

DETAN ROD SYSTEMS

TECHNICAL PRODUCT INFORMATION



DETAN ROD SYSTEMS

DT 16.1-E

FAÇADE



HALFEN
YOUR BEST CONNECTIONS

HALFEN DETAN

The filigree tension and compression rod system

Modern architecture strives to be both practical and functional, but also to design more artistically exceptional buildings. With the DETAN Rod system, HALFEN provides an innovative product solution which meets all the requirements; maximum aesthetics, technological reliability, and quality.

HALFEN provides a design software and qualified support to optimize planning of your tension and compression rod system.

Quality characteristics

- Project specific configurations for system diameter and length
- High steel load capacities
- Large selection of rod diameters
- Hot-dip galvanized and stainless steel finishes
- Hot-dip galvanized, brushed threads
- Seal-sets for maximum corrosion protection

Additional advantages

- Compression rods complement the DETAN System
- Cross couplers available as an alternative to disc couplers
- Complimentary design-software and planning support



Optimized site-logistics

Efficient rod marking and project specific labelling for easy installation.

DETAN Rod systems are delivered preassembled.

Applications

- Lattice frame elements and wind bracing in roofs and walls
- Suspension of pylons and canopies
- Bracing of timber and steel support beams
- Back-bracing of glass façades
- Suspension of pedestrian bridges



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Highest quality and maximum aesthetics.

DETAN ROD SYSTEMS

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DETAN ROD SYSTEM-S460

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DETAN ROD SYSTEM-Stainless steel

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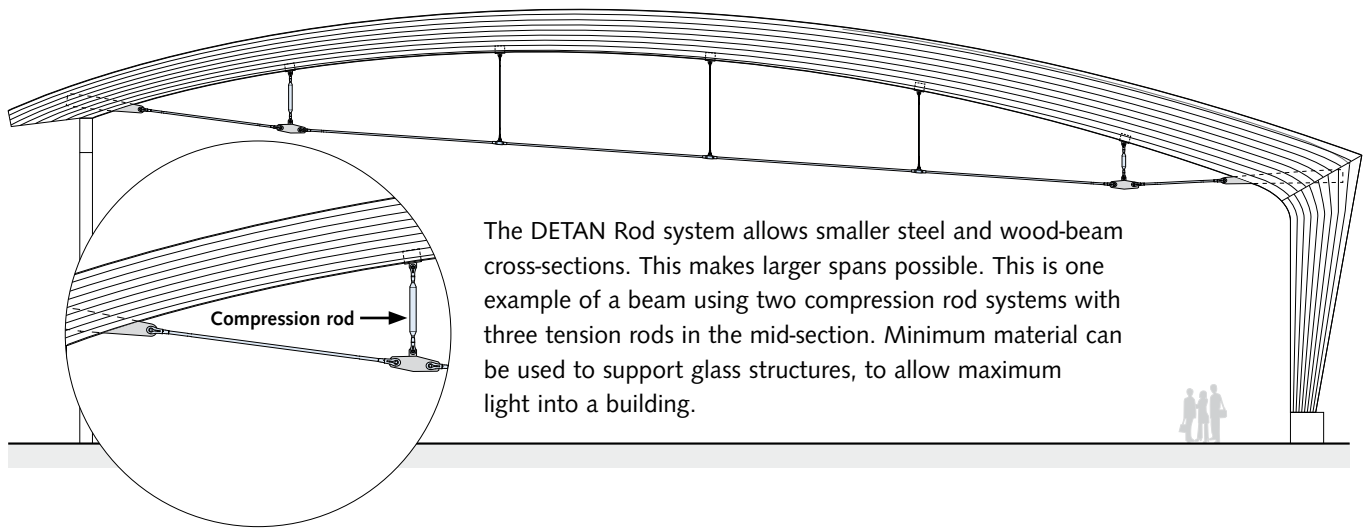
Applications

Application – examples

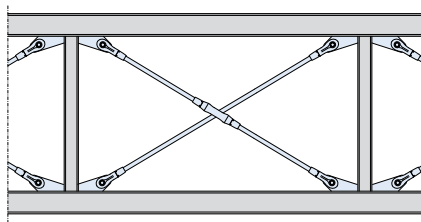
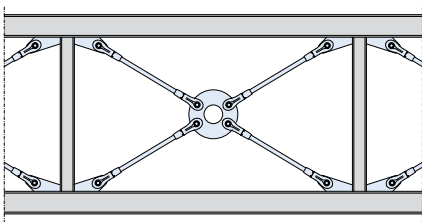
The DETAN Tension and compression rod systems are a perfect match, both structurally and aesthetically. DETAN is suitable for use in all types of bracing applications.

To complement the DETAN range we offer a wide selection of services and accessories, for example, disc couplers and cross couplers; providing construction details and assistance in further possible applications.

Bracing under beams

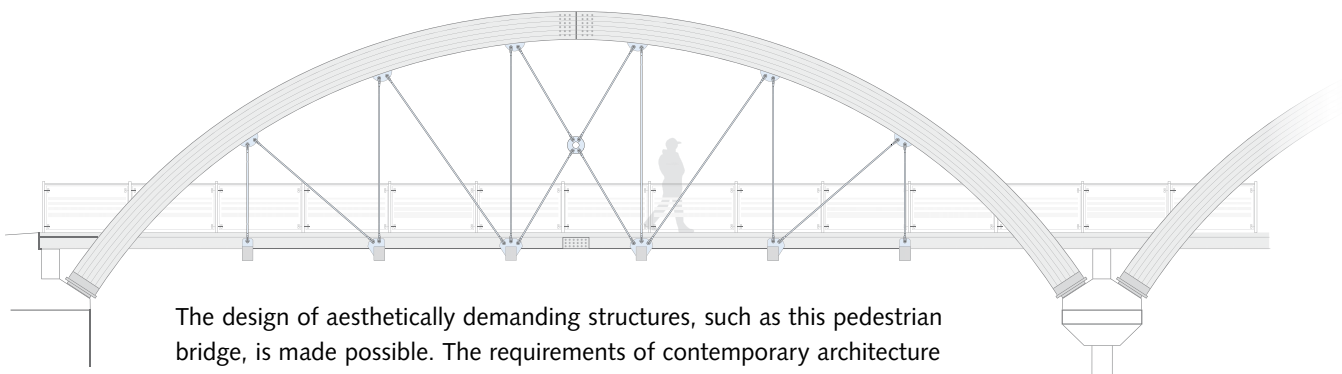


Stiffeners and Bracings



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

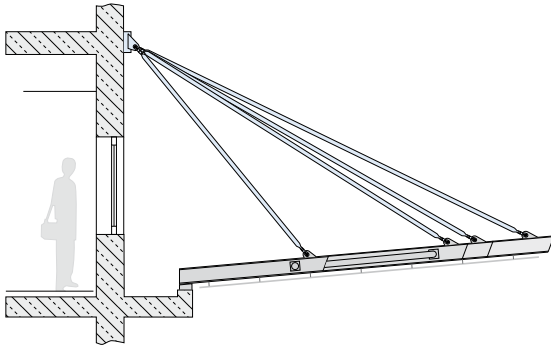


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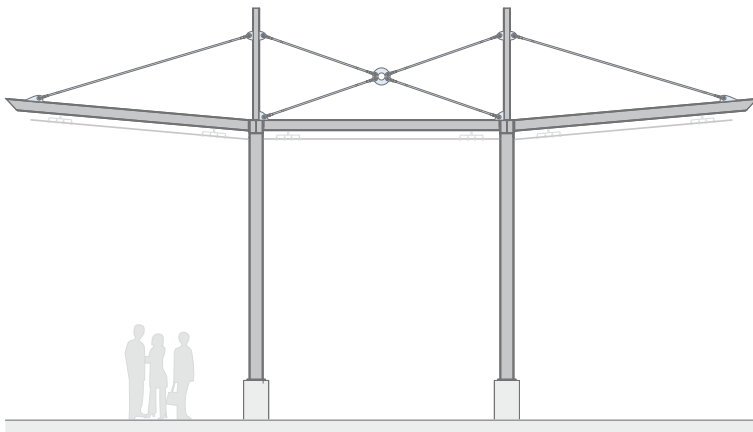
Applications

