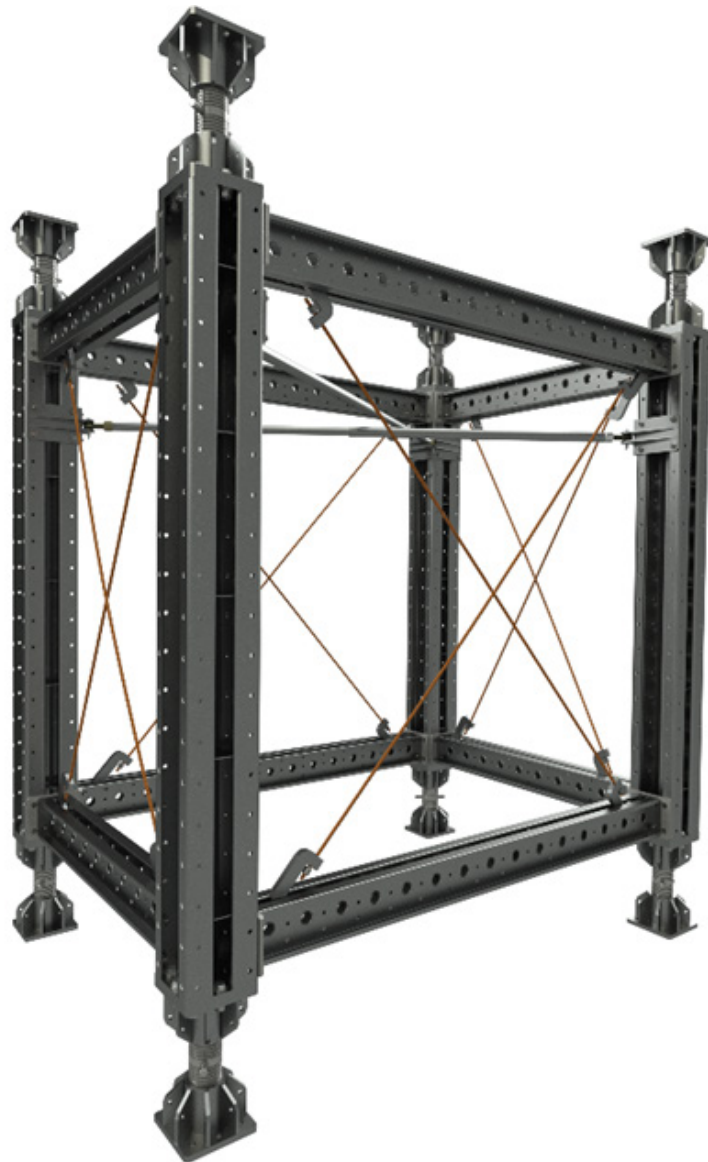




NATFORM



TECHNICAL GUIDE
POWERSHORE 150
HEAVY SHORING SYSTEM



We help build Australia **smarter.**

Any safety provisions as directed by the appropriate governing agencies must be observed when using our products. The pictures in this document are snapshots of situations at different stages of assembly, and therefore are not complete images. For the purpose of safety, they should not be deemed as definitive.

The loads featured in this document, related to the parts of the product, are approximate.

The company reserves the right to introduce any modifications deemed necessary for the technical development of the product.

ALL RIGHTS RESERVED.

Neither all nor part of this document may be reproduced or transmitted in any way by any electronic or mechanical procedure, including photocopy, magnetic recording or any other form of information storage or retrieval system without the written permission.

©COPYRIGHT BY ACROW FORMWORK & SCAFFOLDING PTY LTD 2021

| | |
|--------------|-------------------|
| DOCUMENT NO: | TD-PSP-SPC-21-01 |
| ISSUED BY: | MATTHEW CAPORELLA |
| ISSUE DATE: | JANUARY 2021 |
| ISSUE NO: | 1 |

CONTENTS

SYSTEM DETAILS

| | | |
|----|--|---|
| 1. | System Description | 2 |
| 2. | Purpose of the Document | 2 |
| 3. | Safety Information | 2 |
| 4. | Important Information & Disclaimer | 3 |
| 5. | Applicable Codes and Standards | 3 |
| 6. | General Product Information | 5 |

SYSTEM COMPONENTS

| | | |
|-------|--------------------------------------|----|
| 7. | System Components | 9 |
| 7.1 | Props/Beams | 11 |
| 7.1.1 | Prop Range | 12 |
| 7.1.2 | Props/Beams Section Properties | 13 |
| 7.1.3 | Beam End Connections | 14 |
| 7.2 | Screw Jack | 15 |
| 7.3 | Raking Bracket | 19 |
| 7.4 | Hydraulic Jack Unit | 21 |
| 7.5 | Brace Adapter | 24 |
| 7.6 | End Plate Adapter | 27 |
| 7.7 | Soldier Adapter | 32 |
| 7.8 | Jack Brace Adapter | 36 |
| 7.9 | Prop/Turnbuckle Adapter | 38 |
| 7.10 | Tie Bar Adapter | 41 |

WORKING LOAD LIMITS

| | | |
|-----|---|----|
| 8. | Powershore 150 Working Load Limits | 44 |
| 8.1 | Powershore 150 Prop Axial WLL (Eccentricity in XX Axis) | 44 |
| 8.2 | Powershore 150 Prop Axial WLL (Eccentricity in YY Axis) | 45 |
| 8.3 | Powershore 150 Prop Bending WLL (XX Axis) | 46 |
| 8.4 | Powershore 150 Beam Bending WLL (YY Axis) | 47 |
| 8.5 | Axial WLL Powershore 150 Prop Combined with Screw Jack | 48 |
| 8.6 | Axial WLL Powershore 150 Prop Combined with Raking Bracket Assembly | 49 |
| 8.7 | Axial WLL Powershore 150 Prop Combined with Screw Jack and Raking Bracket | 50 |
| 8.8 | Axial WLL Powershore 150 Prop (Raking Bracket with X-X axis taking bending) | 51 |
| 9. | Slim-Max Soldier Capacity | 53 |
| 9.1 | Slim-Max Axial WLL (Eccentricity in XX Axis) | 53 |
| 9.2 | Slim-Max Axial WLL (Eccentricity in YY Axis)..... | 54 |

1. SYSTEM DESCRIPTION

The Acrow Powershore 150 is a heavy-duty high load propping and shoring system designed to withstand up to 150 tonne shoring loads per vertical member. The flexible Acrow Powershore 150 is primarily used to create temporary stand-alone frames and raking strut structures for the mining, infrastructure, and commercial industries.

The heavy-duty system is also more versatile for propping high structures as the tower takes large lateral forces. The Powershore 150 components can also be used as a horizontal beam, removing the need to use steel beams. The built-in strength of each individual Powershore 150 galvanised component contributes to construction of a support tower capable of supporting loads in excess of 6000kN.

2. PURPOSE OF THE DOCUMENT

The purpose of this document is to provide guidelines for design, safe handling, transport and installation of the Acrow Powershore 150 prop system. It is intended to be used by Structural Engineers.

The document also outlines the various components of the Powershore 150. It features illustrations, working load limits, typical assembly arrangements and safe transport and handling measures.

The information contained in this document is provided as a general guide only and does not replace the need for the design to be reviewed and checked by a qualified person in the field of temporary works design and installation, concrete, steel, building construction and services.

This material has been prepared in the context of relevant Australian Standards and the National Construction Code (NCC). Users should make themselves aware of any recent changes to these documents referred to therein and to local variations or requirements.

This document is NOT a substitute for site-specific Safe Operation Procedures. It is the Installation Contractors responsibility to prepare safe work method statements and observe and comply with site specific health and safety regulations, standards and policies.

Acrow Formwork and Scaffolding has dedicated engineering services available for project assistance. We can provide design support for clients to determine the best way to specify and document Powershore 150. Our technical experts can identify the most efficient temporary work design meeting project requirements, specifications and installation process.

Should the users require any further information or guidance, they are encouraged to contact their local Acrow Formwork & Scaffolding Pty Ltd branch.

3. SAFETY INFORMATION

This safety information is to draw the user's attention to possible musculoskeletal disorders as a result of manual handling during assembly and dismantling of the Acrow Powershore 150.

It is recommended that users of the Acrow Powershore 150 system employ and implement appropriate procedures and control measures to eliminate or control any risk of Musculoskeletal disorder/injury while handling the Acrow Powershore 150.

Refer to the Code of Practice on manual handling published by local Workcover Authority or other approved and recognised guidelines for correct and appropriate manual handling procedure

4. IMPORTANT INFORMATION

The erection and application instructions contained in this manual are the recommended methods to be used for Acrow Powershore 150 products.

