

## JORDAHL® Channels and Accessories

Making Light Work of the Heaviest Loads.

Technical Information



**JORDAHL®**  
anchored in quality

# A Century of Quality

## The JORDAHL Company

JORDAHL connects: steel, concrete, heavy loads, and a whole lot more. Many customers around the world have already decided on high-quality products for fastening, reinforcement, shear connections, framing, and facade connection systems. Customers who choose JORDAHL want more – higher quality, broader choice, better consulting services, wider experience. They get all of this from JORDAHL. Since our company was founded in Germany in 1907, we have been at the forefront of connection and shear reinforcement system development.

JORDAHL products, such as anchor channels, have become milestones in the evolution of structural engineering and have brought lasting changes to construction, shaping the way buildings are designed and making them safer, around the world.



## The JORDAHL Experts

We don't only set high standards with our products, but also offer technical consultation. Our competent and experienced JORDAHL experts are always aware of the latest developments and offer up to date, flexible, and customized solutions to cater to all your needs. The more than 700 emails and calls to JORDAHL experts every day show just how much our customers appreciate the advice. We have more than 50 engineers available around the world, who can also develop the right solution for your very specific application. Simply send an email to [engineering@jordahlusa.com](mailto:engineering@jordahlusa.com) or call (800) 363-3266.

### JORDAHL experts are pleased to help with the following:

- Advice on our products
- Information about new products
- Customized solutions for your application
- Software issues
- Development of installation methods
- Optimized solutions for economical use of our products
- Training for architects, engineers, and design engineers
- Direct on-site support

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# JORDAHL® Channels and T-Bolts

## Applications and Uses

Cast-in JORDAHL® anchor channels together with the matching JORDAHL® T-bolts create an excellent connection system for reliably transferring high loads into reinforced and unreinforced concrete components. Highly versatile, JORDAHL® anchor channels and T-bolts with **evaluation reports issued by the ICC-ES** and other international approvals can be used in a wide variety

of applications. The system provides many advantages for installation and assembly of structural and facade components. Combined with first-class reliability and quality, JORDAHL products are favoured by design engineers and users around the world. They have been tried and tested in countless international projects, setting standards for fastening technology.

### Elevator Installation

JORDAHL® anchor channels and T-bolts offer a secure and adjustable system for safely anchoring elevator guide rails and doors. The dynamic loading conditions are safely resisted for millions of cycles.



### Curtain Wall

JORDAHL® anchor channels and T-bolts meet the demands of modern facade engineering. JORDAHL products have been used on hundreds of projects across the USA and Canada, and around the world.



## Tunnel Construction

JORDAHL® anchor channels, manufactured as pairs, provide for easy placement and offer simple connection-location adjustment for the long-term resistance of dynamic loading applied to catenaries, overhead lines, signaling systems, lights, and ventilation in tunnels.



## Stadium Construction

JORDAHL® anchor channels and T-bolts are used in stadium construction because they provide a simple, adjustable, and safe way to fasten both seats and crowd-control handrails to concrete without noise or dust.



## Precast Construction

The positioning adjustment offered by JORDAHL® anchor channels means that they are extensively used for the restraint, support, and connection of precast, panels, walls, and beams. A wide range of accessories enable sliding or fixed connections between components.



## Applications and Uses

### Bridge Construction

JORDAHL® anchor channels allow drainage pipes and cabling to be accurately and reliably supported back to the bridge structure. Dynamic, seismic and vibration loads can be safely resisted.



### Window Wall Installation

JORDAHL JTB-uni anchor channels used with self-tapping screws are an ideal solution for window wall and window connections to concrete.



### Power Station Construction

Toothed JORDAHL® anchor channels are approved for seismic impact and fatigue loads, and are highly resistant to dynamic loads and fire. They are therefore ideally suited to safety-critical applications.



## Crane Rails

Hot-rolled JORDAHL® anchor channels are ideally suited for dynamic loads and withstand fatigue over millions of cycles. They therefore meet all requirements for reliable fastening of crane rails.



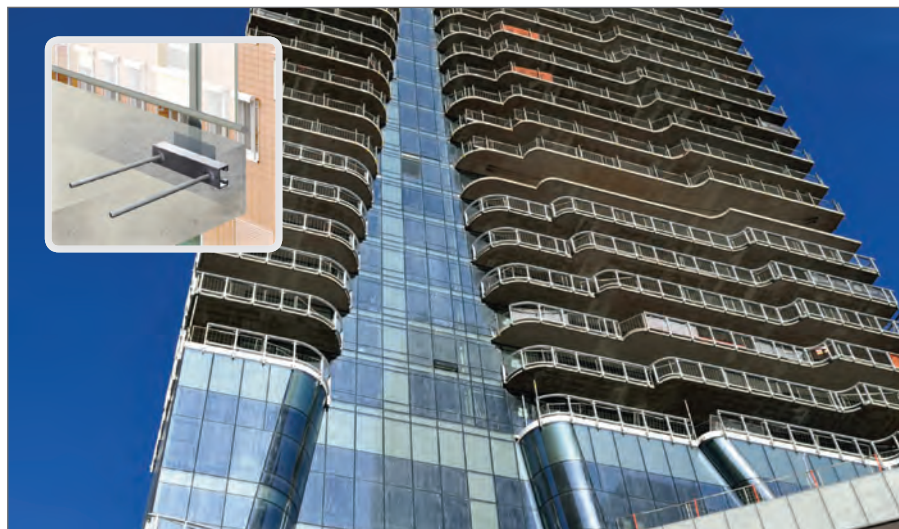
## Structural Connections

The JORDAHL range of toothed and plain lipped anchor channels enable steel beams, canopies, stair structures, and balconies to be accurately and safely connected to the concrete structure.



## Handrail Connections

JORDAHL anchor channels JTA-RF have long rebar anchors that enable critical loads, such as those from balcony hand rail connections, to be safely distributed in thin concrete slabs.



# JORDAHL® Channels and T-Bolts

## Approvals and Certificates



### North American Evaluation Reports

JORDAHL® anchor channels JTA, and toothed anchor channels JXA have evaluation reports issued by the ICC-ES. Performance in seismic design categories A-F are accommodated.



### Quality Management ISO 9001 – Certified

The Quality Mark confirms that JORDAHL production undergoes strict quality control in accordance with the requirements of international certification procedures (ISO 9001:2015).



### European Technical Approval (ETA)

The German Institute for Construction Engineering (DIBt) has issued a European Technical Approval for JORDAHL® anchor channels JTA and T-bolts. The ETA approval assesses these products both technically and in terms of quality. The approval is based on a general European design concept that is valid without restrictions in more than 30 countries and ensures maximum planning reliability even in international projects.



### Approval for Asia

JORDAHL® anchor channels JTA are approved by CABR for China and the Hong Kong Buildings Department. Further approval for nuclear power station construction by CNPE.



#### JORDAHL Information

Interested in our approvals? They are available to download via QR code (simply scan, select the document you require, and download) or as a standard download from [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Approvals.





## Advantages and Features

### Design

- Economical connection system offering a wide range of load capacities
- Maximum versatility in connection locations due to the infinitely variable T-bolt spacing and positioning offered by cast-in anchor channels
- Suitable for a wide variety of connection applications
- Available in hot-dip galvanized and stainless steel materials
- JORDAHL® EXPERT design software allows the rapid creation of verifiable structural calculations for infinite design conditions
- Secure anchoring in cracked concrete, even with small edge distances



### Safety

- Suitable for cracked and uncracked concrete, without restrictions
- Tested for safe application in dynamic loading applications over millions of cycles
- Verified performance under fire conditions
- ICC evaluation reports for safe performance in seismic design categories A-F



### Installation

- Rapid on-site fastening of attached components to keep construction time to a minimum
- Only simple hand tools required
- No drilling, no welding, no power supply needed
- No noise, no silica dust created, no fire risk
- No damage to concrete or reinforcement during installation
- Simple compensation of construction tolerances



hot-rolled profile



cold-formed profile



toothed profile



work safety



reduces construction time



economical



simple assembly



fire prevention



sustainable construction



### JORDAHL Information

Do you need JORDAHL installation instructions? They are available to download via QR code (simply scan, select the document you require, and download) or as a standard download from [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Installation Instructions.



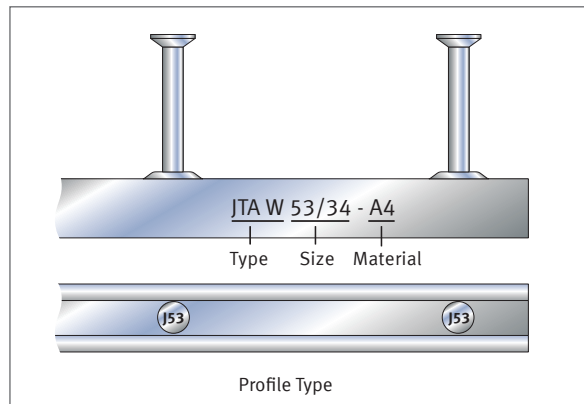
# Material and Identification

JORDAHL Product	Steel		Stainless Steel	
Profile	A 283 C (1.0038) A 633 A (1.0044)	ASTM (EN 10025)	316 (1.4401) / 316L (1.4404) / 316Ti (1.4571) UNS S32304 (1.4362); UNS S31803 (1.4462) 444 (1.4529) / UNS S31254 (1.4547)	AISI (EN 10088)
Anchor	1018 (1.0038) 1012 (1.0214); 1015 (1.0401); 1015 (1.1132) A 914 (1.5525)	AISI (EN 10263)	316 (1.4401) / 316L (1.4404) / 316Ti (1.4571) 316LCu (1.4578) UNS S32304 (1.4362); UNS S31803 (1.4462) 444 (1.4529) / UNS S31254 (1.4547)	AISI (EN 10088)
T-Bolts	strength grade 4.6 / 8.8	ASTM (ISO 898-1)	316 (1.4401) / 316L (1.4404) / 316Ti (1.4571) UNS S32304 (1.4362); UNS S31803 (1.4462) 444 (1.4529) / UNS S31254 (1.4547)	AISI (ISO 3506-1)
Hexagon nuts	strength grade 5 / 8	ASTM (EN 20898-2)	316 (1.4401) / 316L (1.4404) / 316Ti (1.4571) UNS S31803 (1.4462) 444 (1.4529) / UNS S31254 (1.4547)	AISI (ISO 3506-2)
Washers	steel	ASTM	316 (1.4401) / 316L (1.4404) / 316Ti (1.4571) UNS S31803 (1.4462) 444 (1.4529) / UNS S31254 (1.4547)	AISI (EN 10088)

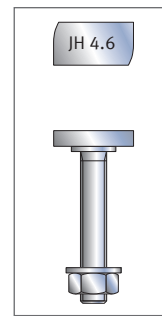
## Identification of JORDAHL® Anchor Channels JTA

JORDAHL® anchor channels are permanently identified on the profile side with type of profile and material specification.

JORDAHL® anchor channels with round anchors are additionally embossed with the profile designation on the rivet head inside the channel.



## Identification of JORDAHL® T-Bolts



JORDAHL® T-bolts are embossed on the T-bolt head with type and strength class.

Head marking 4.6 for standard strength T-bolts and 8.8 for high strength T-bolts.

### Material / Strength Grade

4.6	strength grade 4.6
8.8	strength grade 8.8
A4-50	316 / 316L / 316Ti grade 50
A4-70	316 / 316L / 316Ti grade 70
F4-70	UNS S31803 grade 70
L4-70	UNS S32304 grade 70
HC-50	444 / UNS S31254 grade 50
HC-70	444 / UNS S31254 grade 70

### Material

no mark	A 283 C / A 633 A
A4	316 / 316L / 316Ti
F4	UNS S31803
HC	444 / UNS S31254
L4	UNS S32304
HDG	hot-dip galvanized

### Manufacturing Method

W	hot-rolled
K	cold-formed

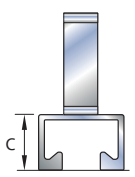
# Corrosion Prevention

Condition	Profile	Anchor	T-Bolt, Nut, Washer	Intended Use
Concrete covered	Steel mill finish	Steel mill finish	Steel mill finish without corrosion protection	Only possible when all the connection elements, depending on the ambient conditions, are protected, by a minimum concrete cover according to ACI 318-14.
Dry internal conditions	Steel hot-dip galvanized $\geq 2.2$ mil (55 $\mu\text{m}$ )	Steel hot-dip galvanized $\geq 2.2$ mil (55 $\mu\text{m}$ )	Steel galvanic zinc plated $\geq 0.2$ mil (5 $\mu\text{m}$ )	Concrete structural components in interior rooms, for example dwellings, offices, schools, hospitals, retail premises – with the exception of wet rooms.
Internal conditions with usual humidity	Steel hot-dip galvanized $\geq 2.2$ mil (55 $\mu\text{m}$ )	Steel hot-dip galvanized $\geq 2.2$ mil (55 $\mu\text{m}$ )	Steel hot-dip galvanized $\geq 2.0$ mil (50 $\mu\text{m}$ )	Concrete structural components in interior rooms with normal atmospheric humidity (including kitchens, bathrooms and wash-rooms in dwellings) – with the exception of permanent moisture.
Medium corrosion exposure	Stainless steel A4 L4	Stainless steel A4 <sup>1)</sup> L4 <sup>1)</sup> Weld-on anchor mill finish <sup>2)</sup>	Stainless steel A4-50 A4-70 L4-70	Applications with medium corrosion resistance, for example in wet rooms, areas exposed to weather, industrial atmosphere, close to the ocean and in inaccessible areas.
High corrosion exposure	on request			Applications with severe corrosion resistance and high corrosion loading by chlorides and sulphurdioxide (including the concentration of pollutants, for example in the case of components in saltwater and road tunnels).

<sup>1)</sup>JORDAHL® stainless steel anchor channels with round anchors:  
The anchor channel types JTA K 28 / 15 to JTA W 50 / 30 are manufactured with round anchors from stainless steel. These anchor channels are not subject to any restrictions with respect to the concrete cover.

The anchor channel types JTA W 72 / 48, JTA W 53 / 34, JXA W 64 / 44 and JXA W 53 / 34 can be manufactured from stainless steel round anchors or welded-on mill-finish steel I-anchors. The static properties of the round anchors or welded-on I anchors are equivalent.

<sup>2)</sup>JORDAHL® stainless steel anchor channels with mill finish weld-on anchors: The following concrete cover *c* must be used for corrosion protection of the welded anchors:

JTA W 53 / 34 in. (mm)	JXA W 53 / 34 in. (mm)	JXA W 64 / 44 in. (mm)	JTA W 72 / 48 in. (mm)	
1.33 (34)	1.33 (34)	1.73 (44)	1.89 (48)	

## Abbreviations of Product Descriptions

JTA = Jordahl Anchor Channel  
W = Hot Rolled Channel  
K = Cold Formed Channel  
RT = Rebar Tails Top of Slab  
RF = Rebar Tails Face of Slab  
R = Rebar Tails  
US = American rebar ASTM A706.

This is an optional acronym since the rebar supply in North America is always "US". The software calculations always have the "US" shown in the part number since it's used internationally with different codes.

KV = Trimmed I-anchors  
S = Headed Concrete Anchors  
A = Round Anchors  
I = I-anchors  
HDG = Hot Dipped Galvanized  
Variant = value for rebar extension at front of channel.

