



Business plan for a DIN SPEC project
according to the PAS procedure on
**"Fibre-reinforced Composites -
Measurement of Interfacial Shear Strength
by means of a Micromechanical Single-
Fibre Pull-Out Test"**

Status:
**For DIN SPEC development after adoption
on 2021-10-18**

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, 2021-10-18 (Version 2)

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1. Status/version of the business plan

- **For developing the DIN SPEC after adoption on 2021-10-18**

Changes to the previous version 1:

- Section 2: Table of participating organizations added
- Section 7: Information on consortium leader added

2. Initiator and other consortium members

- Initiator:

Person/Organization	Short description
Name: Dr. Stefan Fliescher Textechno Herbert Stein GmbH & Co. KG Dohrweg 65 41066 Mönchengladbach s.fliescher@textechno.com Tel.: +49216165990 www.textechno.com	Textechno is a worldwide leading producer of textile testing instrumentation. Besides providing testing instruments and systems for classical and industrial textile products such as fibres and yarns, the company has a special focus on reinforcement fibres, yarns/rovings and fabrics for composite applications.

- 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

- Producers of reinforcement fibres for composites
- Producers of fibre sizings for composites application
- Producers of fibre-reinforced composites

take part in the development of this DIN SPEC.

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

Stefan Fliescher	Textechno Herbert Stein GmbH & Co. KG
Erich Ingelsberger	Textechno Herbert Stein GmbH & Co. KG
Marie Khalid	Textechno Herbert Stein GmbH & Co. KG
Claudia Poitzsch	Textechno Herbert Stein GmbH & Co. KG
Esther Dederer	Faserinstitut Bremen e.V

Petra Hartwig	Faserinstitut Bremen e.V
Axel Drieling	Faserinstitut Bremen e.V
Bernhard Leitner	Fraunhofer IGCV
Frank Manis	Fraunhofer IGCV
Sude Özcelik	Fraunhofer IGCV

3. Objectives of the project

3.1. General

Fibre-reinforced composites have become an indispensable part of modern high-tech applications due to the excellent tensile properties of the reinforcement fibres incorporated in the composite. For this to have an effect, the loads must be distributed evenly to all fibres by means of a matrix, therefore a high interfacial shear strength is required for a good load transfer. Thus, the interfacial shear strength is one of the key parameters in composite technology.

So far, the characterization of interfacial shear strength has only been possible by means of elaborate and thus expensive macromechanical test methods or by means of non-standardized micromechanical measurement methods on individual fibres.

Fast and effective micromechanical testing, which is adapted to the needs of industry, is now available. The aim of this DIN SPEC is to standardize the micromechanical testing of interfacial shear strength on single fibres.

3.2. Planned scope

This document specifies a test method for determining the interfacial shear strength between a single fibre and a matrix by means of a pull-out test. The method can be used to measure the critical energy release rate.

The method is applicable to reinforcement fibres such as carbon fibres, glass fibres, basalt fibres and similar stiff reinforcement fibres and to thermoset, thermoplastic and fine-grained concrete matrices. It can be used for polymeric reinforcement fibres and for other inorganic matrices. It is not applicable to:

- 1) elastomeric fibres and elastomeric matrices such as rubber;
- 2) matrices which cure or melt at temperatures above 400 °C;
- 3) matrices that show a strong tendency to bubble formation or expansion during the sample-preparation process;
- 4) foams.

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:

- ISO/TC 61 "Plastics" („Kunststoffe“)
- ISO/TC 61/SC 13 „ISO/TC 61/SC 13 - Composites and reinforcement fibres“ („Verbundstoffe und Verstärkungsfasern“)
- ISO/TC 61/SC 13/WG 7 „Composites and metal assemblies“ („Verbundwerkstoffe und Metallverbunde“)
- NA 054-02-02 AA „Verstärkte Kunststoffe und härtbare Harze“
- NA 062-05-21 AA „Physikalisch-technologische Prüfverfahren für Textilien“
- DIN SPEC 25714 Basaltfasern – Technische Lieferbedingungen
- ISO 291, Plastics — Standard atmospheres for conditioning and testing

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 on 2021-10-18 as a Web-Meeting. The project duration will be about 6 months.

At this kick-off meeting, the consortium for developing the DIN SPEC will be constituted, further organizational issues will be decided on and clarified, and, where possible, work on the subject matter will be begun.

A draft for public commenting will not be published.

A total of 3 project meetings (kick-off meeting and work meetings) and 0 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 German (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

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 22.415 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 organizations¹. 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

¹ 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.

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.

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

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Annex: Project schedule (preliminary)

DIN SPEC project	2021						2022						
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
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 Kick-off
M Project meeting
W Web conference
A Adoption of DIN SPEC