The technical function related instructions must be accurately followed to obtain the correct performance of the product. Any deviation from the recommended usage will require a separate design and/or verification by Acrow Engineering.

The safe use and application of the Acrow Powershore 150 system must be in accordance with Australian Standard AS 3610 Formwork for Concrete, Occupational Health & Safety regulations, approved industry codes of practice and relevant regulatory authority requirements.

The illustrations in these assembly configurations are minimum guidelines only.

The combined use of the Acrow Powershore 150 system with equipment from other suppliers may entail performance issues and therefore requires a design check and/or verification by Acrow Engineering or a qualified experienced engineer.

Hazard Identification/Risk Assessments for the erection and dismantling of the Acrow Powershore 150 system are available from Acrow branches.

Site specific Hazard and Risk assessments may need to be generated for specific projects.

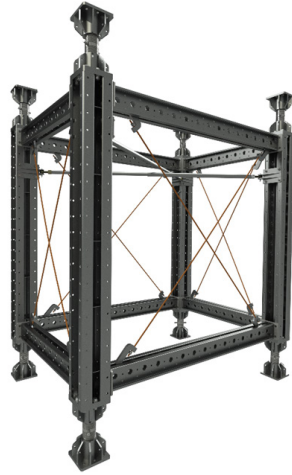
DISCLAIMER

1. The photographs/illustrations shown within this manual are intended as expressing the diversity and possible applications of the product and as such must not be used as assembly instructions.
2. In line with Acrow Formwork & Scaffolding's commitment to continuous product development and improvement, the information contained in this manual may be changed without notice. Please confirm with Acrow Engineering for latest update.
3. While all reasonable effort has been taken to ensure the accuracy and adequacy of the information contained herein, Acrow Formwork & Scaffolding Pty Ltd, accepts no responsibility or liability for any loss or damage suffered by any person acting or refraining from action as a result of this information.

5. APPLICABLE CODES AND STANDARDS

The structural design information and guide provided in this document are limited to the relevant codes nominated below. It does not include certification of any structures or works associated with a project.

| ELEMENT | DESCRIPTION | CODE |
|----------|--|----------------------------|
| Loading | Structural Design Actions – General Principles | AS/NZS 1170.0-2002 (R2016) |
| | Structural Design Actions – Permanent, Imposed And Other Actions | AS/NZS 1170.1-2002 (R2016) |
| Steel | Cold-Formed Steel Structures | AS 4600-2018 |
| | Steel Structures | AS 4100-1998 |
| Formwork | Formwork for Concrete | AS 3610-1995 |
| | Formwork for Concrete Part 1- Specifications | AS 3610.1-2018 |



SECTION ONE

GENERAL PRODUCT INFORMATION

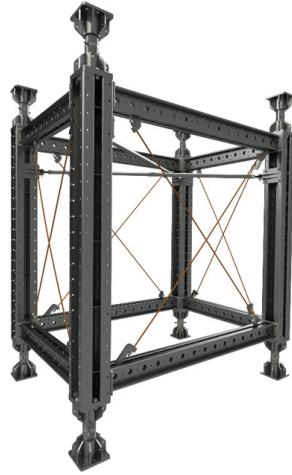


6. GENERAL PRODUCT INFORMATION

| PRODUCT | DESCRIPTION | PRODUCT CODE | MASS KG (NOM.) |
|---|--|--|--|
|  | <p>Powershore 150 Props A wide range of heavy-duty load props designed to be bolted together. The Powershore 150 props are capable of withstanding 150 tonne shoring loads.</p> <p>100mm prop 300mm prop 600mm prop 1200mm prop 1800mm prop 2400mm prop 3000mm prop 25mm Packer Plate</p> | <p>AP150P01 AP150P03 AP150P06 AP150P12 AP150P18 AP150P24 AP150P30 APS15025PP</p> | <p>35.40 46.86 65.08 100.64 136.20 171.68 207.24 16.40</p> |
|  | <p>1500KN Screw Jack A jack designed to interface with the Powershore 150 Prop section and is suitable for a 1500kN WLL at full 200mm extension. 420-620mm range.</p> | APS150SJ | 108.57 |
|  | <p>1500KN Raking Bracket Up to 60° rotation capacity, the Raking Bracket is designed to be bolted to the Powershore 150 props end-plates.</p> | APS150RB | 74.58 |

| PRODUCT | DESCRIPTION | PRODUCT CODE | MASS KG (NOM.) |
|---|---|--------------|----------------|
|  | 1500KN Hydraulic Jack A 150 tonne hydraulic jack designed to be bolted to the Powershore 150 prop end-plates. The Hydraulic Jack has a 200mm jacking capacity at 16mm intervals. | APS150HJ | 331 |
|  | Brace Adapter Bolted to the Powershore 150 props wall, designed for plan brace of the Powershore 150 structure. | APS150BA | 14.68 |
|  | Powershore 150 End Plate Adapter Designed for connecting the Powershore 150 prop end plate to another Powershore 150 prop side wall. | APS150EPA | 17.03 |
|  | Powershore 150 Soldier Adapter Designed for Slim-Max soldier end plate connection to Powershore 150 Prop wall flange and lip. | APS150SA | 10.36 |
|  | Powershore 150 Jack Brace Adapter Designed for HT Thru Tie Rod (Z-bar) brace connection to Screw Jack (or Hydraulic Jack). | APS150JBA | 54.87 |

| PRODUCT | DESCRIPTION | PRODUCT CODE | MASS KG (NOM.) |
|---|---|--------------|----------------|
|  | <p>Powershore 150 Prop / Turnbuckle Adapter Designed for Slim-max Prop or Turnbuckles Connection to Powershore 150 Prop side wall.</p> | APS150PTA | 12.87 |
|  | <p>Powershore 150 Tie Rod Adapter Designed for cross bracing the Powershore 150 structure.</p> <p>The Tie Bar adapter is fixed into members using D19 podger pin.</p> <p>A 15mm diameter HT Thru Tie Rod with HT Thru Tie Hex Nut are used as bracing members.</p> | APS150TBA | 5.16 |



SECTION TWO

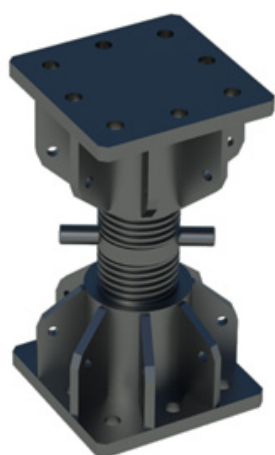
DETAILED PRODUCT INFORMATION



7. SYSTEM COMPONENTS

The Powershore 150 system consists of five major components designed to be joined using M24 G10.8 bolts including a range of adapters:

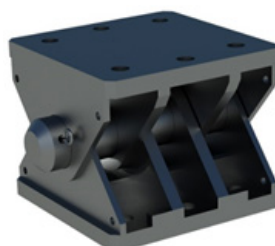
1. 100mm to 3000mm Props / Beams
2. 1500kN Screw Jack
3. Raking Bracket
4. Hydraulic Head Unit
5. Adapters:
 - Brace Adapter
 - End Plate Adapter
 - Soldier Plate
 - Jack Brace Adapter
 - Prop / Turnbuckle Adapter
 - Tie Rod Adapter



**1500kN
SCREW JACK**



**1500kN
HYDRAULIC JACK**



**1500kN
RAKING BRACKET**



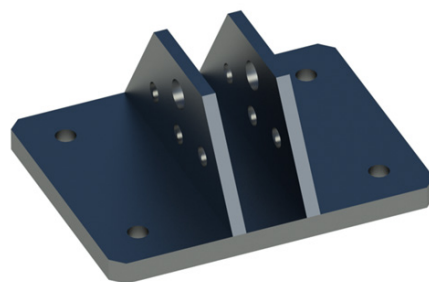
**100MM TO 3000MM PROP /
BEAM**

The range of adapters are designed to enable the bracing of the Powershore 150 props, bolting of vertical and horizontal props and to enable the connection of the Powershore 150 components to Acrow's range of shoring systems such as the Slim-max soldier.



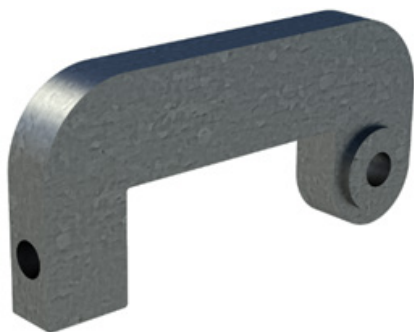
BRACE ADAPTER

Designed to be bolted to the Powershore 150 props wall for plan brace the structure.



