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**amending Commission Delegated Regulation (EU) 2023/2534 on household tumble dryers regarding information on repairability and clarifying some aspects of the measurement and calculation methods, the product information sheet, the technical documentation and the verification procedure**

{C(2025) 3986 final}

## 1. EXECUTIVE SUMMARY

Tumble dryers are a popular appliance in EU households. The market penetration of tumble dryers is increasing and expected to grow from 26% of EU households in 2020 to 35% in 2040. However, the **average lifetime of tumble dryers over the last decade has decreased from 14 to 12 years**, prompting an acceleration of production to compensate the shorter lifetime. This results in an **increase of energy and materials used for production and distribution, as well as higher costs** related to replacements, disposal and recycling. Quantitatively this gives, by 2040, 9,720 TJ (terajoules) additional energy consumption, 1.5 mtCO2e additional greenhouse gas emissions and 114 kilotons extra waste.

Regulation (EU) 2023/2533[1] already includes certain circular economy measures, namely the mandatory availability of spare parts and related information. Already at the time of its adoption it was however considered unlikely that those measures alone would succeed in reverting the negative trend of tumble dryers durability without additional action. The **Regulation therefore requires the Commission to present a repairability score for household tumble dryers no later than 1 January 2025**[2]. A repairability score, displayed in the energy label of the tumble dryer by means of an A-to-E scale, will encourage consumers to buy repairable products and producers to develop appliances that can be repaired in a cost-effective manner. It would also help **protect the single market from fragmentation due to national measures** that might otherwise be adopted to provide consumers with such information, increasing costs for producers and consumers alike.

This document proposes a repairability score for household tumble dryers, based on recent relevant studies on the matter, and **following a similar approach as the one used for the rules adopted on energy labelling for smartphones and tablets**[3], consistent with the terminology used in standard *EN 45554: General methods for the assessment of the ability to repair, reuse and upgrade energy-related products*[4]. The repairability score is determined by scoring, against certain repairability criteria, a number of priority parts, chosen on the basis of their relevance. The final score for the whole product is the weighted average of the partial scores for each repairability criterion. The score for each criterion is, in turn, the weighted average of the partial scores of each priority part against that criterion.

The repairability score will be displayed in the label as a class on an A-to-E repairability scale, immediately allowing the consumer to assess how good or bad a product is in terms of repairability, compared with other models.

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[1] Commission Regulation (EU) 2023/2533 of 17 November 2023 implementing Directive 2009/125/EC of the Euroepean Parliament and of the Council with regard to ecodesign requirements for household tumble dryers, amending Commission Regulation (EU) 2023/826, and repealing Commission Regulation (EU) No 932/2012 (OJ L, 2023/2533, 22.11.2023, ELI: http://data.europa.eu/eli/reg/2023/2533/oj).

[2] Ibid, Art. 7(2).

[3] https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/energy-efficient-products/mobile-phones-cordless-phones-and-tablets_en.

[4] https://www.en-standard.eu/csn-en-45554-general-methods-for-the-assessment-of-the-ability-to-repair-reuse-and-upgrade-energy-related-products/.

The repairability score has been discussed with stakeholders at the Consultation Forum of 11 March 2024. It will be adopted as an amendment to Delegated Regulation (EU) 2023/2534[5].

## 2. INTRODUCTION: POLITICAL, LEGAL AND SOCIAL CONTEXT

### 2.1. Political context

In December 2019, the Commission presented the European Green Deal[6], the centre of its environmental strategy to implement the United Nation's 2030 Agenda and the sustainable development goals[7]. The Green Deal aims at turning Europe into the first climate-neutral continent by 2050, and at protecting health and well-being of citizens from environment-related risks and impacts.

One of the policies included in the Green Deal is the mobilisation of industry for a clean and circular economy. The Circular Economy Action Plan (CEAP)[8] adopted by the Commission in March 2020, contains a set of measures to accelerate the transformational change required by the Green Deal as regards circular economy. One of the actions included in the CEAP is to promote the design of sustainable products, e.g. by improving product durability and repairability and countering premature obsolescence. The CEAP acknowledges that many products break too quickly and cannot be easily reused, repaired or recycled, pointing out that EU initiatives and legislation on circular economy are scattered and that a harmonised approach is needed to ensure that products placed in the EU market meet common criteria on circular economy. To systematically address sustainability criteria in products, the CEAP identifies two lines of action. The first one, general, is to extend the scope of the ecodesign legal framework beyond energy-related products. This has resulted in the adoption and entry into force in 2024 of the Ecodesign for Sustainable Products Regulation (ESPR) to replace the Ecodesign Framework Directive[9]. The second line of action is to modify existing product-specific legislation, on a case-by-case basis, to address product durability and repairability.

