

Eisenmann Manufacturing Instructions 01-04-36



## Eisenmann Manufacturing Instructions 01-04-36

### Contents

Scope of application .....	3
Revision history .....	3
Purpose of the Manufacturing Instructions .....	3
Interpretation in cases of contradictory content .....	3
Contractual priorities.....	4
Packaging / Transport .....	4
Note on standards .....	5
General tolerances .....	5
Fits.....	5
Edge condition .....	5
Thread.....	6
Holes / Countersinks .....	6
Welding / Soldering .....	6
Welding requirements Steel construction.....	7
Welding requirements for piping of stainless austenitic steels.....	8
Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG).....	12
Welding-related requirements for piping and containers for deionized water plant .....	16
Welding seams, symbolic representation Extract from DIN EN 22 553 and ISO 2553 .....	23
Representation and dimensioning of welding seams .....	25
Technical representation of welding symbols with defined testing procedure .....	25
Text – Symbols on drawings.....	26
Drafting .....	32
Drawing format.....	32
Data exchange .....	32
Standard – Assembly of ancillary materials .....	33
Surface treatment technique with painting .....	34
1. Dry interior section.....	35
2. Interior section dry / wet (with resistance to chemicals) and exterior section .....	36
3. Exterior section with resistance to UV rays and seawater .....	37
4. Aluminum paint.....	38
5. Powder coating.....	39
Surface treatment techniques without painting.....	40
Processing regulations for canted and perforated plates made.....	41
Manufacturing regulations hot-dip galvanized sheet steel and stainless steel - plate processing.....	42
Manufacturing regulations plastic processing.....	43

## Eisenmann Manufacturing Instructions 01-04-36

### Scope of application

The Manufacturing Instructions described here are binding for all Eisenmann Group companies (hereinafter referred to as the 'principal') and all contractors, unless otherwise agreed.

### Revision history

Date	Version	Creation / Change	Reason for the change
12.09.2017	1.0.0	First document	replaces: Manufacturing Instructions for Eisenmann drawing parts 01-04-36
25.10.2017	1.1.0	RAL-No. corrected	Surface treatment processes with varnishing of aluminum lacquer RAL no. 3575 to 9006 corrected. Page 36 E-mail address changed
19.12.2017	1.2.0	Pretreatment new	In surface treatment process with painting the pretreatment newly added. Alu-lacquer page 39 Temperature resistance from +250 ° C to +150 ° C corrected.
22.05.2018	1.3.0	Symbol no. 36 new symbol No. 10 and 11 Details expanded	Symbol on drawing no. 36 min. to max. dimensions page 32 newly added. For symbols no. 10 and 11 page 28, the tolerances are indicated anew.
23.11.2018	1.4.0	Drafting	Note regarding drafting neutral to project and implementation added on page 33.
15.01.2019	1.5.0	Packaging guidelines	Page 5, supplier for VCI film has been changed.
25.04.2019	1.6.0	Symbol no. 37 new Welding requirements Steel construction	Symbol on drawing no. 37 Welding bolt marking page 32 new added. Page 8 Welding requirements Steel construction, General information reviewed
23.05.2019	1.7.0	Packaging Guideline as separate document Symbol no. 38 new	The Packaging Guideline is a separate document Symbol on drawing no. 22 Revised description Symbol on drawing no. 38 Oil can newly added

### Purpose of the Manufacturing Instructions

The instructions contained in these Manufacturing Instructions are to be followed for all planning and execution phases. They have been elaborated in accordance with the principal's technical requirements and are binding for the execution of work.

These instructions cover the minimum standard that must be adhered to without fail. Deviations from the minimum standard must be approved in writing by the principal's respective specialist department before work starts.

In addition, such work must be done in accordance with established engineering practice, the technological state of the art and in compliance with the applicable laws, standards and regulations.

The contractor remains solely responsible to the principal for adherence to these Manufacturing Instructions.

### Interpretation in cases of contradictory content

Should contradictions arise within the scope of the technical documents, the contractor is obliged to inform the principal immediately and obtain instructions or find a joint solution.

## Eisenmann Manufacturing Instructions 01-04-36

### Contractual priorities

The interrelationships with and ranking of these Manufacturing Instructions with respect to other agreements concluded between the principal and the contractor are to be dealt with elsewhere, generally in a framework contract and/or in minutes of negotiations and/or in the General Purchasing Conditions.

### Packaging / Transport

Packaging provides protection against damage or any other form of impairment that could lead to a loss of quality in the packaged goods.

On the basis of the properties of the packaged goods (fragility, size, weight etc.), all influences arising from the packaging, transport, storage and unpacking chain, as well as those applying to the customer's chain where this is relevant, that affect the stresses to which the packaging is subjected, are to be taken into account.

In choosing packaging methods and materials, the statutory requirements of the supplier and recipient countries regarding packaging are to be taken into account.

For further information, please refer to our [Packaging guideline](#).



## Eisenmann Manufacturing Instructions 01-04-36

### Note on standards

Even if the Manufacturing Instructions do not explicitly refer to them, it is entirely the responsibility of the contractor to ensure compliance with all requirements applying to the contractor's performance that go beyond what is contained in these Manufacturing Instructions and that arise from legal and other regulations (e.g. EU Directives, ordinances and other applicable laws) as well as from standards and generally recognized codes of practice.

### General tolerances

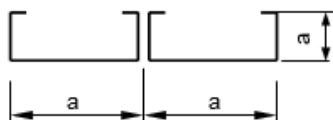
Applicable standards

- DIN ISO 2768-1-m General tolerances (Tolerances for linear and angular dimensions without individual tolerance indications)
- DIN ISO 2768-2-k General tolerances (Tolerances for features without individual indications)
- DIN EN ISO 1101 Geometrical tolerancing – Tolerances of form, orientation, location and run-out
- DIN EN ISO 1302 Indication of surface texture
- **Taking account of DIN EN ISO 13920** General tolerances for welded constructions (dimensions for lengths and angles, shape and position)

General tolerances		Nominal dimensional ranges							
		to 30	>30 120	>120 400	>400 1000	>1000 2000	>2000 4000	>4000 8000	more than 8000
In accordance, with DIN EN ISO 13920									
<b>* Length [mm]</b>		± 1			± 2		± 3		
<b>Angular dimensions</b>	<b>[min]</b>	± 20'		± 15'		± 10'			
	<b>[mm/m]</b>	± 6		± 4.5		± 3			

\* Lengths resulting from sawing, cutting, punching, clinching and welding.

applicable for plate constructions  $S < 5$  (such as sheet metal plates, plate trays, basins, roller conveyor plate frames)



depending on tilt and welding seam 'a'

Nominal measurement range a	to 1000 =	tolerance ± 1
	to 2000 =	tolerance ± 1.5
	> 2000 =	tolerance ± 2

### Fits

Applicable standard

- DIN ISO 286-1 ISO system of limits and fits – Basis of tolerances, deviations and fits

### Edge condition

Applicable standard

- DIN ISO 13715 Edges of undefined shape (Vocabulary and indications)

## Eisenmann Manufacturing Instructions 01-04-36

### Thread

Applicable standard

- DIN 202 Screw threads (General plan)
- DIN ISO 965-1 ISO general purpose Metric screw threads (Tolerances – Part 1: Principles and basic data)
- DIN ISO 965-2 ISO general purpose metric screw threads (Tolerances – Part 1: Limits of sizes for general purpose external and internal screw threads)

### Holes / Countersinks

Applicable standard

- DIN EN 20273 Clearance holes for bolts and screws
- DIN EN ISO 15065 Countersinks for countersunk head screws with head configuration in accordance with ISO7721
- DIN 74 Countersinks for countersunk head screws except countersunk head screws with heads according to DIN EN 27721
- DIN 974-1 Diameters of counterbores – Manufacturing dimensions – Part 1: Hexagon socket head cap screws and screws with cheese head or pan head
- DIN 974-2 Diameter of counterbores for hexagon bolts, screws and nuts; manufacturing dimensions

### Welding / Soldering

Applicable standard

- DIN EN ISO 2553 Welding and allied processes – Symbolic representation on drawings – Welded joints (ISO 2553:2013); German version EN ISO 2553:2013
- DIN EN 1011-1 Welding – Recommendations for welding of metallic materials –Part 1: General guidance for arc welding; German version of EN 1011-1:2009
- DIN EN 1011-2 Welding – Recommendations for welding of metallic materials –Part 2: Arc welding of ferritic steels; German version EN 1011-2:2001
- DIN EN 1011-3 Welding – Recommendations for welding of metallic materials –Part 3: Arc welding of stainless steels; German version EN 1011-3:2000
- DIN EN 1011-4 Welding – Recommendations for welding of metallic materials –Part 4: Arc welding of aluminum and aluminum alloys; German version EN 1011-4:2000

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements Steel construction

#### Welding requirements Steel construction

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### General

In the event of conflicting requirements in the principal's orders, statutory regulations or technical rules, the more stringent quality requirements shall always apply. In case of doubt, consult with the customer!

#### Technical representation on drawings

Symbols and dimensions shall be provided according to:

- DIN EN ISO 2553 Welding and allied processes – Symbolic representation on drawings – Welded joints (ISO 2553:2013); German version EN ISO 2553:2013

Welding seams shall be prepared as per DIN EN 1090-2 according to:

- DIN EN ISO 9692 Welding and allied processes – Types of joint preparation – Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2013); German version EN ISO 9692-1:2013

The quality levels applying to the construction are to be indicated on the drawings according to DIN EN 1090-2.