Example:  
JTA-RT-W53/34-US-KV-300-2I-HDG

# JORDAHL® Anchor Channels

## Anchor Channels JTA



ICC-ES ESR-2854



**JORDAHL® anchor channels with matching T-bolts create an excellent connection system for transferring loads to reinforced concrete components. Initial installation is fast and connections are easy to position accurately. Connections can later be replaced or repositioned at any time to match new fastening requirements. They are a key part of the wide-ranging JORDAHL portfolio of products and can be used for a wide variety of different applications.**

### Extensive Benefits

- Fast, efficient, and adjustable fastening of large loads
- Maintenance-free for years, with a choice of high-quality galvanized, or stainless steel products
- Installation without damaging concrete or reinforcement
- Approved by **ICC-ES (ESR-2854)**

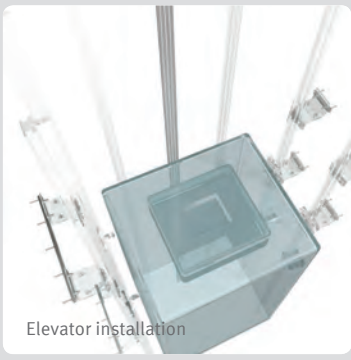
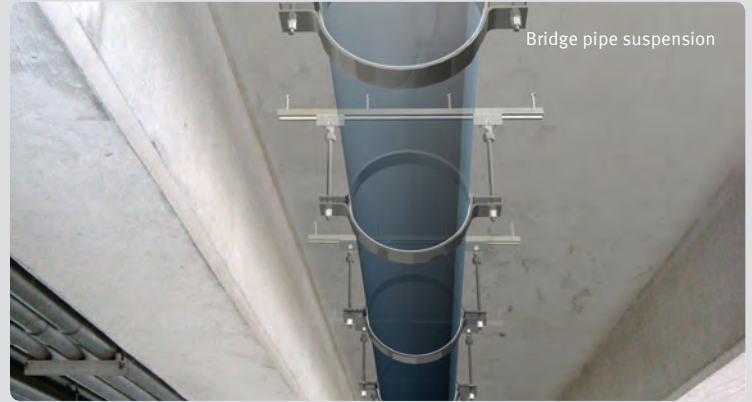


### Maximum Design Reliability

- Secure fastening using code-compatible design concept
- JORDAHL® EXPERT software for reliable and efficient design of JORDAHL® anchor channels
- Free download at [www.jordahlusa.com](http://www.jordahlusa.com)

### Powerful Features

- Suitable for cracked and uncracked concrete and prestressed elements, without restrictions
- Secure fastening, allowing easy adjustment
- Increased load-bearing capacity near to reinforcement





- ### Fastening Solutions
- Curtain walls
  - Overhead lines in tunnels and on railway lines
  - Precast concrete elements
  - Stadium seats
  - Crane rails
  - Cable support systems
  - Elevator guide rails and doors
  - Industrial machinery
  - Pipework
  - Handrails
  - Structural steel




### Anchor Channels JTA W – for Dynamic Loads

- Hot-rolled from a single billet and therefore free of residual stress
- High fatigue strength under dynamic and wind load
- Economical and optimized design for any number of load cycles
- Tested for seismic, explosion, fire and shock loads


### Anchor Channels JTA K – for Static Loads

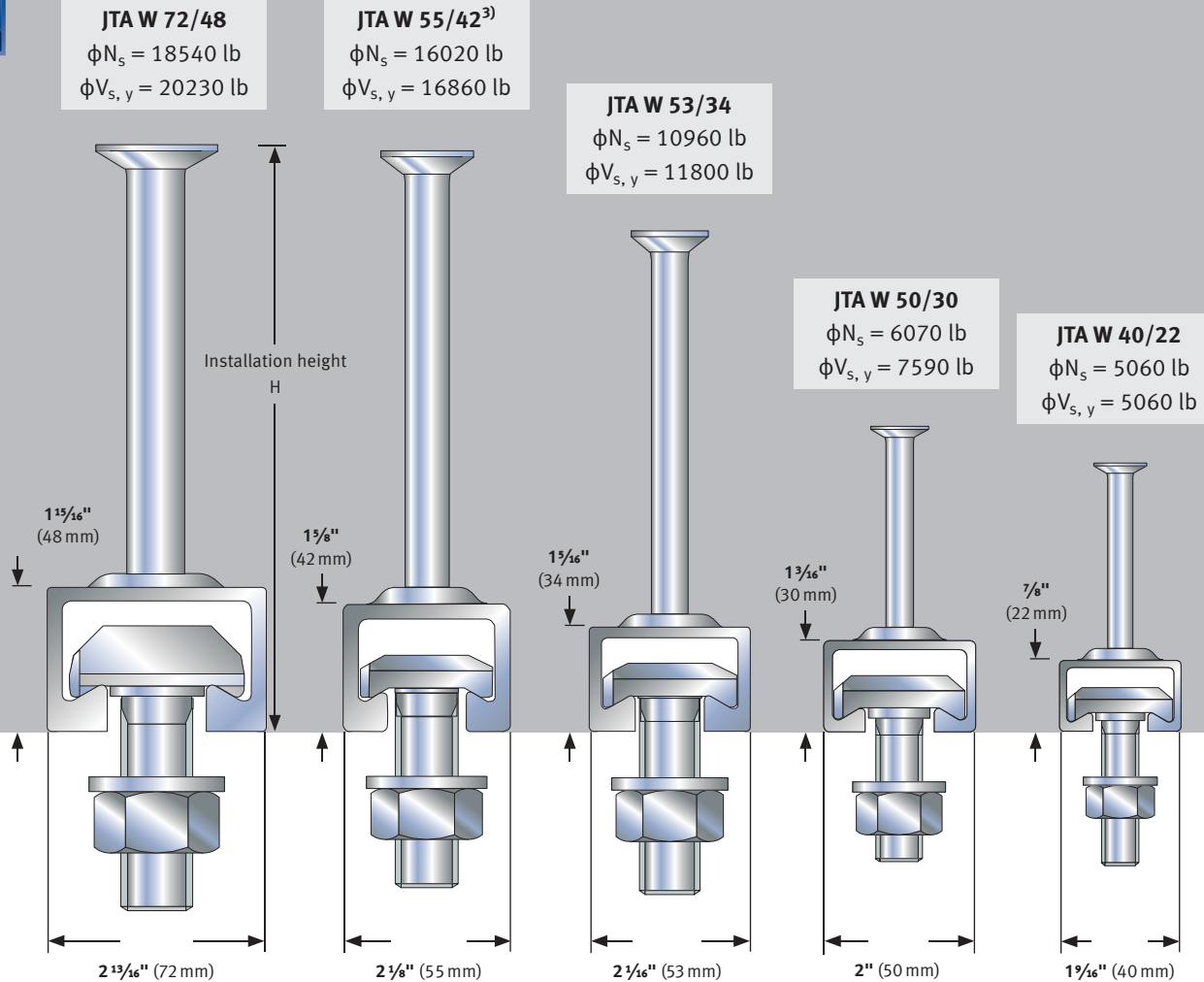
- Cold-formed, round-edged
- Constant material thickness
- Suitable for constant static loads only
- Low weight combined with high static load performance




# JORDAHL® Anchor Channels JTA<sup>1) 2)</sup>

## Hot-Rolled Anchor Channels

ICC-ES ESR-2854



### Min. Edge Distance $c_{\min}$ [in. (mm)]<sup>4)</sup>

6" (150 mm)      4" (100 mm)      4" (100 mm)      3" (75 mm)      2" (50 mm)

### Installation Height H [in. (mm)]

7 3/4" (195 mm)      7 1/2" (190 mm)      6 1/2" (165 mm)      4" (100 mm)      3 1/2" (90 mm)

### T-Bolts

JA	JB	JB	JB	JC
M 20	M 16	M 10	M 10	M 10
M 24	M 20	M 12	M 12	M 12
M 27	M 24 <sup>5)</sup>	M 16	M 16	M 16
M 30		M 20	M 20	

<sup>1)</sup> Profile dimensions may exhibit tolerances.

<sup>2)</sup> Max. design load per point. Individual conditions might reduce the capacity.

<sup>3)</sup> Only in hot-dip galvanized (HDG).

<sup>4)</sup> If minimum distances are used, the load-bearing capacities may be reduced, because the load-bearing capacity of the concrete is the controlling variable. <sup>5)</sup> JB M 24 is equivalent to JE M 24.

#### Material and design of profile

- Hot-dip galvanized steel (HDG)
- Stainless steel (A4, 316)
- Standard filler polyethylene (PE)

#### Material and design of T-bolts

- Electro zinc plated (ZP) or hot-dip galvanized steel (HDG)
- Stainless steel (A4, 316)

## Hot-Rolled Anchor Channels

## Cold-Formed Anchor Channels

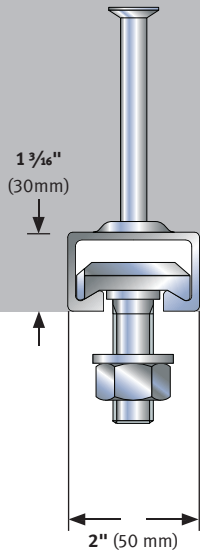
ICC-ES ESR-2854



**NEW!**

### JTA W 50+

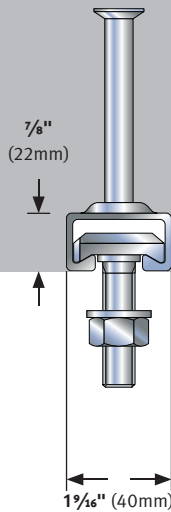
$\phi N_s = 6910$  lb  
 $\phi V_{s,y} = 9950$  lb



**NEW!**

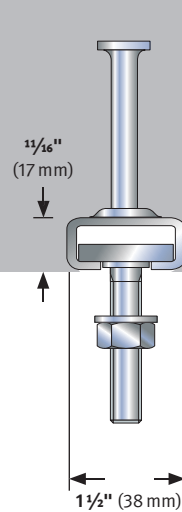
### JTA W 40+

$\phi N_s = 5900$  lb  
 $\phi V_{s,y} = 5900$  lb



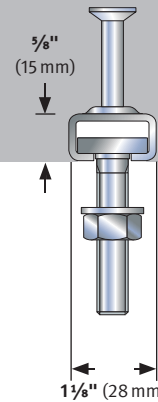
### JTA K 38/17

$\phi N_s = 3030$  lb  
 $\phi V_{s,y} = 3030$  lb



### JTA K 28/15

$\phi N_s = 1520$  lb  
 $\phi V_{s,y} = 1520$  lb



#### Min. Edge Distance $c_{min}$ [mm]<sup>4)</sup>

3" (75 mm)

2" (50 mm)

2" (50 mm)

1 3/16" (40 mm)

#### Installation Height H [mm]

4 1/2" (115 mm)

4" (100 mm)

3 3/8" (80 mm)

2" (50 mm)

#### T-Bolts

JB	JC	JH	JD
M 10	M 10	M 10	M 6
M 12	M 12	M 12	M 8
M 16	M 16	M 16	M 10
M 20			M 12

Approximate conversion 1" = 25 mm.

- $\phi N_s$  = factored nominal tension strength
- $\phi V_s$  = factored nominal shear strength

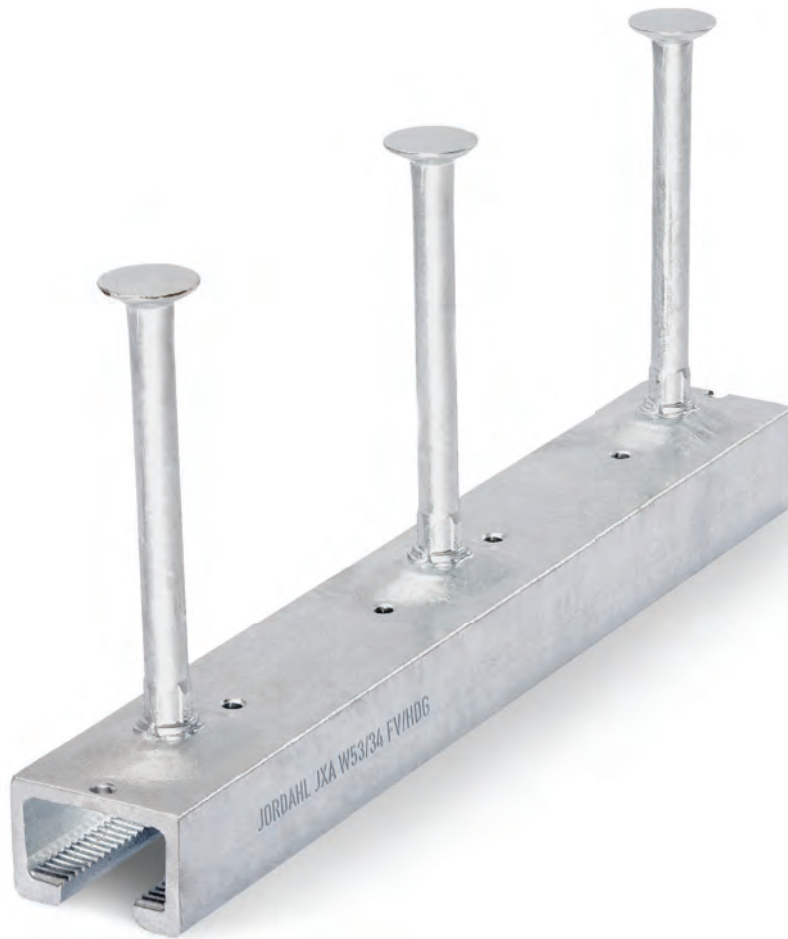


#### JORDAHL Downloads

To plan JORDAHL® anchor channels JTA, we provide convenient and intuitive JORDAHL® EXPERT Design Software. The Software can be downloaded free of charge at [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Software.

# JORDAHL® Anchor Channels

## Toothed Anchor Channels JXA and JXA-PC



ESR-2854

**NEW SEISMIC ICC EVALUATION REPORT!**

JORDAHL® hot-rolled toothed anchor channels and JORDAHL® toothed T-bolts produce a reliable, positive structural connection without slippage. They offer maximum seismic, dynamic and static load capacities in all directions. A comprehensive product range provides a choice of toothed JORDAHL® anchor channels that are suitable for a huge range of fastening requirements.

### Benefits

- Fast, efficient, and adjustable support of large seismic, dynamic or static loads acting in all directions
- Installation without drilling concrete to avoid harmful silica dust on the jobsite
- Installation without welding to avoid damaging sparks or fire on the jobsite
- Easy positioning of connections to compensate for construction tolerances



### Features

- JXA 53/34 and JXA 38/23 are evaluated for high seismic load performance (seismic design categories A-F) in ESR-2854
- Maximum ease of installation for work crews
- Evaluated at category I level by ICC for ease of installation
- Suitable for cracked and un-cracked concrete
- Excellent fire resistant properties and tested performance in fire conditions



ESR-2854

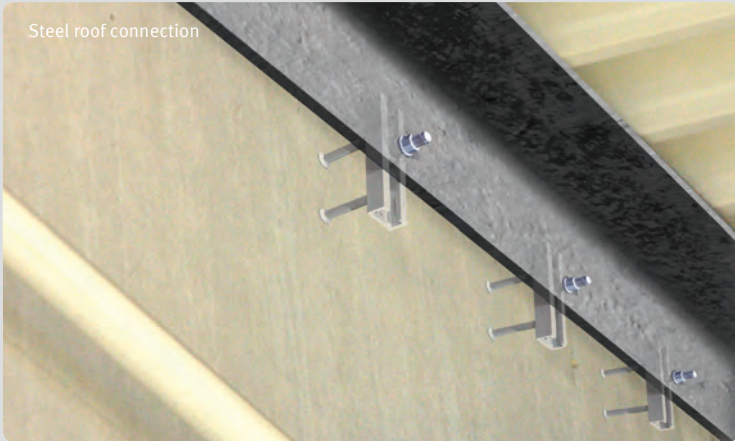




Curtain wall



Light and signalling systems



Steel roof connection

## Fastening Solutions

- Curtain walls
- Overhead lines in tunnels
- Power stations
- Elevator installation
- Light and signaling systems
- Cable support systems
- Pipework
- Precast concrete elements
- Steel to concrete connections requiring vertical adjustment

### Toothed Anchor Channels JXA W – Seismic and Dynamic Load Support in All Directions

- Stress-free hot-rolled steel channel profiles
- Suitable for resisting fatigue connection loosening from seismic, dynamic and impact loads
- Geometry of channel profiles resists high applied bolt torques and prying
- Choice of two profiles evaluated for exceptional seismic performance by ICC Evaluation Report **ESR 2854**



Toothed anchor channels JXA W 53/34 with JORDAHL® toothed T-bolt XB



### Toothed Anchor Channels JXA-PC – for Seismic Loads and Safety-Related Applications

- Special version of hot-rolled JXA toothed anchor channel for exceptional seismic load resistance, in heavily cracked concrete.
- Featuring long anchors with very large diameter head for safe load transfer in wide concrete cracks.
- Also suitable for resisting high fatigue, dynamic and impact loads.

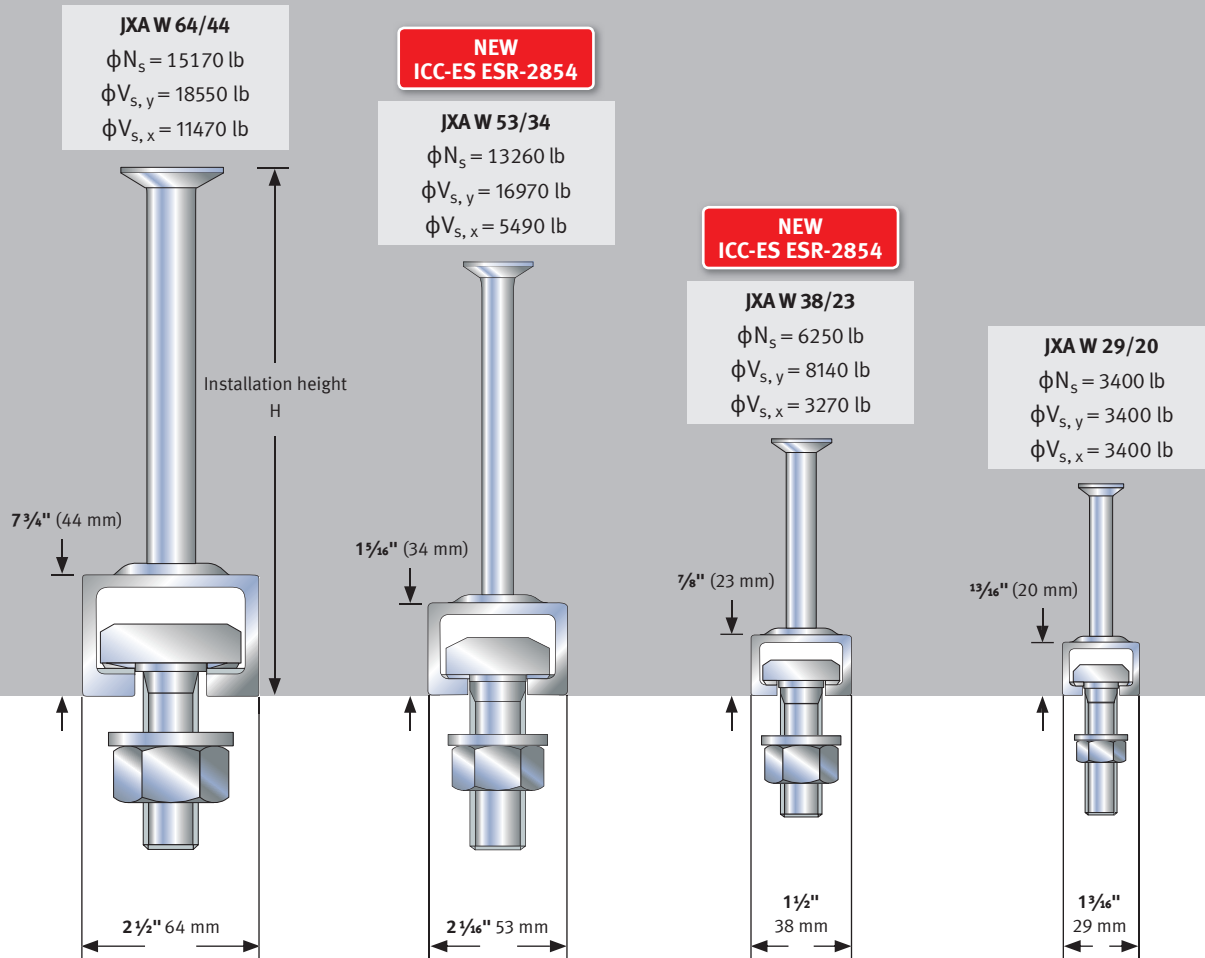


Toothed anchor channels JXA-PC W 53/34 with JORDAHL® toothed T-bolt XB



# Anchor Channels JXA<sup>1) 2) 3)</sup>

## Hot-Rolled Toothed Anchor Channels



Min. Edge Distance $c_{min}$ [in. (mm)] <sup>4)</sup>			
6" (150 mm)	4" (100 mm)	3" (75 mm)	2" (50 mm)
Installation Height H [in. (mm)]			
7 1/2" (190 mm)	6 11/16" (170 mm)	4" (100 mm)	3 11/32" (85 mm)

### Toothed T-Bolts

JXE	JXB	JXH	JXD
M 20	M 16	M 12	M 10
M 24	M 20	M 16	M 12

<sup>1)</sup> Profile dimensions may exhibit tolerances.

