PSA

DESIGN GUIDE

PSA FOOT AND EYE ANCHORS

artéon

PSA LIFTING SYSTEMS

ABOUT PSA FOOT AND EYE ANCHORS

PSA is the exclusive Australian and New Zealand distributor of the universal lifting system from DSI Arteon.
All products feature the DSI Arteon logo

PSA Foot and Eye Anchors are precision-engineered solutions designed for the safe and efficient lifting and handling of precast and tilt-up concrete elements. These anchors are cast into the concrete element during production, providing a reliable and convenient lifting point.

Manufactured from materials tested and compliant with AS 3850.1, all PSA Foot and Eye Anchors are supplied with a durable galvanised finish for enhanced longevity and performance. With Working Load Limits (WLLs) ranging from 1.3t to 32t (subject to conditions), they are suitable for a wide range of applications.

To maintain safety throughout the lifting procedure, it is essential that all PSA Foot and Eye Anchors are used exclusively with PSA Spherical-Head Clutches and that PSA Void Formers are incorporated in the installation. Each anchor series is available in a variety of lengths to accommodate different element thicknesses, providing versatility for various precast designs.

PSA Eye Anchors, featuring the same shaft diameters and WLL ratings as Foot Anchors, are specifically designed for applications requiring anchorage within thinner concrete elements. Instead of a foot, these anchors incorporate an eye designed to accommodate a Grade 500N reinforcing bar, which provide adequate anchorage to fully derive the anchor's lifting capacity in concrete.

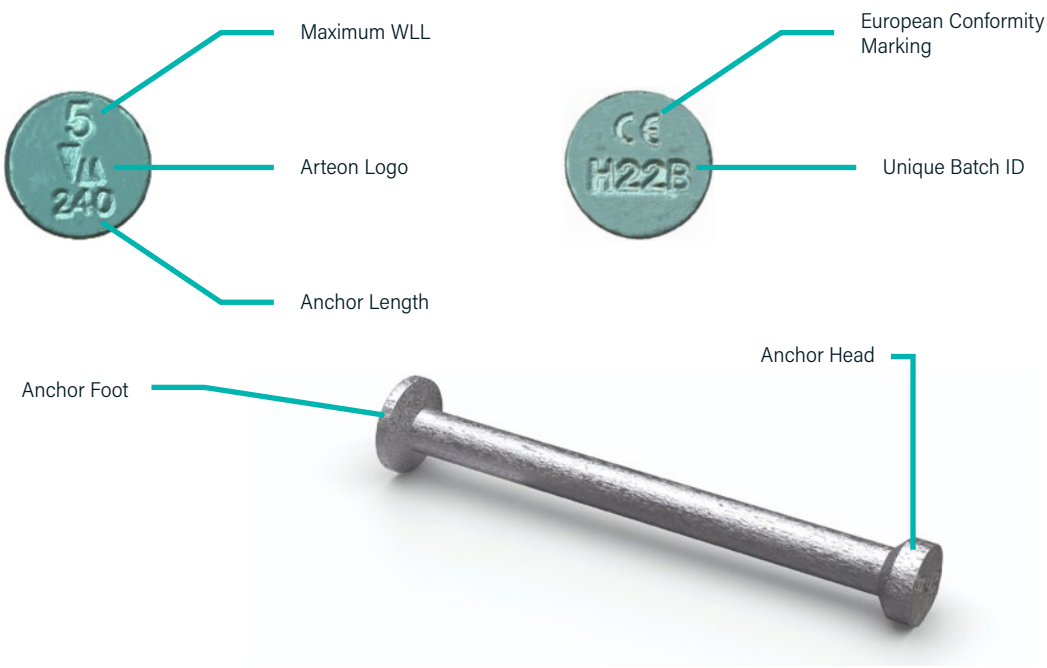
IDENTIFICATION AND TRACEABILITY

PSA Foot and Eye Anchors are designed with clear identification features to ensure ease of use and traceability. The anchor head, which remains exposed after casting, is marked for easy identification on site.

