evaluation**

199 The effectiveness of the Ecodesign Directive and its implementing measures were reviewed and  
200 assessed, according to Article 21 of the Directive. In order to prepare for the review and to  
201 examine the functioning of the Directive, an independent study<sup>2</sup> was conducted in 2012 to assess  
202 the appropriateness of extending the scope of the Ecodesign Directive beyond energy-related  
203 products.

204 The results of the study concluded that, in general, the Ecodesign Directive is effective in attaining  
205 its policy objectives (free movement of goods and environmental protection) and that no revision  
206 of the Directive is deemed appropriate at the moment or necessary to increase its effectiveness  
207 and of its implementing measures.

208 The study also indicated challenges faced at both the EU and Member State levels in the application  
209 of the Ecodesign Directive and its implementing measures, including:

- 210 • complex and lengthy preparatory procedure;
- 211 • unavailability of reliable data to inform policy decisions (e.g. market trends and  
212 technological changes, market data, performance data from market surveillance activities  
213 etc.);
- 214 • insufficient coordination of Ecodesign measures with other pieces of the EU legislation, such  
215 as WEEE, RoHS or EPBD Directives;
- 216 • lack of resources to deal with the increasing amount of the regulatory, communication and  
217 standardisation work;
- 218 • question on the level of ambition of requirements, and especially in Tier-1;
- 219 • remaining potential to further address non-energy related issues of energy related products  
220 (e.g. material efficiency, recyclability etc.);
- 221 • delays in the elaboration of suitable harmonised standards;

---

<sup>2</sup> CSES (2012)

222 • insufficient and ineffective market surveillance.

223 In 2015, the Energy Labelling and Ecodesign Directives were evaluated again.<sup>3</sup> The new Regulation  
224 (EU) 2017/1369, setting a framework for energy labelling and repealing Directive 2010/30/EU, is  
225 based on the analysis of the evaluation report. The major changes arising from this are the  
226 rescaling of the energy label – so that in the future the energy classes will range from A to G - and  
227 the establishment of a product database to improve market transparency for market surveillance  
228 purposes.

## 229 **1. TASK 1: SCOPE**

### 230 **1.1. Objectives**

231 The main objective of this task is to determine a clear scoping for electric kettles according to the  
232 needs of the Ecodesign process. For this definition, legal, normative and functional aspects related  
233 to the topic have been taken into account. These considerations will then serve as a basis for the  
234 whole study.

235 The product classification and definitions to be applied are developed in close agreement with the  
236 Commission following a stakeholder consultation process. These are subject to an on-going review  
237 throughout the course of the following tasks.

### 238 **1.2. Product scope**

#### 239 *1.2.1. General description and definition*

240 In this task, the definition of the product group "electric kettles" will be clearly stated and will be  
241 limited to household appliances, even if such appliances can be used in the tertiary sector (e.g. in  
242 hotel rooms).

243 The Preparatory Study to establish the Ecodesign Working Plan 2015-2017 (BIO 2015) included the  
244 product group "electric kettles" and defined them as "kitchen appliances used to produce hot water  
245 using electrical heating for hot drinks and food".<sup>4</sup> However, the product group "electric kettles" had  
246 a rather heterogeneous scope, including various types of appliances:

247 Appliances for water, e.g. for making hot drinks other than hot water

248 This sub-group of appliances covers appliances preparing hot drinks based on hot water. Figure 1-1  
249 presents common types of such appliances.

### 250 **Figure 1-1: Main types of hot drinks appliances**

251



Electric tea maker



Electric moka pot



Traditional filter coffee machines (coffee pot)

252  
253

---

<sup>3</sup> See EC (2015)

<sup>4</sup> See BIO (2015)

254 1.2.1.1. *Electric water kettles*<sup>5</sup>

255 Electric water kettles are stand-alone appliances designed to boil water used for the production of  
256 food or hot drinks. Some water kettles can also heat water to a different pre-set temperature  
257 and/or maintain the water at the target temperature. A concealed element below a metal plate or  
258 an immersed heating element coil heats the water of the reservoir. Figure 1-2 shows different  
259 types of electric kettles.

260 **Figure 1-2: Different types of electric water kettles**



Traditional or dome shape kettle



Jug shape kettle



Kettle with temperature setting

261 There are different types of electric water kettles, which can be distinguished in particular by  
262 following characteristics:<sup>6</sup>  
263

- 264 • corded or cordless;
- 265 • temperature setting (with pre-set temperature or adjustable temperature);
- 266 • capacity to keep the water at the target temperature (keep-warm);
- 267 • size (capacity of the water reservoir):
  - 268 – small portable kettles (also called travel kettles) below 1.0 litre
  - 269 – medium size kettles with about 1.5 – 2.0 litres (the most common size) or even 2.5  
270 litres
  - 271 – large appliances: urns, which are usually designed with a tap to dispense hot  
272 water. The capacity ranges usually between 2.5 and 26 litres
- 273 • rated input power ranges typically between 1500 and 2400 W;
- 274 • material of the water reservoir. Some travel kettles can be folded.

275 1.2.1.2. *Boiling water heaters*

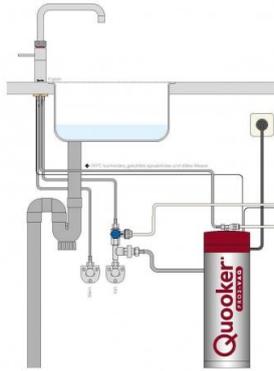
277 Boiling water heaters are products designed to supply boiling water instantly and directly from a  
278 tap. The water is boiled in a tank (usually 3 to 7 litres) by means of an immersed resistive element  
279 (power from 1600 to 2400 W).

280 There are two types of boiling water heaters (see Figure 1-3) depending on the location of the  
281 installed tank: either the tank is installed in the kitchen cupboard and linked to the boiling water  
282 tap on the worktop or it is visible and installed outside the kitchen cupboard.

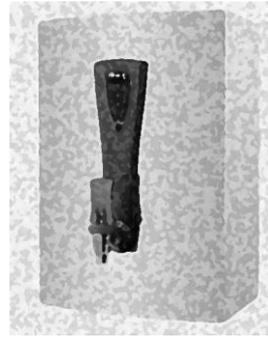
<sup>5</sup> These are to be distinguished from other types of kettles that heat water on a hob

<sup>6</sup> More information is provided in 1.2.3.3 and in Task 4

283 **Figure 1-3: Types of Main boiling water heaters**



Boiling water heaters integrated in the kitchen cupboard (source: Quooker Germany)



Wall mounted boiling water heater

284 Boiling water taps can provide boiled water much faster than kettles and are easier to handle.  
285 However they require to be permanently installed and are considerably more expensive than  
286 kettles, even if kettles have generally lower running costs. <sup>7</sup>

287 On the market, certain boiling water heaters can provide boiling water as well as domestic hot  
288 water. Only those boiling water heaters are covered by Commission Regulation (EU) No. 814/2013  
289 (Ecodesign)<sup>8</sup> and Commission Delegated Regulation (EU) No. 812/2013 (Energy Label)<sup>9</sup> for water  
290 heaters. However, boiling water heaters designed for solely the production of food or hot drinks are  
291 excluded from the water heaters regulation.

