

DETAN ROD SYSTEMS

TECHNICAL PRODUCT INFORMATION



DETAN ROD SYSTEMS

DT 13-E

FAÇADE

NEW!

- with quality mark RAL-GZ 996/5
- ETA-Approval for stainless steel systems DETAN-E



HALFEN
YOUR BEST CONNECTIONS

DETAN ROD SYSTEMS

DETAN - a Creative Design Element

In this project DETAN was purposely applied as a visual, creative design element.

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, UK

DETAN ROD SYSTEMS

DETAN - a Static Element with Aesthetical Claim



Cross bracings provide a futuristic, lightweight construction.

For structural reasons, DETAN runs diagonally through the glazed façade.

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

Project:
The Sage, Gateshead

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-identification
- type-test report S-WUE/120315 according to EC3



DETAN-S460

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

New approval for DETAN-E

- tension rod system DETAN-E in stainless steel now with European Technical Approval ETA-11/0311
- an additional type-test report based on the ETA approval and Eurocode 3 allows a straightforward application of design values from tables
- permanent quality and production monitoring by supervisory institution
- CE-certification recognized in all European union countries
- 25% higher load capacity due to the rod's tension capacity
- tension rods are fully loadable (no reduction factor for single system sizes has to be considered)
- design of allowable loads considering country-specific coefficients γ_{M1} and γ_{M2} (NAD) with the new DETAN software
- minimum requirements (strength class 235) to building-site connection plates simplify supply
- EU wide standardised design concept
- no requirement for national approvals or certificates
- cross couplers are now available in stainless steel
- 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, according to Eurocode 3 (EN1993-1-4)



HALFEN approvals and type test reports available on the internet:
www.halfen.de • Service • Brochures

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 a straightforward application of design values from tables
- CE-certification recognized in all European union countries
- tension rods are fully loadable (no reduction factor for single system sizes has to be considered)
- design of allowable loads considering country-specific coefficients γ_{M1} and γ_{M2} (NAD) with the new DETAN software
- EU wide standardised design concept
- no requirement for national approvals or certificates
- 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

The Advantages at a Glance

Certified HALFEN quality



The RAL Quality Mark is awarded by the Association for façade fixing technology exclusively to companies that fulfil the high standards required for "quality and test specifications for façade fixing technologies". Independent, biannual monitoring provided by specialists at Germanischer Lloyd guarantee that the importance of products, quality and the associated service are observed.

Included in the quality analysis are; specifications, quality management, logistics, competent technical advice, high-quality technical documentation and software, guarantee benefits and tender documents.

Preassembled delivery

The DETAN Rod systems up to and including 60 mm diameter will be delivered pre-assembled. Longer elements will be de-assembled as required to ease transport.

Economic and time saving

- no further assembly required on site
- no danger of mix-ups
- pre-assembled to system length L (with a tolerance $\pm$ adjustment length o_j)
- free movement of threads ensured
- online forms available for tender request or order → page 21-22

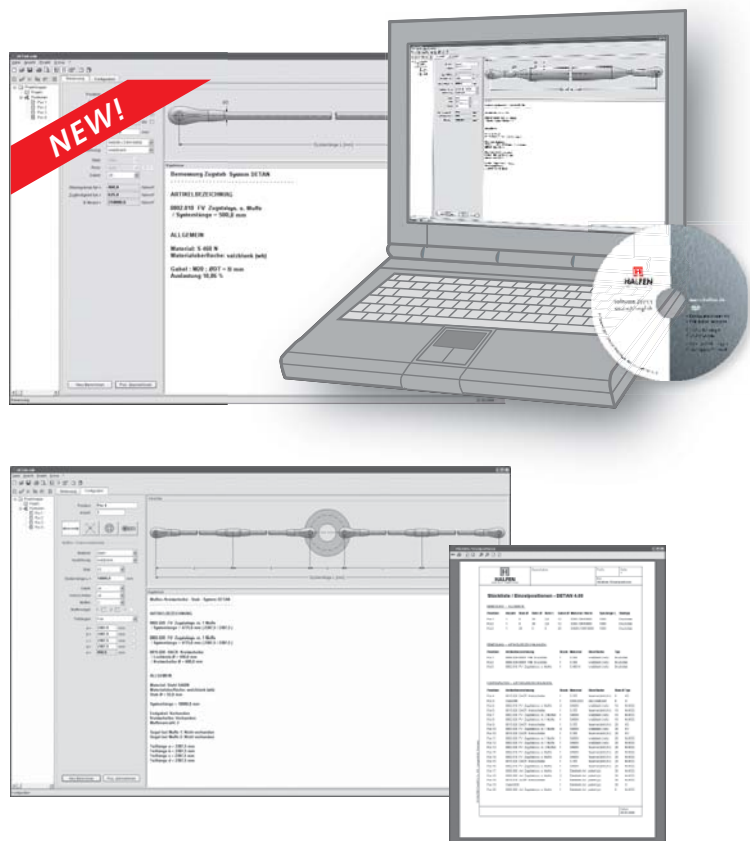


DETAN Dimensioning software

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

- user-friendly programme interface
- structural calculation: tension rod system according to ETA-Approval, compression rod system according to EC3 and Z-30.3-6.
- selection of various materials and finishes
- planning and ordering of individual solutions and standards
- transferring the dimension results to piece lists, with individual items in a printed list
- current program version in German, English, French, Polish, Dutch, Czech, Italian, Spanish, Portuguese, Magyar and Slovenian available on the Internet

