BUILDING
COMMON GROUND

MAX FRANK®

MAX FRANK Coupler

Threaded connection

International edition

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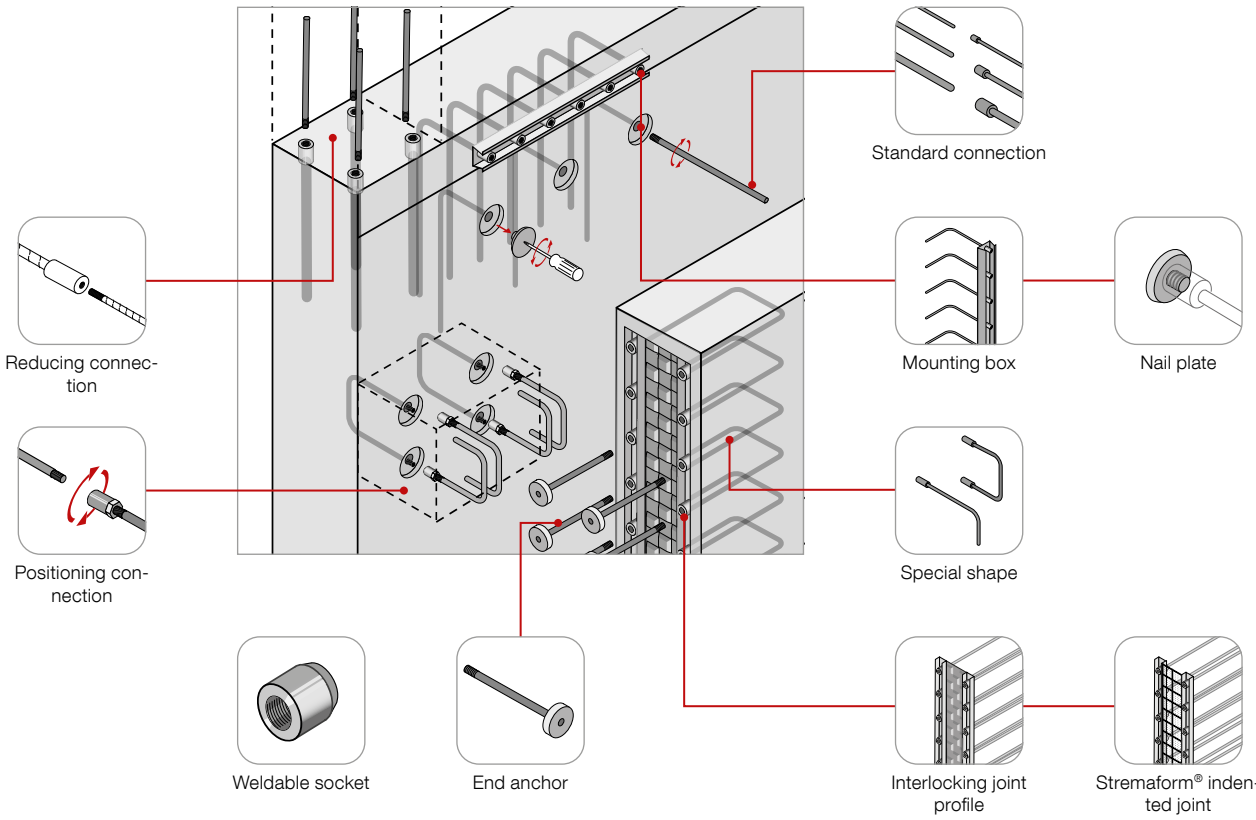
Mechanical connection and anchoring of rebars by means of threaded couplers for permanent and dynamic loads

The MAX FRANK threaded socket connections are used where the conventional splice joint is not practical or not permitted. They are also used where rebending is not possible due to the rebar diameter. The rebar connection usually consists of a threaded bar with a pre-mounted threaded coupler for the 1st construction phase as well as the continuation bar for screwing in during the 2nd construction phase. Threaded coupler connections offer an efficient and cost-effective way to connect reinforcing bars under permanent and dynamic loads.

Advantages

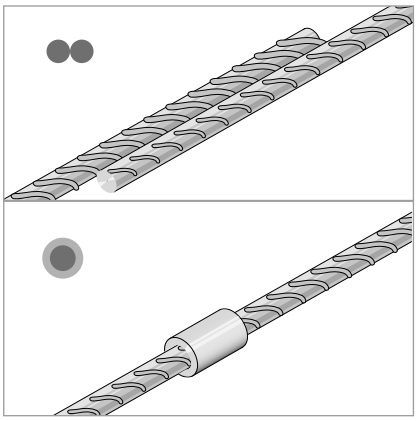
- Easy and quick installation
- Available for all common rebar diameters (12 to 40 mm)
- 100 % force transmission – “Bar Break”
- No reduction in the rebar cross-section
- No positioning couplers required
- Designed to conform to international standards: Eurocode 2 (NEN/DIN/BS EN 1992-1-1), ACI 318 type 1-2, test standard ISO 15835
- Numerous country-specific approvals available



Technical information

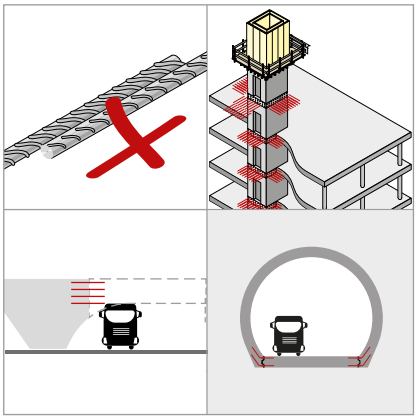
Splice joint or mechanical connection?