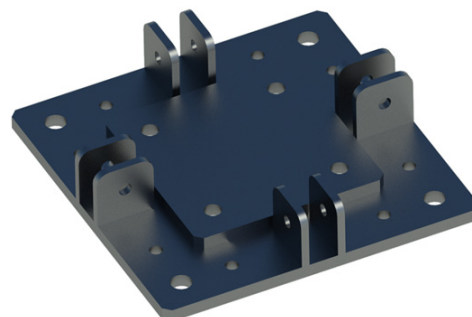
PROP / TURNBUCKLE ADAPTER

Designed for the Slim-Max prop or turnbuckles connection to the Powershore 150 prop side wall.



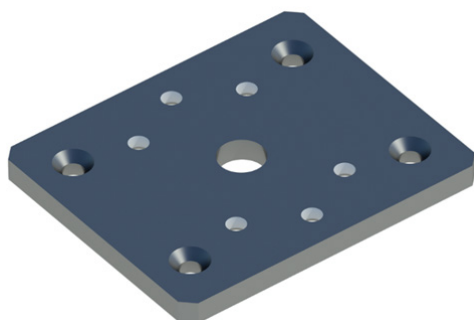
TIE ROD ADAPTER

Designed for bracing of the Powershore 150 structure using the HT Thru Tie Rod (Z-Bar).



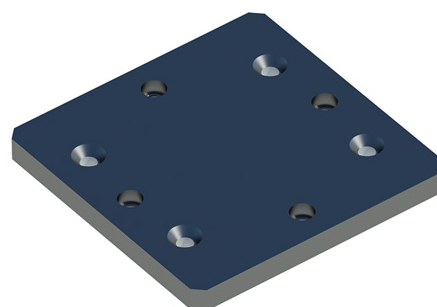
JACK BRACE ADAPTER

Designed for the HT Thru Tie Rod (Z-Bar) brace connection to Screw Jack (or Hydraulic Jack).



SOLDIER ADAPTER

Designed for the Slim-Max soldier end plate connection to the Powershore 150 Prop side wall.



END PLATE ADAPTER

Designed for connecting the Powershore 150 Prop End Plate to another Powershore 150 Prop side wall.

7.1 PROPS / BEAMS

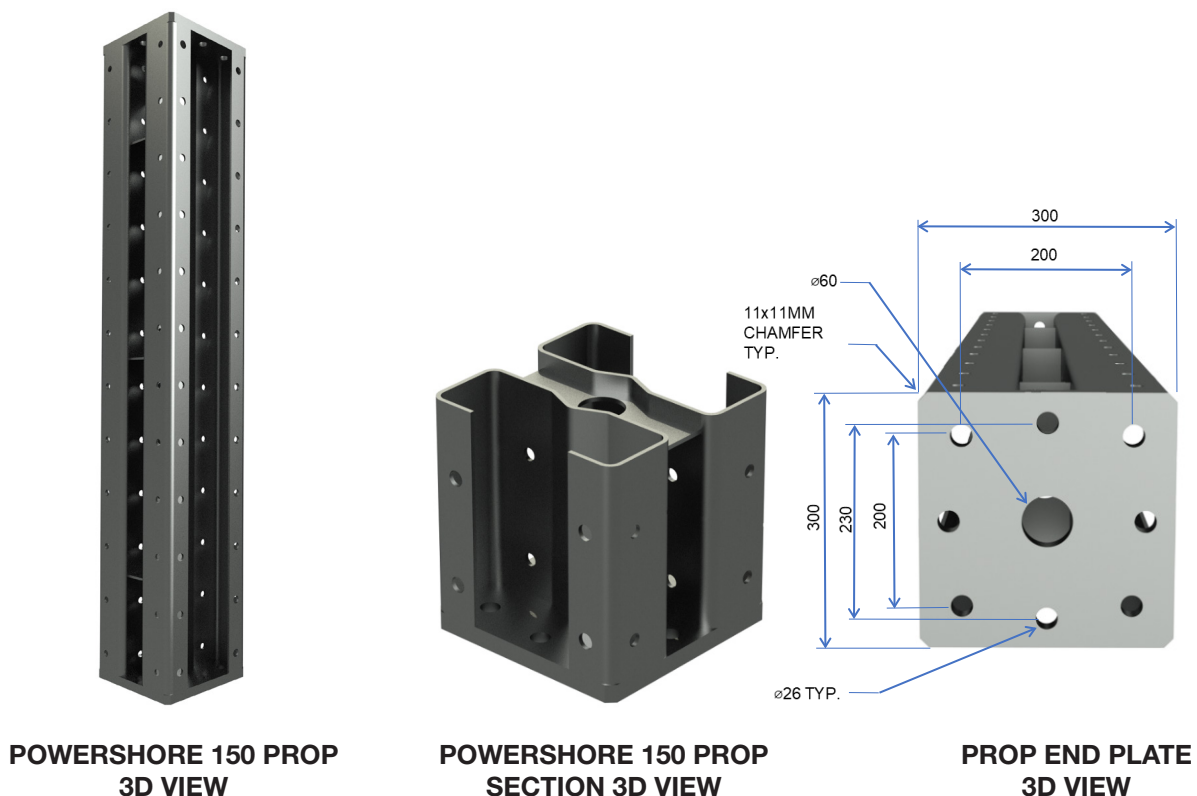
Acrow's Powershore 150 offer a range of props / beams from 100mm to 3000mm high. The prop's section consists of two lipped channels Grade 550 steel sections spaced apart by battens and welded to 25mm thick Grade 450 steel end plates.

The hole patterns in the end plates enable the positive and direct bolting of props / beams to achieve a desired height and length, and to connect to the Screw and Hydraulic jacks.

Another hole patterns in the flanges of the prop sections enable the direct connection of brace members and the remaining of the Powershore 150 components.

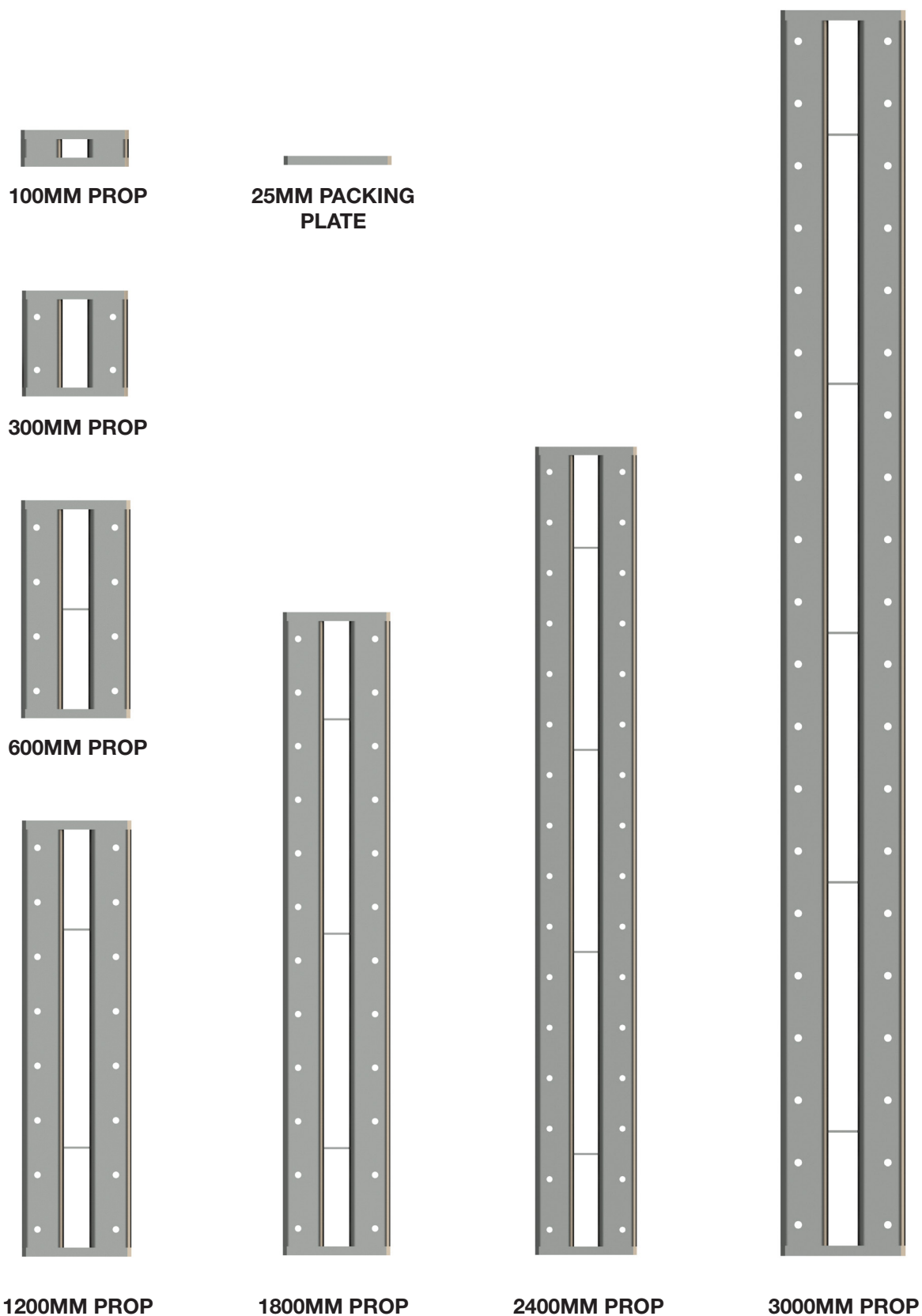
The Powershore 150 props have been designed to resist loads in bending, tension, compression and a combination of these actions, but the capacity may be less than the beam sections. Therefore, connection strength can be increased with added bolts and / or splice plates. These actions will be transferred when components of the Powershore 150 system are bolted together. The End Plate Adapter is designed for the prop end plate connection to another Powershore 150 prop side wall.

