



SLOVENSKI STANDARD
oSIST prEN IEC 62635:2026
01-julij-2026

Ocena stopnje obnovljivosti materialov izdelkov

Assessment of material recoverability rate of products

Ta slovenski standard je istoveten z: **prEN IEC 62635:2026**

ICS:

13.020.60	Življenjski ciklusi izdelkov	Product life-cycles
13.030.50	Recikliranje	Recycling

oSIST prEN IEC 62635:2026

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111/886/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 62635 ED1	
DATE OF CIRCULATION: 2026-05-29	CLOSING DATE FOR VOTING: 2026-08-21
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TITLE:

Assessment of material recyclability rate and material recoverability rate of products

PROPOSED STABILITY DATE: 2032

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CONTENTS

1			
2			
3	1	Scope	8
4	2	Normative references	8
5	3	Terms, definitions and abbreviations	8
6	3.1	General	8
7	3.2	Terms and definitions	8
8	3.3	List of abbreviations	14
9	4	EoL treatment scenarios	14
10	4.1	General requirements and considerations	14
11	4.2	EoL treatment explained	15
12	4.3	Developing EoL treatment scenarios	16
13	5	The default EoL treatment scenario	17
14	5.1	Specification	17
15	5.2	Process flow of the default EoL treatment scenario	17
16	6	Specific EoL treatment scenarios	18
17	6.1	General	18
18	6.2	Development of a specific EoL treatment scenario	19
19	6.3	Ensuring the representativeness of a specific EoL treatment scenario	19
20	6.4	Data collection requirements	20
21	6.4.1	Data sources considerations	20
22	6.4.2	Template for the specific EoL treatment scenario	20
23	7	Provision for EoL treatment information from EoL treatment operators to 24 manufacturer	21
25	7.1	General	21
26	7.2	EoL process identification	22
27	7.3	Measures for pollution prevention	22
28	7.4	EoL treatment scenario information	22
29	7.4.1	General	22
30	7.4.2	Recovery of single recyclable materials documentation and data	22
31	7.4.3	Requirements for parts difficult to process	22
32	7.4.4	Documentation and data	23
33	8	Guidance on the provision for product information from manufacturer to EoL 34 treatment operator	23
35	8.1	General	23
36	8.2	Product identification	23
37	8.3	Safety risk identification	24
38	8.4	Identification of parts requiring separate treatment	24
39	8.4.1	General	24
40	8.4.2	Parts with potential hazards	24
41	8.4.3	Parts difficult to process	24
42	8.4.4	Valuable parts	25
43	9	Design-related aspects affecting material recyclability and material recoverability	25
44	9.1	General considerations	25
45	9.2	Design characteristics related to groups of materials of interest	26
46	9.2.1	General considerations	26
47	9.2.2	Assessment method	26
48	10	Assessment of material recyclability rates based on an EoL treatment scenario	26

49	10.1	Material recyclability rates quantification	26
50	10.2	Material groups and unspecified materials	27
51	10.3	Material recyclability rate quantification of a single or a group of materials of	
52		interest based on an EoL treatment scenario	27
53	11	Material recoverability rates quantification based on an EoL treatment scenario	28
54	12	Documenting the assessment of the material recyclability and material	
55		recoverability rate	29
56	12.1	General	29
57	12.2	Elements of the documentation	29
58	13	IEC 62635 SDB content and maintenance	30
59	13.1	General	30
60	13.2	IEC 62635 SDB update process	30
61	13.3	Creation and maintenance of EOL treatment scenarios	31
62	Annex A (normative)	Calculating the product material recyclability rate and/or material	
63		recoverability rate	32
64	A.1	Flow chart	32
65	A.2	Selection on EoL treatment scenario of the product	33
66	A.3	Description of the specific EoL treatment scenario	34
67	A.4	Evaluation of the product design characteristics	34
68	A.5	Calculation of a product material recycling or material recoverability rate	34
69	A.6	Documentation	34
70	Annex B (normative)	Default EoL treatment scenario for the calculation of product	
71		material recyclability rates	35
72	B.1	Introduction	35
73	B.2	General information	35
74	B.3	Process flow and description	36
75	B.4	Material recycling rates	37
76	Annex C (normative)	Default EoL treatment scenario for the calculation of product	
77		material recoverability rates	39
78	C.1	Introduction	39
79	C.2	General information	39
80	C.3	Process flow and description	39
81	C.4	Material recovery rates	40
82	Annex D (informative)	Specific EoL treatment scenarios	43
83	D.1	Introduction	43
84	D.2	Specific EoL treatment scenario for home appliances in Japan	43
85	D.2.1	General information	43
86	D.2.2	Process flow and description	43
87	D.2.3	Material recycling rates	44
88	D.3	Specific EoL treatment scenario for small household appliances in Korea	43
89	D.3.1	Introduction	45
90	D.3.2	General information	45
91	D.3.3	Process flow and description	46
92	D.3.4	Material recycling rate and/or material recovery rate	46
93	Annex E (informative)	Use case for a potential EoL treatment scenario: Prospective	
94		European scenario for low voltage control and switchgear	49
95	E.1	Introduction	49
96	E.2	General information	49
97	E.3	Process description	49

