TÜVRheinland®
DIN CERTCO
Precisely Right.

Certification Scheme

Additives harmless to the composting process

according to

DIN EN 13432

if applicable, in connection with

ASTM D 6400
ASTM D 6868
DIN EN 14995
NF T 51-800
ISO 17088
ISO 18606
AS 4736
AS 5810
DIN EN 17033

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Foreword

DIN CERTCO was founded in 1972 by DIN the German Institute of Standardization e.g. for the awarding of DIN marks and offers the certification of products and persons, services and enterprises on the basis of the DIN Standards and similar specifications.

In order to proof our impartiality, independency and competence, we are voluntary accredited according to DIN EN ISO/IEC 17065. For the satisfaction and trust of our clients, we have furthermore a certified quality management system according to DIN EN ISO 9001.

This certification scheme is based on DIN EN 13432 if applicable in connection with ASTM D 6400, ASTM D 6868, DIN EN 14995, NF T 51-800, ISO 17088, ISO 18606, AS 4736 and/or AS 5810 standards. It gives manufacturers of additives that are suitable for composting the opportunity to have their products certified by an independent third party. The certification process for products made of compostable materials can be simplified and speeded up through the use of additives that have been certified by DIN CERTCO.

In conjunction with the General Terms and Conditions of TÜV Rheinland DIN CERTCO GmbH and the Testing-, Registration- and Certification Regulations of DIN CERTCO, this certification scheme forms the basis for suppliers between biodegradable and non-biodegradable additives to mark their products with the Certification Mark “DIN-Geprüft”.
You demonstrate that your additives fulfil the requirements on additives of DIN EN 13432 and, if applicable, additionally the requirements of ASTM D 6400, ASTM D 6868, DIN EN 14995, NF T 51-800, ISO 17088, ISO 18606, AS 4736, AS 5810 or rather DIN EN 17033 standards in accordance with a specified maximum usable amount.

The Certification Mark “DIN-Geprüft“ creates consumer confidence, in the way that an independent, neutral and competent body has carefully examined and assessed the product on the basis of the test criteria. Third-party monitoring further ensures that the quality of the product is maintained also during the on-going production process. In this way, the customer receives an added value, which he can take into consideration in deciding on his purchase.

Additives shall receive the Certification Mark “DIN-Geprüft” on meeting the requirements listed under section 3 according to the procedure described in this certification scheme.

All certificate holders can be viewed on the daily up-dated homepage of DIN CERTCO (www.dincertco.tuv.com).

Amendments

This certification scheme differs from the certification scheme “Additives which are harmless to the composting process according to DIN EN 13432” (2018-03) as follows:

a) Addition of DIN EN 17033
b) .Adding IR spectra for master-/colorbatches for initial testing and verification testing
Editorial change
Certificates based on the former revision of the certification scheme will remain valid and will be changed as part of the next renewal.

Previous Editions

Certification scheme “Additives harmless to the composting process” according to DIN EN 13432 (2018-03)

Certification scheme “Additives harmless to the composting process” according to DIN EN 13432 (2016-04)

Certification scheme “Additives harmless to the composting process” according to DIN EN 13432 (2015-03)

Certification scheme “Additives which are harmless for the composting process according to DIN EN 13432” (2013-10)

Certification scheme “Additives which are harmless for the composting process according to DIN EN 13432” (2012-09)

Certification scheme “Additives which are harmless for the composting process according to DIN EN 13432” (2011-08)

CONTENTS

1 Scope

This certification scheme is applicable for additives used in the manufacture of products made of compostable materials that have been proven harmless to the composting process, according to DIN EN 13432 and contains, in conjunction with the basic documents mentioned below, all of the requirements for awarding the Certification Mark “DIN-Geprüft”.

The current version of the certification scheme applies to the following additive categories:

1. Non-biodegradable additives that may be used as product components in accordance with the requirements of DIN EN 13432 and must not exceed 1 % of mass (dry weight) each and 5 % of mass (dry weight) in total of the end product:

   – Water-based inks
   – Solvent-based inks
   – Inorganic pigments
   – Organic colourants

2. Biodegradable additives whose biodegradability has been proven separately:

   – Masterbatches based on biodegradable materials
   – Biodegradable additives
   – Biodegradable organic colourants

This certification scheme does not cover additives that catalyse the degradation of oxo-degradable plastics.