<sup>2)</sup> Max. design load per point. Individual conditions might reduce the capacity.

<sup>3)</sup> Stainless steel on request.

<sup>4)</sup> If minimum distances are used, the load-bearing capacities may be reduced, because the load-bearing capacity of the concrete is the controlling variable.

#### Profile Material and Design

- Hot-dip galvanized steel (HDG)
- Standard filling: polyethylene (PE) or polystyrene (PS)

#### T-Bolt Material and Design

- Zinc electroplated (ZP) or hot-dip galvanized steel (HDG)

# Anchor Channels JXA-PC <sup>1) 2)</sup>

## Hot-Rolled Toothed Anchor Channels



### JXA-PC W 64/44

$\phi N_s = 15170$  lb  
 $\phi V_{s,y} = 18550$  lb  
 $\phi V_{s,x} = 11470$  lb

### JXA-PC W 53/34

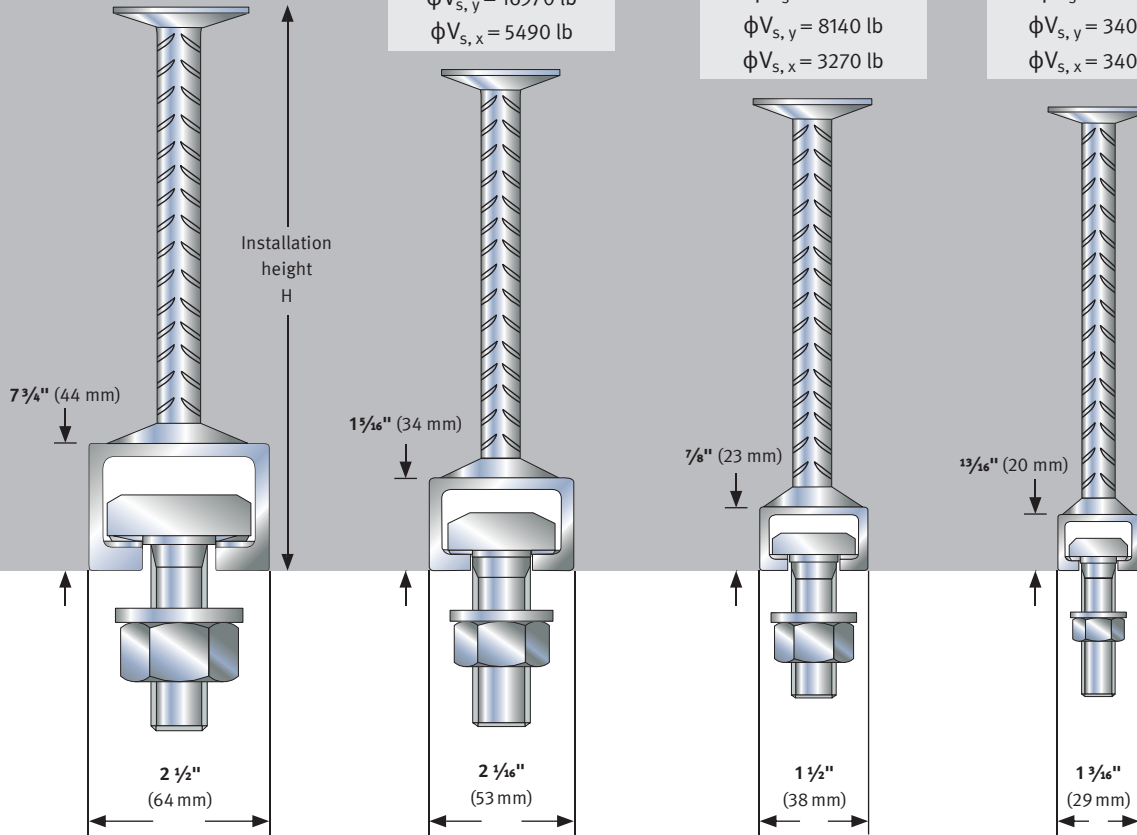
$\phi N_s = 13260$  lb  
 $\phi V_{s,y} = 16970$  lb  
 $\phi V_{s,x} = 5490$  lb

### JXA-PC W 38/23

$\phi N_s = 6250$  lb  
 $\phi V_{s,y} = 8140$  lb  
 $\phi V_{s,x} = 3270$  lb

### JXA-PC W 29/20

$\phi N_s = 3400$  lb  
 $\phi V_{s,y} = 3400$  lb  
 $\phi V_{s,x} = 3400$  lb



### Min. Edge Distance $c_{min}$ [in. (mm)]<sup>4)</sup>

6" (150 mm)	4" (100 mm)	3" (75 mm)	2" (50 mm)
-------------	-------------	------------	------------

### Installation Height H [in. (mm)]

8" (200 mm)	7 3/32" (180 mm)	6 11/16" (170 mm)	6 1/2" (165 mm)
-------------	------------------	-------------------	-----------------

### Toothed T-Bolts

JXE	JXB	JXH	JXD
M 20	M 16	M 12	M 10
M 24	M 20	M 16	M 12

Approximate conversion 1" = 25 mm.

- $\phi N_s$  = factored nominal tension strength
- $\phi V_{s,y}$  = factored nominal shear strength
- $V_{s,x}$  = factored nominal longitudinal strength



### JORDAHL Downloads

To plan JORDAHL® anchor channels JXA, we provide convenient and intuitive JORDAHL® EXPERT Design Software. The software can be downloaded free of charge at [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Software.

## Anchor Channels JTA and JXA

### JORDAHL® EXPERT Software

The software provides a user-friendly and secure way to verify safe anchoring of loads to concrete using JORDAHL® JTA and serrated JXA anchor channels. The user can adjust inputs into the software so that the produced anchoring calculations are specific to the exact

design conditions of the project. This enables the user to optimize the anchoring products selected for each condition both technically and economically. The program is based on the latest IBC and ACI code provisions and allows to design for seismic design categories A through F.

#### Intuitive to use

- Simple data entry and clear structure
- Direct input to the interactive 3D graphic
- Automatically determines loads on T-bolts and channel anchors
- Static and seismic design options
- Input checked immediately via real time updates
- Input comments in pop-up info boxes

#### Optimized design

- Allows project-specific load conditions to be entered
- Positions of connections and dimensions of attached components are simple to optimize for best results
- Clear output with calculation results and quantities of required components

#### Verifiable results

- Simple visual verification of results
- Graphical and text output
- Details of formulas and parameters that have been used



#### JORDAHL Downloads

You can download JORDAHL® EXPERT Software easily and free of charge at [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Software.

### Extra Features

#### Seismic Design

JORDAHL® EXPERT software can provide seismic design calculations for all seismic design categories across the USA. Evaluation of dynamic seismic impact tests on JORDAHL® serrated JXA channels show no reduction of their load resistance performance.

#### Seismic loads

##### Loads

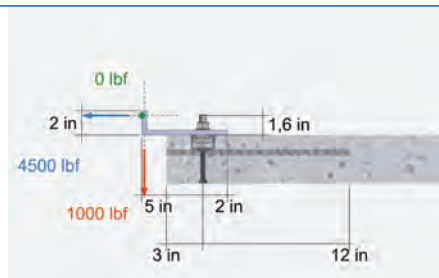
- Ductile yield mechanism (D.3.3.4.3 b and D.3.3.5.3 a)
- Non ductile yield mechanism (D.3.3.4.3 c and D.3.3.5.3 b)
- Load amplification factor  $\Omega$  (D.3.3.4.3 d and D.3.3.5.3 c)

Load distance point from left  $a_x$

Load distance point from below  $a_z$

#### Customized Solutions for High Loads

JORDAHL® EXPERT software provides the engineer with easy tools for the efficient design of customized JORDAHL® cast-in anchor channel products. For connections close to the edge of concrete or for installations on the front face of thin slabs, JORDAHL® JTA & JXA products with welded rebar anchors (RT & RF versions) maximize the efficient transfer of loads into the concrete structure.



Seismic Design acc. ACI 318  
and ICC – ESR 2854 provisions

Abbreviated  
and full printout

Calculation and  
results view

**Bracket**

The load can be entered directly via the bracket to calculate the bolt loads on the anchor channel automatically.

Updates

Language selection

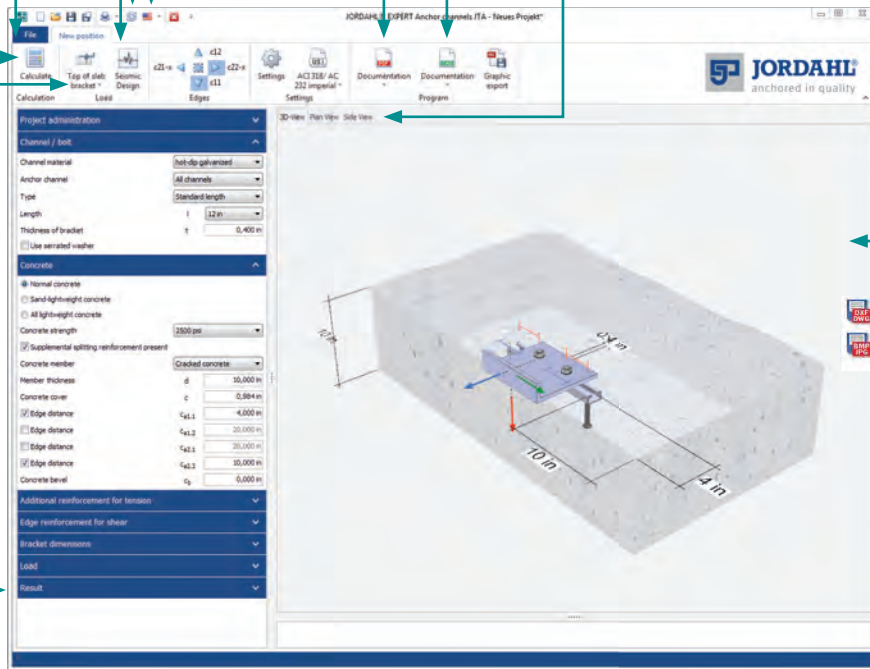
Approvals, design manuals, and catalogs

CAD details of the anchor channels

3D/2D view

**Graphical display**

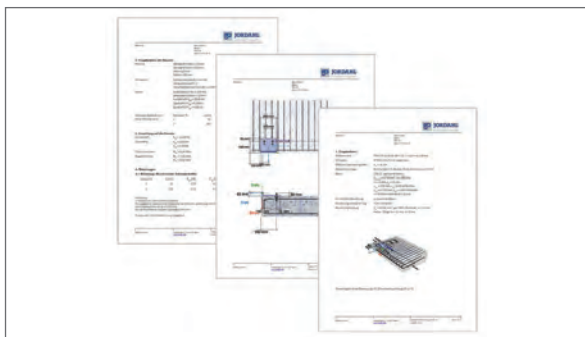
The current input parameters are displayed interactively and clearly in 3D. The view can be rotated, moved, and enlarged intuitively with the mouse.



**Results**

At a glance, the overview provides a summary of the results for all relevant anchor channel possibilities. It is also possible to optimize the anchor channel position here. The design results can be reviewed on the display screen as well as in the form of a printout.

Designation	Maximum utilization	Approval
JTA W 48/22-0350-3A-Iv-CE	104.18 %	ETA/CE
JTA W 58/30-0350-3A-Iv-CE	82.50 %	ETA/CE
JTA W 53/34-0350-3A-Iv-CE	81.89 %	ETA/CE
JTA W 58/42-0350-3A-Iv-CE	77.23 %	ETA/CE
JTA W 72/48-0350-2A-Iv-CE	79.78 %	ETA/CE
JTA RT W 48/22-0350-07-3A-Iv	104.18 %	without Anchor Channel with welded Rebar Tails
JTA RT W 58/30-0350-09-3A-Iv	82.50 %	without Anchor Channel with welded Rebar Tails
JTA RT W 53/34-0350-09-3A-Iv	81.89 %	without Anchor Channel with welded Rebar Tails
JTA K 28/25-0350-3A-Iv-CE	140.00 %	ETA/CE
JTA K 48/25-0350-3A-Iv-CE	146.50 %	ETA/CE
JTA K 58/30-0350-3A-Iv-CE	91.81 %	ETA/CE
JTA K 53/34-0350-3A-Iv-CE	14.00 %	ETA/CE
JTA K 72/48-0350-2A-Iv-CE	79.78 %	ETA/CE



Printout of results: Clearly laid-out design printout with all relevant details for checking.

Detailed results: Product choices, maximum loads, and condition details are shown on the screen for checking and adjustment.



**JORDAHL Advice**

Do you need help in using JORDAHL® EXPERT Software? Just contact our JORDAHL experts by phone at **(800) 363-3266** or by email at [engineering@jordahlusa.com](mailto:engineering@jordahlusa.com).



**JORDAHL service videos**

Find out about the benefits and design options of JORDAHL® EXPERT Software by watching one of our free software tutorials at [www.jordahlusa.com](http://www.jordahlusa.com) → Service.



# Standard Anchor Channel Lengths

## JTA and JXA

JTA W 72 / 48 JTA W 55 / 42		JXA W 64 / 44		JTA W 53 / 34 JXA W 53 / 34 JXA W 38 / 23		JTA W 50+ <sup>1)</sup> JTA W 50 / 30 JTA W 40+ <sup>1)</sup> JTA W 40 / 22		JTA K 38 / 17 JTA K 28 / 15 JXA W 29 / 20 <sup>1)</sup>	
Length in. (mm)	No. of Anchors	Length in. (mm)	No. of Anchors	Length in. (mm)	No. of Anchors	Length in. (mm)	No. of Anchors	Length in. (mm)	No. of Anchors
6 (150)	2	6 (150)	2	6 (150)	2	6 (150)	2	4 (100)	2
8 (200)	2	8 (200)	2	8 (200)	2	8 (200)	2	6 (150)	2
10 (250)	2	10 (250)	2	10 (250)	2	10 (250)	2	8 (200)	2
12 (300)	2	12 (300)	2	12 (300)	2	12 (300)	2	10 (250)	2
14 (350)	2	14 (350)	3	14 (350)	3	14 (350)	3	12 (300)	3
16 (400)	3	16 (400)	3	16 (400)	3	16 (400)	3	14 (350)	3
22 (550)	3	22 (550)	3	22 (550)	3	22 (550)	3	18 (450)	3
36 (900)	4	36 (900)	5	32 (800)	4	32 (800)	4	22 (550)	4
240 (6000)	21	240 (6000)	25	42 (1050)	5	42 (1050)	5	32 (800)	5
				240 (6000)	25	120 (3000)	13	42 (1050)	6
						240 (6000)	25	120 (3000)	16
								240 (6000)	31

Spacing of anchors ≤ 12 in. (300 mm)	Spacing of anchors ≤ 10 in. (250 mm)	Spacing of anchors ≤ 10 in. (250 mm)	Spacing of anchors ≤ 10 in. (250 mm)	Spacing of anchors ≤ 8 in. (200 mm)
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<sup>1)</sup> only in hot-dip galvanized (HDG)  
Approximate conversion 1" = 25 mm



### Material and Design of Profile

- Hot-dip galvanized steel (HDG)
- Stainless steel A4 (316)
- Standard filler polyethylene (PE) or polystyrene (PS)

### Ordering Example Anchor Channels JTA

Type	Profile Size	Channel Length mm	Anchor	Material
JTA W	50 / 30	– 300	– 2A	– HDG

### Ordering Example of Anchor Channels JXA

Type	Profile Size	Channel Length mm	Anchor	Material
JXA W	38 / 23	– 300	– 2A	– HDG

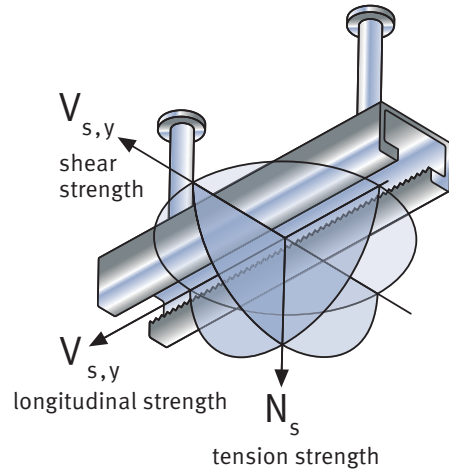
## Seismic Load Capacity

JORDAHL® hot-rolled toothed anchor channels have been tested under seismic loading cracked concrete according to the provisions given in AC232. The channels can take tensile, shear and longitudinal seismic loads. The design is based on ACI 318-14.