292 *1.2.1.3. Hot water dispensers*

293 **Figure 1-4: Typical hot water dispenser**



294  
295

296  
297 Hot water dispensers (see example in Figure 1-4) are stand-alone appliances which supply hot  
298 water on demand. The required quantity of water to be consumed is pumped from a reservoir and  
299 heated up through an integrated instantaneous water heater. The typical rated power is 3000W.  
300 Compared to a kettle, a hot water dispenser has the advantage to quickly dispense a cup or a large  
301 mug of hot water. On the downside the water is hot but not boiling<sup>10</sup> and the quantity of water  
302 delivered is generally between 150 ml and 350 ml at once.

<sup>7</sup> Boiling one litre three times per day, according to Which?  
<https://www.which.co.uk/reviews/kettles/article/quookers-and-boiling-water-taps-are-they-worth-it>

<sup>8</sup> See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R0814>

<sup>9</sup> See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0812>

<sup>10</sup> According to Which <https://www.which.co.uk/reviews/kettles/article/hot-water-dispensers-how-to-buy-the-best>

303 1.2.1.4. Urns

304 Urns boil and heat large quantities of water to a preset temperature and then maintain it at that  
305 temperature. Urns come in a variety of sizes and shapes. It should be noted that a particular  
306 variant of urns are samovars, which include a teapot placed on top. The teapot is filled manually  
307 with hot water from the urn in order to prepare the tea. Figure 1-5 shows a typical urn.

308 **Figure 1-5: Urn**



309

310 1.2.2. Preliminary scope of this study

311 While the Preparatory Study to establish the Ecodesign Working Plan 2015-2017 (BIO 2015)  
312 defined the product group "electric kettles" as "kitchen appliances used to produce hot water using  
313 electrical heating for hot drinks and food", it included a broad panel of products as presented in  
314 1.2.1.

315 Therefore the project team suggests to exclude some types of products. Since the expected energy  
316 service of the product group is to produce hot water, which will then be used for the preparation of  
317 hot drinks and food, appliances producing only hot drinks instead of hot water<sup>11</sup> are excluded.  
318 Furthermore, stand-alone hot water dispensers are as well discarded, since they are restricted to  
319 supplying only one cup or mug of hot water and might be a niche product category and therefore  
320 deliver a different energy service. Regarding boiled water heaters, such products are technical  
321 systems, which require high investment costs and usually have to be installed by a professional. The  
322 distribution channel is typically a kitchen planer, since a boiled water heater has to be integrated in  
323 a (new) kitchen. Consequently, they are hardly comparable to "simple" electrical water kettles. In  
324 other words, boiled water heaters are closer to a system than to a household appliance.

325 Based on this, a more restricted definition of the scope is proposed for the product group "electric  
326 kettles":  
327

Definition of the scope of the preparatory study:

"Electric kettles" are stand-alone, unpressurized, electrically powered kitchen appliances primarily intended for boiling a batch of up to 10 litres of drinking water, potentially also including the possibility to heat water below boiling temperature and/or a warm-keeping function after heating.

328 This definition is a working basis, which may be adjusted in the light of the information provided in  
329 the Task 2 and 3 reports.

330 The 10 litres threshold for the water storage is set in accordance with the EN 60335-2-15.<sup>12</sup> Since  
331 the volume of urns is typically up to 26 litres, only small and medium urns will be included within  
332 the scope of this study. Based on this definition, the following appliances are clearly excluded from  
333 the scope of the study:

---

<sup>11</sup> E.g. tea or coffee

<sup>12</sup> "Household and similar electrical appliances. Safety. Particular requirements for appliances for heating liquids", see in 1.4.1

- 334 • appliances producing directly hot drinks (e.g. coffee machines and tea makers);
- 335 • egg boilers;
- 336 • feeding-bottle heaters;
- 337 • milk heaters;
- 338 • cooking pans;
- 339 • pressure cookers having a rated cooking pressure not exceeding 140 kPa and a rated
- 340 capacity not exceeding 10 litres;
- 341 • slow cookers;
- 342 • steam cookers;
- 343 • wash boilers;
- 344 • yoghurt makers;
- 345 • rice cookers.

### 346 1.2.3. Product categories

347 In this section, product scoping should be discussed with regard to existing classifications. For this  
 348 purpose, the corresponding classifications including PRODCOM classification will be briefly  
 349 discussed.

#### 350 1.2.3.1. PRODCOM categories

351 According to the MEErP methodology, the official European production statistics from the PRODCOM  
 352 database should be used as a preferential data source for refining the scope of preparatory studies.  
 353 PRODCOM consists of a survey of at least annual frequency, with the purpose of collecting and  
 354 disseminating statistics on the production of various industrial (mostly manufactured) goods in the  
 355 EU, mainly in terms of value and quantity. The word PRODCOM stands for the French "Production  
 356 Communautaire". All products that are involved in the survey are listed in the PRODCOM lists and  
 357 are given an eight-digit label. The first four digits refer to the equivalent class within the Statistical  
 358 classification of economic activities in the European Community (NACE), and the subsequent two  
 359 correspond to subcategories within the Statistical classification of products by activity. The  
 360 PRODCOM survey results can be accessed on the Eurostat website in an extensive database  
 361 containing annual production and economic data partially dating back to 1995.

362 A recurring difficulty with PRODCOM data is that it does not provide details (e.g. category or size)  
 363 on products. For kettles, the issue is that the current PRODCOM database does not even label  
 364 electric kettles clearly.

365 Since 2011, water heaters operated electrically are labelled in two categories (see Table 1-1). A  
 366 more detailed analysis on the PRODCOM database is conducted in Task 2.

367 **Table 1-1: PRODCOM statistics for water heaters (source: Eurostat 2018)<sup>13</sup>**

PRODCOM code	Description
27.51.25.30	Electric instantaneous water heaters
27.51.25.60	Electric water heaters and immersion heaters (excluding instantaneous water heaters)

368

369 Until 2010, Prodcom Eurostat Nace Rev 2 code had a slightly more detailed categorization (see  
 370 Table 1-2).

<sup>13</sup> See: [https://ec.europa.eu/eurostat/documents/120432/10398214/Website\\_snapshot\\_2018\\_N2+%281%29.xlsx/3170ebc2-2ec4-b45b-3381-cd37449f308b](https://ec.europa.eu/eurostat/documents/120432/10398214/Website_snapshot_2018_N2+%281%29.xlsx/3170ebc2-2ec4-b45b-3381-cd37449f308b)

371 **Table 1-2: PRODCOM statistics for water heaters (source: Eurostat 2010)<sup>14</sup>**

PRODCOM code	Description
27.51.25.30	Electric instantaneous water heaters
27.51.25.50	Electric water heaters (including storage water heaters) (excluding instantaneous)
27.51.25.70	Electric immersion heaters (including portable immersion heaters for liquids, usually with a handle or a hook)

372

373 According to the Working Plan study, 27.51.25.50 included electric kettles (until 2010). This  
 374 category also covered boiling water heaters. Hot water dispensers are electric instantaneous water  
 375 heaters and accordingly part of 27.51.25.30. However, the NACE categories are not precise enough  
 376 to contribute to the definition of the scope of this study.

377 *1.2.3.2. Categories according to EN- or ISO-standard*

378 The standard IEC 60530;1975 "Methods for measuring the performance electric kettles and jugs  
 379 for household and similar use" provides a brief definition of kettles or jugs: "A portable appliance  
 380 for boiling water with means for pouring, either a lip or spout".

381 *1.2.3.3. Categories according to technologies and features*

382 The U.K. consumers' association *Which?* has tested numerous electric kettles and provided an  
 383 extensive overview of the categories and features of electric kettles on the market.<sup>15</sup> Based on this  
 384 information, a categorisation by technologies and features of the product groups is proposed by the  
 385 project team (see Figure 1-6). The categorisation covers categories, energy-relevant features and  
 386 further features.

