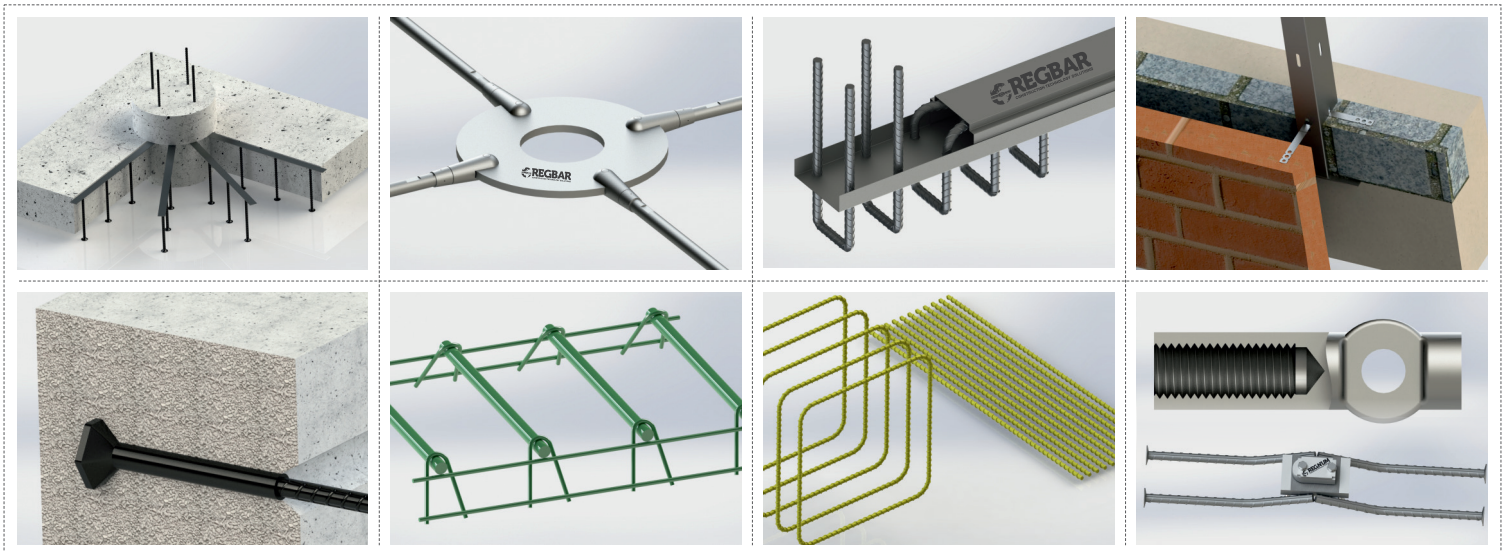


CONSTRUCTION TECHNOLOGY




REGBAR
CONSTRUCTION TECHNOLOGY SOLUTIONS

Who are we?

As REGBAR family, we have vast knowledge and international experience in the fields of engineering and applications as of 2010. We have carried out important domestic and international projects including on-site applications in many developing fields with regard to manufacturing Reinforcement Couplers, Anchorage, Rock Bolts, Tunnel and Soil Equipment, Pre and Post-Tensioning Systems, Fiber Reinforcements, Steel and Case, Shoring and Steel Constructions.

Quality

All REGBAR equipment are designed and manufactured to be installed and operate in factory and field. The machines have CE and related certificates and are used by technicians specialized in provision of high quality service. If needed, fast installation in the field is performed and on-site anchorage and coupler services are provided. REGBAR Couplers comply with; ASTM A706, ASTM A615, ASTM A996, TS708, BS8110, BS4449, ISO 15835 S2, ACI 318, BS8110, ISO 15835 S-1 / S-2, TS500, GOST 34278-2017 standards. All REGBAR products have been tested and approved by independent laboratories.


Date : 20.02.2019
No : DHTY-2019/040

REGNUM Construction Technology Solutions
Sarıy mah. İsmet sarıyı sırtı 13. cadde 318 Blok
Apt.No: 318/132 no/9 İsmik (Mk)-Kocaeli

Subject : Work Completion Certificate
Reference : -/-

Employer : Cengiz İnşaat Sarıy ve Tic. A.Ş.
Filiyatı Cad. Kader Sok. No:36 Gaziosmanpaşa – Çankaya – Ankara / TÜRKİYE

End User : Rosatom State Atomic Energy Corporation (ROSATOM) & Akkuyu Nükleer A.Ş.

Project Name : Akkuyu Nuclear Power Plant, Off-Shore Hydraulic Structures Construction Project

Place of Work : Bilecikcezi Mahallesi, 33715 Gülnar – Mersin / TÜRKİYE


Issued to : REGNUM Construction Technology Solutions

Description of Job :

- Supply of rebar couplers (35.334 Pieces)
- Onsite rebar threading
- Mechanical testing

This completion certificate issued for REGNUM Construction's request in order to expound the Customer reference list.

We hereby confirm that REGNUM Construction successfully completed above mentioned project for our AKKUYU Nuclear Power Plant Off-Shore Hyraulic Structures Construction Project in Mersin/TURKEY


CENGİZ İNŞAAT SAN. TİC. A.Ş.
İNŞAAT
SARİY MAHALLESİ, SAKARYA CADDESİ NO: 13, 318 BLOK, 9/KAT, KOCATEPE, KOCAELİ
T.C. MİLLÎ EĞİTİM BAKANLIĞI
TEKNİK VE MESLEK LİSESİ
MERSİN İLİ, MERKEZİ
Proje Yönetimi
Project Manager

CENGİZ İNŞAAT SARİY VE TİCARET A.Ş.
Altınordu Mah. Evren Cadde No: 37 46100 Sakarya/Bilecik
Tel: +90 264 345 90 00 Fax: +90 264 345 90 01
E-posta: cengiz@csn.com.tr Web: www.csn.com.tr
Akkuys Nükleer Enerji Santrali Projesi
E-posta: cengiz@regnum.com.tr Web: www.regnum.com.tr
Yatırım Sicil No: 255 814/MK MERSİN İl, o code entry (tamam)

By CENGİZ INŞAAT kuruluştur

1/1

Work
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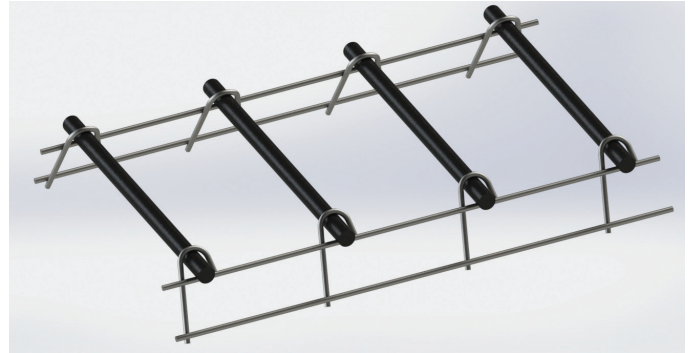


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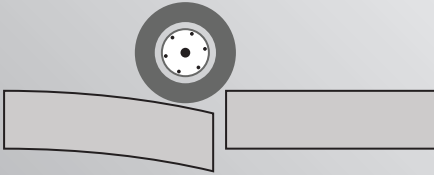
DOWEL BAR

Properties

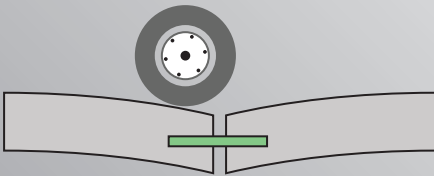
- ▶ Significantly improves the performance of road connections
- ▶ Prefabricated leave-in-place cages, for positioning dowels at the correct height and spacing in the slab
- ▶ Reduces the life cycle cost
- ▶ Simple geometry of the formation of the joint without the need of additional measurement or adjustment
- ▶ Simple formwork and time saving installation
- ▶ Stainless Steel, GFRP or Epoxy coated (optional)



0% load transfer efficiency



100% load transfer efficiency



Dowel Bars are short steel bars that provide a mechanical connection between slabs without restricting horizontal joint movement. Before passing over the load, they make the release plate take on some of the load and increase the efficiency of load transfer. This reduces joint deviation and stress in the approach and dispersion slabs.

Half of the length of this bar is embedded in one of the concrete slabs and the rest is adhered to the adjacent slab. One end of the rod is kept free for movement during expansion and contraction of the slab depending on temperature change.

Epoxy-Coated Dowel Bars protect by using various mechanisms. Epoxy-Coated Dowel Bars have shown that the corrosion rates of Steel Reinforcement Rods is 40 to 50 times lower than similar uncoated bars.

Epoxy Coated rebar can be used in any concrete that is exposed to corrosive conditions. These may include exposure to de-icing salts or seawater.



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

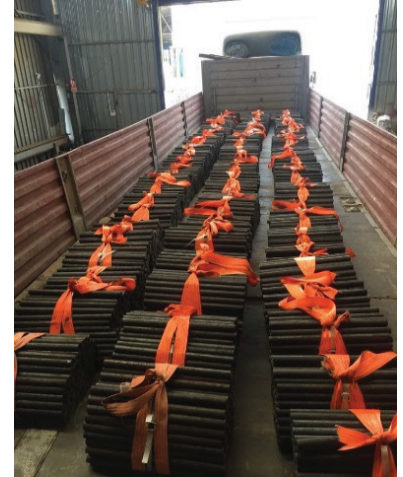
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Dowel bar is widely used in constructions such as:

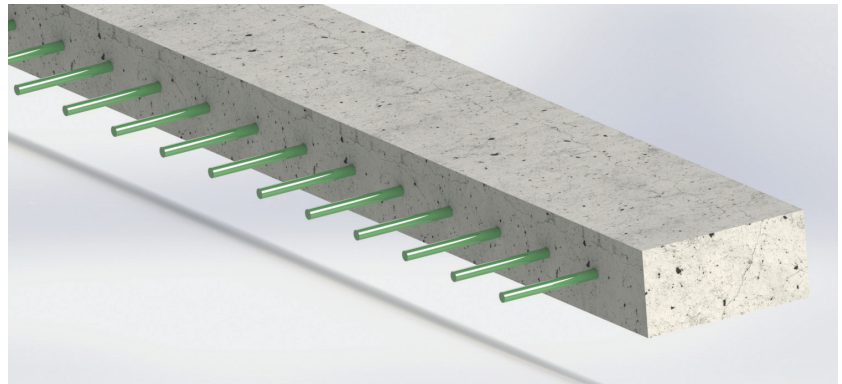
- ▶ Marine structures (harbors, airports, tunnels, etc.)
- ▶ Sidewalks (highway, airport runway, etc.)
- ▶ Park structures
- ▶ Buildings (seaside, power plants, etc.)
- ▶ Repairing

As REGBAR, we offer the best products, services and support that best fit to your needs of Dowel Bar. We produce epoxy coated, galvanized, stainless and GFRP Dowel Bars.



Simple Installation

- 1 Place Dowel bars on the center line of joint and fix it to ground.
- 2 Install the slab reinforcement mesh (if specified) as directed by the slab designer.
- 3 Pour the concrete ensuring that concrete placement and minimum reinforcement coverage is achieved as per slab design.



- 4 Saw cut the slab over the centerline by diamond saw to a depth of 25 ~ 30% total slab thickness, as soon as it is possible to cut without damaging the arrises (within 24 hours). Control the depth of the cut to make sure the dowels are not cut through.

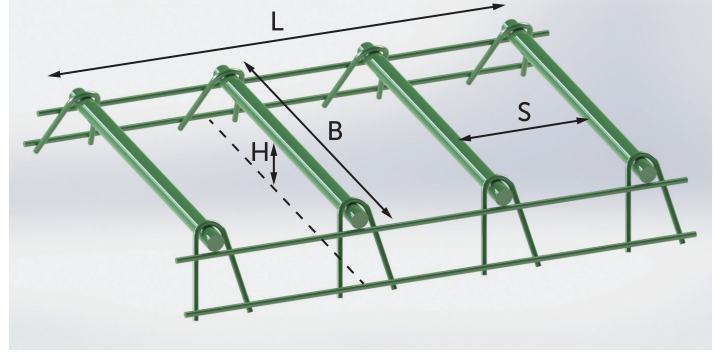


Dimensions

Regbar produces various types of Dowel Bars according to your needs. Dowel diameters can change from 16mm to 32 mm while dowel lengths can change from 200 mm to 600 mm.

Different types of Regbar Dowel Bars are selected according to following criteria:

- Slab Depth. Is required to determine the type of the Dowel Bar as the dowels have to be positioned always in the center of the slab. Advisable slab depths are stated in table below.
- Environment. For internal floors, basic plain steel Dowel Bars is suggested. For external applications and where corrosion resistance is required, it is recommended to use stainless steel or epoxy coated Dowel Bars.



The table below indicates most used types of dowel bars.