www.halfen.de • Service • Software /
CAD • Dimensioning Software • DETAN



DETAN ROD SYSTEMS

The Advantages at a Glance

Corrosion protection

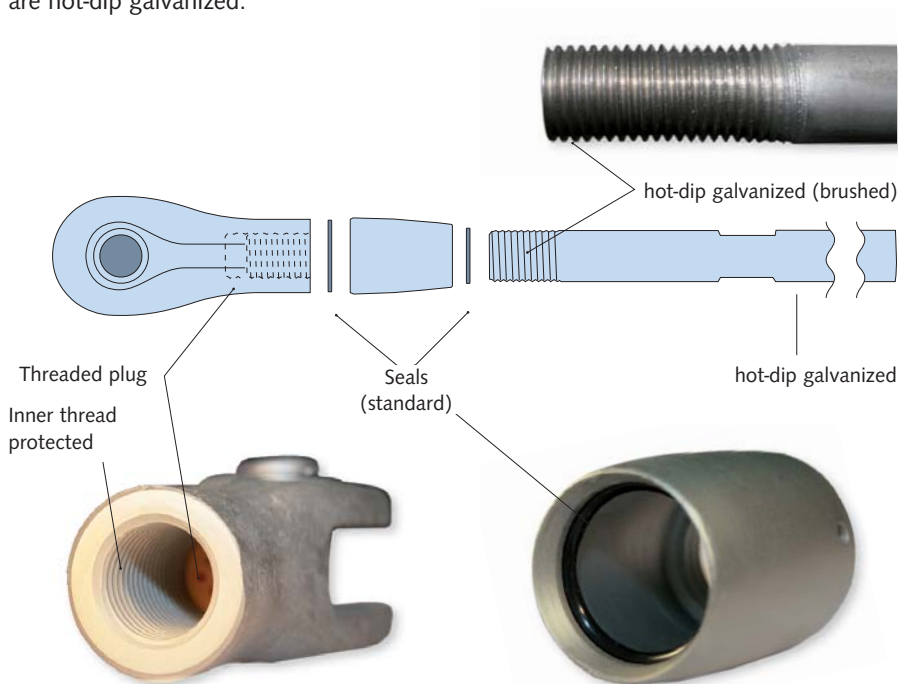
The DETAN Rod systems offer high protection against corrosion, especially in vulnerable areas, e.g. the threads.

A further improvement; the spanner notches are milled before the rods are hot-dip galvanized.

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

Reliable and durable

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



HALFEN Pretension unit



Simple tensioning for system diameters 30 - 60 mm

- optimally tuned system
- extra lightweight aluminium design
- requires no electrical power
- protection of the high-quality galvanized surface
- functional, simple & robust
- for a detailed description → page 18-19

DETAN ROD SYSTEMS

The Advantages at a Glance

HALFEN optimises logistics planning on building sites

Rod marked with system information



Mix-ups impossible

- order and customer specific data (order and item number, rod length, system size)
- standard for diameter 16 mm systems and larger (DETAN S-460)

Label with product-specific data



Simple and customer-oriented

- showing product-specific information, e.g. system length, system diameter etc.
- easy tracking and sorting by item numbers
- ideal and fast construction site logistics
- on customer request: project-specific data, e.g. floor numbers or node

Assembly and safety notes

Arrangements of connection plates

Figure 1

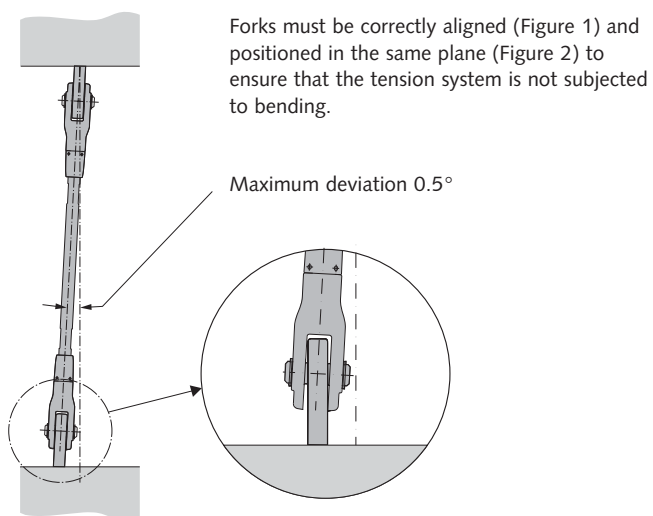
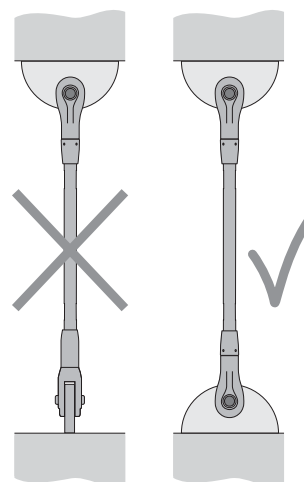


Figure 2



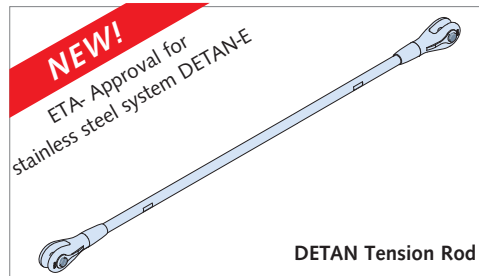
Prior to installation all DETAN Rod system components need to be checked for damage. Damaged components must not be used.

DETAN ROD SYSTEMS

System Overview

DETAN Tension rod system

Basic system:

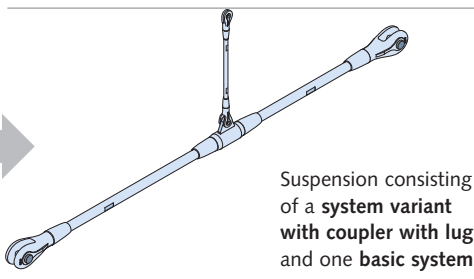
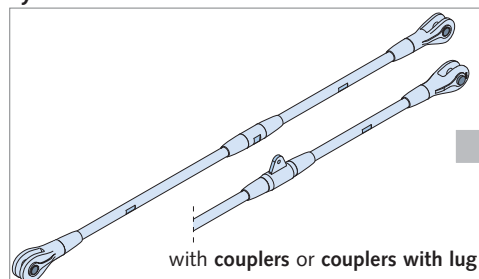


Ordering procedure → page 9
Load capacity, system dimensions and materials:
Steel S460 → page 12-13
Stainless steel → page 14-15

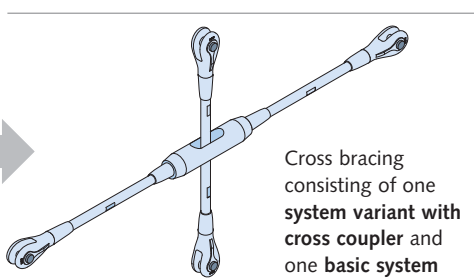
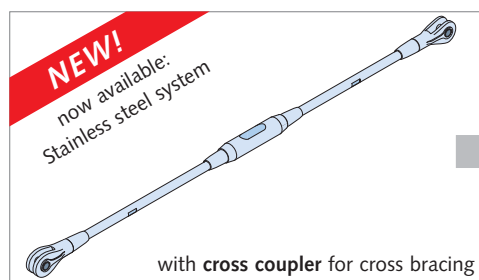


The DETAN Rod system is approved for predominantly static loads only.