As a rule, a splice joint is used to connect two reinforcing bars, in which the ends of the bars are placed parallel to each other over a certain length. The force transmission is ensured by the bond with the concrete (indirect joint). Mechanical connections are used when a splice joint is not possible or not practical. The mechanical connection is a direct connection, i.e. the force transmission is independent of the bond, concrete quality or reinforcing steel diameter.



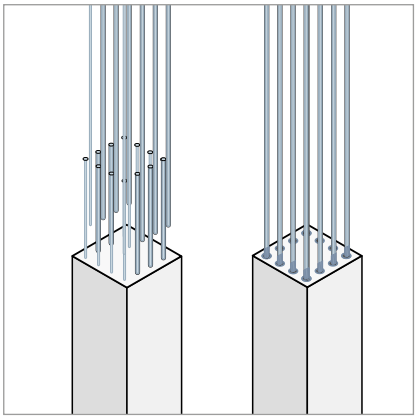
Reinforcing with mechanical connections

In many applications, indirect joints, i.e. splice joints, also pose a certain risk to stability. For this reason, overlaps are not permitted under certain conditions, are only possible to a limited extent or do not suit the particular application. For example, large rebar diameters, constructions in earthquake zones, reinforcement in tunnel construction or infrastructure projects can be reasons for a mechanical rebar connection. In general, the rules for large bar diameters according to DIN EN 1992-1-1, point 8.8 and the corresponding National Annexes must be observed.



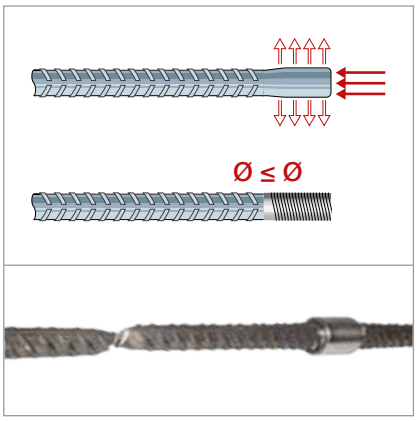
Density of reinforcement

The density of reinforcement in a reinforced concrete component is specified in the relevant standards or reinforcement guidelines. In highly reinforced components, the permissible degree of reinforcement is often exceeded in the joint area of the reinforcement and an overlap joint must be replaced by a mechanical connection. Thanks to its extremely slim and short dimensions, the MAX FRANK Coupler offers convincing advantages here, enabling a 100% joint even with very dense reinforcement. All bars can be joined in one cross-section (full joint).
In other applications, the MAX FRANK Coupler also offers advantages in formwork placement and speeds up the construction process by avoiding protruding connecting bars.



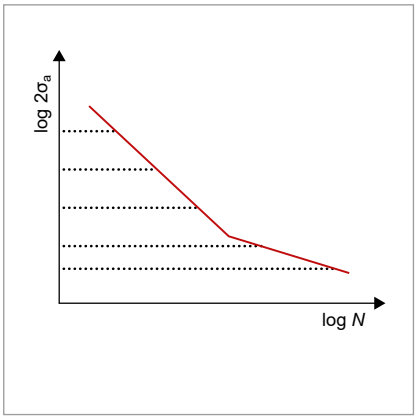
Bar break

“Bar break” refers to the failure of the reinforcing steel outside the socket joint. Before the threads are rolled, the ends of the reinforcing steel are increased in diameter by cold forging. This causes the specimen to fail outside the socket joint during tensile tests (“bar break”). The cold forging process guarantees gentle disruption diameter increase in the entire thread area and thus prevents a fatigue or brittle fracture in the thread. To achieve the bar break, it is sufficient to screw in the connecting bar as far as it will go; a defined torque does not need to be applied. The torque is used to reduce slippage.