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98	E.4 Material recycling rates for polymers	50
99	Annex F (informative) Example of a template for EoL treatment information	52
100	Annex G (informative) Framework of information from EoL treatment operators on	
101	specific EoL treatment scenarios	53
102	G.1 General	53
103	G.2 Specific EoL treatment scenarios template	53
104		
105	Figure 1 – Recovery activities framework	16
106	Figure 2 – Default EoL treatment process flow	18
107	Figure A.1 — Process for calculating the material recyclability and/or recoverability	
108	rate of a product	33
109	Figure B.1 – Flow chart of material recycling activities	36
110	Figure D.1 – Treatment flow of a household appliance EoL treatment facility	44
111	Figure E.2 – Flow chart of recycling activities for a specific EoL treatment scenario for	
112	low voltage control and switchgear	51
113		
114	Table 1 — Representativeness criteria for developing specific EoL treatment scenarios	19
115	Table 2 — Material recycling rates and/or material recovery rates	21
116	Table B.1 – Material recycling rate	37
117	Table C.1 – Material recovery rates	40
118	Table D.2 – Product category and corresponding list	46
119	Table D.3 – Material recycling rates and material recovery rates	46
120	Table E.1 – Material recycling rates of used polymer as a function of the composition	
121	of the input material	50

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Assessment of material recyclability rate and material recoverability rate of products

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- International Standard IEC 62635 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.
- This edition cancels and replaces the technical report published in 2012.
- This edition includes the following significant technical changes with respect to the previous technical specification:
- Material recyclability and material recoverability introduced;
 - Default EoL treatment scenarios for the calculation of product material recyclability and material recoverability introduced;
 - Specific EoL treatment scenarios updated and adapted to the state of the art;
 - Alignment with EN 45555 [8];
 - Material recyclability rate quantification of materials of interest.

176 The text of this International Standard is based on the following documents:

FDIS	Report on voting
xxx	xxx

177

178 Full information on the voting for its approval can be found in the report on voting indicated in
179 the above table.

180 The language used for the development of this International Standard is English.

181 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
182 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
183 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
184 described in greater detail at www.iec.ch/standardsdev/publications.

185 The committee has decided that the contents of this document will remain unchanged until the
186 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
187 specific document. At this date, the document will be

- 188 – reconfirmed,
- 189 – withdrawn,
- 190 – replaced by a revised edition, or
- 191 – amended.

192

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Introduction

196 **EDITOR'S NOTE TO NCs: The objective is to move (copy) the information contained in each**
197 **EoL treatment scenarios in the Annexes of this document into the new IEC SDB 62635 once it**
198 **is created (in reference to standard as database below).**

199 Electrical and electronic equipment (EEE) have become a defining and ubiquitous feature of
200 modern life, raising living standards of the global population. As a counter-effect, they are
201 becoming one of the fastest growing waste streams globally.