System variants:

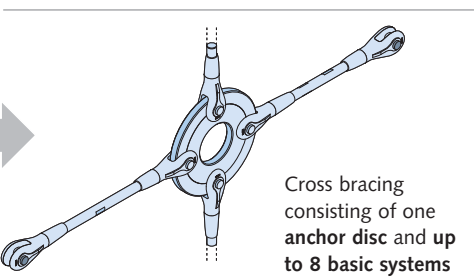
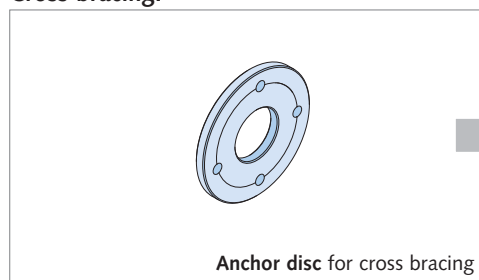


Ordering procedure → page 9
Load capacity, system dimensions and materials:
Steel S460 → page 12-13
Stainless steel → page 14-15



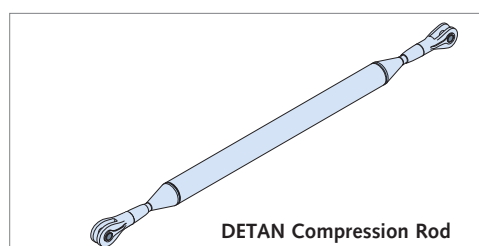
Ordering procedure → page 9
Load capacity, system dimensions and materials:
Steel S460 → page 12-13
Stainless steel → page 14-15

Cross bracing:



Ordering procedure → page 11
Load capacity, system dimensions and materials:
Steel S460 → page 13
Stainless steel → page 15

DETAN Compression rod system



Ordering procedure → page 16
Load capacity, system dimensions and materials → page 16-17

HALFEN Pretension unit



Further information → page 18-19

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

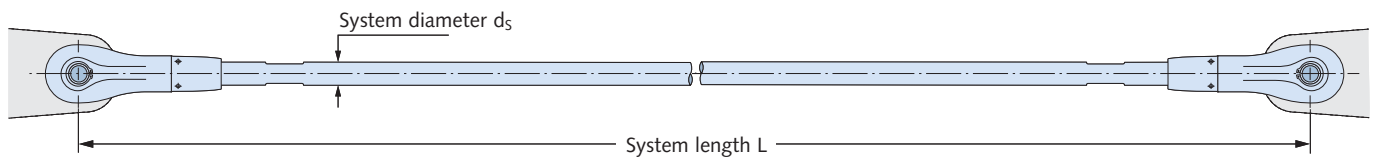
Ordering procedure

Example order: Tension rod system, DETAN S-460, $d_s = 30$ mm, $L = 4500$ mm fv, 1 coupler

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

Abbreviations:
wb = mill finish
hdg = fv = hot-dip galvanized

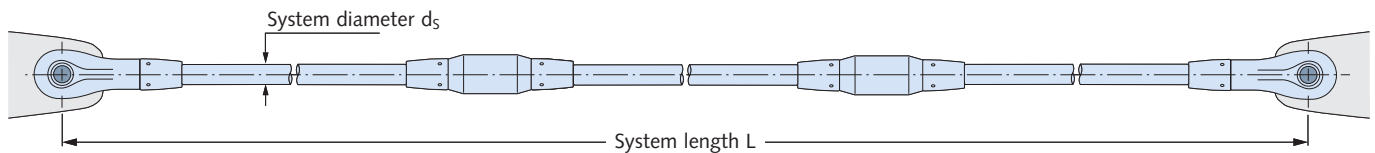
Basic system



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

System variants

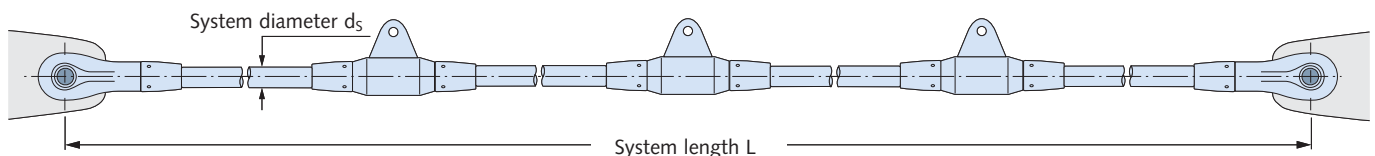
with coupler:



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

Note: Maximum 5 couplers 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

Note: Maximum 5 couplers possible. Items not delivered pre-assembled

System DETAN S-460, 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
Deliverable 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
Deliverable 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 in stainless steel, European Technical Approval ETA-11/0311

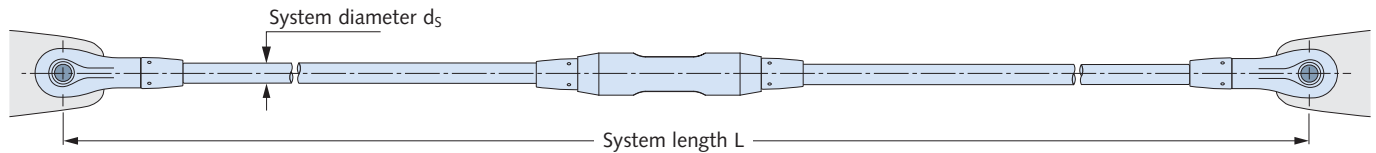
System diameter d_s [mm]	6	8	10	12	16	20	24	27	30
Deliverable minimum system length L [mm]									
polished	190	210	250	310	360	440	520	560	600
Deliverable maximum system length L with <u>one</u> rod [mm]									
polished	3040	6050	6060	6070	6080	6100	6120	6140	6140

DETAN ROD SYSTEMS

Product Range Overview: DETAN Tension Rod System

System variants

with **cross coupler** for cross bracing:



Ordering example (material steel hdg): Tension rod system, DETAN S-460, $d_s = 30$ mm, $L = 5600$ mm fv, 1 cross coupler

