

GERMAN INSTITUTE FOR STRUCTURAL ENGINEERING

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Notification of the extension of the period of validity of the General Building Approval dated 23. January 2004

Approvalnumber: Z-21.4-741

Client: Deutsche Kahneisen Gesellschaft mbH
Nobelstr. 51/55
12057 Berlin

Subject of the Approval: JORDAHL® anchor-channels type JZA

Applicable until: 31. December 2010

This notification extended the period of validity of the General Building Approval No. Z-21.4-741 dated 23. January 2004. This notification comprises one page. It is valid only in connection with the above mentioned General Building Approval and has to be applied together with this Approval.

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DEUTSCHES INSTITUT FÜR BAUTECHNIK

Anstalt des öffentlichen Rechts

10829 Berlin, 23 January 2004
Kolonnenstraße 30 L
Telephone: 030 78730-356
Telefax: 030 78730-320
Reference: 1 23-1.21.4-22/03

General Construction Supervision Approval

Approval No.:

Z-21.4-741

Applicant:

Deutsche Kahneisen Gesellschaft mbH
Nobelstraße 51/55
12057 Berlin

Approval object:

Jordahl Anchor Rails Type JZA

Valid until:

31 December 2005

The aforementioned approval object is herewith granted General Construction Supervision Approval.*

This General Construction Supervision Approval comprises ten pages and six annexes.



* This General Construction Supervision Approval replaces the General Construction Supervision Approval dated 1 January 1996, as amended by resolution dated 26 May 1999, extended by resolution dated 7 December 2000.

The object has been granted General Construction Supervision Approval for the first time on 20 September 1989.

I. GENERAL REGULATIONS

- 1 The usability or applicability of the approval object within the context of the provincial construction regulations is verified by the General Construction Supervision Approval.
- 2 The General Construction Supervision Approval does not replace approvals, agreements or certifications legally prescribed for the performance of building projects.
- 3 The General Construction Supervision Approval is awarded without prejudice to the rights of third parties, particularly private protection rights.
- 4 Manufacturers and distributors of the approval object shall, without prejudice to further stipulations in the "Special Regulations", provide copies of the General Construction Supervision Approval to the person who uses or applies the approved object and shall point out that the General Construction Supervision Approval must be present at the site of use. Copies of the General Construction Supervision Approval shall be submitted to the appropriate authorities on demand.
- 5 The General Construction Supervision Approval may be reproduced only in full. The publication of an extract requires the approval of the Deutsche Institut für Bautechnik. Texts and drawings of advertising publications may not contradict the General Construction Supervision Approval. Translations of the General Construction Supervision Approval shall carry the notice "Vom Deutschen Institut für Bautechnik nicht geprüfte Übersetzung der deutschen Originalfassung" [translation of the original German version, not checked by the Deutsche Institut für Bautechnik].
- 6 The General Construction Supervision Approval is irrevocably awarded. The regulations of the General Construction Supervision Approval can be retrospectively expanded and changed, particularly if required in the light of new technical knowledge.



II. SPECIAL REGULATIONS

1 Approval object and scope of application

1.1. Approval object

The JZA-type Jordahl anchor rail of steel and stainless steel consists of a C-shaped rail with serrations and at least two anchors welded to the back of the profile or permanently clamped compression anchors and associated hammer-head bolts with serrations (JZS serrated bolt).

The anchor rail is embedded in the concrete level with the surface. Any required structural parts can be secured to the anchor rail.

The anchor rail is shown in the installed condition in annex 1.

1.2 Scope of application

The anchor rail may be used as an anchorage under mainly static loading in reinforced or unreinforced standard concrete with a strength class of at least B25 DIN 1045:1988-07 "Concrete and reinforced concrete, design and implementation". It may also be used in concrete with a strength class of at least C20/25 in accordance with DIN EN 206-1:2001-07 "Concrete; part 1: specification, properties, manufacture and conformity" in conjunction with DIN 1045-2:2001-07 "Load-bearing structures of concrete, reinforced concrete and prestressed concrete, part 2: Concrete – specification, properties, manufacture and conformity". The anchor rail may be used only if there are no requirements regarding fire resistance duration for the complete structure including the anchor rails.

When anchored in the tension zone of the concrete generated by load stresses or when minimum clearances between the anchor rails are used, the local transverse tensile stresses that occur due to intrinsic strength must be taken up by additional reinforcement, unless structural measures or other favourable influences (e.g. transverse pressure) prevent splitting of the concrete.

Corrosion prevention measures for anchor rails (rail, anchor, bolt, nut and washer) are to be appropriate for the application area and environment conditions in accordance with annex 4 and section 3.1.2.

A galvanized anchor rail may be in contact with reinforcement only if the temperature at the contact points between the reinforcement and the galvanized steel parts does not exceed 40°C.

For prestressed concrete components, the distance between a galvanized anchor rail and the metal sheath of the tendon, or prestressing wire where there is direct prestressing, must be at least 2 cm.

2 Regulations for the construction product

2.1 Properties and composition

The rails and bolts shall comply with the drawings and details in the annexes.

Material characteristics, dimensions and tolerances of rails and bolts not given in this General Construction Supervision Approval shall comply with the details held at the Certification Centre and External Supervisory Centre of the Deutsche Institut für Bautechnik.

The material properties of the anchor rails are to be certified by a works certificate 2.3 in accordance with DIN EN 10 204 and material properties of the anchors by works certificate 2.2.