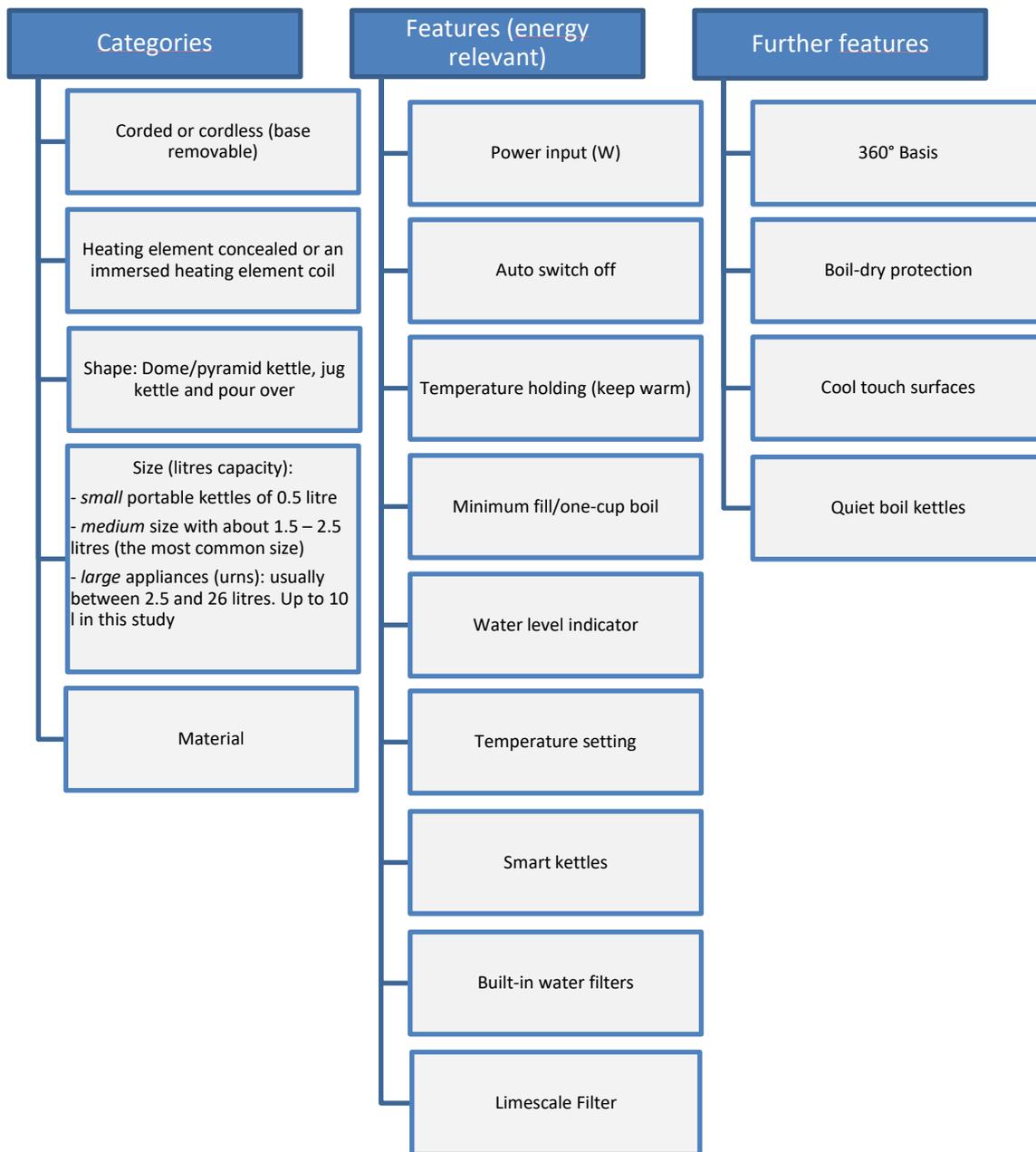
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<sup>14</sup> See: [https://ec.europa.eu/eurostat/documents/120432/10398214/Website\\_snapshot\\_2010\\_N2.xlsx/9a73ab26-e5be-a9c0-e484-a7050e9afd27](https://ec.europa.eu/eurostat/documents/120432/10398214/Website_snapshot_2010_N2.xlsx/9a73ab26-e5be-a9c0-e484-a7050e9afd27)

<sup>15</sup> See: <https://www.which.co.uk/reviews/kettles/article/recommendations/which-best-buy-kettles>

387  
388

**Figure 1-6: Overview of the different types of electric kettles (own representation partly based on Which?<sup>16</sup>)**



389 Short description of the main features:<sup>17</sup>

- 390
- auto switch-off: the kettle automatically switches off as soon as the water is heated and starts to boil;
- 391
- boil-dry protection: if there is not enough water in the kettle, it is automatically switched off;
- 392
- temperature setting: the temperature to which the water is to be heated can be set individually;
- 393
- keep-warm: keep the water at a pre-set temperature;
- 394
- 395
- 396

<sup>16</sup> <https://www.which.co.uk/reviews/kettles/article/how-to-buy-the-best-electric-kettle>

<sup>17</sup> Most of the descriptions are based on <https://www.which.co.uk/reviews/kettles/article/kettle-features-explained>

- 397 • smart Kettle: the kettle is connected to the smart home functions. It has various automatic  
398 features that can be remotely controlled;
- 399 • built-in water filter: no external water filter is required, as a filter is already installed in the  
400 upper part of the kettle and filters the water when pouring;
- 401 • limescale filter (or anti scale spout): mesh filter (typically located in the spout) that is  
402 especially important for hard water treatments;
- 403 • cool touch surface: the outside of the kettle remains cold due to the insulation, even when  
404 the water is boiling;
- 405 • quiet boil kettles: kettles are silently boiling the water;
- 406 • 360° base: the kettle can be placed on the base regardless its orientation.

### 407 **1.3. Functional unit and performance parameters**

#### 408 *1.3.1. Functional unit (FU)*

409 The main function of an electric kettle is to heat water either to boiling or pre-set temperature. The  
410 functional unit is the amount of boiled water. So far, no standard covers the FU for electric kettles.

411 The net consumption of boiled water may vary substantially across European countries since the  
412 boiled water consumption is linked to drinking and cooking habits. However, based on the  
413 publications reviewed in Task 3, it is assumed that the Functional Unit corresponds to 800 litres of  
414 boiling water per year.

#### 415 *1.3.2. Primary Performance parameters*

416 The following primary performance parameters have been identified for kettles:

- 417 • volume (litre) of the water container of the kettle (IEC 60530:1975)
- 418 • power input (W)

#### 419 *1.3.3. Secondary Performance parameters*

420 Apart from the primary performance parameters mentioned in 1.3.2, secondary performance  
421 factors include:

- 422 • time to boil the water (s)
- 423 • time to automatic switch off (s), when boiling water
- 424 • noise (dB) even if this is generally not measured
- 425 • minimum amount of water to be heated (litre)
- 426 • pre-set temperature below boiling temperature (°C)
- 427 • shut-off temperature (°C), when boiling water
- 428 • temperature for keep warm (°C)

429

### 430 **1.4. Test standards**

431 The general objective of this task is to describe test standards related to the product categories  
432 described within the scope of this study. Standards are documents drawn up by consensus and  
433 approved by a recognised standardisation body. A test standard describes a method of testing in  
434 which no pre-given result is required when performing the test.