Further, the Commission published on 30 March 2022 its Communication on making sustainable products the norm[10]. The Communication refers to the ESPR as the cornerstone of the Commission's approach to more environmentally sustainable and circular products, indicating that the ESPR should not only be a framework for setting requirements on how products should be made, but also on what information should be provided to the consumer on

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5 Commission Delegated Regulation (EU) 2023/2534 of 13 July 2023 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of household tumble dryers and repealing Commission Delegated Regulation (EU) No 392/20012 (OJ L, 2023/2534, 22.11.2023, ELI: http://data.europa.eu/eli/reg_del/2023/2534/oj).

6 The European Green Deal, COM(2019) 640 final.

7 Transforming our world: the 2030 Agenda for Sustainable Development.

8 Circular Economy Action Plan for a more competitive Europe, COM(2020) 98. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0614&from=EN.

9 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 (OJ L 285, 31.10.2009, p.10)

10 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on making sustainable products the norm (COM/2022/140 final).

the environmental sustainability of the products. A repairability score is identified in the Communication as one of the possible means to provide that information.

In March 2023, the Commission adopted a proposal for a Directive on the repair of goods (the Right-to-repair Directive)[11], setting a set of common obligations to producers within and beyond the legal guarantee of the product.

There is consensus among stakeholders on the need to urgently develop an EU-wide repairability score for tumble dryers to prevent fragmentation of the single market by national initiatives with a similar aim. APPLiA, the association that represents the home appliance industry in in Europe, has expressed support to the implementation of a repairability score in EU legislation in order to address concerns about similar initiatives at national level that, by setting diverging rules, will risk increasing compliance costs for manufacturers and suppliers, and subsequently prices for consumers. Member States and NGOs have likewise insisted the Commission present a repairability score to inform the consumer at the sales point, within the shortest possible delay. Delegated Regulation (EU) 2023/2534 reflects such urgency, by requiring the Commission to present a proposal to the Consultation Forum no later than 1 January 2025, this is 5 years earlier than the deadline set out in the Regulation for the overall legislative review.

### 2.2. Legal basis and legal context

Article 16(1) of Regulation (EU) 2017/1369[12] empowers the Commission to adopt delegated acts by establishing detailed requirements relating to labels for specific product groups. Article 16(3) sets out that Delegated acts shall specify, where appropriate, the display on the label of supplementary information concerning the product, in a way that this supplementary information does not have a negative impact on the clear intelligibility and effectiveness of the label as a whole towards consumers and emphasising the energy efficiency of the product. It also requires the Commission to present proposals to rescale existing energy labels in accordance with the new A-G scale in accordance with the framework regulation.

A general review was also foreseen in Article 7 of Delegated Regulation (EU) No 392/2012[13] which required the Commission to review the Regulation by June 2017. Accordingly, a new Regulation (EU) 2023/2534 was adopted on energy labelling for tumble dryers and repealing Delegated Regulation (EU) No 392/2012.

As indicated in point 2.1, Article 7(2) of Regulation (EU) 2023/2534 sets out the obligation for the Commission to present the Consultation Forum a repairability score for household tumble dryers and, if appropriate, a draft legal proposal no later than 1 January 2025. The repairability score for tumble dryers should therefore be adopted as an amendment to Regulation 2023/2534.

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[11] https://commission.europa.eu/law/law-topic/consumer-protection-law/consumer-contract-law/rules-promoting-repair-goods_en

[12] Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

[13] Commission Delegated Regulation (EU) No 392/2012 of 1 March 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household tumble driers (OJ L 123, 9.5.2012, p. 1).

### 2.3. Societal context

Designing a product according to circular economy criteria is a matter of growing interest in society. A Eurobarometer published in October 2022 showed that most Europeans are in favour of policies encouraging industry to adopt more circular and sustainable practices. Several EU environmental and consumer organisations have put circular economy in the centre of their priorities, and industry supports such efforts particularly when pursued at EU level.

The public consultation published by the European Commission on the proposal for the Right-to-repair Directive, shows that consumers are in general aware of the shorter lifetime of products. The difficulties to self-repair and the high repair costs were among the main causes explaining that shorter lifetime. Most of the respondents also considered that repair should be prioritised in public policies whenever it is cheaper or at the same cost as replacement.

The review study on household tumble dryers[14] from May 2019 investigated the likeliness for self-repair, finding that approximately 35% of the consumers would for sure repair their tumble dryers, and that an additional 40% would probably repair.

In response to the growing interest in repairing products, several studies on repairability have been conducted or are undergoing. In 2019, the Joint Research Centre published the report Analysis and development of a scoring system for repair and upgrade of products[15] (henceforth "the JRC repairability study"), based on three elements: the selection of critical components, called priority parts, a set of key parameters against which the performance of each priority part would be assessed, and a scoring framework setting out the scores corresponding to each parameter. In 2022, the German Environmental Agency published a study[16] (henceforth "the German repairability study") on a repairability score adapted to two products groups: printers and tumble dryers. In this study, relevant spare parts were selected for each product group, and the repairability score was calculated for a significant number of different models of printers and tumble dryers placed on the market.