For the bolts, the dimensions and material properties are to be certified at least by a works certificate 2.3 in accordance with DIN EN 10 204 unless the bolts are marked with a strength class and manufacturer's mark in accordance with DIN EN ISO 898-1:1999-11.

Hexagonal nuts with dimensions specified in DIN EN ISO 4032:2001-03 shall comply with strength class 8 as specified in DIN EN 20 898-2:1994-02 or A4-50 according to DIN EN ISO 3506-02. For hexagonal nuts as specified in DIN EN ISO 4032:2001-03 (old: DIN EN 24 032:1992-02), a conformity certificate in accordance with the Building Regulations List A, Part 1, serial number 4.8.11 is required.

Washers with dimensions specified in DIN 125-1:1990-03 shall at least correspond to material number 1.0037 (S235 JR; St 37-2) in accordance with DIN EN 10 025:1994-03 and those of stainless steel shall comply with DIN EN 10 088 (material data in accordance with annex 4). For washers to DIN 125, a manufacturer's conformity declaration in accordance with Building Regulation List A, Part 1, serial number 4.8.43 is required.

The regulations of the General Construction Supervision Approval Z-30.3-6 "Products, connecting means and components of stainless steels" shall also be complied with.

2.2 Manufacturing and Marking

2.2.1 Manufacturing (rail/anchor connection)

The connection (welding, clamping) of the anchor to the rail shall take place in the works.

MAG/MAGM shielded-arc welding (process 135 as specified in DIN EN ISO 4063:2000-04) is to be used for welding the welded anchors. The special requirements of the "Products, connecting means and components of stainless steels" Approval Resolution (approval number Z-30.3-6) are to be complied with for joints between stainless steels and low-alloy structural steels. The welds are to be formed in accordance with annex 2.

The business carrying out the welding must be in possession of a valid certification for class C welding "Small verification of suitability with extension" in accordance with DIN

18800-7:2002-09 "Steel structures, part 7; Implementation and manufacturer's qualification".

The compression anchors are inserted, in the works, into preformed holes in the back of the rail and then compressed.

2.2.2 Marking

Each delivery certificate for anchor rails and bolts must be marked by the manufacturer with the compliance mark (Ü mark) in accordance with the Compliance Mark Order of the German Länder. The works mark, the approval number and the complete designation of the anchor rails and bolts shall also be given on the delivery note.

Marking may only be used if the conditions of section 2.3 are met.

The anchor rail is designated according to the type of manufacture and the round profile dimensions, i.e. JZA K 41/22 (cold-formed/width/height). Hammer-head serrated bolts are designated according to the thread size e.g. JZS M12x40.

Each anchor rail is to be marked in accordance with annex 4. The bolt is to be marked with the works mark and works code in accordance with annex 3. The marking of the hexagonal nuts and the washers made of materials 1.4529 and 1.4462 is given in annex 3.

2.3 Proof of conformity

2.3.1 General

Confirmation of conformity of the rails and bolts with the regulations of this General Construction Supervision Approval must take place for each manufacturing works by means of a conformity certificate based on the work's own production inspection and regular third-party monitoring including an initial inspection of the rails and bolts in accordance with the following regulations.

The manufacturer of rails and bolts shall engage a certification centre approved for the purpose and a supervisory centre approved for the purpose for the award of the compliance certificate and the third-party monitoring including the product tests to be carried out for same.

The certification centre issuing the compliance certificate is to supply a copy of it to the Deutsche Institut für Bautechnik for information.

The Deutsche Institut für Bautechnik is also to be given a copy of the initial test report for information.

2.3.2 Works-internal production inspection

A works-internal production inspection system is to be put in place and implemented in each manufacturing works, A works-internal production inspection system is the routine monitoring of production carried out by the manufacturer by means of which the

manufacturer ensures that the building products produced by him complies with the regulations of this General Construction Supervision Approval.

The works-internal production inspection shall include at least the following measures.

Description and inspection of the starting material and the components:

- For structural parts of anchor rails (rail, anchor, bolt, nut and washer), the proofs of conformity and test certificates required in accordance with section 2.1 are to be checked for completeness and correctness.
- The dimensions and material properties of the bolts are to be subjected to routine inspection by the manufacturing works in accordance with DIN ISO 8992 and DIN EN ISO 898 or DIN EN ISO 3506-1.
- Determination of the functional dimensions (thickness, width, height and opening) of the rails and anchors, and comparison with the values given in the annexes carried out on five specimens per delivery.

Verifications and tests are to be carried out on the finished building product, at least on three specimens per 2000 metre run of anchor rails or on every 10,000 short pieces or once per production week.

- The functional dimensions of rails manufactured in their own works are to be determined and compared with the values given in the annexes.
- A check of the weld thickness, weld length and anchor width and anchor spacing and comparison with the values given in the annexes.
- Check of the bolt seating in the rail and a check for suitability for correct assembly.
- Determination of the breaking strain of the anchors using a central tensile test on rails sections with anchors, if necessary after galvanizing. The breaking strain shall not be less than 12.5 kN.
- Determination of the breaking strain of the weld joint or compression joint using a transverse tensile test on rail sections with welded anchors or bolt anchors, if necessary after galvanizing. The breaking strain shall not be less than 15.8 kN.
- The thickness of the corrosion protection coating is to be determined in accordance with, or with regard to, DIN EN ISO 4042, using a coating thickness measuring device. The test is also to be carried out on supplied parts (third-party galvanizing) if supplier certification of the tests is present.
- The dimensions and material properties of bolts shall be routinely checked in accordance with DIN ISO 8992 and DIN EN 20 898 by the manufacturing works.