Product Code	Height from Ground (H)		Dowel Type	Dowel Centers Span (S)		Total Length of Unit (L)		Advisable Slab Depth	
	[mm]	["]		[mm]	["]	[mm]	["]	[mm]	
RDB63	63	1-3/16	Round bar dowel D32 x 450 mm *	450	17-23/32	1000	39-3/8	125	4-59/64
RDB75	75	1-27/64						150	5-29/32
RDB88	88	1-21/32						175	6-57/64
RDB100	100	1-57/64						200	7-7/8
RDB113	113	2-23/64						225	8-55/64
RDB125	125	2-61/64						250	9-27/32

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HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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CONSTRUCTION TECHNOLOGY

FRP REBAR

Properties

- ▶ Does not react to salt, chemical products or the alkalinity of the concrete.
- ▶ Does not rust, even in the toughest conditions.
- ▶ Cut-able by standard earth removal equipment and Tunnel Boring Machines (TBMs).
- ▶ **Regbar FRP** reinforced structures exposed to de-icing salt, sea water or chemical products have significantly longer life-expectancy
- ▶ 4 times lighter compared to steel while offering up to 3 times the tensile strength of steel bar
- ▶ No metal is contained in it; thus, it will not interfere with strong magnetic fields or sensitive electronic instruments.
- ▶ Standardized product range with short delivery times, standard items are available from stock
- ▶ Available in sizes 10 mm - 26 mm



Regbar FRP Rebar is a concrete reinforcement that has higher strength than steel, is lighter, tested and approved, non-corrosive, usable in different areas. Regbar designs and manufactures innovative structural solutions based on high-tensile FRP (Fiber Reinforced Polymer) bars and profiles. Those solutions can be either made Glass-Fiber based (GFRP) or Carbon-Fiber based (CFRP). Regbar offers both GFRP and CFRP bars according to your needs.

Regbar FRP reinforcing bars are covered by various Design Guides and Design Codes, including:

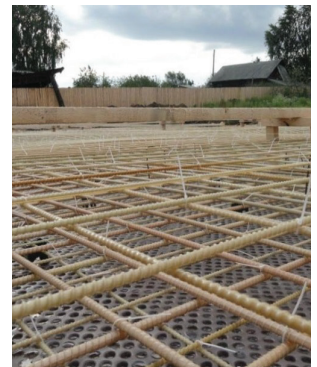
CAN/CSA S806	ACI 440.1R	AASHTO LRFD
FIB Task Group 9.3 – Bulletin 40	CNR DT 203	



It is ideal in; hospitals for MRI machine pads, research facilities, aluminum smelters, industrial facilities, underground electrical enclosures, switchyards, toll roads, monorail tracks, etc.



Also it is widely used in TBM soft-eyes, diaphragm walls, drilled pile walls, formwork anchors, temporary structures, rock anchors, soil nails.



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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Dimensions

Product Code		GFRP ₁₀	GFRP ₁₂	GFRP ₁₆	GFRP ₂₀	GFRP ₂₆	GFRP ₃₂
Bar Size	Metric	10	12	16	20	26	32
	US	#3	#4	#5	#6	#8	#10
	Canada	-	10M	15M	20M	25M	25M
Min Tensile Strength	[MPa]	880	1000	940	940	960	960
	[ksi]	128	145	136	136	139	139
Nominal Tensile Modulus	[GPa]	42.5 ± 2.5					
	[ksi]	6159 ± 363					
Tensile Strain	[%]	2.07	2.35	2.21	2.21	2.26	1.68
Nominal Bond Strength	[MPa]	12.5					
	[psi]	1812					
Bond Dependent Coefficient	[-]	0.8					
Nominal Tensile Modulus	[E-6/C]	6.1					
	[E-6/F]	3.3					
Moisture Absorption	%	0.38	0.36	0.36	0.44	0.30	0.29
Glass Content	% vol	65					
	% weight	83					
Weight	[g/m]	135	232	380	606	925	2488
	[lb/ft]	0.091	0.156	0.255	0.407	0.622	1.672
Nominal Tensile Modulus	[mm ²]	71.3	126.7	197.9	285.0	506.7	791.7
	[inch ²]	0.1104	0.1963	0.3068	0.4418	0.7854	1.2272

NOTES

- Dimensions shown in chart are typical.

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Technology

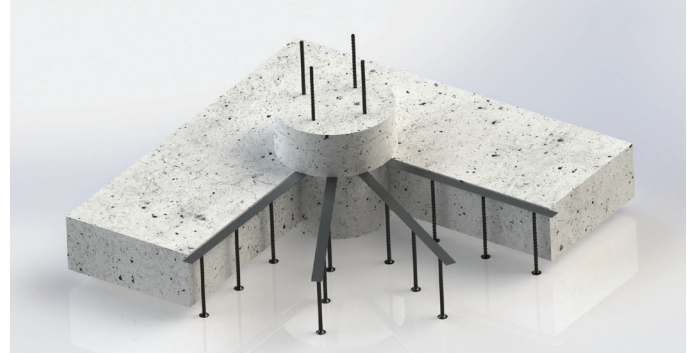


CONSTRUCTION TECHNOLOGY

SHEAR REINFORCEMENT

Properties

- ▶ Higher load bearing capacity than conventional stirrup reinforcements.
- ▶ Time saving easy installation from above
- ▶ Can be installed easily and fast
- ▶ Standardized product range with short delivery times, standard items are available from stock
- ▶ Available in sizes 10 mm - 26 mm
- ▶ Allows simple visual inspection



Regbar Shear Reinforcement (RSR) is the perfect solution to the design and construction problems associated with the punching shear, used in flat slabs to provide further strengthening by providing additional reinforcement around columns. The system consists of double headed studs welded to mounting rails, positioned around the head or base of the column, transferring the shear load from the slab to the column through the studs.

RSR system is suitable for all column shapes and, depending on user preference, can be easily installed either "top down" or "bottom up."



The studs are assembled to form reinforcement elements comprising at least two studs. The studs are tack welded or clamped at one end to a non-structural steel rail or reinforcing bars for securing the position of the double headed studs when pouring the concrete.

All studs of one of those reinforcement elements have the same diameter.

The design of punching shear reinforcement is typically carried out in accordance with the recommendations contained in **BS EN 1992 (Eurocode 2)**, **ACI318** or **Turkish Seismic Code 2018**. Engineering design service is given by Regbar upon request.

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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Defining The Problem: Punching Shear Around Columns



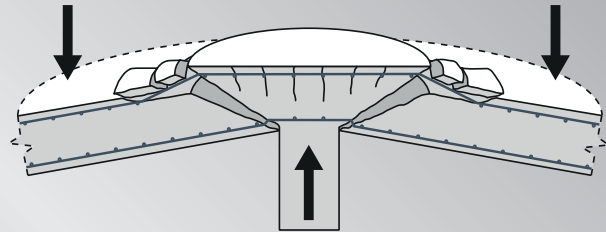
Manufacturing reinforced concrete slabs without any beams and enlarged column heads results in inexpensive manufacturing.

This type of construction allows thinner, lighter and simpler elements, enabling optimum and flexible space use.

Advantages of flat slab manufacturing are:

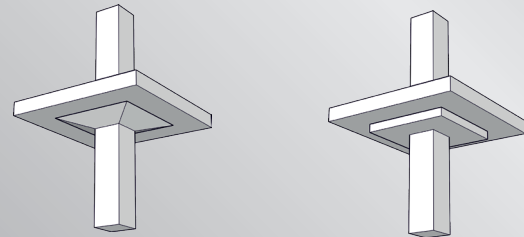
- ▶ Less construction time
- ▶ Slimmer, lighter and more aesthetical elements
- ▶ Easier installation of building utilities under slabs (e.g. auto sprinkler or ventilation ducts)
- ▶ Easy constructability with economy in the formwork flexibility for interior fittings
- ▶ Plain ceiling surface giving better diffusion of light
- ▶ Building height or floor heights can often be reduced

Dealing with the problem - Shear checks:



Load concentration around the column head generally leads to increased stresses that can't be absorbed solely in thin slab thicknesses.

Uneconomical and unfavorable solutions were used to prevent punching shear failure, such as increasing the slab thickness or using extended column heads before. These methods not only extend the construction time, but also reduce the usable height between floors and therefore limit building space.



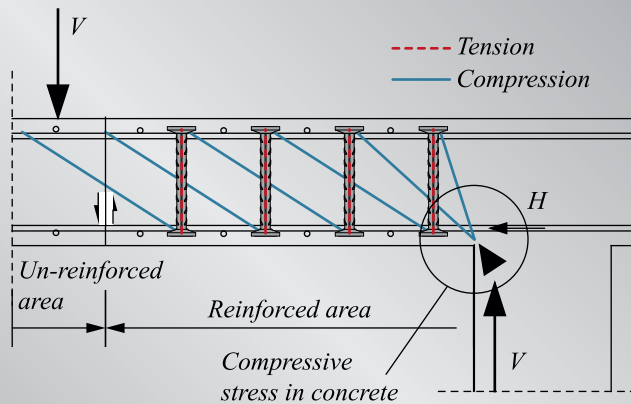
Uneconomical solutions

Alternatively, it is possible to use stirrups cages as punching shear reinforcement. However, longitudinal slab reinforcement must be enclosed by the stirrups which makes installation complicated and difficult

Determining The Solution: Regbar Shear Reinforcement - RSR



Regbar Shear Reinforcement (RSR) System is most typically used as vertical reinforcement in concrete slabs that is designed and detailed to prevent the development of inclined punching cracks. System consists of two, three or four double headed studs welded onto a spacer bar. System can be positioned from top or from bottom. Individual parts can be added to each other to maintain design requirements.



The structural behavior of a slab reinforced by Regbar studs may be interpreted by a system of struts and ties, where the studs act as vertical tensile components.

Designing The Shear Reinforcement



The design methodology is determined by **BS EN 1992-1-1:2004 (EC2)** or to **BS 8110-1:1997**. Regbar offers in-house designs prepared by qualified engineers.

Design Manual According To EC2

An EC2 design will normally produce a radial or cruciform layout pattern, however square patterns can also be achieved following certain procedures with the basic design principles below being maintained.

Outline design procedures for a suspended slab:

- 1 The direct shear at the edge of the loaded area (column or pile) is checked and satisfied.

$$V_{Ed\ 0} \leq V_{Rd\ max} \quad u_o \text{ perimeter must be calculated in accordance with EC2}$$

- 2 The punching shear stress at the control perimeter u_1 is determined; if it's within the concrete punching stress resistance, no punching reinforcement is required and no further action is required.

$$V_{Ed\ 1} \leq V_{Rd\ c} \quad u_1 \text{ perimeter is } 2d \text{ from loaded area in accordance with EC2}$$

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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- 3** If the concrete stress is exceeded, punching shear reinforcement can be added to increase the effective resistance of the slab. If the limit is exceeded the slab properties should be increased accordingly

$$v_{Ed1} \leq 2v_{Rd.c}$$

It may be possible to increase this to 2.5 v_{Rd.c} established from full scale test plus an independent report. This is at the discretion of the Project Engineer. It is normal practice is to remain within the set limits applied in EC2



- 4** Perimeters of punching shear reinforcement are required to within kd (1.5 x the effective depth) of where the normal reinforced slab is able to resist the applied shear loads (U_{out}).

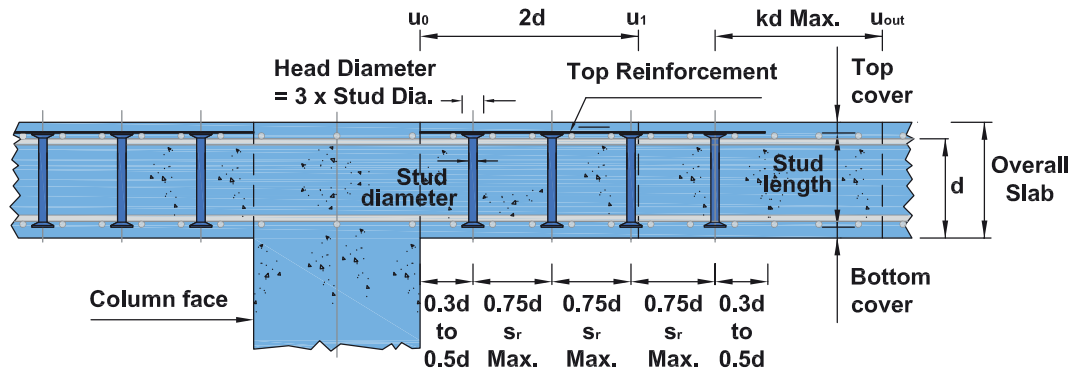
$$A_{sw} = ((v_{Ed0} - 0.75 v_{Rd.c}) u_1 s_r / 1.5 f_{ywd.ef} \times \text{number of studs})$$

or

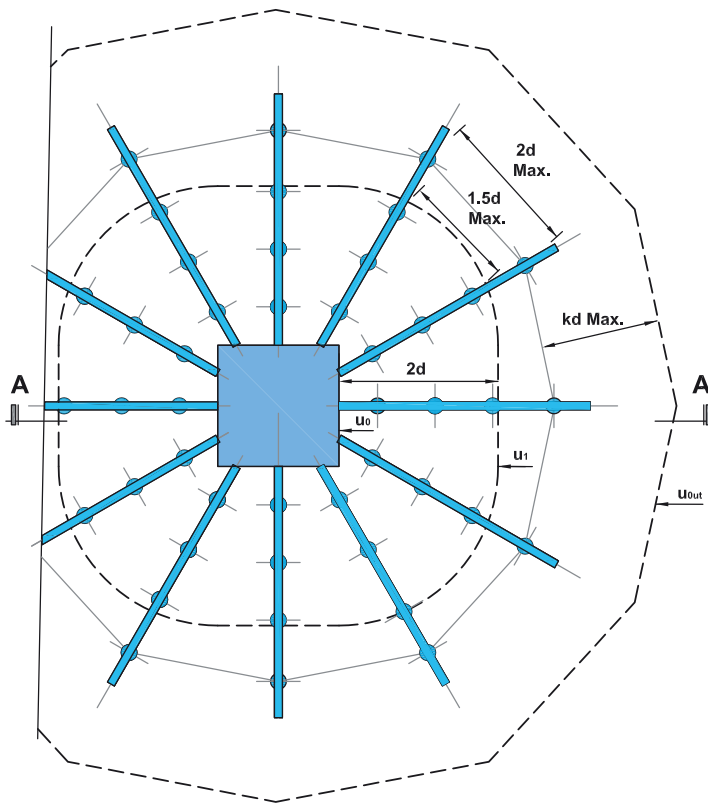
$$A_{sw.min} = (1.5 / (s_r s_t)) \times (0.08 \sqrt{f_{ck} f_{yk}})$$



The calculated value is for the area of one stud, the reinforcement is projected out to within kd (1.5d) of the U_{out} perimeter.