## 3. SUBSIDIARITY. NECESSITY OF ACTING ON REPAIRABILITY AT EU LEVEL

As indicated in point 2.1, in parallel to the growing interest in repairability, some Member States are developing their own repairability scores for specific products. In January 2021, France introduced a repairability index for five product groups. A framework for similar action is underway in Belgium. Germany and Spain have urged the EU to act on this matter as an alternative to national action that might otherwise be pursued.

At the Ecodesign and Energy Labelling Consultation Forum on 6 October 2023, APPLiA expressed strong concern about the risk for internal market fragmentation from emerging

[14] Review study on household tumble dryers – Final report (Viegand Maagoe A/S).

[15] European Commission, Joint Research Centre, Sanfelix, J., Cordella, M., Alfieri, F. Analysis and development of a scoring system for repair and upgrade of products – Final report, Publications Office, 2019, https://data.europa.eu/doi/10.2760/725068.

[16] Methods and standards for assessing the repairability of electrical and electronic devices – Strengthening material efficiency under the Ecodesign Directive (Michael Ritthoff et al.).

national rules and asked Member States to use EU ecodesign and energy labelling and the Consultation Forum to develop common solutions.

The proliferation of national repairability scores across EU Member States would lead to market fragmentation. Diverse national approaches to repairability will be an obstacle for the internal market because products would have to be adapted to diverging national rules, thus raising compliance costs for the industry and, inevitably, prices for consumers. Conversely, an EU approach would extend the benefits to all EU consumers whilst also lowering costs for manufacturers and for consumers.

## 4. THE PRECEDENT: A REPAIRABILITY SCORE FOR SMARTPHONES AND TABLETS

A repairability score is a straight-forward and easy-to-understand mean to inform consumers about how easily a product can be repaired, helping them reduce the total cost of ownership, since a longer lifetime will delay replacement. It also incentivises manufacturers to design their products according to sustainability criteria in trying to reach the highest scores for the models they place on the market.

Commission Delegated Regulation (EU) 2023/1669 with regard to the energy labelling of smartphones and slate tablets[17], is the first product-specific Regulation on energy labelling that implements comprehensive circular economy rules. It is also the first Regulation that will require a label to display a **repairability score**. The repairability score has been adopted together with other circular economy measures adopted in the review of the legislation on smartphones and tablets and was fully supported by Member States and stakeholders. It was based on the terminology developed in the standard *EN 45554: General methods for the assessment of the ability to repair, reuse and upgrade energy-related products* (se also section 5.2). More repairability scores are under study.

## 5. A REPAIRABILITY SCORE FOR TUMBLE DRYERS.

### 5.1. What is the problem?

According to the 2019 review study on household tumble dryers, the average lifetime of tumble dryers over the last decade has decreased from 14 to 12 years[18], prompting an acceleration of production to compensate the shorter lifetime. This results in an increase of energy and materials used for production and distribution, as well as higher costs related to disposal and recycling.

Tumble dryers are big, heavy and complex products the production of which leads to significant consumption of energy and materials. The analysis conducted with the EcoReport Tool of the Methodology for Ecodesign for Energy-related Products (MEErP)[19] for the impact assessment

[17] Commission Delegated Regulation (EU) 2023/1669 of 16 June 2023 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to the energy labelling of smartphones and slate tablets (OJ L 214, 31.8.2023, p. 9).

[18] Section 2.2.1 of the study.

[19] JRC Publications Repository - Ecoreport tool - Manual (europa.eu).

on the review of the ecodesign and energy labelling legislation on tumble dryers[20] (henceforth "the 2022 IA"), indicates that for each unit produced, 4.6 GJ energy are consumed on average, generating 14 kg landfill waste at the end of its lifetime. In addition, the production of a single tumble dryer generates 241 kg CO2eq., 1.5 kg SO2eq, 916 g particulate matter (PM) and 6 g volatile organic compounds (VOC). The unitary figures extended to the whole EU market will result, in 2040, in 9,720 TJ (terajoules) additional energy consumption, 1.5 mtCO2e additional greenhouse gas emissions and 114 kilotons extra waste.

To help increasing the lifetime of tumble dryers back to 14 years on average, Regulation (EU) 2023/2533 includes a list of spare parts which must be available by manufacturers to consumers and professional repairers, including the provision of repair and maintenance information. The environmental and economic impacts of this measure are addressed in the 2022 IA under policy option 4 (PO4). The 2022 IA assumes that by applying PO4, the average lifetime of tumble dryers will be lengthened by two years. However, the 2022 IA also explains that this assumption is based on opinions from repair and service businesses, but there is no further/actual evidence behind it. The 2019 review study on household tumble dryers also acknowledges that it is not possible to know with certainty for how long the lifetime of a tumble dryer will be extended by applying circular economy measures.