Note: Maximum 2 cross couplers possible. Items not delivered pre-assembled

Abbreviations:
wb = mill finish
hdg = fv = hot-dip galvanized

System DETAN S-460, type-tested EC3

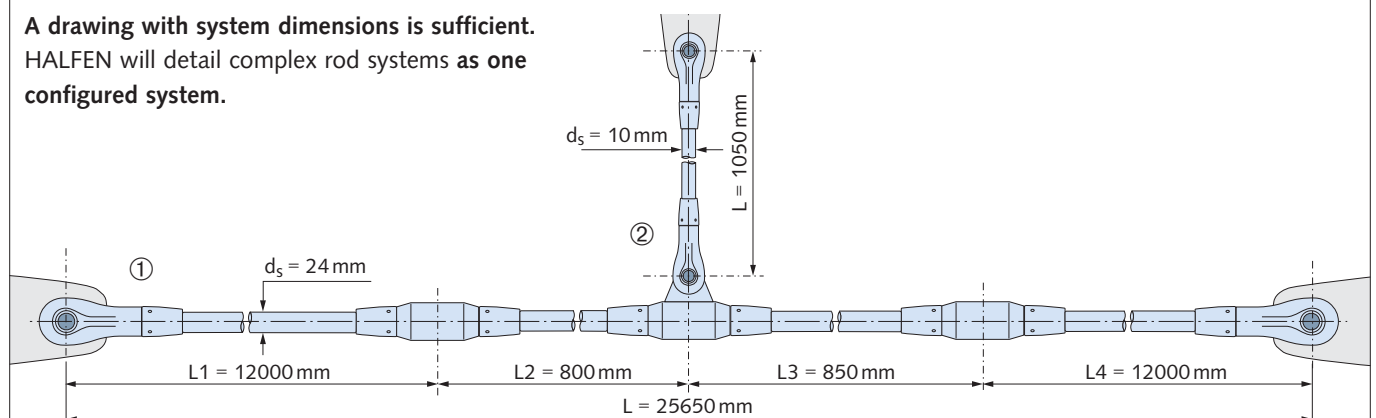
System diameter d_s [mm]			16	20	24	27	30	36							
Deliverable minimum system length L [mm]															
Rod (fv or wb)			1100		1200		1400								

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 place the order using the HALFEN dimensioning software, see page 5.

A drawing with system dimensions is sufficient.
HALFEN will detail complex rod systems as one configured system.



Ordering example:

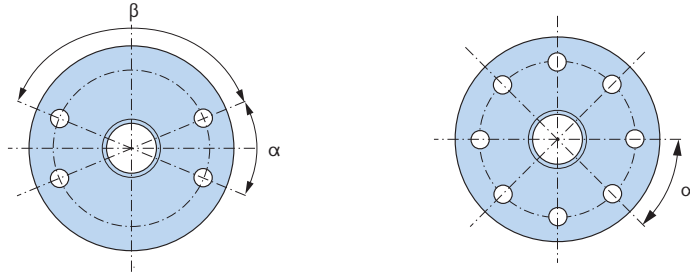
- ① Tension Rod System, DETAN-S460, $d_s = 24$ mm, system length according to drawing, wb, couplers according to drawing
- ② Tension Rod System, DETAN-S460, $d_s = 10$ mm, system length $L = 1050$ mm wb

DETAN ROD SYSTEMS

Product Range Overview: Cross Bracings, DETAN Compression Rod System

Cross bracing

Anchor disc



Note:

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

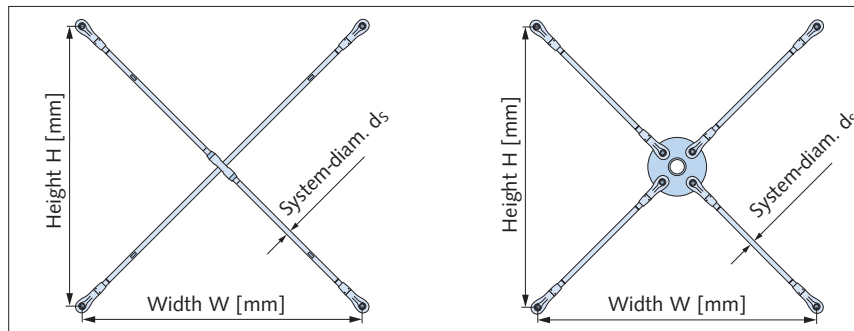
1. Ordering example (material steel): Anchor disc, DETAN-S460, $d_s = 42$ mm, 4 holes drilled $\alpha = 40^\circ$, $\beta = 140^\circ$ (see drawing), fv
2. Ordering example (material stainless steel): Anchor disc, DETAN-E, $d_s = 24$ mm, 8 holes drilled $\alpha = 45^\circ$ (see drawing)

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 in stainless steel, 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 without sealing kit

Type tests and certification are only valid when using components in a complete system
Materials, designs and dimensions refer to → p. 10-14

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, thread length left = 120 mm, thread length right = 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	f_v hot-dip galvanized		hot-dip galvanized		hot-dip galvanized	hot-dip galvanized
	w_b mill finish		hot-dip galvanized		hot-dip galvanized	hot-dip galvanized

System load capacities; system- and deliverable 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] ②	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
Deliverable 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
Deliverable maximum system length with one rod [mm] ③																
black, h.d. galvanized	6060	6070	12080	12100	12120	12140	12140	12170	12220	12260	12270	12290	12320	15430	15480	15530
Deliverable maximum rod length L [mm]																
black, h.d. galvanized	6000	12000										15000				

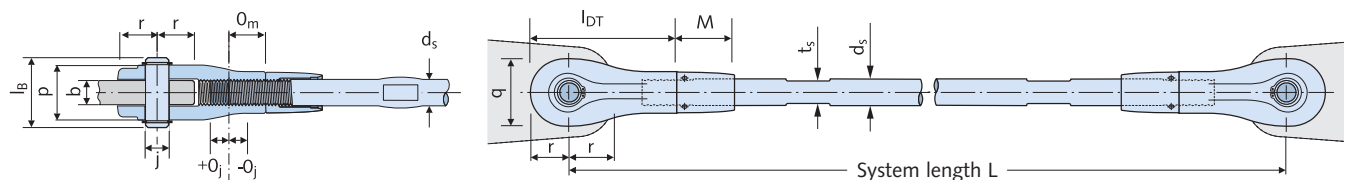
The design loads in this table have been calculated according to technical approval ETA-05/0207, with $\gamma_{M1} = 1.1$ and $\gamma_{M2} = 1.25$.

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.