The results of the works-internal production inspections are to be recorded, evaluated and kept for at least five years. They are to be submitted on demand to the Deutsche Institut für Bautechnik and the relevant main building supervisory authority.

2.3.3 Third-party monitoring

The works-internal production inspection system is to be regulated at least twice per year by a third-party monitoring body.

The initial testing of the anchor rails and bolts is to be carried out as part of the third-party monitoring and specimens must be taken for random testing. The sampling and the tests are the duty of the particular approved monitoring body.

The third-party monitoring should be carried out on at least three specimens of each manufactured size as follows.

- Determination of all dimensions of rails, anchors, bolts and welds and comparison with the values given in the annexes.
- Determination of the breaking strain of anchors using a central tensile test on rail sections with anchors, after galvanizing if necessary. The breaking strains shall be not less than 12.5 kN.
- Determination of the breaking strain of weld joints and compression joints using a transverse tensile test on rail sections with welded anchors or bolted anchors, after galvanizing if necessary. The breaking strains shall be not less than 15.8 kN.
- Determination of the thickness of the corrosion prevention coating of galvanized rails, anchors and bolts.
- Check of the specified markings.

Results of the certification and third-party monitoring shall be kept for at least five years. They are to be submitted by the certification centre or monitoring centre to the Deutsche Institut für Bautechnik and the relevant main building supervisory authority on demand.

3 Concept and design specifications

3.1 Concepts

3.1.1 General

The anchors are to be properly engineered. Verifiable design calculations and design drawings are to be prepared taking account of the loads to be anchored. The design drawings shall provide details of the precise location, size and length of the anchor rails and of the type of associated bolts and their sizes.

3.1.2 Corrosion protection

The application areas of the anchor rails (rails, anchors, bolts, nuts and washers) are given in table 5 of annex 4 relative to the corrosion protection measure (types 1 to 5).

Anchor rails with welded anchors where the rail, bolt, nut and washer are of stainless steel of material numbers 1.4571/1.4401/1.4404 and the anchor is of rolled bright steel (line 4 of table 5 in annex 4) may also be used for structures of corrosion protection class III corresponding to the General Construction Supervision Approval “Products, Connecting Means and Components of Stainless Steels”, Approval No. Z-30.3-6, i.e. they may be used in damp rooms and outdoors, including in industrial atmospheres and in sea areas (but not within the influence area of sea water), provided further corrosion stresses do not occur.

Anchor rails where all the structural parts (rail, anchor, bolt, nut and washer) are of stainless steel of material numbers 1.4571/1.4401/1.4404 (line 4 of table 5 in annex 4) may also be used for structures of corrosion protection class III corresponding to the

General Construction Supervision Approval “Components and Connecting Elements of Stainless Steels”, Approval No. Z-30.3-6, i.e. they may be used in damp rooms and outdoors, including in industrial atmospheres and in sea areas (but not within the influence area of sea water, provided further corrosion stresses do not occur.

Anchor rails where the rail is of stainless steel of material numbers 1.4529/1.4547 and 1.4462 and the round anchor, the bolt, the nut and the washer are of materials 1.4529 and 1.4462 (line 5 of table 5 in annex 4), may also be used for structures of corrosion protection class IV corresponding to the General Construction Supervision Approval “Products, Connecting Means and Components of Stainless Steels” Z-30.3-6, i.e. they may also be used in areas where a very strong corrosion stress occurs due to the concentration of pollutants. Anchor rails the structural parts of which consist of material 1.4462 may not be used in indoor swimming pool atmospheres.

3.2 Design

3.2.1 General

The anchors are to be designed in accordance with engineering principles. Proof of the direct local introduction of force in the concrete is to be established.

When designing anchor rails to DIN 1045-1:2001-07 “Load-bearing structures of concrete, reinforced concrete and stressed concrete, part 1: Design and construction”, the design value of the stress capacity is to be set as follows:

$$F_{Rd} = \text{zul } F \times 1.4$$

The transmission of the loads to be anchored into the component is to be proven.

The weakening of the concrete cross section due to the installation of the anchor rails is to be allowed for as necessary during the structural analysis.

A bending stress may then only be disregarded if

- the component to be connected is made of metal and is stressed with respect to the rail without an intermediate layer,
- the hole diameter in the component to be connected does not exceed 14 mm for an M12 bolt or 18 mm for an M16 bolt.

If the hole clearance cannot be maintained, a bending stress of the bolt is to be taken into account.

Additional stresses that can occur in the anchor rail, in the component to be connected or in the component in which the anchor rail is anchored, due to resistance to a change in shape (e.g. in the event of temperature changes) are to be taken into account.

The application of the single load or load pair can take place at any point in the anchor rail. The axis of the bolt shall be at least 2.5 cm from the end of the rail.

The minimum distances (axial, edge and corner distances) and component dimensions (component width and thickness) given in annex 5 shall be maintained.

Where the rails are stressed by an oblique tensile force $\leq 45^\circ$ and transverse tensile stress vertical to the edge, a reverse-slope reinforcement as shown in the top picture in annex 6 is to be provided for distances of 75 mm to 100 mm.

