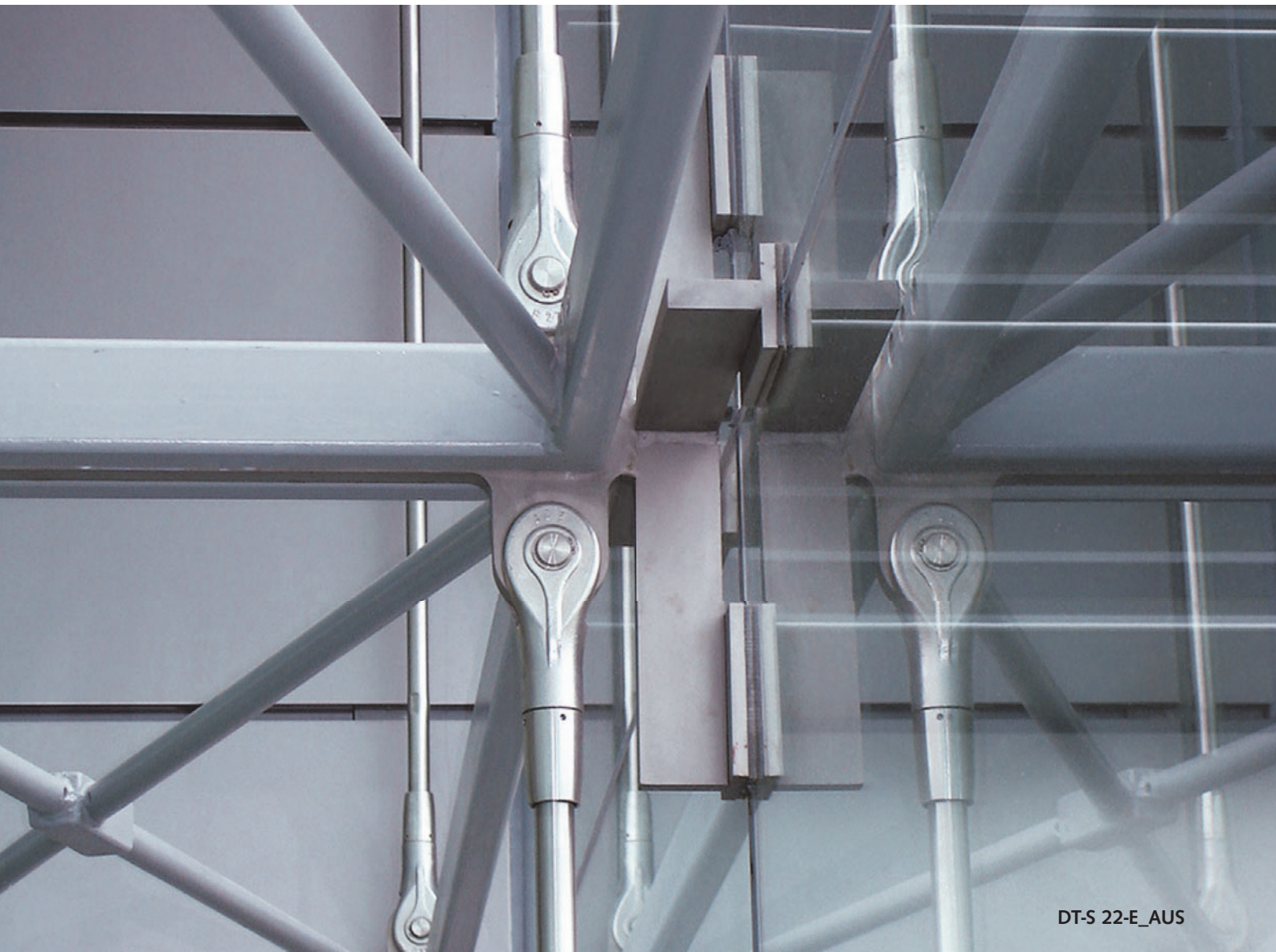


DETAN-S CARBON STEEL ROD SYSTEMS

Technical Product Information





We are one team. **We are Leviat.**

Leviat is the new name of
CRH's construction accessories
companies worldwide.

Under the Leviat brand, we have united the expertise, skills and resources of HALFEN and its sister companies to create a world leader in fixing, connecting and anchoring technology.

The products you know and trust, including DETAN Rod systems, will remain an integral part of Leviat's comprehensive brand and product portfolio. As Leviat, we can offer you an extended range of specialist products and services, greater technical expertise, a larger and more agile supply chain and better, faster innovation.

By bringing together CRH's construction accessories family as one global organisation, we are better equipped to meet the needs of our customers, and the demands of construction projects, of any scale, anywhere in the world.

This is an exciting change. Join us on our journey.

Read more about Leviat at Leviat.com



Our product brands include:

Ancon®


HALFEN

PLAKA



60
locations

sales in
30+
countries

3000
people worldwide

Imagine. Model. Make.

Leviat.com

Tension and Compression Systems

Tension Rod Systems at Leviat

Tension Rod systems are increasingly being used in structures and buildings as an architectural as well as a structural element.

As a forward thinking company, Leviat are focused on the ever-changing demands of the industry. Our recent development looks to combine the Ancon and Halfen rod system portfolios to ensure the individual demands of our customers and the industry are met with a range of our market-leading construction solutions.

The product portfolio of both systems consists of different combinations of materials and finishes, with two different certifications.

Benefits of the DETAN-S Carbon Steel Rod Systems

- European Technical Assessment ETA-05/0207
- Complete system in hot-dip galvanized including hot-dip galvanized components, brushed threads & seal-sets for maximum corrosion
- Additional diameters & higher load capacity for most diameters
- Project specific configurations for system diameter and length
- Complimentary design software and planning support



Benefits of the Ancon-TS 500 SS Stainless Steel Tension Rod Systems

- UKCA & CE Marked
- High load capacity
- Project specific configurations for system diameter and length
- Visual confirmation of correct installation
- A choice of finishes; electro-, satin- or handpolished



Ancon®

For more information on our Ancon and Halfen Tension Rod products, contact us on:

Tel: 1300 304 320

Email: info.au@leviat.com

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DETAN ROD SYSTEMS

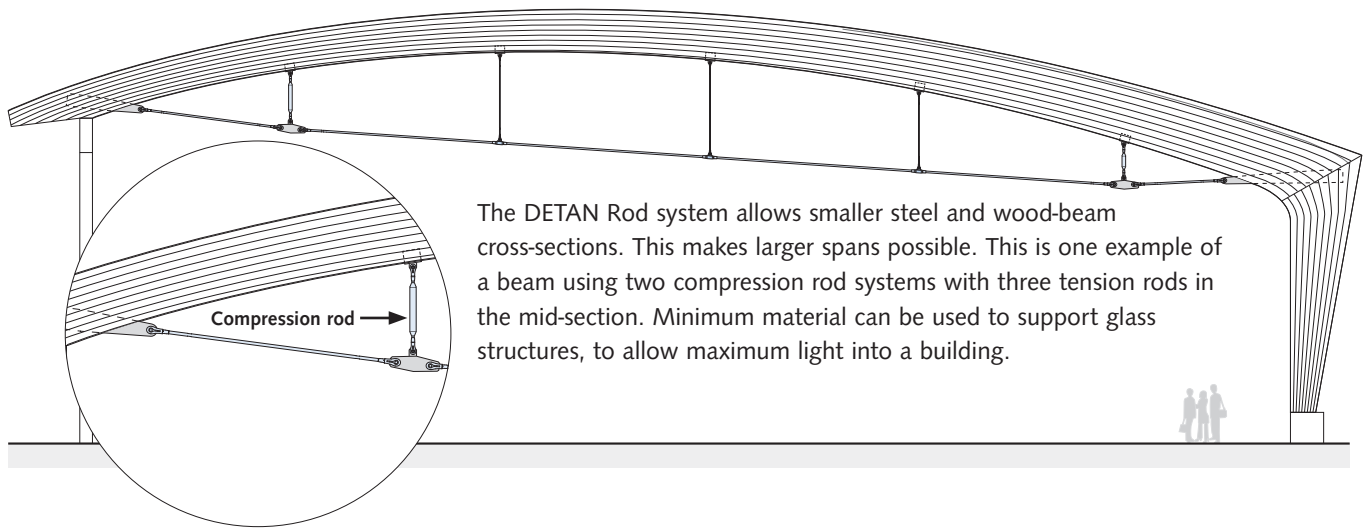
Applications

Application — examples

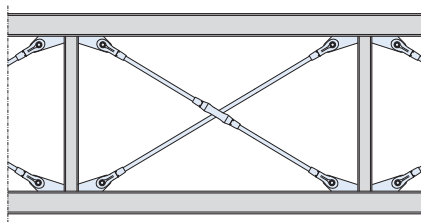
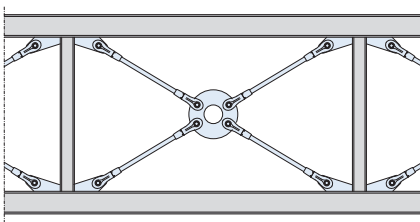
The DETAN Tension and compression rod systems are a perfect match, both structurally and aesthetically. DETAN is suitable for use in all types of bracing applications. To complement the DETAN range we offer a wide selection

of services and accessories, for example, anchor discs and cross couplers and providing construction detailing and assistance for further possible applications.