A repairability score (which would be displayed in the energy label by means of an A-to-D score, as it is for smartphones and tablets) would be a complementary driver to the availability of spare parts for extending the lifetime of tumble dryers. This is because the repairability score becomes immediately visible to the consumers, who will be made aware of how repairable the product is at the time of choosing/purchasing a product. The repairability score is therefore likely to have a larger impact than the availability of spare parts on the purchase decision of the consumer and the placing on the market of more repairable products by suppliers. Availability of spare parts is an important but less visible factor which may not be considered by the consumer when buying the product. In this respect, availability of spare parts is a complementary measure to the repairability score since an increased interest for repairing fostered by the energy label will ultimately increase demand for available spare parts.

### 5.2. Repairability score - general method and formula

The European standard EN 45554:2020 on *general methods for the assessment of the ability to repair, reuse and upgrade energy-related products*, lays down a general procedure for the assessment of product repairability. This standard is the reference point for the JRC repairability study, which, in turn, is the basis for the repairability score for smartphones and tablets set out in Commission Delegated Regulation (EU) 2023/1669. The repairability score laid down in this document follows this same approach, by adapting to household tumble dryers

[20] Commission Staff Working Document Impact Assessment Report Accompanying the documents Commission Regulation (EU) 2023/2533 of 17 November 2023 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household tumble dryers, amending Commission Regulation (EU) 2023/826, and repealing Commission Regulation (EU) No 932/2012 and Commission Delegated Regulation (EU) 2023/2534 of 17 November 2024 of the European Parliament and of the Council with regard to energy labelling of household tumble dryers and repealing Commission Delegated Regulation (EU) No 392/2012.

the general methodology laid down in the abovementioned documents, based on **three main elements**.

The **first element** in the repairability score is the **priority parts**, namely those parts or components against which repairability will be scored. Priority parts are to be selected for each product. For tumble dryers selected priority parts could be, for instance, the pump, the drum bearings, the door, the drum belt, or the motor.

The **second element** is the **scoring parameters**. Typical scoring parameters are the **disassembly depth**, the **fasteners type**, the **tools type** and the **availability of repair information**. Some scoring parameters are addressed at priority part level and others at product level. The score for disassembly depth, fasteners type, or tools type consists of adding partial scores for each priority part. The availability of repair information, on the contrary, consists of a single score to the whole product.

With the first two elements it is already possible to write the general formula for the repairability score, which follows the format:

$$R = \alpha_1 \times S_1 + \alpha_2 \times S_2 + \alpha_3 \times S_3 + \cdots + \alpha_n \times S_n \ (1)$$

where $S_n$ is the score for the scoring parameter *n* and $\alpha_n$ **weighting factors** which value depends on the relevance assigned to the parameter *n.* Weighting factors added must sum up 1. It is possible to assign the same weighting factor to all parameters since all may be considered equally important. However, the JRC report suggests giving lower weights to parameters already covered by ecodesign. For example, a scoring parameter related to the availability of spare parts could be assigned, for tumble dryers and washing machines, a smaller weighting factor, because their respective Regulations on ecodesign, already contain a provision on the mandatory availability of spare parts.

When the score for a parameter consists of adding partial scores for each priority part, such score is calculated according to the formula:

$$S_n = \alpha_{PP1} \times Sn_{PP1} + \alpha_{PP2} \times Sn_{PP2} + \cdots + \alpha_{PPn} \times Sn_{PPn} \ (2)$$

where $Sn_{PPn}$ is the score of each priority part *PPn* with respect to the scoring parameter *n*, and $\alpha_{PPn}$ a weighting factor which would depend on factors such as the relevance of the priority part or the likelihood of failure. Assuming that all priority parts are equally relevant, $\alpha_{PPn}$ can be just fixed according to the likelihood of failure.

The **third and final element** of the repairability score is the **scoring framework**. The scoring framework sets out, for each scoring parameter *n*, the type of score to be applied (for instance a 1-to-5 score) and the criteria to apply such score (for instance, for the scoring parameter *disassembly depth*, the 1-to-5 score for a specific priority part would be higher the lesser is the number of steps taken to disassemble that priority part). The score for each priority part would go into formula (2), or directly into formula (1) if the scoring parameter is addressed at product level and not at priority part level, as explained above.

### 5.3. Repairability score for tumble dryers

The general formulas (1) and (2) must be adapted to tumble dryers.

The scoring parameters are the following: disassembly depth (DD), Fasteners type (F), Tools type (T) and Repair information (RI). These have been derived from the German repairability study and further adapted after discussion with stakeholders at the Consultation Forum on 11 March 2024, taking specially into account APPLiA's contribution.

