



Business plan for a DIN SPEC project
according to the PAS procedure on
**"Recycling of printed polymer packaging –
Evaluation of deinking using a test
procedure"**

Status:
**for developing DIN SPEC after adoption on
09.05.2023**

Requests to participate in the project and/or comments on the
business plan are to be **submitted by 26.04.2023**¹.
The request to participate as well as commenting are submitted via
<https://www.din-events.de/>² with the log-in code **ds91496**.

Recipients of this business plan are requested to name **all patent rights**
known to them to be relevant to the project and to make available
all supporting documents.

Berlin, 25.05.2023 (Version 3)

¹ Applications for participating in the project and comments on the business plan that are not received by the deadline do not need to be taken into consideration. Once constituted, the project workshop will decide whether or not to consider the comments received in good time.

² If registration or commenting via the link is technically not possible, please send them to Yihan.Chen@din.de.

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1. Status/version of the business plan

- **For public commenting (Version 1)**

This business plan is intended to inform the public of a new DIN SPEC project. Any interested party can take part in this project and/or comment on this business plan. Please send any requests to participate or comments by e-mail to yihan.chen@din.de.

Once this business plan is published, the Chairman of DIN's Executive Board decides whether or not the project is to be carried out.

If the project is accepted, all those who have applied for participation or have commented on the business plan by the deadline will be invited to the kick-off meeting of the project consortium.

- **For developing the DIN SPEC after adoption on 9th May 2023**

Changes to the previous version 01:

- Title page, Section 1: Status changed to “For developing DIN SPEC after adoption on 09.05.2023”, as well as an update of the consecutive revision number (version 01 → version 02)
- Section 2: Table of participating organizations added
- Section 4: Kick-off meeting statements adjusted → e.g., “The kick-off took place [...]”
- Section 7: Information on consortium leader added

2. Initiator and other consortium members

- Initiator:

Person/Organization	Short description
Ingo Fehr, Siegwerk Druckfarben AG & Co. KGaA	Siegwerk is one of the leading global providers of printing inks and coatings for packaging applications and labels.

- Other potential participants:

This DIN SPEC will be developed in a consortium (temporary body) that is open to any interested party. The participation of other experts would be helpful and is desired. It is recommended that

- Plastic packaging converters and/or manufacturers
- Original Equipment Manufacturers (OEMs)/product manufacturers

- Research establishments for packaging, recycling, or deinking
- Testing institutes for packaging and materials
- Recyclers of plastic waste
- etc.

take part in the development of this DIN SPEC.

- Organizations² that have registered for participation:

Person	Organization
Ingo Fehr	Siegwerk Druckfarben AG & Co. KGaA
Michael Hofmann	HydroDyn Systems GmbH
Dirk Schneider	HydroDyn Systems GmbH
Patrick Neumann	Interzero
Michal Prochazka	Keycycle
Edward Kosior	Nextek Ltd.
Yihan Chen	DIN Deutsches Institut für Normung e. V.

- Organisations that have adopted this business plan (consortium members):

Person	Organization
Ingo Fehr	Siegwerk Druckfarben AG & Co. KGaA
Andrey Charkovskiy	Siegwerk Druckfarben AG & Co. KGaA
Bernhard Mumelter	Coveris Management GmbH
Matthias Henker	Flint Group Packaging Inks Germany GmbH
Ricarda Hofmann	Flint Group Packaging Inks Germany GmbH
Tanja Fell	Fraunhofer IVV
Dirk Schneider	HydoDyn Systems GmbH
Patrick Neumann	Interzero Plastics Rextyling GmbH
Michal Prochazka	KEYCYCLE GmbH
Dr. Pawel Falkowski	Merck Electronics KGaA
Edward Kosior	Nextek
Dr. Nikola Juhasz	Sun Chemical
Jessica Frost	DIN e. V.
Yihan Chen	DIN e. V.

3. Objectives of the project

3.1. General

Society is becoming increasingly aware of the need for better recycling. Approximately 40% of all plastic is used for the production of packaging, which after a mostly very short period of use ends up as waste material. With today's standard recycling processes, it is often not possible to process this plastic in such a way that it can be used again in its original application. While PET bottles achieve high collection and re-utilization rates in the original application, other common plastic packaging such as PE-LD, PE-HD and PP, especially when printed, is mostly downcycled. In addition to an often mostly darker color, the recyclate also has a non-neutral odor and could contain many non-intentionally added substances (e.g., NIAS) - which could stand in the way of a safe re-use as food packaging.

Part of this problem lies in the printing inks: Today, printing inks remain on the plastic during the recycling processes, enter the extrusion/regranulation and eventually distribute evenly throughout the recyclate. Printing ink consists mainly of pigments (for the color) and binders. The pigments finely dispersed in the recyclate mainly cause discoloration - the binders partly thermally degrade at the high extrusion temperatures and form gases, undefined degradation products in large numbers and cause an odor similar to burnt paper.

