

BLUE ANGEL

The German Ecolabel



**Printing inks, inkjet inks and toners for paper
and cardboard on professional printing ma-
chines**

DE-UZ 237

Basic Award Criteria

Edition July 2024

Version 2

The Environmental Label is supported by the following four institutions:



Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

The Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection is the owner of the label. It regularly provides information on the decisions taken by the Environmental Label Jury.



The German Environmental Agency with its specialist department for "Ecodesign, Eco-Labeling and Environmentally friendly Procurement" acts as office of the Environmental Label Jury and develops the technical criteria of the Basic Criteria for Award of the Blue Angel.



The Environmental Label Jury is the independent, decision-making body for the Blue Angel and includes representatives from environmental and consumer associations, trade unions, industry, the trade, crafts, local authorities, academia, the media, churches, young people and the German federal states.



The RAL gGmbH is the awarding body for the Environmental Label. It organises the process for developing the relevant award criteria in independent expert hearings – which involve all relevant interest groups.

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This document is a translation of a German original. In case of dispute, the original document should be taken as authoritative.

1 Introduction

1.1 Preface

In cooperation with the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, the German Environmental Agency and considering the results of the expert hearings conducted by RAL gGmbH, the Environmental Label Jury has set up these Basic Criteria for the Award of the Environmental Label. RAL gGmbH has been tasked with awarding the Environmental Label.

Upon application to RAL gGmbH and on the basis of a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH, the permission to use the Environmental Label may be granted to all products, provided that they comply with the requirements as specified hereinafter.

The product must comply with all the legal requirements in the country in which it is to be marketed. The applicant shall declare that the product meets this requirement.

1.2 Background

Printing inks, inkjet inks and toners for graphical printed matter made of paper and cardboard (such as newspapers, catalogues, prospectuses, posters, billboards and displays made of cardboard) are highly disseminated products. Around 1.9 million tonnes of press and catalogue papers are printed every year in Germany alone (German Pulp and Paper Association 2023).

Most of the paper products and thus also the printing inks, inkjet inks and toners end up in paper factories via waste paper collections at the end of their life. To ensure that this waste paper can be reused for high-quality and versatile products, it is necessary to ensure that any impurities are largely removed. For this reason, it must be possible to easily remove the printing inks, inkjet inks and toners.

The production and use of printing inks, inkjet inks and toners can negatively impact the environment and health due to hazardous substances. Toxic and persistent substances and also those hazardous to water can end up in bodies of water or find their way into recycled products via the recycled paper fibres. Hazardous substances include heavy metals and amines in dyes. Persistent environmentally hazardous substances include per- and polyfluorinated chemicals (PFAS) that are used to improve abrasion resistance. Substances that prevent the recycling of the paper fibres include hydrocarbons from mineral oil and their impurities containing polycyclic aromatic hydrocarbons (PAH). Using less hazardous substances can reduce or avoid the dangers posed by printing inks, inkjet inks and toners and improve the reusability of the paper fibres.

Some printing inks contain oils based on renewable raw materials instead of mineral oils. However, renewable raw materials – particularly soy, coconut, palm and palm kernel oils and their derivatives – should be sourced from certified sustainable production to conserve biodiversity and help protect the climate. The use of oils from plants cultivated on areas where forests requiring a particularly high level of protection were cleared, such as e.g. tropical or boreal forests, is not acceptable.

1.3 Objectives of the Environmental Label

When selecting printing inks, inkjet inks and toners, there are products available on the market that have a lower impact on the environment and health than comparable products.

Printing inks, inkjet inks and toners that comply with the following criteria can be easily removed from the fibres during recycling of the paper and enable the production of recycled fibres with a lower level of pollutants.

Printing inks, inkjet inks and toners that comply with these criteria will contain less hazardous ingredients. For example, they will not contain any substances with a carcinogenic, mutagenic or teratogenic effect or those that are toxic to people and water organisms. These products also avoid the use of per- and polyfluorinated chemicals.

The "Blue Angel ecolabel for printing inks, inkjet inks and toners for paper and cardboard on professional printing machines" indicates that products issued with this label – in contrast to other products – provide greater preventative protection for the environment and human health. Therefore, the ecolabel acts as a decision-making aid for printing companies when they are purchasing printing inks, inkjet inks and toners so that they can pay particular attention to environmental and health aspects. In particular, this ecolabel is closely aligned with the Blue Angel for printed matter (DE-UZ 195) so that it is easier for printing companies to certify their products.

It is a voluntary label that is designed to motivate printing companies to select products with lower environmental and health hazards when purchasing printing inks, inkjet inks and toners. Manufacturers can use the ecolabel to convey this aspect of their products in a simple manner. This ecolabel is used to certify printing inks, inkjet inks and toners that stand out above all due to the following health and environmental protection criteria:

- Avoidance of input materials that are harmful to the environment and health
- Easy removal of the printing inks, inkjet inks and toners during paper recycling

Therefore, following benefits for the environment and health are stated in the explanatory box:

- Low level of harmful materials
- Supports high-quality paper recycling

1.4 Definitions

Aliphatic hydrocarbons: Saturated hydrocarbons from mineral oils that consist of open chain hydrocarbons (paraffin) and alkylated and non-alkylated cyclic hydrocarbons (naphthalenes)