202 NOTE The amount of e-waste exceeded 57 million tons in 2021 (WEEE Forum [10]).

203 Electrical and electronic equipment waste (e-waste) contains a complex mixture of materials,
204 some of which are hazardous or contain hazardous substances, able to cause major
205 environmental and health problems if the discarded devices are not managed properly. Modern
206 electronics also contain critical and valuable resources, such as critical raw materials (CRMs)
207 and gold. These can be recycled and re-used if the waste is effectively managed. Improving the
208 collection, treatment, recovery (incl. recycling) of electrical and electronic equipment (EEE) at
209 the end of their life can increase resource efficiency and support the shift to a circular economy.

210 To determine the ability to recover the materials contained in a product or its parts and materials
211 at end-of-life, the concepts of "material recyclability rates" and "material recoverability rates"
212 are introduced. In order to effectively improve the ability to recover or recycle materials at their
213 end-of-life, it is important to consider the recoverability and recyclability of the product and its
214 parts already during the design and development phase. In order to ensure that a given material
215 recyclability and material recoverability potential materializes into actual material recycling and
216 material recovery rates it is important to ensure that the actual treatment technologies employed
217 at product EoL are state of the art and capable to recover and/or recycle groups of materials of
218 interest such as critical or environmentally relevant materials.

219 IEC 62635 consists of two parts:

- 220 – this document, which provides a comprehensive framework for assessing the
221 recyclability and recoverability of materials used in EEE, including groups of materials
222 of interest such as critical or environmentally relevant materials;
- 223 – a standard as database (IEC 62635 SDB) which is a managed collection of EoL
224 treatment scenarios including recycling and recovery rates.

225 The IEC 62635 SDB is maintained by a database maintenance team (SDBT 62635) which
226 updates information in the IEC 62635 SDB based on requirements specified in the IEC 62635
227 standard.

228 This document provides the calculation rules based on the understanding that the material
229 recovery rate and material recycling rates are defined as the data provided by the EoL treatment
230 operator. The product material recyclability rate and the material recoverability rate are the
231 result of the calculation performed by the manufacturer.

232 The general method presented in this document takes into account the availability and efficiency
233 of state-of-the-art recycling and recovery processes to predict the material recyclability or
234 material recoverability rates of products during the design phase. The focus is, therefore, on
235 the ability to recycle or recover the product itself rather than the recycling or recovery
236 processes.

237 This document can be used to assess a products material recyclability and material
238 recoverability independently of where it will be recycled using a default EoL treatment scenario
239 presented in Annex B and Annex C. The option to use a default EoL treatment scenario is
240 intended to assess products material recyclability and material recoverability early in the design
241 process where the final fate of a product is not always known, to compare the evolution of a
242 product design overtime or to compare different product designs against each other based on
243 a common baseline.

244 This document can also be used to assess a product material recyclability and material
245 recoverability in relation to an EoL treatment scenario that is specific for a given country, region
246 or product group.

247 It is assumed that the assessment of the material recyclability and material recoverability of a
248 product as a whole may be valid for a certain period of time in a given geographical
249 area. Therefore, the standard provides organizations with

- 250 – relevant information to characterize activities at EoL treatment facilities in order to
251 enable them to implement effective environmentally conscious design and,
- 252 – sufficient information for the product designers (having to ensure the design for
253 recycling) about what will happen later-on, in the recycling process.

254 This document will promote sustainable practices by enabling manufacturers, with the support
255 of EoL operators, to evaluate the potential for material recycling and material recovery at the
256 end of a product's life cycle. It also allows for meaningful interactions between EoL treatment
257 operators including secondary raw material suppliers with manufacturers that use these
258 secondary materials.

259 By applying this document, organisations can enhance their environmental performance,
260 contribute to waste and pollution reduction and so contribute to a circular economy.

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261 1 Scope

262 IEC 62635 provides a method to calculate the material recyclability rate of electrical and
 263 electronic equipment (EEE) during the design phase using material recycling rate data based
 264 on EoL treatment scenarios. It also provides a method to calculate material recoverability rate
 265 based on material recovery rate data. This document sets up criteria and a format to describe
 266 the EoL treatment scenarios. Additionally, the method can be also applied for the calculation of
 267 recyclability and recoverability of materials of interest such as CRMs.