#### 435 *1.4.1. European Standards*

436 The Comité Européen de Normalisation (CEN) states on their website that "A European Standard  
437 (EN) is a standard that has been adopted by one of the three recognised European Standardisation  
438 Organisations (ESOs): CEN, CENELEC or ETSI. It is produced by all interested parties through a  
439 transparent, open and consensus based process". These European Standards are seen as a vital  
440 element to the Single European market, as they serve as catalysts for greater social interaction

441 with technology as well as facilitating market exchange across industries. Regarding electric  
 442 kettles, two technical bodies are relevant:

- 443 • CLC/TC 59X: Performance of household and similar electrical appliances
- 444 • CLC/TC 61: Safety of household and similar electrical appliances

445 The European standards available for electric kettles are given in Table 1-3. They were retrieved  
 446 from the CEN website. So far, none of the EN standards addresses energy (efficiency) issues, only  
 447 EN 50564 focuses on low power energy consumptions.<sup>18</sup>

448 **Table 1-3: Main EN standards relevant for electric kettles**

Reference	Title	Linked to regulation	Short title of the regulation
<b>EN 50564<sup>19</sup></b>	Electrical and electronic household and office equipment - Measurement of low power consumption	1275/2008/EC	Ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
<b>EN 55014-1<sup>20</sup></b>	Electromagnetic compatibility – Requirements for household appliances, electric tools, and similar apparatus: Emission	2014/30/EC	EMC Directive
<b>EN 55014-2<sup>21</sup></b>	Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus: Immunity	2014/30/EC	EMC Directive
<b>EN 62233<sup>22</sup></b>	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	2014/35/EC	LVD Directive

449  
 450 **1.4.2. International Standards**

451 For electrical appliances, the standards elaborated and published by the International  
 452 Electrotechnical Commission (IEC)<sup>23</sup> are relevant. The Technical Committee TC 59<sup>24</sup> "Performance  
 453 of household and similar electrical appliances" includes SC 59L, which is responsible for the  
 454 standardisation of performance measurement of small household appliances and similar electrical  
 455 appliances except surface cleaning appliances, it includes kettles.

456 Table 1-4 presents the most relevant IEC standards.

<sup>18</sup> Note that EN standards which are identical to ISO standards are not included in the analysis of this section but covered by the ISO section (see 1.4.2).

<sup>19</sup> EN 50564:2011-12: IEC 62301:2011, modified

<sup>20</sup> EN 55014-1:2017: CISPR 14-1:2016 + COR1:2016

<sup>21</sup> EN 55014-2:2015: CISPR 14-2:2015

<sup>22</sup> EN 62233:2008: IEC 62233:2005, modified

<sup>23</sup> <https://www.iec.ch/>

<sup>24</sup> [https://www.iec.ch/dyn/www/f?p=103:7:0::: FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1275,25](https://www.iec.ch/dyn/www/f?p=103:7:0::: FSP_ORG_ID,FSP_LANG_ID:1275,25)

457 **Table 1-4: Main IEC standards relevant for electric kettles**

Reference	Title	Linked to regulation	Short title of the regulation
<b>IEC 60335-1</b>	IEC 60335-1 Household and similar electrical appliances - Safety: General requirements	2014/35/EC	Low Voltage Directive
<b>IEC 60335-2-15</b>	Specification for safety of household and similar electrical appliances. Particular requirements for appliances for heating liquids	2014/35/EC	Low Voltage Directive
<b>IEC 61000-3-2</b>	Electromagnetic compatibility (EMC). Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)	2014/30/EC	EMC Directive
<b>IEC 61000-3-3</b>	Electromagnetic compatibility (EMC). Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection	2014/30/EC	EMC Directive
<b>IEC 60530:1975 IEC 60530:1975/AMD1:1992 IEC 60530:1975/AMD2:2004</b>	Methods for measuring the performance of electric kettles and jugs for household and similar use		
<b>IEC 60704-3:2019</b>	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 3: Procedure for determining and verifying declared noise emission values		

458  
459

460 So far, most of the IEC standards deal with generic or safety issues. Only IEC 60530:1975 focuses  
461 on the performance of electric kettles:

- 462
- 463 • scope: Applies to electric kettles and jugs for household and similar use with a capacity up to 2.5 litres.
  - 464 • purpose: The purpose of this standard is to state and to define the principal performance  
465 characteristics of electric kettles, which are of interest to the user and to describe the  
466 standard methods for measuring these characteristics.
  - 467 • characteristics measured:
    - 468 - overall dimensions
    - 469 - mass
    - 470 - length of flexible cord
    - 471 - water capacity
    - 472 - time to boil 1 litre of water
    - 473 - time to boil water capacity
    - 474 - minimum quantity of water that can be boiled

475 - temperatures of supporting surface

476 The time to boil 1 litre of water is defined as the time to heat up 1 litre of cold water (15 °C) by  
477 80°C, reaching a temperature of 95°C. Even if IEC 60530:1975 does not include the measurement  
478 of the electricity consumption, it describes clearly when boiling 1 litre of water is completed and  
479 could therefore be used for a possible ecodesign and/or energy efficiency regulation. The standard  
480 could be also easily upgraded to measure the electricity consumption required for boiling 1 litre of  
481 water and accordingly to rate the energy efficiency of an electric kettle.

#### 482 1.4.3. *Environmental Product Declaration*

483 Electric kettles are not covered by Product Category Rules (PCRs), accordingly, no Environmental  
484 Product Declaration (EPD) has been elaborated.

#### 485 1.4.4. *Test standards in individual Member States*

486 Non-harmonised standards of EU Member States applicable to electric kettles are listed in this  
487 section.

##### 488 RAL-UZ 133 – Water kettles (Germany)

489 This standard is elaborated by RAL GmbH and is used to check if a water kettle fulfils the  
490 requirements of the voluntary Blue Angel eco-label (see Figure 1-8).<sup>25</sup> The scope of this standard is  
491 the electric water kettles for household use.

492 According to the Power Consumption Test Protocol:

- 493 • 1 litre of water is poured in the kettle (at an atmospheric pressure of 1 bar)
- 494 • Temperature difference compared to the boiling temperature of 100°C (at an atmospheric  
495 pressure of 1 bar) is measured (TM)
- 496 • power consumption until automatic switch-off of the kettle (water must boil before switch  
497 off) is measured (WM)
- 498 • finally, the power consumption is calculated as follows:<sup>26</sup>

499  
500 
$$W_{20} = W_M * 80 / T_M$$

501 The standard requires a Maximum Power Consumption of  $W_{20} = 0.115$  kWh/litre of water.

502 The test standard is rather simple and lacks the specifications about:

- 503 • the room temperature, where the test is carried out
- 504 • how to deal with small water kettles (water reservoir <1 litre) or with large kettles

#### 505 1.4.5. *Other test standards*

##### 506 1.4.5.1. *Stiftung Warentest (Germany)*

507 Stiftung Warentest<sup>27</sup> (German consumer organisation ) assesses the performance of kettles. For  
508 this purpose, it measures the power consumption for heating up ¼, ½ and 1 litre of water until  
509 shutoff as well as the power consumption in standby.