Aromatic hydrocarbons: Highly alkylated aromatic hydrocarbons from mineral oils that have one or more aromatic rings

CLP: Classification, Labelling and Packaging

Digital Printing: Inkjet printing or electrostatic printing processes

Printing inks: Inks (colouring matter) that are not applied to a printed substance in an inkjet or electrostatic printing process (such as offset printing processes)

Mixture: Mix, mixture or solution composed of two or more substances

ISCC: International Sustainability and Carbon Certification

Constituent ingredient: Substances added to the product as such or as part of a mixture in order to achieve or influence certain product properties and those required as chemical cleavage products for achieving the product properties

PAHs: Polycyclic aromatic hydrocarbons

Paraffin waxes: A microcrystalline product formed during either the processing of petroleum or synthetically produced. Other descriptions: Fischer-Tropsch waxes (synthetic), mineral oil waxes (from petroleum), microcrystalline waxes. They are used for abrasion protection in printing inks and hot melt adhesives.

PFAs: Per- and polyfluoroalkyl substances (e.g. polytetrafluoroethylene)

Polyolefin waxes: Waxes manufactured from olefins, for example: polyethylene wax. They are used for abrasion protection in printing inks and hot melt adhesives.

Professional printing machines: Printing machines that are not designed as office equipment with printing function (Printers and Multifunction Devices) according to the definition in UZ 219

RSB: Roundtable on Sustainable Biomass

RSPO: Roundtable on Sustainable Palm Oil

REACH: Registration, Evaluation, Authorisation and Restriction of Chemical Substances

RTRS: Roundtable on Responsible Soy Association

Siccative: A drying agent

Substance: A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition

SVHC: Substance of very high concern

Inkjet inks: Inks (colouring matter) that are applied to a printed substance in an inkjet printing process as drops or a jet

Toner: Inks (colouring matter) that are applied to a printed substance in an electrostatic process

TOF: Total Organic Fluorine

TRGS: Technical Rules for Hazardous Substances

Vaseline: Aliphatic hydrocarbon compound (from petroleum or plant-based raw materials), which is used as abrasion protection in printing inks

Applicant/label holder: The respective contractual partner, i.e. the manufacturer of the printing inks

Distributor/label user: The company under whose name the product is placed on the market (e.g. whose address can be found on the printed product)

2 Scope

These Basic Award Criteria apply to printing inks, inkjet inks and toners for graphical printed matter that is designed for use on paper/cardboard and on professional printing machines in, for example, the following printing processes:

- ♦ Sheet-fed offset printing
- ♦ Web offset printing (coldset web offset printing, headset web offset printing and LED UV web offset printing)
- ♦ Digital printing (inkjet inks for inkjet printing, toners for electrostatic printing).

Varnishes are not covered by the Basic Award Criteria because they are used in combination with inks and it is not possible to verify that they are easy to remove in the preparation of recovered paper.

3 Requirements

3.1 Requirements for recyclability

The printing inks, inkjet inks and toners must be removable from the defined carrier material for their use stated in the application¹. In the technical data sheet, the manufacturer must indicate the minimum permissible grammage of paper on which the product complies with the Blue Angel requirements.

Applications submitted for UV curable inks and inkjet printing inks must cover coated and uncoated surfaces and applications for all other printing inks, inkjet inks and toners must only cover uncoated surfaces, stipulating the defined carrier materials and at least one grammage, which is typically used as the lowest grammage for the printing process. These grammages are:

- ♦ 80 g/m² for sheet-fed offset printing and digital printing
- ♦ 42.5 g/m² for paper in coldset web offset printing, LED UV web offset printing and head-set web offset printing.

The removability of the product must be verified by testing a typical printed product with a high ink coverage on both sides. In the case of sheet-fed offset printing and digital printing, a defined printing pattern must be used on both sides.

In the case of products designed for inkjet printing processes, the removability of the inks must be verified by testing five uncoated and five coated digital printing papers from different manufacturers with the grammage stated above (or lower). If the applicant only wants to approve the inkjet ink for use with one type of paper (coated or uncoated), the test must not be carried out on the non-approved type of paper.

The product must comply with the recyclability requirements of the European Paper Recycling Council (EPRC) on the carrier material. The test methods for evaluating recyclability are:

¹ This does not apply to printing inks, inkjet inks and toners designed for printing on paper and kraft paper that has been made out of unbleached recovered paper from the kraft process for classification groups 4 and 5 according to DIN EN 643.

- INGEDE Method 11: Deinkability test (version: January 2018) or
- equivalent methods: PTS RH021/97 Cat I (2012), ISO 21993:2020.

The deinkability of the product must be assessed in accordance with the guidelines issued by the EPRC using the deinkability scorecard², whereby the printing inks used must score a least 51 points on the "Deinkability Scorecard" from the EPRC. In addition, the product should score at least 50% of the maximum number of points available for each individual criterion.

Further information on deinkability can be found in Appendix B.