Subsequently, the formula for a repairability score for tumble dryers reads as follows:

$$R = 0{,}450 \times S_{DD} + 0{,}225 \times S_F + 0{,}225 S_T + 0{,}100 \times S_{RI} \quad (3)$$

Two scoring parameters have been assigned the same weighting factor (0,225), the disassembly depth a higher factor (0,450) and the repair information a lower factor (0,100). Disassembly depth has been assigned a higher factor after discussion at the Consultation Forum on 11 March 2024, where stakeholders agreed that the disassembly depth overlapped with the detachability of the side panels (scoring parameter included in the initial Commission proposal), and that the weighting factor for the disassembly depth could be increased to account for the removal of the detachability of the side panels, which was deleted. Concerning repair information, Regulation (EU) 2023/2533 already sets minimum requirements on repair information, making it less relevant for a repairability score. This approach is supported in the JRC study on a repairability score for smartphones and tablets[21], which points out that the inclusion of a minimum ecodesign requirement on a specific parameter can reduce its relevance as a scoring parameter.

The chosen priority parts and their respective weighting factors are the following:

| **Priority parts** | **Acronym priority part** | **Denomination weighting factor** | **Value weighting factor** |
|---|---|---|---|
| Water pump | WP | $\alpha_{WP}$ | 0.14 |
| Drum bearing | B | $\alpha_{DBe}$ | 0.09 |
| Drum belt | DB | $\alpha_{DB}$ | 0.25 |
| Door | D | $\alpha_{D}$ | 0.08 |
| Motor | M | $\alpha_{M}$ | 0.05 |
| Main printed circuit board | MB | $\alpha_{MEB}$ | 0.28 |
| Fan | F | $\alpha_{F}$ | 0.05 |
| Motor capacitor | MC | $\alpha_{MC}$ | 0.06 |

*Table 1. Priority parts and weighting factors*

Priority parts and their respective weighting factors are based on a list submitted by APPLiA, later modified after discussion with stakeholders in the Consultation Forum on 11 March 2024. The list is the result of an intensive consultation and data collection exercise among APPLiA

[21] European Commission, Joint Research Centre, Spiliotopoulos, C., Alfieri, F., La Placa, M. et al., Product repairability scoring system – Specific application to smartphones and slate tablets, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/340944.

members. Weighting factors for each priority part were set according to two criteria: the likelihood of failure and the sales volume, as declared by the manufacturers participating in the exercise. Relevant literature, already mentioned in this document, suggests also considering the functional relevance of a spare part as a criterion to set weighting factors. However, all selected priority parts have similar functional relevance for the operation of a tumble dryer, for which reason this criterion has been dismissed. The list is also consistent with the list of available spare parts laid down in Regulation (EU) 2023/2533 and with the relevant priority parts for tumble dryers identified in the study from the German Environmental Agency.

Regarding the scores, they are calculated as follows:

#### *5.3.1. Disassembly depth score*

The Disassembly depth score ($S_{DD}$) of a tumble dryer is calculated by adapting formula (2) to the disassembly depth parameter:

$$S_{DD} = \alpha_{WP} \times SDD_{WP} + \alpha_B \times SDD_B + \alpha_{DB} \times SDD_{DB} + \alpha_D \times SDD_D + \alpha_M \times SDD_M + \alpha_{MB} \times SDD_{MB} + \alpha_F \times SDD_F + \alpha_{MC} \times SDD_{MC} \quad (4)$$

Each $SDD_{PPn}$ in formula (4) is calculated based on the percentage of steps required to remove the corresponding priority part from the product with respect to the mean number of steps for that priority part as laid down in Table 2 and 3. The mean number of steps have been taken from the German repairability study.

| **Priority part** | **Mean number of disassembly steps** |
|---|---|
| Water pump | 16.1 |
| Drum bearing | 18.9 |
| Drum belt | 40.9 |
| Door | 3 |
| Motor | 49.4 |
| Main printed circuit board | 13.7 |
| Fan | 7.7 |
| Motor capacitor | 24.9 |

*Table 2. Mean number of steps for each priority part*

| **disassembly depth (as a percentage of the mean number of steps in Table 2)** | **Score ($SDD_{PPn}$)** |
|---|---|
| DD ≤ 70% | 10 |
| 70% < DD ≤ 90% | 7 |
| 90% < DD ≤ 110% | 4 |
| 110% < DD ≤ 130% | 1 |
| DD > 130% | 0 |

*Table 3. Disassembly depth score*

#### *5.3.2. Fastener type score*

The fastener type score ($S_F$) of the tumble dryer is calculated by adapting formula (2) to the fastener type parameter:

$S_F = \alpha_{WP} \times SF_{WP} + \alpha_B \times SF_B + \alpha_{DB} \times SF_{DB} + \alpha_D \times SF_D + \alpha_M \times SF_M + \alpha_{MB} \times SF_{MB} + \alpha_F \times SF_F + \alpha_{MC} \times SF_{MC}$ (5)

Each $SF_{PPn}$ in formula (5) is assigned according to the level of removability and reusability of the fasteners used in the device assembly, in accordance with Table 4. In case different types of fasteners are encountered in the disassembly of a priority part, the lowest score shall be considered.

| **Fastener type** | **Score ($SF_{PPn}$)** |
|---|---|
| Reusable | 10 |
| Resupplied at no cost | 7 |
| Resupplied at additional cost | 3 |
| Removable | 0 |

*Table 4. Fastener type score*

### *5.3.3. Tool type score*

The tool type score ($S_F$) of the tumble dryer is calculated by adapting formula (2) to the tool type parameter:

$S_T = \alpha_{WP} \times ST_{WP} + \alpha_B \times ST_B + \alpha_{DB} \times ST_{DB} + \alpha_D \times ST_D + \alpha_M \times ST_M + \alpha_{MB} \times ST_{MB} + \alpha_F \times ST_F + \alpha_{MC} \times ST_{MC}$ (6)

Each $ST_{PPn}$ in formula (6) is assigned according to the complexity and availability of the tools needed for its replacement, in accordance with Table 5. Where different types of tools are needed for the disassembly of a priority part, the lowest score shall be considered.

| **Use of tools** | **Score ($ST_{PPn}$)** |
|---|---|
| Repair possible with basic tools | 10 |
| Repair possible with tools supplied with the spare part | 7 |
| Repair possible with tools supplied with the household tumble dryer | 4 |
| Repair possible with commonly available tools | 0 |

*Table 5. Tool type score*

### *5.3.4. Repair information score*

The repair information score ($S_{RI}$)is calculated at product level in accordance with Table 6.

| **Use of tools** | **Score ($S_{RI}$)** |
|---|---|
| Availability of repair information at no cost for professional repairers | 10 |
| Availability of repair information with a reasonable and proportionate fee for professional repairers | 0 |

*Table 6. Repair information score*

# 6. EXPECTED IMPACTS OF A REPAIRABILITY SCORE

## 6.1. Introduction

The addition of a repairability score to the new energy label does not in itself warrant a fully-fledged impact assessment given the nature of such a limited modification to the label and the broad agreement among Member States, industry and stakeholders on the merits, urgency and modalities of such an addition. Nevertheless, the Commission services have updated the analysis of the 2022 Impact Assessment to provide a broad estimate/idea of the additional impacts.

## 6.2. Policy options analysed in the 2022 IA

The 2022 IA is the starting point for an update of the assessment of the impacts of the policy including the repairability score. The following table displays the correspondence between problems, measures and policy options as presented in the 2022 IA:

| Problems | Measures | Policy options |
|---|---|---|
| First key problem: missed in-use energy savings due to the lack of adaptation of the legislation to technical progress | - Rescaling the energy label<br>- Improving real-life representativeness of the energy efficiency formula | PO2: energy labelling measures (lenient option) |
| | - New energy efficiency limits | PO3: ecodesign measures (ambitious option) |
| Second key problem: insufficient industry measures on circular economy | - Mandatory availability of critical spare parts<br>- Accessibility to repair and maintenance information<br>- Availability of documentation for enhanced disassembly/recovery of WEEE-components and refrigerants<br>- Permanent marking of the refrigerant type<br>- User information on the location of the filters | PO4: circular economy |

*Table 8. Schematic overview of drivers, problems, objectives and measures and their interlinkage*

The 2022 IA concluded that the preferred policy option would be a combination of all the above, namely PO2+PO3+PO4. PO2+PO3+PO4 has been implemented in Regulation (EU) 2023/2533 and Delegated Regulation 2023/2534, and it will apply from 1 July 2025.

## 6.3. Policy as updated by including a repairability score

Table 8 shows that PO4 is the policy option focussing on circular economy, which key element is the mandatory availability of a list of spare parts for a period of 10 years, after the placing on the market of the last unit of the corresponding model.

Following the approach provided in point 5.1, whereby the repairability score would be an additional measure to extend the lifetime of tumble dryers from 12 to 14 years, the repairability score could be considered as an additional element of policy option PO4. The updated policy option on circular economy (PO4u), then consists of the following items:

- **Items from the 2022 IA**: mandatory availability of spare parts, mandatory access to repair and maintenance information, permanent marking of the refrigerant type, information on the location of the filters and the need to clean them regularly, and availability of information for enhanced disassembly/recovery of WEEE-components and refrigerants.

- **New item**: addition of an A-to-E repairability scale to the energy label, based on the repairability score explained in point 5.3. The letter corresponding to the class of the product within the scale will appear bigger than the rest of the letters.