---

<sup>25</sup> See basic award criteria (version 3 from September 2013) under: <https://www.blauer-engel.de/en/products/electric-devices/water-boilers-electric-kettles>

<sup>26</sup> In order to make it corresponding to temperature difference of 80°C

<sup>27</sup> <https://www.test.de/>

510 **1.4.5.2. Topten (Switzerland)**

511 Topten Switzerland has developed following Power Consumption Test Protocol for electric kettles:<sup>28</sup>

- 512
- measure the consumption to heat 1 litre of water from 15° to 100°C
  - 513 • measure the power to keep the water warm
  - 514 • measure the standby by power

515 Finally, the power consumption is calculated as follows:

516 
$$E_{\text{kettle}} = E_{\text{boil}} + E_{\text{keep warm}} + E_{\text{stand-by}}$$

517 With:

518 
$$E_{\text{boil}} = 365 * E_{\text{consumption to heat 1 litre}}$$

519 if T-setting feature is available: -10%

520 
$$E_{\text{keep warm}} = P_{\text{keep warm}} \times 0.5 \times (\text{max time keep-warm}) \times 365$$

521 if no measurement possible: 15 W x 1h x 365

522 
$$E_{\text{stand-by}} = P_{\text{stand-by}} \times 8760 \text{ h}$$

523 Kettles < 45 kWh/a fulfill the Topten criteria.

524

525 **1.5. Existing legislation**

526 According to the MEErP methodology, EU legislations, Member State legislations and third country  
527 legislations relevant to the product group have been screened and analysed.

528 **1.5.1. European legislation**

529 **1.5.1.1. Overview**

530 At the EU level, the main regulations relevant for electric kettles are listed in Table 1-5 and only  
531 one has a direct impact on energy consumption.

---

<sup>28</sup> <https://storage.topten.ch/source/files/Technische-Kriterien-Wasserkocher-2017.pdf>

532 **Table 1-5: Overview of the main relevant regulations on EU level**

Scope	Reference	Title (short)	Aim
<b>Energy</b>	2009/125/EC With 1275/2008 (and amendments)	Ecodesign Directive With: ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment	max 0.5 W in off mode max 0.5 W in standby mode max 1.0 W when providing only information networked equipment <sup>29</sup> : 2.0 W
<b>Quality</b>	93/68/EEC	CE Marking Directive	Conformity Marking and harmonisation of the market
<b>Safety</b>	2014/35/EC	Low Voltage Directive	Harmonisation of the laws related to safety issues of electrical equipment designed for use within certain voltage limits
<b>Safety</b>	2014/30/EC	Electromagnetic compatibility (EMC) Directive	Compatibility and safety issues
<b>Safety</b>	2011/65/EU	RoHS Directive	Restriction of the use of certain hazardous substances in electrical and electronic equipment
<b>Safety</b>	1935/2004/EC	Materials and articles intended to come into contact with food	
<b>Environment</b>	2012/19/EU	WEEE	Waste electrical and electronic equipment
<b>Environment</b>	2008/98/EC	Waste	Waste
<b>Environment</b>	2018/2005/EU	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

533

534 Based on this overview, there is currently no European regulation specific to electric kettles. Even if  
535 there is no energy label for kettles in the EU, some sellers show confusing information for  
536 consumers (e.g. online website, Figure 1-7).

537 **Figure 1-7: Information suggesting an energy class for electric kettles on online**  
538 **shop (based on Amazon)**



539

540 **1.5.1.2. Details of the directive and regulations**

541 This section provides details on the Directives and regulations listed in 1.5.1.1.

- 542 • Standby and off mode power consumption Regulation 1275/2008<sup>30</sup>

543 *Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive*  
544 *2005/32/EC of the European Parliament and of the Council with regard to ecodesign*  
545 *requirements for standby and off mode electric power consumption of electrical and*  
546 *electronic household and office equipment (Text with EEA relevance)*

<sup>29</sup> Equipment other than high network availability network equipment

<sup>30</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008R1275&from=EN>

547 The regulation establishes ecodesign requirements related to standby and off mode electric  
548 power consumption. This Regulation applies to electrical and electronic household and  
549 office equipment, including kettles.<sup>31</sup>

550 Annex I provides a list of energy-using products covered by this Regulation. "Other  
551 appliances for cooking and other processing of food, cleaning, and maintenance of clothes"  
552 are listed among the household appliances, and water is considered to be food.

553 Since 2013, the requirements both in standby mode and in off mode are 0.5 W.<sup>32</sup>  
554 (according to Annex II).

555 • Low Voltage Directive 2014/35/EC<sup>33</sup>

556 *Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014*  
557 *on the harmonisation of the laws of the Member States relating to the making available on*  
558 *the market of electrical equipment designed for use within certain voltage limits Text with*  
559 *EEA relevance*

560 Directive 2014/35/EU regarding Low Voltage electrical equipment (LVD) was issued in  
561 February 2014 and repeals the existing directive 2006/95/EC with effect from April 2016.  
562 The purpose of this Directive is to ensure that electrical equipment on the market fulfils the  
563 requirements providing for a high level of protection of health and safety of persons, and of  
564 domestic animals and property, while guaranteeing the functioning of the internal market.  
565 The Directive applies to electrical equipment designed for use with a voltage rating  
566 between 50 and 1000 V for alternating current and between 75 and 1500 V for direct  
567 current. These voltage ratings refer to the voltage of the electrical input or output, not to  
568 voltages that may appear inside the equipment. For electrical equipment within its scope,  
569 the directive covers all health and safety risks, thus ensuring that electrical equipment will  
570 be used safely and in applications for which it was made. For most electrical equipment  
571 (including kettles), the health aspects of emissions of electromagnetic fields are also under  
572 the domain of the Low Voltage Directive.

573 • Waste Electrical and Electronic Equipment Directive (WEEE) 2012/19/EC<sup>34</sup>

574 *Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on*  
575 *waste electrical and electronic equipment (WEEE) Text with EEA relevance*

576 The 2012/19EC Directive aims to avoid waste from electrical and electronic equipment  
577 (WEEE) and to reduce such waste by reuse, recycling and other forms of recovery. It lays  
578 down minimum standards for the treatment of WEEE in the EU, so as to preserve, protect  
579 and improve the quality of the environment and to use natural resources wise and  
580 cautiously.

581 The categories of electrical and electronic equipment (EEE) covered by this Directive are:

- 582 - large household appliances
- 583 - small household appliances
- 584 - IT and telecommunication equipment

---

<sup>31</sup> See Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products and its Implementing Regulations: "Annex II applies to any product falling under the Regulation, including kettles ("Other appliances for cooking and other processing of food", water is considered to be food.)", (EC 2019)

<sup>32</sup> See Annex II of the Regulation 1275/2008

<sup>33</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0035&from=DE>

<sup>34</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&from=EN>

- 585 - consumer equipment and photovoltaic panels
- 586 - lighting equipment
- 587 - electrical and electronic tools (with the exception of large-scale stationary industrial
- 588 tools)
- 589 - toys, leisure and sports equipment
- 590 - medical devices (with the exception of all implanted and infected products)
- 591 - monitoring and control instruments
- 592 - automatic dispensers.

593 In the Directive, EEE is defined as:

- 594 - equipment which is dependent on electric currents or electromagnetic field in order
- 595 to work properly
- 596 - equipment for the generation, transfer and measurement of such currents and
- 597 fields
- 598 - equipment designed for use with a voltage rating not exceeding 1000 V for
- 599 alternating current and 1500 V for direct current.