For enhanced traceability, each anchor includes the manufacturing batch number stamped on the foot, providing a reliable reference for quality assurance and compliance tracking.

Anchor Head Markings

Eg: LA05240 Anchor



LA05240 Anchor

COMPLIANCE INFORMATION

PSA Foot & Eye Anchors are meticulously designed and rigorously tested to comply with the requirements of AS 3850.1. The following key compliance points are met:

Working Load Limit (WLL): The WLL is determined in accordance with Clause 2.2 of the standard. Additionally, tensile WLLs under various concrete conditions have been determined and are published in this document, as per the guidelines outlined in Appendix B of AS 3850.1.

Failure Characteristics: During tensile load testing, PSA Foot & Eye Anchors demonstrate ductile failure and plastic deformation, with fully fibrous failure surfaces, meeting the performance criteria specified by the standard.

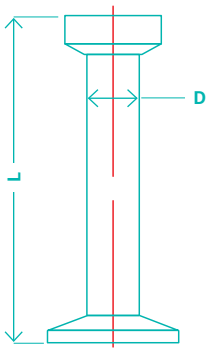
System Marking and Compatibility: All components, including void formers and lifting clutches, are clearly marked to ensure compatibility and seamless integration within the lifting system and related components.

PSA FOOT ANCHORS

PSA Foot Anchors deliver safe and efficient lifting solutions for a wide range of precast concrete applications. Perfect for straight and face lifting, they are commonly used for building elements like wall panels, slab units, and columns, and civil precast structures such as girders, planks, and beams.

With proven durability and compatibility with PSA Spherical-Head Lifting Clutches, they ensure safety and efficiency in demanding construction environments.

PSA Foot Anchor



PSA FOOT ANCHOR DIMENSIONS AND COMPATIBLE COMPONENTS

ANCHOR SERIES	ITEM CODE	ITEM CODE	LENGTH	SHAFT DIA.	WLL STEEL	COMPATIBLE CLUTCH	COMPATIBLE VOID FORMER
	HDG	SS	L (mm)	D (mm)	(t)		
1.3 Series	LA01045	–	45	10	1.3	LC013	HF013 ASF013 SF01
	LA01055	–	55				
	LA01065	LA01065SS	65				
	LA01085	–	85				
	LA01120	LA01120SS	120				
	LA01240	LA01240SS	240				
2.5 Series	LA02055	–	55	14	2.5	LC025	HF025 ASF025 SF025
	LA02075	–	75				
	LA02085	LA02085SS	85				
	LA02120	LA02120SS	120				
	LA02170	LA02170SS	170				
5.0 Series	LA05095	LA05095SS	95	20	5.0	LC05	HF050 ASF050 SF050
	LA05120	LA05120SS	120				
	LA05180	LA05180SS	180				
	LA05240	LA05240SS	240				
10 Series	LA10150	–	150	28	10	LC10	HF10
	LA10200	LA10200SS	200				
	LA10340	–	340				
20 Series	LA20240	–	240	38	20	LC20	HF20
	LA20340	–	340				
	LA20500	–	500				
32 Series	LA32700	–	700	50	32	LC32	HF32

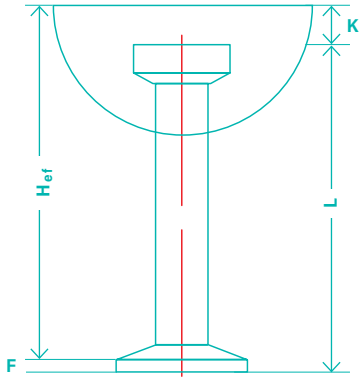
NOTES:

1. *All PSA Foot Anchors are supplied with a galvanised finish for enhanced durability and corrosion resistance.*
2. *Some sizes of PSA Foot Anchors are available in Grade 316 Stainless Steel (see item codes ending on "..SS".*
3. *For detailed information regarding lifting clutches, refer to the 'PSA Spherical-Head Lifting Clutches' document.*
4. *Tensile WLL may vary based on factors such as anchor length, concrete strength, edge distance, and other conditions. Please refer to the Tensile WLL Tables for comprehensive details.*