Bracing under beams

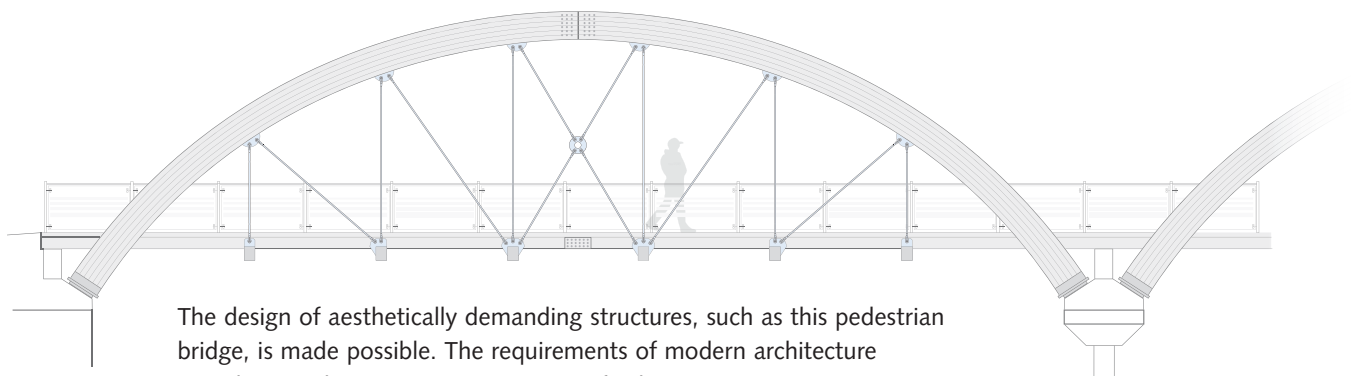


Stiffeners and Bracings



Statically required wind-bracing in roofs and walls can be aesthetically designed as a visual focus-point using the tension rod system. Cross bracing is possible either with a cross coupler or an anchor disc.

Suspensions

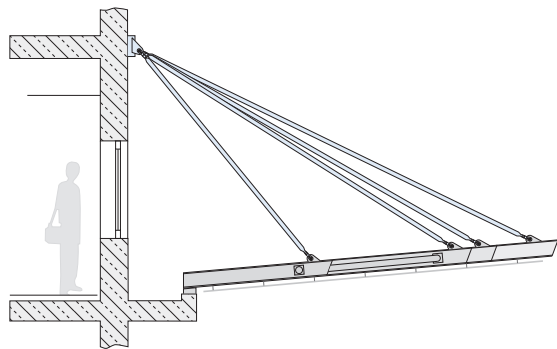


DETAN ROD SYSTEMS

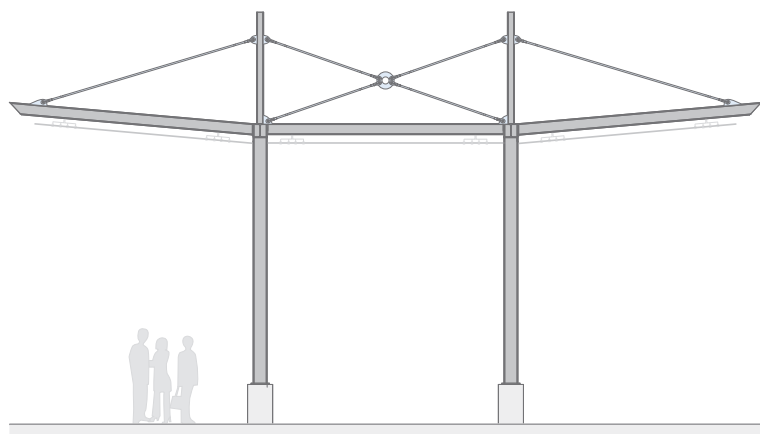
Applications

Application — examples

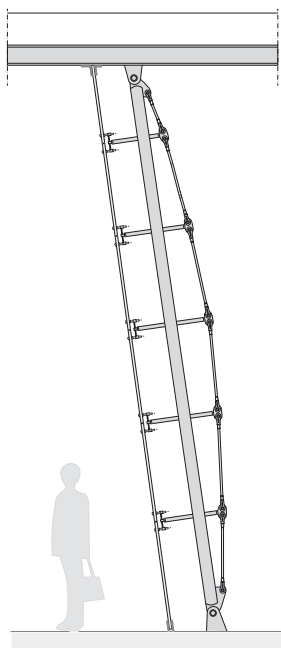
Canopy suspensions



The DETAN System allows bracings to be designed using a minimum of obtrusive structural elements, leaving them almost invisible. Statically required elements are simultaneously used as design elements. The visually, unobtrusive bracing elements give the whole structure an overall lightness. Applications are suspended canopies in all types of commercial and industrial projects. The DETAN Rod system is suitable for tension and compression loads.



Back-braced glass-façades



The DETAN Rod system allows filigree support structures for glass-façades to be realized.

DETAN ROD SYSTEMS

DETAN as a Design Element

Reference

The DETAN Rod system was used as a visual, creative design element in this project.

The effect is an elegant, aesthetic structure.

DETAN fits perfectly into the architectural concept and significantly contributes to the overall style.

Project:
Manchester Civil
Justice Centre,
England, UK



DETAN ROD SYSTEMS

DETAN as a Design Element

Reference



Cross bracings provide a futuristic, lightweight construction.

For structural reasons, DETAN Tension rods run diagonally across the glazed façade.

The filigree DETAN system is perfectly integrated, emphasizing the fascinating overall impression of the building.

Project:
The Sage, Gateshead,
England, UK

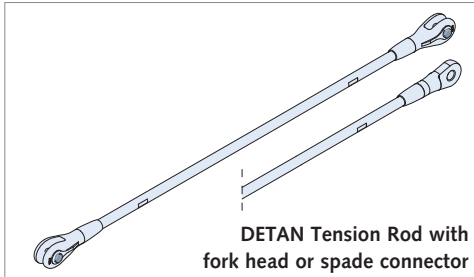
© Francisco Martínez - Alamy Stock

DETAN ROD SYSTEMS

System Overview

DETAN Tension rod system

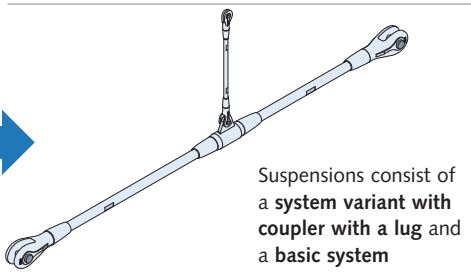
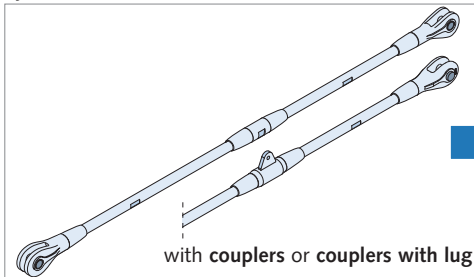
Basic system:



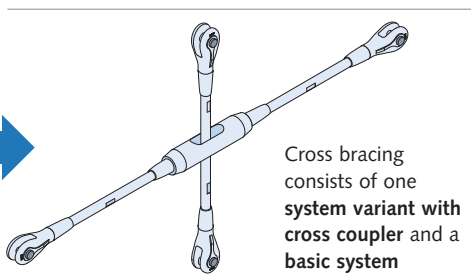
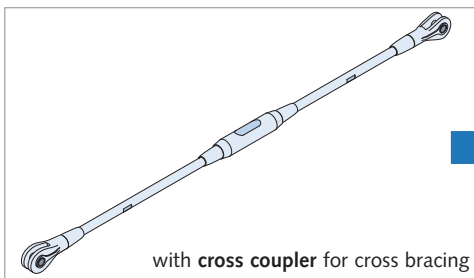
Ordering procedure → page 11
Load capacity, system dimensions and materials:
Steel → pages 14–15

! The DETAN Rod systems are only approved for predominantly static loads.

System variants:

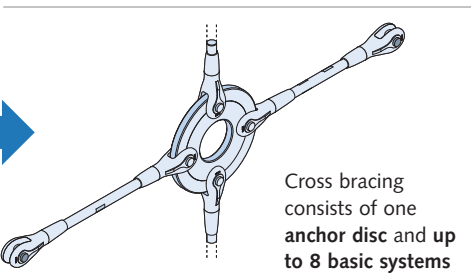
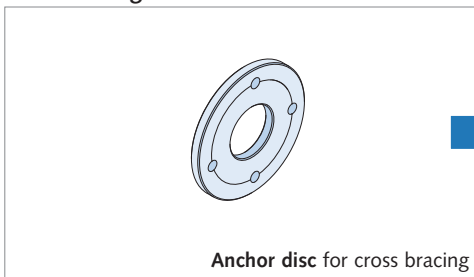


Ordering example → page 11
Load capacity, system dimensions and materials:
Steel → pages 14–15



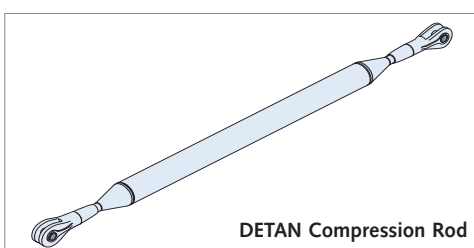
Ordering example → page 12
Load capacity, system dimensions and materials:
Steel → pages 14–15

Cross bracing:



Ordering example → page 13
Load capacity, system dimensions and materials:
Steel → pages 14–15

DETAN Compression rod system



Ordering example → page 16
Load capacity, system dimensions and materials → pages 16–18

Pretension unit



More information → pages 23–24

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

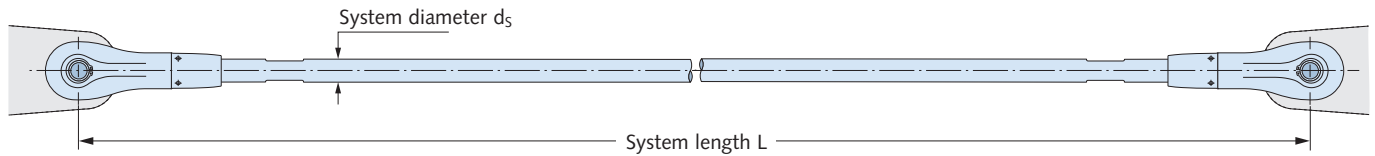
Ordering procedure

Example order: Tension rod system, DETAN-S, $d_s = 30$ mm, $L = 4500$ mm FV, 1 coupler