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

Project:
The Sage, Gateshead,
England, UK

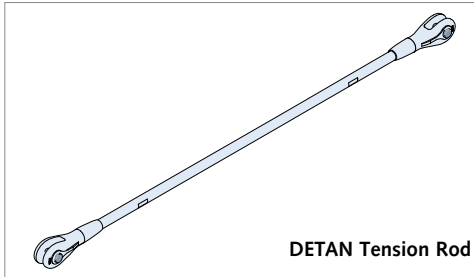
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DETAN ROD SYSTEMS

System Overview

DETAN Tension rod system

Basic system:

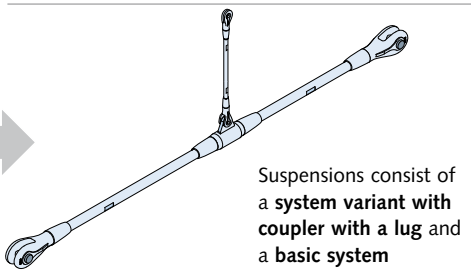
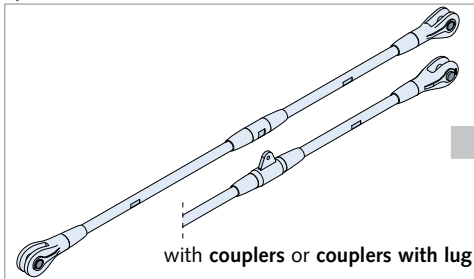


Ordering procedure → page 9
 Load capacity, system dimensions and materials:
 Steel S460 → pages 12-13
 Stainless steel → pages 14-15

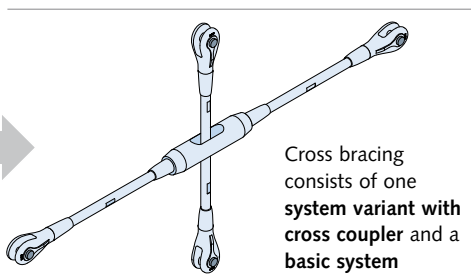
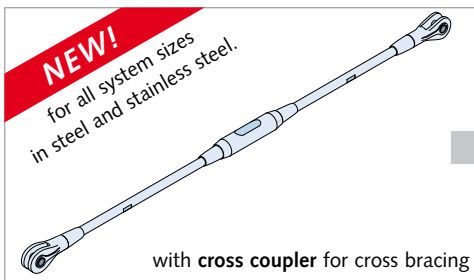


The DETAN Rod systems are only approved for predominantly static loads.

System variants:

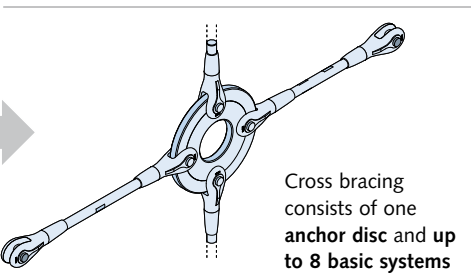
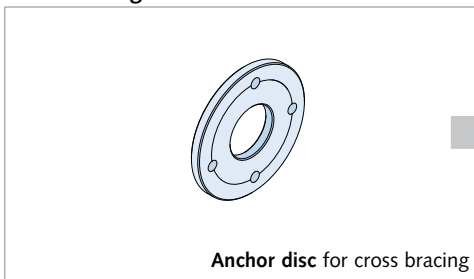


Ordering example → page 9
 Load capacity, system dimensions and materials:
 Steel S460 → pages 12-13
 Stainless steel → pages 14-15



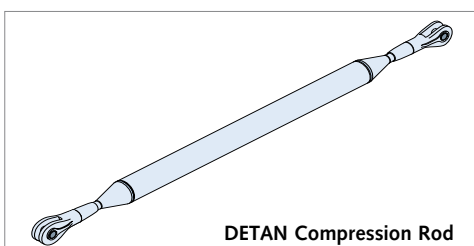
Ordering example → page 10
 Load capacity, system dimensions and materials:
 Steel S460 → pages 12-13
 Stainless steel → pages 14-15

Cross bracing:



Ordering example → page 11
 Load capacity, system dimensions and materials:
 Steel S460 → pages 12-13
 Stainless steel → pages 14-15

DETAN Compression rod system



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

HALFEN Pretension unit



More information → pages 23-24

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

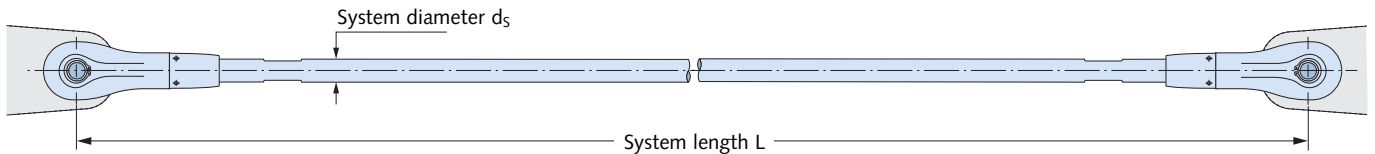
Ordering procedure

Example order: Tension rod system, DETAN-S460, $d_s = 30$ 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

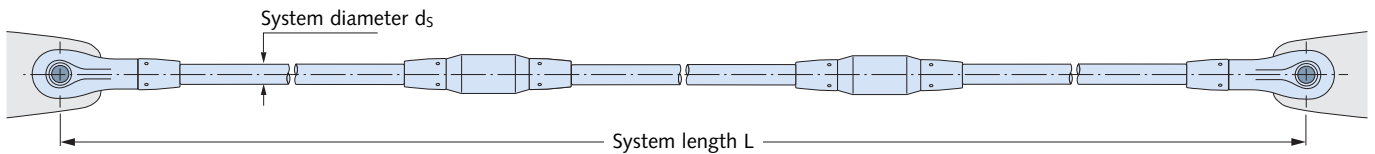
Basic system



Ordering example (material steel HDG): Tension rod system, DETAN-S460, $d_s = 52$ mm, $L = 3620$ mm FV

System variants

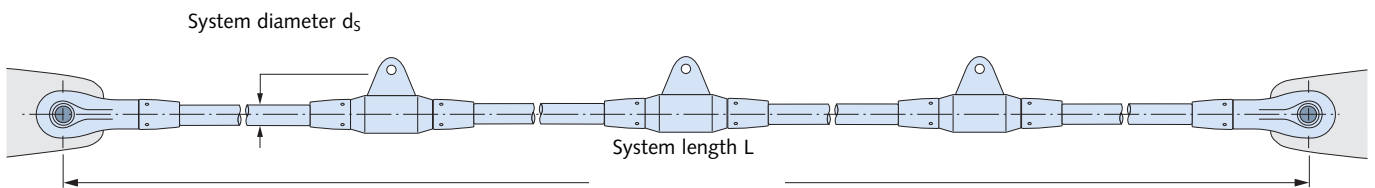
with coupler:



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

Note: Maximum 5 couplers are possible.

coupler with lug:



Ordering example (material steel HDG): Tension rod system, DETAN-S460, $d_s = 30$ mm, $L = 34000$ mm FV, 3 couplers with lug

System DETAN-S460, European Technical Approval ETA-05/0207

System diameter d_s [mm]	10	12	16	20	24	27	30	36	42	48	52	56	60	76	85	95
Available minimum system length L [mm]																
Rod hot-dip galvanized	250	310	360	440	520	560	600	700	810	940	990	1050	1160	1480	1640	1810
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	15480	15530