Compliance verification

*The applicant shall declare compliance with the requirements in **Annex 1** and submit a **test report (Annex 2)** from an independent testing institute on the deinkability of the product using the stated methods in which compliance with the requirements is confirmed by the testing institute. In the case of sheet-fed offset and digital printing, the printing pattern provided by RAL gGmbH must be used from the date these Basic Award Criteria came into force; test reports created before this point in time in accordance with Blue Angel DE-UZ 195 will also be accepted. Tests of sheet-fed offset and digital printing inks using the printing pattern provided by the Austrian ecolabel (UZ 24) will also be accepted. In the case of printing processes other than sheet-fed offset and digital printing, the deinkability of the product must be verified using a printed image with a high ink coverage that is typical for the sector. The test report must contain an image of the printed pattern used for the test so that it is possible to evaluate the ink coverage. In addition, the applicant shall submit the **technical data sheet (Annex 3)** indicating the minimum permissible grammage on which the product complies with the Blue Angel criteria.*

3.2 General substance requirements

Observance of European and German chemical law, as well as standard rules for the sector, is a prerequisite (especially the REACH Regulation Annex XVII, POP Regulation Annex I, CLP Regulation, Biocidal Products Regulation, Solvent Ordinance (31st BImSchV)³.

Printing inks, inkjet inks and toners may not contain substances and substances in added mixtures that comply with the following classification rules if their amount exceeds the limits stated in Appendix C, Table 2 (and the substances have to be correspondingly labelled in the safety data sheet for the printing inks, inkjet inks and toners because they exceed the associated concentration values):

- a) Substances which are identified as particularly alarming under the European Chemicals Regulation REACH (EC) No 1907/2006 and which have been incorporated into the list drawn up in accordance with Article 59, Paragraph 1 of the REACH Regulation (so-called "list of candidates")⁴.

² <http://www.paperforrecycling.eu/download/178/>

³ If substance restrictions from other regulations also apply to the specific product, these also need to be observed.

⁴ List of candidates from the REACH Regulation (EC) No. 1907/2006: <https://www.echa.europa.eu/de/candidate-list-table>. The version of the list of candidates at the time of application is valid. The label holder is obligated to take into account current developments on the list of candidates. If an ingredient is newly added to the list of candidates during the term of the Basic Award Criteria, the label holder must submit an informal notification stating the name of the substance and its CAS or EC number. Deadlines for substituting this ingredient will then be agreed with the label holder.

- b) Substances that according to Regulation (EC) No. 1272/2008 (CLP Regulation) have been classified in the following hazard categories or which meet the criteria for such classification⁵:
- acutely toxic (poisonous) in categories Acute Tox. 1, Acute Tox. 2 or Acute Tox. 3
 - toxic to specific target organs in categories STOT SE 1, STOT SE 2 or STOT RE 1, STOT RE 2, Asp. Tox. 1
 - carcinogenic in categories Carc. 1A, Carc. 1B or Carc. 2
 - germ cell mutagenic in categories Muta. 1A, Muta. 1B or Muta 2
 - reprotoxic (teratogenic) in categories Repr. 1A, Repr. 1B or Repr. 2, Lact.
 - endocrine disruptors with a negative effect on human health in the categories ED HH 1 or ED HH 2⁶
 - endocrine disruptors with a negative effect on the environment in the categories ED ENV 1 or ED ENV 2⁶
 - persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) characteristics from 01/01/2025⁶
 - persistent, mobile and toxic (PMT) or very persistent, very mobile (vPvM) characteristics⁶
 - hazardous to water in the categories Aquatic Acute 1, Aquatic Chronic 1, Aquatic Chronic 2, Aquatic Chronic 3 or Aquatic Chronic 4
 - Supplementary hazard criteria and labelling elements in categories EUH029 (Contact with water liberates toxic gas), EUH031 (Contact with acids liberates toxic gas), EUH032 (Contact with acids liberates very toxic gas) or EUH070 (Toxic by eye contact).
- c) Substances classified as carcinogenic, mutagenic or reprotoxic substances in the currently valid version of TRGS 905⁷.

The hazard statements (H Phrases) that correspond to the hazard categories can be found in Table 2 in Appendix C.

As an exemption to these requirements, the following substances are permitted in the stated type of ink:⁸

- a) Antioxidants
- Sheet-fed offset printing inks: 2-tert-butylhydrochinon (H400), max. 1 %
 - Heatset web offset and sheet-fed offset printing processes: butylhydroxytoluol (H400, H410) max. 0.2 %

⁵ The version of the CLP Regulation (EG) No 1272/2008 at the time of application is valid: https://www.reach-clp-biozid-helpdesk.de/DE/CLP/Rechtstexte/Rechtstexte_node.html. The label holder is obligated to take into account current developments in the CLP Regulation. If an ingredient in the printing ink, inkjet ink or toner is classified with one of the named hazard categories during the term of the Basic Award Criteria, the label holder must submit an informal notification stating the name of the substance and its CAS or EC number, as well as the new hazard category. Deadlines for substituting this ingredient will then be agreed with the label holder.

⁶ New hazard categories according to the CLP Regulation that are legally binding for substances newly placed onto the market from 1 May 2025. For existing substances on the market, a later deadline applies (except for categories ED HH 1 and ED HH 2): legally binding by 1 November 2026 at the latest.

⁷ <http://www.baua.de/de/Themen-von-A-Z/Gefahrstoffe/TRGS/pdf/TRGS-905.pdf>

⁸ Applicants may request approval of other strictly defined exemptions by providing good justifications to RAL gGmbH. The requested exemptions will be examined in consultation with the German Environment Agency and will be added to the Basic Award Criteria if approved.