Removing the printing ink in the recycling process before the extrusion step can solve the problems described at the source. To the best of the author's knowledge, washing systems exist today which remove the printing ink with solvents (see also, for example, patent DE4342848 - Process and device for cleaning polyolefin). However, this technology has not become widespread because, due to the solvents used, expensive explosion-proof plant technology must be used, and the solvents are disadvantageous from a sustainability perspective.

There is a cheaper and more environmentally friendly process for washing printing inks off plastic packaging: Alkaline hot washing. For this purpose, the printed plastic is brought into contact for a few minutes with an aqueous solution that contains caustic soda as well as cleaning agents and surfactants. Mechanical friction further promotes the removal of the printing ink. The technology of water-based deinking is widely used for paper (see e.g., Ingede test method 11; EN 643 - recovered paper grades and requirements for "deinked products"). For plastics, water-based deinking is still a young technology that is hardly used on an industrial scale.

A major problem here is a lack of general understanding of "deinkability":

- At what temperatures, concentrations and washing times is it tested whether printing inks can be removed?
- At what product quality can one speak of deinkability? It is not possible to achieve 100% deinking.

The proposed DIN SPEC is intended to fill these gaps and thus:

- Empower ink manufacturers and packaging developers to develop deinkable products.
- Help the recycling industry design the treatment processes and equipment of the future.
- Provide regulators and dual systems with clear criteria against which recyclability and thus EPR fees can be determined.

In this way, the proposed specification can significantly accelerate the transition of the packaging and recycling industry.

3.2. Planned scope

This document defines requirements for a measurement method that is used to determine the quality and degree of deinkability (removal of ink) of printed plastic packaging. For this purpose, this document describes a specific process that enables any laboratory or organization to measure the deinkability of printed plastic packaging. This document sets requirements for the following factors of the measurement process: sensitivity, objectivity, repeatability, accuracy and simplicity. In addition to the quality of the washed material, the aspect of the washing water should also be considered. This document does not define any requirements in regard to industrial safety.

3.3. Related activities

The subject of the planned DIN SPEC is not at present the subject of a standard. However, there are committees, standards and/or other technical rules that deal with related subjects and thus need to be taken into account - and involved or incorporated, where necessary - in this project:

- Ingede (deinking of paper)
- DIN EN 643, Paper and board - European list of standard grades of paper and board for recycling
- DIN EN 13437, Packaging and material recycling - Criteria for recycling methods - Description of recycling processes and flow chart
- EN 15347, Plastics - Recycled plastics - Characterisation of sorted plastics waste
- Recyclclass testing methods (<https://recyclclass.eu/recyclability/test-methods/>)
- DIN/TR 5020:2022-09 "Introduction to colorimetric principles for quality management"
- DIN 55405 „Packaging - Terminology - Terms and definitions"
- DIN ISO/TR 18568 "Packaging and the environment - Marking for material identification (ISO/TR 18568:2021)"
- DIN EN 13430 "Packaging – Requirements for packaging recoverable by material recycling; German version EN 13430:2004"

4. Work programme

The aim of the project is to develop a DIN SPEC according to the PAS procedure (see www.din.de/go/din-spec-en). The DIN SPEC shall be consistent with the body of German standards and shall not be in conflict with any DIN Standard.

The kick-off meeting took place at Siegwerk Druckfarben AG & Co. KGaA (Alfred-Keller-Str. 55, 53721 Siegburg, Germany) and online via Webex on 9th May 2023. The project duration will be about 3 months.

After the kick-off meeting, the consortium for developing the DIN SPEC was constituted, further organizational issues have been decided on and clarified, and, where possible, work on the subject matter has begun.

A draft for public commenting will not be published.

A total of 2 project meetings (kick-off meeting and work meetings) and 2 web conferences will be held, during which the content of the DIN SPEC will be presented, discussed and approved. The content of the DIN SPEC can be drawn up by individual consortium members or in working groups.

Dates of further meetings and/or web conferences are to be agreed on within the consortium in consultation with DIN.

The DIN SPEC will be drawn up in English (language of meetings, minutes, etc.). The DIN SPEC will be written in English.

NOTE The calculation covers only one language version. Please keep in mind the fact that other language versions involve additional expenses; for this reason, they shall be agreed on separately. If another language version is desired, Beuth/DIN can provide a translation. Requests for translations are to be submitted after the DIN SPEC manuscript has been approved for publication.

5. Resource planning

Each consortium member shall bear the expenses he/she incurs as a result of participation in the project.

If the DIN Executive Board approves the project, the initiator of the project will then conclude a contract with DIN.

The performance of this project as set out in the programme of work will result in DIN incurring costs to a total of 29 606 euros, excluding VAT. Additional services give rise to additional costs.

Sharing the burden of these costs is a prerequisite for membership in the consortium.

By adopting this business plan, consortium members declare their willingness to bear their share of the project costs, which is based on the number of consortium members.

Each consortium member is to declare this willingness to take on his/her share of costs by individual agreement with the initiator.

If the consortium is expanded later, the additional consortium members shall pay the initiator the same fee to cover costs as the original consortium members.