3.2.2 Permissible loads

The permissible loads are given in annex 5 relative to the profile length and the directions of stress. The rail may be stressed with a centric tensile stress, an oblique stress or transverse stress, including also parallel to the rail axis.

3.2.3 Bending stress of bolts

The permissible bending moments are given in annex 5. The design bearing point is the top edge of the anchor rail.

Where bending occurs with additional centric tensile stress or oblique stress, the stresses are to be superimposed, as follows:

F_z	\leq	zul F (1 – M/zul M)
zul F	=	permissible centric tensile load according to annex 5
zul M	=	permissible bending moment of the bolt according to annex 5
F_z	=	existing tensile load component
M	=	existing bending moment

For façade cladding with variable bending stresses (e.g. due to temperature changes), the stress deflection σ_A must not exceed $\pm 50 \text{ N/mm}^2$ about the average value σ_m relative to the design stress cross section of the bolt.

3.2.4 Special case of narrow reinforced concrete components

An anchor rail fitted in the front face of a lightly stressed reinforced concrete component at least 10 cm thick (e.g. façade slabs, lightly stressed bolt) may be subjected to a centric tensile stress equal to the permissible load in annex 5 if additional reinforcement corresponding to annex 6 is provided.

3.2.5 Displacement behaviour

Centric tensile stress; transverse stress in the longitudinal direction of the rail:

Displacements of up to 0.5 mm in the direction of the load can be expected when stressed to the limit of the permissible load:

Transverse tensile stress vertical to the longitudinal direction of the rail:

Displacements of up to 1.5 mm vertical to the longitudinal direction of the rail can be expected when the permissible load is applied. If the bolts are fitted under load,

displacements of up to 0.6 mm can be expected. This value increases to 2.0 mm if the load direction is reversed.

The existing hole clearance between the bolt and the fitted component is also to be taken into account where there are transverse loads.

4 Implementation Regulations

4.1 Fitting the anchor rails

No anchors may be retrospectively attached to the anchor rail or other changes carried out.

The anchor rail is to be fitted in accordance with the design drawings produced in accordance with section 3.1.1.

The anchor rails are to be secured to the formwork in such a way that they do not become displaced when the reinforcement is laid or the concrete is placed and compacted. They are to be protected against the penetration of concrete into the inside of the rail.

4.2 Fitting the connecting structure (bolt assembly)

The required bolt size is given in the design drawings.

If due to incorrect concreting etc. the front edge of the anchor rail is not flush with the surface of the concrete, this intermediate space must be filled in level with the surface when fitting the connecting structure.

The heads of the bolts that are inserted into the rail slot must rest fully against both legs of the anchor rail when rotated clockwise by 90°, engage in the serrating and lock when the nuts are tightened with a torque spanner. The tightening torque values given in annex 5 shall be adhered to.

The bolts are to be checked for correct seating after fitting and the marking slot on the end of the bolt shaft must be transverse relative to the longitudinal direction of the rail. The axial spacing of the bolts shall not be less than that given in annex 5.

4.3 Monitoring the work

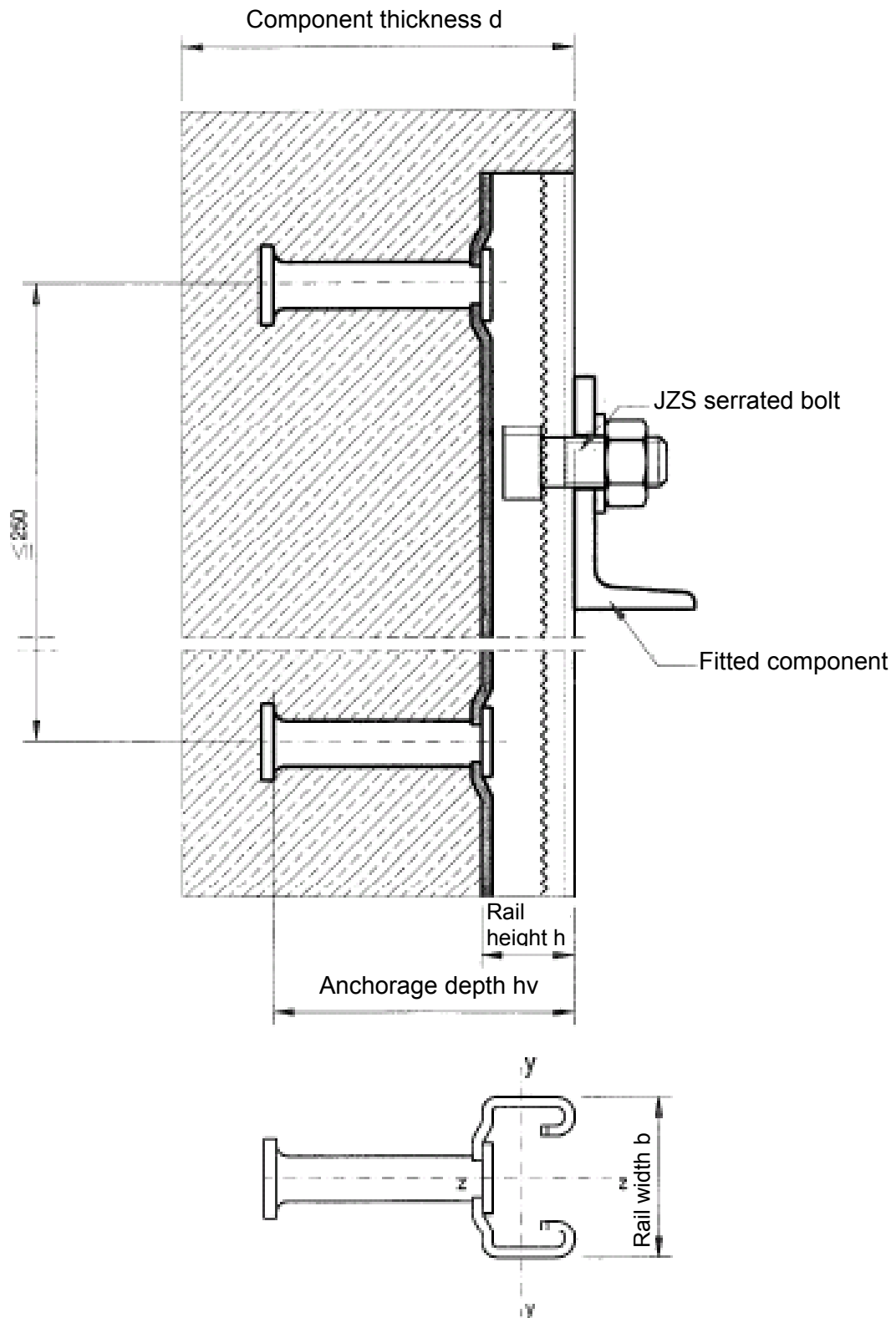
During the installation of the anchor rails and when fitting the bolts (attachment of connecting structures), the contractor engaged to fit the anchor rails, or the building manager appointed by him, or an expert representative of the building manager must be present on the building site. He must ensure that the work is correctly carried out.