PSA FOOT ANCHORS - DIMENSIONS

FOOT ANCHOR DIMENSIONS

ANCHOR SERIES	WLL STEEL (t)	RECESS K (mm)	FOOT HEIGHT F (mm)
1.3 Series	1.3	6	2
2.5 Series	2.5	10	3
5.0 Series	5.0	11.5	3
10 Series	10	14	4
20 Series	20	16	5
32 Series	32	16	8



PSA FOOT ANCHORS TENSILE WLL DATA

WORKING LOAD LIMITS IN TENSION FOR PSA FOOT ANCHORS

ANCHOR SERIES	PART NUMBER	ANCHOR LENGTH (mm)	EMBEDMENT DEPTH H_{ef} (mm)	WLL IN TENSION AT CONCRETE STRENGTH (t)				
				15 MPa	20 MPa	25 MPa	32 MPa	40 MPa
1.3 Series	LA01045	45	49	0.8	0.9	1.0	1.3	1.3
	LA01055	55	59	1.0	1.2	1.3	1.3	1.3
	LA01065	65	69	1.3	1.3	1.3	1.3	1.3
	LA01085	85	89	1.3	1.3	1.3	1.3	1.3
	LA01120	120	124	1.3	1.3	1.3	1.3	1.3
	LA01240	240	244	1.3	1.3	1.3	1.3	1.3
2.5 Series	LA02055	55	62	1.1	1.3	1.4	1.6	1.8
	LA02075	75	82	1.7	1.9	2.2	2.4	2.5
	LA02085	85	92	2.0	2.3	2.5	2.5	2.5
	LA02120	120	127	2.5	2.5	2.5	2.5	2.5
	LA02170	170	177	2.5	2.5	2.5	2.5	2.5
5.0 Series	LA05095	95	104	2.4	2.7	3.1	3.5	3.9
	LA05120	120	129	3.3	3.8	4.2	4.8	5.0
	LA05180	180	189	5.0	5.0	5.0	5.0	5.0
	LA05240	240	249	5.0	5.0	5.0	5.0	5.0
10 Series	LA10150	150	160	4.5	5.2	5.9	6.6	7.4
	LA10200	200	210	6.8	7.9	8.8	10.0	10.0
	LA10340	340	350	10.0	10.0	10.0	10.0	10.0
20 Series	LA20240	240	251	8.9	10.3	11.5	13.0	14.6
	LA20340	340	351	14.8	17.1	19.1	20.0	20.0
	LA20500	500	511	20.0	20.0	20.0	20.0	20.0
32 Series	LA32700	700	708	32.0	32.0	32.0	32.0	32.0

NOTES:

1. *Above Tensile WLLs of PSA Foot Anchors are based on the following parameters:*
   - *Minimum Edge Distance: ≥ 1.5 times H_{ef}*
   - *Minimum Anchor Spacing: ≥ 3.0 times H_{ef}*
2. *For conditions where edge distances or spacings are less than above values, please contact the PSA Technical Team via technical@psa.com.au for guidance and evaluation.*
3. *The recommended minimum concrete strength at the time of lift is 15 MPa.*
4. *Foot anchors shall be fully embedded in un-cracked concrete to achieve above capacities.*
5. *All lifting designs and specifications involving PSA Foot Anchors must be reviewed and approved for suitability by a qualified engineer to ensure compliance with safety and performance requirements.*
6. *The green highlighted fields indicate conditions where the full WLL of the steel is reached.*

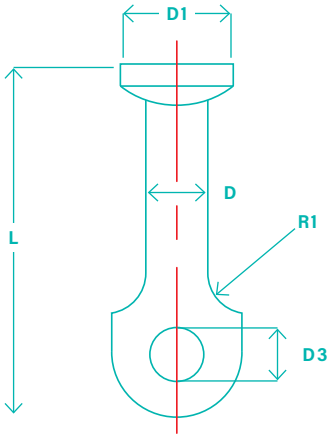
PSA FOOTED EYE AND EYE ANCHORS

PSA Footed Eye and Eye Anchors are designed for use with reinforcing bars in applications where traditional foot anchors cannot achieve the required capacity due to insufficient concrete strength or thickness. These anchors are particularly suited for thin wall panels and other elements where the concrete cone typically developed by foot anchors is inadequate to provide the necessary Working Load Limit (WLL).