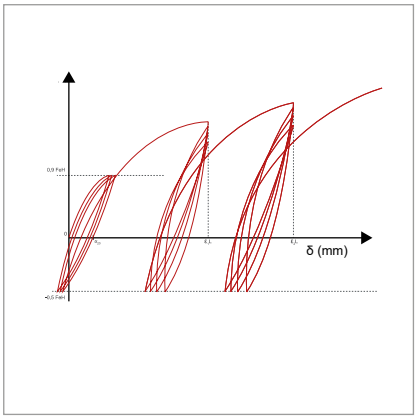
Dynamic loading - high-cycle fatigue

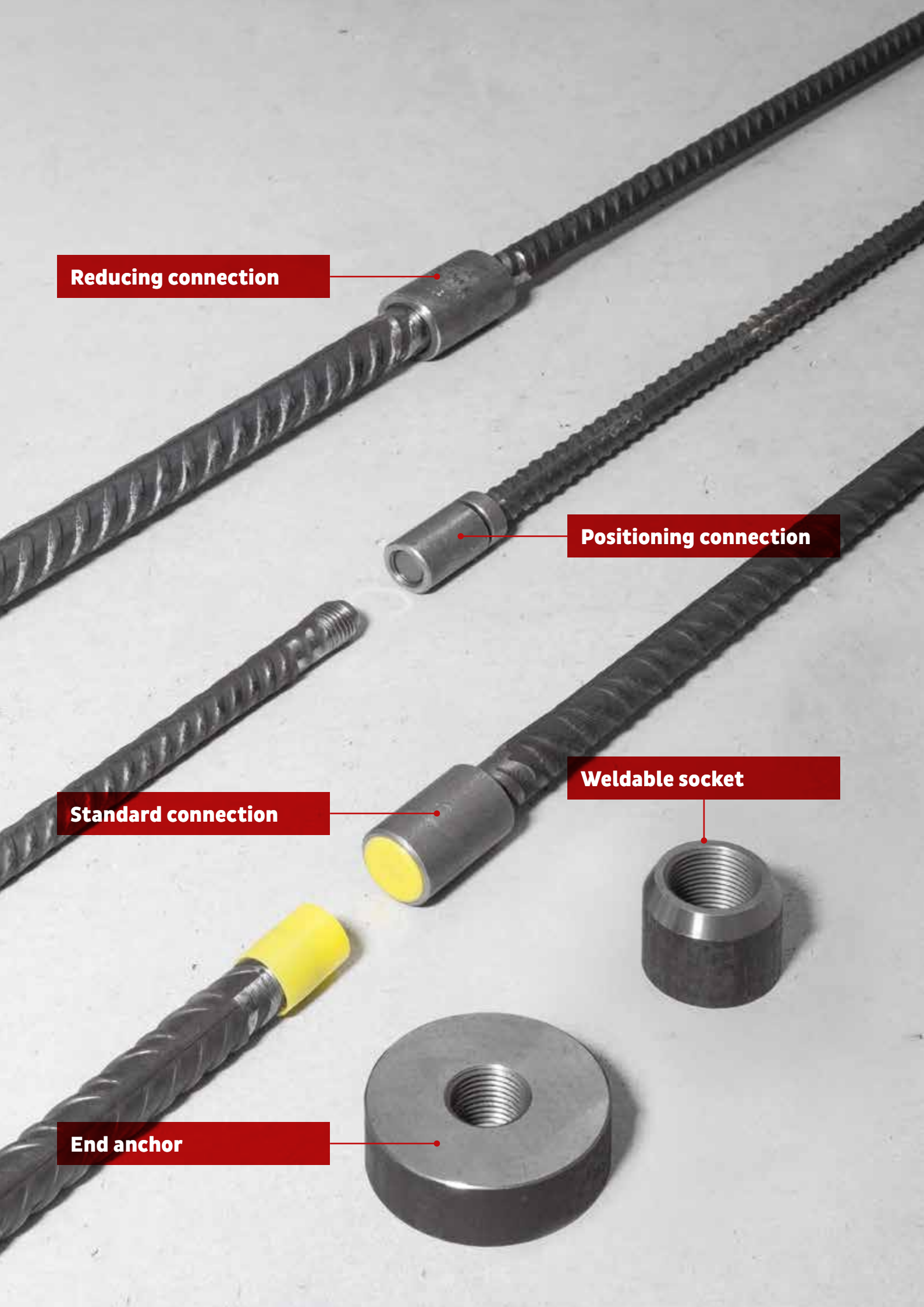
When using mechanical rebar connections in dynamically stressed structures, they must have adequate fatigue resistance. Areas of application include infrastructure projects, e.g. tunnels or bridges, as well as tall buildings. The properties of mechanical reinforcing steel couplers under high-frequency cyclic loading can be illustrated in an S-N diagram taking into account the specifications from ISO 15835:2018 (Wöhler line), see S-N diagram. MAX FRANK Couplers have been tested in accordance with the provisions and test requirements for verifying the fatigue properties of reinforcing steel connections in accordance with ISO 15835:2018 and can therefore also be used under dynamic loads. Please note the required tightening torques of the connection.



Low cycle fatigue

The performance of a mechanical connection for reinforcing steel is also shown by its behaviour under elastic-plastic reversal loading (earthquake), see diagram. The behaviour of mechanical connections under cyclic loading is of decisive importance in seismic areas. The requirements for seismic behaviour differ between Europe and other countries. The guidelines and test requirements for mechanical connections can be found in the following standards: ISO 15835:2018, AC133:2010, DIN EN 1998-1:2010-12, Eurocode 8, DIN EN 1998-1/NA: 2011-01, National Annex. MAX FRANK Couplers comply with the aforementioned test requirements. They therefore have the required strength and ductility and meet the high performance requirements for the design of structures in earthquake zones. Please note the required tightening torques of the connection.




Reducing connection
Positioning connection
Weldable socket
Standard connection
End anchor

MAX FRANK Coupler product variants

Reinforcing steel is one of the most important materials in modern construction and is used in a wide variety of applications. The MAX FRANK Coupler is also designed for this diversity, and the product variants offer numerous areas of application.

Steel diameter

The MAX FRANK Coupler enables the connection of the same or different rebar diameters. The range covers diameters of 12, 14, 16, 18, 20, 22, 24, 25, 26, 28, 30, 32, 34 and 40 mm. Sockets, thread protection caps and nailing plates are colour-coded according to diameter.

Connection types

- Standard connection for connecting reinforcing bars of the same diameter
- Reducing connection for connecting different diameters
- Position connection, consisting of standard socket and lock nut for use with connections that do not rotate freely
- End anchor to reduce the anchorage length
- Weld-on socket for connection to steel components

Sockets

All sockets are provided with a metric parallel thread. Quality control in production and identifiability with unique batch numbers ensure safety and quality in the project.

Colour coding

Ø 12	Ø 14	Ø 16
Ø 18	Ø 20	Ø 22
Ø 24, 25, 26	Ø 28	Ø 30
Ø 32	Ø 34	Ø 40

Building authority approvals

The building authority approvals create planning security for your projects. The requirements for screw connections vary for different markets. Therefore, please refer to the relevant approval for your country-specific project at www.maxfrank.com.

European approval

According to the European Technical Assessment (ETA-20-/0387), the standard connection, the position connection and the reduction connection are approved in the reinforcing steel diameters 12, 14, 16, 18, 20, 22, 25, 28, 32 and 40 mm.

German approval

In accordance with the German DIBt approval (Z-1.5-282), end anchors in reinforcing steel diameters of 12, 14, 16, 20, 25, 28, 32 and 40 mm are approved.