| POWERSHORE 150 PROP SIZE | PROP WEIGHT | PRODUCT CODE |
|--------------------------|-------------|--------------|
| 100mm Prop | 35.40 kg | AP150P01 |
| 300mm Prop | 46.86 kg | AP150P03 |
| 600mm Prop | 65.08 kg | AP150P06 |
| 1200mm Prop | 100.64 kg | AP150P12 |
| 1800mm Prop | 136.20 kg | AP150P18 |
| 2400mm Prop | 171.68 kg | AP150P24 |
| 3000mm Prop | 207.24 kg | AP150P30 |
| 25mm Packing Plate | 16.54 kg | APS15025PP |



7.1.1 PROP RANGE

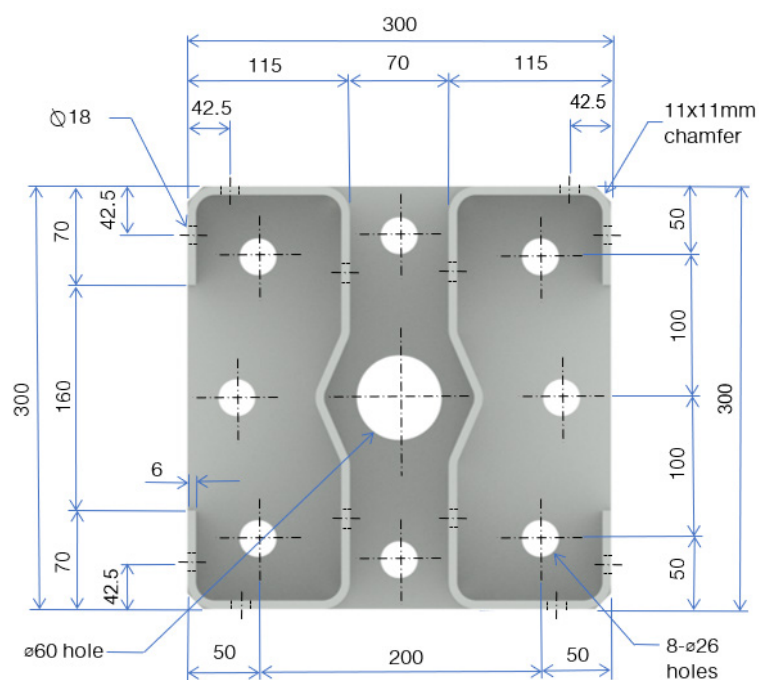
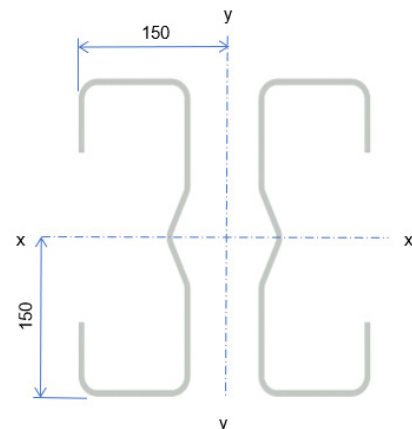
Acrow Powershore 150 offer a range of props / beams from 100mm to 3000mm high. The prop's section consists of two lipped channels Grade 550 steel section spaced apart by battens and welded to 25mm thick Grade 450 steel end plates. A 25mm Packing Plate can be used to accommodate prop heights verinaces multipale of 25mm.



7.1.2 PROPS / BEAMS SECTION PROPERTIES

The table below outlines the various section properties for the Powershore 150 props / beams.

| PROPERTY | | | VALUE |
|------------|-------------------------------------|----------------------------------|--------|
| A | Area | $\times 10^3 \text{ mm}^2$ | 6.179 |
| I_{xx} | Second moment of area (x axis) | $\times 10^6 \text{ mm}^4$ | 77.80 |
| I_{yy} | Second moment of area (y axis) | $\times 10^6 \text{ mm}^4$ | 46.40 |
| Z_{xx} | Section modulus (x axis) | $\times 10^3 \text{ mm}^3$ | 518.69 |
| Z_{yy} | Section modulus (y axis) | $\times 10^3 \text{ mm}^3$ | 309.32 |
| J | Torsion constant | $\times 10^3 \text{ mm}^4$ | 166.60 |
| R_x | Radius of gyration (x axis) | mm | 122.84 |
| R_y | Radius of gyration (y axis) | mm | 86.65 |
| F_y | Yield stress | MPa | 550 |
| E | Young's modulus | GPa | 200 |
| ΔN | Axial shortening (per meter length) | $\times 10^{-4} \text{ mm/kN/m}$ | 6.8 |



**POWERSHORE 150 PROP
TYPICAL CROSS SECTION**

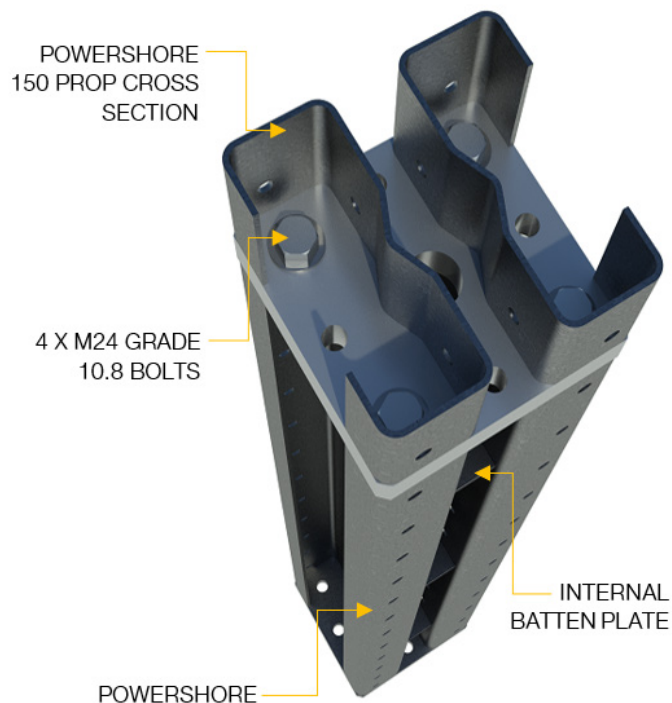


**PROP CROSS SECTION SHOWING THE BATTEN
(GUSSET) PLATE 3D VIEW**

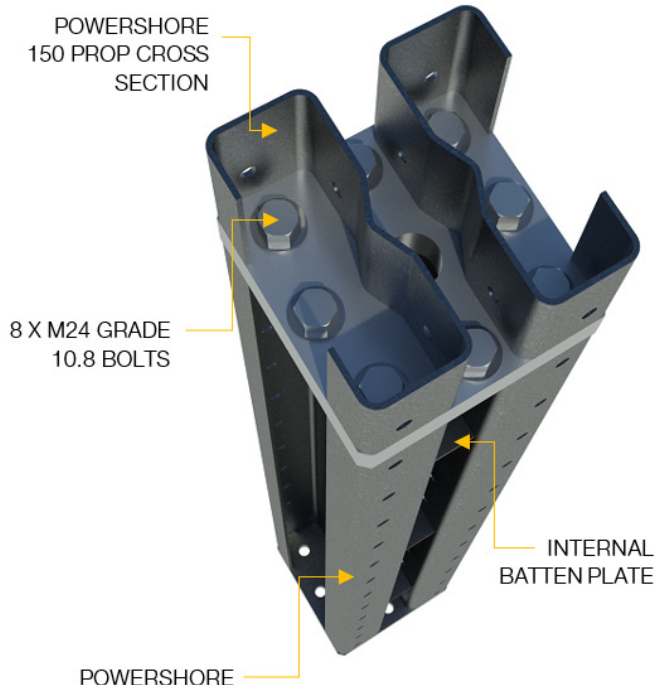
7.1.3 BEAM END CONNECTIONS

There are two bolting configurations for the prop / beam end connections. There are four and eight bolts pattern options providing different capacities to suit the application.