600 Equipment types excluded from the Directive are:

- 601 - equipment which is specially designed and installed as part of another type of
- 602 equipment that is excluded from or does not fall within the scope of this Directive,
- 603 which can fulfil its function only if it is part of the equipment
- 604 - large-scale fixed installations, except any equipment which is not specifically
- 605 designed and installed as part of those installations
- 606 - means of transport for persons or goods, excluding electric two-wheel vehicles
- 607 which are not type-approved.

608 Relevance for electric kettles: According to Annex IV of the WEEE directive, kettles are

609 listed as "Small equipment" (category 5). From 15 August 2018<sup>35</sup>, the minimum target

610 applicable for kettles are:

- 611 - 75 % shall be recovered, and
- 612 - 55 % shall be prepared for re-use and recycled;

613 • RoHS Directive 2011/65/EC<sup>36</sup>

614 *Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the*

615 *restriction of the use of certain hazardous substances in electrical and electronic equipment*

616 *Text with EEA relevance*

617 Directive 2011/65/EU contributes to the protection of human health and the environment,

618 including the environmentally sound recovery and disposal of waste EEE" by regulating

619 their use and placing on the market. The aim is to eliminate hazardous components from

620 electronic waste. It includes the replacing of leaded solderings and promotion of the

621 introduction of equivalent replacement products where possible.

---

<sup>35</sup> See Annex V

<sup>36</sup> See <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:174:0088:0110:en:PDF>

622 Member states should ensure that new products do not contain any of the following  
623 substances:

- 624 - mercury
- 625 - cadmium
- 626 - hexavalent chromium
- 627 - polybrominated biphenyls (PBB)
- 628 - polybrominated diphenyl ethers (PBDE).
- 629 - The categories of EEE covered by this Directive are (Annex 1):
- 630 - large household appliances
- 631 - small household appliances
- 632 - IT and telecommunications equipment
- 633 - consumer equipment
- 634 - lighting equipment
- 635 - electrical and electronic tools
- 636 - toys, leisure and sports equipment
- 637 - medical devices
- 638 - monitoring and control instruments including industrial monitoring and control  
639 instruments
- 640 - automatic dispensers
- 641 - other EEE not covered by any of the categories above.

642 Relevance for electric kettles: at the time of the Preparatory Study, the use of 6  
643 substances<sup>37</sup> was restricted by the RoHS directive

- 644
- 645
- 646 • Waste Framework Directive 2008/98/EC<sup>38</sup>

647 *Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008*  
648 *on waste and repealing certain Directives (Text with EEA relevance)*

649 This Directive of the European Parliament and of the Council of 19 November 2008 sets the  
650 basic waste management definitions for the EU. Furthermore, it provides a general  
651 framework of waste management requirements.

652 Relevance for electric kettles: at the end of life, they should be treated and recycled  
653 according to the waste legislation.

654 Since 15 August 2018, kettles (explicitly included in the non-exhaustive list of EEE covered  
655 by the directive) are subject to the requirements of the Directive 2008/98/EC.

656

---

<sup>37</sup> The Restricted substances are: Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) (see Directive 2011/65/EU ANNEX II)

<sup>38</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=DE>

657 • REACH 1907/2006<sup>39</sup>

658 *Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18*  
659 *December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of*  
660 *Chemicals (REACH), establishing a European Chemicals Agency, amending Directive*  
661 *1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation*  
662 *(EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives*  
663 *91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC*

664 REACH is a regulation of the European Union, adopted to improve the protection of human  
665 health and the environment from the risks that can be posed by chemicals, while  
666 enhancing the competitiveness of the EU chemicals industry. It also promotes alternative  
667 methods for the hazard assessment of substances in order to reduce the number of tests  
668 on animals. In principle, REACH applies to all chemical substances including those used in  
669 electrical appliances. To comply with the regulation, companies must identify and manage  
670 the risks linked to the substances they manufacture and market in the EU.

671 • Electromagnetic compatibility (EMC) Directive 2014/30/EU<sup>40</sup>

673 *Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014*  
674 *on the harmonisation of the laws of the Member States relating to electromagnetic*  
675 *compatibility (recast) Text with EEA relevance*

676 The EMC directive limits electromagnetic emissions from equipment in order to ensure that,  
677 when used as intended, such equipment does not disturb radio and telecommunication, as  
678 well as other equipment. The directive also governs the immunity of such equipment to  
679 interference and seeks to ensure that this equipment is not disturbed by radio emissions,  
680 when used as intended. The main objectives of the directives are to regulate the  
681 compatibility of equipment regarding EMC:

- 682 - equipment (apparatus and fixed installations) needs to comply with EMC  
683 requirements when it is placed on the market and/or taken into service,
- 684 - the application of good engineering practice is required for fixed installations, with  
685 the possibility that competent authorities of EU countries may impose measures in  
686 instances of non-compliance.

687 • Materials and articles intended to come into contact with food – Directive 1935/2004/EC<sup>41</sup>

689 *Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October*  
690 *2004 on materials and articles intended to come into contact with food and repealing*  
691 *Directives 80/590/EEC and 89/109/EEC*

692 Commission Regulation (EC) No 1935/2004 provides a harmonised legal EU framework. It  
693 sets out the general principles of safety and inertness for all Food Contact Materials  
694 (FCMs). The principles set out in Regulation (EC) No 1935/2004 require that materials do  
695 not:

- 696 - release their constituents into food at levels harmful to human health
- 697 - change food composition, taste and odour in an unacceptable way
- 698 - moreover, the framework provides:

---

<sup>39</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1907-20140410&from=EN>

<sup>40</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0030&from=DE>

<sup>41</sup> See <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004R1935&from=en>

- 699 - for special rules on active and intelligent materials (they are by their design not  
700 inert)
- 701 - powers to enact additional EU measures for specific materials (e.g. for plastics)
- 702 - the procedure to perform safety assessments of substances used to manufacture  
703 FCMs involving the European Food Safety Authority
- 704 - rules on labelling including an indication for use (e.g. as a coffee machine, a wine  
705 bottle, or a soup spoon) or by reproducing the appropriate symbol. For more  
706 information, please refer to the following document on Symbols for labelling food  
707 contact materials.
- 708 - for compliance documentation and traceability

709 Complementary, there are further legislations on specific substances.<sup>42</sup>

#### 710 1.5.2. Member State legislation

711 In this section, a scoping of national laws and ordinances of Member States has been performed.

##### 712 1.5.2.1. Germany: Blue Angel eco-label RAL-UZ 133

713 The Blue Angel eco-label (see Figure 1-8) for domestic electric kettles RAL-UZ 133 is a voluntary  
714 endorsement label.<sup>43</sup>

715 **Figure 1-8: Blue Angel eco-label (source: Umweltbundesamt)**



716

717 To be awarded, manufacturers must apply to the program with an electric kettle fulfilling specific  
718 environmental properties (see Table 1-6) covering among others: energy efficiency, water level  
719 and minimum warranty time.