In particular, he must check the construction and location of the anchor rails and any reverse-slope reinforcement.

The records must be held present on the building site during the building work and are to be submitted on request to the agent appointed to carry out the checks. Both those records and the delivery notes must be kept by the contractor for at least five years after completion of the work.

Latenser

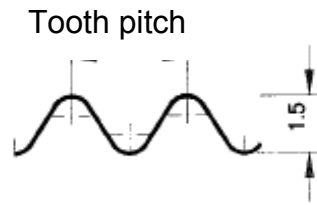
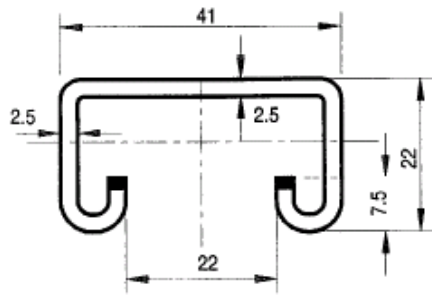




<p>JORDAHL</p> <p>Befestigungstechnik</p> <p>Deutsche Kahneisen Gesellschaft mbH Nobelstraße 51/55 12057 Berlin Tel: 030/ 6 82 83-02 Fax: 030/ 6 82 83-499</p>	<p>JORDAHL Anchor Rails Type JZA K 41/22</p>	<p>ANNEX 1 of the General Construction Supervision approval Z-21.4-741 Dated 23 January 2004</p>
	<p>Installed</p>	

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**Profile dimensions
JZA K 41/22**

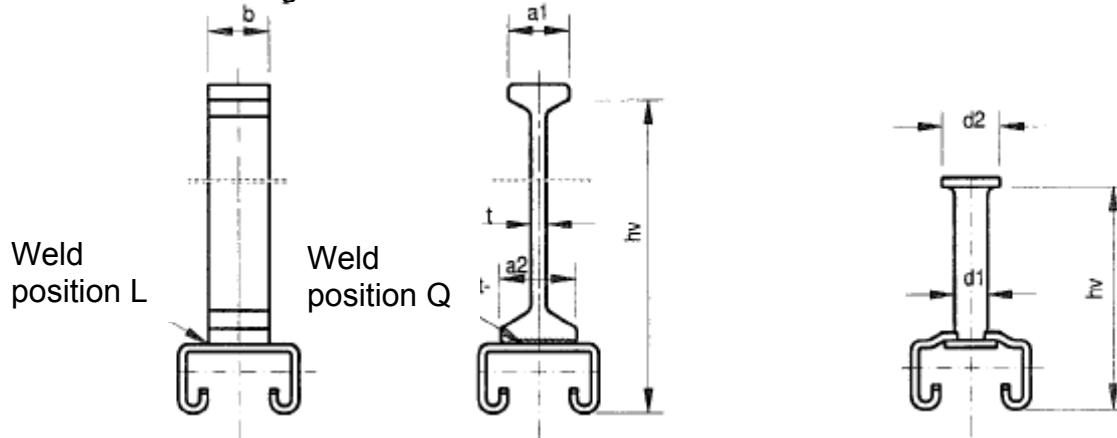


Anchor types

Welded anchor I

**Round anchor R 1
Compression anchor**

Cut length



Anchor position, transverse (Q) Anchor position, lengthwise (L)