The certification scheme presented here lays down the requirements for the product itself as well as for the testing, monitoring and certification of the same.

2 Test and Certification Specifications

The following referenced documents are the basis for testing and certification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DIN EN 13432	Packaging – Requirements for packaging recoverable through composting and biodegradation – Test scheme and evaluation criteria for the final acceptance of packaging
ASTM D 5338	Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions
ASTM D 5988	Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in Soil
ASTM D 6400	Standard Specification for Compostable Plastics
ASTM D 6868	Labeling of End Items that Incorporate Plastics and Polymers as Coatings or Additives with Other and Other Substrates Designed to be Aerobically Composted in Municipal or Industrial Facilities
DIN EN 14995	Plastics – Evaluation of compostability – Test scheme and specifications

ISO 17088	Specifications for compostable plastics
ISO 18606	Packaging and environment – Organic recycling
NF T 51-800	Plastics – Specifications for plastics suitable for home composting
AS 4736	Biodegradable Plastics – Biodegradable Plastics suitable for Composting and other microbial Treatment
AS 5810	Biodegradable plastics – Biodegradable plastics suitable for home composting
DIN EN 17033	Plastics – Biodegradable mulch films for use in agriculture and horticulture – Requirements and test methods;
DIN EN ISO 14851	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium – Method by measuring the oxygen demand in a closed respirometer
DIN EN ISO 14852	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium – Method by analysis of evolved carbon dioxide
DIN EN ISO 14855-1	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions – Method by analysis of evolved carbon dioxide – Part 1: General method
DIN EN ISO 14855-2	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions – Method by analysis of evolved carbon dioxide – Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test
OECD 208	Terrestrial Plant Test Seedling Emergence and Seedling Growth Test
ASTM E 1676	Conducting Laboratory Soil Toxicity or Bioaccumulation Tests with the Lumbricid Earthworm *Eisenia Fetida* and the Enchytraeid Potworm *Enchytraeus albidus*

– this certification scheme
– certification scheme ”Products made of compostable materials (Seedling)“ by European Bioplastics e. V.
– certification scheme “Products made of compostable materials (DIN-Geprüft)“ by DIN CERTCO
– certification scheme “Products made of compostable materials for home and garden composting” by DIN CERTCO
– certification scheme “Biodegradable in soil” by DIN CERTCO
– the General Terms and Conditions of TÜV Rheinland DIN CERTCO
– the Testing-, Registration and Certification Regulations of DIN CERTCO
– the respective schedule of fees of DIN CERTCO

3 Product Requirements

Additives to be used in the manufacture of products made of compostable materials are required to demonstrate compliance with the requirements of DIN EN 13432 by proving that

they are harmless to the composting process. One/several of the standards ASTM D 6400, ASTM D 6868, DIN EN 14995, NF T 51-800, ISO 17088, ISO 18606, AS 4736, AS 5810 or rather DIN EN 17033, may additionally be covered by the certification.
A maximum permissible concentration of the additive within the end product is defined for the purposes of certification. In certain circumstances, this may be higher than the maximum concentration that can actually be used in the end product. The use of certified additives does not eliminate the need for certification of the end product.

Evaluation and testing are based on the concentration of the particular additive in the end product to be certified as the maximum permitted quantity.

3.1 Non-biodegradable additives

This refers to substances with an applied amount of up to 1 mass%.

3.1.1 Water-based inks, solvent-based inks

Inks to be certified must meet the following requirements:

– They must be harmless to the composting process in printed form.
– They must be within the limit values specified in Annexe A 1.
– The disposal of the dried colour as part of household waste is possible.
– They must not have any negative effects on plant growth.
– In the case AS 4736 or AS 5810 standard are used the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida.*
– In the case DIN EN 17033 is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida* and must not influence nitrification negatively

Unless otherwise specified, the quantity of each certified ink contained in the product must not exceed 1 mass% of the end product (dry weight) individually and less than 5 mass% in total (dry weight).

3.1.2 Inorganic pigments, organic colourants

Additives to be certified must meet the following requirements:

– They must be harmless to the composting process in printed form.
– They must be within the limit values specified in Annexe A 1.
– The pigments or colourants are not allowed to constrain the disposal of products containing pigments or colourants.
– They must not have any negative effects on plant growth.
– In the case AS 4736 or AS 5810 standard is used the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida.*
– In the case DIN EN 17033 is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida* and must not influence nitrification negatively

Unless otherwise specified, the quantity of each certified ink contained in the product must not exceed 1 % of the end product (dry weight) individually and less than 5 % in total (dry weight).