<sup>42</sup> E.g. Commission Regulation (EU) 2018/213 - on the use of bisphenol A

<sup>43</sup> See basic award criteria (version 3 from September 2013) under: <https://www.blauer-engel.de/en/products/electric-devices/water-boilers-electric-kettles>

720  
721

**Table 1-6: Main requirements of Blue Angel eco-label RAL-UZ 133 (source: based on Umweltbundesamt)<sup>44</sup>**

Characteristics	Requirements
<b>Scope</b>	Domestic cordless kettles
<b>Minimum energy efficiency</b>	20°C to auto-switch off <0.115kWh/litre 15°C to auto-switch off <0.122kWh/litre
<b>Water level indicator</b>	Must have marks that start at least at 0.5 litres with 0.25 litre increments and be visible from at least 0.3 litre
<b>Manufacturer’s warranty</b>	Two years
<b>Information</b>	Information for users on energy efficient use such as not boiling more water than needed and providing descaling instructions
<b>Material Requirements<sup>45</sup></b>	<p>Several requirements regarding:</p> <p>Plastics used in water tank and base plate shall meet criteria set by different regulations (EC 1272/2008 and REACH). Halogenated polymers as well as halogenated organic compounds shall not be permitted. Flame retardants shall only be added if they are accordingly classified by the regulation EC 1272/2008. There are some exceptions that are excluded from the rule:</p> <ul style="list-style-type: none"> <li>- technically unavoidable impurities</li> <li>- fluor organic additives to improve the physical properties if their weight is less than 0.5 percent</li> <li>- plastic parts less than 25 grams in mass</li> </ul> <p>Plastic parts that may be touched shall contain less than 10 mg/kg of polycyclic aromatic hydrocarbons (PAHs) and less than 1 mg/kg benzo[a]pyrene.</p> <p>Components in contact with drinking Water: In accordance with the provisions of the German Food and Feed Code and with the relevant BfR recommendations for materials coming into contact with food. Bisphenol A is not to be released by plastic components or sealling material.</p>
<b>Safety Requirements</b>	The electric kettle shall switch off within no more than 15 seconds if switched on without water

722

723 According to the Blue Angel website, only one kettle has been awarded the label.<sup>46</sup>

724 **1.5.2.2. U.K.**

725 The UK Energy Saving Trust covers electric kettles. The main requirements of “ESR003 Product  
726 Performance Requirements” were:

727 Products should demonstrate a 20% reduction in energy consumption compared to the  
728 consumption of an average kettle. Unfortunately, no detail on how to measure it has been  
729 published;  
730 Products must consume ≤1W in passive standby (0.5W is now required by the EU standby  
731 Regulation);

<sup>44</sup> See the full version under: <https://produktinfo.blauer-engel.de/uploads/criteriafile/en/DE-UZ%20133-201309-en%20Criteria-2020-01-07.pdf>

<sup>45</sup> Summarized

<sup>46</sup> <https://www.blauer-engel.de/en/products/electric-devices/water-boilers-electric-kettles/ritter-kettle-fontana-5>

732 Applicants should demonstrate due diligence in considering design and usability of the product; and  
733 Products must conform to the relevant British Standards applicable to this class of product,  
734 including:  
735 - BS EN 60335-1:2002 "Household and similar appliances. Safety. General  
736 requirements"  
737 - BS EN 60335-2-15:2002 "Specification for safety of household and similar electrical  
738 appliances. Particular requirements for appliances for heating liquids."

### 739 1.5.3. *Third country legislation*

740 For this section, the policy database of CLASP<sup>47</sup> provides valuable information to identify relevant  
741 legislations.

#### 742 1.5.3.1. *China: GB/T 22089-2008*

743 The **voluntary** standard GB/T 22089-2008 "Performance requirements and measuring methods for  
744 electric kettles" specifies performance requirements for household and electric kettle and test  
745 methods for similar purposes (Table 1-7). This standard applies to the rated voltage not exceeding  
746 250V and the rated capacity of below 2.5 litres. The standard is based on IEC 60530.

747 The energy efficiency is defined as:

$$748 \quad \eta = \frac{C * M * (T_2 - T_1)}{E} * 100\%$$

749

750 Whereby:

- 751 •  $\eta$  is the thermal efficiency in %;
- 752 •  $C$  is the specific heat capacity of water, 4,187 J/(K.kg);
- 753 •  $M$  is the mass of water in kg;
- 754 •  $T_1$  is the initial water temperature, expressed in °C;
- 755 •  $T_2$  is the final water temperature, expressed in °C;
- 756 •  $E$  is the energy consumption, expressed in J.
- 757

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<sup>47</sup> See <https://clasp.ngo/policies>

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**Table 1-7: Main requirements of GB/T 22089-2008 (source: Standardization Administration of the People’s Republic of China)**

Characteristics	Requirements
<b>Scope</b>	Electric kettles with a rated voltage not greater than 250 V AC and a rated capacity not greater than 2.5 L
<b>Minimum energy efficiency</b>	Thermal efficiency > 80%  Measured with the rated capacity of water. The measure is stopped when the water temperature reaches 80 °C.  Test condition: room temperature 20 +/- 5 °C, implicitly the same for the water temperature <sup>48</sup> .
<b>Material Requirements</b>	No
<b>Performance Requirements</b>	The water temperature shall be not lower than 98 °C.
<b>Service Life Requirements</b>	The service life shall be not less than 3,000 working cycles (carried out with water rated volume).

760

761 The MEPS are complemented by an energy label, which differentiates three classes (Grade A to C,  
762 see Figure 1-9). Interestingly, the grades are not only based on thermal efficiency criteria but also  
763 on service lifetime (see Table 1-8).

764 **Figure 1-9: China Energy Label<sup>49</sup>**



765

766

767 **Table 1-8: Main Performance Grading of Electric Kettles (source: GB/T 22089-2008)**

Test	Unit	Grade A	Grade B	Grade C
Thermal efficiency	%	>= 93	>= 85	>= 80
Service Life (cycle)	Number of times	>= 8,000	>= 5,000	>= 3,000

768

769 **1.5.3.2. Korea: Eco-Label Standard EL408:2013**

770 The Korean Eco-Label (see Figure 1-10) is a state-certified eco-label, which provides environmental  
771 information to consumers. Eco-Labeling seeks to induce firms in developing and producing eco-

<sup>48</sup> The thermal efficiency test requires to make the initial water temperature as consistent with the ambient temperature as possible

<sup>49</sup> As example (no kettle presented here)

772 friendly products. It is a **voluntary** scheme developed and implemented by the Ministry of  
 773 Environment. The Korean Eco-Label Standard EL408:2013 is dedicated to electric kettles and  
 774 coffee makers.<sup>50</sup> The main requirements for electric kettles are provided in Table 1-9.

775 **Figure 1-10: Korean Eco-Label logo**



776  
777

778 **Table 1-9: Main requirements of EL408:2013 (source: Ministry of Environment of Korea)**

Characteristics	Requirements
<b>Scope</b>	Electric kettle
<b>Minimum energy efficiency</b>	The consumption power when boiling the water shall be 120 Wh or less per 1 L of water. The temperature shall be 99°C or more right after the power is off.  Test condition: room temperature 20 +/- 2 °C, water temperature 15 +/- 0.5°C.
<b>Material Requirements</b>	Several requirements regarding: Materials, accessories and components. Electric kettles may not contain: <ul style="list-style-type: none"> <li>- lead, cadmium, mercury and their compounds</li> <li>- hexavalent chrome Cr<sup>6+</sup></li> <li>- polybrominated biphenyls (PBBs)</li> <li>- polybromodiphenyl ethers (PBDEs)</li> </ul> More than 50% chlorine concentration SCCP
<b>Safety Requirements</b>	The power shall be automatically off when the water boils

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781 **1.5.3.3. Taiwan: Greenmark N126**

782 Similar to the Blue Angel endorsement label in Germany, Taiwan has elaborated the Greenmark  
 783 scheme, which covers electric kettles (see Figure 1-11).<sup>51</sup> The main requirements are summarized  
 784 in Table 1-10.