Product / DETAN System/ system diameter d_s / system length L / specification

Abbreviations:
WB = mill finish
FV = HDG = hot-dip galvanized

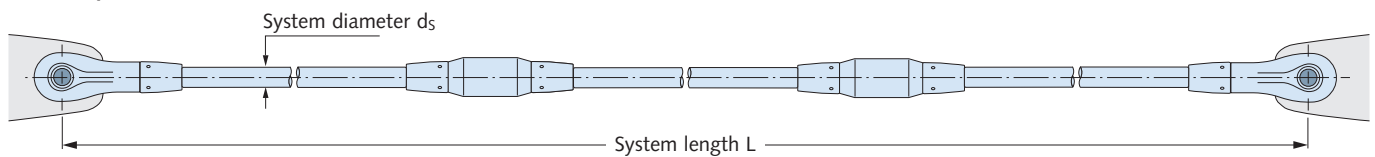
Basic system



Ordering example (material steel HDG): Tension rod system, DETAN-S, $d_s = 52$ mm, $L = 3620$ mm FV

System variants

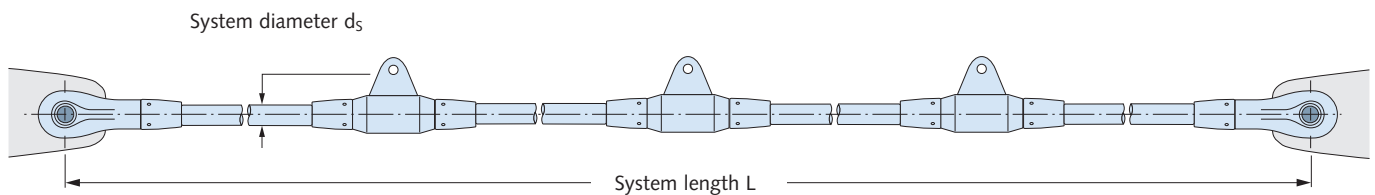
with coupler:



Ordering example (material steel HDG): Tension rod system, DETAN-S, $d_s = 24$ mm, $L = 11200$ mm, 2 couplers

Note: Maximum 5 couplers are possible.

coupler with lug:



Ordering example (material steel HDG): Tension rod system, DETAN-S, $d_s = 30$ mm, $L = 34000$ mm FV, 3 couplers with lug

System DETAN-S, European Technical Assessment ETA-05/0207

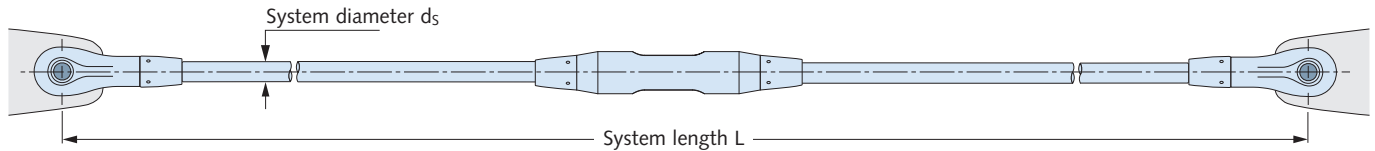
| System diameter d_s [mm] | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
|---|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Available minimum system length L [mm] | | | | | | | | | | | | | | |
| Rod hot-dip galvanized | 250 | 310 | 360 | 440 | 520 | 560 | 600 | 700 | 810 | 940 | 990 | 1050 | 1160 | 1480 |
| Available maximum system length L with <u>one</u> rod [mm] | | | | | | | | | | | | | | |
| Rod hot-dip galvanized | 6060 | 6070 | 12080 | 12100 | 12120 | 12140 | 12140 | 12170 | 12220 | 12260 | 12270 | 12290 | 12320 | 15430 |

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

System variants

Cross coupler for cross bracing:



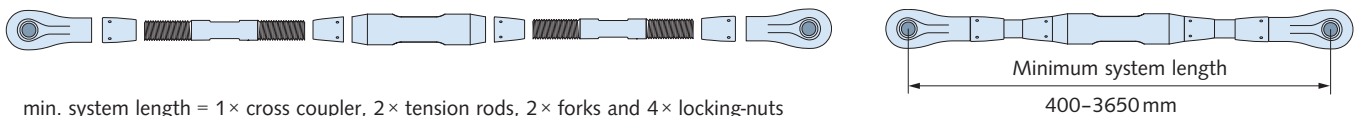
Ordering example (material steel HDG): Tension rod system, DETAN-S, $d_s = 30$ mm, $L = 5600$ mm FV, 1 cross coupler

DETAN-S System dimensions

| System - Ø d_s [mm] | 6 | 8 | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Reduction for 2 × fork | 44 | 51 | 60 | 73 | 85 | 107 | 128 | 140 | 148 | 179 | 220 | 264 | 277 | 290 | 324 | 432 |
| O_m | 10.5 | 12.5 | 15.0 | 18.5 | 22.5 | 27.0 | 34.0 | 37.5 | 42.5 | 51.0 | 55.0 | 62.5 | 70.5 | 77.5 | 85.0 | 115.0 |
| L_{km} | 70 | 85 | 100 | 120 | 142 | 166 | 200 | 222 | 242 | 284 | 310 | 348 | 400 | 440 | 478 | 631 |
| min. system length | 400 | 450 | 550 | 650 | 750 | 900 | 1050 | 1150 | 1200 | 1400 | 1600 | 1850 | 2000 | 2100 | 2300 | 2950 |

spanner flats are available with bars from 700 mm in length

Minimal system length



min. system length = 1 × cross coupler, 2 × tension rods, 2 × forks and 4 × locking-nuts

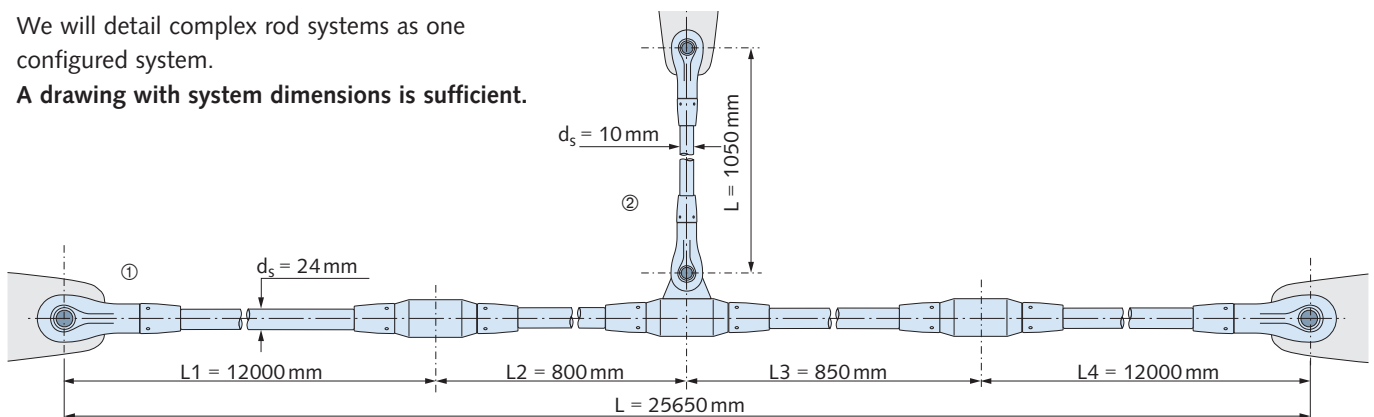
System variant with asymmetric distribution of couplers

Order with specification of system length L:

We calculate the rod lengths and minimum and maximum system length. The couplers are distributed symmetrically. If an asymmetric distribution of the couplers is required, a drawing with all necessary measurements must be included. Alternatively, order using our dimensioning software, see page 21.

We will detail complex rod systems as one configured system.

A drawing with system dimensions is sufficient.



Ordering example:

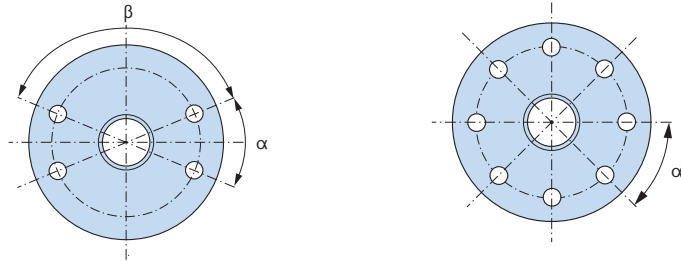
- ① Tension Rod System, DETAN-S, $d_s = 24$ mm, system length according to drawing, WB, couplers according to drawing
- ② Tension Rod System, DETAN-S, $d_s = 10$ mm, system length $L = 1050$ mm WB

DETAN ROD SYSTEMS

Product Range Overview: Cross Bracings, DETAN Compression Rod System

Cross bracings

Anchor disc



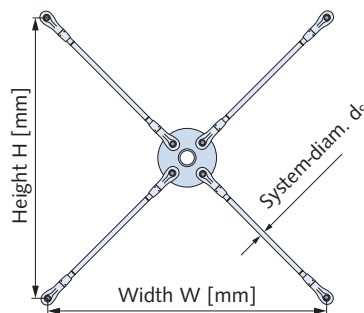
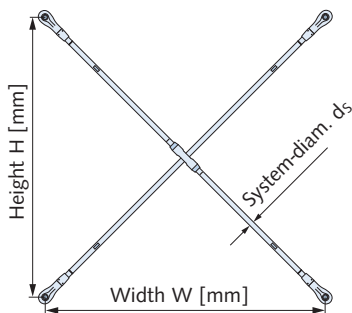
Note:

- maximum 8 tension rod connections are possible
- connecting angle $\alpha_{\min} = 40^\circ$

1. Ordering example: Anchor disc, DETAN-S, $d_s = 42$ mm, 4 holes drilled $\alpha = 40^\circ$, $\beta = 140^\circ$ (see drawing), FV
2. Ordering example: Anchor disc, DETAN-S, $d_s = 24$ mm, 8 holes drilled $\alpha = 45^\circ$ (see drawing), FV

System DETAN-S, European Technical Assessment ETA-05/0207

| System diameter d_s [mm] | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 | 85 | 95 |
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|



Alternatively, please enquiries for **complete systems** with bracings as cross couplers or as anchor disks. **A drawing with system dimensions is sufficient.**

Set articles and individual components

| | | | |
|--|--|--|----------------------------------|
| | • Tension rod (specify rod length separately) | | • Pin |
| | • Fork connection set: Fork, locking-nuts, pins, circlips, sealing kit, left-hand thread | | • Locking nut, left-hand thread |
| | • Fork connection set: Fork, locking-nuts, pins, circlips, sealing kit, right-hand thread | | • Locking nut, right-hand thread |
| | • Coupler set: coupler + 2 locking-nuts, sealing kit | | • Flat seal |
| | • Coupler set with lug: coupler with lug + 2 locking-nuts, sealing kit | | • Round seal |
| | • Cross coupler set: cross coupler + 2 locking-nuts, sealing kit | | • Circlip for one fork |
| | • Spanner | | • Coupler, with lug |
| | | | • Coupler, without lug |
| | | | • Fork, left-hand thread |
| | | | • Fork, right-hand thread |
| | | | • Cross coupler |

European Technical Assessment is only valid when using components as a complete system

1. Ordering example: Connection set, DETAN-S, $d_s = 20$ mm, left-hand thread, FV
2. Ordering example: Tension rod, DETAN-S, $d_s = 10$ mm, $L = 500$ mm, thread length left = 120 mm, thread length right = 150 mm

DETAN ROD SYSTEMS

System DETAN-S, European Technical Assessment ETA-05/0207

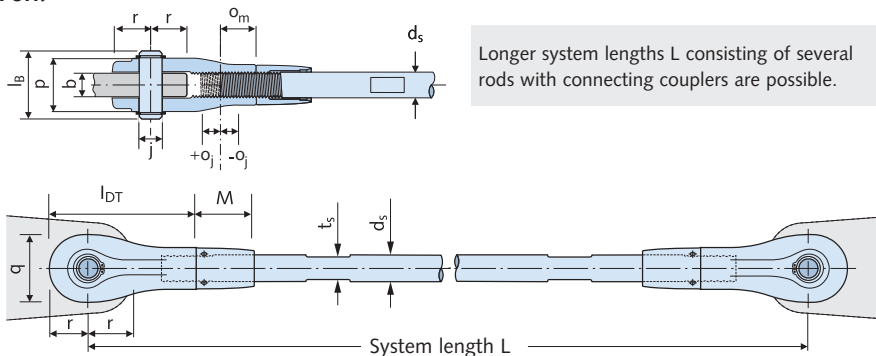
| System components — materials and finish | | | | | | | |
|--|--------------------|-------------|-------|--------------------|------------|------------------------|--------------------|
| | Tension rod | | | Fork | | Couplers, locking-nuts | Anchor disc |
| System diameter d_s [mm] | 10–12 | 16–76 | 85–95 | 10–12 | 16–95 | 10–95 | 10–95 |
| Material | S355J2 | S520 | S470 | S355J2 | G20 Mn5+QT | S355J2/S235JR | S355J2 |
| Finish | hot-dip galvanized | | | hot-dip galvanized | | hot-dip galvanized | hot-dip galvanized |
| | FV | mill finish | | hot-dip galvanized | | hot-dip galvanized | hot-dip galvanized |

| System load capacities; system- and available rod lengths; material specification, steel strength grade S355 (diameter d_s 10-12) or S470/S520 | | | | | | | | | | | | | | | | |
|--|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| System diameter d_s [mm] | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 | 85 | 95 |
| System load capacities | | | | | | | | | | | | | | | | |
| Load capacity $F_{t,R,d}$ [kN] | 21.3 | 30.94 | 81.22 | 126.9 | 182.7 | 238.1 | 290.6 | 423.4 | 581.1 | 763.7 | 911.3 | 1052.4 | 1224.5 | 2016.2 | 2493.7 | 3161.6 |
| Available minimum system length L [mm] | | | | | | | | | | | | | | | | |
| mill finish, hot-dip galvanized | 250 | 310 | 360 | 440 | 520 | 560 | 600 | 700 | 810 | 940 | 990 | 1050 | 1160 | 1480 | 1640 | 1810 |
| Available maximum system length with <u>one</u> rod [mm] | | | | | | | | | | | | | | | | |
| mill finish, hot-dip galvanized | 6060 | 6070 | 12080 | 12100 | 12120 | 12140 | 12140 | 12170 | 12220 | 12260 | 12270 | 12290 | 12320 | 15430 | 15480 | 15530 |
| Available maximum rod length L [mm] | | | | | | | | | | | | | | | | |
| mill finish, hot-dip galvanized | 6000 | | | 12000 | | | | | | | | | | 15000 | | |

In accordance with ETA-05/0207 the partial safety value for the table above are assumed as $\gamma_{M0} = 1.0$ and $\gamma_{M2} = 1.25$

Design load $F_{t,R,d}$ according to annex B11 of ETA-05/0207. The load capacities in this table were determined on the basis of different available material strengths. The up to 15% higher design values can be achieved with strength class S520. The design values of all strength classes can be found in annex B11 of ETA-05/0207.

Fork



| System dimensions [mm], materials — see table above | | | | | | | | | | | | | | | | |
|---|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--|--|
| System diameter d_s | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 ① | | |
| Fork length l_{DT} | 60 | 73 | 89 | 110 | 133 | 147 | 160 | 192 | 225 | 265 | 285 | 305 | 335 | 460 | | |
| Pin length l_B | 28 | 32 | 44 | 52 | 60 | 65 | 72 | 84 | 97 | 111 | 119 | 130 | 139 | 180 | | |
| Fork width p | 20 | 24 | 33 | 40 | 46 | 51 | 57 | 68 | 79 | 90 | 98 | 107 | 116 | 146 | | |
| Fork height q | 26 | 31 | 41 | 51 | 61 | 69 | 75 | 90 | 105 | 119 | 125 | 137 | 146 | 196 | | |
| Thread depth o_m | 15.0 | 18.5 | 22.5 | 27.0 | 34.0 | 37.5 | 42.5 | 51.0 | 55.0 | 62.5 | 70.5 | 77.5 | 85.0 | 115 | | |
| Screw adjustment range o_j | 5.0 | 6.5 | 7.5 | 8.0 | 11.0 | 12.5 | 12.5 | 14.0 | 15.0 | 17.5 | 20.0 | 22.5 | 25.0 | 39 | | |
| Length locking nut M | 24.5 | 37.0 | 41.0 | 50.0 | 58.0 | 63.0 | 64.0 | 72.0 | 83.0 | 91.0 | 98.0 | 105 | 112 | 148 | | |
| Tension rod | Spanner width t_s | | | | | | | | | | | | | Hook spanner ② | | |
| | 8 | 10 | 14 | 18 | 21 | 24 | 27 | 32 | 36 | 41 | 46 | 50 | 55 | 90/6 | | |
| Locking-nuts | With hook spanner | | | | | | | | | | | | | | | |
| | Use soft touch pliers | 25–28 | 30–32 | 34–36 | 40–42 | 45–50 | 52–55 | 68–75 | 68–75 | 80–90 | 80–90 | 80–90 | 80–90 | 155/8 | | |

① Delivery time on request.

② When using a chain tensioner instead of a hook spanner we recommend protecting the rod surface against damage (also applies to the couplers).

Corrosion protection: rod thread hot-dip galvanized. Fork threads sealed with stoppers. Also see page 20 for sealing system

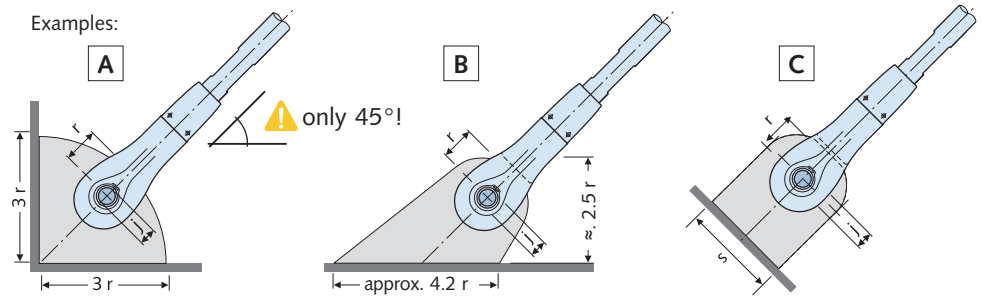
DETAN ROD SYSTEMS

System DETAN-S, European Technical Assessment ETA-05/0207

Connecting plates

The load transfer from the rod system into the plates is considered as verified if the dimensions in the table have been observed.

Plates are not included in the scope of delivery.