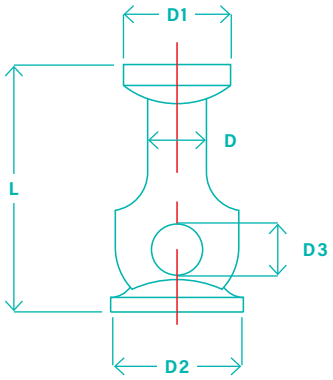
V shaped reinforcing bar (tension bar) is fed through the eye of the anchor and embedded deeply into the concrete, ensuring proper load transfer and secure anchorage.

PSA LFEA Footed Eye Anchor

PSA LEA Eye Anchor



PSA LEA Eye Anchor



PSA LFEA Footed Eye Anchor

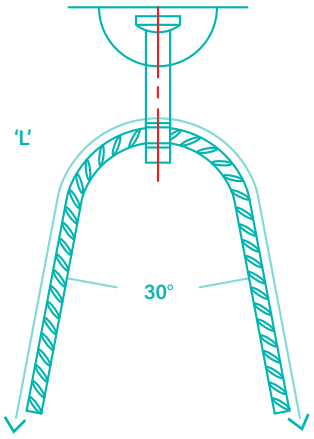
PSA FOOTED EYE ANCHOR/EYE ANCHOR DIMENSIONS

ANCHOR SERIES	PART NUMBER	LENGTH	SHAFT DIA.	HEAD DIA.	FOOT DIA.	EYE DIA.	COMPATIBLE CLUTCH	COMPATIBLE VOID FORMER
		L (mm)	D (mm)	D1 (mm)	D2 (mm)	D3 (mm)		
1.3 Series	LFEA01050	53	10	18	22	10	LC013	HF013 ASF013 SF013
	LEA01050	50			-			
	LEA01065	65			-			
2.5 Series	LFEA02065	65	14	25	35	13	LC025	HF025 ASF025 SF025
	LEA02090	90			-			
5 Series	LEA05090	90	20	36	-	20	LC05	HF050 ASF050 SF050
	LEA05120	120						
10 Series	LEA10115	115	28	46	-	25	LC10	HF10
	LEA10180	180						
20 Series	LEA20250	250	38	69	-	38	LC20	HF20

NOTES:

1. *All PSA Footed Eye and Eye Anchors are supplied with a galvanised finish for enhanced durability and corrosion resistance.*
2. *For detailed information regarding lifting clutches, refer to the 'PSA Spherical-Head Lifting Clutches' document.*
3. *The tensile Working Load Limit (WLL) of PSA Footed Eye Anchors installed without a tension bar can be considered equivalent to that of the corresponding Foot Anchor.*
4. *All PSA Eye Anchors must be used in conjunction with an ACRS-approved Grade 500N tension bar, as outlined in the table on page 8.*

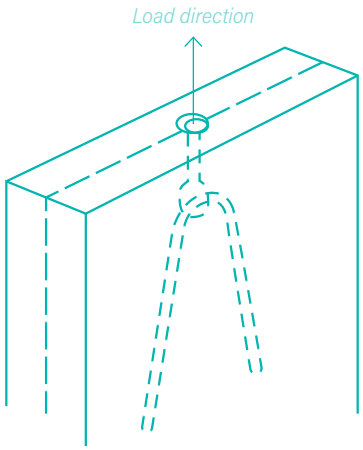
TENSION BAR DIMENSIONS FOR PSA FOOTED EYE AND EYE ANCHORS



TENSION BAR DIMENSIONS

'L'- TOTAL TENSION BAR LENGTH (mm)								
PSA SERIES	BAR øD	COMPRESSIVE CONCRETE STRENGTH AT LIFT (MPa)						
		10	15	20	25	30	35	40
1.3	N8	900	750	650	600	600	600	600
2.5	N10	1100	900	800	700	700	700	700
5	N16	1500	1200	1100	1000	900	900	900
10	N20	2000	1600	1400	1250	1150	1150	1150
20	N28	–	2400	2100	1900	1700	1600	1600