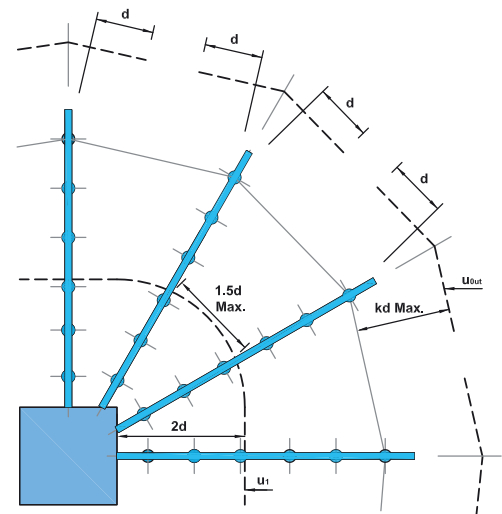


Section A-A

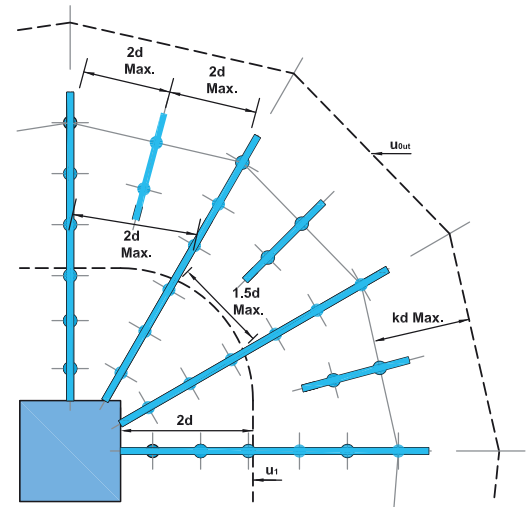


Note: The value of k for use in a Country may be found in the National Annex (Normally 1.5)

Radial Shearail Layout Pattern



Extended Shearails without spacers rails



Extended Shearails with spacers rails

It may be possible to increase stud spacing to $3.5d$ behind $2d$ from the column face, this is at the discretion of the Project Engineer established from independent full scale testing, however it is normal practise is to remain within the set limits applied in EC2.

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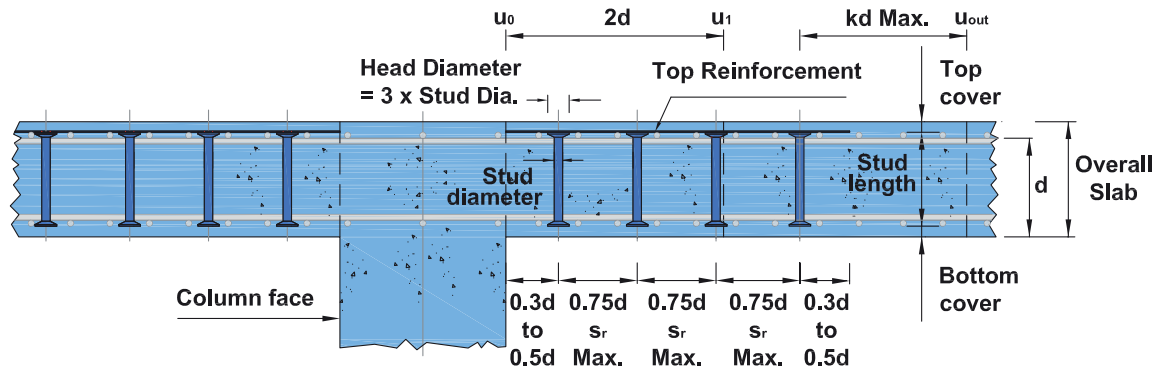
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 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

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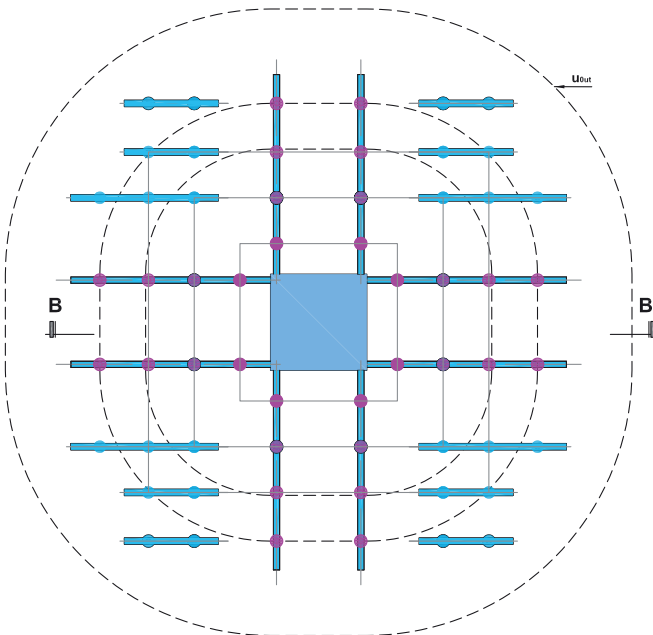
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 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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Section B-B

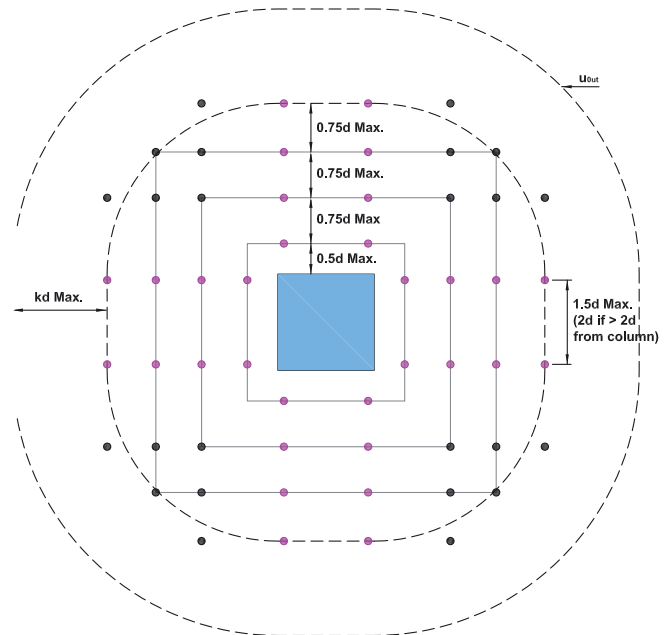


Links are replaced by studs on like for like area basis

Note:

The studs indicated in blue are not used in the punching shear design.

Orthogonal Shearail Layout Pattern



Traditional link layout as designed by the Project Engineer in accordance to the Concise Eorocode 2, published by the Concrete Centre,

Note:

The links indicated in black are not used in the punching shear design.

Selecting RSR

RSR is made from two types of steel material, B420C or B500B.

The characteristic values of resistances of individual RSR studs are summarized in Table below:

Product Code	Bar Sizes			Head Diameter (*)		Stud Section (*)		Stud Yield Strength	
	Metric [mm]	US	Canada	[mm]	["]	[mm]	["]	[MPa]	[ksi]
RSR10	10	#3	-	30	1-3/16	78.60	0.12	420 or 500	60 or 75
RSR12	12	#4	10M	36	1-27/64	113.10	0.18		
RSR14	14	-	-	42	1-21/32	154.00	0.24		
RSR16	16	#5	15M	48	1-57/64	201.10	0.31		
RSR20	20	#6	20M	60	2-23/64	314.20	0.49		
RSR26	26	#8	25M	75	2-61/64	531.00	0.82		

		Head Diameter [mm] (*)					
Stud Yield Strength [MPa]		10	12	14	16	18	20
420	Resistance [kN]	33	47.5	64.7	84.4	131.9	223
500		39.3	56.5	77	100.5	157.1	265.5

The resistance of a concrete member reinforced by rsr has to be verified case-by-case for each project. Custom software may be used to design RSR and verify the resistances of concrete members reinforced by RSR.

Product Code	Stud Bar Sizes			Head Size		Stud Section		Stud Yield Strength	
	Metric [mm]	US	Canada	[mm]	["]	[mm]	["]	[MPa]	[ksi]
SRCT10	10	#3	-	30	1-3/16	78.60	0.12	420 or 500	60 or 75
SRCT12	12	#4	10M	36	1-27/64	113.10	0.18		
SRCT14	14	-	-	42	1-21/32	154.00	0.24		
SRCT16	16	#5	15M	48	1-57/64	201.10	0.31		
SRCT20	20	#6	20M	60	2-23/64	314.20	0.49		
SRCT26	26	#8	25M	75	2-61/64	531.00	0.82		

NOTES

- Dimensions shown in chart are typical..

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

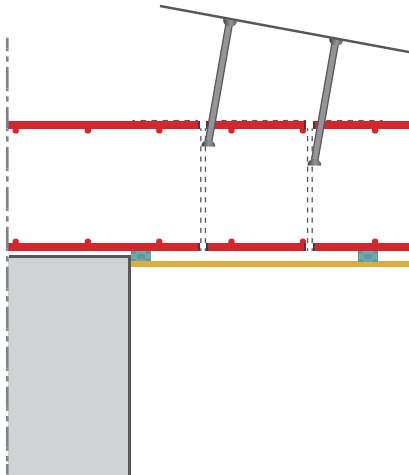
PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

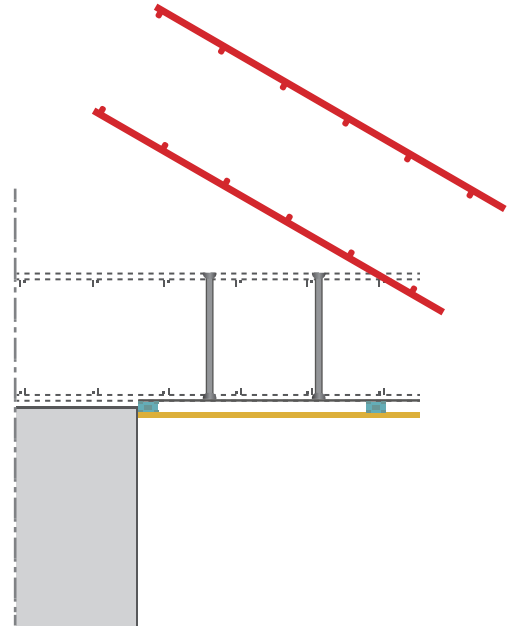
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Simple Installation



After installing the upper and lower mesh reinforcement the Regbar shear reinforcement elements are inserted from above through the reinforcement.



Alternatively, Regbar shear reinforcement elements are installed upside-down before installing the upper and lower mesh reinforcement.

Regbar provides a free design service to assist in the design and detailing of RSR into your project.

To benefit from Regbar's RSR design service simply email your drawings to info@regbar.com. Our experienced and dedicated RSR technical department will use their expertise to formulate the optimum concrete reinforcement strategy for your project based on the drawings and information supplied by you.

You will receive a quote prepared by our in-house costing team who will liaise with the design engineer dealing with your enquiry.

Our design service will provide full calculation sheets for your approval and can also supply DXFs for inclusion in your CAD drawings.