System DETAN-E, European Technical Approval ETA-11/0311

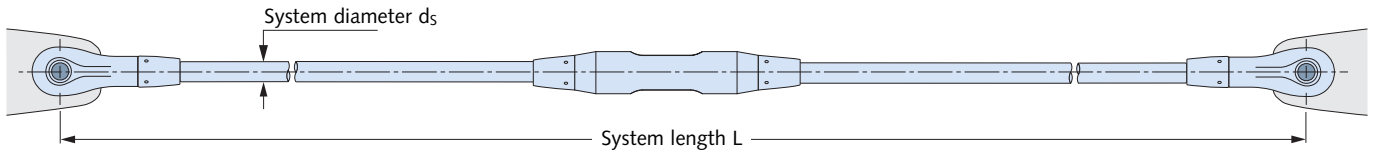
System diameter d_s [mm]	6	8	10	12	16	20	24	27	30
Available minimum system length L [mm]									
polished	190	210	250	310	360	440	520	560	600
Available maximum system length L with <u>one</u> rod [mm]									
polished	3040	6050	6060	6070	6080	6100	6120	6140	6140

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

System variants

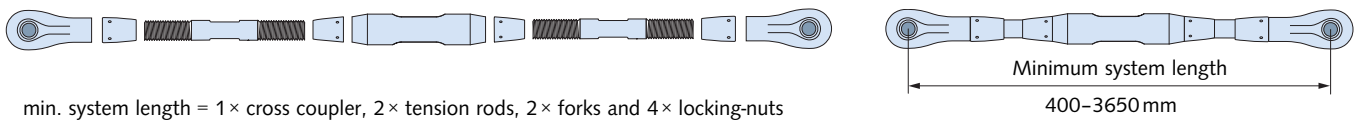
Cross coupler for cross bracing:



Ordering example (material steel HDG): Tension rod system, DETAN-S460, $d_s = 30$ mm, $L = 5600$ mm FV, 1 cross coupler

DETAN-S460 System																		
System - Ø d_s [mm]	6	8	10	12	16	20	24	27	30	36	42	48	52	56	60	76	85	95
Min. L system length	190	210	250	310	360	440	520	560	600	700	810	940	990	1050	1160	1480	1640	1810
Reduction for 2× fork	44	51	60	73	85	107	128	140	148	179	220	264	277	290	324	432	482	532
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	130.0	155.0
L_{km}	70	85	100	120	142	166	200	222	242	284	310	348	400	440	478	631	710	830
min. system length	400	450	550	650	750	900	1050	1150	1200	1400	1600	1850	2000	2100	2300	2950	3250	3650

Minimal system length



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

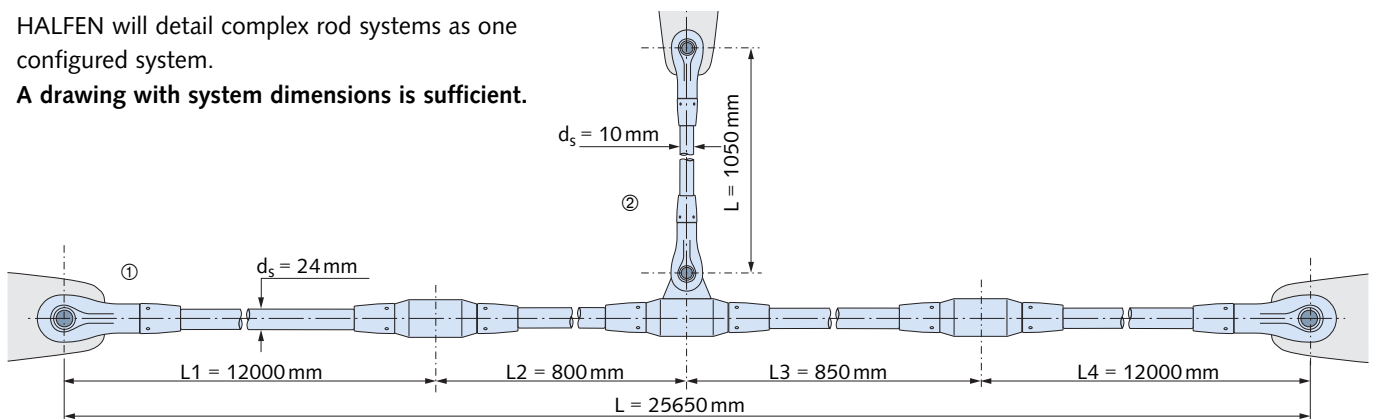
System variant with asymmetric distribution of couplers

Order with specification of system length L:

HALFEN calculates 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 the HALFEN dimensioning software, see page 21.

HALFEN will detail complex rod systems as one configured system.

A drawing with system dimensions is sufficient.



Ordering example:

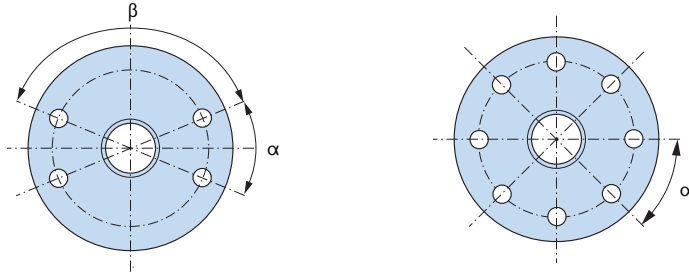
- ① Tension Rod System, DETAN-S460, $d_s = 24$ mm, system length according to drawing, WB, couplers according to drawing
- ② Tension Rod System, DETAN-S460, $d_s = 10$ mm, system length $L = 1050$ mm WB

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Product Range Overview: Cross Bracings, DETAN Compression Rod System

Cross bracings

Anchor disc



Note:

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

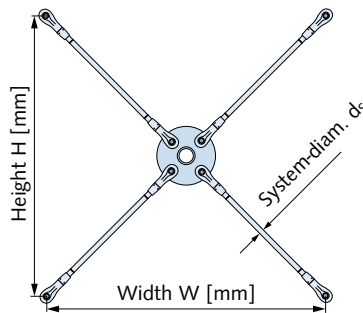
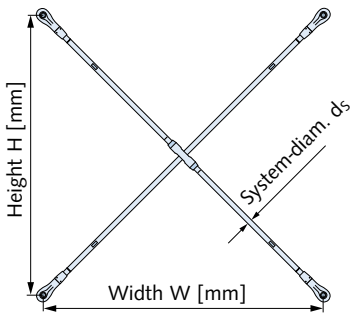
1. Ordering example (material steel): Anchor disc, DETAN-S460, $d_s = 42$ mm, 4 holes drilled $\alpha = 40^\circ$, $\beta = 140^\circ$ (see drawing), FV
2. Ordering example (material stainless steel): Anchor disc, DETAN-E, $d_s = 24$ mm, 8 holes drilled $\alpha = 45^\circ$ (see drawing)

System DETAN-S460, European Technical Approval ETA-05/0207

System diameter d_s [mm]	10	12	16	20	24	27	30	36	42	48	52	56	60	76	85	95
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System DETAN-E, European Technical Approval ETA-11/0311

System diameter d_s [mm]	6	8	10	12	16	20	24	27	30
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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 ①, left-hand thread		• Locking nut, left-hand thread
	• Fork connection set: Fork, locking nuts, pins, circlips, sealing kit ①, right-hand thread		• Locking nut, right-hand thread
	• Coupler set: coupler + 2 locking nuts, sealing kit ①		• Flat seal
	• Coupler set with lug: coupler with lug + 2 locking nuts, sealing kit ①		• Round seal
	• Cross coupler set: cross coupler + 2 locking nuts, sealing kit ①		• Circlip for one fork
	• Spanner		• Coupler, with lug
			• Coupler, without lug
			• Fork, left-hand thread
			• Fork, right-hand thread
			• Cross coupler

① Stainless steel variant is without sealing kit
Type tests and certification are only valid when using components as a complete system

1. Ordering example: Connection set, DETAN-S460, $d_s = 20$ mm, left-hand thread, FV
2. Ordering example: Tension rod, DETAN-E, $d_s = 10$ mm, $L = 500$ mm, left thread length = 120 mm, right thread length = 150 mm