268 To achieve the above, this document addresses:

- 269 – A default EoL treatment scenario for material recycling and for material recovery ,
- 270 – Examples of EoL treatment scenarios and the corresponding material recovery and
 271 material recycling rates,
- 272 – Provisions for product information from manufacturers to EoL treatment operators to
 273 improve material recycling and recovery rates,
- 274 – Provisions for EoL treatment information from EoL treatment operators to manufacturers
 275 to build EoL treatment scenarios.

276 This document does not address the recovery of products and parts for reuse and product
 277 packaging.

EDITOR'S NOTE TO NCs: A paragraph on the horizontal function will be added later, when
 the horizontal publication is approved (separate Q doc will be circulated for it):

"This document is a basic/generic environment horizontal publication focusing on essential
 requirements / data type and is primarily intended for the use by manufacturers and EoL
 management operators in accordance with the principles laid down in IEC Guide 123 and IEC
 Guide 108 ED3."

278

279 2 Normative references

280 There are no normative references in this document.

281 3 Terms, definitions and abbreviations

282 3.1 General

283 For the purposes of this document, the following terms and definitions apply.

284 ISO and IEC maintain terminology databases for use in standardization at the following
 285 addresses:

- 286 – IEC Electropedia: available at <https://www.electropedia.org/>
- 287 – ISO Online browsing platform: available at <https://www.iso.org/obp>

288 3.2 Terms and definitions

289 3.2.1

290 alternate material recovery

291 controlled processing of end-of-life (IEV 193-05-07) products (IEV 193-02-01) or waste (IEV
 292 193-04-01) producing useful material (IEV 193-03-03) of a type different from that of the original
 293 material

294 EXAMPLE Slag, by-product.

295 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-10.]

- 296 **3.2.2**
 297 **critical raw material**
 298 **CRM**
 299 material (IEV 193-03-03) which, according to a defined classification methodology, is
 300 economically important, and has a high risk associated with its supply
- 301 Note 1 to entry: As the classification methodology is country- or region-specific, the CRMs list is also country- or
 302 region-specific.
- 303 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-03-10.]
- 304 **3.2.3**
 305 **depollution**
 306 process of removing pollutant
- 307 **3.2.4**
 308 **pollutant**
 309 substance or agent present in an environmental medium, which, due to its properties, amount
 310 or concentration causes adverse impacts on the environmental medium
- 311 [SOURCE: ISO 11074:2025 [6], 3.328]
- 312 **3.2.5**
 313 **disassembly**
 314 process whereby a product (IEV 193-02-01) is taken apart in such a way that it can subsequently
 315 be reassembled and made operational
- 316 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-26.]
- 317 **3.2.6**
 318 **dismantling**
 319 process whereby a product (IEV 193-02-01) is taken apart in such a way that it is not intended
 320 to be reassembled and made operational
- 321 Note 1 to entry: After dismantling, some parts (IEV 193-02-02) can be reused.
- 322 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-27.]
- 323 **3.2.7**
 324 **end-of-life**
 325 **end of life**
 326 **EoL**
 327 life cycle stage of a product (IEV 193-02-01) starting when it is removed from its use stage until
 328 the product has either its life extended or is handed over for recovery (IEV 193-04-04)
- 329 SEE: Figure 193-05-03
- 330 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-05-07, modified – The Note 1 to entry, related to
 331 homographs, was deleted.]
- 332 **3.2.8**
 333 **end-of-life treatment**
 334 operation covering all activities starting when end-of-life (IEV 193-05-07) products (IEV 193-
 335 02-01) are handed over for recovery (IEV 193-04-04) or are discarded and waste (IEV 193-04-
 336 01) is handed over for recovery or final disposal (IEV 193-04-28)
- 337 Note 1 to entry: End-of-life treatment includes collection and logistics.
- 338 Note 2 to entry: End-of-life products can be handed over for recovery through, for example, a take-back programme
 339 on request of or even managed by the manufacturer.
- 340 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-03, modified – The Figure and related Note
 341 3 to entry have been deleted.]

342 **3.2.9**
 343 **energy recovery**
 344 production of useful energy (IEV 193-03-23) through direct and controlled combustion or other
 345 processing of waste (IEV 193-04-01)

346 SEE: Figure 193-04-04B

347 EXAMPLE Producing hot water, steam and electricity are common means for energy recovery.

348 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-11.]