PROP END PLATE CONNECTION 3D VIEW



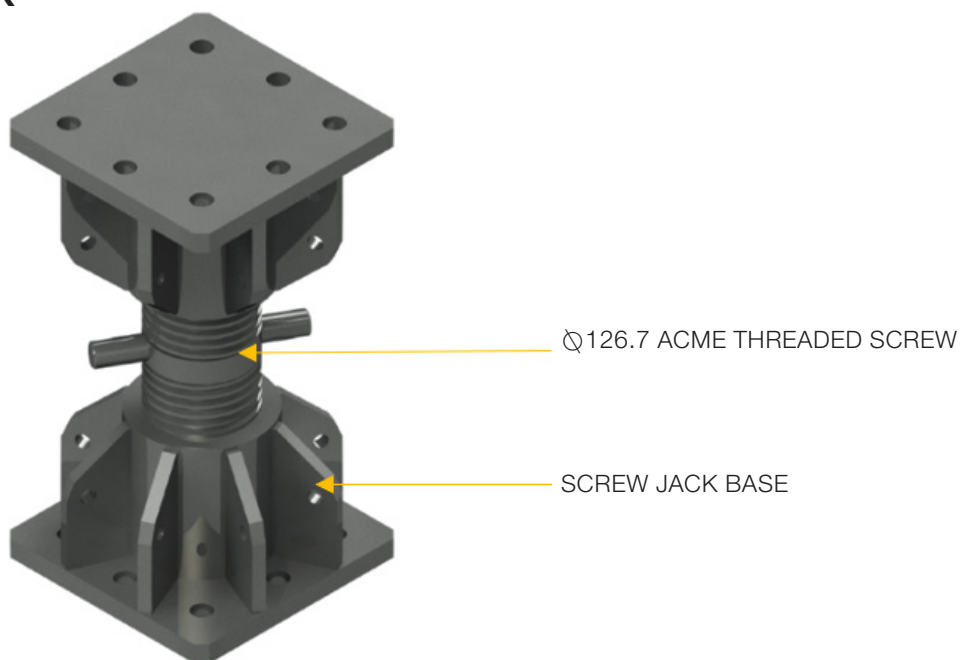
4 BOLTS CONNECTION CONFIGURATION



8 BOLTS CONNECTION CONFIGURATION

| DESIGN CAPACITIES | 4 BOLT GROUP | 8 BOLT GROUP |
|--|--------------|--------------|
| Maximum Axial Tensile Strength (Tension WLL) | | 1248 kN |
| Bending Capacity (WLL) | 79.9 kNm | 142.5 kNm |

7.2 SCREW JACK

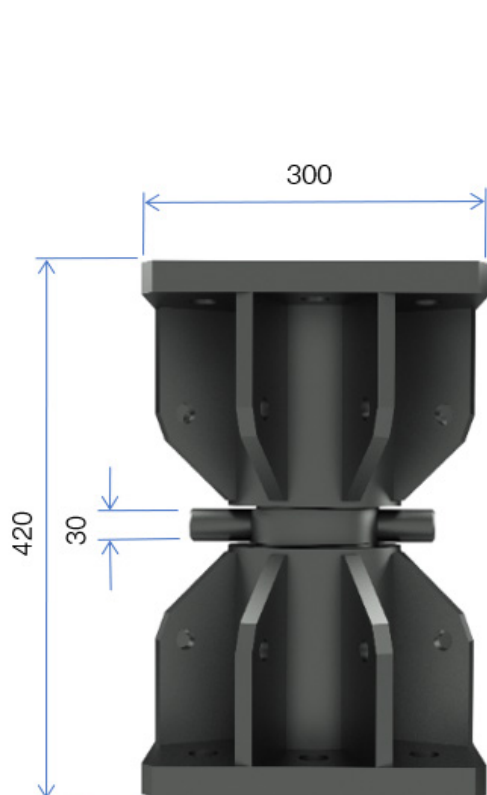


SCREW JACK 3D VIEW

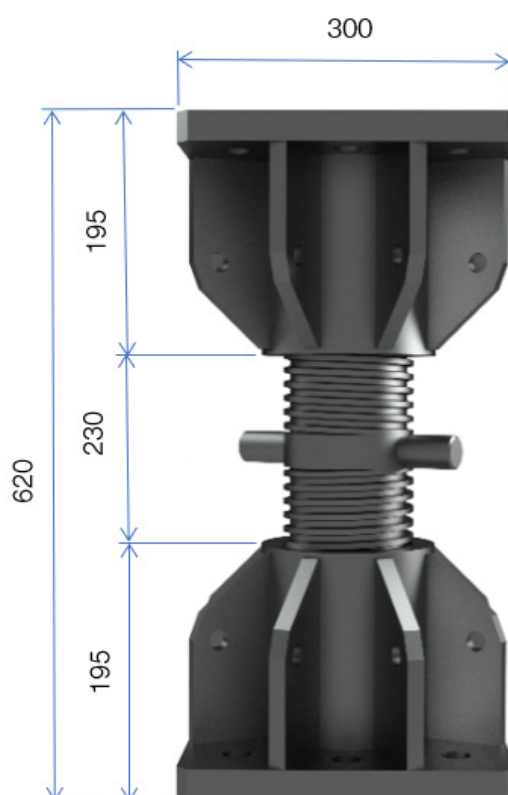
| DESCRIPTION | WEIGHT | PRODUCT CODE |
|-------------|-----------|--------------|
| Screw Jack | 108.57 kg | APS150SJ |

The Screw Jack is designed to interface with the Powershore 150 Prop section and is suitable for a 1500kN WLL at full extension. The Screw Jack has the following properties:

| | |
|--|---------------------------|
| Material Grade | G450 |
| Extension range | 420mm - 620mm |
| Axial compression capacity (0 eccentric) | WLL 1500kN |
| Min. thread engagement | 70mm (both ends of shaft) |
| Jack extension range | 420mm - 620mm |
| LSCF | 2.0 |