Note: Contact the PSA Technical Team via technical@psa.com.au for conditions with reduced wall thicknesses. It is the responsibility of a qualified engineer to evaluate anchor design capacities required. The lifting system must be designed in accordance with relevant industry standards and industry building practices. Published data on Working Load Limits (WLL), including Factors of Safety (FOS). FOS at least 2.25. Refer to AS3600 for bar development length calculations. Element thicknesses and anchor spacings have to be considered for estimating lifting anchor performance.



Typical Anchor-Tension bar placement

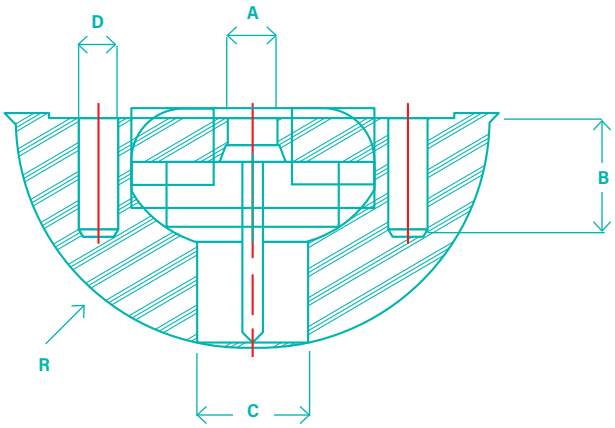
PSA HEMISPHERICAL VOID FORMERS

PSA Hemispherical Void Formers are engineered to ensure precise placement of anchors within concrete panels. Each recess former is specifically designed for its anchor series, reducing the potential for misuse and enhancing safety. Multiple types of hemispherical void formers are available to suit a wide range of applications.

RUBBER HEMISPHERICAL VOID FORMER

Made from durable, oil-resistant rubber, these void formers are flexible and easy to attach to steel, timber, or hang from top surface forms. Each void former comes with a bolt and wing nut for quick and secure installation.

PSA Hemispherical Former

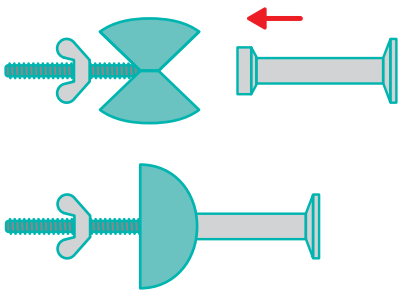


RUBBER HEMISPHERICAL VOID FORMER

CODE	R (mm)	A (mm)	B (mm)	C (mm)	D (mm)	BOLT THREAD
HF013	30	9	6	10	6.5	M8
HF025	37	11	10	14	6.5	M10
HF050	47	11	11.5	20	8.5	M10
HF10	59	13	14	28	10.5	M12
HF20	80	13	16	38	10.5	M12
HF32	102	15	16	50	10.5	M16

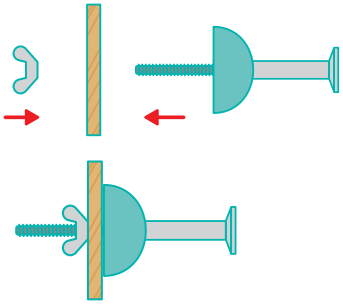
INSTALLATION

STEP 1
Insert the Foot/Eye Anchor into the void former.