3.2 Biodegradable additives

This refers to substances with an applied amount higher than 1 mass%.

3.2.1 Masterbatches/colour batches

Master-/colour batches to be certified must meet the following requirements:

– The master-/colour batch must be harmless to the composting process taking into consideration all masterbatch components.
– The material used as the matrix must demonstrate its compliance with the requirements of DIN EN 13432 and, if applied for, with the ASTM D 6400, ASTM D 6868, DIN EN 14995, NT F 51-800, ISO 17088, ISO 18606, AS 4736, AS 5810 and/or DIN EN 17033 standard according to the "Products made of Compostable Materials" certification scheme. It is possible to reference existing material registrations according to the certification scheme "Products made of Compostable Materials (Seedling or DIN-Geprüft)” and if applicable to the certification schemes “Products made of compostable materials for home and garden composting” and/or “Biodegradable in Soil”. The proof of a valid registration according the certification scheme(s) is sufficient.
– The master-/colour batches are not allowed to constrain the disposal of products containing those master-/colour batches.
– They must be within the limit values specified in Annexe A 1.
– None of the components of the masterbatch must have any ecotoxicological effects on plant growth.
– In the case AS 4736 or AS 5810 standard is used, the following applies additionally: None of the components of the masterbatch must have any negative effects on the worm species *Eisenia Fetida.*
– Where the maximum permitted quantity is used, the requirements stipulated in table A 1 of DIN EN 13432 must be complied with.
– In the case ASTM D 6868 standard is used, the following applies: plastic and polymeric additives must be biodegradable even if these are used in less than 1 mass% dry weight.
– In the case DIN EN 17033 is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida* and must not influence nitrification negatively

The carrier material of the masterbatch must be identical to the end product material. Alternatively, additional tests may be required as part of the certification procedure according to the "Products made of Compostable Materials (Seedling or DIN-Geprüft)" and, if applicable, according to “Products made of compostable materials for home and garden composting” and/or “Biodegradable in Soil” certification scheme; e.g. evidence of a disintegration test in accordance with clause B of the "Products made of Compostable Materials" certification scheme.

3.2.2 Biodegradable organic colourants

Biodegradable organic colourants to be certified must meet the following requirements:

– The biodegradable organic colourants must be harmless to the composting process taking into consideration all components.
– The colourants are not allowed to constrain the disposal of products containing those master-/colour batches.

– The organic colourants themselves must be biodegradable in accordance with the standard requirements. This must be demonstrated by a suitable test report for test according to clause 4.4.
– They must be within the limit values specified in Annexe A 1.
– They must not have any negative effects on plant growth.
– In the case AS 4736 or AS 5810 standard is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida.*
– In the case ASTM D 6868 standard is used, the following applies: plastic and polymeric additives must be biodegradable even if these are used in less than 1 mass% dry weight.
– In the case DIN EN 17033 is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida* and must not influence nitrification negatively

3.2.3 Other biodegradable additives

Biodegradable additives to be certified must meet the following requirements:

– All components contained must be harmless to use in the composting process.
– The additives do not constrain the disposal of products containing those additives.
– The biodegradable additive itself must be biodegradable in accordance with the standard requirements. This must be demonstrated by a suitable test report for testing according to clause 4.4.
– They must be within the limit values specified in Annexe A 1.
– They must not have any negative effects on plant growth.
– In the case AS 4736 or AS 5810 standard is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida.*
– In the case ASTM D 6868 standard is used, the following applies: plastic and polymeric additives must be biodegradable even if these are used in less than 1 mass% dry weight.
– In the case DIN EN 17033 is used, the following applies additionally: They must not have any negative effects on the worm species *Eisenia Fetida* and must not influence nitrification negatively

4 Testing

4.1 General Information

For the performance of the tests required as the basis for the assessment and certification of the products, DIN CERTCO avails itself of the test laboratories to which it has awarded recognition.

All submitted documents must be in German or English language.

4.2 Types of Tests

4.2.1 Initial Test (Type Test)

The initial test is a type test, which serves to determine whether the product meets the requirements laid down in section 3 of this certification scheme.