Table 1: Dimensions

Type of Anchor		Welded Anchor							Round anchor	
	Approx. anchor height [mm]	Anchorage depth hv [mm]	Min. cut length b [mm]	Head/foot width a1/a2 [mm]	Web thickness t [mm]	Anchor position	Weld position	Weld a x l	Shaft diameter d1 [mm]	Head diameter d2 [mm]
I 60	60	77.5	15	18.5/18.5	5	Q/L	Q/L	3x15	-	-
I 125	125	140.5	20	20/25	5	Q	Q	3x20	-	-
R 1	60	74.5	-	-	-	-	-	-	9	17

JORDAHL Befestigungstechnik Deutsche Kahneisen Gesellschaft mbH Nobelstraße 51/55 12057 Berlin Tel: 030/ 6 82 83-02 Fax: 030/ 6 82 83-499	JORDAHL Anchor Rails Type JZA K 41/22	ANNEX 2 of the General Construction Supervision Approval Z-21.4-741 Dated 23 January 2004
	Profile dimensions, anchor types	

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Table 2: Anchor arrangement

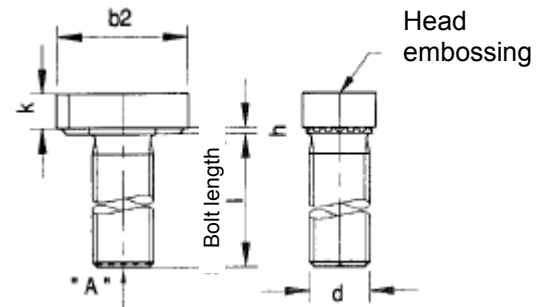
Rail Length [mm]	Axial spacing of anchors [mm]	
100	25 50 25	
150 ¹⁾	25 100 25	
200 ¹⁾	25 150 25	
250 ¹⁾	25 200 25	
>250 ¹⁾	25 ≤250 25	25 ≤250 // ≤250 25

Table 3: Bolt dimensions

D (mm)	Material quality	b1 (mm)	b2 (mm)	b3 (mm)	k (mm)	h (mm)
M 12	8.8	19.5	34.5	16.5	9	1.5
M16	8.8	19.5	34.5	16.5	9	1.5
M 12	A4-50	16.5	34.5	-	7	1.5
M 16	A4-50	19.5	34.5	-	9	1.5

Shaft and Thread according to DIN EN ISO 4018:2001-03

Type JZS serrated bolt



Marking

Head embossing:

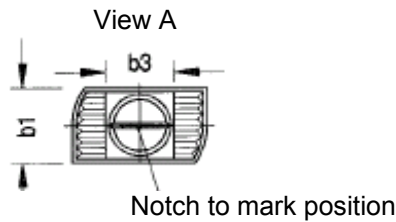
Works marks and material code

e.g. JZS 8.8

JZS A4 (1.4401/1/4404/1.4571)

JZS KK (1.4529)

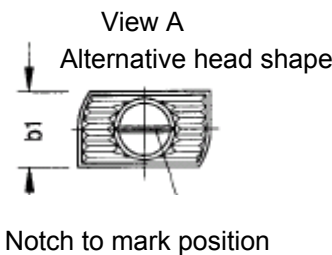
JZS FA (1.4462)



Hexagonal nuts and washers for corrosion protection class IV are marked as follows:

-1.4529: KK alternative 4529

-1.4462: FA alternative 4462



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Table 6: Permissible loads, distances and values

JZA Profile	Minimum concrete strength class	Permissible loads F [kN] (M12 or M16 Bolts)				Minimum distances and component dimensions [cm] (1)								Tightening Torque[Nm]				Permissible bending moments of bolts [Nm] relative to top edge of rail or concrete			
		(2) Central tensile load, transverse tensile load and oblique tensile load		Transverse tensile load parallel to rail axis, $\beta \leq 15^\circ$		a_r	a_a	a_e	a_f	b	d	(6) Rail pairs		Strength class 8.8		Material class A4-50		Strength class 8.8		Material class A4-50	
		Single load Fig a	Load pair Fig b	Single load Fig a	(3) Load pair Fig c							a_{r1}	a_{a1}	M12	M16	M12	M16	M12	M16	M12	M16
Profile length [cm]		≥ 10	≥ 20	≥ 10	≥ 20																
K 41/22	B 25 (C20/25)	5.0	3.5	5.0	5.0	7.5	15	8	20	15		10	10	50	90	50	90	43.7	111	15.3	38.8

- (1) The minimum distances given in the table apply to reinforced concrete. If the distances are increased by $\geq 30\%$, there are no requirements regarding the reinforcement.
- (2) Where there is simultaneous stress either tensile stress or transverse stress vertical to the rail axis and transverse stress parallel to the rail axis, the resulting load must not exceed the value of $F = 5$ kN for single load or $F = 3.5$ kN for load pairs.
- (3) If the load direction deviates from the longitudinal axis of the rail beyond $\beta = 15^\circ$, the permissible load F must be reduced to 3.5 kN
- (4) Applies for the arrangement of one rail
- (5) Obtained from the length of the anchors and the required concrete covering according to DIN 1045
- (6) Permissible only for central tensile stress and transverse stress parallel to the rail axis

directions of stress

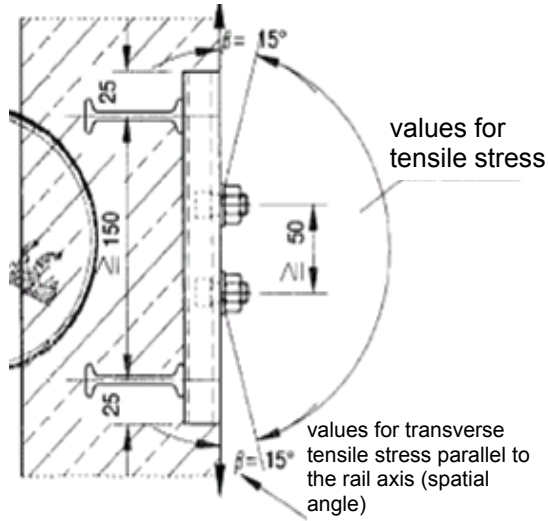


Fig a **Single loads** (for all load directions)