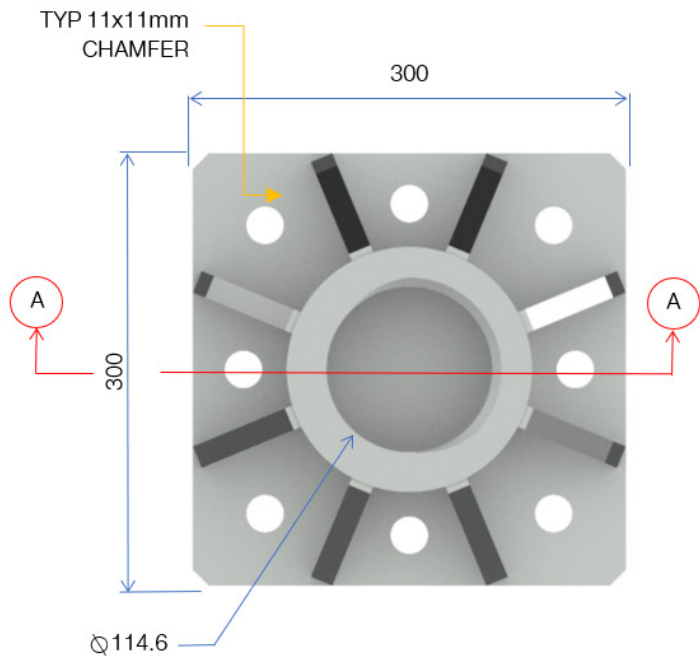


**SCREW JACK ELEVATION
FULLY CONTRACTED**

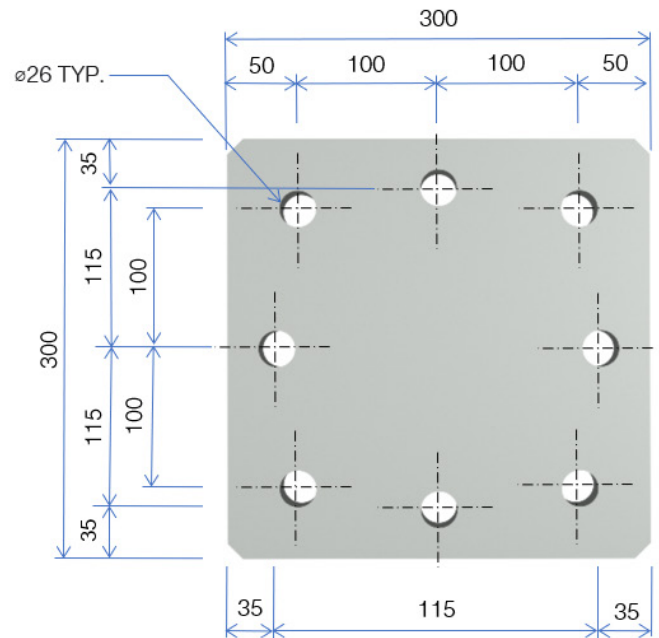


**SCREW JACK ELEVATION
FULLY EXTENDED**

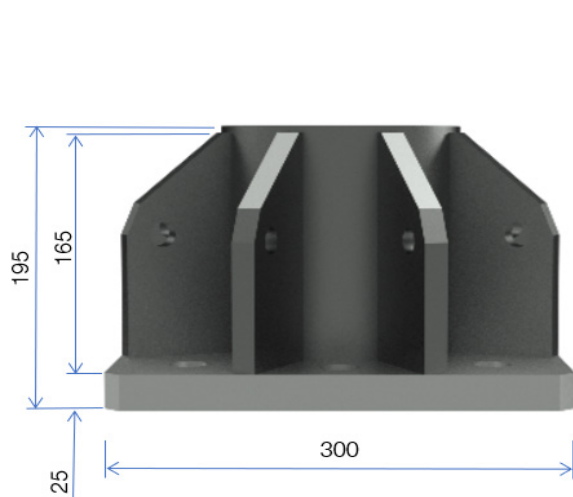
The Screw Jack's bases are identical in geometry, except the ACME thread direction, to facilitate the Screw Jack mechanism. One has a Right-Hand Thread and the other has a Left-Hand Thread.



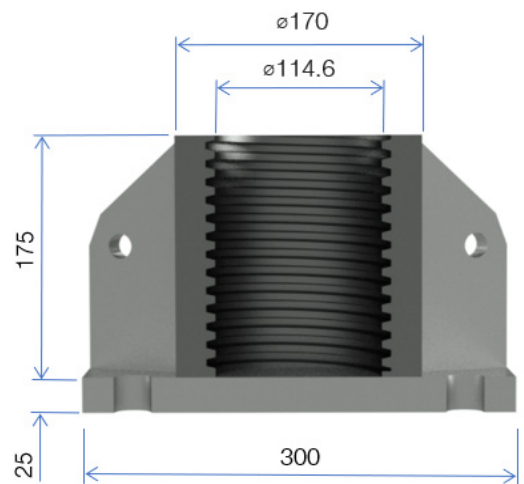
**SCREW JACK BASE ASSEMBLY
PLAN VIEW**



**SCREW JACK BASE ASSEMBLY
END PLATE PLAN VIEW**

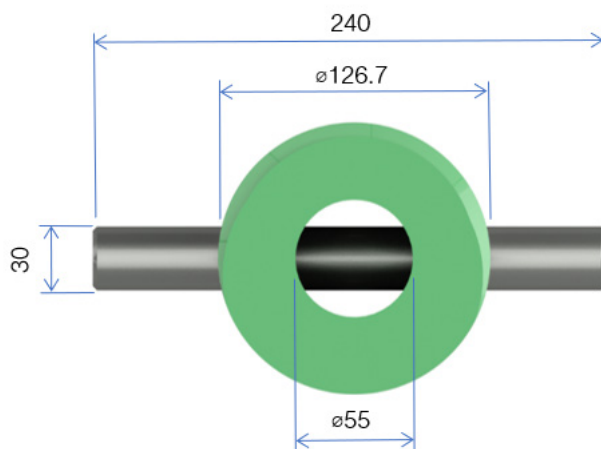


**SCREW JACK BASE ASSEMBLY
FRONT ELEVATION**

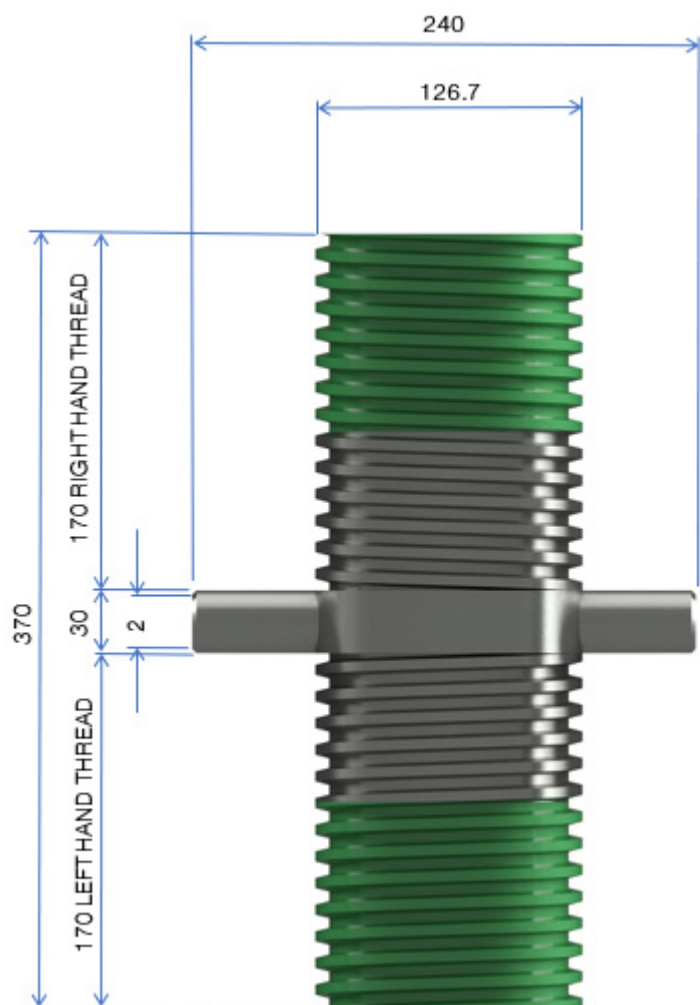


**SCREW JACK BASE ASSEMBLY
SECTION A - A**

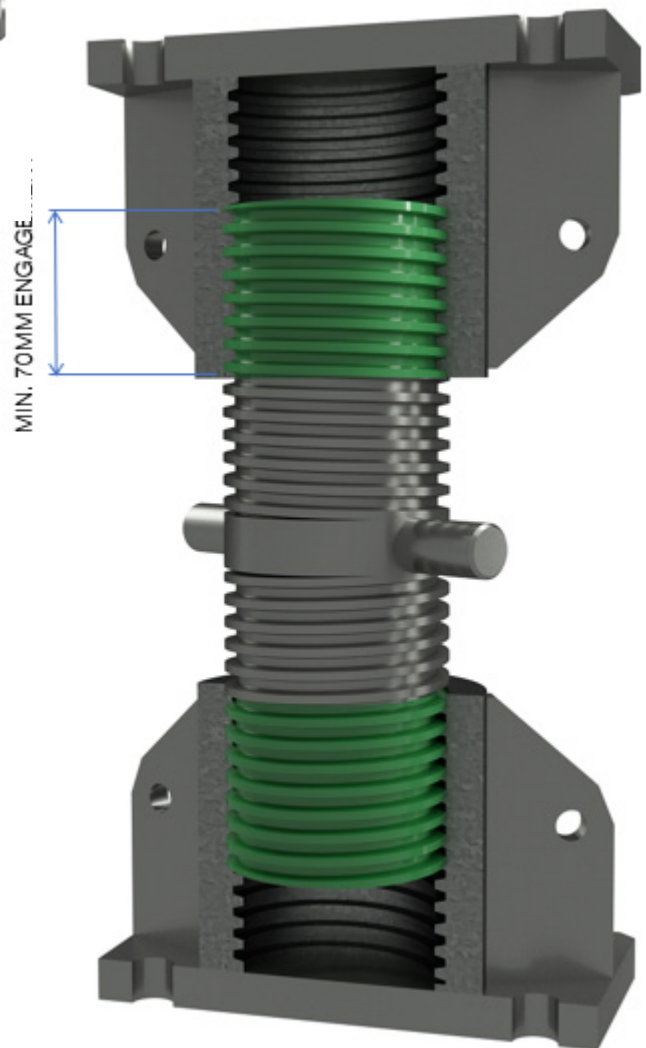
To ensure the Screw Jack maintains a safe 1500KN WLL, a minimum 70mm thread engagement is required on both ends of the shaft. The 70mm is marked in Green on both ends of the Ø126.7 ACME thread screw.