The results of an extensive seismic test program revealed that JORDAHL® hot-rolled toothed channels can bear seismic loads in all 3 directions without any load reduction from static capacities ( $\alpha_{seis} = 1.0$  for tensile, shear and longitudinal loads).

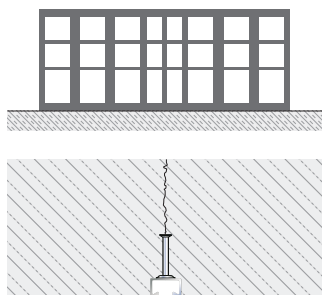
JORDAHL® hot-rolled toothed channels JXA and their matching toothed T-bolts achieve the highest installation safety category 1. This shows the products have the highest reliability in both installation and performance even when subjected to seismic loads.



Performing seismic calculations according to American Concrete Institute (ACI) 318-14, design methods is simplified using JORDAHL® Expert Software. Various approaches for the calculation of seismic conditions help to calculate performance capacities. Simply select seismic design and choose one of the approaches for the calculation according to (ACI) 318-14. Select either ductile yield mechanism, non ductile yield mechanism or load amplification factor to get the seismic design of the channel connection for all seismic levels and design categories.

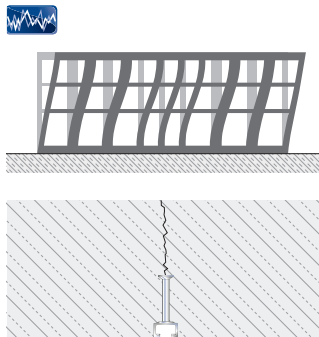
## Seismic Level

### None/Low Seismicity



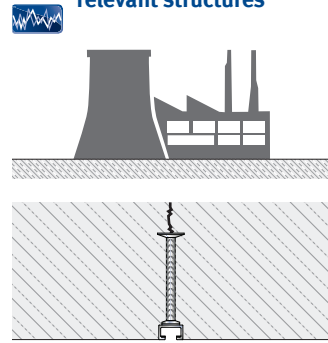
Anchor Channel JTA W

### Medium Seismicity



Anchor Channel JXA-W

### High Seismicity/Safety relevant structures



Anchor Channel JXA-PC W

# JORDAHL® Anchor Channels

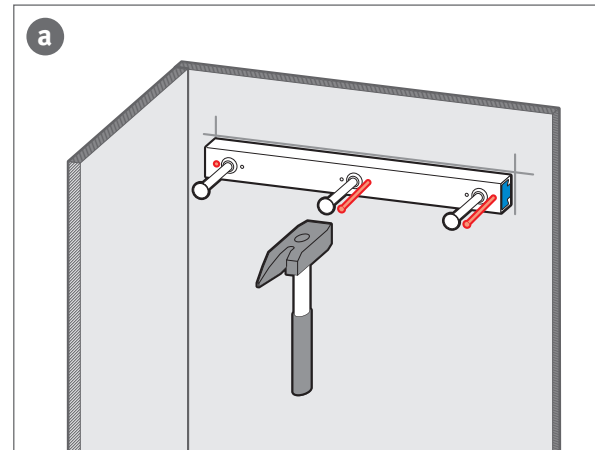
## Installation Instructions

JORDAHL supplies anchor channels in all required lengths. They are filled with polyethylene (PE) foam to prevent wet concrete from entering the profile. The foam can be removed with ease after pouring concrete.

### 1. Securing channels in position (a)

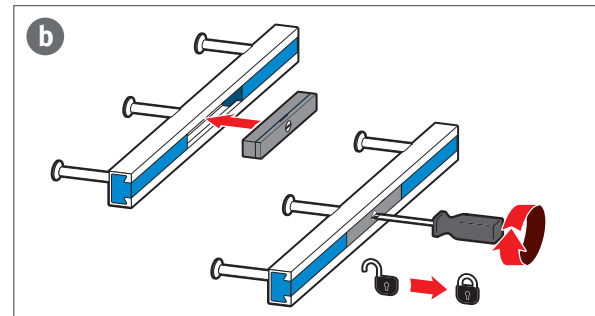
Before the concrete is poured, JORDAHL® anchor channels are located according to the reinforcement and formwork drawings. To prevent displacement, the channels are secured:

- for timber formwork (a) by nailing through the nail holes on the rear of the channel profile,
- by using magnets (b) for steel formwork, or by either gluing with hot-melt adhesive, or alternatively connecting with JORDAHL® T-bolts
- on the top side of a concrete slab, by securely fastening the anchors to the reinforcement or side formwork. When the channel can be positioned using special spacers that are attached to the anchors by spot welds. Please contact us for details.



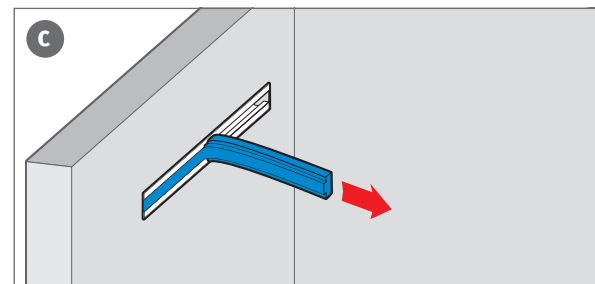
### 2. Concrete (b)

Once the anchor channels have been attached to the formwork, the concrete can be poured. The concrete must be compacted properly around the channel and the anchors.



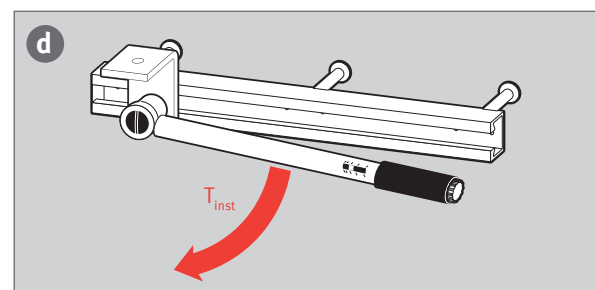
### 3. Removing the foam filling (c)

After the concrete has hardened, the formwork is removed. The anchor channel face should be flush with the concrete. The foam filling can be easily removed with a hammer or another tool.



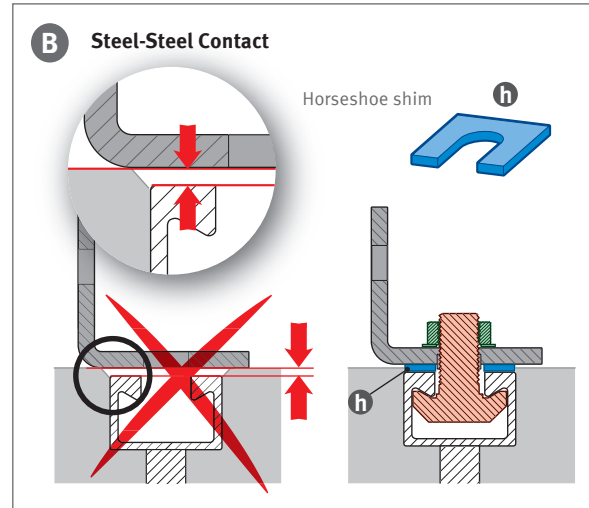
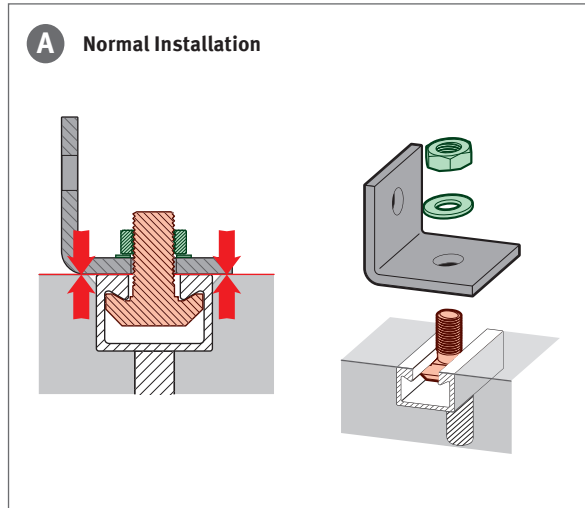
### 4. T-bolt installation (d)

JORDAHL® T-bolts can now be used at any point in the slot of the anchor channel. They are locked by a 90° rotation and tightened to the applicable tightening torque (see table). The notch on the bolt shank must be at a right angle to the direction of the channels (see "Checking T-Bolt Installation", p. 35).






## Installation



A defined contact must be produced between channel and attached component.

## Tightening Torque $T_{inst}$ ft.- lbs. [Nm]

Type	T-Bolt Thread $\varnothing$	Normal Installation <b>A</b>	Steel-Steel Contact <b>B</b>	
			Material	
		<b>4.6, 8.8, A4-50, HC-50, A4-70, HC-70, F4-70, L4-70 Ft. lbs. (Nm)</b>	<b>8.8 Ft. lbs. (Nm)</b>	<b>A4-70, HC-70, F4-70, L4-70 Ft. lbs. (Nm)</b>
JD	M6	1.8 (2.5)	2.2 (3)	–
JD	M8	5.1 (7)	15 (20)	11 (15)
JB, JC, JH, JD	M10	9.6 (13) <sup>1)</sup> , 11 (15)	29 (40)	22 (30)
JXD		–	29 (40)	22 (30)
JB, JC, JH, JD	M12	11 (15) <sup>1)</sup> , 18 (25)	51 (70)	37 (50)
JXD, JXH		–	52 (70)	52 (70)
JB, JC, JH,	M16	22 (30) <sup>2)3)</sup> , 40 (55) <sup>4)</sup>	133 (180)	96 (130)
JKB, JKC		–	150 (203)	–
JXB, JXH		–	133 (-180)	133 (180)
JKB	M20	–	300 (407)	300 (407)
JA, JB		–	265 (360)	184 (250)
JXB, JXE		–	265 (360)	265 (360)
JA, JB, JE	M24	133 (180), 147 (200) <sup>6)</sup>	457 (620)	–
JXE		–	337 (450)	–
JA	M27	220 (300)	675 (900)	–
JA	M30	255 (345)	900 (1200)	–

<sup>1)</sup> JD.

<sup>2)</sup> JH.

<sup>3)</sup> JC.

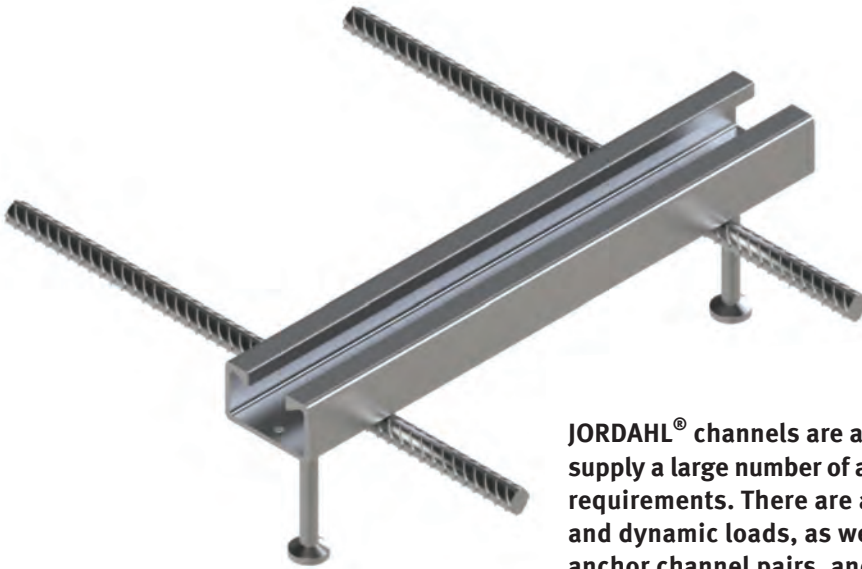
<sup>4)</sup> JB.

<sup>5)</sup> JB in W 50/30; W 50+.

<sup>6)</sup> JA.

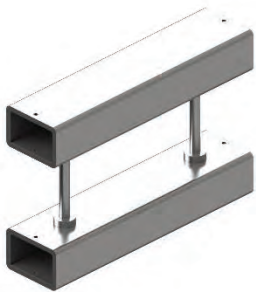
# JORDAHL® Anchor Channels

## Customized Solutions

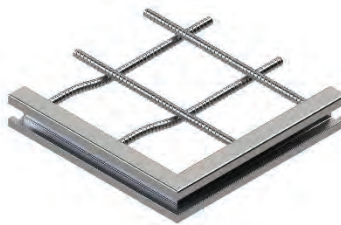


JORDAHL® channels are as varied as your applications. We therefore supply a large number of anchor channels for very specific fastening requirements. There are anchor channels for extremely high static and dynamic loads, as well as anchor channel corner pieces, anchor channel pairs, and curved anchor channels that can be used in tunnel construction, for example.

To fasten handrails and facades, we also supply hot-rolled and cold-formed channels. Channels with welded-on reinforcing bars are suitable for high-transverse loads and reduced edge distances, as well as small concrete depths. With the right T-bolts, our custom solutions provide rapid and secure fastening solutions – even for your very specific applications.



Steel Tubes



Anchor Channel Corner



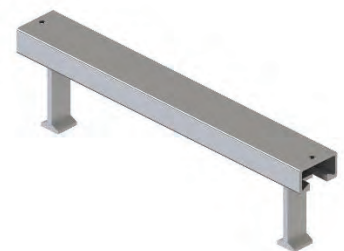
Anchor Channels Pair



Stacked Channels JTB



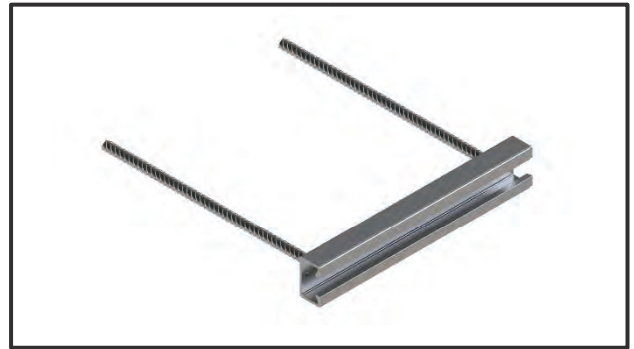
Curved Anchor Channels



Reverse Anchor Channel

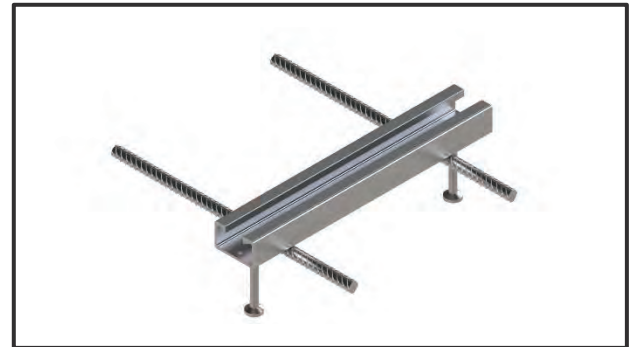
## Face of Slab Anchoring

JORDAHL® JTA-RF anchor channels guarantee secure fastening of railing posts, facades and other components on the face side of thin concrete slabs. Special short lengths of anchor channels with long rebar anchors are set directly into the slab and connected to using JORDAHL® T-bolts, washers and nuts.



## Anchor Channel with Rebar

For applications with high shear loads and reduced edge distances JORDAHL® JTA-RT anchor channels with rebar tails offer high anchorage capacity for curtain wall applications.



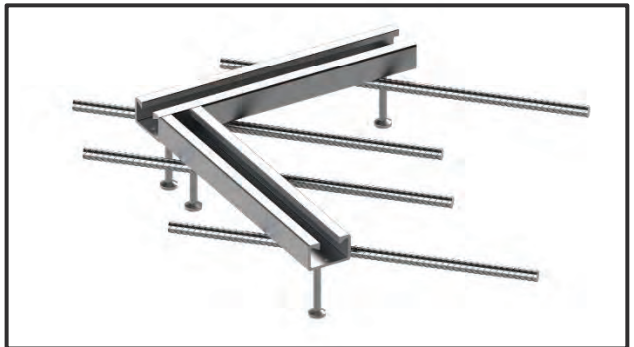
## Stacked Anchor Channel

Stacked Anchor Channels are used for placement in floor to ceiling connection applications which are common in Window Wall. Rebar Spacers are used to set the vertical spacing equal to the slab thickness. Stacking reduces placement time and ensures anchor channels are set level to the concrete slab surface. Offset stacking can also be accommodated.



## Anchor Channel Corner

Anchor channel corner pieces are typically used in facade applications. The channel assembly is used at building corners to efficiently transfer loads from the facade into the concrete structure. In addition to standard corner pieces, special designs can also be supplied on request.



## Blockout Pans

Blockout Pans are used to form a pocket recess at the top of the concrete at the slab edge. JORDAHL® supplies Blockout Assemblies that include the anchor channel and T-Bolts, a sheet metal pan with foam block and aluminum floor anchor and washers. The assembly reduces installation time and ensures correct placement of the anchor channel for edge distance and elevation.