DETAN ROD SYSTEMS

System DETAN-S460, European Technical Approval ETA-05/0207

System components — materials and finish						
	Tension rod		Fork		Couplers, locking nuts	Anchor disc
System diameter d_s [mm]	10 - 12	16 - 95	10 - 12	16 - 95	10 - 95	10 - 95
Material	S355J2	S460N	S355J2	G20 Mn5+QT	S355J2/S235JR	S355J2
Finish	FV	hot-dip galvanized	hot-dip galvanized		hot-dip galvanized	hot-dip galvanized
	WB	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 S460N																
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 $N_{R,d}$ [kN] ①	21.3	30.94	70.5	110.2	158.6	206.7	252.3	367.5	504.4	662.9	791.0	913.5	1063	1750	2227	2823
Available minimum system length L [mm]																
black, h.d. galvanized	250	310	360	440	520	560	600	700	810	940	990	1050	1160	1480	1640	1810
Available maximum system length with one rod [mm] ②																
black, h.d. galvanized	6060	6070	12080	12100	12120	12140	12140	12170	12220	12260	12270	12290	12320	15430	15480	15530
Available maximum rod length L [mm]																
black, h.d. galvanized	6000		12000										15000			

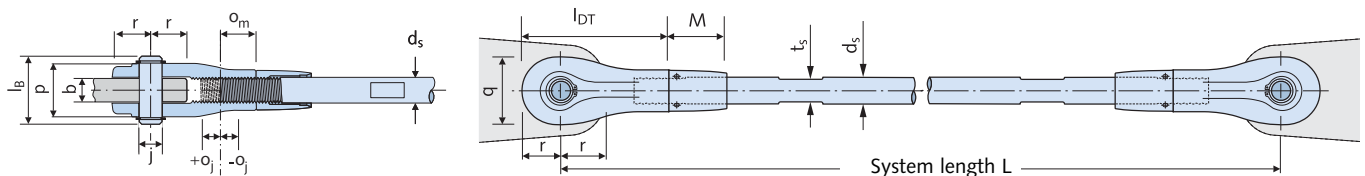
The design loads in this table have been calculated according to technical approval ETA-05/0207, with $\gamma_{M1} = 1.1$ and $\gamma_{M2} = 1.25$.
 If other partial safety values are applicable, the load capacities have to be calculated according to technical approval ETA-05/0207, chapter 2.1.3.

① $N_{R,d}$: Load capacity according to type test S-WUE/060382 based on technical approval ETA-05/0207

② Longer system lengths L consisting of several rods with connecting couplers are possible.

③ Spanner-flats are available on rod length of 700 mm and larger.

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 ③	85 ③	95 ③
Fork length	l_{DT}	60	73	89	110	133	147	160	192	225	265	285	305	335	460	520	580
Pin length	l_B	28	32	44	52	60	65	72	84	97	111	119	130	139	180	202	229
Fork breadth	p	20	24	33	40	46	51	57	68	79	90	98	107	116	146	166	189
Fork height	q	26	31	41	51	61	69	75	90	105	119	125	137	146	196	216	236
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	130	155
Screw adjustment range	o_j	5.0	6.5	7.5	8.0	11.0	12.5	14.0	15.0	17.5	20.0	22.5	25.0	39	45	60	
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	165	205
Tension rod		Spanner width t_s												Hook spanner ④			
		8	10	14	18	21	24	27	32	36	41	46	50	55	90/6	90/6	155/6
Locking nuts	Use soft touch pliers	Hook spanner															
Length locking nut	r	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	155/8	230/10	
Pin hole diameter	j	→ see table dimensions on page 13 for connecting plates															
Thickness conn. plate	b																

③ Delivery time on request.

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

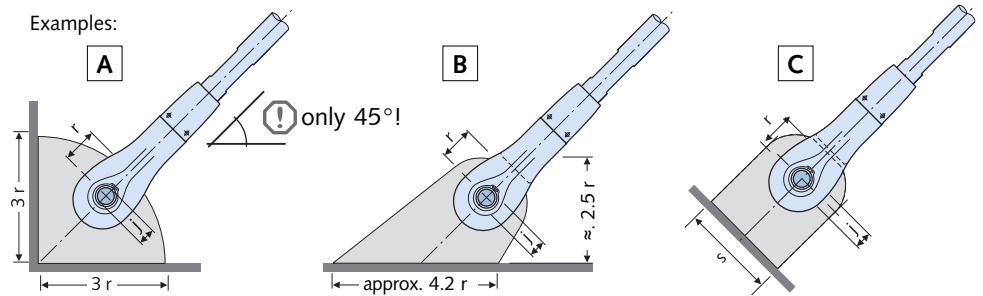
④ When using a chain tensioner instead of a hook spanner we recommend protecting the rod surface against damage (also applies to the couplers).

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System DETAN-S460, European Technical Approval 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.



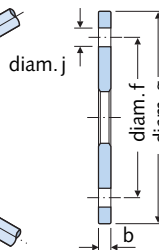
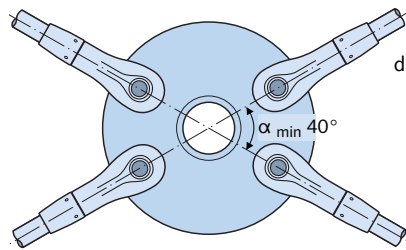
Note: A can only be used when simultaneously using the circular anchor disc at 45°, see page 19.

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	85	95
Thickness conn. plate	b	8	10	15	18	20	22	25	30	35	40	45	50	55	65	75	85
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	86	96
Hole position	r	15	18	24	29	35	39	43	51	60	70	76	83	88	129	149	159
Minimum width	s	28	33	40	51	64	73	80	94	113	129	142	151	161	216	240	270

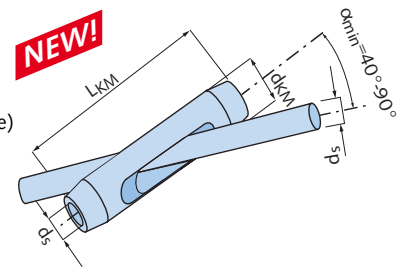
Cross bracing

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)



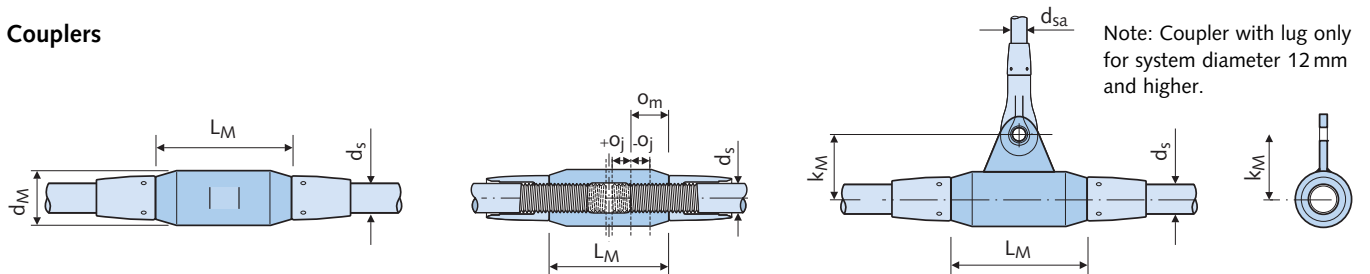
Option 2: Cross coupler (connecting angle $\alpha = 40^\circ - 90^\circ$)



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	85	95
Diameter of outer holes	f	90	110	140	180	210	240	260	310	360	420	450	490	520	702	777	832
Outer anchor disc - diam.	g	120	146	186	238	280	318	346	412	480	558	600	652	692	960	1075	1150

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	85	95
Coupler length	L_{KM}	100	120	142	166	200	222	242	284	310	348	400	440	478	631	710	830
Coupler diameter	d_{KM}	20	24	32	39	46	52	57	70	80	93	101	112	120	154	173	194