The following applies:

- DIN EN ISO 5817 Welding – Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections (ISO 5817:2014); German version EN ISO 5817:2014

Tolerances for welded constructions are to be indicated according to DIN EN 1090-2.

The following applies:

- DIN EN 13920 General tolerances for welded constructions – Dimensions for lengths and angles - Shape and position (ISO 13920:1996); German version EN ISO 13920:1996

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements for piping of stainless austenitic steels

#### Welding requirements for piping of stainless austenitic steels

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### General requirements

Translations of welding-related specialist terms as well as calculation, manufacture, design and inspection of all pipework are to be carried out according to standards.

#### Applicable standards

- DIN EN 1792 Welding - Multilingual list of terms for welding and related processes – Trilingual version EN 1792:2003
- AD 2000 information sheet HP 100 R Construction regulations – Pipes made of metallic materials
- DIN EN 13480-1 to DIN EN 13480-8 Metallic industrial piping

#### Requirements for the manufacturer / supplier

Certification as per AD/HP 0 or Pressure Equipment Directive and/or the respective welding procedure tests.

#### Applicable standard

- DIN EN ISO 15614-1 Specification and qualification of welding procedures for metallic materials – Welding procedure test. Part 1: Arc welding of nickel and nickel alloys



**Eisenmann Manufacturing Instructions 01-04-36****Welding requirements  
for piping of stainless austenitic steels**

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

**Quality assurance for welding work**

For quality assurance in welding work, the following quality requirements are to be observed:

## Applicable standard

- DIN EN ISO 3834-2 Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements (ISO 3834-2:2005); German version EN ISO 3834-2:2005

corresponding with the following chapters:

- chapters 5 Review of the requirements and technical review
- chapters 6 Subcontracting
- chapters 7 Welding personnel
- chapters 8 Monitoring and testing personnel
- chapters 9 Equipment
- chapters 10 Welding-related and associated activities
- chapters 11 Filler metals
- chapters 12 Storage of parent metals
- chapters 14 Monitoring and testing
- chapters 17 Identification and traceability
- chapters 18 Quality reports

**Quality of welding joints**

The welding joint quality is to be specified by the designer and entered into the drawings.

## Applicable standard

- AD 2000 information sheet HP 100 R Construction regulations – Pipes made of metallic materials
- DIN EN 13480-1 to DIN EN 13480-8 Metallic industrial piping

If nothing has been laid down or specified, quality level 'C' applies.

## Applicable standard

- DIN EN ISO 5817 Welding – Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections (ISO 5817:2014); German version EN ISO 5817:2014

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements for piping of stainless austenitic steels

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### Requirements for the base material

Basic material inspection documents 3.1 according to DIN EN 10204 Metallic products - Types of inspection documents; German version EN 10204:2004

#### Requirements for the filler metal

- Use equivalent or higher alloyed filler metals
- TÜV approval
- Material certificate 2.2 according to DIN EN 10204.
- Welding without filler metal only permitted with approval from the Eisenmann company.
- Molybdenum higher alloyed filler metals are to be used for molybdenum alloyed steels!

#### Tests and scope of inspections

are generally to be determined together with the customer and laid down in writing in accordance with the following standards prior to signing the contract!

- AD 2000 information sheet HP 100 R Construction regulations – Pipes made of metallic materials
- DIN EN 13480-1 to DIN EN 13480-8 Metallic industrial piping
- Checking pipelines for leaks

The testing personnel must be qualified and certified.

- DIN EN ISO 9712 Non-destructive testing Qualification and certification of NDT personnel (ISO 9712:2012); German version EN ISO 9712:2012
- DIN EN ISO 9712 Supplement Nondestructive testing – Qualification and certification of NDT personnel; Supplement 1: Recommendations on the application of DIN EN ISO 9712:2012-12

#### Test types:

If testing is to be non-destructive, then the following standards are to be applied, or other standards according to the requirements associated with the component:

- General rules according to DIN EN ISO 17635
- Visual testing (VT) DIN EN ISO 17637
- Radiographic testing (RT) DIN EN ISO 17636
- Surface check by the dye penetration method (PT) DIN EN ISO 3452
- Ultrasonic testing (UT) DIN EN ISO 17640
- Magnetic particle testing (MT) DIN EN ISO 17638
- Leakage test by the bubble method, with the vacuum chamber, with leak detection spray DIN EN 1779
- Leakage test with excess pressure, with leak detection spray or differential pressure measurement DIN EN 1779

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements for piping of stainless austenitic steels

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### Processing of stainless steels

With the exception of electropolishing, the following applies to processing and reworking:

- DIN EN 1011-3 Recommendations for welding of metallic materials – Part 3: Arc welding of stainless steels; German version EN 1011-3:2000

The surfaces of austenitic stainless steels must be free of tempering colors and passivated.

#### Inspections

The contractor must assure the principal or the principal's representative that inspection of the parts to be manufactured is possible at any time.

#### General

In the event of conflicting requirements in the principal's orders, statutory regulations or technical rules, the more stringent quality requirement shall always apply. In case of doubt, please contact the person who released the order beforehand!

#### Technical representation on drawings

Symbols and dimensions shall be provided according to:

- DIN EN ISO 2553 Welding and allied processes – Symbolic representation on drawings – Welded joints (ISO 2553:2013); German version EN ISO 2553:2013

Welding seam preparation is to be according to:

- DIN EN ISO 9692 Welding and allied processes – Types of joint preparation – Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2013); German version EN ISO 9692-1:2013

The form of the welded joint is to be in accordance with:

- DIN EN 1708-01 Welding – Basic welded joint details in steel – Part 1: Pressurized components; German version EN 1708-1:2010

## Eisenmann Manufacturing Instructions 01-04-36

### Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG)

#### Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG)

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### General requirements

- Translations of welding-related specialist terms are to be carried out according to the prescribed standard.
- Calculation, manufacture, design and inspection of all pipework and containers are to be carried out according to standard.
- Regulations for plant governing the handling of water-hazardous substances (VawS) and on specialist companies are to be adhered to and to be examined.
- Administrative provisions on the execution of the VawS (VV-VawS) are to be observed.
- Construction and manufacturing shall be carried out according to TRbF (Technische Regeln brennbarer Flüssigkeiten – Technical Regulations on Flammable Liquids) and the standards and regulations stipulated therein.
- The requirements of the Building Rules Lists must be observed.

#### Applicable standard

- DIN EN 1792 Welding - Multilingual list of terms for welding and related processes – Trilingual version EN 1792:2003

#### Requirements for the manufacturer / supplier

Existence of recognition as a specialist company according to the Federal Water Act with monitoring contract including welding technology and recognized welding techniques (welding procedure tests)

#### Applicable standard

- DIN EN ISO 15614-1 Specification and qualification of welding procedures for metallic materials – Welding procedure test. Part 1, Arc welding of nickel and nickel alloys

## Eisenmann Manufacturing Instructions 01-04-36

### **Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG)**

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### **Quality assurance for welding work**

For quality assurance in welding work, the following quality requirements are to be observed:

- DIN EN ISO 3834-2 Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements (ISO 3834-2:2005); German version EN ISO 3834-2:2005

corresponding with the following chapters:

- chapters 5 Review of the requirements and technical review
- chapters 6 Subcontracting
- chapters 7 Welding personnel
- chapters 8 Monitoring and testing personnel
- chapters 9 Equipment
- chapters 10 Welding-related and associated activities
- chapters 11 Filler metals
- chapters 12 Storage of parent metals
- chapters 14 Monitoring and testing
- chapters 17 Identification and traceability
- chapters 18 Quality reports

#### **Quality of welding joints**

The welding joint qualities are to be specified by the designer and entered into the drawings.

Applicable standard

- AD 2000 information sheet HP5/3 Manufacturing and testing of pressure tanks – making and testing the joints – non-destructive testing of the welded joints

#### **Requirements for the base material**

Basic material inspection documents 3.1 according to DIN EN 10204 Metallic products - Types of inspection documents; German version EN 10204:2004

Proof of IC (intercrystalline corrosion) resistance for corrosion-resisting materials.

#### **Requirements for the filler metal**

- Use equivalent or higher alloyed filler metals
- TÜV or DB approval
- Material certificate 2.2 according to DIN EN 10204.
- Welding without filler metal only permitted with approval from the principal.



## Eisenmann Manufacturing Instructions 01-04-36

### **Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG)**

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### **Tests and scope of inspections**

As per AD/HP 5/3 and the regulations laid down therein and/or contractual provisions. However, all pipes at least 2% of the weld seam lengths irrespective of material and diameter.

The testing personnel must be qualified and certified.

- DIN EN ISO 9712 Non-destructive testing Qualification and certification of NDT personnel (ISO 9712:2012); German version EN ISO 9712:2012
- DIN EN ISO 9712 Supplement **Nondestructive testing – Qualification and certification of NDT personnel; Supplement 1: Recommendations on the application of DIN EN ISO 9712:2012-12**

#### **Test types:**

If testing is to be non-destructive, then the following standards are to be applied, or other standards according to the requirements associated with the component:

- General rules according to DIN EN ISO 17635
- Visual testing (VT) DIN EN ISO 17637
- Radiographic testing (RT) DIN EN ISO 17636
- Surface check by the dye penetration method (PT) DIN EN ISO 3452
- Ultrasonic testing (UT) DIN EN ISO 17640
- Magnetic particle testing (MT) DIN EN ISO 17638
- Leakage test by the bubble method, with the vacuum chamber, with leak detection spray DIN EN 1779
- Leakage test with excess pressure, with leak detection spray or differential pressure measurement DIN EN 1779

#### **Processing of stainless steels**

With the exception of electropolishing, the following applies to processing and reworking:

- DIN EN 1011-3 Recommendations for welding of metallic materials – Part 3: Arc welding of stainless steels;  
German version EN 1011-3:2000

The surfaces of austenitic stainless steels must be free of tempering colors and passivated.