Romanian approval

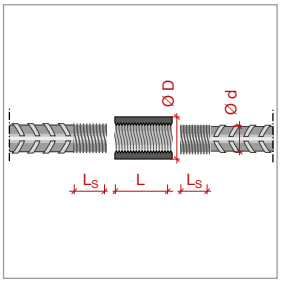
In accordance with Romanian approval (Agrement tehnic 001SB-01/417), the standard connection, the position connection, the reducing connection, the weld-on socket and the end anchor are approved in reinforcing steel diameters of 12, 14, 16, 18, 20, 22, 25, 28, 32 and 40 mm.

Product variants

MAX FRANK Coupler standard connection

for freely rotatable connections

The same Couplers are used for standard and positioning connections. For the standard connection, a socket bar is installed in the 1st construction phase; in the 2nd construction phase, the socket bar to be connected can be moved longitudinally and rotated freely.



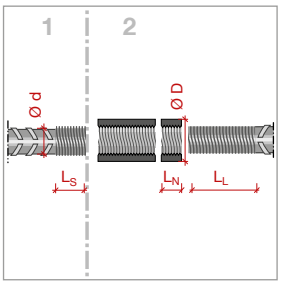
Item No.	Rebar Ø d mm	Socket outside Ø D mm	Length sleeve L mm	Screw-in depth L_S mm	Thread mm	Tightening torque Nm
CMPST12	12	20	28	14	M 14,0 x 2,0	40
CMPST14	14	22.5	32	16	M 16,0 x 2,0	80
CMPST16	16	26	36	18	M 18,5 x 2,0	120
CMPST18	18	28.5	40	20	M 20,5 x 2,0	150
CMPST20	20	32	44	22	M 22,5 x 2,0	180
CMPST22	22	34.5	48	24	M 24,5 x 2,0	220
CMPST25	24, 25, 26	38	54	27	M 27,5 x 2,5	270
CMPST28	28	42	60	30	M 30,5 x 2,5	270
CMPST30	30	50	66	33	M 33,5 x 3,0	300
CMPST32	32	48	68	34	M 34,5 x 2,5	300
CMPST34	34	55	74	37	M 37,5 x 3,0	300
CMPST40	40	61	85	42.5	M 43,5 x 3,0	350

Tightening torque, if required.

MAX FRANK Coupler positioning connection

for reinforcement bars that are not freely rotatable

With the positioning connections, the connecting bar can be moved longitudinally but cannot be rotated. For this reason, a protected threaded bar is first installed in the 1st construction phase. In the 2nd construction phase, a threaded bar with a loose screwed-on locking nut and pre-assembled screw socket is connected according to the working instructions. A special positioning sleeve is not required. The positioning connection consists of a standard socket and the corresponding lock nut listed below.



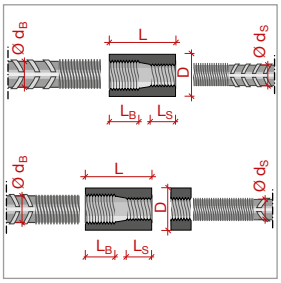
Item No.	Rebar Ø d mm	Socket outside Ø D mm	Length locknut L_N mm	Thread length L_L mm	Thread mm	Tightening torque Nm
CMLN12	12	20	9	37	M 14,0 x 2,0	40
CMLN14	14	22.5	9	41	M 16,0 x 2,0	80
CMLN16	16	26	9	45	M 18,5 x 2,0	120
CMLN18	18	28.5	9	49	M 20,5 x 2,0	150
CMLN20	20	32	9	53	M 22,5 x 2,0	180
CMLN22	22	34.5	9	57	M 24,5 x 2,0	220
CMLN25	24, 25, 26	38	13	67	M 27,5 x 2,5	270
CMLN28	28	42	13	73	M 30,5 x 2,5	270
CMLN30	30	50	13	79	M 33,5 x 3,0	300
CMLN32	32	48	13	81	M 34,5 x 2,5	300
CMLN34	34	55	13	87	M 37,5 x 3,0	300
CMLN40	40	61	13	98	M 43,5 x 3,0	350

Tightening torque, if required.

MAX FRANK Coupler reducing connection

For connections of different steel diameters

Reducing screw connections are used to connect reinforcing steel bars with different diameters. Reducing connections are often used for columns and cross-storey connections. Positioning connections can also be produced with reducing Couplers.



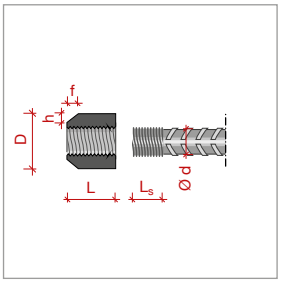
Item No.	Rebar Ø d_B mm	Rebar Ø d_S mm	Socket outside Ø D mm	Length sleeve L mm	Screw-in depth L_B mm	Screw-in depth L_S mm	Thread bar B mm	Thread bar S mm	Tightening torque bar S Nm
CMPSTR1412	14	12	22.5	35	16	14	M 16.0 x 2.0	M 14.0 x 2.0	40
CMPSTR1614	16	14	26	39	18	16	M 18.5 x 2.0	M 16.0 x 2.0	80
CMPSTR1816	18	16	28.5	43	20	18	M 20.5 x 2.0	M 18.5 x 2.0	120
CMPSTR2016	20	16	32	45	22	18	M 22.5 x 2.0	M 18.5 x 2.0	120
CMPSTR2018	20	18	32	47	22	20	M 22.5 x 2.0	M 20.5 x 2.0	150
CMPSTR2220	22	20	34.5	51	24	22	M 24.5 x 2.0	M 22.5 x 2.0	180
CMPSTR2520	24.25.26	20	38	54	27	22	M 27.5 x 2.5	M 22.5 x 2.0	180
CMPSTR2522	24.25.26	22	38	56	27	24	M 27.5 x 2.5	M 24.5 x 2.0	220
CMPSTR2825	28	24.25.26	42	64	30	27	M 30.5 x 2.5	M 27.5 x 2.5	270
CMPSTR3025	30	24.25.26	50	61	33	22	M 33.5 x 3.0	M 27.5 x 2.5	270
CMPSTR3225	32	24.25.26	48	68	34	27	M 34.5 x 2.5	M 27.5 x 2.5	270
CMPSTR3228	32	28	48	71	34	30	M 34.5 x 2.5	M 30.5 x 2.5	270
CMPSTR3430	34	30	55	78	37	33	M 37.5 x 3.0	M 33.5 x 3.0	300
CMPSTR4032	40	32	61	84	43	34	M 43.5 x 3.0	M 34.5 x 2.5	300
CMPSTR4034	40	34	61	90	43	37	M 43.5 x 3.0	M 37.5 x 3.0	300

Tightening torque, if required.