- b) Drying agents
 - Sheet-fed offset printing inks: manganneodecanoat (H373), mangantallat (H373), max. 3 %
- c) Solvents
 - Heatset web offset printing inks (H304)
 - Digital printing inks (H304).

See Chapter 3.3 “Special requirements for biocidal products and biocidal substances” for other deviating requirements with respect to H Phrases.

Compliance verification

*The applicant shall verify compliance with the requirements in **Annex 1** and submit a current safety data sheet according to Article 31 and Annex II of the REACH Regulation (EC) No. 1907/2006 for the product named in the application (**Annex 4**). The safety data sheets should not be older than 2 years.*

If the applicant wants to make changes to the substances contained in the product during the term of the contract that will lead to a change in classification, he or she must submit the associated documentation to RAL gGmbH in order to continue labelling the product with the Blue Angel. RAL gGmbH must be notified when the applicant becomes aware that an added substance has an endocrine effect that exceeds the limits in Appendix C, at the latest by the end of the transition deadlines, i.e. for new substances by 01/05/2025 and for existing substances on the market by 01/11/2026.

3.3 Special requirements for specific substances

These special substance requirements are supplementary to the general substance requirements. The requirements relate to the entire colour system, meaning the ready-for-use printing inks, inkjet inks and toners (“ready for printing”) and verification is required for each of them.

3.3.1 Requirements for biocidal products and biocidal substances

In-can preservatives, i.e. for the protection of finished products in containers against microbial deterioration to ensure their shelf life (Product-type 6 according to the Biocidal Products Regulation (EU) No. 528/2012), are the only biocidal substances or biocidal products permitted in the printing inks, inkjet inks and toners. However, only those substances for which an active substance dossier for preservatives for products during storage (product-type 6), according to the Biocidal Product Regulation, has been submitted may be used as a biocidal product and biocidal substance. If inclusion on the list of approved substances for product type 6 is rejected after an evaluation has been completed, the use of this substance is no longer permitted.

As an exemption to Paragraph 3.2., substances classified with the hazard statements H410 or H411 on their safety data sheets may also be used as in-can preservatives if the bioaccumulation potential is < 3.0 (log Pow octanol/water partition coefficient) or the bioconcentration factor is ≤ 100 .

Compliance verification

The applicant shall declare compliance with the requirements for the biocides used as in-can preservatives in the production process in **Annex 1** and state which preservative substances have been used in the formula for the printing inks and inkjet inks with their IUPAC names and CAS numbers. The applicant shall submit **safety data sheets (Annex 5)** for the products used as biocides in the production process and state the proportion by mass of each of the biocidal products.

3.3.2 Heavy metals

The following heavy metals may not be added to printing inks, inkjet inks and toners as a constituent component (dye, pigment, siccative): lead, cadmium, chromium VI, cobalt, mercury, nickel and copper compounds with the exception of copper phthalocyanine.

Manganese compounds may only be added as a constituent component (dye, pigment, siccative) if the proportion of manganese in the printable mixture does not exceed a maximum of 0.5 % by mass.

Compliance verification

The applicant shall declare compliance with the requirements in **Annex 1** and state the proportion by mass accounted for by the manganese compound.

3.3.3 Dusty ingredients in toners

The Basic Award Criteria aim to ensure that the toner formulation has the lowest possible proportion of dust with an aerodynamic diameter of $\leq 10 \mu\text{m}$.

Compliance verification

The applicant shall carry out a measurement in accordance with DIN EN 15051 and submit a corresponding **measurement report (Annex 6)** that states the proportion of dust with an aerodynamic diameter of $\leq 10 \mu\text{m}$.

3.3.4 Azo dyes

No azo dyes or pigments may be added that can break down into amines. Amines are listed in Regulation (EC) No. 1907/2006, Annex XVII, No. 43, Appendix 8 or 9⁹, or in TRGS 614¹⁰:

Table 1:

Substance	CAS number
benzidine	92-87-5
4-chloro-o-toluidine	95-69-2
2-naphthylamine	91-59-8
o-aminoazotoluene / 4-amino-2',3-dimethylazobenzene / 4-o-tolylazo-o-toluidine	97-56-3

⁹ Regulation (EG) No. 1907/2006

¹⁰ Technical Rules for Hazardous Substances – Restrictions on use for azo dyes, which may release aromatic amines classified as carcinogens (2001)

Substance	CAS number
5-nitro-o-toluidine	99-55-8
4-chloroaniline	106-47-8
4-methoxy-m-phenylenediamine	615-05-4
4,4'-methylenedianiline / 4,4'-diaminodiphenylmethane	101-77-9
3,3'-dichlorobenzidine / 3,3'-dichlorobiphenyl-4,4'-ylenediamine	91-94-1
3,3'-dimethoxybenzidine / o-dianisidine	119-90-4
3,3'-dimethylbenzidine / 4,4'-bi-o-toluidine	119-93-7
4,4'-methylenedi-o-toluidine	838-88-0
6-methoxy-m-toluidine / p-cresidine	120-71-8
4,4'-methylene-bis-(2-chloro-aniline) / 2,2'-dichloro-4,4'-methylene-dianiline	101-14-4
4,4'-oxydianiline	101-80-4
4,4'-thiodianiline	139-65-1
o-toluidine / 2-aminotoluene	95-53-4
4-methyl-m-phenylenediamine	95-80-7
2,4,5-trimethylaniline	137-17-7
o-anisidine / 2-methoxyaniline	90-04-0
4-amino azobenzene	60-09-3
4-Amino-3-fluorophenol*	399-95-1
6-Amino-2-ethoxynaphthalene*	-
* Azo dyes that can break down into this amine are not known. Analytical proof is not required here.	