② $N_{R,d}$: Load capacity according to type test S-WUE/060382 based on technical approval ETA-05/0207

③ 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	10	12	16	20	24	27	30	36	42	48	52	56	60	76 ④	85 ④	95 ④
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	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		
	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															
		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	
Length locking nut	r	→ see table dimensions connecting plate page 13															
Pin hole diameter	j																
Thickness conn. plate	b																

④ Delivery time on request

Corrosion protection: rod thread hot-dip galvanized. Fork threads sealed with stoppers. Also see sealing system on page 6

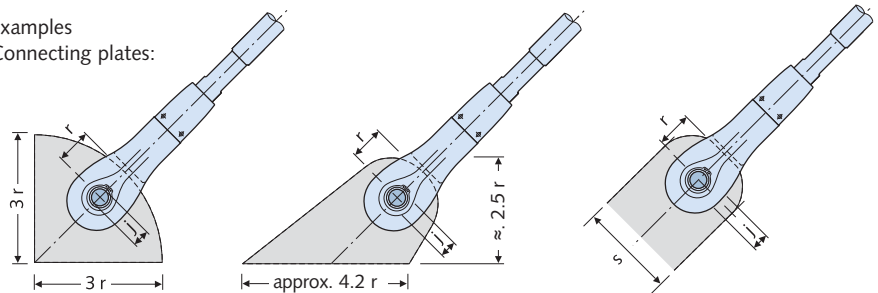
DETAN ROD SYSTEMS

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

Connecting plates

The dimensions specified in the table below must be complied with. Plates are **not** included in the scope of delivery. The specifications also apply to the Compression rod system.

Examples
Connecting plates:

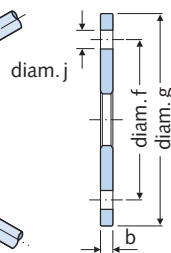
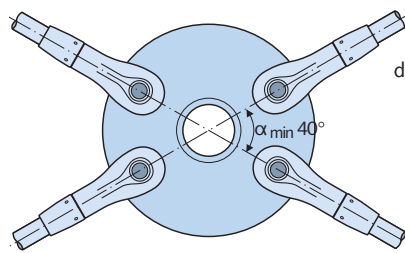


Dimensions [mm]; Material — minimum qualities for diameter 10 - 12, steel strength grade S235JR; or for diameter 16 - 95, steel strength grade S355J2																	
System diameter	d_s	10	12	16	20	24	27	30	36	42	48	52	56	60	76	85	95
Thickness conn. plate	b	8	10	15	18	20	22	25	30	35	40	45	50	55	65	75	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

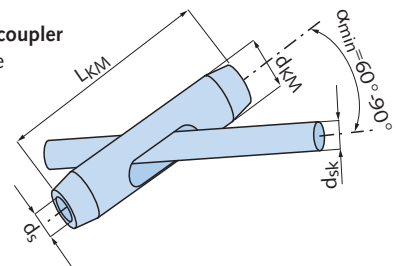
Cross bracing

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)



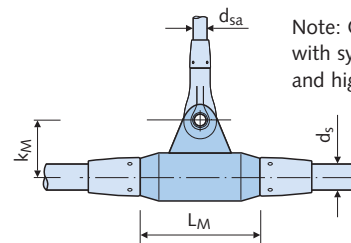
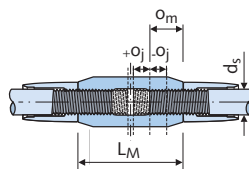
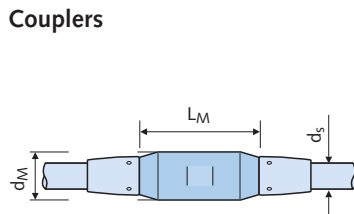
Option 2: **Cross coupler**
(connecting angle
 $\alpha = 60^\circ - 90^\circ$)



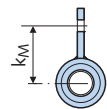
Anchor disc: Dimensions [mm]; material specification, steel strength grade S355J2, hot-dip galvanized																	
System diameter	d_s	10	12	16	20	24	27	30	36	42	48	52	56	60	76	85	95
Diameter of circ. hole	f	90	110	140	180	210	240	260	310	360	420	450	490	520	702	777	832
Outer anchor disc - diam.	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			16	20	24	27	30	36								
Coupler length	L_{KM}			142	166	200	222	242	284								
Coupler diameter	d_{KM}			32	39	46	52	57	70								
Diameter of cross rod	d_{SK}			16	20	24	27	30	36								

Couplers



Note: Coupler with lug only
with system diameter 12 mm
and higher.



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
Dist. 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 ②③	Fork ②	Couplers ③④, locking nuts	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 A4	Stainless steel A4	Stainless steel A4	Stainless steel A4	Stainless steel A4
Finish	A4 p	polished	polished	polished	polished	polished
① circlips according to DIN 471, material 1.4122 stainless steel A2 ② material stainless steel A4, strength grade S460				③ material stainless steel A4, strength grade S355 ④ material stainless steel A4, strength grade S235		

Note: The planner is responsible for establishing the effect of corrosion for various ambient conditions for each individual case when using DETAN-E.

System load capacities; system- and deliverable rod length; material, stainless steel A4

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
Deliverable minimum system length L [mm]									
polished	190	210	250	310	360	440	520	560	600
Deliverable maximum system length with one rod [mm] ⑥									
polished	3040	6050	6060	6070	6080	6100	6120	6140	6140
Deliverable maximum rod length L [mm]									
polished	3000	6000							

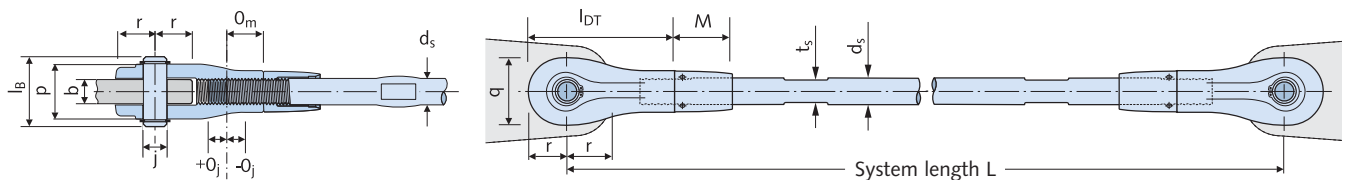
The partial safety value for above table has been calculated with $\gamma_{M1} = 1.1$ and $\gamma_{M2} = 1.25$ according to ETA-11/0311

If other partial safety values apply the load capacities have to be calculated.