349 **3.2.10**
 350 **final disposal**
 351 **disposal**
 352 operation that does not lead to the recovery (IEV 193-04-04) of product (IEV 193-02-01), parts
 353 (IEV 193-02-02), materials (IEV 193-03-03) or energy (IEV 193-03-23)

354 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-28, modified – The Figure and related Note
 355 3 to entry have been deleted.]

356 **3.2.11**
 357 **manufacturer**
 358 natural or legal entity with responsibility for the design, manufacture, packaging and labelling
 359 of a product (IEV 193-02-01) before it is placed on the market under its own name, regardless
 360 of whether these operations are carried out by that entity itself or on its behalf by a third party

361 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-02-10 – modified, Note 1 to entry referring to
 362 homographs has been deleted.]

363 **3.2.12**
 364 **material recovery**
 365 controlled processing of end-of-life (IEV 193-05-07) products (IEV 193-02-01) or waste (IEV
 366 193-04-01) to produce useful material (IEV 193-03-03)

367 Note 1 to entry: Processes for material recovery can include dismantling, depollution, grinding, shredding, milling,
 368 concentration, homogenization, refining, etc.

369 Note 2 to entry: The result of the material recovery is either alternate material or material that will be further processed
 370 in material recycling.

371 Note 3 to entry: Material recovery results in circular material, i.e. material that can be recovered again.

372 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-07, modified – The Figure and the related
 373 Note 4 to entry have been deleted.]

374 **3.2.13**
 375 **material recovery rate**
 376 mass ratio of any useful material (IEV 193-03-03) recovered from end-of-life (IEV 193-05-07)
 377 products (IEV 193-02-01) or waste (IEV 193-04-01) excluding products or parts recovery (IEV
 378 193-04-05) and energy recovery (IEV 193-04-11)

$$R(\text{reco}) = \frac{m(\text{reco})}{m(\text{eol/w})}$$

379 where

380 $R(\text{reco})$ is the material recovery rate;

381 $m(\text{reco})$ is the mass of the recovered materials;

382 $m(\text{eol/w})$ is the total mass of the end-of-life products or waste (inflow in a certain period).

383 Note 1 to entry: When the material recovery rate is calculated, it is important to make clear where the material is
 384 recovered from, whether end-of-life products or waste.

385 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-08.]

386 **3.2.14**
 387 **material recycling**
 388 controlled processing of material (IEV 193-03-03) that has been recovered from end-of-life (IEV
 389 193-05-07) products (IEV 193-02-01) or waste (IEV 193-04-01) to produce material of the same
 390 or similar type as the original material

391 EXAMPLE An ABS compound that is shredded and then recycled as ABS compound; an aluminium alloy that is
 392 recycled as an aluminium alloy; a thermoset that is shredded and used as filler in a thermoset material.

393 Note 1 to entry: Polymer materials are of the same type if they have the same base polymer such as PE, PP, ABS.
 394 Metal materials of the same type share the same base metal (e.g. aluminium alloy).

395 Note 2 to entry: There can be variation in the performance or characteristics of the recycled material compared to
 396 the original one.

397 Note 3 to entry: In some cases, the processes of recovery and recycling cannot be distinguished from each other.

398 Note 4 to entry: If the produced material is of a different type from the original material, it is an alternate material.

399 Note 5 to entry: Material recycling excludes products and parts recovery, alternate material recovery (IEV 193-04-
 400 10) and energy recovery (IEV 193-04-11).

401 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-13, modified – The Figure and related Note
 402 6 to entry have been deleted.]

403 **3.2.15**
 404 **material recycling rate**
 405 mass ratio of recycled material (IEV 193-03-12) recovered from end-of-life (IEV 193-05-07)
 406 products (IEV 193-02-01) or waste (IEV 193-04-01) excluding alternate material recovery (IEV
 407 193-04-10), products or parts recovery (IEV 193-04-05) and energy recovery (IEV 193-04-11)

$$R(\text{recy}) = \frac{m_{(rm)}}{m_{(w)}}$$

408 where

409 $R_{(\text{recy})}$ is the material recycling rate;

410 $m_{(rm)}$ is the mass of the recycled materials, excluding alternate materials;

411 $m_{(w)}$ is the total mass of the end-of-life products or waste (inflow in a certain period).