## Eisenmann Manufacturing Instructions 01-04-36

**Welding-related requirements for plant pipelines and containers of austenitic stainless steel (Germany) according to the Wasserhaushaltsgesetz (Federal Water Act, WHG)**

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

### Inspections

The contractor must assure the principal or the principal's representative that inspection of the parts to be manufactured is possible at any time.

### General

In the event of conflicting requirements in the principal's orders, statutory regulations or technical rules, the more stringent quality requirement shall always apply. In case of doubt, please contact the person who released the order beforehand!

### Technical representation on drawings

Symbols and dimensions shall be provided according to:

- DIN EN ISO 2553 Welding and allied processes – Symbolic representation on drawings – Welded joints (ISO 2553:2013); German version EN ISO 2553:2013

Welding seam preparation is to be according to:

- DIN EN ISO 9692 Welding and allied processes – Types of joint preparation – Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2013); German version EN ISO 9692-1:2013

## Eisenmann Manufacturing Instructions 01-04-36

### Welding-related requirements for piping and containers for deionized water plant

<p><b>Welding-related requirements for piping and containers for deionized water plant</b></p>	<p>Author: Fiedler, Wolfgang (PL-GER) Reviewer: Ruckaberle, Rainer (PL-GER)</p>
<p><b>General requirements</b></p> <ul style="list-style-type: none"> <li>• Translations of welding-related specialist terms are to be carried out according to the prescribed standard.</li> <li>• Calculation, manufacture, design and inspection of all pipework and containers are to be carried out according to standard.</li> <li>• Regulations for plant governing the handling of water-hazardous substances (VawS) and on specialist companies are to be adhered to and to be examined.</li> <li>• Administrative provisions on the execution of the VawS (VV-VawS) are to be observed.</li> <li>• For containers under internal or external pressure, the AD regulations apply.</li> </ul> <p>Applicable standard</p> <ul style="list-style-type: none"> <li>• DIN EN 1792 Welding - Multilingual list of terms for welding and related processes – Trilingual version EN 1792:2003</li> </ul> <p><b>Requirements for the manufacturer / supplier</b> Existence of recognition as a specialist company according to the Federal Water Act with monitoring contract including welding technology and recognized welding techniques (welding procedure tests)</p> <p>Applicable standard</p> <ul style="list-style-type: none"> <li>• DIN EN ISO 15614-1 Specification and qualification of welding procedures for metallic materials – Welding procedure test. Part 1: Arc welding of nickel and nickel alloys</li> </ul>	

## Eisenmann Manufacturing Instructions 01-04-36

### Welding-related requirements for piping and containers for deionized water plant

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### Quality assurance for welding work

For quality assurance in welding work, the following quality requirements are to be observed:

- DIN EN ISO 3834-2 Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements (ISO 3834-2:2005); German version EN ISO 3834-2:2005

corresponding with the following chapters:

- chapters 5 Review of the requirements and technical review
- chapters 6 Subcontracting
- chapters 7 Welding personnel
- chapters 8 Monitoring and testing personnel
- chapters 9 Equipment
- chapters 10 Welding-related and associated activities
- chapters 11 Filler metals
- chapters 12 Storage of parent metals
- chapters 14 Monitoring and testing
- chapters 17 Identification and traceability
- chapters 18 Quality reports

#### Quality of welding joints

The welding joint qualities are to be specified by the designer and entered into the drawings.

#### Applicable standard

- DIN EN ISO 5817 Welding – Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections (ISO 5817:2003) (ISO 5817:2003 + Cor. 1:2006); German version EN ISO 5817:2003 + AC:2006

Generally, quality level 'C' applies for welding seams in corrosion-resistant materials as per

- DVS (German Welding Association) information sheet 0705 Recommendations for quality level assignment acc. to DIN EN ISO 5817:2006-10 and the preceding standard DIN EN 25817:1992-09

**Eisenmann Manufacturing Instructions 01-04-36****Welding-related requirements for piping and containers for deionized water plant**

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

**Requirements for the base material**

Basic material inspection documents 3.1 according to DIN EN 10204 Metallic products - Types of inspection documents; German version EN10204:2004

**Requirements for the filler metal**

- Use equivalent or higher alloyed filler metals
- TÜV or DB approval
- Welding without filler metal only permitted with approval from the Eisenmann company.

**Tests and scope of inspections**

shall generally be determined together with the customer and taken down in writing prior to signing the contract!

This procedure is to be based on the following standards:

- AD 2000 information sheet HP 5/3 Manufacturing and testing of pressure tanks – making and testing the joints – non-destructive testing of the welded joints
- AD 2000 information sheet HP 100 R Construction regulations – Pipes made of metallic materials

**Test types:**

If testing is to be non-destructive, then the following standards are to be applied, or other standards according to the requirements associated with the component:

- General rules according to DIN EN ISO 17635
- Visual testing (VT) DIN EN ISO 17637
- Radiographic testing (RT) DIN EN ISO 17636
- Surface check by the dye penetration method (PT) DIN EN ISO 3452
- Ultrasonic testing (UT) DIN EN ISO 17640
- Magnetic particle testing (MT) DIN EN ISO 17638
- Leakage test by the bubble method, with the vacuum chamber, with leak detection spray DIN EN 1779
- Leakage test with excess pressure, with leak detection spray or differential pressure measurement DIN EN 1779



## Eisenmann Manufacturing Instructions 01-04-36

### Welding-related requirements for piping and containers for deionized water plant

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### Processing of stainless steels

- Processing carried out according to DIN EN 1011 part 3.
- With the exception of electropolishing, the recommendations contained in DIN EN 1011 P3 apply to reworking:
- The interior and exterior surfaces of plant made of stainless, austenitic steels must be free of temper colors and passivated.

#### Inspections

The contractor must assure the principal or the principal's representative that inspection of the parts to be manufactured is possible at any time.

#### General

In the event of conflicting requirements in the principal's orders, statutory regulations or technical rules, the more stringent quality requirement shall always apply. In case of doubt, please contact the person who released the order beforehand!

#### Technical representation on drawings

Symbols and dimensions shall be provided according to:

- DIN EN ISO 2553 Welding and allied processes – Symbolic representation on drawings – Welded joints (ISO 2553:2013); German version EN ISO 2553:2013
- DIN EN 1708-1 Welding – Basic welded joint details in steel welding. Part 1: Pressurized components; German version EN 1708-1:2010

Drawings are to be checked regarding welding aspects!

Welding seam preparation is to be according to:

- DIN EN ISO 9692 Welding and allied processes – Types of joint preparation – Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2013); German version EN ISO 9692-1:2013

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements Selection of ancillary material

#### Welding requirements Selection of ancillary material

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

Construction material	Inert-gas welding			Manual electric welding		
	Inert gas as per DIN EN ISO 14175			Welding wire	Electrode	Type of electrical current
Combinations	MAG	MIG	WIG	EN ISO (material number) EN AWS	EN ISO (material number) EN AWS	AC DC

#### Standard joints

Construction steel	Construction steel							
		M23/ M21	--	I 1	EN ISO 14341-A: G 42 3 M G3Si1 AWS A5.18: ER 70S-6 (1.5125)	EN ISO 2560-A: E 42 0 RR 12 EN 499: E 42 0 RR 12 AWS A5.1: E 6013	~	=/-
	-hot-dip galvanized sheet steel		--				~	=/-
hot-dip galvanized sheet steel	-hot-dip galvanized sheet steel	--	I 1		EN ISO 24373: S Cu 6100 (CuAl7) AWS A5.7: ER Cu Al – A1 (2.0921)	EN ISO 2560-A: E 38 0 RC 11 EN 499: E 38 0 RC 11 AWS A5.1: E 6013	--	=/-
Construction steel	-S235+C -S355+C	M23/ M21		I 1	EN ISO 17632-A: T 46 4 M M 1 H5 AWS A5.18: E70C-6M H4	EN ISO 2560-A: E 38 3 B12 H10 AWS A5.1: E 7016-H8	~	=/+
	-1.5415	M23/ M21			EN ISO 21952-A: G Mo Si (1.5424) AWS A5.28: ER 70S-A1	EN ISO 2560-A: E 50 4 Mo B 4 2 H5 EN ISO 3580-A: E Mo B 42 H10 AWS A5.5: E7018-A1-H4	--	=/+
	-1.4307	M12			EN ISO 14343-A: G 18 8 Mn (1.4370) AWS A5.9: ~ ER 307	EN 14700: E Fe10 (1.4370) EN 1600: E 18 8 Mn R 1 2 AWS A5.4: ~ E 307-16	~	=/+
	-1.4404						~	=/+
	-1.4541						~	=/+
	-1.4571		I 1				~	=/+

#### Heat-resistant joints up to approx. 300 °C

1.5415	-1.4541	M12	--	I 1	EN ISO 14343-A: G 18 8 Mn (1.4370) AWS A5.9: ~ ER 307	EN 14700: E Fe10 (1.4370) EN 1600: E 18 8 Mn R 1 2 AWS A5.4: ~ E 307-16	~	=/+
--------	---------	-----	----	-----	--	---	---	-----