⑤ N_{Rd} : Load capacity according to type test report 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 breadth	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 dimensions connecting plate on page 13								
Pin hole diameter	j									
Thickness conn. plate	b									

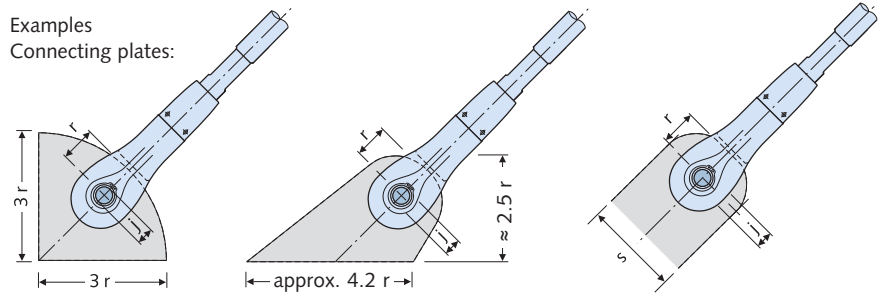
DETAN ROD SYSTEMS

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

Connecting plates

The dimensions specified in the table below must be complied with. Plates are not included in the delivery scope. The specifications also apply to the compression rod system.

Examples
Connecting plates:



Dimensions [mm]; material — minimum qualities, 1.4401, 1.4404 or 1.4571 (stainless steel A4), strength grade S235

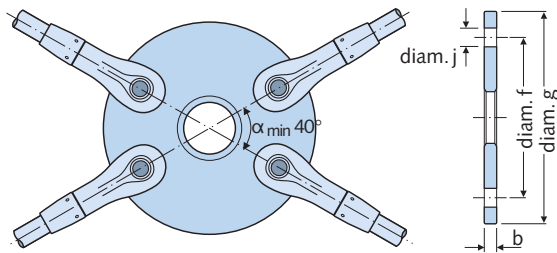
System diameter	d_s	6	8	10	12	16	20	24	27	30
Thickness conn. plate	b	6	8	10	12	16	20	22	25	30
Hole diameter for pin	j	6.5	7.5	9.5	11.5	14.5	18.5	21.5	24.5	26.5
Hole position	r	9	12	15	18	24	29	35	39	43
Minimum width	s	17	21	26	31	41	51	61	69	75

Cross bracing

Option 1: **Anchor disc**, Standard K40

(smallest connecting angle $\alpha_{\min} = 40^\circ$)

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

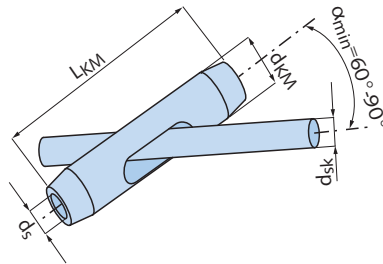


Anchor disc measurements [mm]; stainless steel A4, strength grade S235

System diameter d_s	6	8	10	12	16	20	24	27	30
Diameter of circ. hole f	55	75	90	110	140	180	210	240	260
Outer Anchor disc - diam. g	73	99	120	146	186	238	280	318	346

Option 2: **Cross coupler**

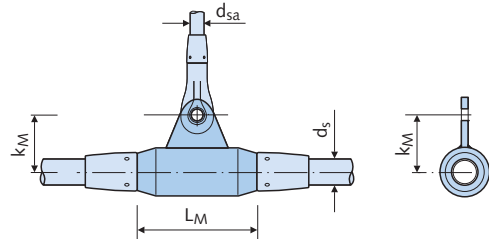
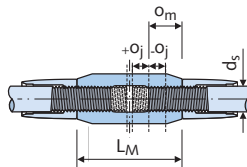
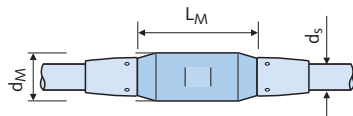
(connecting angle $\alpha = 60^\circ - 90^\circ$)



Cross coupler measurements [mm]; stainless steel A4, strength grade S355

System diameter	d_s	16	20	24	27	30
Coupler length	L_{KM}	142	166	200	222	242
Coupler diameter	d_{KM}	32	39	46	52	57
Diameter of cross rod	d_{SK}	16	20	24	27	30

Couplers



Dimensions [mm]; stainless steel A4, strength grade S355

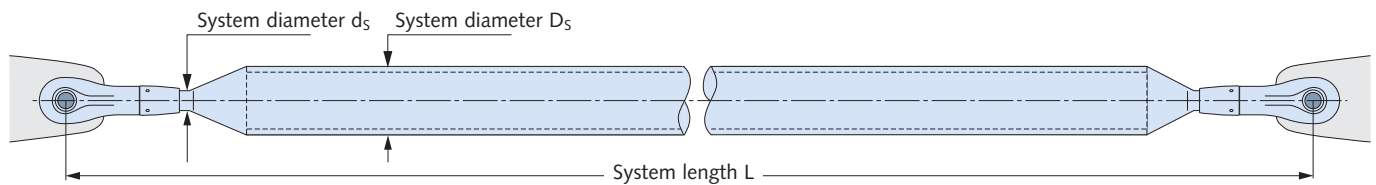
System diameter	d_s	6	8	10	12	16	20	24	27	30
Coupler length	L_M	34	40	40	50	62	78	94	104	120
Coupler diameter	d_M	12	15	20	22	28	35	42	47	53
Thread depth	o_m	10.5	12.5	15.0	18.5	22.5	27.0	34.0	37.5	42.5
Screw adjustment range	o_j	4.5	4.5	5.0	6.5	7.5	8.0	11.0	12.5	12.5
Suspension system diam.	d_{sa}	-	-	-	6	6	8	8	10	10
Offset of 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

Compression rod

To complement the DETAN Tension rod system HALFEN also offers compression rods which can be incorporated technically and optically perfectly into a system. Compression rods consist of large diameter tubes, which are tapered at each end allowing standard DETAN Fork connectors to be used.