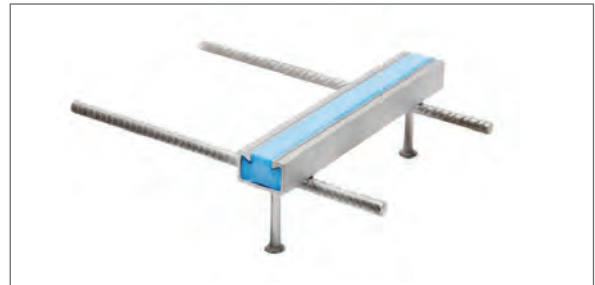
## Anchor Channels JTA-RF and JTA-RT

JORDAHL® channels JTA-RF and JTA-RT are designed to transfer high shear and tension loads into thin concrete elements. They are a perfect solution for fastening heavy curtain wall elements or other components to thin concrete floor slabs. JTA-RT channels are used for connections to the top of the floor slab and JTA-RF

channels are used for connections to the front face of slabs. Both types are particularly suitable for conditions where connections must occur close to the edge of the concrete. The length of the channels and the number of anchors can be adjusted to the specific requirements of the project.

### Features

- High load capacities in thin concrete elements
- Connections can be adjusted in the channel parallel to the slab edge for rapid facade installation and to compensate for design tolerances
- Dimensions of attached brackets can be reduced due to small edge distance
- Suitable for tall buildings with extremely high wind loads
- Low installation height helps installation both in top of slab bracket recesses, and also for filigree prestressed concrete slabs
- Hot-rolled channel profiles resist dynamic wind and other loads over millions of cycles. Also suitable for heavy seismic loading



Rebar Tails Top of Slab (JTA-RT)



Rebar Tails Face of Slab (JTA-RF)

### JTA-RF product range

JTA-RF Anchor Channel with Rebar Anchors	Profile	Anchor Ø	Rebar Length in. (mm)
	JTA-RF W 40/22	#3 (10)	12" (300)
	JTA-RF W 50/30	#4 (12)	12" (300)
	JTA-RF W 53/34	#4 (12)	20" (500)

### Ordering Example for Facade Connection Channels

Type	Profile	Length [in. (mm)]	# Of Rebar Anchors	Material
JTA-RF	W 50/30	12" (300)	2R	HDG

### Material and Design

- Hot-dip galvanized steel (HDG) for interior applications
- Stainless steel (A4) for exterior applications, with efficient corrosion protection
- Standard filling: polyethylene (PE)

## Anchor Channels JTA-RF and JTA-RT

### JTA-RT product range

JTA-RT Anchor Channels with Rebar Tails	Profile	Variant	Profile Length in. (mm)	c in. (mm)	l in. (mm)
	JTA-RT W 40/22 Installation Height H = 3 1/2" (90 mm)	1	6"-22" (150 - 550)	2" (50)	14" (350)
		2		3" (75)	15" (375)
		3		4" (100)	16" (400)
		4		5" (125)	17" (425)
		5		6" (150)	18" (450)
		6		7" (175)	19" (475)
		7		8" (200)	20" (500)
	JTA-RT W 50/30 Installation Height H = 4" (100 mm)	1	6"-22" (150 - 550)	3" (75)	15" (375)
		2		4" (100)	16" (400)
		3		5" (125)	17" (425)
		4		6" (150)	18" (450)
		5		7" (175)	19" (475)
		6		8" (200)	20" (500)
	JTA-RT W 53/34 Installation Height H = 6 1/16" (170 mm)	1	6"-22" (150 - 550)	4" (100)	16" (400)
		2		5" (125)	17" (425)
		3		6" (150)	18" (450)
		4		7" (175)	19" (475)
		5		8" (200)	20" (500)

### Ordering Example for JTA-RT

Type	Profile	Length mm	Variant	# Of Round Anchors	Material
JTA-RT	W 40/22	300	01	2A	HDG



#### JORDAHL Downloads

To design JORDAHL® anchor channels JTA-RF and JTA-RT, we provide convenient and intuitive JORDAHL® EXPERT Design Software. The software can be downloaded free of charge at [www.jordahlusa.com](http://www.jordahlusa.com). → Downloads → Software.

# JORDAHL® Mounting Channels

## Mounting Channels JM, JXM, and JZM



**JORDAHL® mounting channels provide maximum reliability and versatility: Combined with the matching JORDAHL® T-bolts, they create a reliable and adjustable connection that can be adapted at any time to meet new support and fastening requirements. Mounting channels can either be welded or bolted to supporting structures.**

### Extensive Benefits

- Quick replacement, refitting, and adjustment of attached components
- Provide economies due to shorter design and installation times of attached components
- Versatile positioning of connections and easy location adjustment with the use of simple wrench
- Connection locations can easily compensate for construction tolerances; standard connection layouts can easily be changed
- Fast disassembly of attached components
- Complete 2D and 3D CAD models available to download free of charge at [www.deconusa.com](http://www.deconusa.com)



### Powerful Features

- Suitable for medium duty and heavy load applications
- Variable connection locations and easy adjustment in the longitudinal direction of the channel
- Channels available in lengths of up to 19'-8" (6 meter)
- Available in mill finish steel (black), hot-dip galvanized steel (HDG), and stainless steel A4 / 316 for efficient corrosion protection
- Curved mounting channels, back-to-back profiles, and slotted back mounting channels available on request



Vehicle construction



Ship building industry



Elevator doors fastened in lattice girder shaft

## Fastening Solutions

- Rail vehicles
- Ship building
- Tunnel construction
- Power station construction
- Elevator installation
- Vehicle construction
- Machinery and plant building
- Steel and industrial construction
- Energy and building technology

## Hot-Rolled Mounting Channels JM W and JXM W

- Suitable for supporting tension and shear loads acting in all directions relative to the channel axis
- Hot-rolled toothed channels JXM W also offer enhanced load capacity in the longitudinal direction of the channel
- Highly ductile hot-rolled material suitable for welding and high dynamic loading



JM W



JXM W

## Cold-Formed Mounting Channels JM K

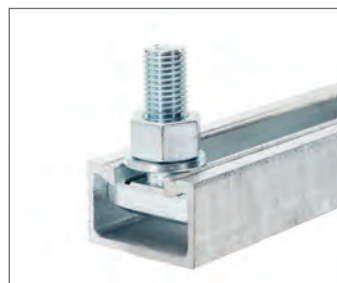
- Cold-formed channels JM K are suitable for supporting tension and shear load at right angles to the channel axis
- Cold-formed constant material thickness
- Suitable for regular static loads but not dynamic applications
- Low weight and good load capacity
- Typically used for easy fastening of mechanical and electrical services, such as cable trays and air-conditioning ducts



JM K

# JORDAHL® Mounting Channels

JORDAHL® mounting channels and JORDAHL® T-bolts provide a versatile and reliable connection system that is capable of adaptation to new load and connection location requirements at any time. Mounting channels can be welded to steel structures; bolted to the surface of other substrates; or bolted together to form independent support structures.



## Advantages

- Rapid replacement, retrofitting and movement of components
- No templates, hole patterns or on-site welding necessary
- Less time required for connection design and installation
- Versatile positioning of connections and easy location adjustment with simple twist-in T-bolts
- Connection locations can easily compensate for construction tolerances and standard connection layouts can easily be changed
- Rapid disassembly of components

## Technical Details

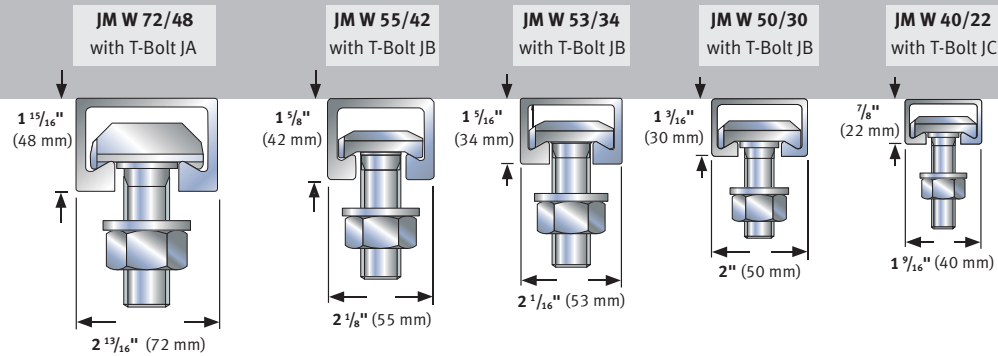
Profile	Weight <sup>1)</sup> G ft · lb	Cross section properties							Material strength	
		Area A in. <sup>2</sup>	Center of gravity e in.	Moments of inertia		Moments of resistance			Yield strength f <sub>y</sub> psi	Tensile strength f <sub>u</sub> psi
				l <sub>y</sub> in. <sup>4</sup>	l <sub>z</sub> in. <sup>4</sup>	S <sub>y</sub> in. <sup>3</sup>	S <sub>z</sub> in. <sup>3</sup>	Z <sub>y,pl</sub> in. <sup>3</sup>		
<b>Hot-rolled channels – JTA W</b>										
JM W 72 / 48	5.940	1.747	0.945	0.840	2.001	0.889	1.411	1.116	34080	56560
JM W 55 / 42	4.543	1.335	0.870	0.450	0.871	0.518	0.812	0.715	39890	60920
JM W 53 / 34	3.346	0.983	0.685	0.224	0.569	0.326	0.551	0.438	34080	52210
JM W 50 / 30	2.170	0.639	0.630	0.125	0.334	0.198	0.346	0.265	34080	52210
JM W 40 / 22	1.411	0.415	0.480	0.047	0.141	0.099	0.181	0.131	36260	55110
<b>Cold-formed channels – JTA K</b>										
JM K 38 / 17	1.216	0.357	0.409	0.020	0.103	0.050	0.138	0.076	34080	52210
JM K 28 / 15	0.732	0.215	0.350	0.010	0.035	0.028	0.063	0.041	34080	52210
<b>Toothed channels – JXA</b>										
JXM W 64 / 44	4.83	1.419	0.902	0.58	1.302	0.642	1.034	0.842	50760	62360
JXM W 53 / 34	3.125	0.92	0.728	0.222	0.557	0.305	0.534	0.418	50760	65270
JXM W 38 / 23	1.626	0.477	0.524	0.050	0.147	0.096	0.196	0.140	50760	65270
JXM W 29 / 20	1.040	0.305	0.441	0.024	0.057	0.055	0.100	0.078	50760	65270

<sup>1)</sup> All weights per foot for mill finish steel. For galvanized profiles: weights per foot × 1.10. For A4 profiles: weights per foot × 1.02.

<sup>2)</sup> The bolt load bearing capacity and the maximum point load bearing capacity must be noted. The respective lower value controls.



## Hot-Rolled Mounting Channels JM W

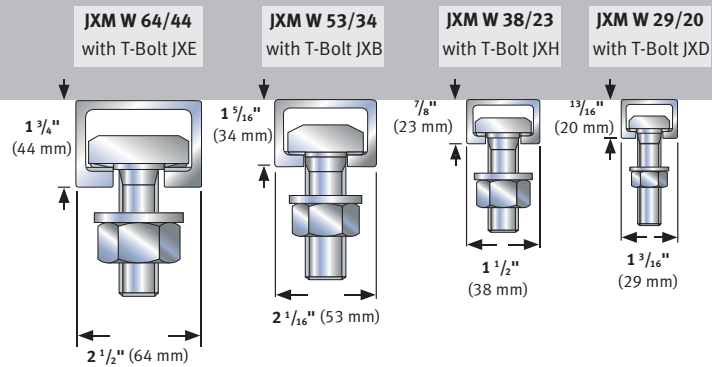


### T-Bolts

JA	JB	JB	JB	JC
M 20	M 16	M 10	M 10	M 10
M 24	M 20	M 12	M 12	M 12
M 27	M 24 <sup>1)</sup>	M 16	M 16	M 16
M 30		M 20	M 20	

<sup>1)</sup> JB M 24 is equivalent to JE M 24

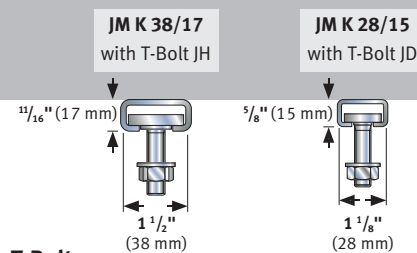
## Hot-Rolled Toothed Mounting Channels JXM W



### Toothed T-Bolts

JXE	JXB	JXH	JXD
M 20	M 16	M 12	M 10
M 24	M 20	M 16	M 12

## Cold-Formed Mounting Channels JM K



### T-Bolts

JH	JD
M 10	M 6
M 12	M 8
M 16	M 10
	M 12

# JORDAHL® T-Bolts



All JORDAHL® T-bolts are purpose made to ensure reliable and accurate connection with the range of JORDAHL® channels. The T-bolts face enter into the channel profiles and rotate 90 degrees to safely lock in position. Lines on the end of the T-bolts indicate the head position for easy checking after installation.

## JORDAHL® Hook-Head T-Bolts

JORDAHL® hook-head T-bolts are used with JORDAHL's medium and heavy duty JTA and JM range of hot-rolled and cold-formed channels. Together with JTA anchor channels they form a vital part of the JORDAHL® concrete anchoring system evaluated by **ICC-ES ESR-2854**.



## JORDAHL® Hammer-Head T-Bolts

JORDAHL® hammer-head T-bolts are used with JORDAHL's light duty JTA and JM range of cold-formed channels. Together with JTA anchor channels they form a vital part of the JORDAHL® concrete anchoring system evaluated by **ICC-ES ESR-2854**.



## JORDAHL® Toothed T-Bolts

JORDAHL® toothed T-bolts are used with JORDAHL's JXA-W and JXM-W range of hot-rolled channels. Together with JXA and JXM anchor channels they form a vital part of the JORDAHL® concrete anchoring system for seismic and high longitudinal loads evaluated by **ICC-ES ESR-2854**.



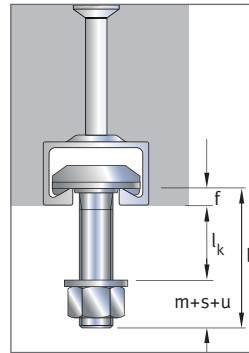
## JORDAHL® Double-Notch Toothed T-Bolts

JORDAHL® double-notch toothed T-bolts are used with hot-rolled smooth JORDAHL® channels. When the T-bolts are tightened, their teeth bite into the channel lips to create a positive, non-slip connection to resist longitudinal loads. It is therefore possible to transmit force with plain hot-rolled JORDAHL® channels in all directions.



## Determining the T-Bolt Length

T-bolt	Total m + s + u [in. (mm)]
M 6	3/8" (8.8)
M 8	7/16" (11.3)
M 10	9/16" (13.9)
M 12	11/16" (17.3)
M 16	7/8" (21.8)
M 20	1 1/16" (27.0)
M 24	1 9/32" (32.5)
M 27	1" (35.8)
M 30	1 1/2" (38.6)



- l = T-bolt length
- l<sub>k</sub> = Clamping length (thickness of the attached component)
- f = Profile lip
- m = Nut height ISO 4032
- s = Washer thickness ISO 7093-1
- u = T-bolt projection ISO 4753

### Profile Lip Thickness f in. (mm)

Profile	f
W 72/48	5/8 (15.5)
W 55/42	1/2 (12,9)
W 53/34	7/16 (11,5)
W 50+	5/16 (8)
W 50/30	5/16 (8)
W 40+	3/4 (6)
W 40/22	3/4 (6)

Profile	f
K 38/17	1/8 (3)
K 28/15	3/32 (2,3)

Profile	f
XW 64/44	3/8 (10)
XW 53/34	5/16 (7,5)
XW 38/23	7/32 (5,5)
XW 29/20	13/64 (5)

**Required T-bolt length (l) = l<sub>k</sub> + f + (m+s+u)**

The T-bolts are supplied with nuts. Washers must be ordered separately (see page 44).

### Example

Checking T-bolt length required for connecting a 2-5/8" thick component to JORDAHL® anchor channel JTA-W 53/34, using T-bolt type JB M16

Channel lip thickness f = 7/16" (0.44")

Clamping length needed l<sub>k</sub> = 2-5/8" (2.63")

m+s+u dimension for M16 = 7/8" (0.88")

**Therefore minimum required T-bolt length**

$$l = 0.44" + 2.63 + 0.88" = 3.95"$$

**Select T-bolt with length greater than**

$$3.95" = \text{JB M } 16 \times 4" (100\text{mm})$$

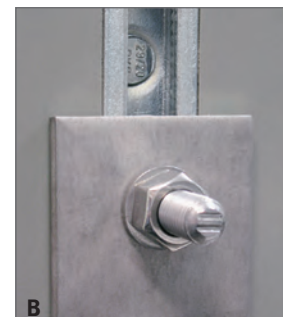
**If shims will be needed behind the component add their thickness to the calculation. When shimming always get guidance from the responsible engineer regarding maximum shimming thickness allowed in case bolt bending is a consideration,**

## Checking T-Bolt Installation

Hook-head and hammer-head T-bolts are identified by **one pressed line (A)** on the end of the bolt shank.

Toothed bolts and double-notched toothed T-bolts are identified by **two pressed lines (B)** on the end of the bolt shank.

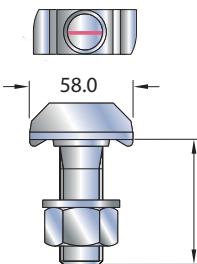
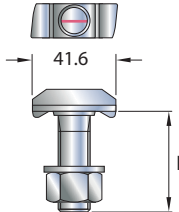
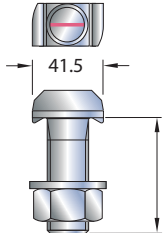
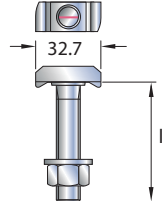
Following installation, the pressed line(s) must be at right angles to the longitudinal direction of the channel! This is a visual indication of correct engagement between the T-bolt and the lips of the anchor channel.