#### up to approx. 400 °C

1.5415	-1.5415	M23/ M21	--	I 1	EN ISO 21952-A: G Mo Si (1.5424) AWS A5.28: ER 70S-A1	EN ISO 2560-A: E 50 4 Mo B 4 2 H5 EN ISO 3580-A: E Mo B 42 H10 AWS A5.5: E7018-A1-H4	~	=/+
--------	---------	-------------	----	-----	--	--	---	-----

## Eisenmann Manufacturing Instructions 01-04-36

### Welding requirements Selection of ancillary material

Author: Fiedler, Wolfgang (PL-GER)  
Reviewer: Ruckaberle, Rainer (PL-GER)

#### up to approx. 600 °C

Construction material		Inert-gas welding			Manual electric welding			
1.4541	-1.4541	M12	I 1	I 1	EN ISO 14343-A: G 18 8 Mn (1.4370) AWS A5.9: ~ ER 307	EN 14700: E Fe10 (1.4370)	~	=/+
	-1.4828					EN 1600: E 18 8 Mn R 1 2	~	=/+
	-1.4835					AWS A5.4: ~ E 307-16	~	=/+

#### up to approx. 1000 °C

1.4876	-1.4876	--	I 1	I 1	EN ISO 18274: S Ni 6082 (NiGr20Mn3Nb) AWS A5.14: ER NiCr-3 (2.4806)	EN ISO 14172: E Ni 6082 (NiCr20Mn3Nb) (2.4648) AWS A5.11: ~ E NiCrFe-3	--	=/+
							~	=/+

#### up to approx. 1100 °C

1.4828	-1.4828	M12	I 1	I 1	EN ISO 12072: G 22 12 H (1.4829) AWS A5.9: ~ ER 309	EN ISO 1600: E 22 12 R 12 (~1.4829) AWS A5.4: E 309-16 mod.	--	=/+
	-1.4835				AVESTA 253 MA (UTP/ AVESTA Company) similar to Wst. 1.4835		~	=/+

#### up to approx. 1150 °C

1.4835	-1.4835	--	I 1	I 1	AVESTA 253 MA (UTP/ AVESTA Company) similar to Wst. 1.4835	EN ISO 1600: E 22 12 R 12 (~1.4829) AWS A5.4: E 309-16 mod.	--	=/+
							~	=/+

#### Acid-resistant joints

Construction material		Inert-gas welding			Manual electric welding			
1.4307	-1.4307	M12	I 1	I 1	EN ISO 14343-A: G 19 12 3 LSi (1.4430) AWS A5.9: ER 316 LSi	EN 14700: E Fe10 (1.4370) EN 1600: E 18 8 Mn R 1 2 AWS A5.4: ~ E 307-16	~	=/+
	-1.4404						~	=/+
	-1.4541						~	=/+
	-1.4571						~	=/+
1,444	-1.4404						~	=/+
	-1.4541						~	=/+
	-1.4574						~	=/+
1.4541	-1.4541						~	=/+
	-1.4571						~	=/+
1.4571	-1.4571						~	=/+

## Eisenmann Manufacturing Instructions 01-04-36

<b>Welding requirements</b> <b>Selection of ancillary material</b>					Author: Fiedler, Wolfgang (PL-GER) Reviewer: Ruckaberle, Rainer (PL-GER)			
<b>Special materials</b>								
<b>Plate Alu 99.5%</b>								
3.0255	-3.0255	--	I 1	I 1	EN ISO 18273: S AL 1450 (Al 99,5Ti) DIN 1734: SG-Al 99.5 Ti (W-Nr.3.0805)		~	=/+
<b>Profile</b>								
(Div. Al-Mg alloys)		--	I 1	I 1	EN ISO 18273: S AL 5356 (AlMg5Cr(A)) DIN 1732: SG-AlMg5 (W-Nr.3.3556) AWS A5.10: ER5356		~	=/+
<b>Composition of the protection gases:</b>								
I1: 100% argon (argon 4.8)				M12: max. 2.5%CO2 , rest argon				
M21: 18% CO2, rest argon				M23: 5% O2, 5% CO2, Rest Argon				
<b>Black/White welded joints in general</b>								
Temperature in the vicinity of the welding seam				Ancillary material				
Less than 300 °C				e.g. 1.4370				
More than 300 °C				e.g. 2.4806				

## Eisenmann Manufacturing Instructions 01-04-36

### Welding seams, symbolic representation

Extract from DIN EN 22 553 and ISO 2553

#### Basic symbols

Kehlnaht			I - Naht			HV - Naht		
V - Naht			Punktnaht					

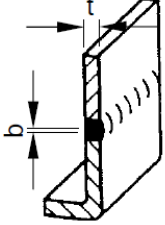
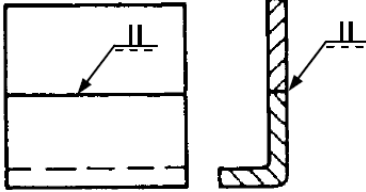
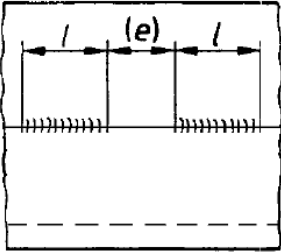
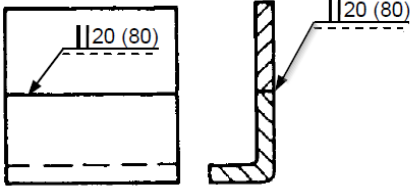
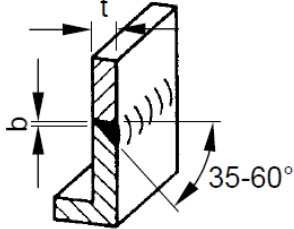
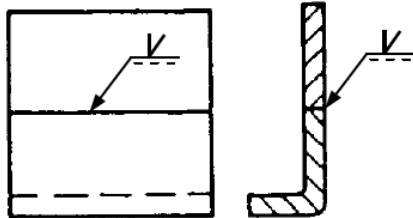
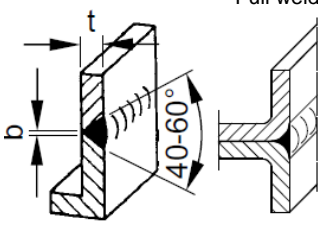
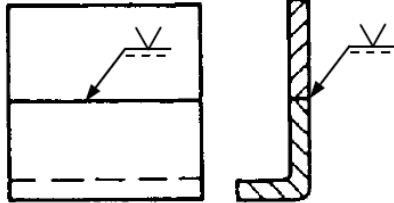
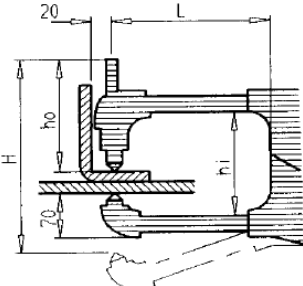
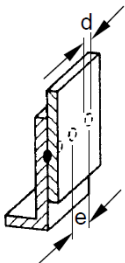
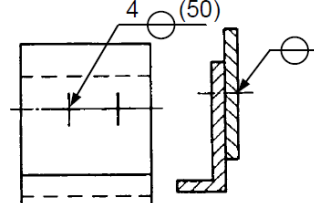
#### Display

as image	Drawings as per DIN EN 22553	Construction note
<p>Continuous fillet weld</p>	<p>for seam thickness a = 5</p>	<p><b>Reference values for fillet weld dimensions</b></p> <p><b>Seam thickness a</b>            for *t ≤ 2 mm a = 2            *t = 3 – 5 mm a = 3            *t = 6 – 10 mm a = 5            *t = 12 -15 mm a = 7</p>
<p>Interrupted fillet weld</p>	<p>for seam thickness a = 5;            l = 60; seam spacing (e) = 240</p>	<p>For interrupted seam:  <b>Seam length l</b> l = 10 x *t  <b>Seam spacing (e)</b>            t ≤ 6 mm e = 40 x *t            t ≥ 8 mm e = 20 x *t</p> <p>* for differing sheet thicknesses t min. applies in each case</p>
<p>Continuous double fillet weld</p>	<p>for seam thickness a = 5</p>	
<p>Interrupted double fillet weld, offset</p>	<p>for seam thickness a = 5;            l = 60; seam spacing (e) = 240</p>	

