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# Certification according DIN 6701

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In case of further questions please contact:

Frank Stein

Head of Certification Body

TBB<sup>Cert</sup>

Wiener Str. 12

28359 Bremen

Germany

Tel: (+49) 421 69606793

stein@tbbcert.de

Christian Schuch

Deputy Head of Certification Body

TBB<sup>Cert</sup>

Wiener Str. 12

28359 Bremen

Germany

Tel: (+49) 421 69606794

schuch@tbbcert.de

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# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## I. DIN 6701 – What is it about?

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## I. DIN 6701 – What is it about?

- The series of standards „DIN 6701“ is a comprehensive set of rules for quality assurance in the field of adhesive bonding in rail vehicle industry and in the maintenance of rail vehicles.
- The standards in the DIN 6701 series “Adhesive bonding of railway vehicles and parts” comprise:
  - DIN 6701-2: Qualification of manufacturer
  - DIN 6701-3: Guideline for construction design and verification of bonds on railway vehicles
  - DIN 6701-4: Manufacturing controls and quality assurance  
(The draft of part 1 “Basic terms and basic regulations” has been withdrawn).
  - Additional: A-Z-Guideline of the „Workgroup adhesive bonding DIN 6701“  
(Collection of supplementary definitions, regulations, restrictions and interpretations relating to the DIN 6701 series of standards)

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## I. DIN 6701 – What is it about?

### History:

- **2000:** An increasing number of damage events leads to an additional monitoring of the processes of welding and adhesive bonding.
- **February 26th 2008:** The German Federal Railway Authority (EBA: Eisenbahn-Bundesamt) defines that the DIN 6701-2: 2006-05 is considered as „state of the art“ for adhesive bonding in rail vehicle industry.

### Resulting requirement:

- All adhesive processes for production and maintenance of rail vehicles and parts of rail vehicles need to correspond to the „state of the art“ of adhesive bonding.
- This applies to all rail vehicles which are using the railroad network controlled by the German Federal Railway Authority.
- The compliance with the „state of the art“ of adhesive bonding can be demonstrated by certification according to DIN 6701 or with a „case-by-case“ review.

## II. Basics of certification in accordance to DIN 6701

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## II. Basics of certification in accordance to DIN 6701

### **Requirement of the German Federal Railway Authority (EBA):**

All adhesive processes for production and maintenance of rail vehicles and parts of rail vehicles need to correspond to the „state of the art“ of adhesive bonding.

This applies to all rail vehicles which are using the railroad network controlled by the German Federal Railway Authority.

The compliance with the „state of the art“ of adhesive bonding can be demonstrated by:

**„Case-by-Case“ Review**

or

**Certification according to DIN 6701**

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## II. Basics of certification in accordance to DIN 6701

### Reference for certification

- DIN 6701-2 Qualification of manufacturer
- DIN 6701-3 Guideline for construction design and verification of bonds on railway vehicles
- DIN 6701-4 Manufacturing controls and quality assurance
  
- Current version of A-Z-Guideline of the Workgroup „Adhesive bonding DIN 6701“

### Notes:

- The new series of standards 6701 is available in German and English. The standards can be purchased at Beuth-Publishing House ([www.beuth.de](http://www.beuth.de))
- The current version of the A-Z-Guideline is available at the „Online-Register DIN 6701“ (<https://www.din6701.de>). Access and downloads are free of charge.
- The Workgroup „Adhesive bonding DIN 6701“ consists of representatives of European rail vehicle manufacturers, suppliers, rail operators, Maintenance companies, German Federal Railway Authority and Certification Bodies.



# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## II. Basics of certification in accordance to DIN 6701

### **TBB<sup>Cert</sup> intentions of announcing the DIN 6701 certification:**

- Transferring the „state of the art“ of adhesive bonding technology into the user companies
- Making adhesive bonding in rail industry more reliable
- Supporting companies in order to use the whole potential of adhesive bonding technology
- Demonstrating a continuous high level of quality due to certification of the adhesive bonding related processes

## III. Requirements / First steps of audit preparation

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## III. Requirements / First steps of audit preparation

First step: classification of the adhesive bond

Class	Description	Definition safety requirements
<b><u>A1</u></b>	Joints on rail vehicles and parts with <b><u>high</u></b> safety requirements	Failure will inevitably result in threat to life or physical condition or will jeopardise the reliability in service
<b><u>A2</u></b>	Joints on rail vehicles and parts with <b><u>average</u></b> safety requirements	Failure may result in accidents involving physical injury of persons or impairment of serviceability of the complete system
<b><u>A3</u></b>	Joints on rail vehicles and parts with <b><u>low</u></b> safety requirements	Failure results in loss of comfort at most / accidents involving physical injury are unlikely
<b><u>Z</u></b>	Joints on rail vehicles and parts with <b><u>no</u></b> safety requirements	Failure will not cause any threat in life or physical condition and does not jeopardise the reliability in service

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## III. Requirements / First steps of audit preparation

### Second Step: Definition of adhesive bonding work scope and work volume

**IMPORTANT:** Only the projects which will be carried out according to DIN 6701 need to be considered. It is still possible to produce without applying the DIN 6701. This needs to be clearly stated to the client.