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	85	95
Coupler length	L_M	40	50	62	78	94	104	120	140	158	180	195	210	245	328	370	450
Coupler diameter	d_M	20	22	28	35	42	47	53	64	75	87	93	98	104	155	180	195
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	130	155
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	45	60
Suspension system diam.	d_{sa}	-	10	10	10	10	10	10	10	10	12	12	12	12	12	16	16
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	150.0	157.5
Hook spanner size		-	-	-	-	-	-	-	-	-	-	-	-	-	155/8	230/10	230/10

DETAN ROD SYSTEMS

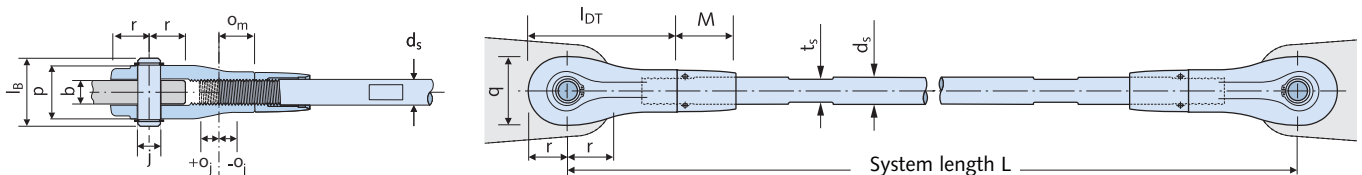
System DETAN-E in Stainless Steel, European Technical Approval ETA-11/0311

System components – material and design					
	Tension rod ②	Fork ②	Couplers ③, locking nuts ④	Pins ②, circlips ①	Anchor disc ④
System diameter d_s [mm]	6 - 30	6 - 30	6 - 30	6 - 30	6 - 30
Material	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Finish	polished	polished	polished	polished	polished
① circlips according to DIN 471, stainless steel 1.4568 ② material stainless steel, strength grade S460			③ material stainless steel, strength grade S355 ④ material stainless steel, strength grade S235		
Stainless steel acc. to ETA 11/0311, annex 2 corresponds to corrosion resistance class III as described in approval no. Z-30.3-6.					

Note: When using DETAN-E the effects of corrosion for various ambient conditions must be verified by the design engineer in each separate case.

System load capacities, system and available rod lengths: material: Stainless steel										
System diameter d_s [mm]	6	8	10	12	16	20	24	27	30	
System load capacities										
Load capacity N_{Rd} [kN] ⑤	9.42	17.13	27.14	39.44	73.32	114.6	165.0	215.0	262.4	
Available minimum system length L [mm]										
polished	190	210	250	310	360	440	520	560	600	
Available maximum system length with one rod [mm] ⑥										
polished	3040	6050	6060	6070	6080	6100	6120	6140	6140	
Available maximum rod length L [mm]										
polished	3000				6000					
In accordance with ETA-11/0311 the partial safety value for the table above are assumed as $\gamma_{M1} = 1.1$ and $\gamma_{M2} = 1.25$ If other partial safety values are to be applied the load capacities have to be calculated according to ETA approval 11/0311.										
⑤ N_{Rd} : Design load according to type test S-WUE/120315 DETAN-E in accordance with ETA Approval 11/0311										
⑥ Longer system lengths L consisting of several rods with connecting couplers are possible!										

Fork



System dimensions [mm]; materials, see table above										
System diameter	d_s	6	8	10	12	16	20	24	27	30
Fork length	l_{DT}	42	50	60	73	89	110	133	147	160
Pin length	l_B	18	22	28	32	42	50	58	63	70
Fork width	p	12	16	21	24	33	40	46	51	57
Fork height	q	17	21	26	31	41	51	61	69	75
Thread depth	o_m	10.5	12.5	15.0	18.5	22.5	27.0	34.0	37.5	42.5
Screw adjustment range	o_j	4.5	4.5	5.0	6.5	7.5	8.0	11.0	12.5	12.5
Length locking nut	M	17.5	20.0	24.5	37.0	41.0	50.0	58.0	63.0	64.0
Tension rod assembly: Spanner width	t_s	5	6	8	10	14	18	21	24	27
Locking nut assembly: Hook spanner size		Use soft-touch pliers				25 - 28	30 - 32	34 - 36	40 - 42	45 - 50
Edge distance	r	→ see table on page 15 for dimensions of connecting plates								
Pin hole diameter	j									
Thickness of connection plate	b									

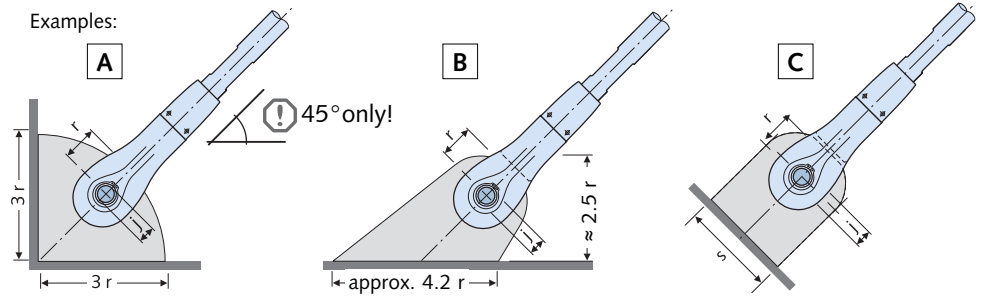
DETAN ROD SYSTEMS

System DETAN-E in Stainless Steel, European Technical Approval ETA-11/0311

Connecting plates

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

Connection plates are not included in the scope of delivery.

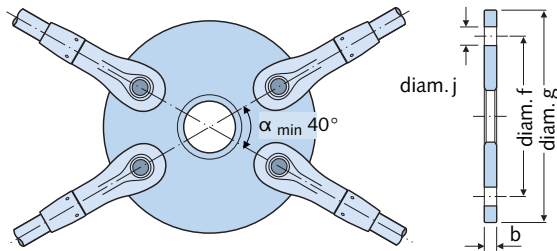


Note: A only possible when simultaneously using the circular anchor disc at 45°, see page 19.

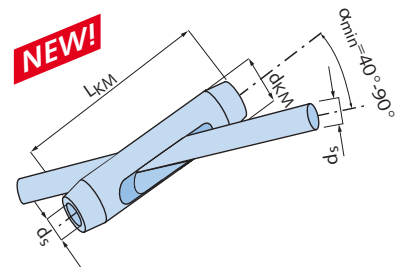
Dimensions [mm]; material — minimum qualities: Stainless steel, strength grade S235										
System diameter	d_s	6	8	10	12	16	20	24	27	30
Thickness conn. plate	b	6	8	10	12	16	20	22	25	30
Hole diameter for pin	j	6.5	7.5	9.5	11.5	14.5	18.5	21.5	24.5	26.5
Hole position	r	9	12	15	18	24	29	35	39	43
Minimum width	s	17	21	26	31	41	51	61	69	75

Cross bracing

Option 1: **Anchor disc**, Standard K40 (smallest connecting angle $\alpha_{min} = 40^\circ$) Example: Anchor disc with 4 tension rods (maximum 8 tension rod connections per disc)



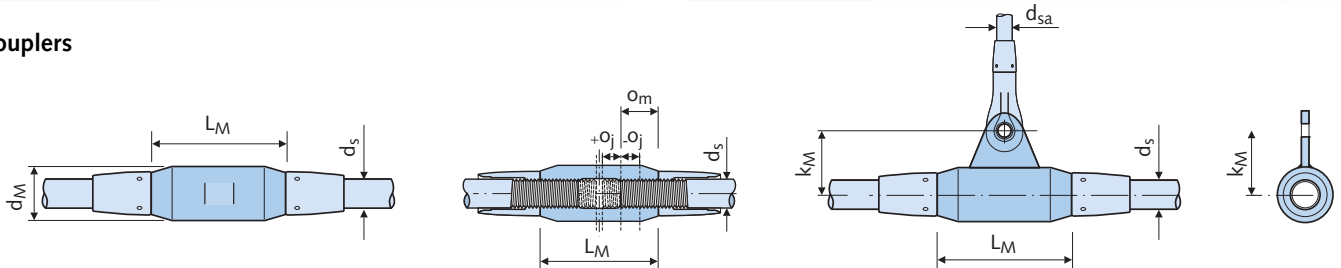
Option 2: **Cross coupler** (connecting angle $\alpha = 40^\circ-90^\circ$)



