DVS – DEUTSCHER VERBAND FÜR SCHWEISSEN UND VERWANDTE VERFAHREN E.V.	Quality requirements in adhesive bonding technology	Technical Code DVS 3310

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Contents:

1 Introduction

This technical code describes the requirements on users who are either planning to use adhesive bonding technology or who are already using adhesive bonding technology. This technical code is not specific to a particular bonding task and can therefore be utilised for all adhesive bonding work.

The technical code is both a guide and an aid for users. It will allow them to make decisions on measures for an in-house quality assurance system for adhesive bonding. These measures will enable them to meet the requirements laid down in regulations or laid down by their customers in contracts.

In order to be able to successfully plan adhesive bonding work, the company management must make the following decisions in advance:

– Confirm that adhesive bonding is to be carried out.

– Specify the highest class of bonded joint (see Section 5) that is to be manufactured at the company.

– Define the scope of the adhesive bonding process (with regard to the value added at the company).

– Make decisions about what is undertaken in-house and what work is outsourced (e.g. design, purchasing, production, maintenance, etc.)

– Define the relevance of adhesive bonding technology for the company.

The scope of the resulting work must be estimated based on the requirements laid down in this technical code and must be compared with the potential benefits for the company. Adhesive bonding technology can only be successfully used if the company creates the necessary boundary conditions.

In each individual case, the level of operational production quality needed to fulfil the duty of care depends on the features of the product in question.

According to the DIN EN ISO 9000 series for quality assurance systems, adhesive bonding constitutes a "special process".

In order for the bonded product, components or structures to be used as intended, the whole of the bonding process must be monitored. This monitoring must cover the design stage, the selection of the substrates and adhesives, the surface treatment, the application and curing of the adhesive and the testing of the bonded joints. The adhesive bonding processes must be described clearly and any deviations from these processes must be avoided. Monitoring must be carried out in order to ensure that the prescribed quality is attained. In order to guarantee fault-free production and to avoid shortcomings, users of this technical code must employ suitable quality assurance procedures.

2 Area of application

In order for a bonded product to be safely used, relevant quality assurance procedures must monitor its manufacture and employees and companies must be suitably qualified to undertake this work.

The requirements specified in this technical code are guiding principles for the necessary production quality and also include the maintenance and repair of bonded joints. The minimum requirements in an individual case may be more or less stringent. If they are less stringent, this must be reasoned in documented form.

This technical code is intended for the following purposes:

a) For preparing explanatory notes in accordance with the requirements of DIN EN ISO 9001, and as a guideline for specifications and for preparing that part of the quality assurance system that relates to the monitoring of adhesive bonding as a "special process".

b) For preparing guidelines for specifications and requirements relating to adhesive bonding when the quality assurance system does not fall under DIN EN ISO 9001.

c) For evaluating the quality requirements for adhesive bonding, as mentioned under a) and b).

DVS, Technical Committee, Working Group "Adhesive Bonding Technology"

This technical code can be used, for example, for:

– Contract negotiations:
Specification of requirements for adhesive bonding technology within quality assurance systems.

– Users:
Specifications and compliance with requirements relating to adhesive bonding technology.

– Committees which draw up standards:
Requirements relating to adhesive bonding technology

– Participants, e.g. independent testing bodies, customers or managers of the user:
Evaluation of quality requirements relating to adhesive bonding technology.

3 References to standards and technical regulations

This technical code includes specifications from other publications in the form of dated or undated references. These references are quoted at relevant places in the text. Details of these publications are given below. In the case of dated references, later amendments or revisions to these publications only form part of this technical code if the amendment or revision is included. In the case of undated references, the last edition of the relevant publication is valid.

DIN EN ISO 9000	Quality management systems – Fundamentals and vocabulary
DIN EN ISO 9001	Quality management systems – Requirements
DIN EN ISO 9004	Managing for the sustained success of an organization – A quality management approach
Guideline DVS®-EWF 3301	European Adhesive Specialist – EAS
Guideline DVS®-EWF 3305	European Adhesive Bonder – EAB
Guideline DVS®-EWF 3309	European Adhesive Engineer – EAE
Technical code DVS 3311	Adhesive bonding supervision
GefStoffV	Hazardous Substances Act

4 Definitions and terms

The following definitions apply for this technical code:

• Users

Users are the people or organisations utilising adhesive bonding technology.

• Work instructions

Work instructions describe the correct way to manufacture bonded joints and, where necessary, the testing of bonded joints. Users can stipulate any deviations from standard tests or the testing of components in in-house work instructions.

• Personnel carrying out the bonding work

This covers the personnel who manufacture or repair the bonded joints, who possess the basic knowledge required for this work and who are capable of understanding and properly executing work instructions regarding adhesive bonding work.

• Load-bearing capacity

The load-bearing capacity is a measure of the behaviour of a bonded joint over time under the acting loads.

• Strain

Strain is understood to be all the influences (mechanical, thermal, media, physical and biological) which alter the properties of a bonded joint, also caused by internal stresses.

• Dimensioning

Dimensioning is understood to be the comparison between the strain of the bonded joint and the load-bearing capacity.

• Auxiliary production equipment

Auxiliary production equipment (APE) refers to machines, devices and individual parts which are necessary for carrying out the production process or for optimising the production process, the ergonomics or occupational health and safety aspects (e.g. tools, jigs and disposable cloths).

• Infrastructure

Infrastructure is understood here to be the following non-product-specific production facilities and equipment:

– Factory sites / locations

– Buildings (e.g. production halls, storage areas, laboratories and office buildings)

– Transport inside the company (e.g. roads and rails) and outside the company (e.g. road, rail and waterway connections and airports)

– Production hall/workshop equipment (e.g. cranes, pits, means of transport, production hall partitioning and air conditioning)

– Equipment for utility provision (e.g. electricity, gas, water, heat, compressed air and data lines)

– EDP equipment (hardware and software)

– Means of transport (e.g. trucks, rail vehicles, fork lift trucks and trailers)

– Support services (e.g. transport, communication and facility management).

• Maintenance

This is required if the bonded joint has failed in operation or if the bonding process is replacing/augmenting the original joining method (e.g. welding, screwing, lamination, etc.).

• Supervisors of adhesive bonding work (SABs)

This refers to personnel who are responsible for the entire adhesive bonding process or for parts of the adhesive bonding process, from the planning stage right up to the (series) production or repair.

• Adhesive bonding process

The adhesive bonding process is a process which begins with the preparation of the adhesive and the substrates and ends when the required load-bearing capacity is attained.

• Demonstration of proof

The demonstration of proof is a procedure to demonstrate that the design complies with the requirements.

• Testing

Testing relates to activities such as measurement, inspection and evaluation of one or several properties and comparison of the results with the specified requirements in order to verify that every property complies with requirements.

• Qualified process

A qualified (controlled) process is a process in which proven parameters of the process essentially do not alter or only alter in a known way or within known limits.

• Quality management system

A quality management system is a management system for managing and controlling the quality of a company's production processes, products and services.

• Quality testing

Quality testing refers to checking to what extent one part of a product satisfies the quality requirements. Quality tests are performed based on specific product properties. It must be specified