To enable us to proceed with a design we would require the following information:

- ▶ General Arrangement (G.A)/Layout of the floor being considered and the floor below
- ▶ Top reinforcement drawings (Bottom if transfer situation)
- ▶ Any drawings showing voids not detailed on G.A/Layouts
- ▶ Any applicable sections (steps etc.)
- ▶ Shear loads (kN) and any moments to be considered (kNm), (factors from the code will be applied if only unfactored loads are supplied)

Regbar Construction
Technology

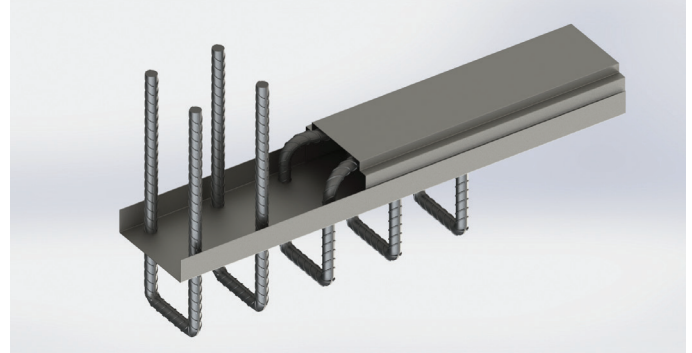


CONSTRUCTION TECHNOLOGY

REBEND CONNECTION

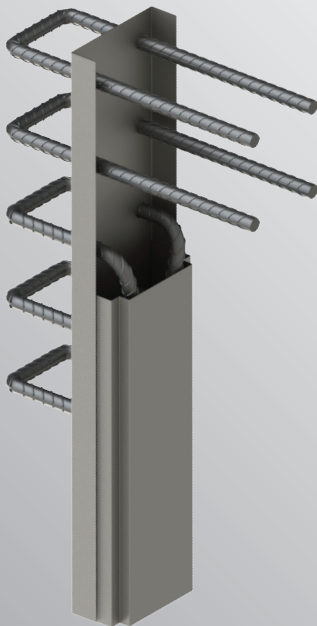
Properties

- Simplify formwork on concrete working joints
- The formwork does not need to be pierced
- Reliable connection between joints
- Custom production in a short time



Regbar Rebend Connection system is used for effective connection of the concrete pieces which are poured and connected in different phases. The cover can be taken out of the body, thus it is manufactured from the galvanized sheet with the in-advanced drilled clutch holes and the protection system.

The product can be mounted to formwork only by nailing or fixing with an additional binding wire.



Use of the **Regbar Rebend Connection** system provides many advantages over conventional joint construction, including the simplifying formwork design and removing the need to drill shuttering.

As the bars stay in the casing until necessary, they are protected, minimizing the danger of injury from projecting bars. Easy to use, for installation, the system needs little on-site training.

The **Regbar Rebend Connection** system is potentially suitable for use in any construction joint in concrete, but the most commonly found applications include floor slabs, walls, stairwells, corbels diaphragm walls, jumpforms and brick support ledges.

There is a standard range of products for the most common mounting situations with 0.8 m and 1.25 m body lengths and the single and double-layer connection.

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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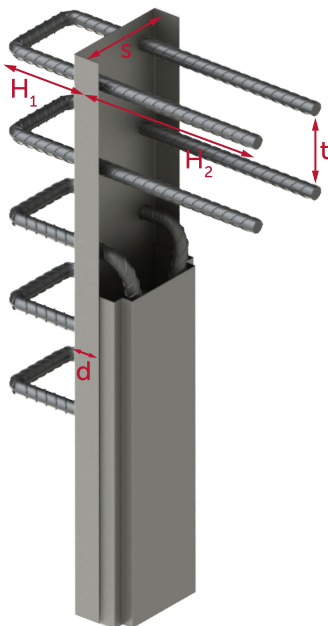
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Simple Installation

- 1** Nail the Rebend Connection through the casing to the formwork or alternatively securely tie the projecting anchorage reinforcing bars back to the main reinforcement. In both cases the Rebend Connection box should be securely fixed to avoid displacement during concreting. The casing should be tight against the formwork. Pour concrete.
- 2** After concrete hardening, strike the formwork to reveal the cover. Remove the cover to expose the pre-bent bars.
- 3** Straighten the bars using the re-bending tool for the size of bar. The bars should be straightened only once. To avoid damage to adjacent concrete, it is prudent to allow a concrete curing period of seven days.
- 4** Once the bars are straightened and aligned they are ready for lapping with the concrete element reinforcement.



Dimensions



Regbar produces various types of Rebend Connection System according to your needs. Some types mentioned in the table below are in-stock products and available at short notice depending on the quantity ordered.

The delivery time for the other standard products is 2 to 5 work days (depending on the quantity, larger quantities on enquiry).

Regbar Construction
Technology



Product Code	For wall thickness from	Case Width	Steel Diameter	Stirrup Width	Overlap Length	Stirrup Spacing	Case Height	Weight of Piece
	[cm]	s [cm]	Ø [metric]	m [mm]	H ₂ [mm]	t [mm]	[m]	[kg/pce.]
RBC0815	13	9	8	7	26	15	1.25	4.68
RBC1015	13	9	10	7	30	15	1.25	6.78
RBC0815	16-18	12	8	10	26	15	1.25	5.12
RBC0820	16-18	12	8	10	26	20	1.25	4.35
RBC1015	16-18	12	10	10	30	15	1.25	7.18
RBC1020	16-18	12	10	10	30	20	1.25	5.8
RBC1215	16-18	12	12	10	39	15	1.25	10.89
RBC1220	16-18	12	12	10	39	20	1.25	8.58
RBC0815	18-20	15	8	12	26	15	1.25	5.16
RBC820	18-20	15	8	12	26	20	1.25	4.37
RBC1015	18-20	15	10	12	30	15	1.25	7.7
RBC1020	18-20	15	10	12	30	20	1.25	6.27
RBC1215	18-20	15	12	12	39	15	1.25	11.55
RBC1220	18-20	15	12	12	39	20	1.25	7.08
RBC0815	23-26	19	8	17	26	15	1.25	5.34
RBC1010	23-26	19	10	17	30	10	1.25	10.82
RBC1015	23-26	19	10	17	30	15	1.25	7.89
RBC1020	23-26	19	10	17	30	20	1.25	6.42
RBC1210	23-26	19	12	17	39	10	1.25	17.48
RBC1215	23-26	19	12	17	39	15	1.25	12.52
RBC1220	23-26	19	12	17	39	20	1.25	10.09
RBC0815	26-29	22	8	20	26	15	1.25	6.21
RBC1010	26-29	22	10	20	30	10	1.25	12.03
RBC1015	26-29	22	10	20	30	15	1.25	8.89
RBC1210	26-29	22	12	20	39	10	1.25	18.02
RBC1215	26-29	22	12	20	39	15	1.25	12.95
RBC1220	26-29	22	12	20	39	20	1.25	10.41
RBC1010	29	25	10	23	30	10	1.25	12.54
RBC1015	29	25	10	23	30	15	1.25	9.32
RBC1210	29	25	12	23	39	10	1.25	18.72
RBC1215	29	25	12	23	39	15	1.25	13.54
RBC1220	29	25	12	23	39	20	1.25	10.85

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

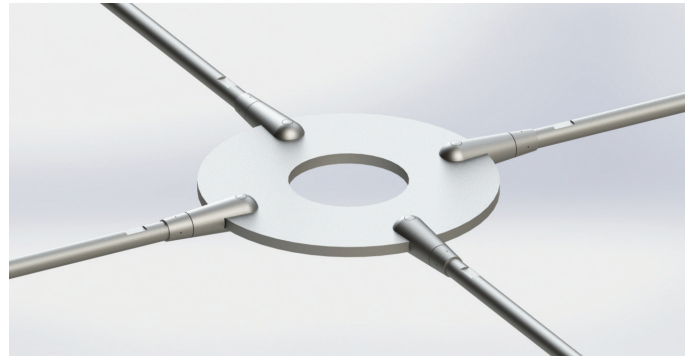
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CONSTRUCTION TECHNOLOGY

TENSION ROD SYSTEM

Properties

- ▶ Regbar Tension Rod system is monolithic.
- ▶ Compression bar system is used with stainless steel versions up to Europe Technical Approval ETA-04/0038 M160 for nominal dimensions which meet the desired tension load.
- ▶ Cast steel fork connectors work on the tie rod system up to 9,568 kN with high strength.
- ▶ All components are stable at low temperatures (min. 27J / -20 ° C).
- ▶ Fork locked pinned lock system provides homogeneous load distribution.
- ▶ All rod components are available in hot galvanized version.
- ▶ Controlled pre-tension is possible.



Connecting rods are used not only structurally but also architecturally in structures and buildings. Regbar Tension Rod are designed to meet the challenging aesthetic requirements of today's applications.

Regbar Tension Rod provides perfect combination of stainless steel connection rod system, corrosion resistance and aesthetics upon request. In the nominal size range from M8 to M100, there is virtually no limit to support. **Regbar Tension Rod** is designed to transmit tensile and compression forces.



Regbar Tension Rod is usually purchased with suitable fork-end dippers for connection to the host structure. Typical applications include hangers and supports, cross linking and shear support elements.

A series of different strength grades and surface qualities are available to meet all technical and aesthetic requirements.

Applications

The wide range of components can be used to create a variety of assemblies, from simple tie bars to complex bracing systems involving several bars joined at one point.



Dimensions

	Thread Size	Disc Thickness	Overall Diameter	Effective Diameter	Hole Diameter for Pin
Product Code	[mm]	[mm]	[mm]	[mm]	[mm]
CTAD8	8	8	8	76	7.5
CTAD10	10	10	10	93	9.5
CTAD12	12	12	12	112	11.5
CTAD16	16	15	15	150	14.5
CTAD20	20	20	20	184	18.5
CTAD24	24	20	20	212	21.5
CTAD30	30	30	30	269	26.5
CTAD36	36	30	30	318	30.5
CTAD42	42	35	35	367	35.5
CTAD48	48	40	40	416	42.5
CTAD56	56	50	50	488	50.5

Regbar Construction
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Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
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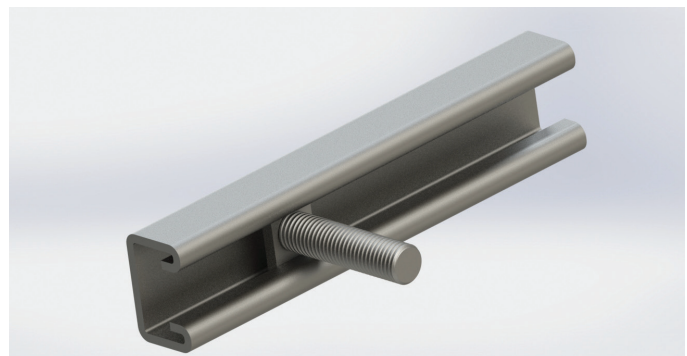
CONSTRUCTION TECHNOLOGY

FIXING SYSTEM

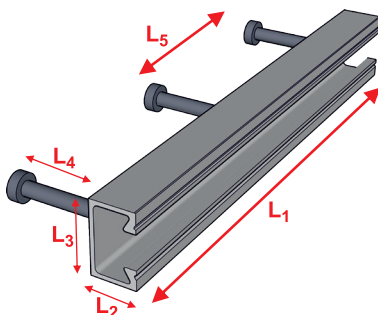
Construction experts consider that Regbar Ballustrade Fixings are particularly suitable for fixing balustrade connections to thin edges of balcony plates.

Cast-in Channels

- ▶ Standard tensile profile runs along the entire length of the part and allows most standard devices to be placed anywhere between the bars
- ▶ Spring steel retaining strap can be manually locked in place for a tool-free installation
- ▶ Ready to use outside of the box and eliminates the need for cutting struts
- ▶ Pre-cut design, transported and stored more easily than standard strut lengths
- ▶ Suitable for two-dimensional static loads
- ▶ Suitable for use in building components with fire protection requirements
- ▶ Suitable for mounting in concrete pressure and concrete tension zones
- ▶ High corrosion resistant steel versions are available
- ▶ Hot rolled profiles available for fatigue-related effects



Cast-in Channels - Dimensions

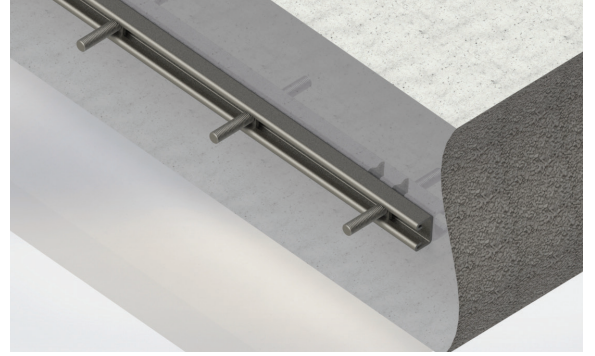


Product Code	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]
RGCIC01200	200	23	40	56	150
RGCIC01250	250	23	40	56	200
RGCIC01350	350	23	40	56	150
RGCIC01500	500	23	40	56	150
RGCIC013050	3050	23	40	56	150

Balustrade Fixings

Construction experts consider that Regbar Ballustrade Fixings are particularly suitable for fixing balustrade connections to thin edges of balcony plates.

Easily placed Ballustrade Fixings and corresponding high-tension Regbar Bolts A4 – 70 enable the railing posts to be attached to the surface of concrete plates which are at least 100 mm thick and this provides a reliable and statically robust connection. This is possible with special back anchorage of reinforcement steel with swaged anchor heads.



Cast-in Channels Long

Construction experts consider that Regbar Ballustrade Fixings are particularly suitable for fixing balustrade connections to thin edges of balcony plates.

Easily placed Ballustrade Fixings and corresponding high-tension Regbar Bolts A4 – 70 enable the railing posts to be attached to the surface of concrete plates which are at least 100 mm thick and this provides a reliable and statically robust connection. This is possible with special back anchorage of reinforcement steel with swaged anchor heads.



Curtain Wall System

Regbar Curtain Wall System is used to fix the curtain wall elements quickly, safely and economically to the main structure of the building.