**SCREW JACK BASE ASSEMBLY
PLAN VIEW**

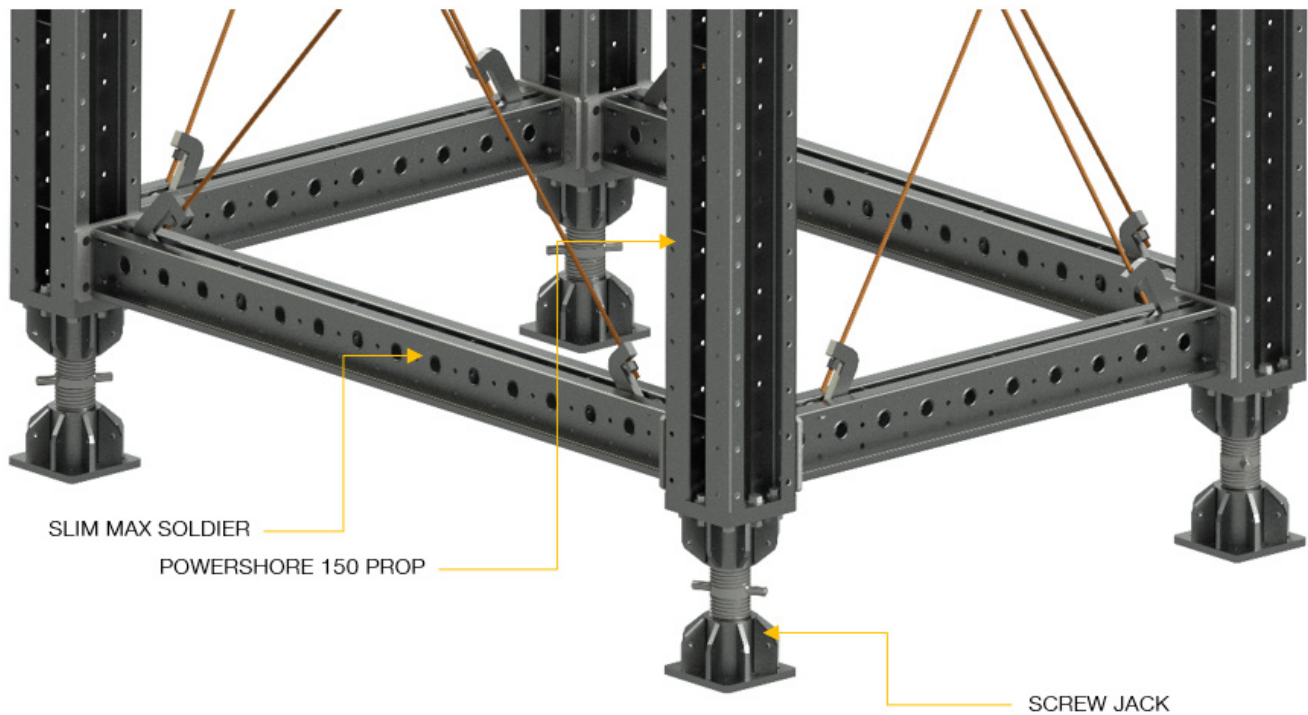


**SCREW JACK BASE ASSEMBLY
SIDE ELEVATION**

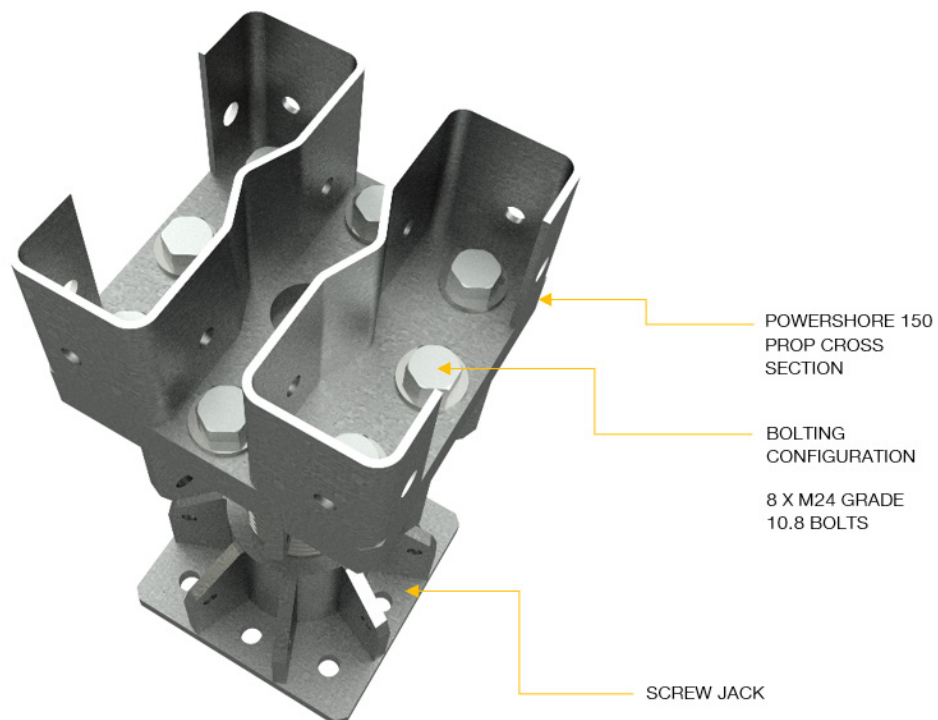


**SCREW JACK BASE ASSEMBLY
3D SECTION VIEW**

The Screw Jacks are to bear on suitable footings by others. The footing should be designed based on the applied loads. The typical configuration and bolting method of the Screw Jacks are shown below:



SCREW JACK CONNECTION 3D VIEW

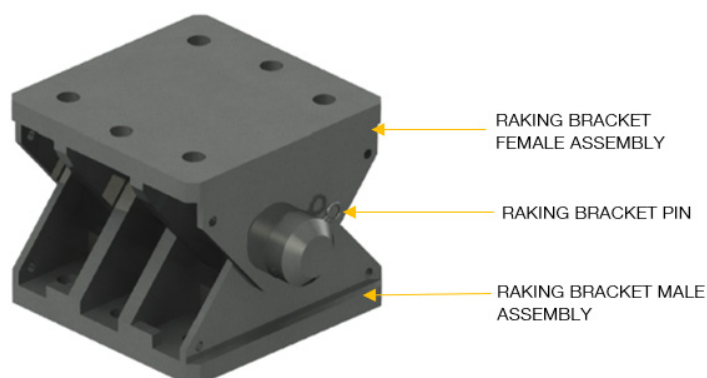


**SCREW JACK TO POWERSHORE 150 PROP CONNECTION
3D CROSS-SECTION VIEW**

7.3 RAKING BRACKET

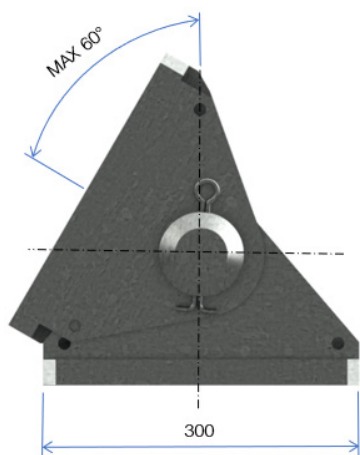
The Raking Bracket is designed for connection to the Powershore 150 Prop / Beam Section via six (6) M24 Grade 10.8 bolts, nuts and washers.

| | |
|--|------------|
| LSCF: | 1.5 |
| Permissible rotation range (each side): | 0 - 60 deg |
| Axial compression capacity at 0 eccentricity and 0 degree pivoting angle (α): | |
| • WLL for raker main ply parallel to beam webs: | 1500kN |
| • WLL for raker main ply perpendicular to beam webs: | 900kN |
| • Allowed applied force directions shall be within the same plane of the raker main ply. | |

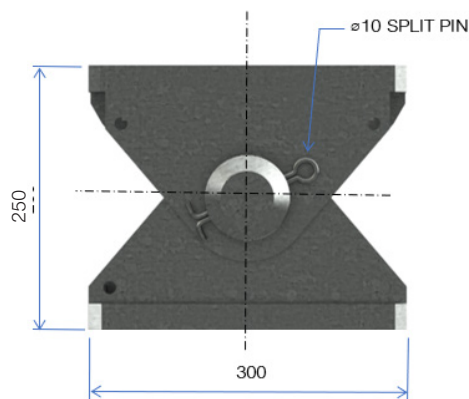


RAKING BRACKET ASSEMBLY 3D VIEW

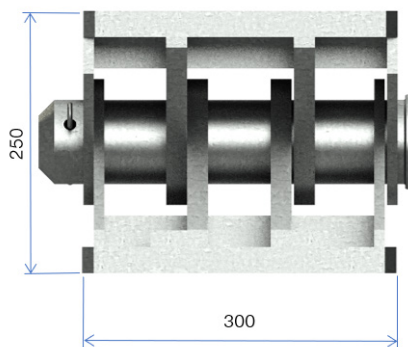
| DESCRIPTION | WEIGHT | PRODUCT CODE |
|----------------|----------|--------------|
| Raking Bracket | 74.58 kg | APS150RB |