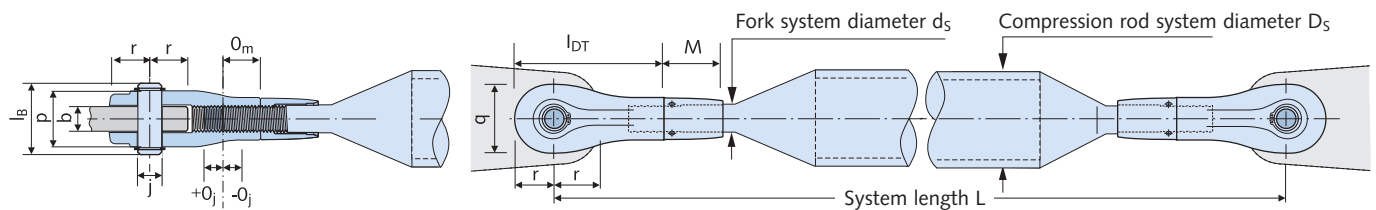
Ordering example: Compression rod system, DETAN-S355, $D_s = 42$ mm, $L = 2000$ mm, fork connector $d_s = 16$ mm

System DETAN-S355						
Compression Rod diam. D_s	42	54	60	76	89	114
Fork connector diam. d_s	according to structural calculations see page 17					
Minimum available system length L [mm]						
hot-dip galvanized ①	1000					
Standard in stock maximum system length L for a standard-tube [mm]						
hot-dip galvanized ①	6340	6380	6440	6540	6610	6710

① Materials and designs of all components plus custom designs see table below

Note: System DETAN-E on request. Items not delivered pre-assembled

System components and materials



All fork and connecting plates system dimensions see page 12-13

System components — material and design			
	Compression rod	Fork	Locking nut
System diameter D_s [mm]	42 - 114	according to statics calculations	according to statics calculations
Material	S355J2	G20 Mn5+QT	S235JR
Finish	fv	hot-dip galvanized	hot-dip galvanized
	wb	mill finish	hot-dip galvanized

Note: DETAN-E System on request. The planner is responsible for establishing the effect of corrosion in various ambient conditions for each individual case when using DETAN-E.

DETAN ROD SYSTEMS

DETAN Compression Rod System, DETAN-S355, Structural References

System and standard lengths [mm]; material, steel strength grade S355							
System diameter D_S [mm]	42	54	60	76	89	114	
Tube diameter	42.4	54.0	60.3	76.1	88.9	114.3	
Section thickness	2.6	2.6	2.9	2.9	3.2	3.6	
max. system lengths L [mm] without reduction of load capacity $N_{b,R,d}$ [kN] according to EC3: selected examples ②							
Load capacity $N_{b,R,d}$ [kN]	Fork end diam. d_S [mm]	max. system length L [mm]					
26	16	2000	3000	3700	5400	-	-
43	20	1500	2200	2800	4100	5600	-
61	24	1200	1800	2300	3400	4600	-
84	27	800	1400	1900	2800	3900	6200
106	30	-	1100	1600	2400	3400	5400
160	36	-	-	-	1700	2600	4300
223	42	-	-	-	-	1800	3400

The design loads given in the table above have been calculated according to EC3 with the partial safety values $\gamma_{M1} = 1.1$ and $\gamma_{M2} = 1.25$.

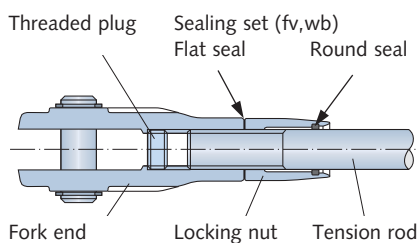
If other partial safety values or standards apply the load capacities have to be calculated accordingly.

② For design and structural calculation see HALFEN software on page 5 and www.halfen.de.

Alternatively please send an request with drawing, system dimensions and load calculation.

Structural references

Sealing systems for system-components parts (for tension and pressure rods) = effective protection against humidity and contamination.



As standard all fork ends are delivered with a threaded stopper mounted at the end of the screw-in thread.

The stoppers are colour-coded:

Yellow = right-hand thread,

Blue = left-hand thread.

A special sealing system provides additional protection. Available as standard for all diameter sizes 16 mm and larger.

We recommend sealing the outer joint of the locking nuts on site applying a durable elastic silicone suitable for external application.

In general, with sizes < M16 the connecting couplers should always be tightened applying suitable silicon.

Further coating variants (Duplex systems, powder coatings)

The responsibility for any additional coatings or the use of duplex systems is with the respective contractor.

We recommend doing sample coating tests in advance and having them checked and evaluated by a specialist contractor.

Safety instructions and installation information

For safety instructions see page 7. Further information for assembly of DETAN Rod systems can be found in the installation instructions.



Installation instruction can be downloaded as a pdf-file under:
www.halfen.de • Service • Brochures • Installation instructions • DETAN

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 quite 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-flange 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 flanges
- 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 a pretensioned system is intended then this should be considered at the planning-stage.

To apply pretension, special rental units can be obtained from our Engineering Support team.

The necessary rod force is converted into the required hydraulic pressure and then using the DETAN Pretension unit is applied to the DETAN Rod.

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 requires no electrical power.



DETAN ROD SYSTEMS

DETAN Pretension Unit

Assembly of the Pretension unit



Assembly of the pretension unit

To avoid possible damage to the rod surface load transfer is via threaded flanges. The hydraulic-system is clipped in front and behind the coupler on the threads. The hydraulic jacks temporarily relieve the strain on the coupler, allowing it 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.

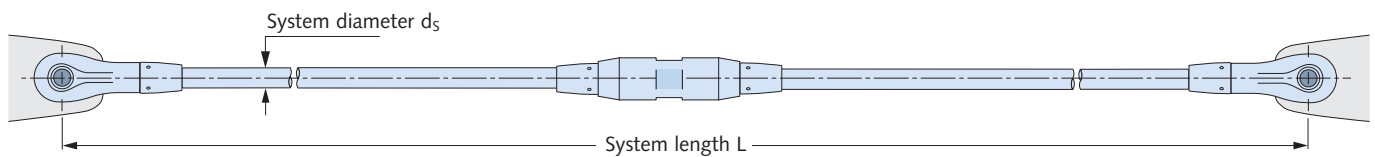
To ensure that the maximum recommended load has been reached the required hydraulic pressure is needed. Please refer to the table below. Alternatively the load can be checked using the extensometer.