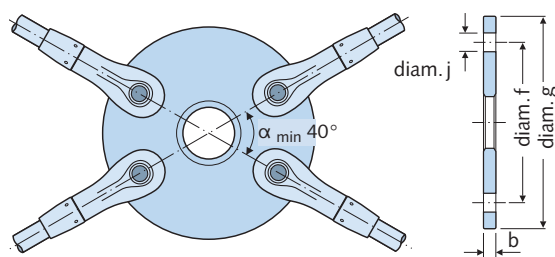
Note: A can only be used when simultaneously using the circular anchor disc at 45°, see page 19.

| Dimensions [mm]; Material — minimum qualities for diameter 10-12, steel strength grade S235JR; or for diameter 16-95, steel strength grade S355J2 | | | | | | | | | | | | | | | |
|---|-------|-----|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| System diameter | d_s | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
| Thickness conn. plate | b | 8 | 10 | 15 | 18 | 20 | 22 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 65 |
| Hole diameter for pin | j | 9.5 | 11.5 | 15.5 | 19.5 | 23.5 | 26.5 | 29.5 | 33.5 | 41 | 47 | 49 | 53 | 57 | 76 |
| Hole position | r | 15 | 18 | 24 | 29 | 35 | 39 | 43 | 51 | 60 | 70 | 76 | 83 | 88 | 129 |
| Minimum width | s | 28 | 33 | 41 | 53 | 66 | 76 | 83 | 97 | 117 | 134 | 143 | 152 | 162 | 222 |

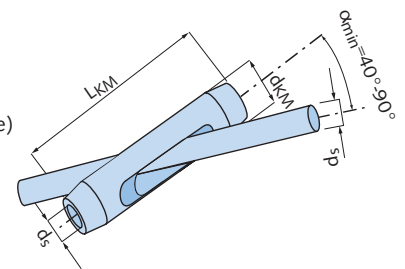
Cross bracing

Option 1: Anchor disc, Standard K40 (smallest connecting angle $\alpha_{\min} = 40^\circ$)

Example: Anchor disc with 4 tension rods (max. of 8 rod connections per disc)



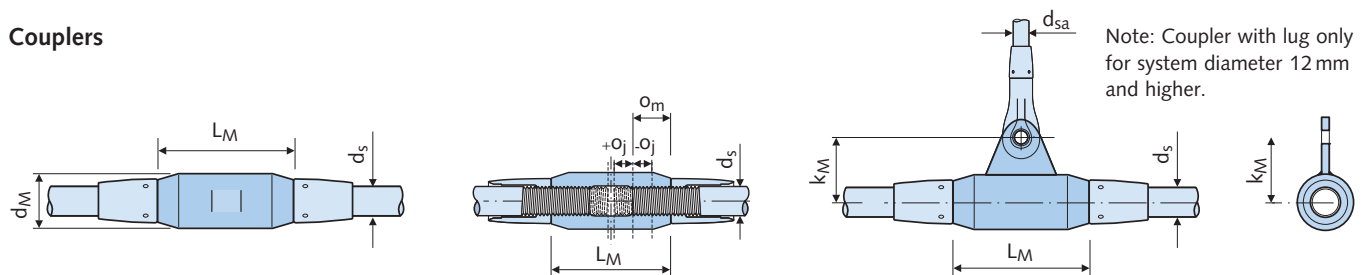
Option 2: Cross coupler (connecting angle $\alpha = 40^\circ - 90^\circ$)



| Anchor disc — Dimensions [mm]; material specification, steel strength grade S355J2, hot-dip galvanized | | | | | | | | | | | | | | | |
|--|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| System diameter | d_s | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
| Diameter of outer holes | f | 90 | 110 | 140 | 180 | 210 | 240 | 260 | 310 | 360 | 420 | 450 | 490 | 520 | 702 |
| Outer anchor disc - diam. | g | 120 | 146 | 186 | 238 | 280 | 318 | 346 | 412 | 480 | 558 | 600 | 652 | 692 | 960 |

| Cross coupler — Dimensions [mm]; material specification, steel strength grade S355J2, hot-dip galvanized | | | | | | | | | | | | | | | |
|--|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| System diameter | d_s | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
| Coupler length | L_{KM} | 100 | 120 | 142 | 166 | 200 | 222 | 242 | 284 | 310 | 348 | 400 | 440 | 478 | 631 |
| Coupler diameter | d_{KM} | 20 | 24 | 32 | 39 | 46 | 52 | 57 | 70 | 80 | 93 | 101 | 112 | 120 | 154 |

Couplers



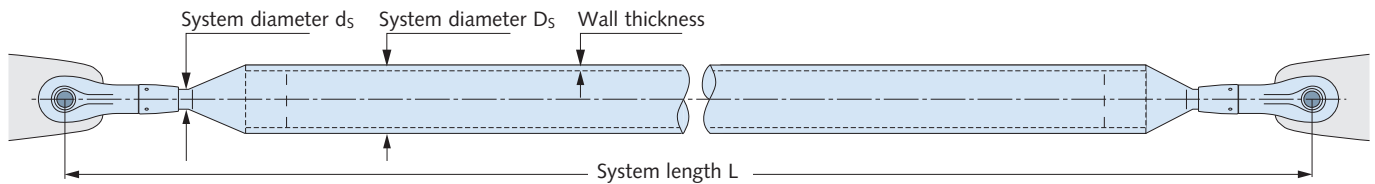
| Dimensions [mm]; material specification, steel strength grade S355J2, hot-dip galvanized | | | | | | | | | | | | | | | |
|--|----------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|
| System diameter | d_s | 10 | 12 | 16 | 20 | 24 | 27 | 30 | 36 | 42 | 48 | 52 | 56 | 60 | 76 |
| Coupler length | L_M | 40 | 50 | 62 | 78 | 94 | 104 | 120 | 140 | 158 | 180 | 195 | 210 | 245 | 328 |
| Coupler diameter | d_M | 20 | 22 | 28 | 35 | 42 | 47 | 53 | 64 | 75 | 87 | 93 | 98 | 104 | 155 |
| Thread depth | o_m | 15.0 | 18.5 | 22.5 | 27.0 | 34.0 | 37.5 | 42.5 | 51.0 | 55.0 | 62.5 | 70.5 | 77.5 | 85.0 | 115 |
| Screw adjustment range | o_j | 5.0 | 6.5 | 7.5 | 8.0 | 11.0 | 12.5 | 12.5 | 14.0 | 15.0 | 17.5 | 20.0 | 22.5 | 25.0 | 39 |
| Suspension system diam. | d_{sa} | - | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 12 | 12 | 12 | 12 | 12 |
| Offset of suspension hole | k_m | - | 28.0 | 31.0 | 44.5 | 48.0 | 50.5 | 57.5 | 72.0 | 86.5 | 98.5 | 111.5 | 124.5 | 137.0 | 140.0 |
| Hook spanner size | | - | - | - | - | - | - | - | - | - | - | - | - | - | 155/8 |

DETAN ROD SYSTEMS

Product Range Overview: DETAN Compression Rod System

DETAN Compression rod

To complement the DETAN Tension rod system we also offer compression rods, which can be incorporated technically and aesthetically perfect into a system. Compression rods consist of larger diameter tubes, which are tapered at each end allowing standard DETAN Fork heads to be used.

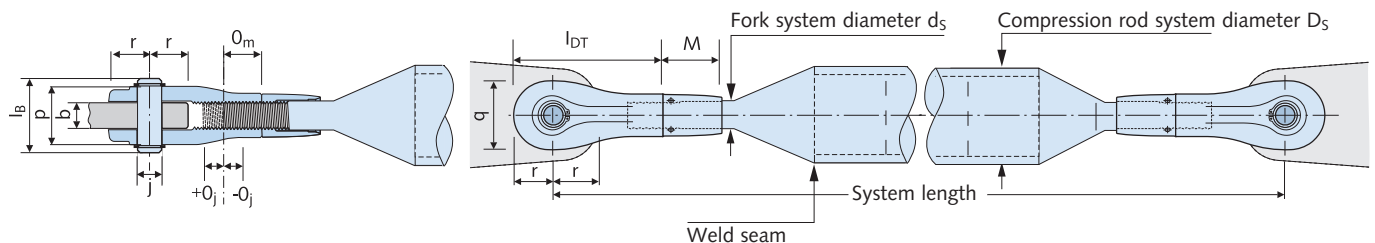


Ordering example: Compression rod system, DETAN-S, $D_s = 42$ mm, $L = 2000$ mm, fork connector $d_s = 16$ mm

| Rod cross-sections — examples / recommended configurations | | | | | | | |
|--|------|------|------|------|------|-------|-------|
| System - Ø D_s [mm] | 42 | 54 | 60 | 76 | 89 | 114 | 139 |
| Rod diameter | 42.4 | 54.0 | 60.3 | 76.1 | 88.9 | 114.3 | 139.7 |
| Wall thickness | 2.6 | 2.6 | 2.9 | 2.9 | 3.2 | 3.6 | 4.0 |
| Other rod dimensions are also available. Please contact us for further information. | | | | | | | |

! Static calculation of compression rods is required for individual projects. A free DETAN Calculation program is available. Contact us if you require assistance. An enquiry with drawings, system dimensions and static verification is also possible.

System components and materials



All fork and connecting plate system dimensions; see page 14–15 (steel)

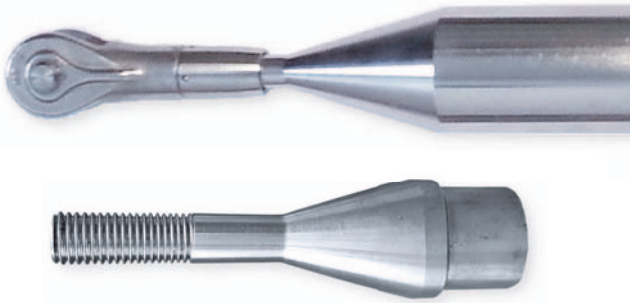
| Compression rod in steel | | | |
|----------------------------|--|-----------------------------------|--------------------|
| | Compression rod | Fork | Locking nut |
| System diameter D_s [mm] | 42-139/according to statics calculations | according to statics calculations | see fork |
| Material | S355J2 | G20 Mn5+QT | S235JR |
| Finish | FV | hot-dip galvanized | hot-dip galvanized |
| | WB | mill finish | hot-dip galvanized |

DETAN ROD SYSTEMS

DETAN Compression Rod System

System assembly

Length adjustment at the forks.
The cone (with thread) is inserted in the rod and secured with a continuous weld.
Available as a custom piece with at least one fork.