Different brackets are available to allow mounting on the top or edge of concrete plates. Regbar Curtain Wall System connection channel can be used three dimensional, adjustable, quick installation and efficiently recuperate tolerances on-site.

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HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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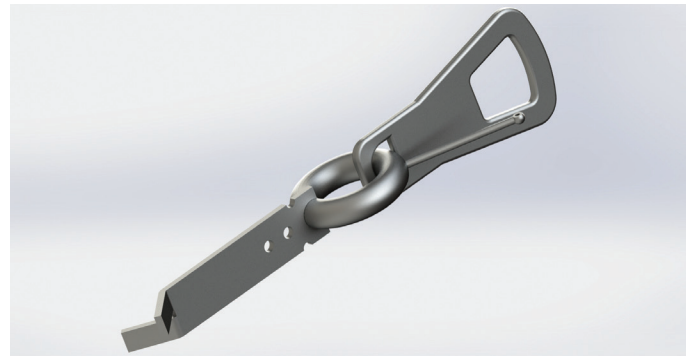
CONSTRUCTION TECHNOLOGY

LIFTING SYSTEM

Regbar Lifting System is used in precast industry and suitable for lifting, transporting and assembling the precast. Some of the advantages of this system are below:

Cast-in Channels

- ▶ A large variety of lifting sockets
- ▶ Simple and secure connection
- ▶ Lifting systems can be reused
- ▶ All Regbar Lifting Systems, has CE marking which guarantees conformity with Europe.
- ▶ Regbar Lifting Systems combines a hoisting anchor embedded in the concrete unit and a lifting device.
- ▶ Regbar Lifting System is in conformity with design for technical instructions, German rule VDI / BV-BS6205.



Lifting Socket - Anchor

Regbar Lifting Socket Anchorages is designed for bearing various precast concrete elements between 1.3 and 15 tons of load range. Anchorage consists of a steel slot that provides the load distributed on the concrete and a press threaded socket.

Upper lifting anchorages are available with a metric thread and round thread.



Lifting Socket - Anchor With Barrier

Lifting Socket with Barrier is composed of a stainless steel (SS) Regbar Bushing and an anchorage leg made of reinforcing steel.

The bushing is processed on both sides and barrier is obtained in the middle. This prevents leakage of water or other abrasive substances.



Lifting Sling

Lifting Slings can be used with any type of anchor and threaded socket. Suitable for most of the lifting situations, especially in construction site operations. Periodically controlled products are suitable for re-use.

The Gear Lifting Strap should only be assembled on the concrete unit and should be used after the concrete strength reaches 15MPa.



Threaded Swivel Eye

Threaded Swivel Eye can be used for anchors with threaded sockets. They are especially suitable for most lifting situations. They are more suitable for turning and tilting than lifting systems made of steel wire and box.

Threaded Swivel Eye is made of high quality steel and designed with safety factor. Each Lifting System is tested separately on 3 levels of working load and delivered with a unique certificate. Threaded Rotary Eye should only be assembled on the concrete unit and should be used after the concrete strength reaches 15 MPa. Generally they will be disassembled after the concrete elements are assembled. This lifting system is suitable for use with a threaded socket.



Spherical Head Anchor

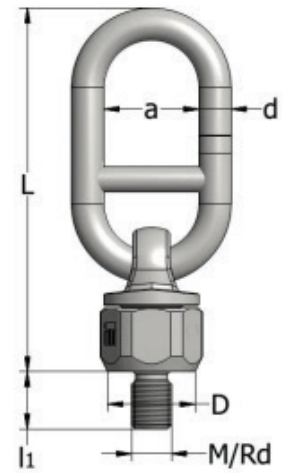
The Spherical Head Anchor is poured with a detachable hole mold to the concrete and can be used to carry the loads in every direction. Anchors with a load capacity of up to 450 KN are available. Universal head lifting connections can be locked in the anchor in seconds to ensure lifting and transport of the unit.



Dimensions

Threaded Swivel Eye

	Metric Thread Size	Axial Load	L	a	d	D
Product Code	[mm]	[kN]	[mm]	[mm]	[mm]	[mm]
RGSW12	12	12	125	34	11	30
RGSW16	16	24	144	38	13	35
RGSW16	20	39	166	45	15	44
RGSW24	24	49	197	49	17	44
RGSW30	30	74	228	60	20	59
RGSW36	36	101	265	64	24	59
RGSW42	42	124	288	68	26	75



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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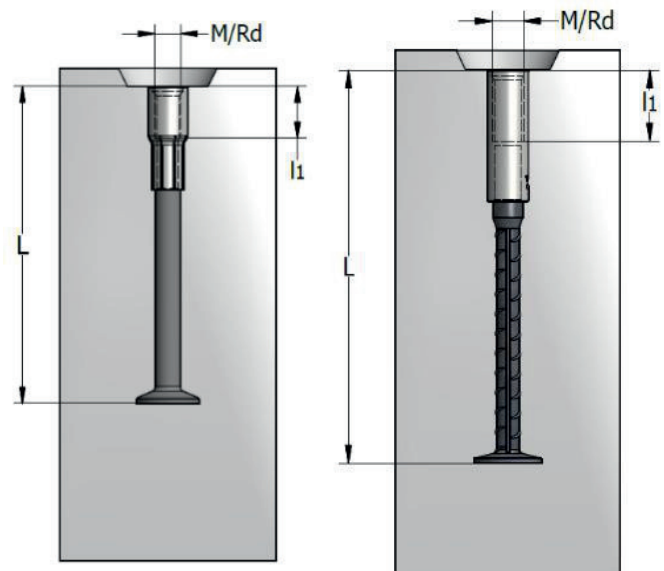
Dimensions

Lifting Socket - Anchor (A)

	Load Group	Metric Thread Size	Overall Length L	Weight
Product Code	[t]	[mm]	[mm]	[kg/pc]
RGLS12-7	1.3	12	70	0.084
RGLS12-13	1.3	12	130	0.120
RGLS16-9	2.5	16	90	0.195
RGLS16-10	2.5	16	100	0.205
RGLS16-14	2.5	16	140	0.255
RGLS16-17	2.5	16	175	0.301
RGLS16-20	2.5	16	200	0.332
RGLS20-12	4.0	20	125	0.402
RGLS20-13	4.0	20	135	0.423
RGLS20-17	4.0	20	175	0.509
RGLS20-25	4.0	20	258	0.672
RGLS24-15	5.0	24	135	0.588
RGLS24-27	5.0	24	135	0.620
RGLS24-32	5.0	24	135	0.921
RGLS30-18	7.5	30	355	1.044
RGLS30-21	7.5	30	355	1.161
RGLS30-32	7.5	30	355	1.550
RGLS30-40	7.5	30	355	1.816
RGLS36-28	10.0	36	425.5	2.133
RGLS36-37	10.0	36	425.5	2.590
RGLS36-47	10.0	36	425.5	3.066
RGLS42-42	12.5	42	493.5	4.110
RGLS42-55	12.5	42	493.5	5.012

Lifting Socket - Anchor with barrier (B)

	Load Group	Metric Thread Size	Overall Length L	Weight
Product Code	[t]	[mm]	[mm]	[kg/pc]
RGLSB16-20	2.5	16	200	0.335
RGLSB24-32	5.0	24	325	1.050
RGLSB30-40	7.5	30	400	1.822



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Technology

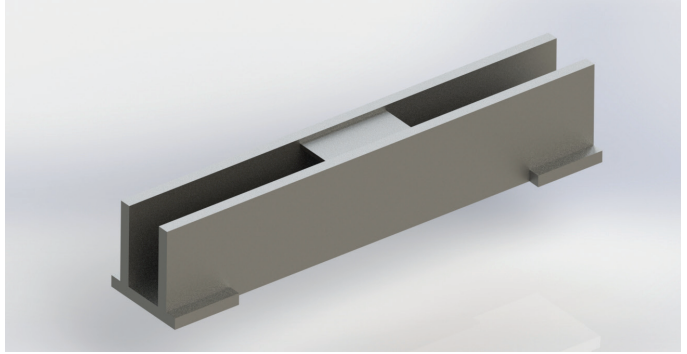


CONSTRUCTION TECHNOLOGY

PRECAST

Precast Solutions

Regbar offers precast solutions for you projects. Upon beginning of the manufacturing of prefabricated projects and according to availability of molds, manufacturing is planned by taking the completion time of the work in to consideration. In accordance with this schedule, mold modifications are made according to manufacturing projects.



Quality staff controls the molds to ensure that they are made according to the requirements of the project. If appropriate, the process begins upon approval of the mold. If it is not, the required operation is performed.

During this process, iron reinforcements are prepared according to the product projects. After they are placed in the mold, necessary anchors and embedded elements are checked. Following the approval of reinforcement, concrete samples are taken during concrete casting to maintain the quality control of the concrete.

Upon completion of concrete casting, the concrete is covered after a while and curing begins. After reaching the desired strength, the necessary quality control and durability tests are carried out and they are moved to the project area or storage area.

Precast elements are listed such as;

► **Regbar Superstructure Elements**

(Roof Truss, Purlin Beam, Gutter Beam, Column, Ridge Piece, Crane Beam, Floor Beams, Paving Slabs)

► **Regbar Facade Elements**

(Concrete Facade Linings, Roof Parapets, TT Facade Panel)

► **Regbar Bridge Beams and Tunnel Segments**

(Prestressed Bridge Beams, Prefabricated Tunnel Segments, Concrete Traverse, Box Culvert, Underpass Elements)

► **Regbar Infrastructure and Environment Elements**

(Prefabricated Foundation, Retaining Walls, Garden Walls)

► **Regbar Concrete Prefabricated Systems:**

Reliable connection of concrete facades and safety for challenging facades.

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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Lesnaya Plaza 4, 4th Lesnoy
Pereulok No: 24/8 125047
Moscow / RUSSIA

ASSEMBLY

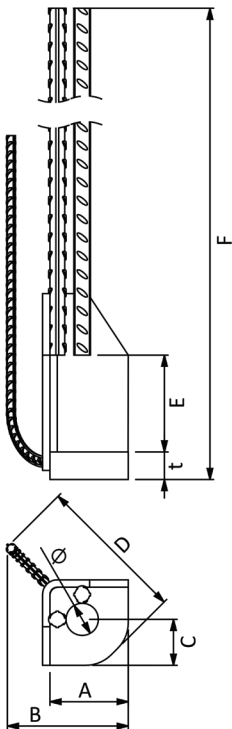
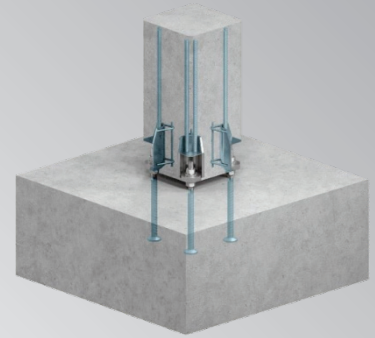


Axis and grade works of foundation manufacturing are completed in the work or project site before the assembly and if there are no problems, assembly process begins. Upon completion of assembly necessary finishes are performed and the building is delivered.

Regbar Concrete Pre-Casting Systems ensure a fast and economic installation of pre-casting.

Regbar Column Shoe

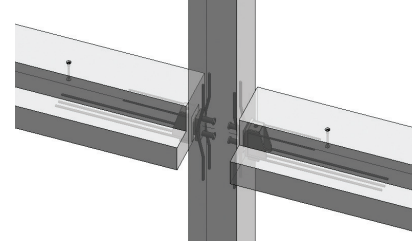
Column Shoes (Column Apparatus) are fasteners that provide fast and secure connections between precast concrete columns and foundations or between precast concrete columns. It is a widely-approved product for various types of precast columns.



Product Code	RCS16	RCS20	RCS24	RCS30	RCS40
A [mm]	75	80	85	90	110
B [mm]	115	120	125	140	180
C [mm]	50	50	50	50	60
D [mm]	135	145	150	175	225
E [mm]	85	95	105	120	150
F [mm]	725	875	1105	1430	1885
t [mm]	15	20	30	45	50
Ø [mm]	28	31	35	40	55
Weight [kg/pc]	2.2	3.8	6.4	13.5	26.6

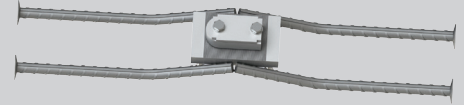
Regbar Corbel

Regbar Corbel is a modular corbel where the cast part provides flat mold walls and the bolted bracket offers superior adjustability and high resistances. The Corbel system ensures reaching the maximum earth height and visually attractive beam-to-column connections in dwellings.



Long Corbel

Long Corbel is a structural steel part used to support the precast floor elements to the beams. It is normally used in TT plates or secondary beams placed between supporting structures.



Beam Shoe

Beam Shoes forms effective, moment-resistant bolted connections between precast concrete columns and precast concrete beams. They are used with Anchor Connectors. The wide range of products is suitable for most light and heavy load conditions.