Further, following the 2022 IA, which preferred policy option is PO2+PO3+PO4, the policy option which impacts are to be calculated in this Section is PO2+PO3+PO4u.

To give industry time to adapt to the new policy PO2+PO3+PO4u, which on the one hand implies fixing the new label with the repairability scale on units placed on the market for the first time, and on the other hand the possible relabelling of units already placed on the market by the date of application of the new measure, the impact model assumes an obligation to fix the new energy label by 1 year after the date of application of Regulation 2023/2534, namely 1 July 2026. This means that, during the first year of application of the new Regulations, the impacts calculated in the 2022 IA for PO2+PO3+PO4 apply, and from 2026 onwards those impacts need to be reassessed for PO2+PO3+PO4u.

### 6.4. Assumptions

The inclusion of the repairability score does not change the assumptions made in the 2022 IA (Section 6 and Annex 6 in the 2022 IA), namely:

- The average lifetime of tumble dryers increases from 12 to 14 years.

- There is no change of the total EU stock estimated for the business-as-usual scenario (BAU) developed in the 2022 IA. None of the policy options assessed in the 2022 IA entails a change in the stock.

- The average repair costs per unit is around 150 €. As explained in the 2022 IA, there are very different views on how often a tumble dryer is repaired, varying from "it is often not repaired" according to APPLiA to "twice during the lifetime" according to R.U.S.Z[22]. The review study suggests that the machines on average will be repaired 0,4 times during their lifetime[23] (5 €/year x 12 years being the cost per repair 150 €). To extend the lifetime, it is assumed that more repairs are required and that the repair and maintenance cost per year will increase to 8 €/year. With this assumption a tumble dryer will on average be repaired 0,75 times during its lifetime of 14 years.

- Price increase is fully carried over to the consumer.

[22] https://rusz.at/en/

[23] 5 €/year in 12 years is used in the review study.

## 6.5. Impacts

### *6.5.1. Environmental impacts*

As explained in section 5.1, the repairability score would not change the environmental impacts for PO4 that were already assessed in the 2022 IA. The environmental impacts of PO4u and PO4 are the same because they are calculated on the same assumption that the circularity measures will lengthen by two years the lifetime of appliances.

| | **Energy consumption during use [TWh/year]** | | | | **Savings [TWh/year]** | | **Cumulative savings [TWh]** | |
|---|---|---|---|---|---|---|---|---|
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 10.50 | 9.49 | 8.97 | 8.10 | | | | |
| **PO4/PO4u** | 10.50 | 9.49 | 8.97 | 8.16 | 0.00 | -0.05 | 0.00 | -0.17 |
| **PO2+PO3+PO4u/PO2+PO3+PO4** | 10.50 | 9.42 | 8.30 | 7.04 | 0.67 | 1.06 | 2.11 | 12.57 |
| | **Total energy consumption (in-use+embedded) [TWh/year]** | | | | **Savings [TWh/year]** | | **Cumulative savings [TWh]** | |
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 12.45 | 11.64 | 11.21 | 10.45 | | | | |
| **PO4/PO4u** | 12.45 | 11.64 | 11.21 | 9.84 | 0.00 | 0.61 | 0.00 | 2.69 |
| **PO2+PO3+PO4u/PO2+PO3+PO4** | 12.45 | 11.57 | 10.58 | 8.72 | 0.64 | 1.73 | 1.93 | 15.01 |
| | **GHG emission, in-use + embedded [mtCO2e/year]** | | | | **Savings [mtCO2e/year]** | | **Cumulative [mtCO2e]** | |
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 3.62 | 3.07 | 2.52 | 1.95 | | | | |
| **PO4/PO4u** | 3.62 | 3.07 | 2.52 | 1.59 | 0.00 | 0.36 | 0.00 | 1.54 |
| **PO2+PO3+PO4u/PO2+PO3+PO4** | 3.62 | 3.09 | 2.53 | 1.52 | -0.01 | 0.43 | -0.27 | 1.75 |

*Table 9. EU environmental impacts for BAU, PO2+PO3+PO4 and PO2+PO3+PO4u*

Until 2031, the decrease in energy consumption is only due to PO2 and PO3, since the benefits from PO4 are only realised in the long term. From 2032 onwards, the effects from PO4u start to be noticed as described in section 6.3.1 of the 2022 IA.

### *6.5.2. Economic impacts*

The wider scope of PO4u increases compliance costs, due to the following two factors:

- First, the redesign of some models where manufacturers choose to do so in trying to get the highest repairability score. The average cost of redesigning the product is assumed here to be equivalent to the increase of cost calculated in the 2022 IA for PO2, this is the policy option including only energy labelling measures. Compliance costs in PO2 in the 2022 IA factored in a 1% increase of production costs due to manufacturers' investment to attain better energy efficiency classes. The introduction of a repairability scale in the label is assumed to trigger an equivalent effect with a similar increase of compliance costs.