- How many adhesive bonds will be carried out (type of bond and amount of production)?
- Definition of demand of qualified employees for bonding work and supervision of the process
- How many bonding areas need to be certified?
- Are bonding processes carried out at different company sites? (Every company site needs an own certificate)
- Is the design/dimensioning of the adhesive bond, adhesive selection/validation and the adhesive process planning done in the company or are these information provided by appropriate certified clients?

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## III. Requirements / First steps of audit preparation

### **Third Step: Definition of qualification and amount of personnel involved into adhesive bonding related processes**

- The qualification of the personnel for production and process supervision has to meet the requirements of the class of certification. The necessary qualification are shown on the next page.
- The number of qualified personnel needs to correspond with the amount of bonding work (Don`t forget production shifts, substitution for holidays, etc.)

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## III. Requirements / First steps of audit preparation

Area of validity	Class of bonded joint		
	A1	A2	A3
	Qualification Supervisor in Charge / Qualification Deputy		
1. Design/construction and process planning	EAE / EAE <sup>a</sup>	EAS / EAS <sup>a</sup>	EAS <sup>d</sup> / EAS <sup>a</sup>
2. Production	EAS <sup>b</sup> / EAS <sup>c</sup>	EAS / EAS <sup>c</sup>	EAS <sup>d</sup> / EAS <sup>a</sup>
3. Maintenance and repair	EAS <sup>b</sup> / EAS <sup>c</sup>	EAS / EAS <sup>c</sup>	EAS <sup>d</sup> / EAS <sup>a</sup>
4. Purchase, further sale and assembly of bonded components	EAS <sup>d</sup> / EAS <sup>d</sup>	EAS <sup>d</sup> / EAS <sup>d</sup>	Without level of qualification in adhesive bonding
5. Contracting third parties	EAS / EAS <sup>c</sup>	EAS / EAS <sup>c</sup>	Without level of qualification in adhesive bonding

a If permanent availability of SIC is not necessary, it is possible to nominate a non-equally authorized deputy without level of qualification who ensures that no decisions related to adhesive bonding are made during absence of SiC.

b EAS is sufficient if it has been ensured that no decision-making authority in the area of design/construction and process planning is required.

c If permanent availability of SIC is not necessary, it is possible to nominate a non-equally authorized deputy with a lower level of qualification.

d Or proof of specific knowledge.

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## III. Requirements / First steps of audit preparation

### **Fourth Step: Implementing the organizational requirements and the production requirements in the company**

#### **Note / Tip:**

For all mentioned subjects always keep in mind the following "rule":

- How is it done (e.g. work instructions, process descriptions) ?
- Is it documented (e.g. bonding protocols, quality sheets) ?
- Is it put into practice ?

In case of an already existing quality management system (e.g. ISO 9001):  
“Don` t reinvent the wheel”. It is sometimes more simple and efficient to implement the requirements of the DIN 6701 into already existing quality management processes.

e.g.:

Naming of Supervisors of Bonding in the general organization chart;  
Implementing DIN 6701-check into the process of contract review

## IV. Carrying out an audit according to DIN 6701



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## IV. Carrying out an audit according to DIN 6701



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## IV. Carrying out an audit according to DIN 6701

Issue	Content
<b>Qualification of staff, authorization of supervisors</b>	Integration into the organizational structure of the company; Duties, responsibilities and qualification of supervisors, quality control staff and workers
<b>Contract review, specifications</b>	Contract review; Comply with customer specifications and requirements
<b>Process management</b>	Process coordination, responsibilities, approval, handling of documents, fault management
<b>Qualification of suppliers</b>	Contractual requirements; Specifications of products used in adhesive processes; Purchasing of bonded parts; Supplier audits
<b>Design</b>	Appropriate design for assembly, load and ageing; Design review; risk assessment and classification of adhesive bonds
<b>Qualification of the bond</b>	Selection of adhesive and adherends; load limit analysis; validation / qualifying tests; considering ageing; proof of usage safety
<b>Dimensioning</b>	Calculation/dimensioning of minimum bonding area and adhesive layer thickness
<b>Production line</b>	Production environment; assembly parameters; work instructions; repair instructions; machinery/production equipment (dosing units, tools, etc.)
<b>Quality assurance and testing</b>	Quality concept; in-process testing/production accompanying work samples; product release; test plan and test instructions; traceability
<b>Logistics and storage</b>	Purchasing; technical delivery requirements; materials management; incoming inspection, storage condition; transport
<b>Human resources development</b>	Recurrent qualification, fluctuation

## V. Certificate DIN 6701

# DIN 6701: Adhesive Bonding in Rail Vehicle Industry

## V. Certificate DIN 6701

### The Certificate defines:

- Class of adhesive bonding (e.g. A2)
- Main function of the adhesive bond (e.g. force transmitting bond; sealing)
- Pre-treatment methods (e.g. anodization)
- Production methods (e.g. use of 2-component adhesive)
- Test methods (e.g. destructive test methods)
- Degree of mechanization (e.g. partly automated; manual application)

**Period of validity:** 3 years

### Recurrent certification

- Monitoring audit within the period of validity (usually after 18 months)
- Recurrent audit after expiration of validity

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V. Certificate DIN 6701

**Official list of actual certificates: Online-Register: <https://www.din6701.de>**