MAX FRANK Coupler weld-on socket

Connection of reinforcing steel with steel components

The weld-on socket offers an effective solution for connecting reinforcing steel to steel components. It has a circumferential chamfer at one end for applying the weld seam. Like the other sockets, the weld-on socket also has a metric thread and is available for all standard reinforcing steel diameters. Special welding requirements apply to the material 1.0503.

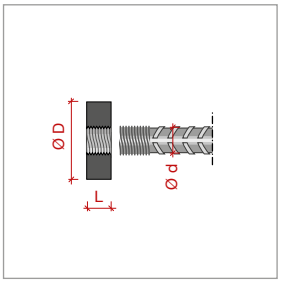


Item No.	Rebar Ø d mm	Socket outside Ø D mm	Length sleeve L mm	Chamfer Height h mm	Chamfering depth f mm	Screw-in depth L_s mm	Thread mm
CMPW12	12	20	19	4	4	14	M 14,0 x 2,0
CMPW14	14	24	21	4	5	16	M 16,0 x 2,0
CMPW16	16	26	24	5	5	18	M 18,5 x 2,0
CMPW18	18	30	26	5	6	20	M 20,5 x 2,0
CMPW20	20	32	29	7	6	22	M 22,5 x 2,0
CMPW22	22	34	31	7	6	24	M 24,5 x 2,0
CMPW25	24, 25, 26	38	35	8	7	27	M 27,5 x 2,5
CMPW28	28	42	38	8	7	30	M 30,5 x 2,5
CMPW32	32	49	43	10	8	34	M 34,5 x 2,5
CMPW40	40	66	53	10	12	42.5	M 43,5 x 3,0

MAX FRANK Coupler end anchor

Anchoring of reinforcing bars

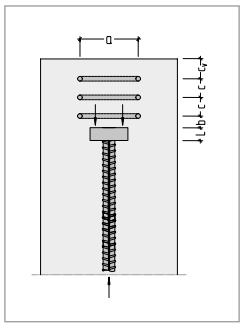
End anchors or anchor plates are used to anchor reinforcing bars. End anchors are used when the required anchoring length of reinforcing steel cannot be installed in the structure and end hooks cannot be used because the reinforcement density is too high or the components are too slender.



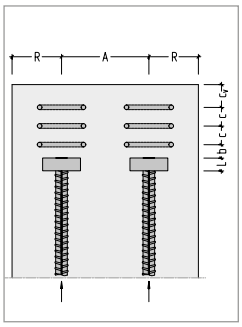
Item No.	Rebar Ø d mm	Anchor Ø D mm	Anchor length L mm	Thread mm	Tightening torque Nm
CMPA12	12	45	14	M 14,0 x 2,0	40
CMPA14	14	45	16	M 16,0 x 2,0	80
CMPA16	16	55	18	M 18,5 x 2,0	120
CMPA18	18	55	20	M 20,5 x 2,0	150
CMPA20	20	65	22	M 22,5 x 2,0	180
CMPA22	22	70	24	M 24,5 x 2,0	220
CMPA25	24, 25, 26	80	27	M 27,5 x 2,5	270
CMPA28	28	95	30	M 30,5 x 2,5	270
CMPA30	30	95	33	M 33,5 x 3,0	300
CMPA32	32	105	34	M 34,5 x 2,5	300
CMPA34	34	105	37	M 37,5 x 3,0	300
CMPA40	40	130	42.5	M 43,5 x 3,0	350

Tightening torque, if required.

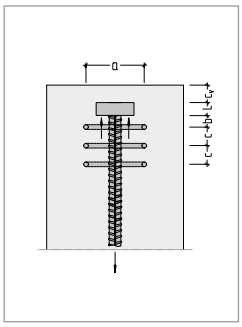
Spacing and additional reinforcement for end anchoring



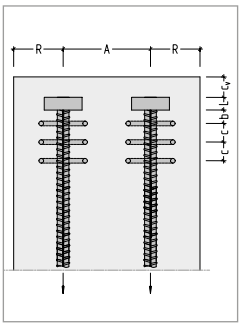
For compressive stress on a bar



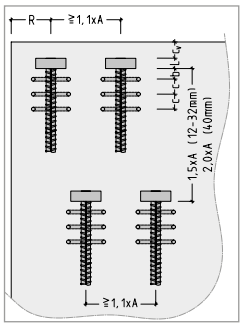
For compressive stress on two bars



For tensile stress on a bar



For tensile load on two bars



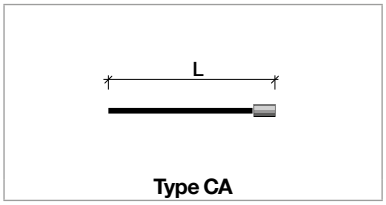
Offset anchoring

Rebar Ø d mm	Centre distance A mm	Edge distance R mm	Additional reinforcement Number n	Additional reinforcement Ø mm	Additional reinforcement a mm	Additional reinforcement b mm	Additional reinforcement c mm
12	85	65	2	8	60	20	28
14	85	65	2	8	60	20	28
16	100	70	2	8	70	20	30
18	130	85	3	8	100	20	32
20	130	85	3	8	100	20	32
22	145	90	3	8	120	15	41
24, 25, 26	145	90	3	8	120	15	41
28	170	100	3	8	140	10	41
30	190	110	3	8	155	20	50
32	190	110	3	8	155	20	50
34	250	150	3	10	200	25	45
40	250	150	3	10	200	25	45