- Second, there may be administrative costs due to relabelling, as suppliers will have to provide two labels instead of one for a period of 4 months. These costs have been calculated in the 2022 IA and estimated at 0.3 EUR to print a label. For 1.9 million household tumble dryers sold in 4 months, this means a total cost of approximately 567,000 € for suppliers to

temporarily provide a second label for a transition of one label to another. They are one-off costs representing around 0.03% of turnover in the year that they occur, namely 2026.

Since costs are assumed to be entirely carried over to the consumer, the modest increase in costs due to PO4u will produce an equivalent increase of the sector's turnover.

The economic impacts of PO4u and PO2+PO3+PO4u are displayed in Table 10. These can be compared with the impacts of PO2+PO3+PO4 as calculated in the 2022 IA.

| | **Industry turnover [bln. €/year]** | | | | **Difference to BAU [bln. €/year]** | | **Cumulative difference [bln. €]** | |
|---|---|---|---|---|---|---|---|---|
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 1.27 | 1.37 | 1.45 | 1.54 | | | | |
| **PO2+PO3+PO4** | 1.27 | 1.38 | 1.57 | 1.45 | 0.12 | -0.11 | 0.45 | 1.08 |
| **PO2+PO3+PO4u** | 1.27 | 1.38 | 1.58 | 1.47 | 0.13 | -0.07 | 0.54 | 1.29 |
| | **Retail turnover [bln. €/year]** | | | | **Difference to BAU [bln. €/year]** | | **Cumulative difference [bln. €]** | |
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 2.69 | 2.84 | 2.94 | 3.12 | | | | |
| **PO2+PO3+PO4** | 2.69 | 2.87 | 3.09 | 2.30 | 0.13 | -0.82 | 0.80 | -2.32 |
| **PO2+PO3+PO4u** | 2.69 | 2.87 | 3.10 | 2.34 | 0.14 | -0.78 | 0.99 | -1.27 |
| | **Total user expenditure [bln. €/year]** | | | | **Savings [bln. €/year]** | | **Cumulative savings [bln. €]** | |
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 5.08 | 5.16 | 5.26 | 5.26 | | | | |
| **PO2+PO3+PO4** | 5.08 | 5.17 | 5.33 | 4.43 | -0.07 | 0.83 | -0.46 | 2.83 |
| **PO2+PO3+PO4u** | 5.08 | 5.17 | 5.35 | 4.47 | -0.09 | 0.79 | -0.70 | 2.26 |

*Table 10. EU Economic impacts for BAU, PO2+PO3+PO4 and PO2+PO3+PO4u*

### *6.5.3. Social impacts. Employment*

The slight change in the sector's turnover will produce an equivalent change of employment. As explained in the 2022 IA, the impact on employment for manufacturers and retailers is estimated from the turnover, with a correction for changes in labour productivity. Based on historical manufacturing data, an increase of 1% in turnover will lead to a 0,6% increase in workforce, and a 1% decrease in turnover leads to a 1,6% decrease in workforce.

| | **Total employment [jobs/year]** | | | | **Difference to BAU (jobs/year)** | |
|---|---|---|---|---|---|---|
| | **2020** | **2025** | **2030** | **2040** | **2030** | **2040** |
| **BAU** | 22,023 | 22,977 | 23,651 | 24,531 | | |
| **PO2+PO3+PO4** | 22,023 | 23,118 | 24,691 | 18,681 | 1,040 | -5,850 |
| **PO2+PO3+PO4u** | 22,023 | 23,118 | 24,742 | 18,861 | 1,091 | -5,670 |
| **Out of which in the repair sector** | 1,602 | 1,906 | 2,594 | 3,680 | 439 | 1,337 |

*Table 3. EU Employment (manufacturers + retailers) for BAU, PO2+PO3+PO4 and PO2+PO3+PO4u*

## 7. INPUT FROM STAKEHOLDERS

The Commission presented a working document at the Consultation Forum on 11 March 2024. At that meeting, the Commission gave a detailed explanation of the main assumptions for the assessment of the impacts and the corresponding results and discussed all the relevant aspects with stakeholders.

Written comments were submitted by stakeholders and Member States. Those comments referred to the spare parts and parameters to be included in the calculation of the repairability index, as well as the scoring criteria. There also were contributions related to the relevance of the information on repairability for the definition of new models and to the transitional measures to be applied until the date of mandatory application of the new label.

These comments were examined and taken up to the extent possible. Minutes of the meeting and comments from stakeholders are publicly available in CIRCABC[24].

[24] https://circabc.europa.eu/ui/group/418195ae-4919-45fa-a959-3b695c9aab28/library/793260a3-318a-448f-b55f-5dc27dd36118?p=1&n=10&sort=name_DESC