#### Display



## Eisenmann Manufacturing Instructions 01-04-36

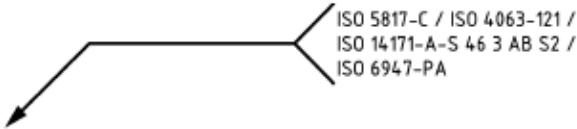
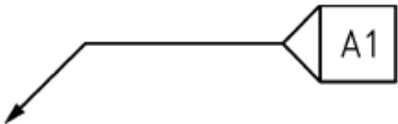
as image	Drawings as per DIN EN 22553	Construction note																				
<p>I - Continuous weld</p>  <p>for sheet <math>t \leq 6 \text{ mm}</math></p>		<p><b>Reference values for butt weld dimensions</b></p> <p>For interrupted seam:  <b>Seam length l</b> <math>l = 10 \times t</math>  <b>Seam spacing (e)</b>  <math>t \leq 6 \text{ mm} \quad e = 40 \times t</math>  <math>t \geq 8 \text{ mm} \quad e = 20 \times t</math></p>																				
<p>I - interrupted seam</p> 	 <p>for seam thickness <math>l = 20</math>; seam spacing <math>(e) = 80</math></p>	<p>* for differing sheet thicknesses <math>t</math> min. applies in each case</p> <p><b>Welding gap b</b>  <b>for manufacturing plates:</b>  welding machine <math>b = 0</math>  manual <math>t \leq 3 \quad b = 0</math>  <math>t &gt; 3 \quad b = 2</math></p>																				
<p>HV - continuous seam</p>  <p>for sheet <math>t = 8 - 10 \text{ mm}</math></p>		<p><b>for pipes</b>  steel <math>b = 0</math>  stainless steel  forming gas <math>b = 0</math>  stainless steel  remainder <math>b = 1</math></p>																				
<p>continuous V seam</p> <p>Full weld</p>  <p>for sheet <math>t \geq 12 \text{ mm}</math></p>		<p><b>Reference values for spot weld dimensions</b>  spot diameter <math>d = 4</math>  spot spacing <math>(e) = 50</math></p> <p><b>Options of plate thickness:</b>  <b>bold = coil sheet</b></p> 																				
<p>spot weld</p> 	 <p>for spot weld diameter <math>d = 4</math>; spot weld spacing <math>(e) = 50</math></p>	<table border="1"> <thead> <tr> <th><math>t \leq \text{mm}</math></th> <th>L</th> <th>hi</th> <th>ho</th> <th>H</th> </tr> </thead> <tbody> <tr> <td>2 + 2</td> <td><b>850</b></td> <td>140</td> <td>220</td> <td>320</td> </tr> <tr> <td>2,5 + 2,5</td> <td>510</td> <td>250</td> <td>370</td> <td>450</td> </tr> <tr> <td>3 + 3</td> <td>200</td> <td>140</td> <td>220</td> <td>310</td> </tr> </tbody> </table>	$t \leq \text{mm}$	L	hi	ho	H	2 + 2	<b>850</b>	140	220	320	2,5 + 2,5	510	250	370	450	3 + 3	200	140	220	310
$t \leq \text{mm}$	L	hi	ho	H																		
2 + 2	<b>850</b>	140	220	320																		
2,5 + 2,5	510	250	370	450																		
3 + 3	200	140	220	310																		

## Eisenmann Manufacturing Instructions 01-04-36

### Representation and dimensioning of welding seams



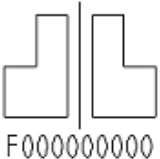
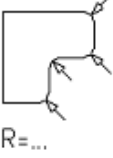
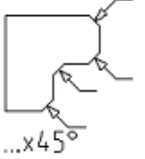
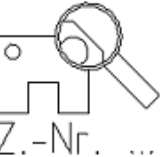

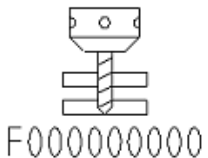
Symbolic representation and execution are to be carried out according to DIN EN 22 553. Where symbols are included with incomplete dimensioning (seam thickness, seam length, seam spacing), the **reference values** apply.

### Technical representation of welding symbols with defined testing procedure

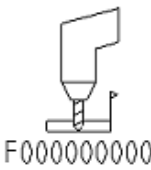
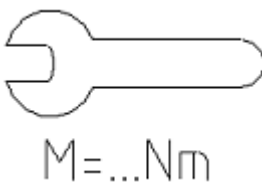
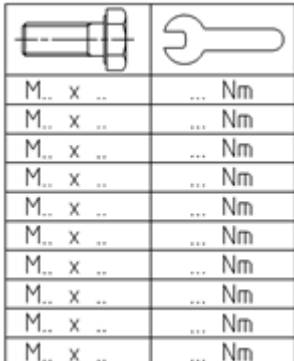



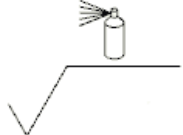
Symbol	Usage as below
<p>Example from DIN EN ISO 2553</p>	<p>The welding symbol must always be represented with details of the testing procedure according to the currently valid standard.</p>
<p>Open fork</p> 	<p>Details in the fork here as examples for welding process, filler metal and welding position</p>
<p>Closed fork</p> 	<p>A closed fork may only be used in order to emphasize a certain instruction, e.g. a welding instruction, the report on qualification of a welding technique or another document such as a testing procedure (TXT reference)</p>
<p><b>Possible leakage test techniques are:</b></p> <ul style="list-style-type: none"> <li>• Color penetration test DIN EN ISO 3452-1 If 'leak-proof' is placed after the welding symbol, the tightness is to be tested using the procedure indicated above.</li> <li>• Overpressure test using leak detection spray or pressure difference measurement DIN EN 1779</li> <li>• Underpressure test using a vacuum suction cup and leak detection spray DIN EN 1779</li> </ul> <p>Detailed information (supplementary to the symbol on the drawing) on the test procedure are to be included in the object text. A test report is required without fail.</p>	

## Eisenmann Manufacturing Instructions 01-04-36

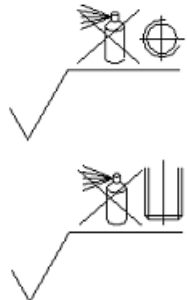

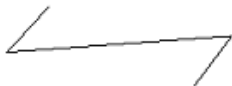
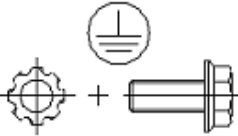
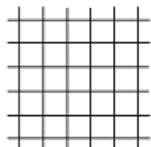
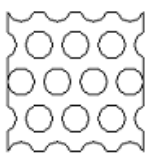

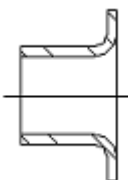
### Text – Symbols on drawings

Text – Symbols on drawings		Author: Wacker, Ralf (IT-GER) Reviewer: Benzinger, Rainer (IT-GER)
No.	Symbol	Application
1		<p>Explanatory text / description which is to be found in the object text in the parts list under 'TXT n'.</p> <ul style="list-style-type: none"> <li>• there is special information available on this point</li> <li>• placement directly at the appropriate location</li> </ul>
2		<p>Explanatory text(s) available to the drawing</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> <li>• note on object texts</li> <li>• note on assembly instructions etc.</li> </ul>
3		<p>mirror part is available (see item ID)</p> <ul style="list-style-type: none"> <li>• original part = symbol and item ID of the mirrored part</li> <li>• mirrored part = symbol and item ID of the original part</li> </ul>
4		<p>collective symbol for all radii not dimensioned</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
5		<p>collective symbol for all chamfers not dimensioned</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
6		<p>Extra detail drawing available</p> <ul style="list-style-type: none"> <li>• see drawing number...</li> </ul>
7		<p>check dimensions are on drawing</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
8		<p>drilled and reamed with ...</p> <ul style="list-style-type: none"> <li>• Placement above the drawing title block or at the respective drill holes</li> <li>• F000000000 = item ID of the other component</li> </ul>

## Eisenmann Manufacturing Instructions 01-04-36

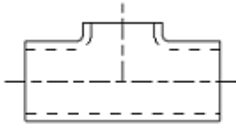
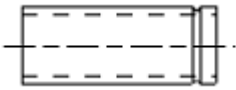

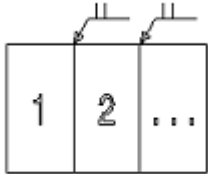
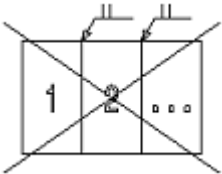

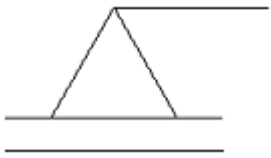

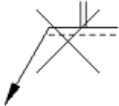
9	 <p>F000000000</p>	<p>drilled on assembly with ...</p> <ul style="list-style-type: none"> <li>• Placement above the drawing title block or at the respective drill holes</li> <li>• F000000000 = Art. No. of the component to be used for drilling out</li> </ul>																				
10	 <p>M=...Nm</p>	<p>Bolt tightening torque</p> <p>Screws must be tightened to within +/- 6% of the tightening torque specifications.</p> <p>When selecting the torque tool, make sure that the required torque is between 20% and 80% of the adjustment range of the tool.</p> <ul style="list-style-type: none"> <li>• Placement above the drawing title block or at the respective bolted fittings</li> </ul>																				
11	 <table border="1" data-bbox="295 952 590 1243"> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> <tr><td>M.. x ..</td><td>... Nm</td></tr> </table>	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	M.. x ..	... Nm	<p>Table for multiple bolt tightening torques</p> <p>Screws must be tightened to within +/- 6% of the tightening torque specifications.</p> <p>When selecting the torque tool, make sure that the required torque is between 20% and 80% of the adjustment range of the tool.</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
M.. x ..	... Nm																					
12		<p>Separation point for transportation</p> <ul style="list-style-type: none"> <li>• Placement at the transport separation points with additional dimensions</li> </ul>																				
13		<p>Visible side must not be scratched</p> <ul style="list-style-type: none"> <li>• Placement directly at the respective location or above the drawing title block and the respective location is marked with a dot-dash line parallel to the workpiece contour (— - —)</li> </ul>																				
14		<p>Surface must not be painted / coated</p> <ul style="list-style-type: none"> <li>• placement directly at the appropriate location</li> </ul>																				
15		<p>Surface must be painted / coated</p> <ul style="list-style-type: none"> <li>• placement directly at the appropriate location</li> </ul>																				

