

INDUSTRIAL APPLICATION

The quality of a bonded product is largely determined by the bonding process

In the context of DIN 2304, the expertise of Fraunhofer IFAM allows the specific requirements of our customers to be addressed. Our teams of scientists, engineers, and technicians develop bonding processes for a range of industries including:

- Automotive industry
- Aircraft manufacture
- Rail vehicle manufacture
- Plant construction
- Electrical engineering
- Microsystem technology and optics
- Construction industry
- Shipbuilding
- Special vehicle manufacture
- Packaging industry
- Tool manufacture
- Medical technology
- Textile industry

and other industries.

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Images:

- [1] Destructive testing of a bonded electronic component.
- [2] Discussion about the quality of a bonded component (Photo: © Dirk Mahler).
- [3] Optimization of the adhesive application.
- [4] Process planning with the aid of computer simulation.

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ADHESIVE BONDING – FOR SURE! Bonding processes in accordance with DIN 2304

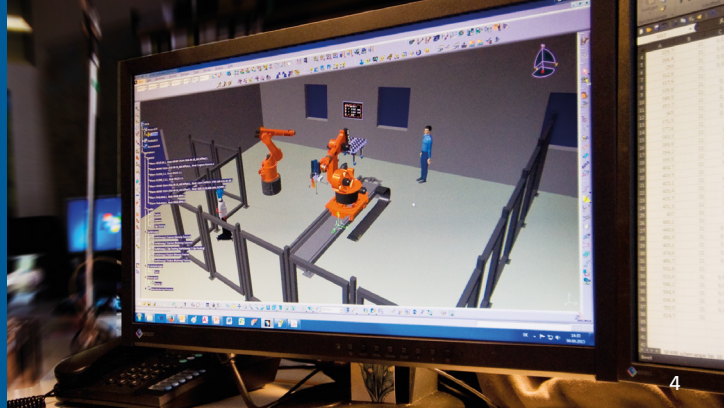
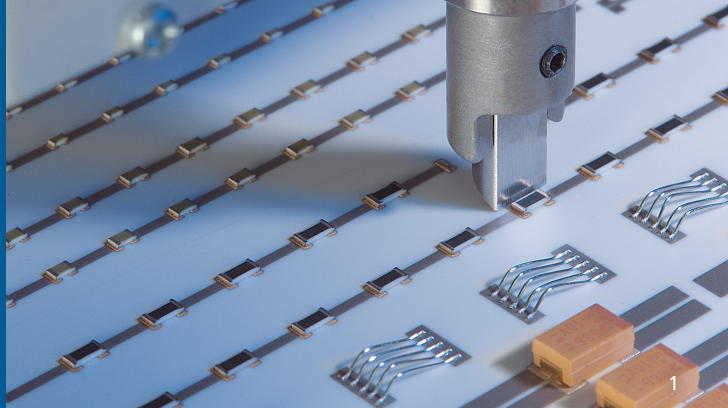


ADHESIVE BONDING – A “SPECIAL PROCESS”

According to DIN EN ISO 9001, adhesive bonding is, just as welding, defined as a “special process”. This is a process whose results cannot be tested 100 % non-destructively. To fundamentally ensure the reproducibility of a bonding process, a strategy for failure prevention is indispensable. This can be achieved by detailed specification of a bonding process in a quality management system customized for the particular application.

Based on knowledge and DIN 2304 “Adhesive bonding technology – Quality requirements on bonding processes”, Fraunhofer IFAM reviews industrial bonding processes for customers in order to ensure they are compliant with the relevant standards. This reviewing is undertaken by DVS®/EWF European Adhesive Engineers with extensive experience in the certification of industrial bonding processes. The process review is carried out in a customized way depending on the product requirements and customer wishes.

The aim is to identify the potential for improvement, to optimize the process, and to evaluate compliance with DIN 2304.



RANGE OF SERVICES

Fraunhofer IFAM supports customers with implementation of DIN 2304 in all stages of a bonding process – from the planning to the implementation and execution. In all cases, customer-specific requirements and circumstances are taken into account.

- Evaluation of bonding processes for existing or planned production
- Assistance with the carrying out of Failure Modes and Effects Analysis (FMEA) in consideration of adhesive bonding technology
- Advice on classification of bonded joints into safety classes
- Advice on the introduction of DIN 2304 in production
- Assessment of the realization of DIN 2304 via process reviews
- Workforce training in adhesive bonding technology

EVALUATION OF THE CURRENT PROCESS STATUS

Adhesive bonding technology results in new challenges for companies that go far beyond the actual production process. Therefore it is important to analyze the complete bonding process in order to identify potential risks and opportunities for optimization at an early stage. This involves the following steps:

- Analysis of the entire bonding process
- Evaluation of compliance with the requirements of DIN 2304
- Identification of potential for optimization and development of specific, process-oriented solutions

CHECKING COMPLIANCE WITH STANDARDS

During process reviews the compliance of the existing bonding process with relevant standards such as DIN 2304 and guidelines such as DVS® 3310/3320 is evaluated.

- Analysis of the entire bonding process
- Transparent and clear assessment of the realization of relevant standards and guidelines

ASSISTANCE WITH THE IMPLEMENTATION OF DIN 2304

DIN 2304 applies to all sectors of industry and outlines the quality assurance requirements for adhesive bonding processes. However, it does not contain guidelines on how to implement this in specific production environments.

To this end, clear concepts must be established, including not only the organizational division of responsibilities but also technical aspects and the documents to be prepared. To assist companies with these tasks, Fraunhofer IFAM provides the following services:

- Development of an overall concept for the implementation of DIN 2304 for industrial production
- Assistance with the preparation of work instructions
- Development of calculation and design of bonded joints
- Procedures for the selection and qualification of adhesives
- Preparation of production documentation
- Quality assurance concepts for individual production steps
- Accredited workforce training in accordance with DIN 2304

PROCESS STEPS TO BE CONSIDERED

Along the entire process chain, the following points are taken into account for evaluating the current process status, assessing compliance with standards, and supporting the implementation of DIN 2304:

- Classification of bonded joints according to their safety requirements
- Contract review and subcontracting
- Development process, design, and process planning
- Infrastructure
- Production and maintenance
- Storage and logistics
- Personnel
- Monitoring of measuring equipment, testing devices, and auxiliary production equipment
- Quality management