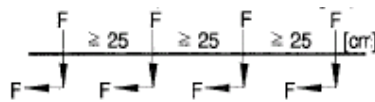


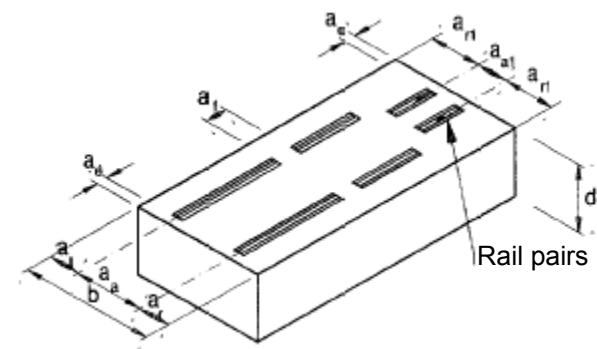
Fig b **Load pairs** (for tensile, transverse tensile, oblique tensile stress)



Fig c **Load pairs** (parallel to rail longitudinal axis)

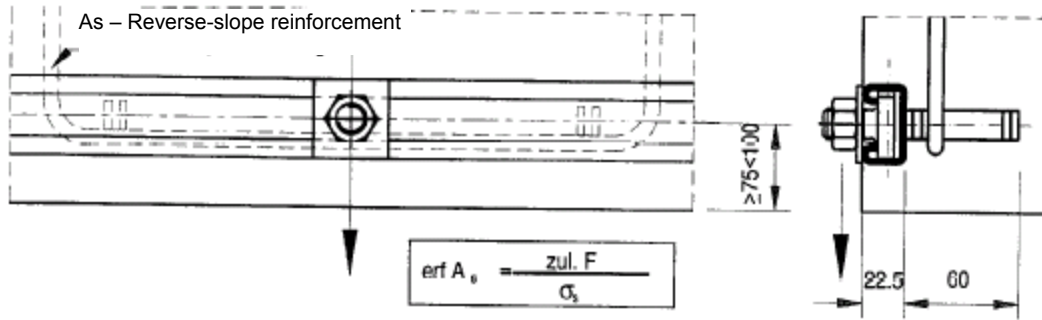


Minimum distances and minimum component dimensions

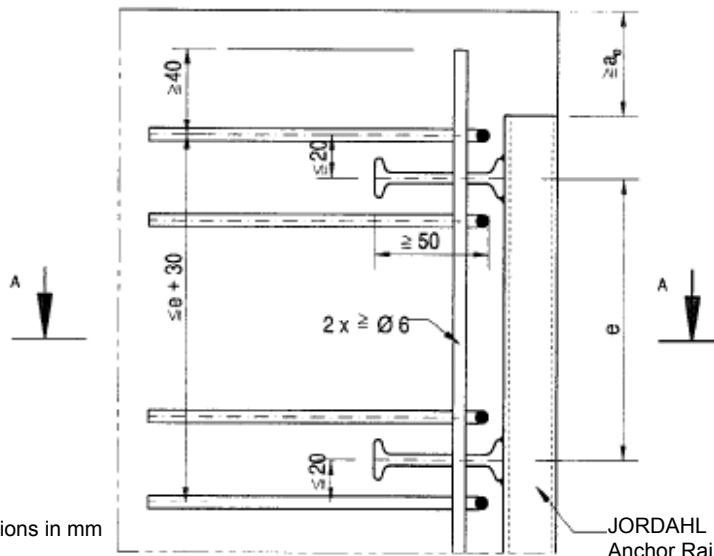
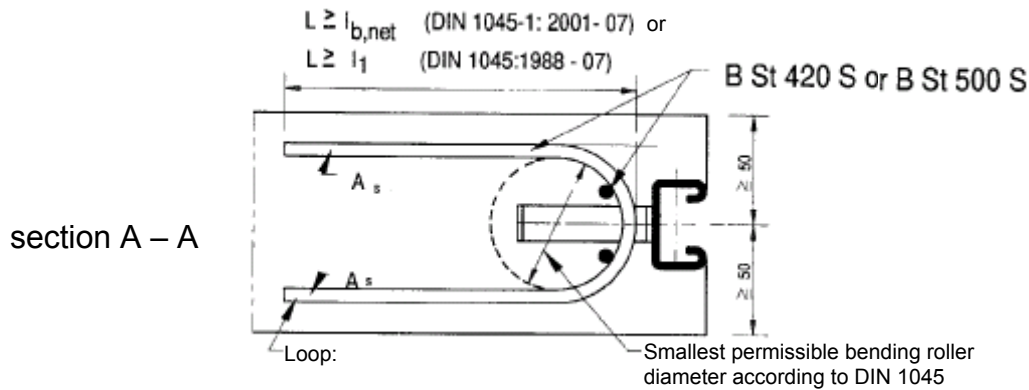


Note: Translation of the German original version not checked by the German Institute for Structural Engineering. Every page of the German original bears the official stamp of the German Institute for Structural Engineering.