Anchor disc: measurements [mm]; material: Stainless steel, strength grade S235										
System diameter	d_s	6	8	10	12	16	20	24	27	30
Outer hole diameter	f	55	75	90	110	140	180	210	240	260
Outer anchor disc diameter	g	73	99	120	146	186	238	280	318	346

Cross coupler: measurements [mm]; material: Stainless steel, strength grade S355										
System diameter	d_s	6	8	10	12	16	20	24	27	30
Coupler length	L_{KM}	70	80	100	120	142	166	200	222	242
Coupler diameter	d_{KM}	14	17	20	24	32	39	46	52	57

Couplers



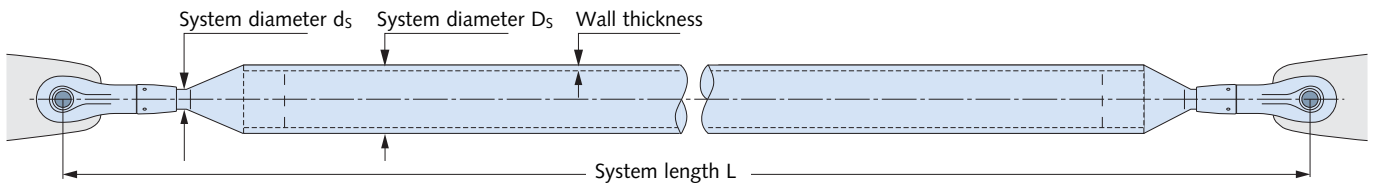
Dimensions [mm]; material: Stainless steel, strength grade S355										
System diameter	d_s	6	8	10	12	16	20	24	27	30
Coupler length	L_M	34	40	40	50	62	78	94	104	120
Coupler diameter	d_M	12	15	20	22	28	35	42	47	53
Thread depth	o_m	10.5	12.5	15.0	18.5	22.5	27.0	34.0	37.5	42.5
Screw adjustment range	o_j	4.5	4.5	5.0	6.5	7.5	8.0	11.0	12.5	12.5
Suspension system diam.	d_{sa}	-	-	-	6	6	8	8	10	10
Offset, suspension hole	k_M	-	-	-	27.5	33.0	37.0	44.0	50.5	57.5

DETAN ROD SYSTEMS

Product Range Overview: DETAN Compression Rod System

DETAN Compression rod

To complement the DETAN Tension rod system HALFEN also offers 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.



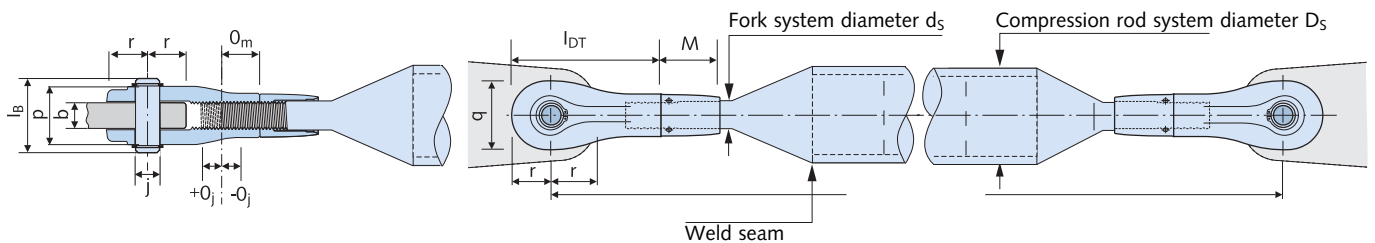
Ordering example: Compression rod system, DETAN-S355, $D_s = 42$ mm, $L = 2000$ mm, fork connector $d_s = 16$ mm

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 HALFEN for further information.

! Static calculation of compression rods is required for individual projects. A free DETAN Calculation program is available. Contact HALFEN 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 12-13 (steel) , 14-15 (stainless 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

Compression rod in stainless steel			
	Compression rod	Fork	Locking nut
System diameter D_s [mm]	42 - 139/according to statics calculations	according to statics calculations	see fork
Material	S235	S460	S235
Finish	stainless steel ①	stainless steel ①	stainless steel ①

① Stainless steel corresponds to corrosion protection class III as in german approval no. Z-30.3-6.

Note: The design engineer is responsible to verify the corrosion resistance is suitable for the various ambient conditions for each individual case when using DETAN-E.

DETAN ROD SYSTEMS

DETAN Compression Rod System

System assembly

- length adjustment at the forks
- the cone 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. Contact HALFEN for information on possible coatings. The coatings are applied by a certified coating specialist.

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

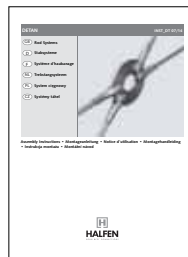


Safety instructions and installation information

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



Fire protection

Fire protection classification for tension rod systems: Individual consultation for enquiries concerning fire protection classification is available.

New with German (DIBt) building authority approval: There is now a manufacturer who can provide a reactive fire protection system for steel elements with round profiles.



HALFEN Technical Service

Contact HALFEN for further information on fire protection.



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 angle. 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 new cross coupler is also available in two finishes.

- hot-dip galvanized steel
- stainless steel

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.

HALFEN DETAN Compression rods



Bracing between an exterior steel column and an interior steel beam

The DETAN Rod system is an intelligent system combining tension and compression rods. To complement the DETAN Rod system HALFEN also supplies 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.

As with the DETAN-S460 and DETAN-E the compression rods are also available in steel and stainless steel. In addition to standard pipe profiles HALFEN also provides other pipe cross sections and special solutions.

The compression rod systems are pre-installed with standard, HALFEN Forks and locking-nuts.