## Eisenmann Manufacturing Instructions 01-04-36

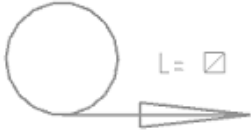

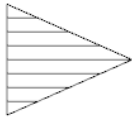
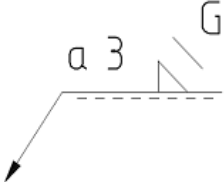


















16		<p>Thread(s) must not be painted / coated</p> <ul style="list-style-type: none"> <li>• Placement above the drawing title block, in which case it applies to all threads</li> <li>• Placement directly next to the respective thread, in which case it applies only to that thread</li> </ul>
17		<p>Conveying direction</p> <ul style="list-style-type: none"> <li>• Placement at the respective location</li> </ul>
18		<p>Direction of bearing for gratings</p> <ul style="list-style-type: none"> <li>• Placement on the simplified grating representation</li> </ul>
19		<p>Earthing of all metallic parts in the assembly</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> <li>• Components required for grounding to be listed in the parts list</li> </ul>
20		<p>Representation grid / sieve</p> <ul style="list-style-type: none"> <li>• Placement on the simplified net and sieve representations</li> <li>• Notes on mesh size to be entered into the object text</li> </ul>
21		<p>Representation of perforated plate</p> <ul style="list-style-type: none"> <li>• Placement on the simplified perforated sheet representation</li> <li>• Notes on diameter and hole spacing to be entered into the object text</li> </ul>
22		<p>Representation of stud plate</p> <ul style="list-style-type: none"> <li>• Placement on the simplified stud plate sheet representation</li> <li>• Notes on stud pattern and size to be entered into the object text</li> </ul>
23		<p>Preference must be given to the fabrication of flanges.</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>



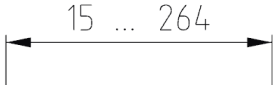
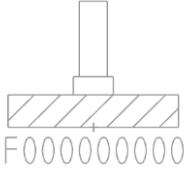
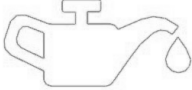
## Eisenmann Manufacturing Instructions 01-04-36

24		<p>Preference must be given to the fabrication of extrusion(s).</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
25		<p>Victaulic couplings must be produced at the ends</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> </ul>
26		<p>Chip-free Components must be completely free of chips.</p>
27		<p>Multi-part manufacture of the component permitted</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> <li>• The component may be manufactured in multiple parts, whereby the production department may determine how it is to be split up.</li> <li>• If there is a requirement for fixed separating points, these must be indicated and dimensioned on the component.</li> </ul>
28		<p>Multi-part manufacture of the component <u>NOT</u> permitted</p> <ul style="list-style-type: none"> <li>• placement above the drawing title block</li> <li>• Manufacture of the component in multiple parts is <u>NOT</u> permitted.</li> </ul>
29		<p>Fixed bearing installed at this location</p> <ul style="list-style-type: none"> <li>• placement directly at the appropriate location</li> </ul>
30		<p>Floating bearing installed at this location</p> <ul style="list-style-type: none"> <li>• placement directly at the appropriate location</li> </ul>
31		<p>Not permitted</p> <ul style="list-style-type: none"> <li>• Symbol is placed above a welding sign Means: "Welding is not permitted here."</li> </ul> <p>Example</p> 

## Eisenmann Manufacturing Instructions 01-04-36

32		<p>The extended length of the plate</p> <ul style="list-style-type: none"> <li>• Symbol is placed above the title block</li> <li>• Indication of the extended length</li> </ul>																																						
33		<p>Crimp free section</p> <p>Crimp-free section necessary in the area of the bending edge</p>																																						
34		<p>Corrugation direction</p> <p>For packaging material (corrugated cardboard, twin-wall sheets, ...)</p>																																						
35		<p>Welding symbol with data about reworking</p> <table border="1" data-bbox="624 891 1442 1402"> <thead> <tr> <th colspan="2">Supplementary and additional images</th> </tr> </thead> <tbody> <tr> <td></td> <td>Seam surface: hollow (concave)</td> </tr> <tr> <td></td> <td>Seam surface: flat (even)</td> </tr> <tr> <td></td> <td>Seam surface: arched (convex)</td> </tr> <tr> <td></td> <td>Seam surface: Notch-free</td> </tr> <tr> <td></td> <td>remaining inset used</td> </tr> <tr> <td></td> <td>support used</td> </tr> </tbody> </table> <table border="1" data-bbox="624 1406 1442 1962"> <thead> <tr> <th colspan="3">Selection for reworking the welding seam<sup>1)</sup></th> </tr> <tr> <th>Letter</th> <th>Procedure (English)</th> <th>Procedure (German)</th> </tr> </thead> <tbody> <tr> <td>C</td> <td><i>finish by chipping</i></td> <td><i>durch spannende Bearbeitung</i></td> </tr> <tr> <td>G</td> <td><i>finish by grinding</i></td> <td><i>durch Schleifen</i></td> </tr> <tr> <td>H</td> <td><i>finish by hammering</i></td> <td><i>durch Hämmern</i></td> </tr> <tr> <td>M</td> <td><i>finish by machining</i></td> <td><i>durch maschinelle (spanende) Bearbeitung</i></td> </tr> <tr> <td>R</td> <td><i>finish by rolling</i></td> <td><i>durch Walzen</i></td> </tr> <tr> <td>P</td> <td><i>finish by peening</i></td> <td><i>durch Kugelstrahlen / Strahlhämmern</i></td> </tr> </tbody> </table> <p><sup>1)</sup> Letters for the reworking are currently only used in the standards of English-speaking countries, e.g. ANSI/AWS A2.4 and currently not mentioned in the DIN, EN or ISO.</p>	Supplementary and additional images			Seam surface: hollow (concave)		Seam surface: flat (even)		Seam surface: arched (convex)		Seam surface: Notch-free		remaining inset used		support used	Selection for reworking the welding seam <sup>1)</sup>			Letter	Procedure (English)	Procedure (German)	C	<i>finish by chipping</i>	<i>durch spannende Bearbeitung</i>	G	<i>finish by grinding</i>	<i>durch Schleifen</i>	H	<i>finish by hammering</i>	<i>durch Hämmern</i>	M	<i>finish by machining</i>	<i>durch maschinelle (spanende) Bearbeitung</i>	R	<i>finish by rolling</i>	<i>durch Walzen</i>	P	<i>finish by peening</i>	<i>durch Kugelstrahlen / Strahlhämmern</i>
Supplementary and additional images																																								
	Seam surface: hollow (concave)																																							
	Seam surface: flat (even)																																							
	Seam surface: arched (convex)																																							
	Seam surface: Notch-free																																							
	remaining inset used																																							
	support used																																							
Selection for reworking the welding seam <sup>1)</sup>																																								
Letter	Procedure (English)	Procedure (German)																																						
C	<i>finish by chipping</i>	<i>durch spannende Bearbeitung</i>																																						
G	<i>finish by grinding</i>	<i>durch Schleifen</i>																																						
H	<i>finish by hammering</i>	<i>durch Hämmern</i>																																						
M	<i>finish by machining</i>	<i>durch maschinelle (spanende) Bearbeitung</i>																																						
R	<i>finish by rolling</i>	<i>durch Walzen</i>																																						
P	<i>finish by peening</i>	<i>durch Kugelstrahlen / Strahlhämmern</i>																																						

## Eisenmann Manufacturing Instructions 01-04-36

36		Minimum dimension $\underline{\quad}$ to $\underline{\quad}$ maximum dimension ( ... )
37		Welding bolt marking <ul style="list-style-type: none"> <li>• To be affixed above the title block of the drawing or at the applicable positions for the welding bolts.</li> <li>• F000000000 = Item-ID of the assembly drawing in which the welding bolts are installed.</li> </ul>
38		Greased / oiled with a lubricant, see object text.

## Eisenmann Manufacturing Instructions 01-04-36

### Drafting

Drawings are drafted neutral to project and implementation.

When preparing drawings, make sure that no logistical details such as: (provision, to the attention of ..., delivery date, etc.) are indicated on the drawing, BOM or texts describing materials attached to physical materials.

### Drawing format

Generally, drawing formats according to DIN EN ISO 216 are to be used. If different specifications are made, this will be laid down individually in the contract.