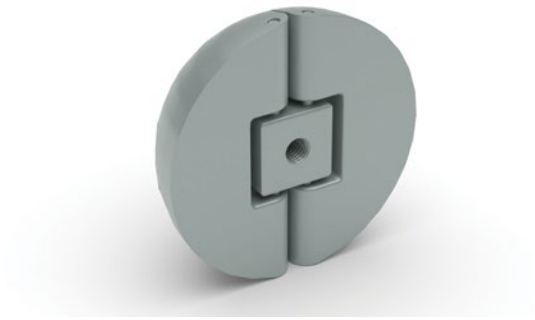
STEP 2
Drill a hole in the formwork or suspension timber at the anchor location. Drill size as per bolt size given above.

STEP 3
Feed the bolt through the drilled hole and secure with the wing nut.

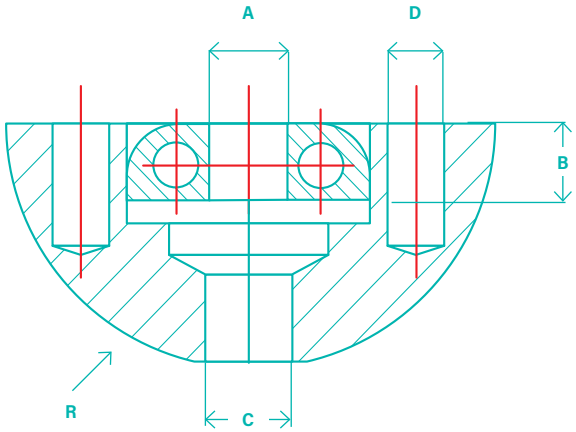


ARTICULATED STEEL VOID FORMER

Articulated steel void formers provide a durable alternative to rubber hemispherical void formers, offering a long service life and consistent performance for high-volume precast production.



PSA Articulated steel former



ARTICULATED STEEL VOID FORMER

CODE	R (mm)	A (mm)	B (mm)	C (mm)	D (mm)	BOLT THREAD
ASF013	30	10	10	11	7	M10
ASF025	37	10	10	15	7	M10
ASF050	47	10	10	21	10	M10

INSTALLATION

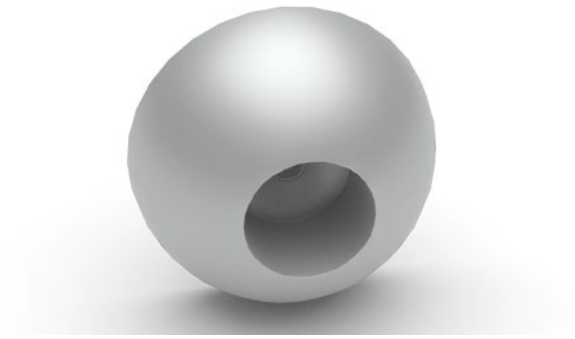
STEP 1
Insert the Foot/Eye Anchor into the void former.

STEP 2
Drill a hole in the formwork or suspension timber at the anchor location. Drill size as per bolt size given above.

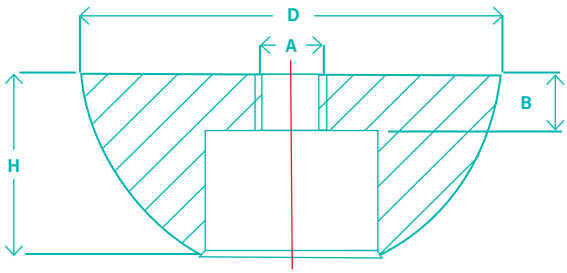
STEP 3
Feed the bolt through the drilled hole and secure with the wing nut.

ROUND STEEL VOID FORMER

Round steel void formers are a durable alternative to rubber hemispherical ones, designed for long-lasting, reliable use in high-volume precast production. They feature a simple push-on rubber retaining ring, making installation easier than the articulated steel option.