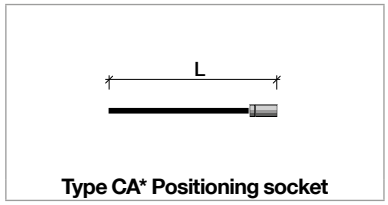
The reinforcement shown here is only a suggestion and can be replaced by equivalent reinforcement. A helical reinforcement can also be used in accordance with the approval.

MAX FRANK Coupler custom-made products

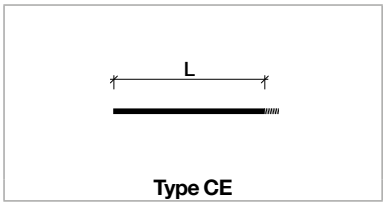
The MAX FRANK Couplers are available as standard versions and as custom-made products under the item no. CMCSONDER. They can be manufactured at short notice according to your requirements. In addition to different bending radii and individual bar lengths, we also offer a wide range of socket or threaded connections. Alongside standard, positioning and reducing connections, weldable sockets and end anchors are also possible variants.



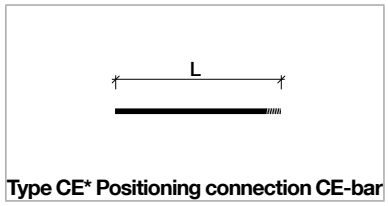
Type CA



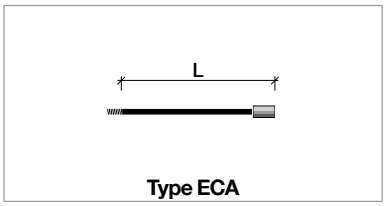
Type CA* Positioning socket



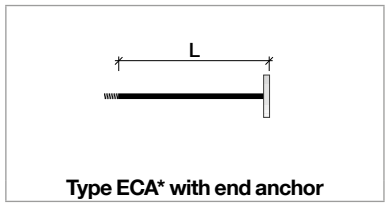
Type CE



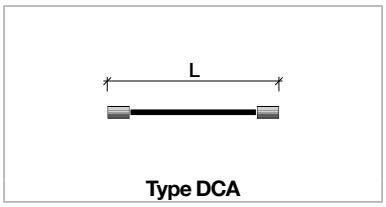
Type CE* Positioning connection CE-bar



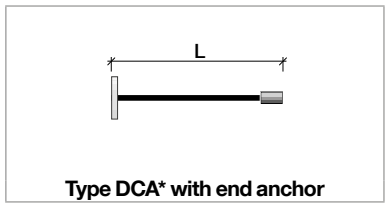
Type ECA



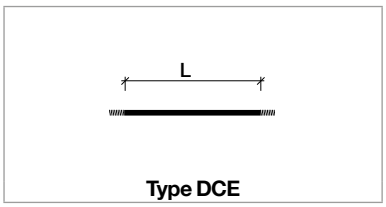
Type ECA* with end anchor



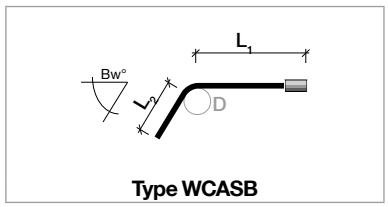
Type DCA



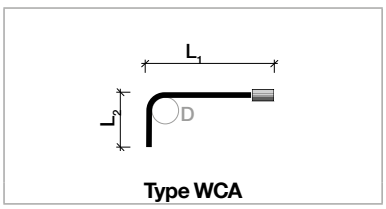
Type DCA* with end anchor



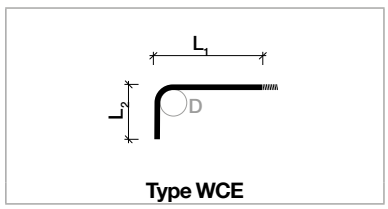
Type DCE



Type WCASB



Type WCA



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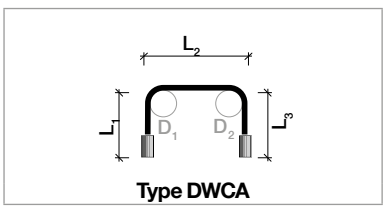
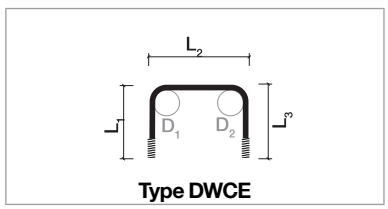


Type DWCA



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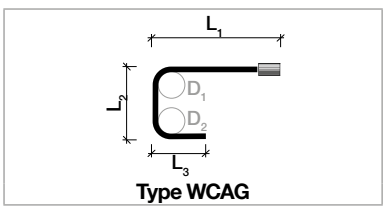
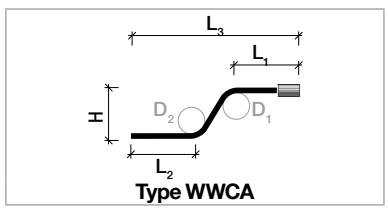


Type WCAG



Type WWCA

* Example of type variants: Under the article number CMCSONDER, the variants of the connections such as positioning and reducing connection as well as weldable couplers and end anchors can also be selected from the different types of bending shapes.