Precast Panel Anchors

- Fast and easy anchorage of concrete facade panels to concrete support structure
- Load groups from 5.0 to 56 kN
- Also suitable for use in panel thicknesses of 30-50 mm

Parapet Corbels

- Economic use with 8 different profile sizes
- Suitable for different insulation thicknesses
- Stainless steel for high corrosion protection



Wire Sandwich Panel Anchors

- Installation is simple and fast
- Officially approved, technically advanced system
- Economically applicable even for very thick insulation layers between concrete cover

Flat Anchors

- Absorption of high loads and suitable for large unit sizes

Wire Sandwich Panel Anchors

- Adjuster for aligning precast concrete wall elements
- Easy, damage free screwable height adjustment

Regbar Construction
Technology



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

Lesnaya Plaza 4, 4th Lesnoy
Pereulok No: 24/8 125047
Moscow / RUSSIA

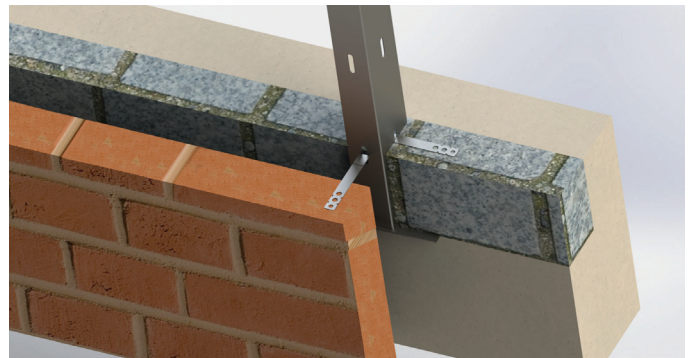
CONSTRUCTION TECHNOLOGY

MASONRY SUPPORT

Regbar provides efficient and safe equipment designed for all bricks, parts, brick security systems (with and without insulation) and bonds. It is bond to concrete walls, columns or facades of steel and wooden buildings with **Regbar** brick separators. Separators reduce the risk of cracks in the wall and allow it to slide vertically in the channel. Regbar Brick Separators can be placed at a desired point in the wall construction and brick tie channel at desired intervals.

Brick Tie System

Regbar Brick Safety Systems enable to take efficient and reliable measures designed for knots in all brick sections (without any gap or insulation). With Regbar Brick Separators concrete walls, columns or steel and wooden structures are connected to masonry facades. Separators reduce potential risk of wall cracking and allow vertical slipping in the channel. Regbar Brick Separators can be placed anywhere at recommended intervals at wall construction joint and inside the brick-binding channel



Masonry Reinforcement

Regbar masonry reinforcement increases a wall's structural efficiency by providing additional lateral load resistance.

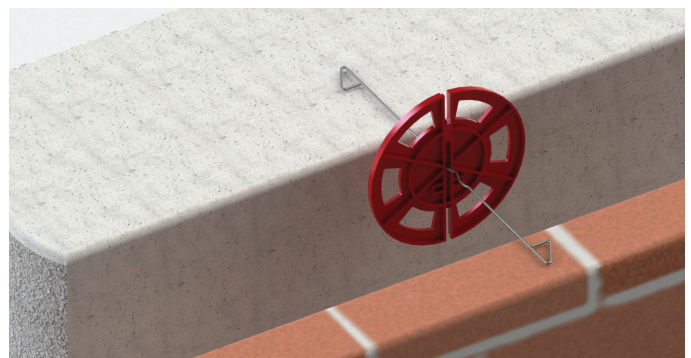
Located in the bed joint, it has a flattened profile, even when lapped or used with wall links, to maintain a good mortar cover.



Wall Ties & Restraint Fixings

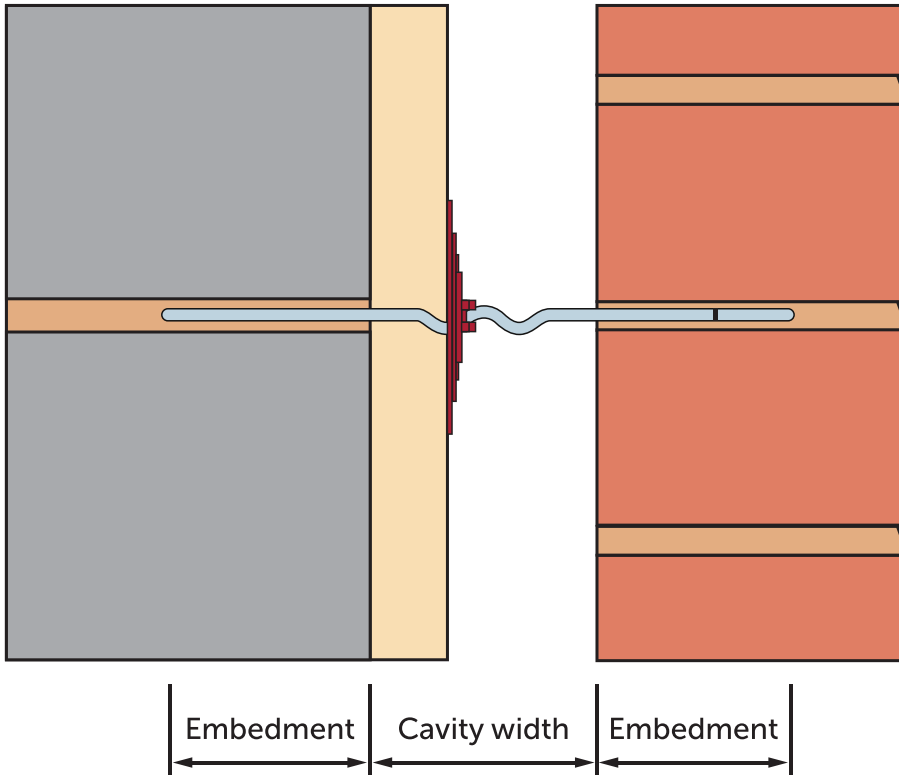
Wall ties and fixings are an important element for the strength of wall panels.

Regbar manufactures various lengths and types of fittings to limit brick, block and stone masonry labor. Contact us to get detailed dimensions.



Dimensions

	Material	Product Width	Suitable Wall Width
Product Code		s [mm]	[mm]
RMR30	Austenitic stainless steel	60, 100, 150, 175	100 to 215
RMR40			
RMR40	Galvanized steel	60, 100, 150, 175	100 to 215
RMR45			



Regbar Construction
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Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

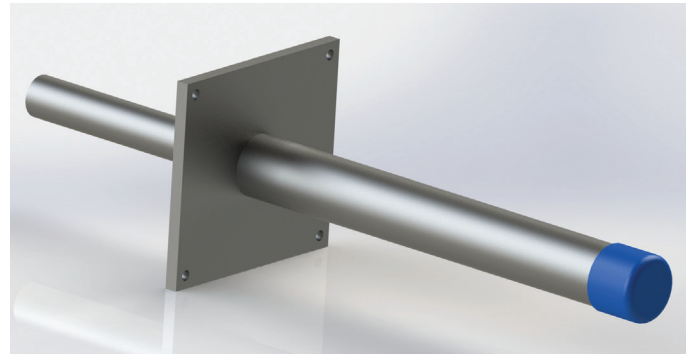
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Pereulok No: 24/8 125047
Moscow / RUSSIA

CONSTRUCTION TECHNOLOGY

SHEAR PIN

Properties

- ▶ Simple geometry of the formation of the joint
- ▶ Simple formwork and time saving installation
- ▶ Simple reinforcement layout gain in space through avoidance of double supports
- ▶ Cost saving and gain in space through staged erection of the construction elements
- ▶ High shear force transfer
- ▶ Fire protection coating (optional)
- ▶ Epoxy coated (optional)



The concrete structures are designed with expansion and contraction joints to enable the movements. The Shear Pin is used to transfer the slip load across these joints. For the correct operation of the overall design of the structure, design of the joint is important.

Regbar Shear Load Connector provides considerable benefits over straight dowel rods. In load transfer and compromise motions, they are more efficient and simpler to install owing to their two-piece structure.

By using **Regbar Shear Pin**, the shear forces are transferred to the reinforced concrete construction with the option of uniaxial or bi-axial displacement from joints of construction element.

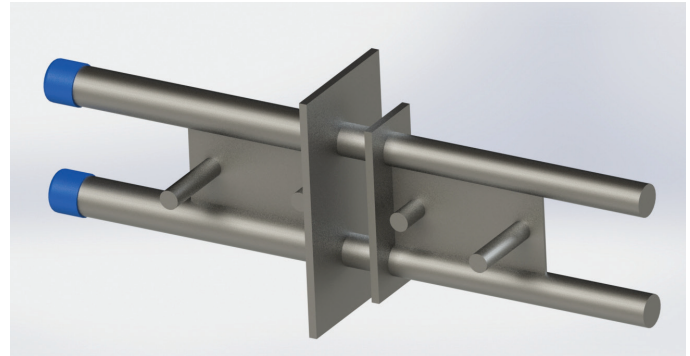
Regbar Shear Pin components enable sliding in the direction of the member axis. They are normally used to transfer shear loads in any direction. Movable connections prevent taking place of uncontrolled cracks and resulting damage.

In the shear pin system, non-corrosive grade steels are used as per (No. 1.4571, 1.4462, EN 10088-5). This system also includes a one-piece plastic cover. No official approval is required for the Regbar Shear Pin System.

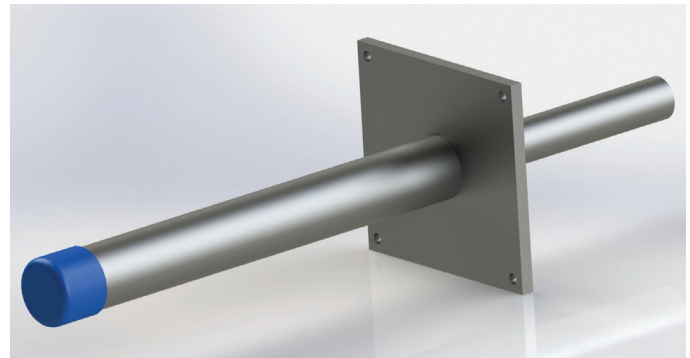
There are two types of Shear Pin Connectors produced by Regbar Construction:

- 1- Regbar Double Shear Dowel (DSD)
- 2- Regbar Single Shear Dowel (SSD)

The Regbar DSD is the original two-part, double dowel, shear load connector. The two dowels are Duplex stainless steel bar. To accommodate motion, the dowel element can move longitudinally inside the sleeve. The connector is available in ten standardized dimensions and has design resistance from approximately 20kN to more than 950kN. It is possible to use the larger connectors in joints up to 60 mm wide. The use of special dowels can accommodate larger joints.

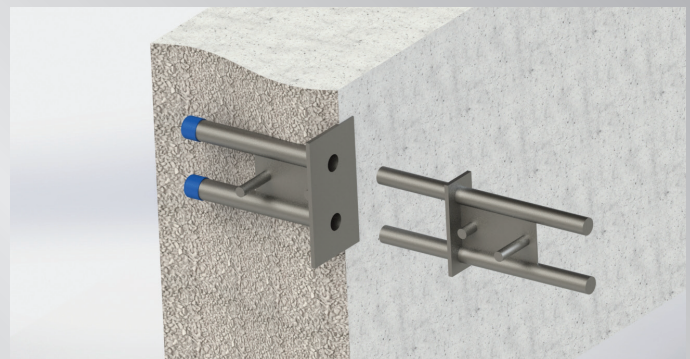


The Regbar SSD shear load connector is used where loads are small, but where alignment is critical. It is available in four sizes with each size available in two lengths. The dowel component is stainless steel bar.



Simple Installation

The two-part assembly of all Regbar shear connectors eliminates the need for drilling formwork on site, supporting dowel bars and fitting debonding sleeves and end caps. The installation is a fast and accurate process.



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

Lesnaya Plaza 4, 4th Lesnoy
 Pereulok No: 24/8 125047
 Moscow / RUSSIA

Following steps of installation is same for all types of Regbar Shear Connectors:

- 1 Nail the sleeve element to the shuttering to ensure that the sleeve is properly oriented towards the load direction.
- 2 Fix the local reinforcement in position around the sleeve component together with any other reinforcement that is required, ensuring that the correct cover to the reinforcement is maintained. Pour the concrete to complete the installation of the sleeve component.
- 3 When the concrete has achieved sufficient strength, strike the shuttering. Peel off or puncture the label to reveal the holes for the dowels.
- 4 Position compressible joint filler of the appropriate width, for applications where movement is expected between the two sections of concrete. Push the dowel component through the joint filler (if applicable) until it is fully located in the sleeve component.
- 5 Fix the local reinforcement in position around the dowel component together with any other reinforcement that is required, ensuring that the correct cover to the reinforcement is maintained. Pour the concrete to finish the installation of the shear connector.

Detailing And Design Resistance of Regbar SSD Connector

To ensure that the forces are transferred between the connectors and the concrete, local reinforcement is required around each connector. Correct detailing will guarantee Regbar DSD in accordance with suitable design codes, and connectors will achieve their complete ability.