Duplex-coatings

Custom colour design: Powder coating

Two criteria can be met with a protective powder coating:
Free architectural design using colour with simultaneous improvement of the corrosion protection.
The coatings can be applied by a certified coating specialist.

Duplex-coating (Hot-dip galvanized + paint coating or powder coating) according to EN ISO 12944-5.



Safety instructions and installation information

See page 19 for assembly and safety instructions. More information for DETAN Rod systems assembly can be found in the installation instruction INST_DT.



Scan the QR to download the assembly instructions as a pdf file or go to,
www.halfen.com/products/tension-rod-systems/detan-rod-system/product-information



Scan the QR code for an installation video or go to,

www.halfen.com/service/videos/tension-rod-systems



Fire protection

There are reactive fire protection systems for steel elements with round profiles approved by the German Institute of Construction Engineering (*DIBt, Deutsches Institut für Bautechnik*) on the market. We can gladly put you in touch with the supplier of such systems.

Downloads and information about the fire protection system HENSOTHERM® 421 KS by Rudolf Hensel GmbH, are available on the website at www.rudolf-hensel.de/421KS.



DETAN ROD SYSTEMS

Couplers and Compression Rods

DETAN Cross couplers



Cross coupler with a minimal cross angle of 40°



Cross-bracing with a cross coupler

The DETAN Cross coupler is an alternative to the anchor disc cross coupler. The new cross coupler can be used for minimum crossing angles. The cross coupler can be used instead of the anchor disc and 4 fork heads. In both cases the same load capacity is guaranteed.

The DETAN Cross couplers are elegant solutions and allow contactless crossing of tension rods in the same plane. Other advantages are the moderate costs compared to an anchor disc solution and the easy installation.

DETAN Compression rods



Bracing between an exterior steel column and an interior steel beam



Compression system connected to a welded plate

The DETAN Rod system is an intelligent system combining tension and compression rods. To complement the DETAN Rod system we also supply compression rods that integrate perfect both visually and technically into the system. To blend in and to match the tension rods the compression rods taper towards the rod-ends. This allows use of the same design of fork and locking-nuts to give a uniform design. The concept is especially convincing as the forks are suitable for compression as well as for tension loads. This combination of tension and compression rods is therefore technically very beneficial.

In addition to standard pipe profiles we also provide other pipe cross-sections and special solutions.

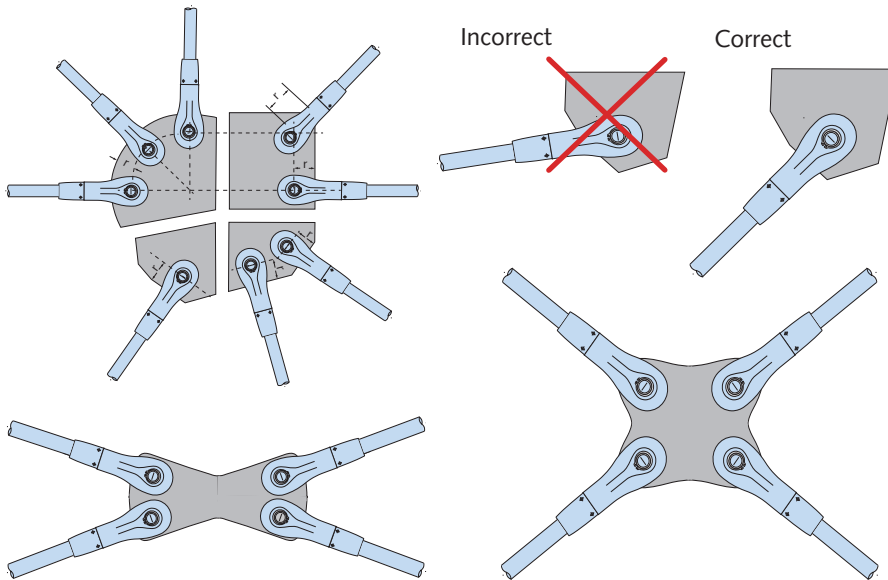
The compression rod systems are pre-assembled with our standard forks and locking-nuts.

DETAN ROD SYSTEMS

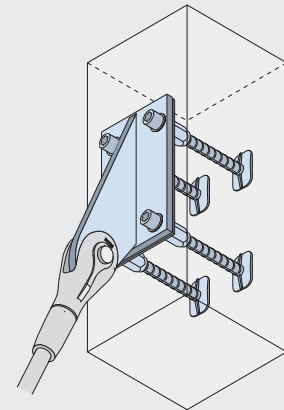
Connection plates and Installation

Examples – Connection plates and anchor discs

Connection plates



The connecting elements shown here are only examples of our custom solutions illustrating possible shapes of connecting plates. These steel plates are not standard products. Drawings are always required for enquiries and estimates.



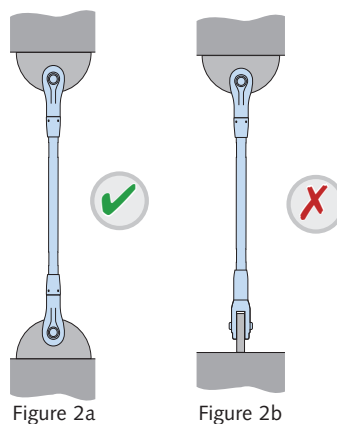
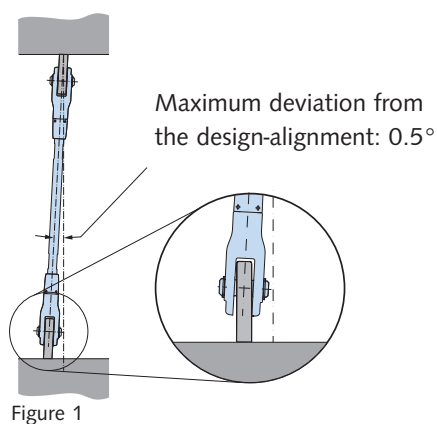
HALFEN Universal connection

A Technical Product Information pdf document can be downloaded here:



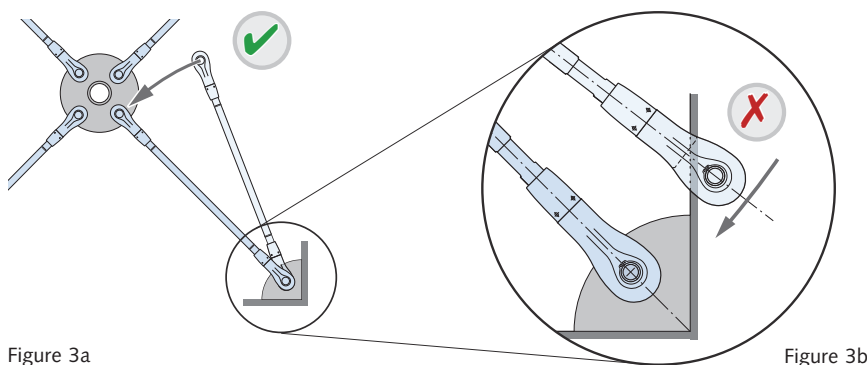
[www.halfen.com/products/reinforcement-systems/HUC Universal connection](http://www.halfen.com/products/reinforcement-systems/HUC%20Universal%20connection)

Installation and safety notes



Forks must be **correctly aligned** and positioned in the **same plane** (Figure 1 and 2a) to ensure that the tension system is not subjected to bending.

To ensure the rod can be installed, one fork end of the rod **must be able to swing into place**; this may not always be possible (see figure 3b). An **anchor disk** must be used in this case, to allow correct installation (see figure 3a).



! Prior to installation all DETAN Rod system components must be checked for damage. Damaged components must not be used.

i More information can be found in the installation instruction **INST_DT** (see page 17)

DETAN ROD SYSTEMS

The Advantages at a Glance

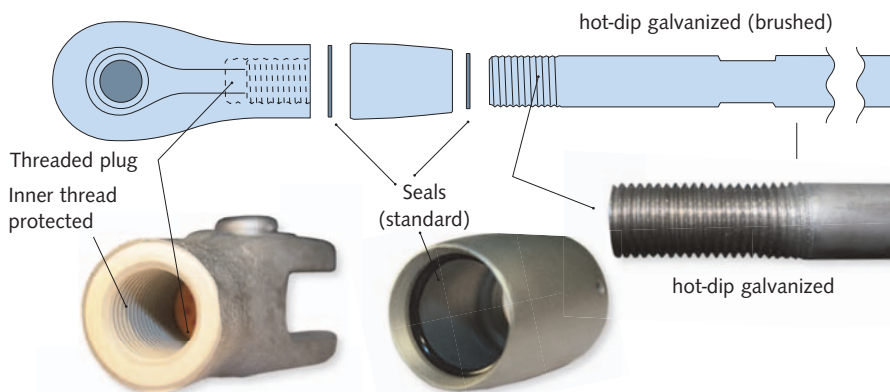
Corrosion protection

The DETAN Rod systems offer high protection against corrosion, especially for vulnerable parts of the system, e.g. the threads.