# Hook-Head and Hammer-Head T-Bolts

ICC-ES ESR-2854

## Range of Hook-Head T-Bolts

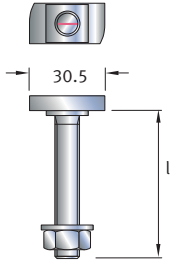
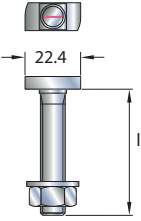
W 72/48 <sup>3)</sup>				W 55/42, W 53/34, W 50+, W 50/30 <sup>3)</sup>						W 55/42 <sup>3)</sup>		W 40+, W 40/22 <sup>3)</sup>		
T-Bolt Type JA				T-Bolt Type JB			T-Bolt Type JE <sup>2)</sup>			T-Bolt Type JC				
														
Length l in. (mm)	M 20	M 24	M 27 M 30	Length l in. (mm)	M 10	M 12	M 16	Length l in. (mm)	M 20	M 24 <sup>2)</sup>	Length l in. (mm)	M 10	M 12	M 16
2 (50)	4.6 HDG 8.8 HDG	4.6 HDG A4-50		1 3/16 (30)	4.6 ZP A4-50	4.6 HDG 4.6 ZP A4-50	4.6 ZP A4-50	1 3/8 (35)	4.6 ZP 8.8 ZP A4-50		1 3/16 (30)	4.6 ZP A4-50	4.6 ZP A4-50	4.6 ZP A4-50
2 3/8 (60)	8.8 HDG			1 1/2 (40)	4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP A4-50	1 3/4 (45)	4.6 HDG 4.6 ZP 8.8 ZP A4-50		1 1/2 (40)	4.6 HDG 4.6 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70
3 (75)	4.6 HDG 8.8 HDG	4.6 HDG 8.8 HDG	4.6 HDG	2 (50)	4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	2 1/4 (55)	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70		2 (50)	4.6 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70
4 (100)	4.6 HDG 8.8 HDG 4.6 ZP	4.6 HDG 8.8 HDG A4-50	4.6 HDG	2 3/8 (60)	4.6 HDG 8.8 HDG 4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	2 3/8 (60)		4.6 ZP	2 3/8 (60)	4.6 HDG 4.6 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70
5 (125)	8.8 HDG			2 9/16 (65)	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP			2 9/16 (65)	A4-50		3 1/4 (80)	4.6 HDG 4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70
6 (150)	4.6 HDG 8.8 HDG 4.6 ZP	8.8 HDG 4.6 ZP A4-50 F4-70	4.6 ZP <sup>1)</sup>	3 1/4 (80)	4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	3 (75)	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 4.6 ZP	4 (100)	4.6 HDG 4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50
8 (200)	4.6 HDG	4.6 HDG 8.8 HDG	4.6 HDG <sup>1)</sup>	4 (100)	4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	4.6 HDG 8.8 HDG 4.6 ZP A4-50 F4-70	3 1/4 (80)	F4-70		5 (125)		8.8 HDG 4.6 ZP 8.8 ZP	8.8 HDG 4.6 ZP 8.8 ZP
				5 (125)		4.6 HDG 4.6 ZP 8.8 ZP A4-50	8.8 HDG 4.6 ZP 8.8 ZP A4-50	4 (100)	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	4.6 HDG	6 (150)		8.8 HDG 4.6 ZP 8.8 ZP A4-50	8.8 HDG 4.6 ZP 8.8 ZP A4-50
				6 (150)		4.6 ZP	4.6 HDG 4.6 ZP A4-50	5 (125)	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50		8 (200)		8.8 HDG 4.6 ZP 8.8 ZP	8.8 HDG 4.6 ZP A4-50
				8 (200)		8.8 HDG 4.6 ZP	4.6 ZP A4-50	6 (150)	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 F4-70	8.8 ZP	10 (250)			4.6 ZP
				12 (300)		4.6 ZP	4.6 ZP	8 (200)	4.6 HDG 4.6 ZP		12 (300)			4.6 ZP
								12 (300)	4.6 ZP					

<sup>1)</sup> Not available as JA M 27.

<sup>2)</sup> JB M 24 is equivalent to JE M 24.

<sup>3)</sup> Matching channel profile(s) for T-bolt type below.

## Range of Hammer-Head T-Bolts

K 38/17 <sup>3)</sup>				K 28/15 <sup>3)</sup>				
T-Bolt Type JH				T-Bolt Type JD				
								
Length l in. (mm)	M 10	M 12	M 16	Length l in. (mm)	M 6	M 8	M 10	M 12
¾ (20)	4.6 HDG 4.6 ZP	4.6 ZP	4.6 ZP	½ (15)	4.6 ZP	4.6 ZP	4.6 ZP	4.6 ZP
1 (25)		4.6 ZP A4-50 A4-70	A4-50	¾ (20)	4.6 ZP	4.6 ZP	4.6 ZP	
1 ⅜ (30)	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 8.8 HDG 4.6 ZP 8.8 ZP A4-50 A4-70	8.8 HDG 4.6 ZP 8.8 ZP A4-50	1 (25)	4.6 ZP	4.6 ZP	4.6 ZP A4-50 A4-70	
1 ½ (40)	4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50	1 ⅜ (30)	4.6 ZP	4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 ZP
2 (50)	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50	1 ½ (40)	4.6 ZP	4.6 ZP	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 ZP
2 ⅜ (60)	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 8.8 HDG 4.6 ZP A4-50	2 (50)	4.6 ZP	4.6 ZP	4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP
3 ¼ (80)	4.6 HDG 4.6 ZP	4.6 HDG 4.6 ZP A4-50	4.6 HDG 4.6 ZP A4-50	2 ⅜ (60)	4.6 ZP	4.6 ZP	4.6 ZP A4-50 A4-70	4.6 HDG
4 (100)	4.6 ZP	4.6 HDG 8.8 HDG 4.6 ZP A4-50 A4-70	4.6 HDG 4.6 ZP A4-50 A4-70	3 ¼ (80)		4.6 HDG 4.6 ZP	4.6 ZP A4-50	4.6 HDG 4.6 ZP
5 (125)	4.6 ZP	4.6 ZP 8.8 ZP	4.6 ZP	4 (100)		4.6 HDG 4.6 ZP	4.6 HDG 4.6 ZP A4-50 A4-70	
6 (150)	4.6 ZP	4.6 ZP 8.8 ZP A4-50	4.6 ZP 8.8 ZP A4-50	5 (125)		4.6 ZP	4.6 ZP A4-50	
8 (200)		4.6 ZP 8.8 ZP A4-50	A4-50	6 (150)		4.6 ZP	4.6 ZP A4-50	
				8 (200)			4.6 ZP	

### Ordering Example for JORDAHL® T-Bolts

Type	Thread Ø	Length mm	Strength Grade	Material
JB	M 16	x 100	8.8	HDG

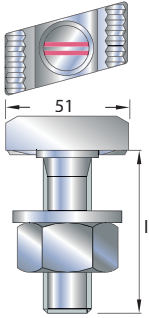
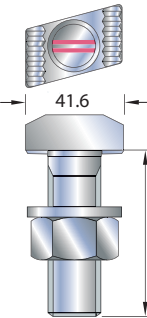
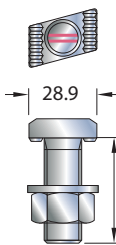
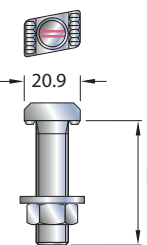
### T-Bolt Material and Design

- Hot-dip galvanized steel (HDG), strength grade 4.6
- Hot-dip galvanized steel (HDG), strength grade 8.8
- Zinc electroplated steel (ZP), strength grade 4.6
- Zinc electroplated steel (ZP), strength grade 8.8
- [Stainless steel A4-50 / 316](#)
- [Stainless steel A4-70 / 316](#)
- [Stainless steel F4-70 \(≙ FA-70\) / 316](#)

## Toothed T-Bolts and Double-Notch Toothed T-Bolts

ICC-ES ESR-2854

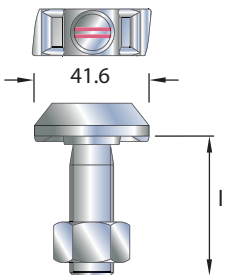
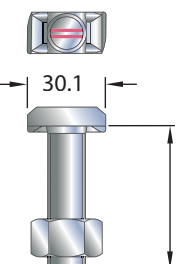
### Range of Toothed T-Bolts

JXA W 64/44 <sup>1) 2)</sup>			JXA W 53/34 <sup>2)</sup>			JXA W 38/23 <sup>2)</sup>			JXA W 29/20 <sup>1) 2)</sup>		
T-Bolt Type JXE			T-Bolt Type JXB			T-Bolt Type JXH			T-Bolt Type JXD		
											
Length l in. (mm)	M 20	M 24	Length l in. (mm)	M 16	M 20	Length l in. (mm)	M 12	M 16	Length l in. (mm)	M 10	M 12
2 (50)	F4-70	F4-70	2 3/8 (60)	8.8 HDG F4-70	8.8 HDG	1 3/16 (30)	8.8 HDG	8.8 HDG	1 3/16 (30)		8.8 HDG
2 3/8 (60)	8.8 HDG		2 9/16 (65)		8.8 HDG	1 1/2 (40)	8.8 HDG F4-70	8.8 HDG	1 1/2 (40)	8.8 HDG	8.8 HDG F4-70
3 (75)		8.8 HDG	3 1/4 (80)	8.8 HDG F4-70	8.8 HDG F4-70	2 (50)	8.8 HDG	8.8 HDG	2 (50)		8.8 HDG
4 (100)	8.8 HDG F4-70	8.8 HDG F4-70	4 (100)	8.8 HDG F4-70	8.8 HDG F4-70	2 3/8 (60)	8.8 HDG F4-70	8.8 HDG F4-70	2 3/8 (60)		8.8 HDG F4-70
6 (150)	8.8 HDG	8.8 HDG	6 (150)		8.8 HDG F4-70	3 1/4 (80)	8.8 HDG F4-70	8.8 HDG	3 1/4 (80)		8.8 HDG F4-70
						4 (100)	8.8 HDG	8.8 HDG	4 (100)		8.8 HDG
						5 (125)		8.8 HDG	5 (125)		8.8 HDG
						6 (150)		8.8 HDG	6 (150)		8.8 HDG
						8 (200)		8.8 HDG			8.8 HDG

<sup>1)</sup> German Technical Approval abZ Z-21.4-1690.  
Not covered by ICC-ES.

<sup>2)</sup> Matching channel profile(s) for T-bolt type below.

### Range of Double-Notch Toothed T-Bolts

JTA W 50/30, JTA W50+, JTA W 53/34 <sup>2)</sup>			W40+, JTA W 40/22 <sup>2)</sup>	
T-Bolt Type JKB			T-Bolt Type JKC	
				
Length l in. (mm)	M 16	M 20	Length l in. (mm)	M 16
1 1/2 (40)	8.8 HDG	8.8 HDG	1 1/2 (40)	8.8 HDG
2 3/8 (60)	8.8 HDG	8.8 HDG	2 3/8 (60)	8.8 HDG
3 1/4 (80)	8.8 HDG	8.8 HDG	3 1/4 (80)	8.8 HDG
4 (100)	8.8 HDG			



JORDAHL® double-notch toothed T-bolt JKB.



The notched teeth of the T-bolt are pressed into the channel lips.

# Design T-Bolt Steel Strengths

## JORDAHL® Steel T-Bolts and Stainless Steel T-Bolts

Steel T-Bolts Ø		M 6	M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30	
T-Bolt Strength	4.6	Tensile Strength $\phi N_{ss}$	lbs. 1170 (kN) (5.2)	2130 (9.5)	3390 (15.1)	4920 (21.9)	9180 (40.8)	14320 (63.7)	20630 (91.8)	26830 (119.3)	32790 (145.9)
		Shear Strength $\phi V_{ss}$	lbs. 650 (kN) (2.9)	1190 (5.3)	1870 (8.3)	2720 (12.1)	5090 (22.6)	7930 (35.3)	11420 (50.8)	14860 (66.1)	18160 (80.8)
	8.8	Tensile Strength $\phi N_{ss}$	–	4280 (19.1)	5750 (25.6)	8350 (37.2)	13950 (62.1)	26600 (118)	41270 (183.6)	–	–
		Shear Strength $\phi V_{ss}$	–	2370 (10.6)	3750 (16.7)	5450 (24.2)	10170 (45.2)	15860 (70.6)	22850 (101.6)	–	–
Stainless Steel T-Bolts Ø		M 8	M 10	M 12	M 16	M 20	M 24				
T-Bolt Strength	A4-50	Tensile Strength $\phi N_{ss}$	–	3390 (15.1)	4920 (21.9)	9180 (40.8)	14320 (63.7)	20630 (91.8)			
		Shear Strength $\phi V_{ss}$	–	1870 (8.3)	2720 (12.1)	5090 (22.6)	7930 (35.3)	11420 (50.8)			
	A4-70	Tensile Strength $\phi N_{ss}$	3740 (16.6)	5930 (26.4)	8160 (36.3)	13880 (61.7)	25060 (111.5)	–			
		Shear Strength $\phi V_{ss}$	2080 (9.2)	3290 (14.6)	4770 (21.2)	8890 (39.5)	13880 (61.7)	–			

All values are factored nominal strengths. JORDAHL® steel T-bolts are supplied electro zinc plated (ZP) or hot-dip galvanized (HDG).

### Stand-Off Installation

In the case of stand-off installation, a connection is stressed by a bending moment as well as by tension and shear forces. The design bending moments specified below must be taken into consideration.

#### Note

T-Bolt capacity may be limited by the channel capacity. The smaller value controls. The specified values are design resistances. For allowable ASD loads divide by 1.5 safety factor.



Stand-off installation

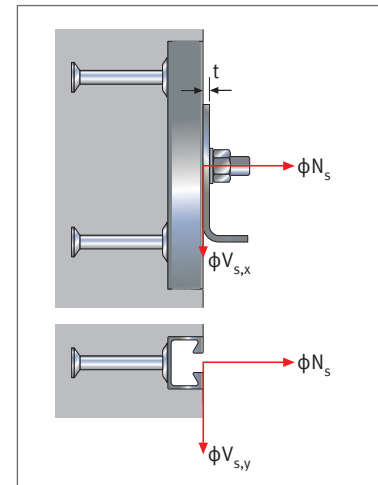
### JORDAHL® T-Bolt Design Bending Moments

Steel T-Bolts Ø		M 6	M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
Recommended hole diameter in attached component – in. (mm)		9/32 (7)	11/32 (9)	15/32 (12)	9/16 (14)	11/16 (18)	7/8 (22)	1 1/32 (26)	1 3/16 (30)	1 19/64 (33)
Factored Bending Strength $\phi M_{ss}$ ft•lb (Nm)	4.6	3 (4)	7 (10)	14 (19)	25 (34)	64 (86)	124 (169)	215 (291)	320 (433)	431 (584)
	8.8	–	14 (20)	29 (39)	50 (68)	127 (173)	249 (337)	430 (582)	–	–
Stainless Steel T-Bolts Ø		M 8	M 10	M 12	M 16	M 20	M 24			
Recommended hole diameter in attached component – in. (mm)		11/32 (9)	15/32 (12)	9/16 (14)	11/16 (18)	7/8 (22)	1 1/32 (26)			
Factored Bending Strength $\phi M_{ss}$ ft•lb (Nm)	A4-50	–	14 (19)	25 (34)	64 (86)	124 (169)	215 (291)			
	A4-70	13 (17)	25 (34)	44 (60)	111 (151)	218 (295)	–			

## Longitudinal Loads

### Double-Notch Toothed T-Bolts

JORDAHL® double-notch toothed T-bolts (type JK) have two hardened teeth on the underside of the bolt head. Manufactured in high tensile steel enables high installation torques to be applied to this type of T-bolt when used with JORDAHL® hot-rolled channel profile types JTA W and JM W. Under high torques the two teeth bite into the lips of the hot-rolled channel profiles, creating a mechanical interlock that provides longitudinal load carrying capacity ( $V_{s,x}$ ) even after relaxation of the initial torque. During the T-bolt tightening process the lips of the ductile hot-rolled channels undergo irreversible plastic deformations, creating notches approximately  $\frac{1}{8}$ " deep. This does not affect the anchor channel performance or corrosion resistance.



T-Bolt Type	T-Bolt Diameter (Grade 8.8)	Longitudinal Shear <sup>1)</sup> $\phi V_{s,x}$ lbs. (kN)	Transverse Shear <sup>1)</sup> $\phi V_{s,y}$ lbs. (kN)	Tensile Strength <sup>1)</sup> $\phi N_s$ lbs. (kN)	Installation Torque $T_{inst}$ ft•lb (Nm)	Min. Connecting Plate Thickness $t$ in. (mm)	Suitable Profile Type JTA JM
JKB	M 20	2360 (10.5)	15860 (70.5)	26300 (117)	300 (400)	$\frac{3}{8}$ (8)	W 50 / 30 W 53 / 34 W 55 / 42
JKB	M 16	1570 (7)	10170 (45.24)	13880 (61.75)	150 (200)	$\frac{1}{4}$ (6)	W 50 / 30 W 53 / 34 W 55 / 42
JKC	M 16	1570 (7)	10170 (45.24)	13880 (61.75)	150 (200)	$\frac{1}{4}$ (6)	W 40 / 22

<sup>1)</sup> Load values are LRFD design strength. To use allowable stress design divide by 1.5 load safety factor.



The notched teeth of the T-bolt are pressed into the channel lips.