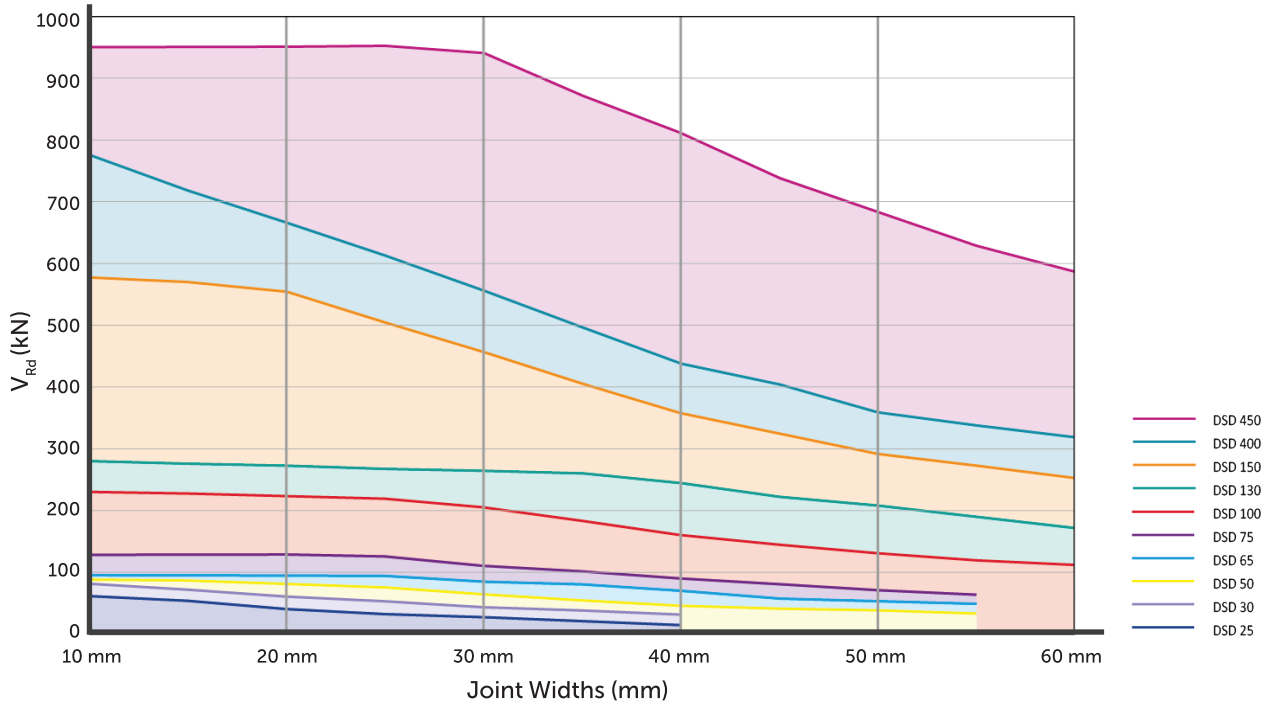
To choose the correct product that the structure needs, engineers may use the following calculations steps. There are tables in the following pages to make the choosing of product easier.

DSD Design Example

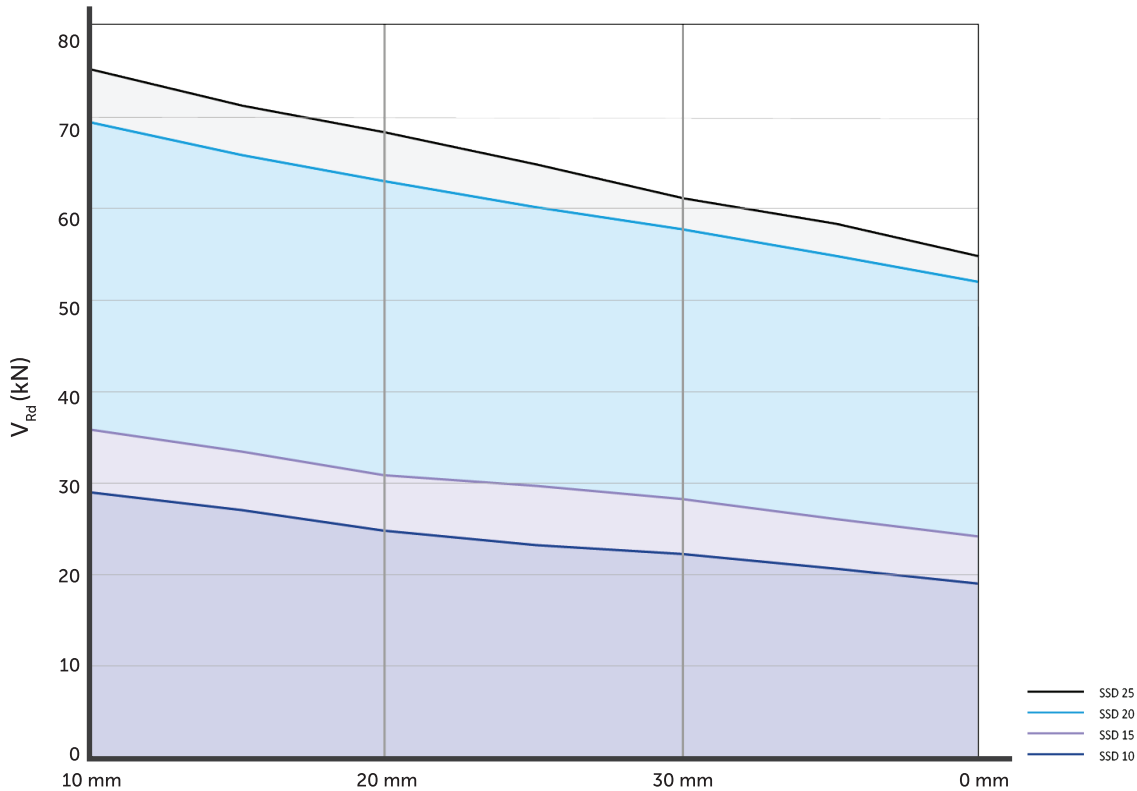
Slab Thickness	= 400mm	
Maximum width of joint	= 30mm	
Concrete strength	= C30/C37	
Characteristic dead load	= 100kN/m	$\gamma_G = 1.35^*$
Characteristic imposed load	= 120kN/m	$\gamma_Q = 1.5^*$
Design load	= $(100 \times 1.35) + (120 \times 1.5) = 315\text{kN/m}$	Either connector would be acceptable, although using DSD130s at 700mm centers would minimize the number of connectors to be installed.
V_{Rd} (Design resistance)	Maximum centers	
DSD100 = 203.9kN	= $203.9 / 315 = 0.647\text{m}$ use 600mm	
DSD130 = 225.0kN	= $225.0 / 315 = 0.714\text{m}$ use 700mm	

*The partial safety factors of 1.35 (γ_G) and 1.5 (γ_Q) are those recommended in EN 1990 Eurocode: Basis for structural design. For designs to Eurocode 2, please refer to the national annex for the factors to be used in the country concerned.

Regbar DSD V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) at the Maximum Slab Thickness (mm) in C30/37 Concrete (See the following pages for details)



Regbar SSD V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) at the Maximum Slab Thickness (mm) in C30/37 Concrete (See the following pages for details)



HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

Lesnaya Plaza 4, 4th Lesnoy
 Pereulok No: 24/8 125047
 Moscow / RUSSIA

V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C25/30 Concrete

Slab Thickness [mm]	Product Reference	Maximum Width of Joint [mm]					
		10	20	30	40	50	60
180*	DSD25	39.5	39.5	29.9	23.2	-	-
200		45.7	41.8	29.9	23.2	-	-
220		52.3	41.8	29.9	23.2	-	-
240		59.3	41.8	29.9	23.2	-	-
260		66.7	41.8	29.9	23.2	-	-
280		69.6	41.8	29.9	23.2	-	-
180*	DSD30	42.7	42.7	42.7	34.7	-	-
200		49.2	49.2	44.6	34.7	-	-
220		56.1	56.1	44.6	34.7	-	-
240		63.4	62.4	44.6	34.7	-	-
260		71.1	62.4	44.6	34.7	-	-
280		79.1	62.4	44.6	34.7	-	-
180*	DSD50	43.8	43.8	43.8	43.8	40.4	-
200		50.3	50.3	50.3	49.4	40.4	-
220		57.3	57.3	57.3	49.4	40.4	-
240		64.6	64.6	63.5	49.4	40.4	-
260		72.3	72.3	63.5	49.4	40.4	-
280		80.4	80.4	63.5	49.4	40.4	-
200*	DSD65	62.2	62.2	62.2	62.2	55.4	-
220		64.3	64.3	64.3	64.3	55.4	-
240		68.6	68.6	68.6	67.7	55.4	-
260		76.4	76.4	76.4	67.7	55.4	-
280		84.6	64.6	64.6	67.7	55.4	-
300		93.0	93.0	87.1	67.7	55.4	-
240*	DSD75	86.1	86.1	86.1	86.1	73.8	-
260		89.1	89.1	89.1	89.1	73.8	-
280		94.8	94.8	94.8	90.1	73.8	-
300		104.0	104.0	104.0	90.1	73.8	-
320		113.6	113.6	113.6	90.1	73.8	-
340		123.4	123.4	115.9	90.1	73.8	-
320*	DSD100	161.5	157.6	154.0	150.5	133.6	114.0
340		166.5	162.6	158.8	155.2	133.6	114.0
360		170.8	166.7	162.8	159.1	133.6	114.0
380		183.2	178.9	174.7	161.4	133.6	114.0
400		196.0	191.4	186.9	161.4	133.6	114.0
420		209.1	204.2	199.4	161.4	133.6	114.0
360*	DSD130	185.0	181.3	177.7	174.3	171.0	167.9
380		193.4	189.5	185.8	182.2	178.8	175.5
400		206.6	202.5	198.5	194.7	191.0	176.1
420		220.2	215.8	211.5	207.5	203.6	176.1
440		234.0	229.3	224.8	220.5	206.5	176.1
460		248.2	243.2	238.4	238.8	206.5	176.1
450*	DSD150	280.8	276.0	271.3	266.8	262.4	253.6
500		308.2	302.8	297.7	292.8	288.0	253.6
550		339.7	333.8	328.2	322.7	297.4	253.6
600		380.5	373.9	367.6	359.3	297.4	253.6
700		465.4	457.3	449.6	359.3	297.4	253.6
800		485.6	477.2	451.2	359.3	297.4	253.6
600*	DSD400	441.1	434.6	428.3	422.2	369.3	315.0
650		485.1	478.0	471.0	441.8	369.3	315.0
700		529.9	522.1	514.5	441.8	369.3	315.0
800		620.9	611.8	554.1	441.8	369.3	315.0
900		712.7	666.4	554.1	441.8	369.3	315.0
1000		745.3	666.4	554.1	441.8	369.3	315.0
600*	DSD450	485.1	485.1	485.1	485.1	485.1	485.1
650		515.5	515.5	515.5	515.5	515.5	515.5
700		561.4	561.4	561.4	561.4	561.4	561.4
800		654.4	654.4	654.4	654.4	654.4	586.9
900		747.9	747.9	747.9	747.9	684.7	586.9
1000		840.1	840.1	840.1	811.4	684.7	586.9

*Refers to the minimum slab depth H_{min} for each connector type

V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C30/37 Concrete

Slab Thickness [mm]	Product Reference	Maximum Width of Joint [mm]					
		10	20	30	40	50	60
180*	DSD25	44.7	41.8	29.9	23.2	-	-
200		51.8	41.8	29.9	23.2	-	-
220		59.3	41.8	29.9	23.2	-	-
240		67.3	41.8	29.9	23.2	-	-
260		69.6	41.8	29.9	23.2	-	-
280		69.6	41.8	29.9	23.2	-	-
180*	DSD30	48.3	48.3	44.6	34.7	-	-
200		55.7	55.7	44.6	34.7	-	-
220		63.6	62.4	44.6	34.7	-	-
240		71.8	62.4	44.6	34.7	-	-
260		80.5	62.4	44.6	34.7	-	-
280		89.7	62.4	44.6	34.7	-	-
180*	DSD50	49.6	49.6	49.6	49.4	40.4	-
200		57.0	57.0	57.0	49.4	40.4	-
220		64.9	64.9	63.5	49.4	40.4	-
240		73.2	73.2	63.5	49.4	40.4	-
260		82.0	82.0	63.5	49.4	40.4	-
280		91.1	88.9	63.5	49.4	40.4	-
200*	DSD65	70.5	70.5	70.5	67.7	55.4	-
220		72.8	72.8	72.8	67.7	55.4	-
240		77.8	77.8	77.8	67.7	55.4	-
260		86.6	86.6	86.6	67.7	55.4	-
280		95.8	95.8	57.1	67.7	55.4	-
300		105.5	105.5	87.1	67.7	55.4	-
240*	DSD75	97.6	97.6	97.6	90.1	73.8	-
260		101.0	101.0	101.0	90.1	73.8	-
280		107.4	107.4	107.4	90.1	73.8	-
300		117.9	117.9	115.9	90.1	73.8	-
320		128.7	128.7	115.9	90.1	73.8	-
340		139.9	139.9	115.9	90.1	73.8	-
320*	DSD100	183.0	178.7	174.5	161.4	133.6	114.0
340		188.7	184.3	180.0	161.4	133.6	114.0
360		193.5	188.9	184.5	161.4	133.6	114.0
380		207.7	202.7	198.0	161.4	133.6	114.0
400		222.2	216.9	203.9	161.4	133.6	114.0
420		237.0	231.4	203.9	161.4	133.6	114.0
360*	DSD130	209.7	205.5	201.4	197.6	193.8	176.1
380		219.2	214.8	210.6	206.5	202.7	176.1
400		234.2	229.5	225.0	220.7	206.5	176.1
420		249.5	244.5	239.8	235.1	206.5	176.1
440		265.2	259.9	254.8	249.5	206.5	176.1
460		281.2	275.6	270.2	249.5	206.5	176.1
450*	DSD150	318.2	312.8	307.5	302.3	297.4	253.6
500		349.2	343.2	337.4	331.8	297.4	253.6
550		385.0	378.3	371.9	359.3	297.4	253.6
600		431.2	423.8	416.6	359.3	297.4	253.6
700		527.4	518.3	451.2	359.3	297.4	253.6
800		582.7	553.0	451.2	359.3	297.4	253.6
600*	DSD400	499.9	492.5	485.4	441.8	369.3	315.0
650		549.8	541.7	533.8	441.8	369.3	315.0
700		600.5	591.7	554.1	441.8	369.3	315.0
800		703.7	666.4	554.1	441.8	369.3	315.0
900		778.7	666.4	554.1	441.8	369.3	315.0
1000		778.7	666.4	554.1	441.8	369.3	315.0
600*	DSD450	549.8	549.8	549.8	549.8	549.8	549.8
650		584.2	584.2	584.2	584.2	584.2	584.2
700		636.2	636.2	636.2	636.2	636.2	586.9
800		741.7	741.7	741.7	741.7	684.7	586.9
900		847.6	847.6	847.6	811.4	684.7	586.9
1000		952.1	952.1	941.1	811.4	684.7	586.9