Compliance verification

The applicant shall verify compliance with the requirements in Paragraph 3.3.4 in **Annex 1**. If azo dyes and pigments have been used, the applicant shall verify compliance with the requirements by submitting an **analysis (Annex 7)** carried out in accordance with DIN 55610:1986 or ETAD Method 212 (2016). The proportion of primary aromatic amines in the azo dyes or pigments (e.g. due to cleavage or production-related impurities) must not exceed 0.05%.

3.3.5 Hydrocarbons in printing inks for offset printing

In order to avoid unhealthy contamination during the reuse of the printed paper fibres, the following requirements must be fulfilled for offset printing inks:

- In the case of aliphatic hydrocarbons, only those substances with a chain length of C10 to C20 may be used as constituent components. In addition, the following high-molecular compounds without solvent properties may be used if they have a carbon number C > 35 and the proportion of those with a carbon number of C20 to C35 does not exceed a maximum of 5%: microcrystalline waxes, Vaseline, polyolefin waxes, paraffin waxes or Fischer-Tropsch waxes.

The proportion of aromatic hydrocarbons from mineral oil as a constituent component of the printing inks must not exceed 0.1% by mass. In printing inks used in heatset web offset printing, it is permissible for aromatic hydrocarbons from mineral oil with a proportion of up to 1% by mass to be used as solvents because the oils are largely destroyed in the dryer.

In addition, the printing ink may not contain more than 0.2 mg/kg of each of the following PAHs: Benzo[a]pyrene, Benzo[e]pyrene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[j]fluoranthene, Benzo[k]fluoranthene, Chrysen, Dibenzo[a,h]anthracene, Benzo[g,h,i]perylene, Indeno[1,2,3-cd]pyrene.

Furthermore, the sum of all the above-named PAHs in the printing ink should be below 1 mg/kg.

Compliance verification

*The applicant shall verify compliance with the requirements by submitting **Annex 1**. In addition, the applicant shall submit **information on the recipes (Annex 8)** for the components used in the printing inks to RAL gGmbH and a **measurement report (Annex 9)** on the PAH content carried out in accordance with AfPS GS 2019:01 PAK, which states the individual amounts and sums of the restricted PAHs and also the amounts of naphthalene, the sum of phenanthrene, pyrene, anthracene and fluoranthene and the sum of all 15 PAHs determined in the measurement processes. In justified exceptional cases, the measurement can be carried out using a different method with a sufficiently low determination limit.*

3.3.6 Per- and polyfluoroalkyl substances (PFAS)

To avoid the release of persistent substances into the environment, the following requirements must be complied with from 01/01/2025 onwards: No per- and polyfluoroalkyl substances (PFAS) may be added to the printing inks, inkjet inks and toners. The amount of organic fluorine compounds due to impurities should not exceed 50 mg of organically bound fluorine/kg of ink. The maximum permissible content is 200 mg of organically bound fluorine/kg of ink. If the value is between 50 and 200 mg of organically bound fluorine/kg of ink, the manufacturer must state the reasons why this is the case and describe the measures taken to minimise these substances. If the maximum value is exceeded due to the use of organic fluorine compounds that do not belong to PFAS, the applicant must state the amount added (converted into mg/kg of TOF) and their function.

Compliance verification

*The applicant shall verify compliance with the requirements in **Annex 1** and submit a **measurement report (Annex 10)** stating the fluorine content and extractable organic fluorine (EOF) or the total organic fluorine (TOF). Fluorine analyses carried out in accordance with the methods stated in DIN EN 14582:2016 or DIN EN 15408:2011 are permitted. If the limit of 200 mg of fluorine per kilogram of ink is exceeded due to inorganic fluorine compounds, the applicant is also permitted to carry out an **additional measurement (Annex 10a)** on EOF or TOF, e.g. in accordance with the method stated in SAA-H-TOF.015:2018-11 or using an equivalent method.*

3.4 Requirements for renewable raw materials

3.4.1 Certified renewable raw materials

If the printing inks, inkjet inks and toners contain or are produced on the basis of renewable raw materials, the applicant must provide certificates in the case of soy oil, palm oil, palm kernel oil and coconut oil and derivatives derived from them to verify that they were cultivated in accordance with recognised sustainability criteria. Information on the country of origin must be

provided for other renewable raw materials such as rapeseed oil, linseed oil, colophony and tall oil ("wood oil").