### Data exchange

CAD data are to be supplied as follows:

- 2D in DGN/DWG format for MicroStation Layout
- 3D in DGN/DWG format for MicroStation Layout
- 3D in Step format for NX Design
- 3D in DXF format for NX Design
- 3D in Parasolid format for NX Design
  
- Electrical data compatible with EPLAN P8 Version 2.1.4

## Eisenmann Manufacturing Instructions 01-04-36

### Standard – Assembly of ancillary materials

<b>Standard – Assembly of ancillary materials</b> <b>Assembly of hubs on wheels</b>	Author: Mutze, Andreas (CS-GER) Reviewer: Benzinger, Rainer (IT-GER)						
<p><b>‘Gleitmo 800’ ancillary material – supplied by Fuchs Lubritech GmbH</b></p> <ul style="list-style-type: none"> <li>• Gleitmo 800 is a white, high-performance lubricating paste that must be used in the temperature range of -25/+100 °C.</li> <li>• Gleitmo 800 is silicone-free.</li> <li>• Gleitmo 800 facilitates the assembly and later removal of hubs onto/from shafts.</li> </ul> <table border="1" data-bbox="189 734 1398 987"> <thead> <tr> <th data-bbox="189 734 794 846">EISENMANN article numbers</th> <th data-bbox="794 734 1398 846">Manufacturer: Fuchs Lubritech GmbH Manufacturer Article Number</th> </tr> </thead> <tbody> <tr> <td data-bbox="189 846 794 927"> <ul style="list-style-type: none"> <li>■ Art. No. M3020080 (1000 ml container)</li> </ul> </td> <td data-bbox="794 846 1398 927"> <ul style="list-style-type: none"> <li>■ Art. No. 7000170150 (1000 ml container)</li> </ul> </td> </tr> <tr> <td data-bbox="189 927 794 987"> <ul style="list-style-type: none"> <li>■ Art. No. M3020081 (200 ml container)</li> </ul> </td> <td data-bbox="794 927 1398 987"> <ul style="list-style-type: none"> <li>■ Art. No. 7000170155 (200 ml container)</li> </ul> </td> </tr> </tbody> </table> <p><b>Standard</b> The ancillary material ‘Gleitmo 800’ is to be used for assembling hubs onto shafts (with the exception of clamping sets, shrink disks).</p> <p><b>Deviations from standard</b> If a special ancillary material is necessary, this must be indicated on the drawing and laid down in the object text.</p> <p>If no special ancillary material is to be used, this must be indicated on the drawing and laid down in the object text.</p> <p><b>Application:</b> ‘Gleitmo 800’ is to be applied thinly to clean sliding surfaces (if possible degreased) using a brush or lint-free cloth.</p>		EISENMANN article numbers	Manufacturer: Fuchs Lubritech GmbH Manufacturer Article Number	<ul style="list-style-type: none"> <li>■ Art. No. M3020080 (1000 ml container)</li> </ul>	<ul style="list-style-type: none"> <li>■ Art. No. 7000170150 (1000 ml container)</li> </ul>	<ul style="list-style-type: none"> <li>■ Art. No. M3020081 (200 ml container)</li> </ul>	<ul style="list-style-type: none"> <li>■ Art. No. 7000170155 (200 ml container)</li> </ul>
EISENMANN article numbers	Manufacturer: Fuchs Lubritech GmbH Manufacturer Article Number						
<ul style="list-style-type: none"> <li>■ Art. No. M3020080 (1000 ml container)</li> </ul>	<ul style="list-style-type: none"> <li>■ Art. No. 7000170150 (1000 ml container)</li> </ul>						
<ul style="list-style-type: none"> <li>■ Art. No. M3020081 (200 ml container)</li> </ul>	<ul style="list-style-type: none"> <li>■ Art. No. 7000170155 (200 ml container)</li> </ul>						

## Eisenmann Manufacturing Instructions 01-04-36

### Surface treatment technique with painting

If surface treatment is required, this must be carried out according to the following specifications.

Surface treatment technique with painting		Author: Tietze, Margit (IT-GER) Reviewer: Benzinger, Rainer (IT-GER)	
Pretreatment:	Steel, black	degrease manually	: wash with solvent, e.g. TURCO Prepaint
		Pretreatment plant	: degrease and phosphatize
	Steel, galvanized/AS	degrease manually	: wash with acetone
<p><b>Color hues according to RAL color table K1</b> The required paint quality can be obtained from the Weckerle company.</p> <p>Weckerle GmbH Strohgäustrasse 20, D-70435 Stuttgart <a href="mailto:info@weckerle-lacke.de">info@weckerle-lacke.de</a>, <a href="http://www.weckerle-lacke.de">www.weckerle-lacke.de</a> Tel.: +49 (0) 711 82601-0, Fax: +49 (0) 711 82601-70</p> <p><b>Alternative paints and paint suppliers may only be used in cases where the physical and optical paint properties correspond with the paints supplied by the Weckerle company.</b></p> <p><b>The respective parts list items must be identified and painting requirements supplied.</b></p>			

## Eisenmann Manufacturing Instructions 01-04-36

### Surface treatment technique with painting

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### Technical data for water paints (without customer-specific requirements)

For components with high degrees of surface roughness (e.g. cast material), the layer thickness is 40 µm + roughness depth of the component.

The following tolerances apply for painting: 0 to +10 µm.

processing technology: spraying, painting and rolling.

### 1. Dry interior section

Top coat		Base coat		Base coat		Top coat	
				Paint type: Single-component water paint temperature resistance: +150°C / -30°C Gloss level: semi-lustrous 5 - 15 GU GU = gloss unit, measurement angle = 60°		Paint type: Single-component water paint temperature resistance: +150°C / -30°C Gloss level: semi-lustrous 5 - 15 GU GU = gloss unit, measurement angle = 60°	
RAL No.	Color name:	RAL No.	Color name:	Layer thickness Base coat [µm] (Smooth surface R <sub>tmax</sub> 10 µm)	Weco number Base coat	Layer thickness Base coat [µm] (Smooth surface R <sub>tmax</sub> 10 µm)	Weco number Top coat
1004	Gold-yellow	9002	Gray-white	40µm	45133140902	40µm	45133140104
1015	Light ivory	9002	Gray-white	40µm	45133140902	40µm	45133140115
1021	Canola yellow	9002	Gray-white	40µm	45133140902	60µm	45133140121
2000	Yellow-orange	9002	Gray-white	40µm	45133140902	60µm	45133140200
2001	Red-orange	9002	Gray-white	40µm	45133140902	40µm	45133140201
2003	Pastel orange	9002	Gray-white	40µm	45133140902	60µm	45133140203
2004	Pure orange	9002	Gray-white	40µm	45133140902	60µm	45133140204
3000	Fire red	9002	Gray-white	40µm	45133140902	40µm	45133140300
5010	Gentian blue	9002	Gray-white	40µm	45133140902	40µm	45133140510
5012	Light blue	9002	Gray-white	40µm	45133140902	40µm	45133140512
6011	Reseda green	5018	Turquoise-blue	40µm	44103010518	40µm	45133140611
7001	Silver gray	9002	Gray-white	40µm	45133140902	40µm	45133140701
7047	Telegray 4	9002	Gray-white	40µm	45133140902	40µm	45133140747
9002	Gray-white	9002	Gray-white	40µm	45133140902	40µm	45133140902



## Eisenmann Manufacturing Instructions 01-04-36

### Surface treatment technique with painting

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### Technical data for EP two-component paint

EP two-component base coat and EP two-component top coat are only used in combination on account of the consistency and weathering properties of the paint.  
It is not possible to mix them with other paints.

For two-component paints, a water-based composition is standard.

The solvent-based composition is only to be used in special cases.

Processing technique: spraying and painting **Attention: Do not roll**

### 2. Interior section dry / wet (with resistance to chemicals) and exterior section

Top coat		Base coat		Base coat		Top coat	
				Paint type: EP two-component paint (water-based is standard / solvent) A higher degree of resistance to chemicals is possible using s solvent. temperature resistance: +130°C / -30°C Gloss level: matt 5 - 15 GU GU = gloss unit, measurement angle = 60°		Paint type: EP two-component paint (water-based is standard / solvent) A higher degree of resistance to chemicals is possible using s solvent. temperature resistance: +150°C / -30°C Gloss level: matt 8 - 15 GU GU = gloss unit, measurement angle = 60°	
RAL No.	Color name:	RAL No.	Color name:	Layer thickness Base coat [µm] (Smooth surface Rtmax 10 µm)	Weco number Base coat	Layer thickness Base coat [µm] (Smooth surface Rtmax 10 µm)	Weco number Top coat
1004	Gold-yellow	1015	Light ivory	40µm	41601125144	80µm	40602010104
1015	Light ivory	1015	Light ivory	40µm	41601125144	60µm	40602010115
1021	Canola yellow	1015	Light ivory	40µm	41601125144	80µm	40602010121
2000	Yellow-orange	1015	Light ivory	40µm	41601125144	80µm	40602010200
2001	Red-orange	1015	Light ivory	40µm	41601125144	80µm	40602010201
2003	Pastel orange	1015	Light ivory	40µm	41601125144	80µm	40602010203
2004	Pure orange	1015	Light ivory	40µm	41601125144	60µm	40602010204
3000	Fire red	1015	Light ivory	40µm	41601125144	40µm	40602010300
5010	Gentian blue	1015	Light ivory	40µm	41601125144	40µm	40602010510
5012	Light blue	1015	Light ivory	40µm	41601125144	40µm	40602010512
6011	Reseda green	1015	Light ivory	40µm	41601125144	40µm	40602010611
7001	Silver gray	1015	Light ivory	40µm	41601125144	40µm	40602010701
7047	Telegray 4	1015	Light ivory	40µm	41601125144	40µm	40602010747
9002	Gray-white	1015	Light ivory	40µm	41601125144	60µm	40602010902

## Eisenmann Manufacturing Instructions 01-04-36

### Surface treatment technique with painting

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### Technical data for EP two-component paint

EP two-component base coat and EP two-component top coat are only used in combination on account of the consistency and weathering properties of the paint. It is not possible to mix them with other paints.

For two-component paints, a water-based composition is standard.

The solvent-based composition is only to be used in special cases.