The following documentary evidence must be submitted for the initial test:

Water-based inks, solvent-based inks, inorganic pigments, organic colourants

– Safety data sheets for the individual colours
– Information about the pigments used in the individual shades, incl. quantities
– Information about the solvents used, incl. safety data sheets if applicable
– Test reports on the testing mentioned in section 4.4

Master-/Colour Batches

– Safety data sheets of the individual master-/colour batches
– Composition of the individual batches
– Safety Data Sheets of all batch ingredients
– Reference to registration of the material used as the matrix in accordance with the "Products made of compostable materials (Seedling or DIN-Geprüft)" and if applicable “Products made of compostable materials for home and garden composting” and/or “Biodegradable in Soil” certification scheme or, alternatively, evidence of its compliance with the requirements of DIN EN 13432 and, if applicable, other standards in accordance with the "Products made of Compostable Materials" (Seedling or DIN-Geprüft)" and if applicable “Products made of compostable materials for home and garden composting” and or “Biodegradable in Soil” certification scheme
– Test reports on the testing mentioned in clause 4.4

Other biodegradable additives, biodegradable organic colourants

– Safety data sheet of the additive
– Composition of the additive
– Safety data sheets of all ingredients contained
– Test reports on the testing mentioned in clause 4.4

4.2.2 Verification Test (Control Test)

The verification test is conducted repeatedly at determined intervals and serves to ascertain whether the certified product corresponds to the type-tested product during the production phase.

The test must be evidenced on the due date by a positive test report.

Surveillance testing is conducted every 12 months and comprises the in the following named testing. If sub-types exist, the testing will focus on 0.6 x $\sqrt{n}$ of the certified sub-types. The result is rounded up to the nearest whole number. The certificate holder must ensure that alternate subtypes are submitted each time.

n = Total of certified types and sub-types of a certificate

Water-based inks, solvent-based inks; Master-/Colour Batches, inorganic pigments, organic colourants, biodegradable colourants

Test report on chemical analysis in accordance with Annexe A.
If the chemical analysis is performed on groups of different sub-types, it is assumed as part of a worst-case analysis that the result for the group corresponds to the individual result. Generally, a maximum of 5 types/subtypes may be tested at the same time.

For master-/colorbatches additionally an IR spectrum is required.

Biodegradable pigments, other biodegradable additives, not biodegradable organic additives (the latter max. 1 %)

– Test report on the measurement of the infrared transmission spectrum
– Performance of one chemical characterisation according to Annexe A during the validity.

4.2.3 Supplementary Test

A supplementary test shall take place when additions, extensions or modifications (see section 5.9) are made to the certified product, which may influence the product’s conformity with the pertinent, fundamental requirements.

The type and scope of the supplementary test shall be laid down on a case by case basis by DIN CERTCO in conjunction with the testing laboratory.

4.2.4 Special Test

A special test is conducted when

– defects are detected
– the production has been suspended for a period of more than 6 months
– required by DIN CERTCO - reasons to be specified
– requested in writing by a third party if a particular interest in the maintenance of proper conduct of market procedures in relation to competition or quality is involved

The type and scope of the special test shall be laid down in accordance with the specific, respective purpose on a case by case basis by DIN CERTCO in conjunction with the testing laboratory.

Should defects be detected in the course of the special test or because of the suspended production, the certificate holder shall bear the costs of the examination procedure.

Should the special test at the request of a third party reveal no defects, the costs shall be borne by said third party.

4.3 Sampling

The samples for the initial examination and monitoring test are standardally delivered by the manufacturer to the testing laboratory which has been commissioned to perform the tests. The costs for this shall be paid by the manufacturer.

The number of samples for the product test shall be agreed between DIN CERTCO and the testing laboratory in so far as this is not already laid down in the basic test stipulations.

4.4 Test Procedure

The following tests must be performed in accordance with the requirements of DIN EN13432:

– Chemical analysis in accordance with Annexe A 1.
  If the chemical analysis is performed on groups of different sub-types, it is assumed as part of a worst-case analysis that the result for the group corresponds to the individual result. Generally, a maximum of 5 types/subtypes may be tested at the same time.

– Testing of ecological toxicity in accordance with the requirements of DIN EN 13432, DIN EN 17033, AS 4736 or AS 5810 and the requirements specified in Annexe A 2. Generally, a maximum of 5 types/subtypes may be tested at the same time.
  For substances, which are approved as food additives according to E-No.-list, testing of ecological toxicity can be omitted under the condition that the applied amount does not exceed the maximum quantities of use mentioned in the E-No-list.