Compliance verification

*The applicant shall verify compliance with the requirements by declaring in **Annex 1** that either no renewable raw materials are used or by naming the renewable raw materials added to the product. In the case of soy oil, palm oil, palm kernel oil, coconut oil and derivatives derived from them, the applicant shall submit a **certificate (Annex 11)** from 01/01/2025 onwards to verify that they were cultivated in accordance with recognised sustainability criteria. The following sustainability criteria will be accepted: ISCC¹¹ PLUS, ISCC EU, RSB¹² , RSPO¹³ , RTRS¹⁴ and ProTerra¹⁵ . In the case of other renewable raw materials such as rapeseed oil, linseed oil, colophony and tall oil ("wood oil"), the manufacturer shall submit information in the form of a **letter from the supplier (Annex 11)** stating the countries in which the cultivation areas are located so that research into suitable sustainability certificates can be carried out for the next revision of the Basic Award Criteria.*

3.4.2 Raw materials made of non-genetically modified plants

If the printing inks, inkjet inks and toners contain or are produced on the basis of renewable raw materials, these should not originate from genetically modified plants.

Compliance verification

*The applicant shall verify compliance with the requirements by submitting a **declaration from the manufacturer (Annex 12)** that certifies the exclusion of genetically modified plants. The certification system used to certify that the raw materials are free of genetically modified plants shall be stated when the application is made and the **certificate (Annex 13)** submitted. Otherwise, the applicant shall state which genetically modified raw materials are used in the product and in what quantities. If verification cannot currently be provided, the applicant shall justify the reasons.*

3.5 Requirements for energy consumption

The energy sources used at the site where the product stated in the application is formulated must be stated together with information on their main uses (e.g. gas to produce steam, thermal oil, heating water, hot water; electricity for machines and lighting) so that the proportion of the energy sourced from regenerative sources is clear.

The applicant must state whether he or she has a certified energy management system for the production of the products named in the application or describe which internal company targets, responsibilities and measures have been defined to manage energy consumption. Product-specific energy consumption figures must be submitted. If no consumption figures are available, the

¹¹ International Sustainability and Carbon Certification (<https://www.iscc-system.org>)

¹² Roundtable on Sustainable Biomass (<https://rsb.org>)

¹³ Roundtable on Sustainable Palmoil (<https://rspo.org>)

¹⁴ Roundtable on Sustainable Soy Oil (<https://responsiblesoy.org>)

¹⁵ Pro Terra Foundation (<https://www.proterrafoundation.org>)

applicant must state the reasons why this is the case and make a plausible estimate of one figure.

Compliance verification

*The applicant shall verify compliance with the requirements by listing the energy sources used together with their main uses, as well as by providing information on energy management and product-specific energy consumption figures in kilowatt hours per kilogram (**Annex 14**). The energy consumption figures can be submitted at a later date for new product developments.*

3.6 Requirements for product advertising

Product names containing terms such as "organic", "eco", "nature" etc. are only permitted if 100% of the oils added (approx. 30-40% of the total ink) are produced based on renewable raw materials. The explanation of the product name must be included on the product information sheet. The use of these word elements to advertise the products outside of the product name is not permitted¹⁶.

Advertising claims must not include any information in the sense of Article 25 (4) of the CLP Regulation (EC) No. 1272/2008 that could play down the risks such as e.g. "non-toxic", "non-harmful to health" or similar claims.

Compliance verification

*The applicant shall declare compliance with the requirement in **Annex 1** and submit the corresponding **product information sheet (Annex 3)** and the **container text (Annex 15)**. If parts of the name or product descriptions contain terms such as "organic", "eco", "nature" etc., the product sheet must explain why this term was selected (e.g. due to the use of renewable raw materials).*

3.7 Overview of possible future requirements

As part of the next revision of these Basic Award Criteria, the following aspects, among others, will be taken into account:

- Extension of the scope of validity to include printing inks, inkjet inks and toners for printing on packaging
- Extension of the scope of validity to include printing inks for textiles and plastics
- Advantages and disadvantages of publishing further information on the recipes
- Effect of the use of substances classified as sensitising substances on the finished printed product
- The residual monomer content in the finished printed product with LED UV web offset printing inks at a reduced radiated power (which will presumably ensure food deinkability)
- Defining limits for other PAHs
- Inclusion of a measurement method to verify that the proportion of aromatic hydrocarbons from mineral oil in offset printing inks is less than 0.1%
- Defining a PFAS limit of 50 mg of fluorine/kg of ink, without any exemptions

¹⁶ This is a concession to existing product lines and reflects the fact that these terms are generally used in B2B (and not B2C) communication. However, it is recommended that other product names are selected in the future.

- Certification options for renewable raw materials other than soy, palm oil, palm kernel oil and coconut oil and their derivatives
- Improving the definition of genetically modified renewable raw materials
- Reviewing the requirements for product advertising (also against the background of the new Directive (EU) 2024/825, which still has to be transposed into national law, to empower consumers for the green transition through better protection against unfair practices and through better information).

4 Applicants and Parties Involved

Manufacturers or distributors of final products according to Paragraph 2 shall be eligible for application.

Parties involved in the award process are:

- RAL gGmbH to award the Blue Angel Environmental Label,
- the federal state being home to the applicant's production site,
- Umweltbundesamt (German Environmental Agency) which after the signing of the contract receives all data and documents submitted in applications for the Blue Angel in order to be able to further develop the Basic Award Criteria.

5 Use of the Environmental Label

The use of the Environmental Label by the applicant is governed by a contract on the use of the Environmental Label concluded with RAL gGmbH.

Within the scope of such contract, the applicant undertakes to comply with the requirements under Paragraph 3 while using the Environmental Label.