412 Note 1 to entry: When the material recycling rate is calculated, it is important to make clear where the material is
 413 recycled from, whether end-of-life products or waste.

414 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-14.]

415 **3.2.16**
 416 **material separation**
 417 operation to separate materials (IEV 193-03-03), including mechanical, chemical or thermal
 418 processes additional to disassembly (193-04-26) and dismantling (IEV 193-04-27)

419 EXAMPLE Smelting, sorting, etc.

420 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-25, modified – The Figure and related Note
 421 1 to entry have been deleted.]

422 **3.2.17**
 423 **products or parts recovery**
 424 controlled process whereby functioning products (IEV 193-02-01) or parts (IEV 193-02-02) are
 425 recovered from end-of-life (IEV 193-05-07) products or waste (IEV 193-04-01) and are brought
 426 back to use for the same or a different purpose

427 Note 1 to entry: Processes for product recovery can include refurbishment (IEV 193-06-03), remanufacture (IEV 193-
 428 06-04) and repurpose (IEV 193-06-05).

429 Note 2 to entry: Processes for parts recovery can include disassembly (IEV 193-04-26), cleaning, and testing.

430 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-05.]

431 **3.2.18**
 432 **product material recoverability rate**
 433 ratio of mass of the estimated recoverable material (IEV 193-03-03) to the mass of the complete
 434 product (IEV 193-02-01)

$$R(\text{reco},p) = \frac{m(\text{reco})}{m(p)}$$

435 where

436 $R(\text{reco},p)$ is the product material recoverability rate;

437 $m(\text{reco})$ is the total mass of the materials of the product that can be recovered;

438 $m(p)$ is the total mass of the product.

439 Note 1 to entry: The amount of materials that can be recovered is estimated based on a specific state-of-the-art end-
 440 of-life treatment scenario.

441 Note 2 to entry: Recoverable material excludes material used for energy recovery.

442 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-09.]

443 **3.2.19**
 444 **product material recyclability rate**
 445 ratio of mass of the materials (IEV 193-03-03) that can be recycled to the mass of the complete
 446 product (IEV 193-02-01)

$$R(\text{recy},p) = \frac{m(\text{recy})}{m(p)}$$

447 where

448 $R(\text{recy},p)$ is the product material recyclability rate;

449 $m(\text{recy})$ is the total mass of the materials of the product that can be recycled;

450 $m(p)$ is the total mass of the product.

451 Note 1 to entry: Recyclable materials exclude alternate materials and those related to energy recovery.

452 Note 2 to entry: The amount of materials that can be recycled is estimated based on a specific state-of-the-art end-
 453 of-life treatment scenario.

454 [SOURCE: IEC/FDIS 60050-193:2026 [1], 193-04-15.]

455 **3.2.20**
 456 **recovery**
 457 controlled process by which products (IEV 193-02-01), parts (IEV 193-02-02) or materials (IEV
 458 193-03-03) are recovered from end-of-life (IEV 193-05-07) products or waste (IEV 193-04-01),
 459 or by which waste is used to produce energy (IEV 193-03-23)

460 Note 1 to entry: Recovery is an operation by which value is regained from end-of-life products or waste.

461 [SOURCE: IEC/FIDS 60050-193:2026 [1], 193-04-04, modified – The Figures and the related
 462 Note 2 entry as well as Note 3 to entry related to homographs have been deleted.]

463 **3.2.21**
 464 **recycled material**
 465 material (IEV 193-03-03) reprocessed from end-of-life (IEV 193-05-07) products (IEV 193-02-
 466 01) or waste (IEV 193-04-01) that is of the same or similar type as the original material and that
 467 is ready to be used in manufacturing of products

468 SEE: Figure 193-03-11

469 Note 1 to entry: Recycled material can be pre- or post-consumer.

470 Note 2 to entry: Recycled material refers to the sum of the various fractions of materials recycled from end-of-life
 471 products or waste like metals, plastics, etc., excluding alternate material and material used to produce energy (IEV
 472 193-03-23)