Additional reinforcement for edge distances of anchor rails of ≥ 75 mm up to <100 mm and a load direction vertical to the edge (see section 3.2.1).



Additional reinforcement for anchor rails in front faces where $d >100$ up to $2a_r$ or $2a_{r1}$ (see section 3.2.4).



$$\text{erf } A_s = \frac{\text{zul. } F * 0.25}{\sigma_s}$$

useable steel stress $\sigma_s = 8\text{ kN/cm}^2$

A_s = cross section of reinforcement [cm^2]

zul. F [kN] = max load according to annex 5

Dimensions in mm

JORDAHL
Anchor Rail JZA

<p>JORDAHL Befestigungstechnik</p> <p>Deutsche Kahneisen Gesellschaft mbH Nobelstraße 51/55 12057 Berlin Tel: 030/ 6 82 83-02 Fax: 030/ 6 82 83-499</p>	<p>JORDAHL Anchor Rails Type JZA K 41/22</p> <p>Reverse-slope reinforcement where the edge distance is reduced</p>	<p>ANNEX 6 of the General Construction Supervision Approval</p> <p>Z-21.4-741 Dated 23 January 2004</p>
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Legal basis for the award of General Construction Supervision Approvals
in accordance with German Provincial Building Regulations

Version: April 2003

Baden-Württemberg:	§18 and §21 of the Provincial Building Regulation for Baden-Württemberg (LBO) of 8 August 1995 (GBI p 617) as amended by Law of 19 December 2000 (GBI p 760)
Bavaria:	Article 20 and Article 23 of the Bavarian Building Regulation (BayBO) of 4 August 1997 (GVBI p 434, ber. 1998 p 270) as amended by Law of 27 December 1999 (GVBI p 532)
Berlin:	§19 and §21 of the Building Regulation for Berlin (BauOBln) of 3 September 1997 (GBVI p 421), as amended by article XLV of the Law dated 16 July 2001 (GBVI p 260, 271)
Brandenburg:	§21 and §24 of the Brandenburg Building Regulation (BbgBO) of 25 March 1998 (GBVI I p 82)
Bremen:	§21 and §24 of the Bremen Provincial Building Regulation (BremLBO) of 27 March 1995 (Brem GBI p 211) as amended by article 27 of the Law of 11 December 2001 (Brem GBI p 393)
Hamburg:	§20a and §21 of the Hamburg Building Regulation (HBauO) of 1 July 1986 (HmbGVBI p 183), as amended by article 6 of the Law of 17 December 2002 (HmbGVBI p 35) in conjunction with Item 3 of the Order for the Transfer of Construction Supervision Jurisdiction to the Deutsche Institut für Bautechnik (DIBt-VO) of 29 November 1994 (HmbGVBI p 301, 310)
Hessen:	§17 and §20 of the Hessen Building Regulation (HBO) of 18 June 2002 (GBVI I p 274)
Mecklenburg-Vorpommern:	§18 and §21 of the Provincial Building Regulation for Mecklenburg-Vorpommern (LBauO M-V) as promulgated on 6 May 1998 (GVOBI M-V S. 468 ber. p 612), as amended by article 6 of the Law of 9 August 2002 (GVOBI M-V p 531)
Lower Saxony:	§25 and §27 of the Lower Saxony Building Regulation (NBauO) as promulgated on 10 February 2003 (Nds GVBI p 89)
North Rhine Westphalia:	§21 and §24 of the Building Regulation for North Rhine Westphalia - Provincial Building Regulation (BauO NW) of 1 March 2000 (GV.NRW p 256) as amended by Law of 9 May 2000 (GV.NRW p 439)
Rheinland Pfalz:	§19 and §22 of the Provincial Building Regulation for Rheinland Pfalz (LBauO) of 24 November 1998 (GVBI p 365) as amended by Law of 18 December 2001 (GVBI p 303)
Saarland:	§26 and §29 of the Building Regulation for the Saarland (LBO) of 27 March 1996 (Official Gazette p 477) as amended by Law of 7 November 2001 (Official Gazette p 2182) in conjunction with § 1 paragraph 2 item 1 of the Order for the Transfer of Jurisdiction of the Main Building Supervisory Authority to the Deutsche Institut für Bautechnik of 20 June 1996 (Official Gazette p 750)
Saxony:	§21 and §23 of the Saxony Building Regulation (SächsBO) of 18 March 1999 (SächsGVBI p 86) as amended by article 3 of the Law of 14 December 2001 (SächsGVBI p 716, 724)
Sachsen-Anhalt:	§21 and §24 of the Building Regulation of Sachsen-Anhalt (BauO LSA) of 9 February 2001 (GVBI LSA p 50)
Schleswig-Holstein:	§24 and §27 of the Provincial Building Regulation for Schleswig-Holstein (LBO) of 10 January 2000 (GVOBI Schl.-H. p 47) as amended by article 8 of the Law of 16 December 2002 (GVOBI Schl.-H. p 264)
Thüringia:	§21 and §23 of the Thüringia Building Regulation (THürBO) of 3 June 1994 (GVBI TH p 553) as amended by article 18 of the Law of 24 October 2001 (GVBI TH p 265)