System components

MAX FRANK Coupler mounting box

- For standard, reducing and positioning connection
- For simple series installation
- The bar spacing “s” can be selected as required (100/150/200 mm as standard)
- Mounting box with cover and two end caps, alternatively available with solid polystyrene core, e.g. for the positioning connection
- The bars must be additionally secured
- Available for all diameters
- Geometry: L x W x H = 1200 x 70 x 30 mm up to diameter 28 mm, 1200 x 90 x 30 mm from diameter 32

MAX FRANK Coupler nail plate

- For standard and reducing connection
- For fixing individual MAX FRANK Coupler socket bars to the formwork
- With thread for secure fixing in the socket
- The bars must be additionally secured
- Available for all diameters
- The colour of the nail plates corresponds to the diameter-dependent colour coding

MAX FRANK Coupler protective caps

- To protect the threads between production and installation
- Plastic protective caps
- Available for all diameters
- The colour of the protective caps corresponds to the diameter-dependent colour coding
- Can also be used as an assembly aid to position connections if necessary

Wooden nail strip

- For standard and reducing connection
- For simple series installation
- Mounting option to be provided on site
- Available prefabricated in Switzerland (hole spacing 100/150/200 mm, L x W x H = 1200 x 100 x 30 mm)
- Complete removal of the strip, without leaving any residue in the concrete
- The bars must be additionally secured

MAX FRANK Coupler torque wrench

- Application of a defined tightening torque to the connecting bar
- Special pliers head for the MAX FRANK Coupler rebar connections from 12 to 40 mm
- Infinite adjustment of the required torques possible
- Two types available depending on diameter

CMDMS730Q20MF14

MAX FRANK Coupler torque wrench 0 - 270 Nm

Ø	Nm
12	40
14	80
16	120
18	150
20	180
22	220
24 - 28	270

CMDMS721Q30MF18

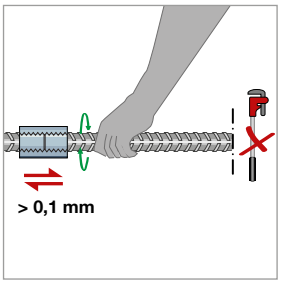
MAX FRANK Coupler torque wrench 180 - 350 Nm

Ø	Nm
20	180
22	220
24 - 28	270
30 - 36	300
40	350

A torque is required

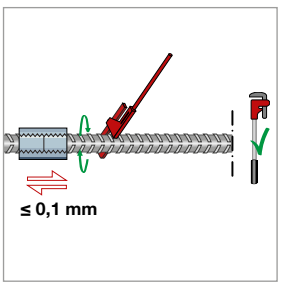
Load safety (Bar Break)

A torque wrench is not required to ensure full load-bearing capacity. It is sufficient to screw in the connecting bar as far as it will go to guarantee the break in the reinforcing steel (Bar Break).



Serviceability

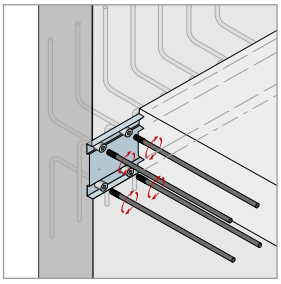
In order to meet the slip requirements (ISO 15835-1/2), the bar ends are screwed into the sockets and tensioned with the torques listed in accordance with ETA-20/0387.



Product combinations

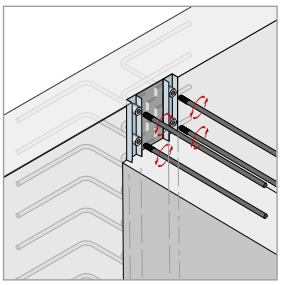
MAX FRANK Coupler with Stabox® reinforcement connection standard boxes (shear force indentation)

The Stabox® standard boxes offer an indented joint in accordance with DIN EN 1992-1-1:2011 (/NA:2011-01) thanks to the profile design in the transverse force direction. This product combination provides the approach with the highest concrete load-bearing capacity (indented joint) for the design of the construction joint with MAX FRANK Coupler screw connections with large diameters of 12 to 40 mm. This combination is possible up to a component thickness of 30 cm. For larger component thicknesses, it is recommended to combine with Stremaform®.



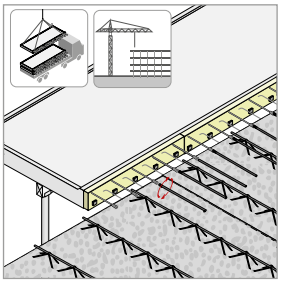
MAX FRANK Coupler with Stabox® reinforcement connection single-row and indented joint profile

MAX FRANK Coupler screw connections are used to assemble prefabricated joint formwork elements for highly stressed components in all load cases with a bar diameter of 12 to 40 mm at the factory. The variation option with two single-row Stabox® offers the highest joint category “indented” according to DIN EN 1992-1-1:2011 (/NA:2011-01) due to the box profile and the indented joint profile former. This means that when designing highly loaded construction joints, the concrete load-bearing components can also be assigned the highest design values for an indented joint in the shear direction.



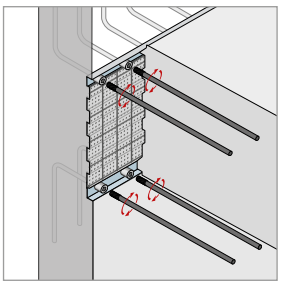
MAX FRANK Coupler with Egcobox® cantilever connection

The transport sizes of balcony slabs from the precast facility to the construction site can be significantly reduced. For this purpose, the tension bars of the Egcobox® cantilever slab connections are shortened using MAX FRANK Couplers to improve delivery and installation conditions. The screwable connecting bars must be installed on site. For detailed planning, coordination between the structural engineer and MAX FRANK application technology is required.