### JORDAHL Downloads

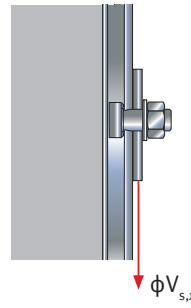
You can download JORDAHL® EXPERT Software easily and free of charge at [www.jordahlusa.com](http://www.jordahlusa.com) → Downloads → Software.



### Standard T-Bolts

Standard JORDAHL® T-bolts used with JTA and JM channels provide excellent capacities for resisting tensile loads and shear loads acting transversely to the channel. Normal JORDAHL® T-bolts may also be used to resist shear loads acting longitudinal (parallel) to the channel, but higher load resistances for this application are available using JK type double-notched T-bolts or JORDAHL toothed channels JXA, JXM with matching toothed T-bolts.

Longitudinal loads can be supported by applying high torques to normal JORDAHL® T-bolts in order to create a friction resistance to the applied load. This application



requires the selection of hot-rolled JORDAHL® channel types JTA W or JM W and the use of high tensile steel or stainless steel T-bolts (grades 8.8 and FA-70 respectively). The following tables show load capacities based on internal tests to which an approximate safety factor of 5.0 has been applied.

For conditions with high longitudinal loads JORDAHL® toothed channels JXA are recommended.

### Longitudinal load capacity of normal JORDAHL T-bolts

Channel Type JTA or JM	T-Bolts		Tightening Torque $M_A$ ft•lb (Nm)	Allowable Longitudinal Shear Capacity ( $\phi V_{s,x}$ ) – lbs. (kN)		Minimum Thickness of the Attached Part in. (mm)
	Type	$\varnothing$		Profile / Steel Hot-Dip Galvanized	Profile / Degreased Stainless Steel	
				Steel T-Bolt Grade 8.8	Stainless Steel T-Bolt Grade FA-70	
W 72 / 48	JA	M 24	457 (620)	944 (4.2)	441 (1.96)	3/8 (10)
		M 20	265 (360)	652 (2.9)	306 (1.36)	
W 55 / 42	JB <sup>1)</sup> (JE)	M 24	457 (620)	944 (4.2)	441 (1.96)	3/8 (10)
		M 20	265 (360)	652 (2.9)	306 (1.36)	
		M 16	133 (180)	427 (1.9)	191 (0.85)	
W 53 / 34	JB	M 20	265 (360)	652 (2.9)	306 (1.36)	1/4 (6)
		M 16	133 (180)	427 (1.9)	191 (0.85)	
W 50 / 30	JB	M 20	265 (360)	652 (2.9)	306 (1.36)	1/4 (6)
		M 16	133 (180)	427 (1.9)	191 (0.85)	
		M 12	52 (70)	202 (0.9)	99 (0.44)	
W 40 / 22	JC	M 16	133 (180)	427 (1.9)	191 (0.85)	13/64 (5)
		M 12	52 (70)	202 (0.9)	99 (0.44)	

<sup>1)</sup> JB M 24 is equivalent to JE M 24

## Prestressed T-Bolt Connections

### Prestressing T-Bolts

In the conditions

- **Suspended and stand-off loads**
- **Longitudinal shear loads applied to the channel**

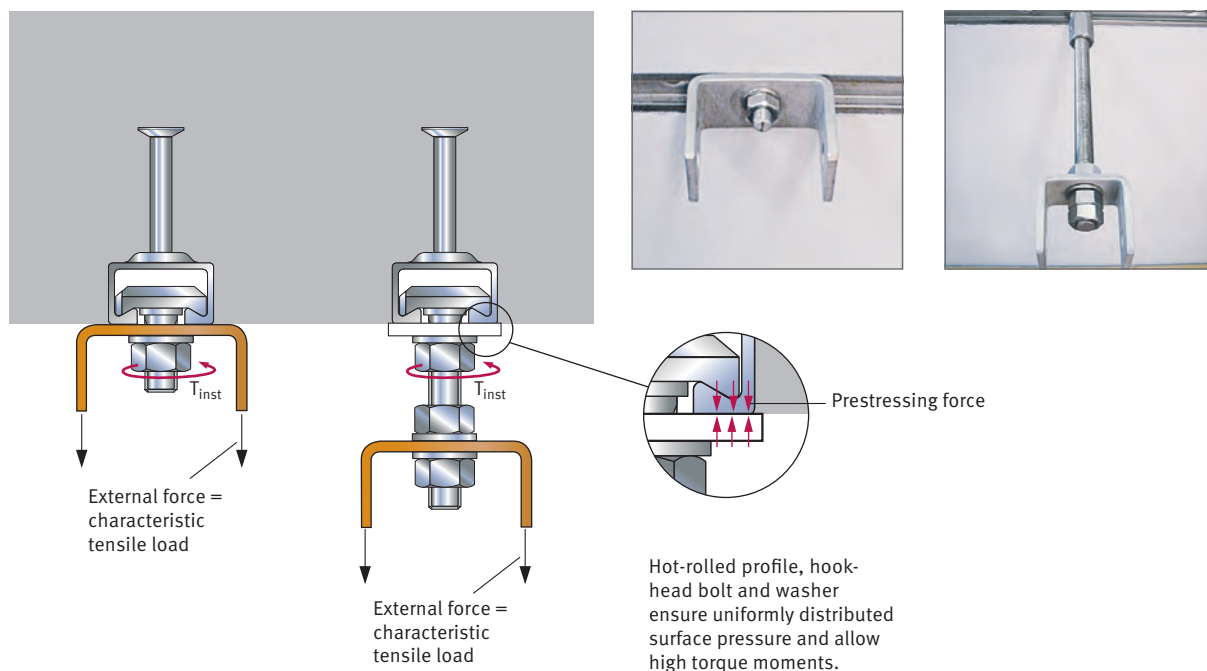
it is important to apply a tightening torque to prestress bolted connections in order to prevent loosening or slippage. Higher-strength T-bolts (8.8) are not absolutely necessary for this purpose. Steel grade 4.6 and stainless steel grade A4-50 T-bolts are also adequate if the following points are taken into consideration:

- In the short term, a force applied from prestressing with tightening torque is normally higher than the external load.
- The applied prestressing force is dissipated down to about 30% by relaxation.
- T-bolts made of stainless steel exhibit higher friction than zinc plates or hot-dip galvanized T-bolts. Therefore, stainless steel T-bolts produce lower prestressing forces.
- JORDAHL® T-bolts are supplied ready for installation. They should not be additionally oiled or treated with lubricants before the tightening torque is applied.
- The bolted joint may be prestressed only when there is steel to steel contact.

If the channel is set back behind the concrete surface, then the connection must be shimmed by means of a suitable washer (see page 44). If this is not followed and the attached part is prestressed against the concrete surface, it leads to residual stresses in the component. These can cause cracks or splitting of the concrete component and damage the anchor channel.

### Suspended and Stand-Off Installation

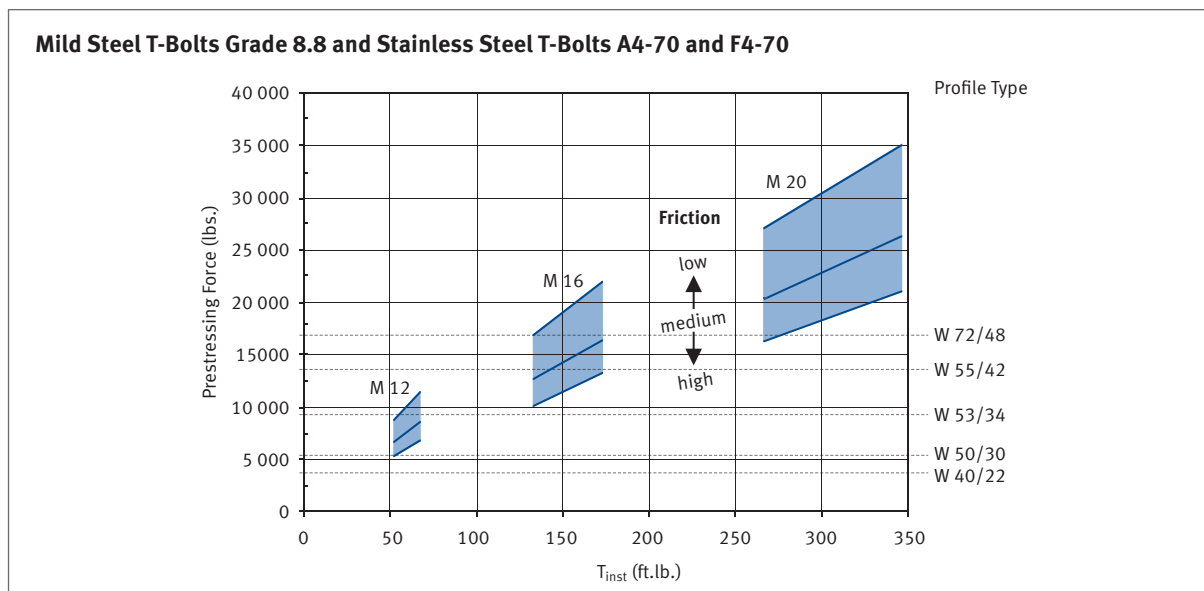
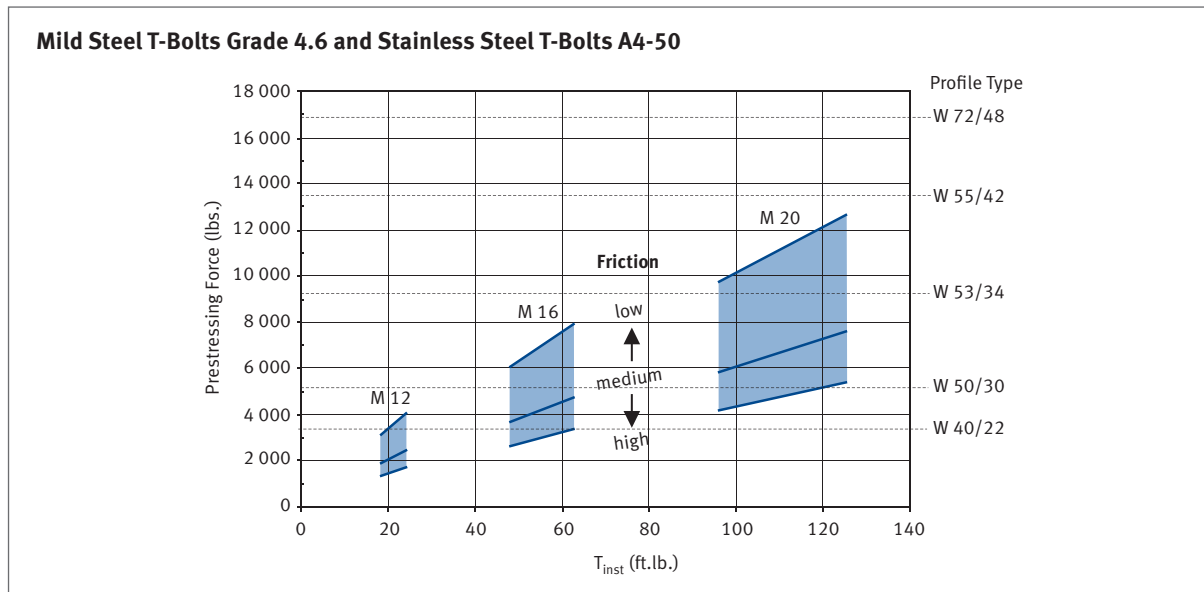
For these applications, cold-formed and hot-rolled profiles can be used. In order to prestress a bolted joint with electro zinc plated T-bolts or stainless steel T-bolts, we recommend using the tightening torques according to page 25.



The relationship between prestressing force and tightening torque are shown in the graphs below. The prestressing forces vary strongly with the friction in the thread between the nut and the T-bolt. Low friction causes high pre-load, typical for hot-dip galvanized T-bolts with lubricated nuts.

Friction is increased for electro zinc plated (medium) and stainless steel (high) nuts and T-bolts. The recommended installation torque may be increased by 30% without danger of reaching the yield strength of the T-bolts.

### Relationship Between Prestressing Force and Installation Torque

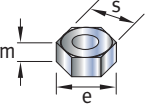


**JORDAHL Information**

The tightening torques and notes on stand-off installation can be found on page 25 (installation instructions for anchor channels).

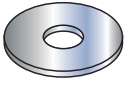
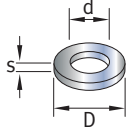
# Accessories

## Metric Hex Nuts ISO 4032

Material ZP, A4, HDG				
	Ø	e [mm]	s [mm]	m [mm]
	<b>M 6</b>	11.05	10.0	5.2
	<b>M 8</b>	14.38	13.0	6.8
	<b>M 10</b>	18.90	16.0	8.4
	<b>M 12</b>	21.10	18.0	10.8
	<b>M 16</b>	26.75	24.0	14.8
	<b>M 20</b>	32.95	30.0	18.0
	<b>M 24</b>	39.55	36.0	21.5
	<b>M 27</b>	45.20	41.0	23.8
	<b>M 30</b>	50.85	46.0	25.6

Also available as nylon lock nuts

## Washers<sup>1)</sup>

Material ZP, A4, HDG					
Washers	Ø	d [mm]	D [mm]	s [mm]	
	<b>ISO 7093-1 (DIN 9021)</b>	<b>M 6</b>	6.4	18.0	1.6
	<b>M 8</b>	8.4	24.0	2.0	
	<b>M 10</b>	10.5	30.0	2.5	
	<b>M 12</b>	13.0	37.0	3.0	
	<b>M 16</b>	17.0	50.0	3.0	
	<b>M 20</b>	22.0	60.0	4.0	
	<b>ISO 7089 (DIN 125)</b>	<b>M 6</b>	6.4	12.0	1.6
	<b>M 8</b>	8.4	16.0	1.6	
	<b>M 10</b>	10.5	20.0	2.0	
	<b>M 12</b>	13.0	24.0	2.5	
	<b>M 16</b>	17.0	30.0	3.0	
	<b>M 20</b>	21.0	37.0	3.0	
	<b>M 24</b>	25.0	44.0	4.0	

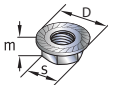
<sup>1)</sup> For stand-off application please see table below

## Dimensions of Washers

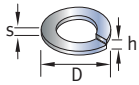
Profile	T-Bolt Type	M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
JTA K 28 / 15	JD	1" x 1" x 1/8" (25 x 25 x 3 mm)	1" x 1" x 1/8" (25 x 25 x 3 mm)	1" x 1" x 1/8" (25 x 25 x 3 mm)	-	-	-	-	-
JTA K 38 / 17	JH	-	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	-	-	-	-
JXA W 29 / 20	JXD	-	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	-	-	-	-	-
JTA W 40 / 22	JC	-	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	-	-	-	-
JXA W 38 / 23	JXH	-	-	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	1-1/2" x 1-1/2" x 5/16" (38 x 38 x 5 mm)	-	-	-	-
JTA W 50 / 30	JB	-	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	-	-	-
JXA W 53 / 34	JXB	-	-	-	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	-	-
JTA W 53 / 34	JB	-	50 x 50 x 6	50 x 50 x 6	50 x 50 x 6	50 x 50 x 6	-	-	-
JTA W 55 / 42	JB <sup>1)</sup>	-	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	2" x 2" x 1/4" (50 x 50 x 6 mm)	-	-
JXA W 64 / 44	JXE	-	-	-	-	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)	-	-
JTA W 72 / 48	JA	-	-	-	-	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)	2-3/4" x 2-3/4" x 5/16" (70 x 70 x 8 mm)

<sup>2)</sup> JB M 24 is equivalent to JE M 24

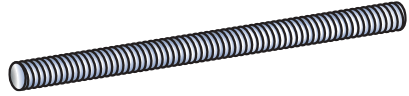
## Metric Threaded Flange Nuts

	Thread	D [mm]	m [mm]	s [mm]	Material
	M 12	26.0	12	18	ZP, strength class 8
	M 16	34.5	16	24	

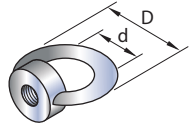
## Lock Washer (DIN 127)

	For Thread	$h_{min}$ [mm]	$D_{max}$ [mm]	s [mm]	Material
	M 6	3.6	11.8	1.6	ZP A4, HDG
	M 8	4.6	14.8	2.0	
	M 10	5.0	18.1	2.2	
	M 12	5.8	21.1	2.5	
	M 16	7.8	27.4	3.5	
	M 20	8.8	33.6	4.0	
	M 24	11.0	40.0	5.0	
M 30	13.6	48.2	6.0		

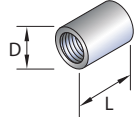
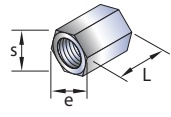
## Metric Threaded Rod – Length L = 1000 mm (39 – 3/8")

						
Thread	M 6	M 8	M 10	M 12	M 16	M 20
Material	ZP, A4					

## Metric Ring Nuts

	Thread	d [mm]	D [mm]	Material
	M 8	20.0	36.0	mill finish ZP
	M 10	25.0	45.0	
	M 12	30.0	54.0	
	M 16	35.0	63.0	
	M 20	40.0	72.0	
	M 24	50.0	90.0	

## Metric Threaded Couplers

	Thread	D [mm]	L [mm]	Material	
	M 6	10.0	20.0	ZP A4 on request	
	M 8	11.0	20.0		
	M 10	13.0	25.0		
	M 12	15.0	30.0		
	M 16	22.0	40.0		
	M 20	28.0	50.0		
	Thread	e [mm]	s [mm]		L [mm]
	M 6	11.05	10.0	15.0	ZP A4 on request
	M 8	14.38	13.0	20.0	
	M 10	18.90	17.0	25.0	
	M 12	21.10	19.0	30.0	
	M 16	26.75	24.0	40.0	
	M 20	32.95	30.0	50.0	

## Locking Plates


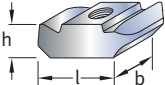
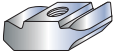
JORDAHL® locking plates can be installed at any point on the JORDAHL® channel. They are installed through the lips of the channel before being rotated ninety degrees to lock in position, and are typically used with metric threaded rod for hanging stand-off connections. For easier installation it is recommended to engage a few threads of the locking plate with the threaded rod before inserting and rotating the locking plate into the channel.