The following additional tests have to be performed for other biodegradable additives and master-/colorbatches under clause 1, no. 2:

– Measurement of the infrared transmission spectrum

– A biodegradability test must be performed in accordance with the combination of standards applied for, as per table 1.

Acceptance of biodegradation test at 28°C:
Biodegradability test at a temperature of 28 °C, according to EN ISO 14855, may be accepted for EN 13432, ASTM D 6400, ASTM D 6868, DIN EN 14995, ISO 17088, ISO 18606 and AS 4736 if the test duration does not exceed the 6 months period laid down in this standard.

Table 1 Overview about the test methods for ultimate biodegradation depending on the standard which is applied for

Testing according to the following standards	**mandatory**	**optional**								
	DIN EN 13432	ASTM D 6400	ASTM D 6868	DIN EN 14995	NF T 51-800	ISO 17088	ISO 18606	AS 4736	AS 5810	DIN EN 17033
ISO 14855-1	x	X	x(1)	x	x(2)	x	x	x	x(2)	
ISO 14855-2	x	X	x(1)		x(2)	x	x		x(2)	
ISO 14851	X(1)		x(1)	x(1)	x(2)		x(1)	x(1)	x(2)	
ISO 14852	X(1)		x(1)	x(1)	x(2)		x(1)	x(1)	x(2)	
ISO 17556	x		x(1)							x(3)
DIN EN 14046	x		x(1)							
ASTM D 5338	x	x	x(1)			x				

This certification scheme is based on the standard DIN EN 13432, thus this standard is marked as mandatory for certification. The further listed standards marked as optional can be additionally addressed for certification.
(1) Only possible if the nature and properties of the test material do not permit testing to the requested testing method.
(2) Reaction temperature according to AS 5810 is 25±5 °C with a maximum test time of 12 months. For NF T 51-800, the temperature should not exceed 30 °C.
(3) Reaction temperature according to DIN EN 17033 is 25±5 °C with a maximum test time of 24 months.

4.5 Test Report

The testing laboratory shall inform the principal of the test and examination results in the form of a test report. This must be submitted to DIN CERTCO in the original.

As a rule, the test report may not be older than 6 months on submitting the application. In individual cases, older test reports can be recognized if the testing laboratory provides written confirmation of the current validity of the information given in said test report and the customer provides written confirmation of the identity of the composition.

The test report must be in conformity with DIN EN ISO/IEC 17025, Section 5.10 and contain at least the following information:

– Name and address of the manufacturer
– Name and address of the applicant (if different from the manufacturer)
– Test basis with date of issue
– Type of test (e.g. type-test, complementary examination, etc.)
– Date of examination
– Test result and assessment
– Name and signature of the person responsible for the examination

5 Certification

Certification in the sense of this certification scheme relates to the assessment of conformity of a product by DIN CERTCO on the basis of test reports submitted by testing laboratories recognized by DIN CERTCO. To this end, the products to be certified are examined and subsequently monitored in respect of conformity with the requirements laid down in section 3.

The right to use the Certification Mark “DIN-Geprüft” will be granted by the issuing of the respective certificate.

5.1 Application

Both manufacturers according to § 4 of the Product Liability Act (ProdHaftG) and distributors who, with the written consent of the certificate holder, bring the products onto the market under their own responsibility in the sense of the Product Liability Act, may apply.

The applicant must submit the following documents to DIN CERTCO:

– Application for certification in the original complete with legally binding signature
– an up-to-date test report according to section 0 concerning an Initial Examination in so far as the test was not commissioned by DIN CERTCO
– further documents according to section 4.2.1

The applicant shall receive from DIN CERTCO, after receipt of the application, a confirmation of order with a process number and notes regarding the further course of the procedure and, as applicable, queries concerning any missing documents.