<sup>50</sup> See <http://el.keiti.re.kr/enservice/enpage.do?mMenu=2&sMenu=1>

<sup>51</sup> See <http://greenliving.epa.gov.tw/GreenLife/uploadfiles/Criteria/126/7ab784a7-239c-4e83-86c5-ca7331a47b72.pdf>

785 **Figure 1-11: Greenmark (source: Environmental Protection Administration)**



786

787

788 **Table 1-10: Main requirements of Greenmark N126 (source: based on Environmental**  
 789 **Protection Administration)**

Characteristics	Requirements
<b>Scope</b>	This standard is applicable to electric kettles, which meet the definition of CNS 15548.
<b>Minimum energy efficiency</b>	The product's water boiling energy consumption shall be less than 0.117 kWh/L, with an initial water temperature of 15 °C. The water temperature at the end of the boiling cycle shall be above 99 °C.
<b>Water level indicator</b>	The product shall have an easy to read and transparent water level indicator.
<b>Disassemblability</b>	The product shall be disassemble.
<b>Information</b>	The product shall have a clearly visible warning light to indicate that it is in use (power on).
<b>Material Requirements</b>	Several requirements regarding materials, accessories and components.  There are regulatory limits for coating material (lead, cadmium, hexavalent chromium and mercury) as well as for plastics ((lead, cadmium, hexavalent chromium, mercury, PBBs, PBDEs, chloroparaffins with 10-13 carbon atoms per molecule, TPT, TBT and phthalate ester plasticizers).
<b>Safety Requirements</b>	The product shall power off automatically within 15 seconds when it is empty.

790

791 While the Blue Angel requires max 0.122 kWh/l for 85 °C temperature increase, Greenmark N126  
 792 requires max 0.117 kWh/l for 84°C and is therefore more stringent in terms of energy efficiency.

793 **1.5.3.4. Thailand: Energy Efficiency Label No.5 for Electric Kettle**

794 As a further Asiatic country covering electric kettles, Thailand has elaborated and implemented a  
 795 **voluntary** comparative label in 2010 (see Figure 1-12).<sup>52</sup>

<sup>52</sup> See [http://labelno5.egat.co.th/new58/wp-content/uploads/2016/form/mn/ele\\_kettle.pdf](http://labelno5.egat.co.th/new58/wp-content/uploads/2016/form/mn/ele_kettle.pdf)

796 **Figure 1-12: Energy label in Thailand**



797

798

799 The energy efficiency is defined as:

800 
$$\eta = \frac{q}{0,24 P \cdot t} * 100$$

801

802 Whereby:

- 803 •  $\eta$  is the energy efficiency in %
- 804 •  $q$  is the volume of water used in the test, ml
- 805 •  $T_1$  is the initial temperature of the water (30 °C)
- 806 •  $T_2$  is the final temperature of the water (90 °C)<sup>53</sup>
- 807 •  $T$  is the time for heating the water from the water temperature of 30 °C to 90 °C in s
- 808 •  $P$  is the power input of the electric kettle from the water temperature of 30 °C to 90 °C in
- 809 W

810 The energy efficiency classes are defined as follows:

Energy efficiency value (percent)		
Number 3	Number 4	Number 5
82.00-85.99	86.00-89.99	≥ 90

811

812

813 **1.5.3.5. Iran- ISIRI 7875**

814 The Islamic Republic of Iran has elaborated and implemented Minimum Energy Performance  
 815 Standards (MEPS) as well as energy labelling<sup>54</sup> requirements for large electric kettles. The standard  
 816 ISIRI 7875 covers the specifications and energy labelling of the electric kettles as well as the  
 817 methods and indicators for measuring the energy consumption. The main characteristics of this  
 818 standard are summarized in Table 1-11.

<sup>53</sup> In case the thermostat switches off at a temperature below 90 °C, short-circuit the thermostat so that the water in the electric kettle reaches the temperature of 90 °C

<sup>54</sup> See <http://www.behsa.ir/index.php/booklibrary/standards/20-isiri-7875/file>

819 **Table 1-11: Characteristics of ISIRI 7875 (source: ISIRI 2005)**

Characteristics	Requirements
<b>Scope</b>	Electric kettles with a rated volume between 4 and 30 L, and a rated voltage of up to 250 V <sub>a.c.</sub>
<b>Definition</b>	Domestic electric kettle: rated volume max 10 L Commercial electric kettle: rated volume between 10 and 30 L
<b>Performance</b>	Time to heat the water from 20°C to 90°C is measured
<b>Energy efficiency</b>	Defined as the energy consumption per hour and per L to maintain the water at 90°C. Test is carried out over 2 hours, water reservoir is refilled with "cold water" every 30 min to compensate the volume of water evaporated.
<b>Safety Requirements</b>	The products shall comply with the safety standards of the electric kettles (INSO 1562-15)

820

821 The scope of the Iranian standard is large kettles (urns and samovar), the energy efficiency metric  
822 is focusing on the energy to maintain the temperature constant and not on the energy to heat up  
823 the water.

824 Table 1-12 presents the energy efficiency classes of the energy label (Figure 1-13).

825 **Table 1-12: Energy efficiency classes of electric kettles (source: ISIRI 2005)**

Energy Efficiency Class	EE in [Wh/L] for domestic kettle	EE in [Wh/L] for commercial kettle
<b>A</b>	$E_e < 108$	$E_e < 83$
<b>B</b>	$108 \leq E_e < 112$	$83 \leq E_e < 84$
<b>C</b>	$112 \leq E_e < 117$	$84 \leq E_e < 86$
<b>D</b>	$117 \leq E_e < 121$	$86 \leq E_e < 87$
<b>E</b>	$121 \leq E_e < 125$	$87 \leq E_e < 88$
<b>F</b>	$125 \leq E_e \leq 130$	$88 \leq E_e \leq 90$

826

827 The energy label for the electric kettles (Figure 1-13) indicates the energy efficiency class (A-F),  
828 boiling time (m), energy consumption (Wh/L), rated power (W) and rated volume (L). Only the  
829 products with the energy efficiency classes A and B are granted the permit to be imported into the  
830 country.

831 **Figure 1-13: Energy label for electric kettles (source: ISIRI 2005)**



832  
833

834 **1.5.4. Summary and conclusion on the review on legislations for electric kettles**

835 A first assessment of the legislation regarding energy efficiency of electric kettles has revealed a  
836 lack of energy regulations in the EU. The majority of existing regulations directed to kettles  
837 predominantly cover safety aspects and no stringent requirements regarding energy efficiency  
838 could be found, except for stand-by requirements.

839 Outside the EU, a handful of countries in the world – which have a tea culture - have implemented  
840 energy efficiency regulations for electric kettles. However, most of these regulations are voluntary  
841 energy labelling schemes.

842 No test standard to measure the energy efficiency or the energy consumption of electric kettles  
843 could be identified. Yet, IEC 60530:1975 could be easily upgraded for this purpose.

844 **1.6. Conclusions for product scoping**

845 The work carried out under Task 1 suggests that the scope of the study could be exclusively limited  
846 to electric kettles with a volume of up to 10 litres. The proposed scope of the study for the Working  
847 Plan included products providing a different energy service than that of electric kettles. Analysis of  
848 Task 2 (market) and Task 3 (users) will be used to assess this preliminary scope. There is a lack of  
849 test standards to assess the energy consumption of kettles. Few voluntary programs (a majority in  
850 Asia) covering electric kettles have been identified. These programs have developed their own  
851 methodology to measure and assess the energy consumption or the energy efficiency of kettles.

852

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