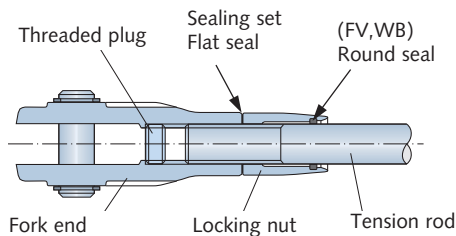
The forks and locking-nuts are hot-dip galvanized to ensure durable top-quality protection against corrosion as well as to ensure good mechanical resistance.

Reliable and durable

- tension rods are completely hot-dip galvanized after production
- no danger of hydrogen embrittlement
- no flaking zinc
- large spanner flats ensure that rod can be properly tightened
- forks and locking-nuts are hot-dip galvanized
- threads are corrosion protected
- threads are additionally protected against humidity and contamination
- sealing-sets as standard for rods with diameter 16 mm or larger



Sealing systems for system-component (for tension and compressure rods) = effective protection against humidity and contamination



All forks are delivered with a threaded cap inserted to protect the thread as standard. The caps are colour-coded to help identify the thread direction:
Yellow = right-hand thread,
Blue = left-hand thread.

A special sealing system is provided as standard for additional protection

for all rod diameters larger 16 mm. We recommend sealing the outer joint of the locking-nuts on-site with a durable elastic silicone suitable for outdoor application. In general, all connecting couplers smaller than M16 should always be sealed using suitable silicone sealant.

Optimal on-site logistics



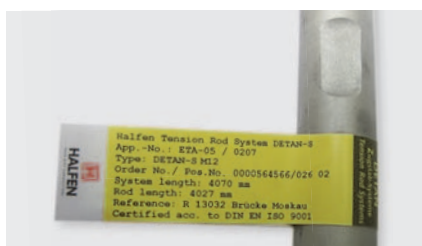
Rod marked with system information

Avoid mix-ups on-site with system specific rod marking

- all rods are clearly marked with contract and customer specific data (order and rod position number, rod length, system size)
- standard for systems diameter 16 – 60 mm (DETAN-S)

Easy and customer-friendly labels with specific information

- includes product-specific information, e.g. system length, system diameter
- exact identification and sorting with item position numbers
- optimized and efficient on-site logistics
- customer specified information possible: Project-data, e.g. floor numbers or node position



Label with product-specific data

DETAN ROD SYSTEMS

DETAN Design Software

Certified quality

Pre-assembled delivery

The DETAN Rod systems up to and including 60 mm diameter will be delivered pre-assembled. (76 mm diameter rods and larger are delivered in separate components). Larger system elements will be separated at the couplers as required to enable delivery.

Economic and time saving

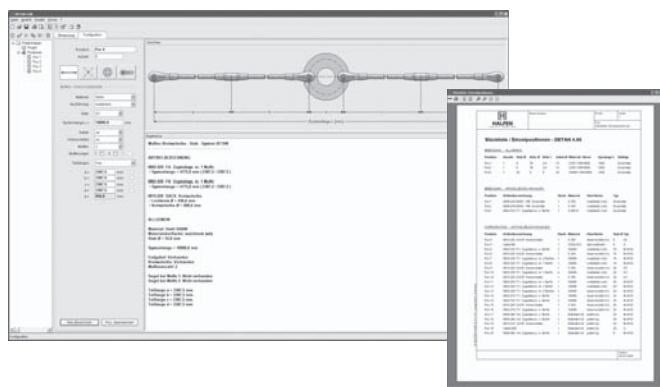
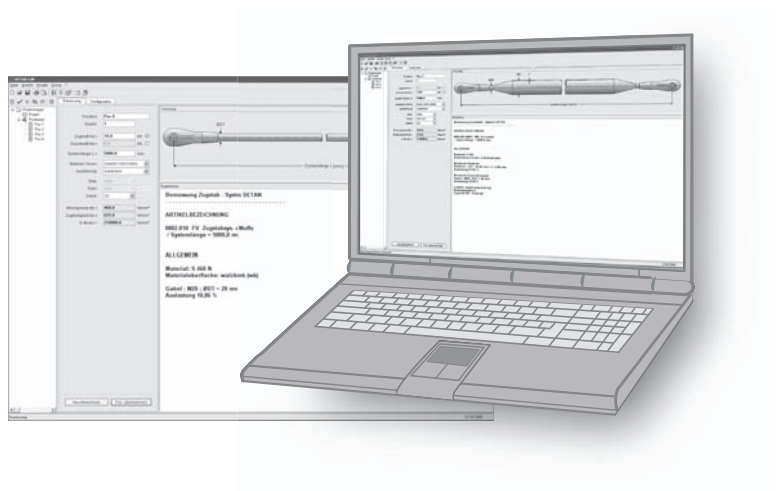
- no further on-site assembly required
- no danger of mix-ups
- pre-assembled to system length $L + o_j$ → see pages 12 and 14
- free movement of threads ensured
- easy online forms available for tender request, or use the order forms attached → see pages 26-27



DETAN Design software

The DETAN design software: Structural calculation and planning tool in one programme.

- user-friendly programme interface
- structural calculation: tension rod system design according to ETA Assessment, compression rod system design according to EC3 and ETA Assessment
- various material options and finishes
- planning and ordering of custom solutions and standards
- dimension results are used to generate item lists with individual positions listed in a print-out
- up-to-date versions of the calculation program available on the internet in German, English, French, Polish, Dutch, Czech, Italian, Spanish, Portuguese, Magyar and Slovenian

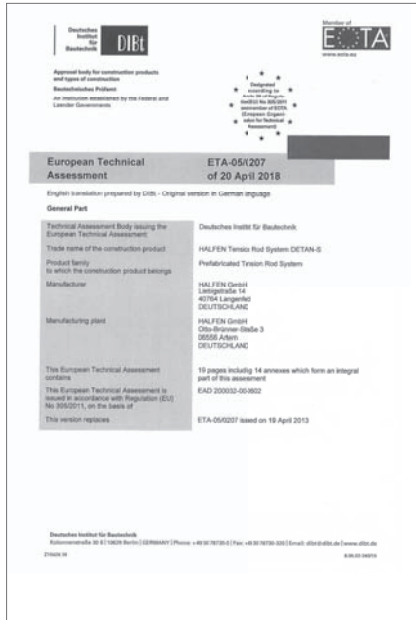


www.halfen.com/Downloads/Software-CAD/Dimensioning Software/DETAN

DETAN ROD SYSTEMS

European Technical Assessment

Assessment for DETAN-S



DETAN-S

- European Technical Assessment ETA-05/0207
- CE marking



DETAN approvals available on the internet:
www.halfen.com/Products/Tension rod system/DETAN Rod System/Product information

Assessment for DETAN-S

- tension rod system DETAN-S with European Technical Assessment ETA-05/0207
- up to 15% higher load capacities with the additional S470 and S520 strength classes which are included in the new ETA; compared with strength class S460
- CE marking recognized in all European Union countries
- design of allowable loads considering country-specific coefficients γ_{M0} and γ_{M2} (NAD) using the DETAN software
- EU wide standardised design concept
- no national approvals or certificates required
- cross couplers are a cost effective alternative to anchor discs for cross bracing

Design of compression rods

- compression rods are regulated in the ETA
- dimensioning of DETAN-S compression rods from tube material, strength class S355, according to Eurocode 3 (EN1993-1-1)

DETAN ROD SYSTEMS

DETAN Pretension Unit

DETAN Pretension unit – Advantages and basics

The exact application of pretension for system diameters 30 and larger can be difficult, therefore additional tools such as hydraulic jacks become necessary.

The HALFEN Pretension unit for use with DETAN Rod systems from M30 to M60 provides an effective solution with load transfer using a threaded-plate preventing damages to the rod surface.

Additional advantages

- › the system is optimised for DETAN Rods
- › extra lightweight aluminium design for simple assembly
- › targeted hydraulic application for tension up to 425 kN
- › no power-source needed
- › the high-quality galvanized surface is protected by special load transfer plates



- › simple control of load application with a calibrated manometer
- › additional control using optional extensometer, even after load application (if previously gauge-marked)
- › functional, simple & robust



Applying pretension

If pretensioning a system is intended then special couplers, special thread lengths and locking-nuts are required. These cannot be retrofitted and must therefore be taken into consideration at the planning stage.

Our technical support team is available to assist in any enquires. Contact information can be found at the back of this catalogue.

To apply pretension, special pretension units are available from our technical support team. The necessary rod force is converted into the required hydraulic pressure and then applied using the DETAN Pretension unit.

Pretension check

If the rod was previously gauge-marked, the pretension force can be controlled using an extensometer.

This system can be used during, as well as after load application.

This allows load control using hydraulic pressure as well as monitoring direct rod strain.

Similar to the DETAN Pretension unit this device is easy to use, is robust and also requires no power-source.



DETAN ROD SYSTEMS

DETAN Pretension Unit

Assembly of the pretension unit



Easy to attach and to operate

To avoid possible damage to the rod surface load transfer is via threaded plates. The hydraulic-system is attached in front and behind the coupler. The hydraulic jacks temporarily relieve the strain on the coupler, allowing the coupler to be easily turned by hand. When reaching the desired pressure, the hydraulic unit is released and removed. After release the coupler

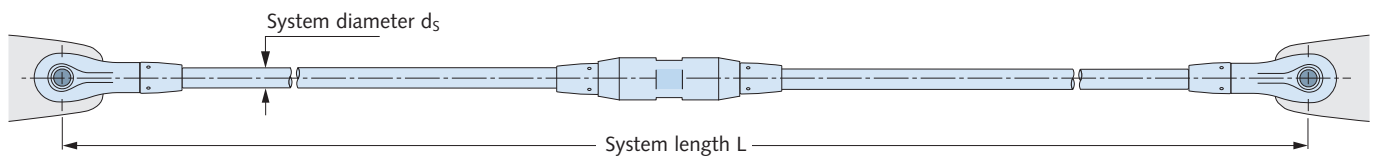
takes the load.