*Refers to the minimum slab depth H_{min} for each connector type

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
 No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
 13. Cadde 318 Blok Apt. No: 318/132
 No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

Lesnaya Plaza 4, 4th Lesnoy
 Pereulok No: 24/8 125047
 Moscow / RUSSIA

Detailing And Design Resistance of Regbar SSD Connector

To ensure that the forces are transferred between the connectors and the concrete, local reinforcement is required around each connector. Correct detailing will guarantee Regbar SSD in accordance with suitable design codes, and connectors will achieve their complete ability.

To choose the correct product that the structure needs, engineers may use the following calculations steps. There are tables in the following pages to make the choosing of product easier.

DSD Design Example

Slab Thickness	= 220mm	
Maximum width of joint	= 30mm	
Concrete strength	= C30/C37	
Characteristic dead load	= 20kN/m	$\gamma_G = 1.35^*$
Characteristic imposed load	= 26kN/m	$\gamma_Q = 1.5^*$
Design load	= $(20 \times 1.35) + (26 \times 1.5) = 66\text{kN/m}$	Any of the three connectors would be acceptable, although using ESD20s at 800mm centers would minimize the number of connectors to be installed
V_{Rd} (Design resistance)	Maximum centers	
SSD10 = 22.4kN	= $22.4 / 66 = 0.339\text{m}$ use 330mm	
SSD15 = 28.1kN	= $28.1 / 66 = 0.426\text{m}$ use 400mm	
SSD20 = 53.6kN	= $53.6 / 66 = 0.812\text{m}$ use 800mm	

**The partial safety factors of 1.35 (γ_G) and 1.5 (γ_Q) are those recommended in EN 1990 Eurocode: Basis for structural design. For designs to Eurocode 2, please refer to the national annex for the factors to be used in the country concerned.*

V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C25/30 Concrete

Slab Thickness [mm]	Product Reference	Maximum Width of Joint [mm]			
		10	20	30	40
180*	SSD10	25.6	25.6	22.4	19.7
200		26.7	25.7	22.4	19.7
220		26.7	25.7	22.4	19.7
240		26.7	25.7	22.4	19.7
260		26.7	25.7	22.4	19.7
280		26.7	25.7	22.4	19.7
180*	SSD15	28.7	28.7	28.1	24.9
200		32.3	31.9	28.1	24.9
220		32.3	31.9	28.1	24.9
240		32.3	31.9	28.1	24.9
260		32.3	31.9	28.1	24.9
280		32.3	31.9	28.1	24.9
220*	SSD20	47.3	47.3	47.3	47.3
240		54.9	54.9	54.9	52.7
260		60.0	60.0	57.8	52.7
280		60.0	60.0	57.8	52.7
300		60.0	60.0	57.8	52.7
350		60.0	60.0	57.8	52.7
240*	SSD25	56.8	56.8	56.8	55.7
260		65.0	65.0	61.5	55.7
280		73.7	68.0	61.5	55.7
300		75.4	68.0	61.5	55.7
350		75.4	68.0	61.5	55.7
400		75.4	68.0	61.5	55.7

*Refers to the minimum slab depth H_{min} for each connector type

 V_{Rd} Design Resistance (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C30/37 Concrete

Slab Thickness [mm]	Product Reference	Maximum Width of Joint [mm]			
		10	20	30	40
180*	SSD10	29.1	25.7	22.4	19.7
200		29.6	25.7	22.4	19.7
220		29.6	25.7	22.4	19.7
240		29.6	25.7	22.4	19.7
260		29.6	25.7	22.4	19.7
280		29.6	25.7	22.4	19.7
180*	SSD10	32.6	31.9	28.1	24.9
200		36.3	31.9	28.1	24.9
220		36.3	31.9	28.1	24.9
240		36.3	31.9	28.1	24.9
260		36.3	31.9	28.1	24.9
280		36.3	31.9	28.1	24.9
220*	SSD20	53.6	53.6	53.6	52.7
240		62.2	62.2	57.8	52.7
260		69.9	63.5	57.8	52.7
280		69.9	63.5	57.8	52.7
300		69.9	63.5	57.8	52.7
350		69.9	63.5	57.8	52.7
240*	SSD25	64.4	64.4	61.5	55.7
260		73.7	68.0	61.5	55.7
280		75.4	68.0	61.5	55.7
300		75.4	68.0	61.5	55.7
350		75.4	68.0	61.5	55.7
400		75.4	68.0	61.5	55.7

*Refers to the minimum slab depth H_{min} for each connector type

Regbar Construction
Technology


HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
Phone: +90 216 405 21 55 pbx
E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

RUSSIA BRANCH

Lesnaya Plaza 4, 4th Lesnoy
Pereulok No: 24/8 125047
Moscow / RUSSIA

CONSTRUCTION TECHNOLOGY

SCREW CONNECTION

Properties

- ▶ High fatigue strength in bridge structures
- ▶ Cyclically changing loads even in an earthquake.
- ▶ Heavy loads in nuclear power plants.
No need for special tools and torque wrench is not needed for screwing. A plain visual observation is sufficient.
- ▶ A wide range of accessories, socket bars and pre-prepared formwork fasteners save installation time and ensure safe fastening to formworks.
- ▶ Color coded covers explicitly indicate the diameter.
- ▶ Reinforcement diameter varies between 12 - 40 mm.
- ▶ System components are color coded to assign the system components easily.
- ▶ Safe installation with simple visual control, no need for torque wrench.



Regbar Threaded Joints are the most appropriate solution for reinforced concrete constructions and all joints.

Regbar Threaded Joints can be used in any combination. Due to the versatility of threaded joints, they can reinforce almost all joints. A single and same joint bar can be used for all threaded bars. Position socket, bars that cannot be moved and rotated axially. For example, for crane openings on the ceiling. Threaded joint anchorages, available for joints with short anchorage lengths.

Regbar Construction
Technology



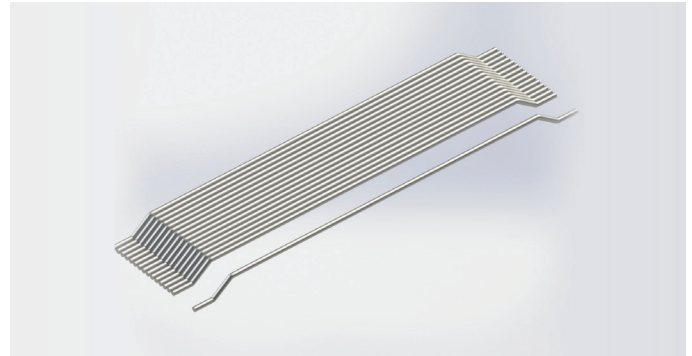
CONSTRUCTION TECHNOLOGY

STEEL CONCRETE REINFORCEMENT

Regbar Lifting System is used in precast industry and suitable for lifting, transporting and assembling the precast. Some of the advantages of this system are below:

Properties

- ▶ Easily added to concrete.
- ▶ Hooked wires provides anchorage.
- ▶ Provides faster construction times.
- ▶ The reinforcement is always in the right place.
- ▶ Economic as compared to traditional methods.
- ▶ Load bearing capacity is high.
- ▶ 3-dimensional dispersion of reinforcement provides excellent crack control.
- ▶ High resistance to dynamic loads and sudden impacts.
- ▶ Provides wide joint spans.



The concrete has low tensile strength and ductility. It is necessary to add reinforcement to resist the tensions in the structural elements. ACI and ASCE recommend use of steel fiber as reinforced concrete to prevent cracking, increase impact resistance and prevent destruction due to fragmentation.

The concrete has low tensile strength and ductility. It is necessary to add reinforcement to resist the tensions in the structural elements. ACI and ASCE recommend use of steel fiber as reinforced concrete to prevent cracking, increase impact resistance and prevent destruction due to fragmentation.

It is recommended to use **10kg/m³** minimum dosage according to **EN 14889-1**.

Dimensions

	Head Size	Head Size	Stud Section
Product Code	[mm]	[mm]	[mm]
RGSCR	60	0.75	20

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Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
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E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
13. Cadde 318 Blok Apt. No: 318/132
No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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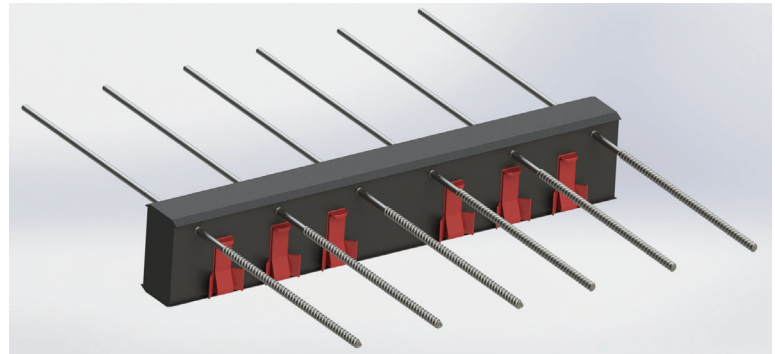
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Pereulok No: 24/8 125047
Moscow / RUSSIA

CONSTRUCTION TECHNOLOGY

INSULATED CONNECTION

Regbar Insulated Connector minimizes heat loss while maintaining structural integrity. They provide a thermal fission by adding a material with low thermal conductivity between highly conductive elements and mostly secure a local insulation at the joint.

They transfer moment, shear, stress and compression forces as a critical structural component. Standard solutions are available for applications from concrete-to-concrete, steel-to-concrete and steel-to-steel.

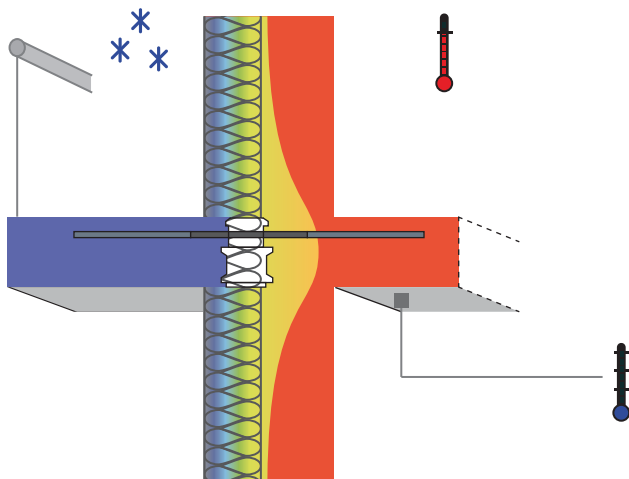


Steel Connection

Regbar Steel System, is a compact thermal breakage system which is typically used to connect steel balconies to structural steel frames but they are equally suitable for other steel-steel applications. It includes tension and compression components in a single compact unit wrapped with polystyrene insulation. Each unit is equipped with four A4 stainless steel fixing studs and one thermoset plate at each steel interface. They are supplied as standard with galvanized steel compacting component or as stainless steel version upon request.

Steel-to-Concrete Connection

Steel-to-Concrete System binds steel balconies and concrete pavement slabs together. The two-piece setup including a thermal anchor and a fixed bend placed on the main piece allows disposed in the spacer allows phased structure. Supplied as standard with galvanized steel bend or stainless steel bend upon request.



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solutions
for better
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www.regbar.com
info@regbar.com

HEADQUARTERS

Caferağa Mah. Albay Faik Sözdener Cad.
No:7/23 Kadıköy - İstanbul - TURKEY
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E-mail: info@regbar.com

PLANT

Sanayi Mah. İzmit Sanayi Sitesi
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No:9 İzmit - Kocaeli - TURKEY
Mobile: +90 541 932 37 51

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Lesnaya Plaza 4, 4th Lesnoy
Pereulok No: 24/8 125047
Moscow / RUSSIA