A detailed assembly instruction is available on the Internet:

www.halfen.de • Service • Brochures
• Installation instructions • DETAN

System variations

with pretension coupler:



Ordering example (material steel): Tension rod system, DETAN S-460, $d_s = 30$ 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
Deliverable 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

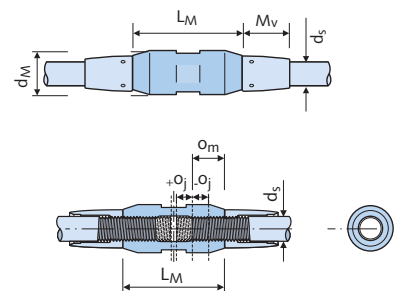
Pretension table for DETAN Rod system S-460 (values are partially rounded off)

Max. rec. 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 $\cong$ 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

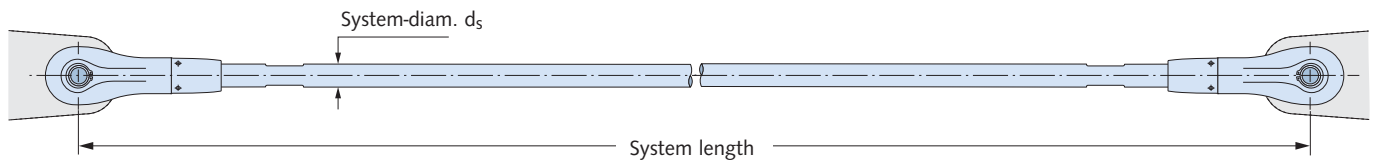


DETAN ROD SYSTEMS

Planning Help

Tender specification — examples

HALFEN Tension rod system DETAN-E



HALFEN Tension rod system type DETAN-E made of stainless steel A4, corrosion resistance class III according to Z-30.3-6, or according to EN 1993-1-4: 2006, consisting of 1 fork connection right-hand thread, 1 fork connection left-hand thread, plus 1 tension rod including 2 pins, 4 circlips and 2 DT-E nuts,

with European Technical Approval ETA 11/0311, type-tested, RAL RAL-GZ 996/5 quality mark approved by the Association for Façade Fixing Technology (Gütegemeinschaft Fassadenbefestigungstechnik e.V.), pre-assembled and product-specific-labelled tension rod system,

type

DETAN-E, d_s , L

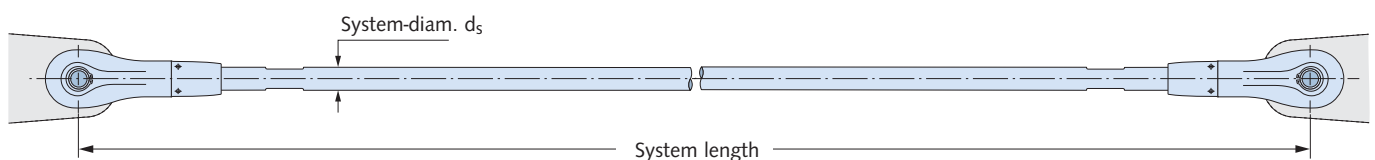
with

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 manufacturer's instructions. Includes welding the connector flanges according to provided engineer's specifications.

HALFEN Tension rod system DETAN-S460 fv



HALFEN Tension rod system type DETAN-S460 aus S460, consisting of 1 fork connection right-hand thread, 1 fork connection left-hand thread, plus 1 tension rod including 2 pins, 4 circlips and 2 DT-S nuts,

with European Technical Approval ETA 05/0207, type-tested, RAL RAL-GZ 996/5 quality mark approved by the Association for Façade Fixing Technology (Gütegemeinschaft Fassadenbefestigungstechnik e.V.), 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-dipped galvanized finish (alternative; mill-finished tension rod), or equivalent; deliver and install according to manufacturer's instructions. Includes welding the connector flanges according to architect's/engineer's specifications.

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: _____

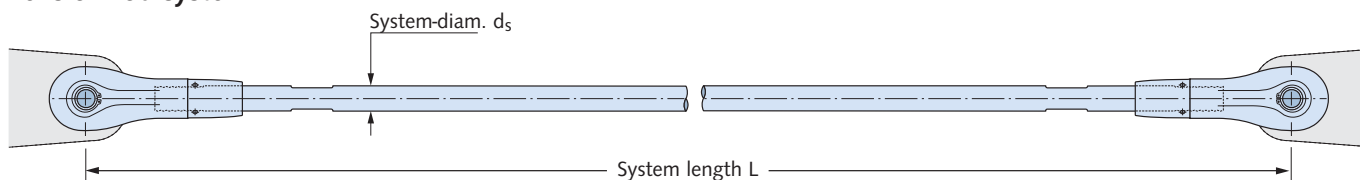
Customer address: _____

Tel.: _____ Fax: _____ e-mail: _____

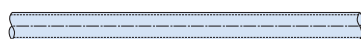
Project: _____ Project address: _____

Date: _____ Customer No: _____ ☐ Enquiry ☐ Estimate ☐ Order

Tension rod system



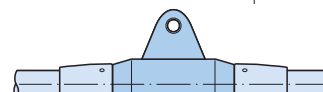
Design variants:



without coupler



with coupler

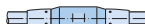
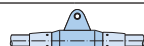


with coupler with lug

Choice of material:

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

DETAN-E (Stainless steel A4)
according to European Technical Approval ETA-11/0311
and type-test report S-WUE/120315 according to EC3

Item.	No.	d_s [mm]	$Z_{Ed,max}$ ② [kN]	L [mm]						Material choice		
										mill finish	hot-dip galva- nized	Stainless Steel A4
Beispiel	3	30		5600		x	2				x	

①: Number of couplers in one system length

②: maximum tension load required if diameter is unknown

More order forms available at:

www.halfen.de • Products • Tension rod system • Order form

Easy planning with DETAN Dimensioning software, see page 5.

Please send the completed form to HALFEN by
fax +49 (0) 2173 970-450 or by
e-mail to es.det@halfen.com.
Please contact us for an estimate.

Planning Help

Customer: _____ Contact name: _____
Customer address: _____
Tel.: _____ Fax: _____ e-mail: _____
Project: _____ Project address: _____
Date: _____ Customer No: _____ ☐ Enquiry ☐ Estimate ☐ Order

DETAN-E (Stainless steel A4)
according to European Technical Approval
ETA-11/0311 and type-test report
S-WUE/120315 according to EC 3

①: maximum tension load required if diameter is unknown, ②: smallest installation angle $\alpha = 40^\circ$, ③: smallest installation angle $\alpha = 60^\circ$

Please send this completed form to HALFEN by
fax +49 (0) 2173 970-450 or
e-mail to es.det@halfen.com.
Please contact us for an estimate.

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Belgium / Luxembourg	HALFEN N.V. Borkelstraat 131 2900 Schoten	Phone: +32 - 3 - 658 07 20 E-Mail: info@halfen.be Internet: www.halfen.be	Fax: +32 - 3 - 658 15 33
China	HALFEN Construction Accessories Distribution Co.Ltd. Room 601 Tower D, Vantone Centre No. A6 Chao Yang Men Wai Street Chaoyang District Beijing · P.R. China 100020	Phone: +86 - 10 5907 3200 E-Mail: info@halfen.cn Internet: www.halfen.cn	Fax: +86 - 10 5907 3218
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