To ensure that the maximum recommended load has been reached the required hydraulic pressure is needed. Please refer to the table below. Alternatively the load can be checked using an extensometer.

A detailed assembly instruction is available on the Internet:
[www.halfen.com/Service/Brochures/Installation instructions/DETAN](http://www.halfen.com/Service/Brochures/Installation%20instructions/DETAN)

System variations

with pretension coupler:



Ordering example (material steel): Tension rod system, DETAN-S, $d_s = 30$ mm, $L = 5600$ mm FV, 1 pretension coupler

System load capacities, system lengths and available rod lengths

| System diameter d_s [mm] | 30 | 36 | 42 | 48 | 52 | 56 | 60 |
|--|-------|-------|-------|-------|-------|--------|--------|
| Cross-section A [mm ²] | 707 | 1018 | 1385 | 1810 | 2124 | 2463 | 2827 |
| Thread length o [mm] | 105 | 118 | 126 | 139 | 176 | 188 | 195 |
| Available min. system length with coupler L [mm] | 1076 | 1244 | 1440 | 1652 | 1758 | 1866 | 2056 |
| Load capacity $N_{R,d}$ [kN] | 290.6 | 423.4 | 581.1 | 763.7 | 911.3 | 1052.4 | 1224.5 |

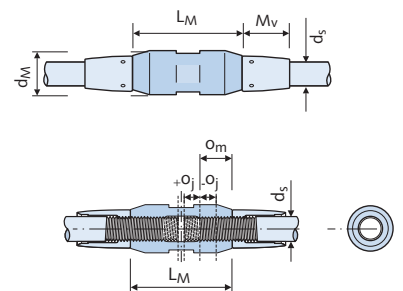
Pretension table for DETAN Rod system S (some values are rounded)

| | | | | | | | | |
|---|------------|------|------|------|------|------|------|------------------|
| Max. recommended pretension ^① [kN] | N | 116 | 169 | 232 | 305 | 365 | 421 | 425 ^② |
| Hydraulic pressure [bar] | p | 190 | 277 | 380 | 500 | 596 | 688 | 695 |
| Strain [%] | ϵ | 0.78 | 0.79 | 0.80 | 0.80 | 0.82 | 0.81 | 0.72 |
| Stress [N/mm ²] | σ | 164 | 166 | 168 | 169 | 172 | 171 | 150 |
| Elongation [μ m/10 cm] | Δl | 78 | 79 | 80 | 80 | 82 | 81 | 72 |

① Maximum recommended pretension without precise verification $\Delta \pm 40\%$ of $N_{R,d}$. ② Maximum hydraulic pressure at approx. 700 bar

Pretension coupler (all dimensions in [mm])

| System diameter d_s | 30 | 36 | 42 | 48 | 52 | 56 | 60 |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Coupler length L_M | 120 | 140 | 158 | 180 | 195 | 210 | 245 |
| Coupler diameter d_M | 53 | 64 | 75 | 87 | 93 | 98 | 104 |
| Locking nut length M_V | 99 | 107 | 118 | 126 | 158 | 165 | 172 |
| Coupler assembly SW | 46 | 55 | 65 | 75 | 80 | 85 | 90 |
| Spanner width t_s | | | | | | | |
| Tension rod assembly | 27 | 32 | 36 | 41 | 46 | 50 | 55 |
| Hook spanner size | | | | | | | |
| Locking nut assembly | 45-50 | 52-55 | 68-75 | 68-75 | 80-90 | 80-90 | 80-90 |

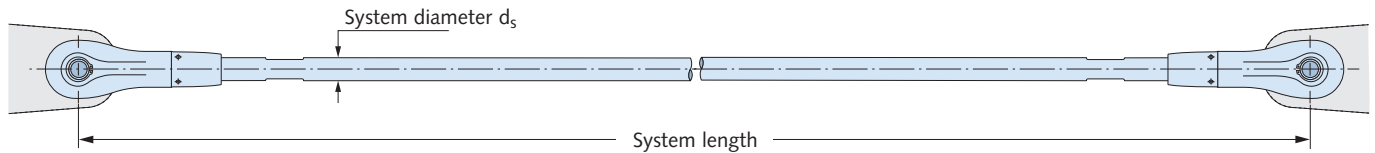


DETAN ROD SYSTEMS

Planning Help

Tender specification

HALFEN Tension rod system DETAN-S ...



HALFEN Tension rod system type DETAN-S, consisting of 1 right-hand threaded fork, 1 left-hand threaded fork, plus 1 tension rod including 2 pins, 4 circlips and 2 DT-S nuts,

with European Technical Assessment ETA 05/0207, pre-assembled and product-specific-labelled tension rod system, type DETAN-S $d_s = 30$, L, F

with

d_s = system-diameter [mm] (10 / 12 / 16 / 20 / 24 / 27 / 30 / 36 / 42 / 48 / 52 / 56 / 60 / 76)

L = system-length [mm] (from bolt-axis/to bolt-axis),

F = (material FV /WB) for hot-dip galvanized or mill finished surface

completely hot-dip galvanized finish (alternative; mill finished tension rod), or equivalent; deliver and install according to the manufacturer's installation instructions. Includes welding the connector plates according to the specifications provided by the planner.

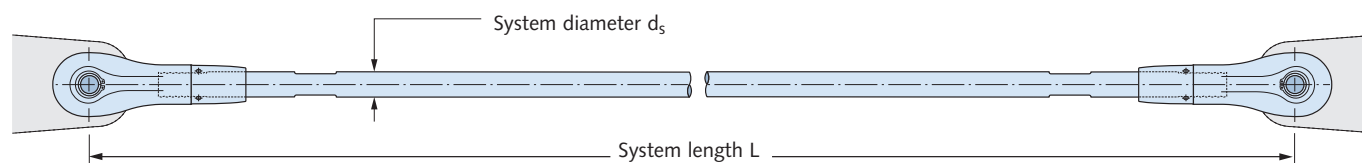
DETAN ROD SYSTEMS

Planning Help

| | | |
|---|---|--|
|  | CHECKLIST DETAN Tension rod system | Product field : DETAN Tension rod systems |
| | | Form no.: CHK-F-DT-001-E |

Customer: _____ Contact name: _____
 Customer address: _____
 Phone.: _____ Fax: _____ email: _____
 Project: _____ Project address: _____
 Date: _____ Customer no.: _____ ☐ Enquiry ☐ Estimate ☐ Order

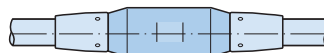
Tension rod system



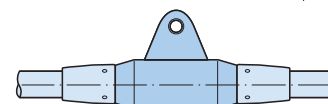
Design variants:



without coupler



with coupler


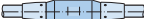


with coupler with lug

Choice of material:

DETAN-S - FV (hot-dip galvanized)
 ETA-05/0207; EN1993

DETAN-S - WB (mill finish)
 ETA-05/0207; EN1993

| Item | No. | d_s [mm] | $Z_{Ed,max}^{②}$ [kN] | L [mm] |  | Quantity ① | |  | Quantity ① | | Material choice | |
|---------|-----|---------------|--------------------------|-----------|---|------------|---|--|------------|--|-----------------|--------------------|
| | | | | | | | | | | | mill finish | hot-dip galvanized |
| Example | 3 | 30 | | 5600 | | x | 2 | | | | | x |
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①: Number of couplers in one system length

②: maximum tension load required if diameter is unknown

Please send the completed form to us by email to info.au@leviat.com. Please contact us for an estimate.

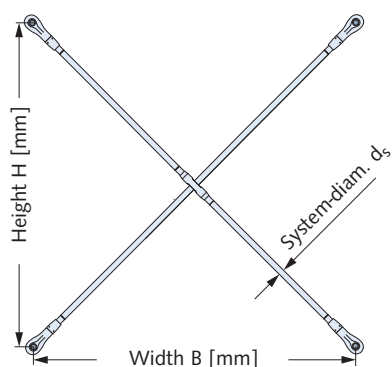
DETAN ROD SYSTEMS

Planning Help

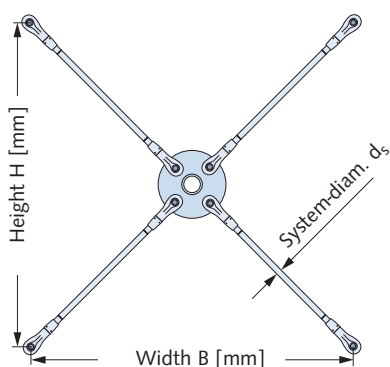
| | | |
|---|---|---|
|  | <p>CHECKLIST</p> <p>DETAN Cross bracings</p> | Product field: DETAN Tension rod systems |
| | | Form no.: CHK-F-DT-002-D |

Customer: _____ Contact name: _____
Customer address: _____
Phone: _____ Fax: _____ email: _____
Project: _____ Project address: _____
Date: _____ Customer no.: _____ ☐ Enquiry ☐ Estimate ☐ Order

Cross bracing



with cross coupler ②



with anchor disc ②

Choice of material:

DETAN-S - FV (hot-dip galvanized)
ETA-05/0207; EN1993

DETAN-S - WB (mill finish)
ETA-05/0207; EN1993

[illegible]

①: maximum tension load required if diameter is unknown

②: smallest installation angle $\alpha = 40^\circ$

More order forms are available at:
[www.halfen.com/Products/Tension rod system/Order form](http://www.halfen.com/Products/Tension_rod_system/Order_form)
 Information about DETAN Dimensioning software → page 21

Please send the completed form to us by email to **info.au@leviat.com**. Please contact us for an estimate.





Leviat®
A CRH COMPANY

**Innovative engineered products and construction solutions
that allow the industry to build safer, stronger and faster.**



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Innovative engineered products and
construction solutions that allow
the industry to build safer,
stronger and faster.



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