5.2 Definition of Types and Sub-Types

Inks, inorganic pigments, organic colours, master-/colour batches, biodegradable additives or biodegradable colours are defined as different types. If additives are different in essential characteristics relevant to certification (e.g. properties that have a significant influence on safety, operation or handling and that therefore require the product to be marketed under a different trade name), they are defined as additional type or model. Characteristics relevant for certification are e.g.:

Water-based inks, solvent-based inks:
– Different base (e.g. solvent or binding agent) in the case of inks
– Labelling as separate ink series by the manufacturer

Inorganic pigments:
– Different types of application (e.g. for the manufacturing of master-/colour batches or printing inks)
– Labelling as separate pigment series by the manufacturer

Organic colourants
– Different types of application (e.g. for the manufacturing of master-/colour batches or printing inks)
– Labelling as separate pigment series by the manufacturer

Master-/colour batches
– Alternative colour
– Labelling as different master-/colour batch by the manufacturer

Other biodegradable additives
– Different compositions

Biodegradable organic colourants
– Different types of application (e.g. for the manufacturing of master-/colour batches or printing inks)
– Labelling as separate pigment series by the manufacturer

A separate certificate is issued for each type.

Sub-types are generally products of a particular model/type, which share the same base and differ only in terms of the following characteristics:

Water-based inks, solvent-based inks:
– Different colours, pigments

Inorganic pigments:
– Different pigments

Organic colourants
– Different colours

Master-/colour batches
– Different biodegradable materials

Biodegradable organic colourants
– Different colours

For other biodegradable additives, subtypes are not possible.

5.3 Conformity Assessment

On the basis of the documents submitted, DIN CERTCO conducts the conformity examination. To this end, in particular, an assessment is made with the aid of the examination report as to whether the product meets the requirements of the Certification scheme and of the Standard(s).

The applicant shall receive written notification from DIN CERTCO in the event of any possible deviations.

5.4 The Certificate and the Right to Use the Mark

After successful testing and conformity assessment of the submitted documents, DIN CERTCO issues a certificate to the applicant and awards the right to use the Certification Mark “DIN-Geprüft” in conjunction with a corresponding registration number.

Format of the Registration Number **8Zxxxx**

Additives, for which the right to use the certification mark “DIN-Geprüft” has been awarded, must be marked with the respective certification mark "DIN-Geprüft" and the respective registration number.

The mark and the corresponding registration number may only be used for the type for which the certificate has been issued and which corresponds to the type-tested product.

For each respective type, a registration number shall be issued. For design types (sub-types) of a type, the same registration number shall be issued (see section 5.2).

In addition to this, the General Terms and conditions of DIN CERTCO shall apply.

5.5 Publications

All certificate holders can be viewed on the daily up-dated homepage of DIN CERTCO (www.dincertco.tuv.com) on the online database. Manufacturers, users and consumers use this research possibility for obtaining information on certified products.

Besides the contact details of the certificate holders (telephone, telefax, e-mail, homepage), it is also possible to view the technical data of the registered additive.

5.6 Validity of the Certificate

The certificate is valid for 5 years. The period of validity is shown on the certificate. On expiry of the certificate, the right to use the mark also expires.

5.7 Renewal of the Certificate

If the certification shall continue to apply beyond the date shown on the certificate, an up-to-date, positive test report and an application for renewal must be submitted in good time to DIN CERTCO.

The manufactured item's current composition must be submitted with the application for renewal. For renewals, the Certification Body will make an assessment based on the certification scheme valid at the time of renewal and may request supplemental documentation.

Proof of conformity with the requirements of the test and certification specifications according is done on the basis of the results of the verification testing.

5.8 Expiry of the Certificate

In the event that the new Standard conformity examination according to section 4 has not been completed before expiry of the validity period, the right to use the Certification Mark "DIN-Geprüft" and the registration number expires without the necessity for explicit notification from DIN CERTCO.

Furthermore, the certificate can also expire if for example:

– the surveillance according to section 6 is not performed punctually or completely,
– the Certification Mark "DIN-Geprüft" is misused by the certificate holder,
– the requirements laid down in the Certification scheme or its accompanying documents are not fulfilled,
– the certification fees are not paid on the due date
– the prerequisites for the issuing of the certificate are no longer fulfilled

5.9 Alterations/Amendments

5.9.1 Alterations/Amendments to the Product

The certificate holder is obliged to notify DIN CERTCO of all alterations to the product without delay. The testing laboratory in conjunction with DIN CERTCO shall decide on the scope of an examination that shall be conducted according to section 4.2.3 and whether it is a matter of a substantial alteration. The respective test report shall be forwarded to DIN CERTCO by the test laboratory.

Should the testing laboratory determine a substantial alteration, the certificate with the corresponding registration number shall expire. For the modified product, a new application for initial certification authorising the use of the Certification Mark "DIN-Geprüft" may be submitted.

The certificate holder remains obliged to notify of any changes in the formal details (e.g. certificate holder or his address). An application of amendment has to be handed in. After positive assessment, the certificate will be amended accordingly.