Processing technique: spraying and painting **Attention: Do not roll**

### 3. Exterior section with resistance to UV rays and seawater

Top coat		Base coat		Base coat		Base coat	
				Paint type: EP two-component paint (water-based is standard / solvent) A higher degree of resistance to chemicals is possible using s solvent. temperature resistance: +130°C / -30°C Gloss level: matt 5 - 15 GU GU = gloss unit, measurement angle = 60°		Paint type: PUR two-component paint (water-based is standard / solvent) A higher degree of resistance to chemicals is possible using s solvent. temperature resistance: +150°C / -30°C Degree of gloss: glossy 60 - 80 GU GU = gloss unit, measurement angle = 60°	
RAL No.	Color name:	RAL No.	Color name:	Layer thickness Base coat [µm] (Smooth surface Rtmax 10 µm)	Weco number Base coat	Layer thickness Base coat [µm] (Smooth surface Rtmax 10 µm)	Weco number Base coat
1004	Gold-yellow	1015	Light ivory	40µm	41601125144	80µm	41522010104
1015	Light ivory	1015	Light ivory	40µm	41601125144	60µm	41522010115
1021	Canola yellow	1015	Light ivory	40µm	41601125144	80µm	41522010121
2000	Yellow-orange	1015	Light ivory	40µm	41601125144	80µm	41522010200
2001	Red-orange	1015	Light ivory	40µm	41601125144	80µm	41522010201
2003	Pastel orange	1015	Light ivory	40µm	41601125144	80µm	41522010203
2004	Pure orange	1015	Light ivory	40µm	41601125144	60µm	41522010204
3000	Fire red	1015	Light ivory	40µm	41601125144	40µm	41522010300
5010	Gentian blue	1015	Light ivory	40µm	41601125144	40µm	41522010510
5012	Light blue	1015	Light ivory	40µm	41601125144	40µm	41522010512
6011	Reseda green	1015	Light ivory	40µm	41601125144	40µm	41522010611
7001	Silver gray	1015	Light ivory	40µm	41601125144	40µm	41522010701
7047	Telegray 4	1015	Light ivory	40µm	41601125144	40µm	41522010722
9002	Gray-white	1015	Light ivory	40µm	41601125144	60µm	41522010735

## Eisenmann Manufacturing Instructions 01-04-36

**Surface treatment  
technique with painting**

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

### Technical data for aluminum paint

Components that are outdoors must also be pre-painted with a base coat layer of 40 µm to provide for weathering resistance. Then the aluminum paint must be applied with a layer thickness of 20 µm.

Processing technique: spraying

### 4. Aluminum paint

Top coat		Base coat		Base coat		Top coat	
				Paint type: Single-component water paint temperature resistance: +150°C / -30°C Gloss level: semi-lustrous 5 - 15 GU GU = gloss unit, measurement angle = 60°		Paint type: Aluminum water paint temperature resistance: +150°C / -30°C Gloss level: matt 5 - 15 GU GU = gloss unit, measurement angle = 60°	
RAL No.	Color name:	RAL No.	Color name:	Layer thickness Base coat [µm] (Smooth surface R <sub>tmax</sub> 10 µm)	Weco number Base coat	Layer thickness Base coat [µm] (Smooth surface R <sub>tmax</sub> 10 µm)	Weco number Top coat
9006	White aluminum	9002	Gray-white	40µm	45133140902	20 µm	42106513575

## Eisenmann Manufacturing Instructions 01-04-36

**Surface treatment  
technique with painting**

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

### 5. Powder coating

As an alternative painting surfaces with wet paint, powder coating can be used instead.

#### **Eisenmann-Processing Guidelines: Paints (powder Paint) (polyester powder TGIC free GSB) in accordance with DIN 55990**

Technical Data	Type of paint	10
	Polyester powder TGIC free GSB	
Color	refer to paint order	
RAL-No./ *KM-No.	refer to paint order	
Gloss level	semi-lustrous 5 - 15 GU GU = gloss unit, measurement angle = 60°	
temperature resistance	+150°C / -30°C	
Granularity	µm	5 - 100
poss. coating thicknesses	µm	60 - 80
Hazard class	None	
Comments	can be painted with water paint	

For **powder coating**, the pretreatment consists of either sandblasting or wet-chemical treatment, depending on the requirements and the characteristics of the parts concerned. In that case the parts are degreased, treated with iron phosphate, rinsed with deionized water and then passivated by means of the no-rinse technique. Alternatively, the parts can also be pickled in addition. The coating consists of polyester powder. The powder supplier's processing parameter specifications are to be observed. The layer thickness is oriented on the customer's specifications and is generally between 80 and 120 µm. Depending on the part geometry and the surface to be painted, this may vary upwards or downwards!

## Eisenmann Manufacturing Instructions 01-04-36

### Surface treatment techniques without painting

#### Surface treatment techniques without painting

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### **Sand blasting**

Scale, rust and coatings are removed so that residue only remains visible as light nuances due to tinting of pores. The blasting material must be completely removed.

#### **Pickling, galvanizing, powder coating**

#### **Generally the following applies:**

Electro galvanizing is to be carried out according to DIN EN ISO 2081  
The parts are degreased, pickled, electrolytically degreased, deoxidized, galvanized electrolytically using a weak acid and then blue trivalent chrome passivated. By way of orientation, we aim for a galvanizing layer of 8 µm.

**Untreated or unpainted components must always be protected from corrosion by being wrapped in VCI foil!**

## Eisenmann Manufacturing Instructions 01-04-36

### Processing regulations for canted and perforated plates made

#### Processing regulations for canted and perforated plates made

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### hot-dipped aluminum coated steel sheet metal:

- Plates must not be scratched on the visible side and feature no locations of white rust. Marking on the visible side see text – Symbols on drawings No.13
- Paint welded locations (if present) with Alu paint, white aluminum KM 3575, No. 4210651 from the Co. Weckerle.

#### Sendzimir-galvanized steel sheet metal:

- Plates must not be scratched on the visible side and feature no locations of white rust. Marking on the visible side see text – Symbols on drawings No.13
- paint welded sections (if present) using zinc powder paint No. 4210651 (Weckerle Company).

#### Stainless steel sheet:

- Plates must not be scratched on the visible side. Marking on the visible side see text – Symbols on drawings No.13
- Pickle welded sections (if present) using pickling paste.

#### Type of execution and surface quality according to DIN EN 10088-2

The following surface qualities are laid down for non-rusting sheets in 1.4307, 1.4541, 1.4404, 1.4571.

- 1D applies => 3,0 mm sheet hot rolled, heat treated, scale-free pickled (pickled = matt)
- 2B applies < 2,5 mm sheet cold rolled, heat treated, pickled, cold post-rolled (pickled = matt)

## Eisenmann Manufacturing Instructions 01-04-36

### Manufacturing regulations

#### hot-dip galvanized sheet steel and stainless steel - plate processing

#### Manufacturing regulations hot-dip galvanized sheet steel and stainless steel - plate processing

Author: Tietze, Margit (IT-GER)  
Reviewer: Benzinger, Rainer (IT-GER)

#### Drier components

(e.g. blow-out walls, filter walls, suction channels etc.)

1. The manufactured components must have no scratches. The profile must not be scratched on the visible side.  
(The adjacent edge radii and cut edges are also included as part of the visible side.)  
Marking on the visible side see text – Symbols on drawings No.13  
Adhere to the following tolerances:  
All edges must be achieved with  $90^\circ \pm 30'$ .  
The permitted torsion angle is  $1^\circ$  along the total length.
2. Plates and reinforcements have to be designed in a way that allows no clearances when assembled.
3. Fundamentally, cambers at the welding seams or other unevenness, e.g. sagged roots or welding spatter must be removed.  
Welding seams must be produced level, have no pores, notches and no flank errors.  
Distortion is to be avoided as far as possible.  
No fluff must catch during cleaning later using a wool cloth.  
Risk of injury must be excluded.
4. Do not grind extensively (e.g. in the vicinity of the welding seam). Risk of corrosion due to damage of the aluminum coating or stainless steel surface!
5. **Under no circumstances** use lacquers, sealant and similar materials not compatible with paint.
6. After manufacture, the components must be 'swept clean'.  
Cleaning must only be carried out dry, without a cleaning agent.
7. The components must be processed and stored dry.  
The packaging for transportation to the delivery address must be selected so that contamination and humidity cannot ingress into the components.

#### For hot-dip galvanized sheet steel plate

8. The welds must be produced so that the hot-dip galvanized sheet steel coating does not burn the in the area of the seam and on the rear of the plate.

#### For stainless steel plate

9. Tempering colors must be completely removed.



## Eisenmann Manufacturing Instructions 01-04-36

### Manufacturing regulations plastic processing

<b>Manufacturing regulations plastic processing</b>	Author: Tietze, Margit (IT-GER) Reviewer: Benzinger, Rainer (IT-GER)
<p><b>Plastic parts</b> (e.g. gear wheels etc.)</p> <ol style="list-style-type: none"><li>1. The manufactured components must have no scratches.</li><li>2. Deburr all cut edges. Fundamentally, cambers at the welding seams or other unevenness, e.g. sagged roots or welding spatter must be removed. Welding seams must be produced level, have no pores, notches and no flank errors. Distortion is to be avoided as far as possible. No fluff must catch during cleaning later using a wool cloth. Risk of injury must be excluded.</li><li>3. After manufacture, the components must be 'swept clean'. Cleaning must only be carried out dry, without a cleaning agent.</li><li>4. The components must be processed and stored dry. The packaging for transportation to the delivery address must be selected so that the component is not damaged and contamination and humidity cannot ingress into the components.</li></ol>	