Contracts on the Use of the Environmental Label are concluded to fix the terms for the certification of products under Paragraph 2. Such contracts shall run until December 31, 2028.

They shall be extended by periods of one year each, unless terminated in writing by March 31, 2028 or March 31 of the respective year of extension.

After the expiry of the contract, the Environmental Label may neither be used for labelling nor for advertising purposes. This regulation shall not affect products being still in the market.

The applicant (manufacturer) shall be entitled to apply to RAL gGmbH for an extension of the right to use the ecolabel on the product entitled to the label if it is to be marketed under another brand/trade name and/or other marketing organisations.

The Contract on the Use of the Environmental Label shall specify:

- Applicant (manufacturer/distributor)
- Brand/trade name, product description
- Distributor (label user), i.e. the above-mentioned marketing organisations.

The label holder shall point out that printed matter using printing inks, inkjet inks and toners certified with the Blue Angel may not carry the Blue Angel logo if it does not comply with all of the requirements for the DE-UZ 195 ecolabel (Blue Angel for printed matter). A single sentence (without the logo) stating that printing inks, inkjet inks and toners certified with the Blue Angel were used is permitted.

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Appendix A Cited legislations and standards, literature

AfPS GS 2019:01 PAK: Testing and assessment of polycyclic aromatic hydrocarbons (PAHs) in the course of awarding the GS mark – specification according to § 21 (1) No. 3 ProdSG. GS specification. Product Safety Commission (AfPS), Federal Institute for Occupational Safety and Health, Dortmund, 10 April 2020.

https://www.baua.de/DE/Aufgaben/Geschaeftsfuehrung-von-Ausschuessen/AfPS/pdf/AfPS-GS-2019-01-PAK.pdf?__blob=publicationFile&v=6

DIN EN 15051:2013: Workplace exposure – Measurement of the dustiness of bulk materials. <https://www.beuth.de/de/norm/din-en-15051-1/187600756>

DIN 55610:1986: Testing of pigments and solvent-soluble dyestuffs; determination of unsulfonated primary aromatic amines. <https://www.beuth.de/de/norm/din-55610/1305793>

EPRC (2017): Assessment of Printed Product Recyclability – Deinkability Score User's Manual. European Paper Recycling Council. <https://www.paperforrecycling.eu/download/178/>

ETAD Method 212 (2016): Identification and Quantification of Primary Aromatic Amines in Organic Pigments by HPLC. <https://etad.com/publications/>

INGEDE Method 11 (2018): Assessment of print product recyclability – Deinkability test. <http://pub.ingede.com/methoden/>

Papierindustrie (2023): PAPIER 2023 – Ein Leistungsbericht, Die Papierindustrie e.V., Berlin (The German Pulp and Paper Association (2023): PAPER 2023 – A Performance Report, The German Pulp and Paper Association, Berlin)

PFAS (2023): Umweltbundesamt-Informationen zu per- und polyfluorierten Chemikalien. (PFAS (2023): Information from the German Environment Agency on per- and polyfluorinated chemicals) <https://www.umweltbundesamt.de/tags/pfas>

SAA-H-TOF.015:2018-11: Determining the organic fluorine content (TOF) – combustion in a stream of oxygen.

TRGS 614 (2001): Technical Rules for Hazardous Substances – Restrictions on use for azo dyes, which may release aromatic amines classified as carcinogens, March 2001. <https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-614.html>

TRGS 905 (2020): Technical Rules for Hazardous Substances – Directory of carcinogenic and mutagenic substances and substances toxic to reproduction, March 2016, updated in 2020. <https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-905.html>

UBA (2018): Implementierung von Nachhaltigkeitskriterien für die stoffliche Nutzung von Biomasse im Rahmen des Blauen Engel – Machbarkeitsstudie zu übergreifenden Aspekten

(Implementation of sustainability criteria for the material use of biomass in the context of the Blue Angel - A Feasibility Study on Fundamental Requirements). German Environment Agency (Publisher), Dessau-Roßlau.

https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-08-19_texte_87-2019_be_biomassenutzung_uebergreifende-aspekte.pdf

Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.

https://www.reach-clp-biozid-helpdesk.de/DE/CLP/Rechtstexte/Rechtstexte_node.html

Regulation (EU) No. 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

https://www.reach-clp-biozid-helpdesk.de/DE/Biozide/Rechtstexte/Rechtstexte_node.html

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

https://www.reach-clp-biozid-helpdesk.de/DE/REACH/Rechtstexte/Rechtstexte_node.html

Regulation (EU) 2022/2400 of the European Parliament and of the Council of 23 November 2022 amending Annexes IV and V to Regulation (EU) 2019/1021 on persistent organic pollutants.

<https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32022R2400>

Appendix B Deinking test

Deinking test

The applicant shall commission deinking tests according to INGEDE Method 11 or comparable methods. Equivalent methods are: PTS RH021/97 Cat. I (2012) and ISO 21993:2020.

In the case of printing inks for sheet-fed offset printing and inkjet inks and toners for digital printing, the printing pattern provided by RAL gGmbH must be used for the deinking test from the time that these Basic Award Criteria come into force. The printing pattern produced by the Austrian ecolabel may also be used for digital printing. Deinking tests carried out before these Basic Award Criteria came into force can be submitted as verification if the grammage complies with the minimum requirements, the test report is complete and the report contains an image of the printing pattern that indicates a high ink coverage.