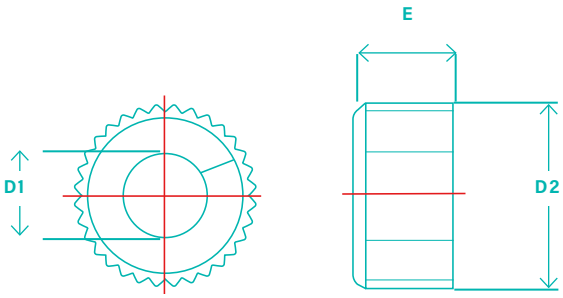
PSA Round Steel Formers



ROUND STEEL VOID FORMER					
CODE	D (mm)	A (mm)	B (mm)	H (mm)	BOLT THREAD
SF013	58	8	10	25	M8
SF025	74	12	10	32	M12
SF050	94	12	10	39	M12

RUBBER RINGS FOR ROUND STEEL VOID FORMER

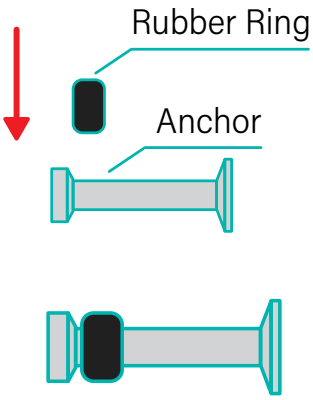
PSA Rubber Ring



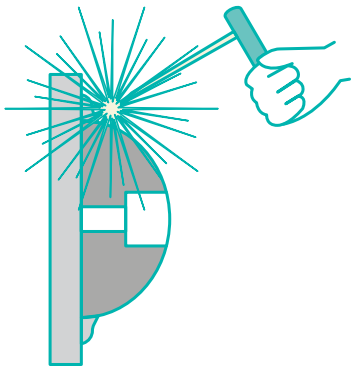
RUBBER RINGS TO SUIT ROUND STEEL VOID FORMER			
CODE	D1 (mm)	D2 (mm)	E (mm)
RR013	10	22	11
RR025	14	32	12
RR05	21	38.7	14
RR10	28.5	49.4	20

PERMANENT INSTALLATION TO MOULDS WITH WELDING

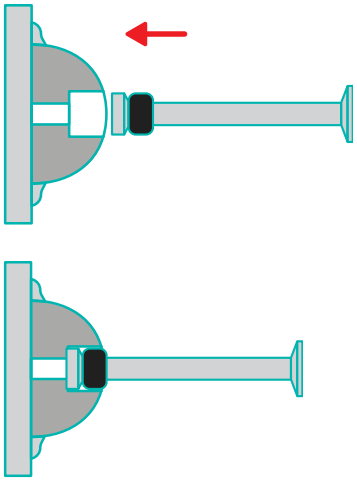
STEP 1
Secure the rubber ring around the anchor head.



STEP 2
Weld Round Steel Void Former to the steel mould.

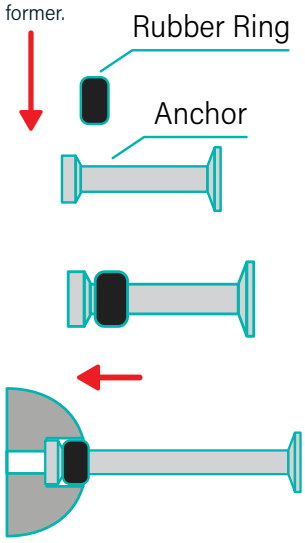


STEP 3
Insert Foot Anchor with the attached Rubber Ring into the Round Steel Void Former.



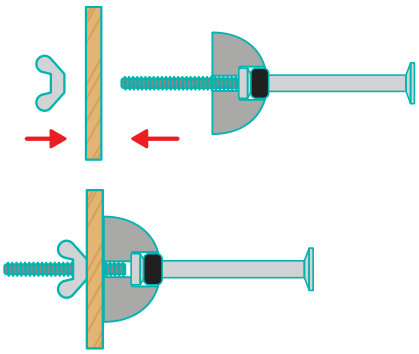
TEMPORARY INSTALLATION USING BOLT AND WING NUT

STEP 1
Secure the rubber ring around the anchor head. Insert the Foot/Eye Anchor into the void former.



STEP 2
Drill a hole in the formwork or suspension timber at the anchor location. Drill size as per bolt size given above.

STEP 3
Feed the bolt through the drilled hole and secure with the wing nut.



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