The certificate holder may apply to DIN CERTCO for an extension of the existing certificate for further design-types (sub-types) of the same type. It is for DIN CERTCO to decide whether these amendments require a complementary examination. The design-types shall be entered in the certificate for the already certified product and, provided that the conditions are fulfilled, shall be regarded as an integral part of same.

5.9.2 Alterations to the Basic Test Specifications

If the basic test specifications for the certification are modified, an application for the alteration of the certification shall be generally submitted within 6 months of receiving notification from DIN CERTCO and, as a rule, after 12 months, proof of conformity with the modified examination specifications shall be submitted in the form of a positive test report (see section 4.2.3).

The time limit will be defined by the Certification Body and might last up to the next renewal at the latest.

5.10 Product Defects

In the event that a certified product on the market is found to be defective, the certificate holder shall be summoned in writing by DIN CERTCO to rectify the defects.

In conjunction with the testing laboratory, DIN CERTCO shall decide whether it is a serious or a minor defect.

In the case of defects having a direct or indirect effect on the compostability behavior (serious defects), the manufacturer must ensure that, until the defects have been rectified, the products are no longer marked with the Certification Mark.

The defects must also be rectified without delay in delivered products or products in storage. The manufacturer must submit proof to DIN CERTCO within 3 months, in the form of a test report on a special test in accordance with section 4.2.4, that the defects have been rectified and that the product in question again fulfils the stipulated requirements.

In the case of defects that have no influence on the compostability behavior (minor defects), the manufacturer must submit suitable proof to DIN CERTCO within 3 months that the defects in the product in question have been rectified.

Should the manufacturer fail to observe these deadlines, he and the distributor of product will no longer be permitted to use the Certification Mark "DIN-Geprüft”.

Should grounds for complaint continue to exist, DIN CERTCO shall initially suspend the certificate and at the same time issue a final deadline for the rectification of the defects. Should the certificate holder fail to meet this demand, or fail to meet it within the period of grace, or if it is again not possible to prove that the defects have been rectified, the certificate shall be annulled.

6 Surveillance

The constant surveillance of the certified product during the entire duration of the certification period is an integral component of the certification itself. The surveillance shall be performed at regular intervals of 12 months in according with section 4.2.2.

Annexe A Testing

A 1 Chemical Characterization

A 1.1 According to DIN EN 13432, ASTM D 6400, ASTM D 6868, DIN EN 14995, NF T 51-800, ISO 17088, ISO 18606, AS 4736 or AS 5810

Chemical characterization is carried out according to DIN EN 13432 (see table A1)..

Table A1 Maximum element content as listed in Table 1 of DIN EN 13432 (80 %) and Table 1 NF T 51-800 (80 %).

Element	mg/kg dry product
Zn	120
Cu	40
Ni	20
Cd	0.4
Pb	40
Hg	0.4
Cr	40
Mo	0.8
Se	0.6
As	4
F	80
Co*	30,4

* Only layed down in NF T 51-800.

A 2 Ecotoxicity testing

A 2.1 According to DIN EN 13432, ASTM D 6400, ASTM D 6868, DIN EN 14995, NF T 51-800, ISO 17088, ISO 18606

The test of ecological toxicity must be performed in accordance with the requirements of DIN EN 13432, section 8, A.4 und E in conjunction with OECD 208 with a plant growth ecotoxicity test with two plant species. Corresponding to DIN EN 13432 testing shall be carried out by adding 10 % of the final product based on the quantity of compost used.

A 2.2 According to AS 4736, AS 5810 and DIN EN 17033

The ecotoxicity test has to be carried out according to section A 2.1 in correspondence to the requirements of DIN EN 13432 in conjunction with OECD 208.

Additionally, a 14-days toxicity test with the worm species *Eisenia Fetida* according to section A1 of the ASTM E 1676 is required. Corresponding to DIN EN 13432 testing shall be carried out by adding 10 % of the final product based on the quantity of compost used.

For DIN EN 17033 testing is required according to DIN EN ISO 11268-1 or DIN EN ISO 11268-2.

Note: DIN EN 17033 asks for DIN EN ISO 11268-1 or DIN EN ISO 11268-2 for Earthworm toxicity testing. Alternatively, conformity can be shown according to AS 4736 or AS 5810 in accordance with this certification scheme, respectively.