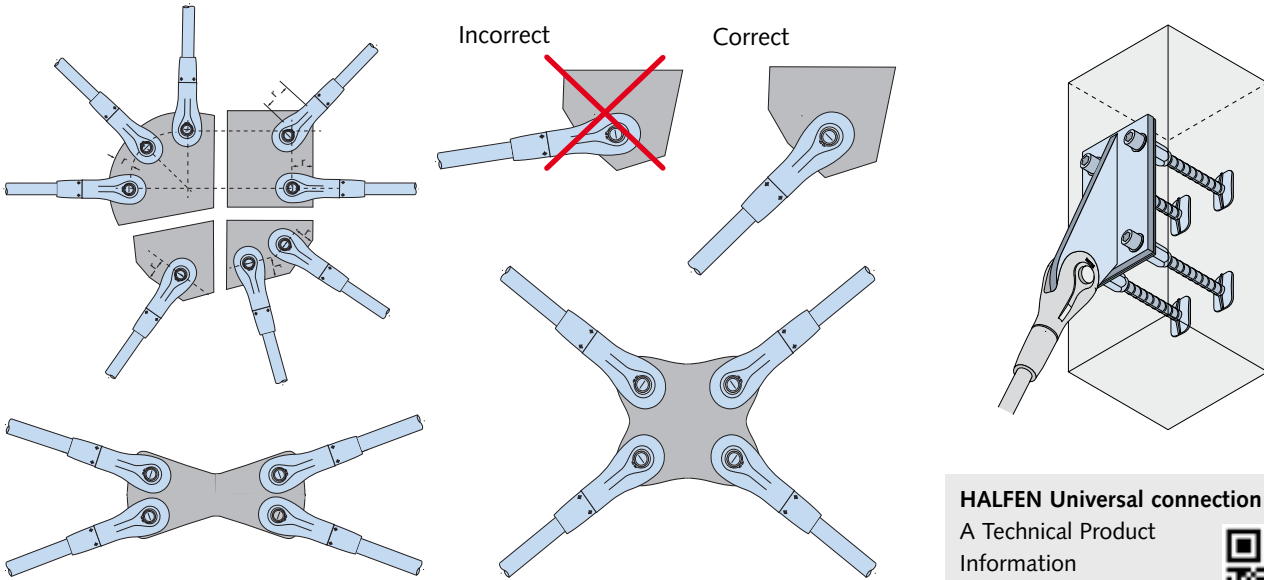
Compression system connected to a plate

DETAN ROD SYSTEMS

Connection plates and Installation

Examples – Connection plates and anchor discs

Connection plates



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

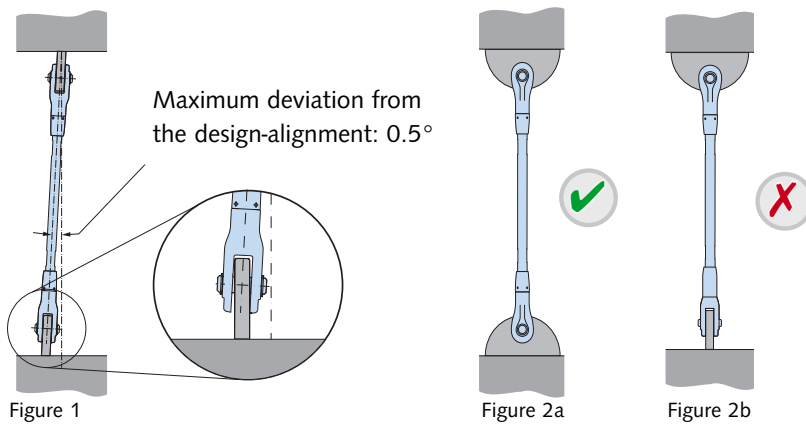
HALFEN Universal connection

A Technical Product Information pdf-document can be downloaded here:



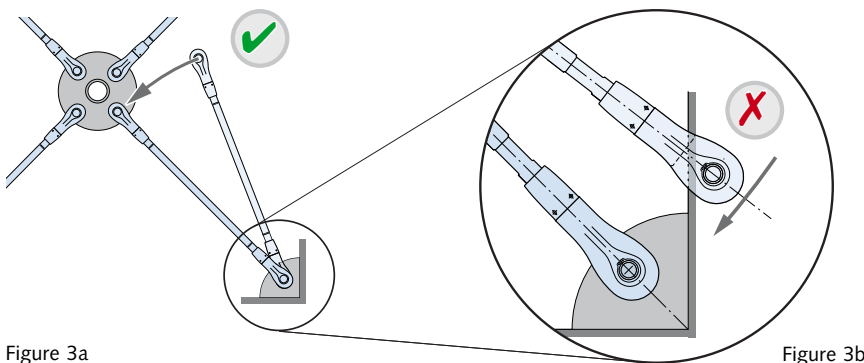
[www.halfen.com/products/reinforcement-systems/HUC Universal connection](http://www.halfen.com/products/reinforcement-systems/HUC%20Universal%20connection)

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.

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

DETAN ROD SYSTEMS

The Advantages at a Glance

Corrosion protection

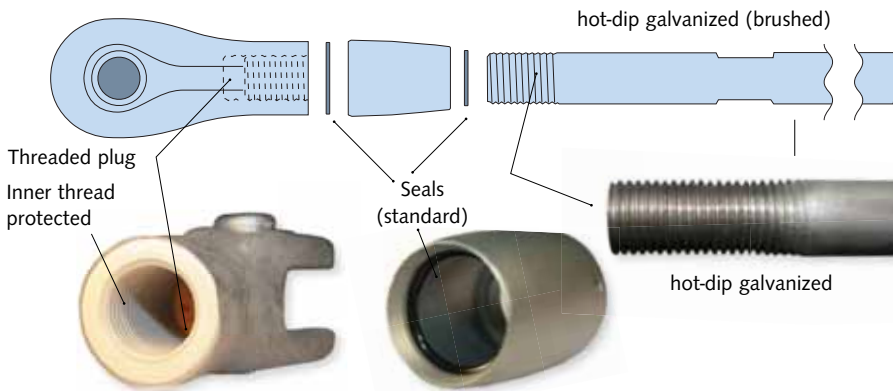
The DETAN Rod systems offer high protection against corrosion, especially for vulnerable parts of the system, e.g. the threads.

A further improvement in quality; the spanner flats are milled before the rods are hot-dip galvanized.

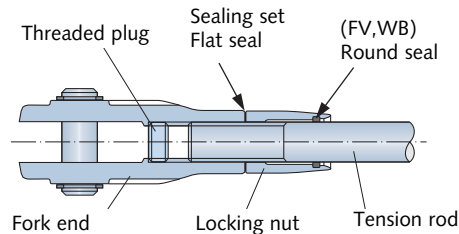
The forks and locking nuts are hot-dip galvanized to ensure durable top-quality protection against corrosion as well as to ensure good mechanical resistance.

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



As standard all forks are delivered with a threaded cap inserted to protect the thread. 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 mm - 60 mm (DETAN-S460)



Label with product-specific data

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

DETAN ROD SYSTEMS

The Advantages at a Glance

Certified HALFEN quality

Preassembled 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

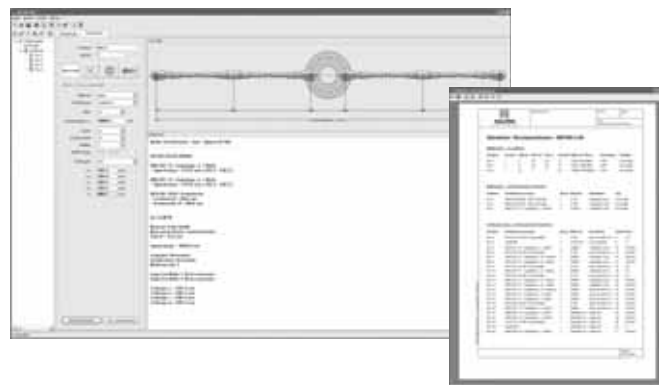
- no further on-site assembly required
- no danger of mix-ups
- pre-assembled to system length $L + o_j$, → see pages 12-j14
- free movement of threads ensured
- easy online forms available for tender request, or use the order forms attached → see pages 26-27



DETAN Dimensioning software

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

- user-friendly programme interface
- Structural calculation: tension rod system design according to ETA-Approval, compression rod system design according to EC3 and Z-30.3-6
- 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.de/Downloads/Software-CAD/Dimensioning Software/DETAN

DETAN ROD SYSTEMS

The Advantages at a Glance

ETA-European Technical Approval – a secure base for structural design



DETAN-E

- European Technical Approval ETA-11/0311
- CE-certification
- type-test report S-WUE/120315 according to EC3



DETAN-S460

- European Technical Approval ETA-05/0207
- CE marking
- type-test S-WUE/060382 according to EC3

New approval for DETAN-E

- tension rod system DETAN-E in stainless steel with European Technical Approval ETA-11/0311
- an additional type-test report based on the ETA approval and Eurocode 3 allows straightforward application of design values from tables
- permanent quality and production monitoring by a supervisory institution
- CE marking recognized in all European Union countries
- design of allowable loads considering country-specific coefficients γ_{M1} and γ_{M2} (NAD) using the DETAN software
- minimum requirements (strength class 235) for building-site connection plates simply by supply
- EU wide, standardised design concept
- no national approvals or certificates required
- cross couplers are a cost effective alternative to anchor discs for cross bracings

Design of compression rods

- dimensioning of DETAN-E compression rods in stainless steel strength class 235 according to general certificate of approval Z-30.3-6
- dimensioning of DETAN-E compression rods in stainless steel strength class 235, also according to Eurocode 3 (EN1993-1-4)



DETAN approvals and type test reports available on the internet:
[www.halfen.com/Products/Tension rod system/DETAN Rod System /Product information](http://www.halfen.com/Products/Tension_rod_system/DETAN_Rod_System/Product_information)

Approval for DETAN-S460

- tension rod system DETAN-S460 with European Technical Approval ETA-05/0207
- an additional type-test report based on the ETA approval and Eurocode 3 allows easy application of design values from verified tables
- CE marking recognized in all European Union countries
- design of allowable loads considering country-specific coefficients γ_{M1} 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

- 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 like 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



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.