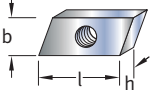

### Hooked-Head Locking Plates

These are forged with a hooked shape to match the lip profile of the heavier JORDAHL® channels. The hook shape provides even load transfer, and greater safety as the shape tends to prevent the plate rotating anti-clockwise out of the channel after installation.

### Hammer-Head Locking Plates

Hammer-Head locking plates are used for less safety critical installations, as their shape does not lock with the channel lip in the same way as the hook-head locking plates.

Hooked-Head Locking Plates (forged)	Type	Dimensions l x w x h [mm]	Metric Thread Size	$\phi N_s$ <sup>1)</sup> lbs. (kN)	Material	Suitable for Channel Profile
	JGM A	57 x 31 x 22	M 20	<b>8500</b> (37.8)	ZP	W 72 / 48
	JGM B	41 x 21 x 16	M 6	<b>700</b> (3.1)	ZP A4	W 50 / 30 W 53 / 34 W 55 / 42
			M 8	<b>1260</b> (5.6)		
			M 10	<b>2020</b> (9.0)		
			M 12	<b>2920</b> (13.0)		
	JGM C	32 x 17 x 11	M 6	<b>700</b> (3.1)	ZP A4	W 40 / 22
			M 8	<b>1260</b> (5.6)		
			M 10	<b>2020</b> (9.0)		
		32 x 23 x 13	M 12	<b>2520</b> (11.2)		
			M 16	<b>5440</b> (24.2) <sup>2)</sup>		

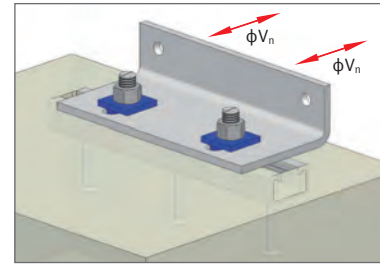
Hammer-Head Locking Plates JGM (Flat Steel)	Type	Dimensions l x w x h [mm]	Metric Thread Size	$\phi N_s$ lbs. (kN)	Material	Suitable for Channel Profile
	JGM H	30 x 14 x 6	M 5	<b>490</b> (2.2)	ZP A4	K 38 / 17
			M 6	<b>700</b> (3.1)		
			M 8	<b>1260</b> (5.6)		
			M 10	<b>2020</b> (9.0)		
		30 x 18 x 8	M 12	<b>2200</b> (9.8)		
	JGM D	21 x 12 x 4	M 4	<b>310</b> (1.4)	ZP A4	K 28 / 15
			M 5	<b>490</b> (2.2)		
			M 6	<b>700</b> (3.1)		
			M 8	<b>1100</b> (4.9)		
		18 x 14 x 6	M 10	<b>1100</b> (4.9)		

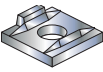
<sup>1)</sup> The load bearing capacities of the anchor channels and the mounting profiles must be checked. The respectively smaller value is decisive.

<sup>2)</sup> The full 5440 lbs. (24.2 kN) capacity is achievable only in the W 53 / 34 and W 55 / 42 channel profiles.

## Double Toothed Washer

JORDAHL® double-toothed washers enable bracket loads to be transferred in the longitudinal direction of slotted holes. The washers have two teeth on the underside. When high torques are applied to the nut these teeth bite into the bracket material on either side of the bracket slot. This creates permanent indentations in the steel and a mechanical resistance to slip. Connections with double-toothed washers provide a load capacity of up to  $\phi V_n = 1685$  lbs. (7.5 kN) with a safety factor of 3 in the direction of the slot.

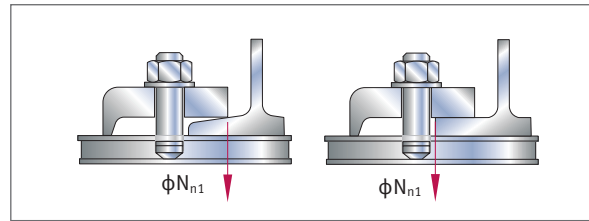


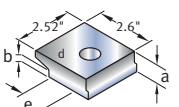
Double-Toothed Washer	Type and Finish	Dimensions l x w x h [in. (mm)]	For T-bolt Type	$\phi V_n$ lbs. (kN)	Tightening torque ft·lb (Nm)	Bracket	
						Minimum thickness in. (mm)	Yield limit PSI (N/mm <sup>2</sup> )
	<b>JKZS M 16 HDG</b>	(40 × 40 × 6)	M 16 8.8	<b>1685</b> (7.5)	<b>148</b> (200)	<sup>5</sup> / <sub>16</sub> (8)	<b>34000</b> (240)

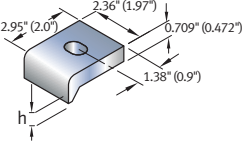
## Clamping Plates

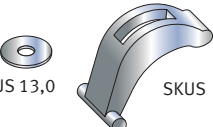


JORDAHL clamping plates are suitable for fastening steel profiles and also crane rails.  
**Material: HDG**



Clamping Plates for Crane Rails <sup>1)</sup>	Suitable for Crane Rails		Type	a in. (mm)	b in. (mm)	For T-bolts Ø	d [mm]	e in. (mm)
	A 45	(KS 22)	<b>KP-A 45</b>	<b>0.866</b> (22.0)	<b>0.335</b> (8.5)	M 20	Ø 22	<b>0.71</b> (18)
	A 55	(KS 32)	<b>KP-A 55</b>	<b>0.886</b> (22.5)	<b>0.354</b> (9)			
	A 65	(KS 43)	<b>KP-A 65</b>	<b>0.925</b> (23.5)	<b>0.394</b> (10)			
	A 75	(KS 56)	<b>KP-A 75</b>	<b>0.965</b> (24.5)	<b>0.433</b> (11)			

Clamping Plates	Type	For Flange Thicknesses in. (mm)	For T-bolts Ø	Factored strength lbs. (kN)
 LL 18 × 24 (14 × 20)	<b>50 / 7<sup>4)</sup></b>	<b>0.28</b> (7)	M 12	$\phi N_{n1} = 1180$ (5.25)
	<b>60 / 10</b>	<b>0.393</b> (10)	M 16	$\phi N_{n1} = 2300$ (9.8)
	<b>60 / 11</b>	<b>0.433</b> (11)		
	<b>60 / 12<sup>2)</sup></b>	<b>0.472</b> (12)		
	<b>60 / 14<sup>3)</sup></b>	<b>0.551</b> (14)		
	<b>60 / 16</b>	<b>0.630</b> (16)		
	<b>60 / 18</b>	<b>0.708</b> (18)		
	<b>60 / 20</b>	<b>0.787</b> (20)		$\phi N_{n1} = 3550$ (15.8)

Clamping Claws with Adapter	Type	h in. (mm)	T-Bolt Dimension [in. (mm)]	Factored strength lbs. (kN)
 US 13,0      SKUS	<b>SKU</b>	<b>0.2 – 1.57</b> (5 – 40) <b>0.2 – 1.38</b> (5 – 35) <sup>5)</sup>	M 12 × 4" (100) <sup>5)</sup> strength class 8.8 washer ISO 7093-1 (DIN 9021)	$\phi N_{n1} = 3150$ (14)

<sup>1)</sup> Crane rail acc. to DIN 536 on request: M 16 Ø 18, M 24 Ø 26

<sup>2)</sup> Also for crane rails A100 (KS75)

<sup>3)</sup> Also for crane rails A120 (KS101)

<sup>4)</sup> Other rail types also available

<sup>5)</sup> 1.38 (35 mm) at bolt length of 3¼ (80 mm)

# JORDAHL® Channels for Self-Drilling Screws JTB-uni

## Channels for Windows and Window Walls

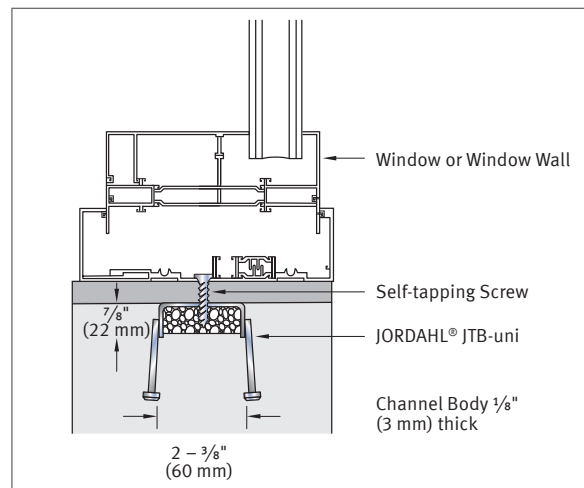
JORDAHL® JTB-uni anchor channels are used with self-tapping screws, and are an ideal solution for window wall and window connections to concrete. They provide the following user benefits:

- Fast and reliable connections to concrete.
- Two dimensional connection adjustment.
- No drilling of concrete – No dust. No concrete cracking or reinforcement conflict.
- No welding – No spark damage or fires.
- Easy placement

Standard channel length: 12" (300 mm) with 4 anchors  
Standard finish: Pre-galvanized carbon steel  
Stainless steel and longer lengths are also available.



### Installation and Design Data



JORDAHL® JTB-uni channels can be used to transfer wind loads into the concrete slab or architectural precast panels according to the data provided below. The design engineer should also check that the capacity of the selected self-tapping fasteners are sufficient to transfer the applied loads.

Single connections or double connections (at minimum 6" spacing) can be made at any position greater than 1 – 1/2" from the ends of each channel, providing that the maximum capacity of the channel is not exceeded.

JORDAHL® JTB-uni channels should be cast into concrete according to the minimum dimensions provided below. The concrete around the channel should be carefully compacted, and the channel should be straight and level with the surface of the concrete.

### Calculation

$$\text{Factored load } V_u \leq \phi V_s \cdot \psi_0 \cdot \psi_1 \cdot \psi_2$$

$\psi_0 = 1.4$ , if uncracked concrete may be assumed  
(else :  $\psi_0 = 1.0$ )

$$\psi_1 = \sqrt{\frac{f'_{c, \text{project}}}{2,500 \text{ ps.}}} ; f'_{c, \text{project}} = \text{concrete strength for the project, 8500 psi max}$$

$\psi_2 =$  according to Tables 1 & 2

$$\phi V_s = 1700 \text{ lbs (7.4 kN)}$$

(for minimum dimensions)

### Minimum Dimensions for Edge Connections

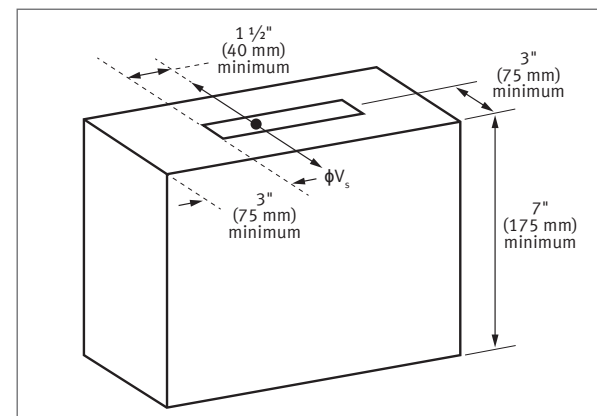
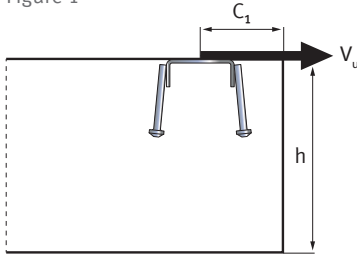




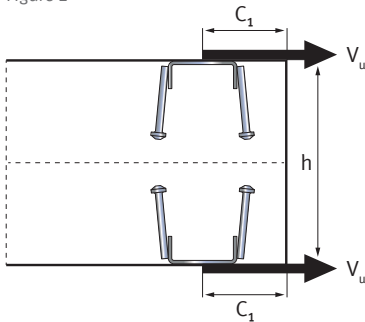
Figure 1



**Table 1 – Reduction Factors for Top of Slab/Panel Edge Connections**

Edge distance $C_1$ [in]	Concrete thickness $h$ [in]				
	5	5 - 1/2	6	6 - 1/2	7
	Modification factor ( $\psi_2 \leq 1$ ) for slab thickness $h \leq 7''$				
3	0.78	0.84	0.89	0.93	1.00
3 - 1/2	0.88	0.94	1.00	1.00	1.00

Figure 2

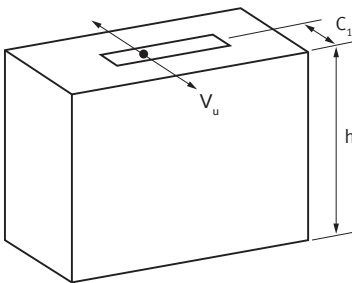


**Table 2 – Reduction Factors for Top and Bottom Slab Connections**

Edge distance $C_1$ [in]	Slab thickness $h$ [in]									
	6	6 - 1/2	7	7 - 1/2	8	8 - 1/2	9	9 - 1/2	10	
	Modification factor ( $\psi_2 \leq 1$ ) for slab thickness $h \leq 10''$									
3	0.56	0.59	0.62	0.65	0.68	0.70	0.73	0.76	0.78	
3 - 1/2	0.63	0.66	0.70	0.73	0.76	0.79	0.82	0.85	0.88	
4	0.70	0.73	0.77	0.81	0.84	0.88	0.91	0.94	0.98	
4 - 1/2	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.00	1.00	
5	0.82	0.87	0.91	0.95	1.00	1.00	1.00	1.00	1.00	

## Calculation Examples

### Factored nominal strength (LRFD)



Given:  $\phi V_s = 1700$  lb (7.4 kN) for cracked, unreinforced concrete 2500 psi

#### Case 1 (Edge connection to architectural precast panel. (Fig. 1))

Design conditions:  $f'_c$ , project = 5000 psi, uncracked concrete,  
 $c_1 = 3''$  (75mm),  $h = 7''$  (175mm),  $V_u = 2500$  lb (11.1kN)

$\psi_0 = 1.4$ , (uncracked concrete);  $\psi_1 = \sqrt{\frac{5000 \text{ psi}}{2,500 \text{ psi}}} = 1.41$ ;  $\psi_2 = 1.0$  (table 1)  
 $\phi V_s = 1700 \text{ lb} \times 1.4 \times 1.41 \times 1.00 = 3350 \text{ lb} > V_u = 2500 \text{ lb} \rightarrow \text{OK}$

#### Case 2 (Top and bottom slab connection. (Fig. 2))

Design conditions:  $f'_c$ , project = 4300 psi, uncracked concrete,  
 $c_1 = 3''$  (75mm),  $h = 8''$  (200mm),  $V_u = 2000$  lb (8.9kN)

$\psi_0 = 1.4$ , (uncracked concrete);  $\psi_1 = \sqrt{\frac{4300 \text{ psi}}{2,500 \text{ psi}}} = 1.31$ ;  $\psi_2 = 0.68$  (table 2)  
 $\phi V_s = 1700 \text{ lb} \times 1.4 \times 1.31 \times 0.68 = 2120 \text{ lb} > V_u = 2000 \text{ lb} \rightarrow \text{OK}$

### Ordering Example Anchor Channels JTJB

Type	Profile Size	Channel Length mm	Material
JTB-UNI	60/22/3-150	3000	HDG



### JORDAHL Support

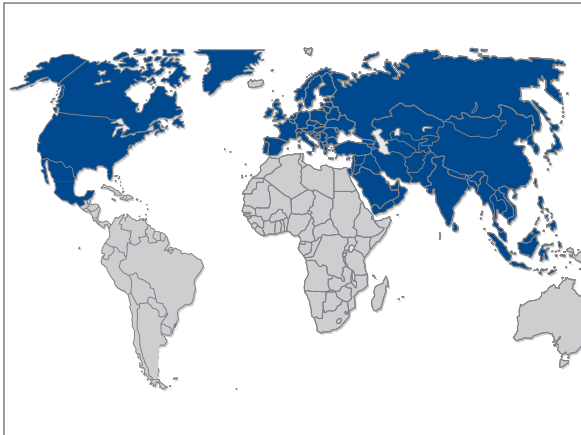
Our engineering and sales support team will be pleased to provide further specific assistance for your project, as required.

## Advice and Service



### The JORDAHL Experts

You are always well advised when you choose JORDAHL products. Whether from the point of view of structural calculations, general technical advice / service or the development of customized solutions – competent and experienced JORDAHL product specialists offer you state-of-the-art, flexible and customized solutions for all your needs.



### Throughout North America and around the world

JORDAHL products have proven themselves in use around the world because high quality standards are in demand everywhere. We also focus on reliable delivery of our products using proven logistics partners and personalized, customer oriented service.



### Warranty

JORDAHL® USA, Inc. warrants the supply of JORDAHL® Anchor Channels for a period of one year from the date of delivery that, should any defects in workmanship and/or materials in our work develop, we will repair and/or replace any and all such defects promptly at no cost to the Purchaser. Ordinary wear and tear, unusual abuse or neglected and improper installation of JORDAHL® Anchor Channels are not included in the warranty.

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(see also Anchor Channels)

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