A 2.3 Nitrification inhibition test with soil microorganisms

The nitrite formation in soil exposed to the test material shall be more than 80 % of those from the corresponding blank soil not exposed to the test material.

The effects of materials on the microbial nitrification activity in soil shall be determined with the following method with the modifications specified in Annex E of DIN EN 17033:

– ISO 15685 Soil quality -- Determination of potential nitrification and inhibition of nitrification -- Rapid test by ammonium oxidation

A 3 Additional information regarding the performance of the ecotoxicity testing

<u>The required sample quantity is determined based on the following assumptions:</u>

The test substance is added to the compostable sample at 10 % of mass (including the maximum quantity of the additive to be tested) in accordance with the requirements of DIN EN 13432 in conjunction with OECD 208.

<u>Assumptions:</u>

- After composting and sieving < 10 mm, approximately 35 % of the compost will remain. The pigments do not biodegrade.
- The additive does not biodegrade.
- After disintegration, 10 % of the degradable quantity of the product sample remains in sieve fraction < 10 mm.
- 5 additives at 1 % of mass should be tested

<u>Underlying formula:</u>

$$m_{WA} + m_{ZA} = 0{,}1 \cdot m_{KA}$$

$$m_{ZA} = n_Z \cdot p_Z \cdot m_{WA} \cdot 0{,}1$$

$$m_{gesE} = m_{KE} + m_{WE} + m_{ZE}$$

$$p_{ZP} = \frac{m_{ZE}}{m_{gesE}} \cdot \frac{1}{n_Z} \cdot 100\ \%$$

where:

m_{kA} – Quantity of compost prior to composting

m_{WA} – Quantity of material prior to composting
m_{ZA} – Quantity of additive prior to composting
m_{gesA} – Total quantity prior to composting
m_{KE} – Quantity of compost after composting and sieving
m_{WE} – Quantity of material after composting and sieving
m_{ZE} – Quantity of additive after composting and sieving
m_{gesE} – Total quantity after composting
n_Z – Number of additives tested
p_Z – Percentage of additive tested
p_{ZP} – Percentage of additive tested in m_{gesE}

Example calculation:

100 kg compost $\xrightarrow{\text{composting and sieving <10 mm: 35\% remains (experience)}}$ 35 kg compost

10 kg product sample $\xleftrightarrow{\text{made of}}$ 9.5 kg compostable material + 0.5 kg additives

9.5 kg compostable material $\xrightarrow{\text{composting and sieving <10 mm: 10 \% remains (DIN EN 13432)}}$ 0.95 kg compostable material

0.5 kg additives to be tested $\xrightarrow{\text{composting and sieving < 10 mm: 100\% remains}}$ 0.5 kg additives to be tested

Result: m_{gesE} = 36.45 kg

Under the conditions given, the required quantity for each additive is as follows:

P_{ZP}=0.274 %

A 3.1 Testing for non-biodegradable additives

The test of ecological toxicity must be performed in accordance with the requirements of DIN EN 13432 in conjunction with OECD 208 or rather ASTM E 1676. Testing shall be carried out by adding 10 % of the final product based on the quantity of compost used.

A 3.2 Testing for inks, masterbatches and biodegradable additives

The pigments including contained solvent are mixed with sand and undergo a drying process to simulate the printing process.

The sand is mixed with finished compost, which consists of < 10 mm sieve fraction of fresh, pre-treated bio waste (municipal waste) that has undergone aerobic composting for more than 12 weeks.

A simplified, shortened composting process is completed over 7 days at 58 °C followed by a 3-day stabilisation phase at ambient temperature. The use of one approach is sufficient.

The further testing is performed in accordance with the requirements of DIN EN 13432 in conjunction with OECD 208 or rather ASTM E 1676.

A 3.3 Testing for biodegradable additives

The calculation can be performed similar to the one for non-biodegradable additives. For the determination of the time of composting, the results of the biodegradation testing shall be taken into consideration.

Alternatively, a 12-week disintegration test in accordance with ISO 16929 may be performed beforehand. The quantity of additives to be added is specified in accordance to the requirements of DIN EN 13432 in conjunction with OECD 208 or rather ASTM E 1676.

Annexe B Infrared-Transmission spectra

The spectrum should be recorded in a range between the wave numbers 4000 cm^{-1} and 400 cm^{-1}, and a transmission level from 0-100 % being indicated on the vertical axis.