MAX FRANK Coupler with Stremaform® formwork

In addition to the combination of the MAX FRANK Coupler with the Stabox® standard boxes, the combination with the Stremaform® formwork is also suitable for shear force connection. The connection of the joint in accordance with Eurocode 2 and the National Annex is made possible by the Stremaform® preformed unit. This combination variant is used from a component thickness of 30 cm.



References

Karlatornet, Gothenburg (SE)

The Karlatornet skyscraper in Gothenburg offers space for around 2,000 apartments, offices, stores and restaurants on 73 floors. At 246 meters high, Karlatornet is the tallest building in Scandinavia. One of the world's largest architectural firms, Skidmore, Owings and Merrill (SOM), headquartered in Chicago, designed the building. The construction company Serneke® from Gothenburg was awarded the contract to build the gigantic skyscraper.
Photo: © www.serneke.de

Luxury apartments Ayia Napa Marina (CY)

Ayia Napa in Cyprus is one of the best-known vacation resorts in the south-east of Cyprus. The Ayia Napa Marina project was developed here with two top-class residential towers, as well as 20 villas and commercial buildings. The west and east towers are each over 100 meters high and have 25 floors.
Photo: © www.marinaayianapa.com

The Terraced Tower, Rotterdam (NL)

The Terraced Tower is a 110 meter high residential building with 33 floors and a total of 25,000 square meters of high-quality living space. All rooms in the apartments offer a large balcony and a fantastic view of the city. This has created a successful connection between inside and outside living.
Photo: © www.provast.nl

Piraeus station, metro line 3 (GR)

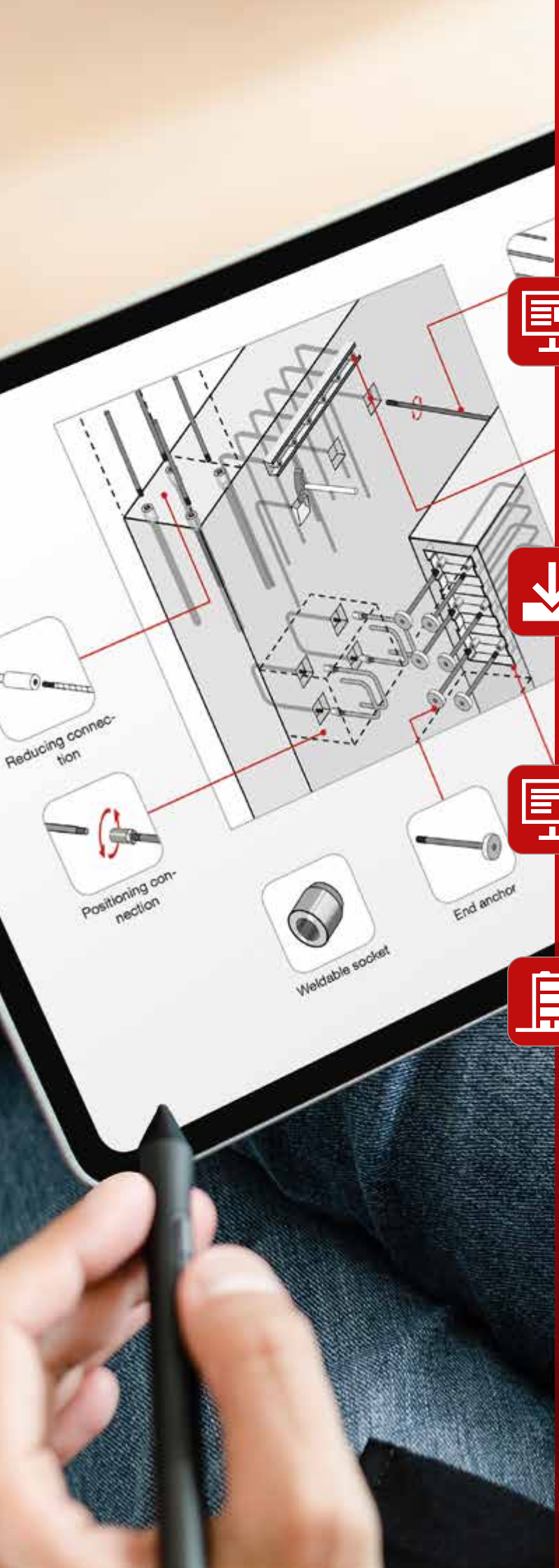
In Piraeus, the third largest port in the Mediterranean, metro line 3 was extended to counteract the acute traffic problems in Athens and to improve accessibility to the city by public transport. The MAX FRANK Coupler screw connection was supplied for the new tunnel section.
Photo: © www.maxfrank.com

Recycling plant, Kalmar (SE)

In the southern Swedish province of Kalmar, a recycling plant has been constructed on an area of 44,000 square meters. In addition to the function of a wastewater treatment plant, the water is recycled and can be used for the irrigation of green areas, agriculture and forestry and also for industrial water. The plant also produces certified fertilizer and biogas. The MAX FRANK Coupler screw connection was used for several construction phases of the project.
Photo: © www.maxfrank.com

BUILDING
COMMON GROUND

MAX FRANK®



PRODUCT PAGE

On our MAX FRANK Coupler product page www.maxfrank.com/max-frank-coupler you will find general information on the areas of application, extensive image and video material, current topics relating to screw connections and helpful product documentation.

DOWNLOADS

Documents such as installation instructions, test certificates and environmental declarations are available in the download area of the MAX FRANK Coupler product page.

ONLINE CATALOGUE

Browse our online catalogue with practical features such as product comparison or watch list for your MAX FRANK Coupler selection.

REFERENCES

You can find further references on our website.

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