The initiator is obliged to use the financial resources that have been made available to him by the consortium members solely for purposes furthering the project, and to return any surplus amount in equal parts to all consortium members without delay.

6. Rules of cooperation in the DIN SPEC consortium

This project is governed by the PAS procedural rules. All interested parties and consortium members are to inform themselves of these procedures by going to www.din.de/go/din-spec-en.

The consortium will be constituted during the course of the kick-off meeting. The kick-off meeting will not take place until the business plan has been published and approved by DIN's Management Board. The consortium shall comprise at least three members from different organizations². It is not necessary that these members come from different areas and represent different stakeholders. By approving this business plan, the interested parties declare their willingness to participate in the consortium and will be formally named as consortium members, with the associated rights and duties. Participants at the kick-off meeting who do not approve the business plan are not given the status of a consortium member and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the project.

If an organization (e.g. an association) sends someone who is not an employee to the consortium, this person shall be authorized by the organization, who shall provide proof of this to DIN.

Each consortium member is entitled to vote and has one vote. If an organization sends several experts to the consortium, that organization has only one vote, regardless of how many consortium participants it sends. Transferring voting rights to other consortium members is not permitted. During voting procedures, decisions are passed by simple majority; abstentions never count.

² Organizations are participating legal entities that send the experts to the DIN SPEC consortium and are assigned to a corporate structure as defined by § 15 of the German Stock Corporation Act or § 271 paragraph 2 of the German Commercial Code.

As a rule, the consortium is closed once it is constituted. The current consortium members shall decide whether any additional members will be accepted or not.

During the kick-off meeting, the consortium members shall elect a consortium leader, who is responsible for content management and any decision-making and voting procedures. The leader is supported by the responsible DIN Project Manager, whereby DIN will always remain neutral regarding the content of the DIN SPEC. Furthermore, the DIN Project Manager shall ensure that DIN's rules of procedure, rules of presentation, and the principles governing the publication of DIN SPEC have been observed. Should a consortium leader no longer be able to carry out his/her duties, the DIN Project Manager shall initiate the election of a new leader.

The DIN Project Manager is responsible for organizing and leading the kick-off meeting, in consultation with the initiator. Further project meetings and/or web conferences shall be organized by the DIN Project Manager in consultation with the consortium leader.

If consortium members cannot be present when the DIN SPEC or its draft is approved, an alternative means of including them in the voting procedure shall be used (e.g. in writing, electronically).

All consortium members who voted for the publication of the DIN SPEC or its draft will be named as authors in the Foreword, including the organizations which they represent. All consortium members who voted against the publication of the DIN SPEC or its draft, or who have abstained, will not be named in the Foreword.

Any expansion of the consortium at a later date is decided on by the members making up the consortium at that time. It is particularly important to consider these aspects:

- a) expansion would be conducive to shortening the duration of the project or to avoiding or averting an impending delay in the planned duration of the project;
- b) the expansion would not result in the project taking longer to complete;
- c) the new consortium member would not address any new or complementary issues beyond the scope defined and approved in the business plan;
- d) the new consortium member would bring complementary expertise into the consortium in order to incorporate the latest scientific findings and state-of-the-art knowledge;
- e) the new consortium member would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
- f) the new consortium member would ensure wider application of the DIN SPEC.

To allow the legal reproduction and distribution of results for the purposes of project work, the consortium members grant DIN rights of use on the basis of the copyright that will accrue to them for the results of their work on the DIN

SPEC. The transfer of these utilization rights does not prevent the consortium members from using and further developing the knowledge, experience and findings they bring to the project.

Consortium members are requested to inform DIN of all patent rights known to them to be relevant to this DIN SPEC project.

Subsequent changes to the scope (Section 3.2) or to the resource planning (Section 5) require, in addition to a two-thirds majority of all votes cast, the approval of DIN.

7. Contacts

- Consortium leader:
See initiator (Ingo Fehr, Siegwerk Druckfarben AG & Co. KGaA)
- Project manager:
Yihan Chen
DIN German Institute for Standardization
Am DIN-Platz
Burggrafenstraße 6
10787 Berlin
Tel.: + 49 30 2601- 2665
Fax: + 49 30 2601 - 42665
E-mail: yihan.chen@din.de
- Initiator:
Ingo Fehr
Siegwerk Druckfarben AG & Co. KGaA
Alfred Keller Str. 55
53721 Siegburg
+49 151 51157258
ingo.fehr@siegwerk.com

Annex: Project schedule (preliminary)

DIN SPEC project	2023													2024
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
Initiation														
1. Request and review														
2. Business plan drawn up														
3. Publication of business plan														
Development phase														
4. Kick-off meeting/consortium constituted														
5. DIN SPEC drawn up														
6. DIN SPEC approved by consortium														
Publication														
7. Review and release by DIN														
8. Publication of DIN SPEC														
Milestones						K	W	W	M / A					

K Kick-off
M Project meeting
W Web conference
A Adoption of DIN SPEC