Applying pretension

If pretensioning a system is intended then this should be considered 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 using the DETAN Pretension unit applied.



DETAN ROD SYSTEMS

DETAN Pretension Unit

Assembly of the pretension unit



Easy to attach and to operate

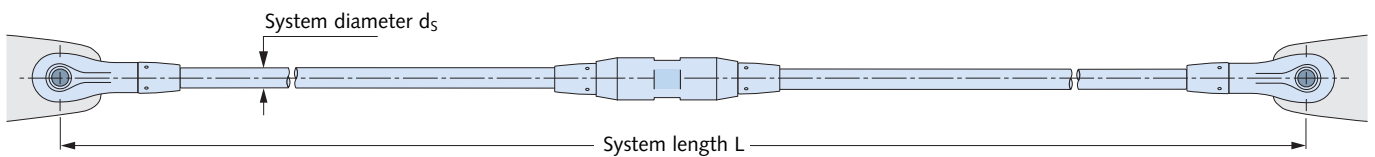
To avoid possible damage to the rod surface load transfer is via threaded plates. The hydraulic-system is attached in front and behind the coupler. The hydraulic jacks temporarily relieve the strain on the coupler, allowing the coupler to be easily turned by hand. When reaching the desired pressure, 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-S460, $d_s = 30$ 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]	252.3	367.5	504.4	662.9	791.0	913.5	1063

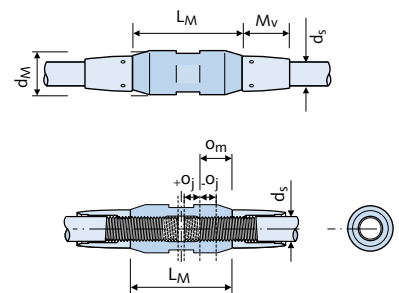
Pretension table for DETAN Rod system S-460 (some values are rounded)

Max. recommended pretension * [kN]	N	100	145	200	265	315	365	425
Hydraulic pressure [bar]	p	165	240	330	435	515	600	695
Strain [%]	ϵ	0.68	0.69	0.69	0.70	0.71	0.71	0.72
Stress [N/mm ²]	σ	143	144	146	147	148	148	150
Elongation [μ m/10 cm]	Δl	68	69	69	70	71	71	71

* Max. recommended pretension $\hat{=}$ 40% of $N_{R,d}$

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
Tension rod assembly	Spanner width t_s						
	27	32	36	41	46	50	55
Locking nut assembly	Hook spanner size						
	45-50	52-55	68-75	68-75	80-90	80-90	80-90

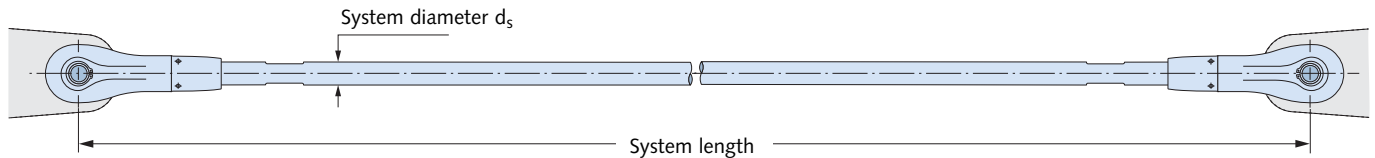


DETAN ROD SYSTEMS

Planning Help

Tender specification – examples

HALFEN Tension rod system DETAN-E



HALFEN Tension rod system type DETAN-E made of stainless steel, corrosion resistance class III according to Z-30.3-6, or according to EN 1993-1-4: 2006, consisting of 1 right-hand threaded fork, 1 left-hand thread fork, plus 1 tension rod including 2 pins, 4 circlips and 2 DT-E nuts,

with European Technical Approval ETA 11/0311, type-tested, pre-assembled and product-specific-labelled tension rod system, type DETAN-E, d_s , L

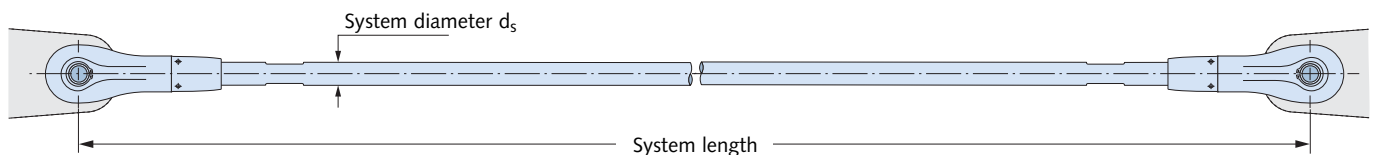
with

d_s = system-diameter [mm] (6 / 8 / 10 / 12 / 16 / 20 / 24 / 27 / 30)

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

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.

HALFEN Tension rod system DETAN-S460 FV



HALFEN Tension rod system type DETAN-S460, 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 Approval ETA 05/0207, type-tested, pre-assembled and product-specific-labelled tension rod system, type DETAN-S460 $d_s = 30$, L, FV

with

d_s = system-diameter [mm] (10 / 12 / 16 / 20 / 24 / 27 / 30 / 36 / 42 / 48 / 52 / 56 / 60 / 76 / 85 / 95)

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.

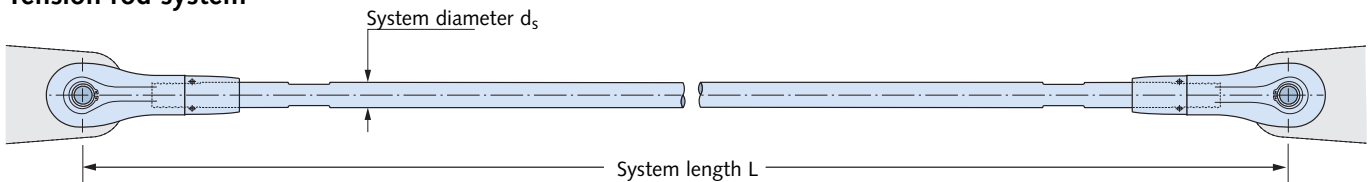
DETAN ROD SYSTEMS

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

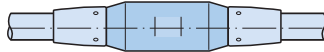
Tension rod system



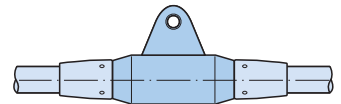
Design variants:



without coupler



with coupler






with coupler with lug

Choice of material:

DETAN-S460 - FV (hot-dip galvanized)
 acc. to European Technical Approval
 ETA-05/0207 and
 type-test report S-WUE/060382 acc. to EC3

DETAN-S460 - WB (mill-finish)
 acc. to European Technical Approval
 ETA-05/0207 and
 type-test report S-WUE/060382 acc. to EC3

DETAN-E (Stainless steel)
 acc. to European Technical Approval
 ETA-11/0311 and
 type-test report S-WUE/120315 acc. to EC3

Item	No.	d_s [mm]	$Z_{Ed,max}$ ② [kN]	L [mm]	Material choice					
					mill finish	hot-dip galvanized	Stainless steel			
<i>Example</i>	3	30		5600					x	

①: Number of couplers in one system length
 ②: maximum tension load required if diameter is unknown

Please send the completed form to HALFEN by email to es.det@halfen.com.
 Please contact us for an estimate.

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