In the case of radiation hardened, UV curable inks, the test must be carried out on two types of paper: coated and uncoated paper. The test must only be carried out on uncoated paper for other types of printing inks, inkjet inks and toners. Precisely specified series of printing inks from one manufacturer must be used for the test. The test report must state both the paper (trade name, coated/uncoated, mass per unit area, manufacturer) used for the test and the precise description of the printing inks, inkjet inks or toners (trade name, colour tone, manufacturer).

If the ink series only differ with respect to the amount of solvent used to set the viscosity, it is possible to cover multiple series with two tests of the series with the lowest and highest proportion of solvent if a declaration from the manufacturer is submitted.

Example: "Fictitious ink 200" and "Fictitious ink 300" have been tested and approved for all four colour tones, which only differ due to the proportion of solvent used. As a result, the other printing products "Fictitious ink 2xx" with ink series that use a proportion of solvent that is between that used in "Fictitious ink 200" and "Fictitious ink 300" are covered by their tests and approvals.

If the applicant can verify the deinkability of the product in accordance with the Deinkability Scorecard from the EPRC, approval will be issued by RAL gGmbH for all printed matter that is produced in accordance with these specifications – the same or lower ink coverage, the same or higher mass per unit area of paper – without each one requiring special individual verification. After successfully verifying the deinkability of the inks on uncoated paper, approval is automatically issued for coated paper for all printing inks, inkjet inks and toners that are not cured.

Appendix C Hazard categories and hazard statements (H Phrases)

Table 2:

Hazard category	Hazard statement (H Phrase)	Wording	Limit value (% by mass)
Toxic substances			
Acute Tox. 1 Acute Tox. 2	H300	Fatal if swallowed.	0.1
Acute Tox. 3	H301	Toxic if swallowed.	0.1
Asp. Tox. 1	H304	May be fatal if swallowed and enters airways.	1.0
Acute Tox. 1 Acute Tox. 2	H310	Fatal in contact with skin.	0.1
Acute Tox. 3	H311	Toxic in contact with skin.	0.1
Acute Tox. 1 Acute Tox. 2	H330	Fatal if inhaled.	0.1
Acute Tox. 3	H331	Toxic if inhaled.	0.1
Carcinogenic, mutagenic and reprotoxic substances			
Muta. 1A Muta. 1B	H340	May cause genetic defects.	0.1
Muta. 2	H341	Suspected of causing genetic defects.	1.0
Carc. 1A Carc. 1B	H350	May cause cancer.	0.1
Carc. 1A Carc. 1B	H350i	May cause cancer if inhaled.	0.1
Carc. 2	H351	Suspected of causing cancer.	0.1
Repr. 1A Repr. 1B	H360F	May damage fertility.	0.1
Repr. 1A Repr. 1B	H360D	May damage the unborn child.	0.1
Repr. 1A Repr. 1B	H360FD	May damage fertility. May damage the unborn child.	0.1
Repr. 1A Repr. 1B	H360Fd	May damage fertility. Suspected of damaging the unborn child.	0.1
Repr. 1A Repr. 1B	H360Df	May damage the unborn child. Suspected of damaging fertility.	0.1
Repr. 2	H361f	Suspected of damaging fertility.	0.1
Repr. 2	H361d	Suspected of damaging the unborn child.	0.1
Repr. 2	H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.	0.1
Other potential hazards			
Lact.	H362	May cause harm to breast fed children.	0.1
STOT SE 1	H370	Causes damage to organs.	1.0
STOT SE 2	H371	May cause damage to organs.	1.0
STOT RE 1	H372	Causes damage to organs through prolonged or repeated exposure.	1.0
STOT RE 2	H373	May cause damage to organs through prolonged or repeated exposure.	1.0
Aquatic Acute 1	H400	Very toxic to aquatic life.	0.1

Hazard category	Hazard statement (H Phrase)	Wording	Limit value (% by mass)
Aquatic Chronic 1	H410	Toxic to aquatic organisms.	1.0
Aquatic Chronic 2	H411	Toxic to aquatic organisms with long-lasting effects.	1.0
Aquatic Chronic 3	H412	Harmful to aquatic organisms with long lasting effects.	1.0
Aquatic Chronic 4	H413	May cause long lasting harmful effects to aquatic organisms.	1.0
	EUH029	Contact with water liberates toxic gas.	1.0
	EUH031	Contact with acids liberates toxic gas.	1.0
	EUH032	Contact with acids liberates very toxic gas.	1.0
	EUH070	Toxic by eye contact.	1.0
ED HH 1	EUH380	May cause endocrine disruption in humans.	0.1
ED HH 2	EUH381	Suspected of causing endocrine disruption in humans.	1.0
ED ENV 1	EUH430	May cause endocrine disruption in the environment.	0.1
ED ENV 2	EUH431	Suspected of causing endocrine disruption in the environment.	1.0
PBT	EUH440	Accumulates in the environment and living organisms including in humans.	0.1
vPvB	EUH441	Strongly accumulates in the environment and living organisms including in humans.	1.0
PMT	EUH450	Can cause long-lasting and diffuse contamination of water resources.	0.1
vPvM	EUH451	Can cause very long-lasting and diffuse contamination of water resources.	1.0