**RAKING BRACKET
MAX ROTATION**

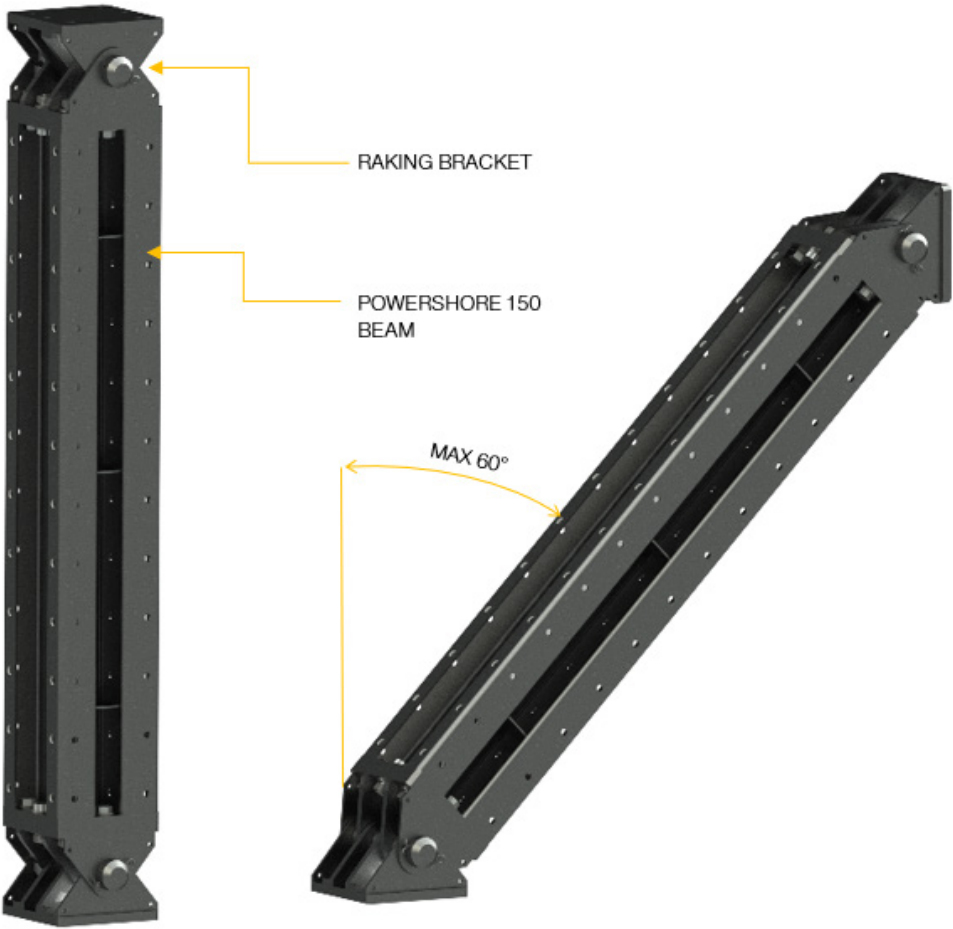


**RAKING BRACKET
FRONT ELEVATION**

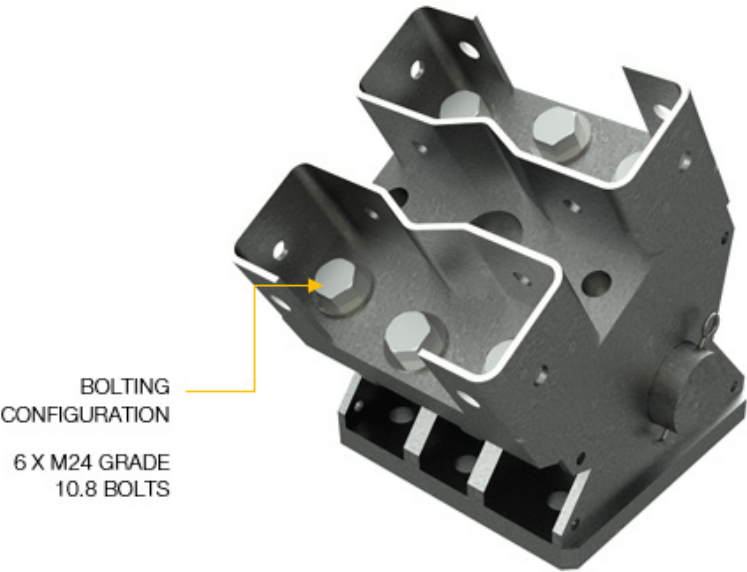


SIDE ELEVATION

The Raking Bracket's typical connection is demonstrated below:



RAKING BRACKET TYPICAL CONNECTION



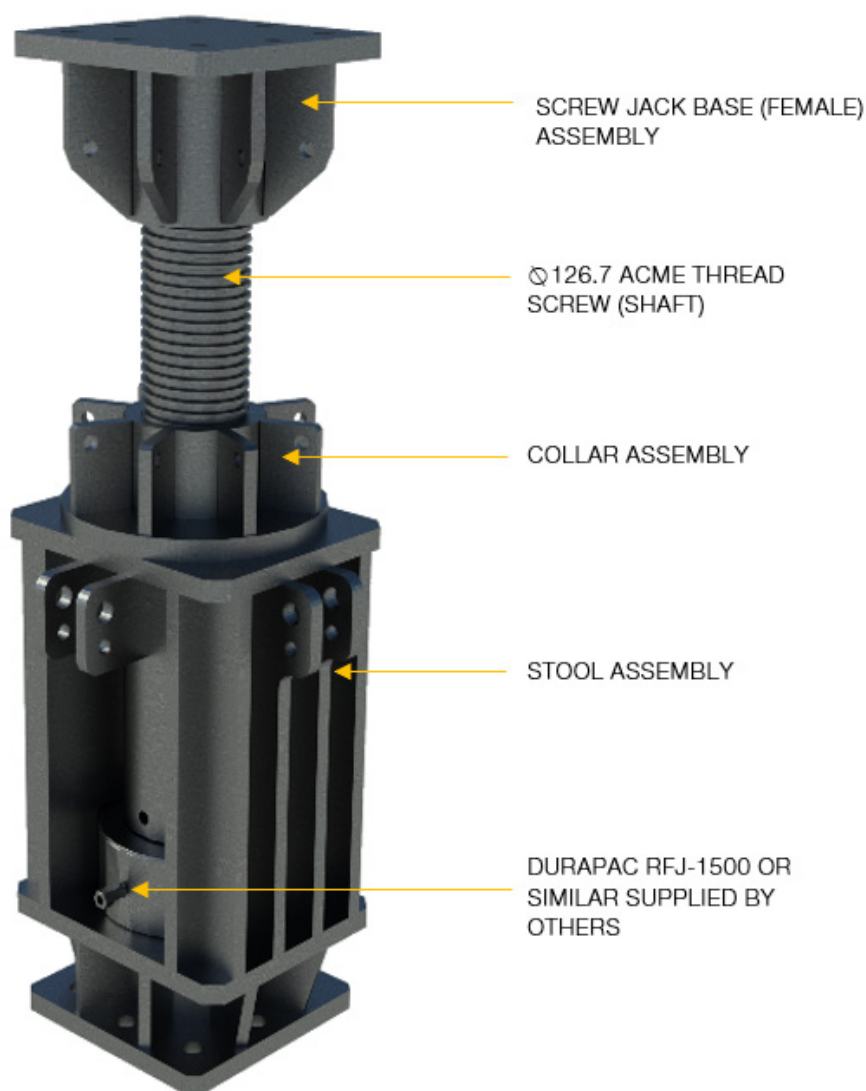
RAKING BRACKET CONNECTED TO POWERSHORE 150 PROP CONNECTION 3D VIEW

7.4 HYDRAULIC JACK UNIT

The Hydraulic Jack unit is designed to suit the 150 tonne RFJ-1500 Durapac Jack or similar supplied by others.

| | |
|------------------------|-------------------------|
| Material grade: | G450 |
| LSCF: | 1.5 |
| Axial compression WLL: | 1500kN |
| Extension range: | 200mm |
| Max. extension range: | 200mm |
| Min. thread enagement: | 70mm both ends of shaft |

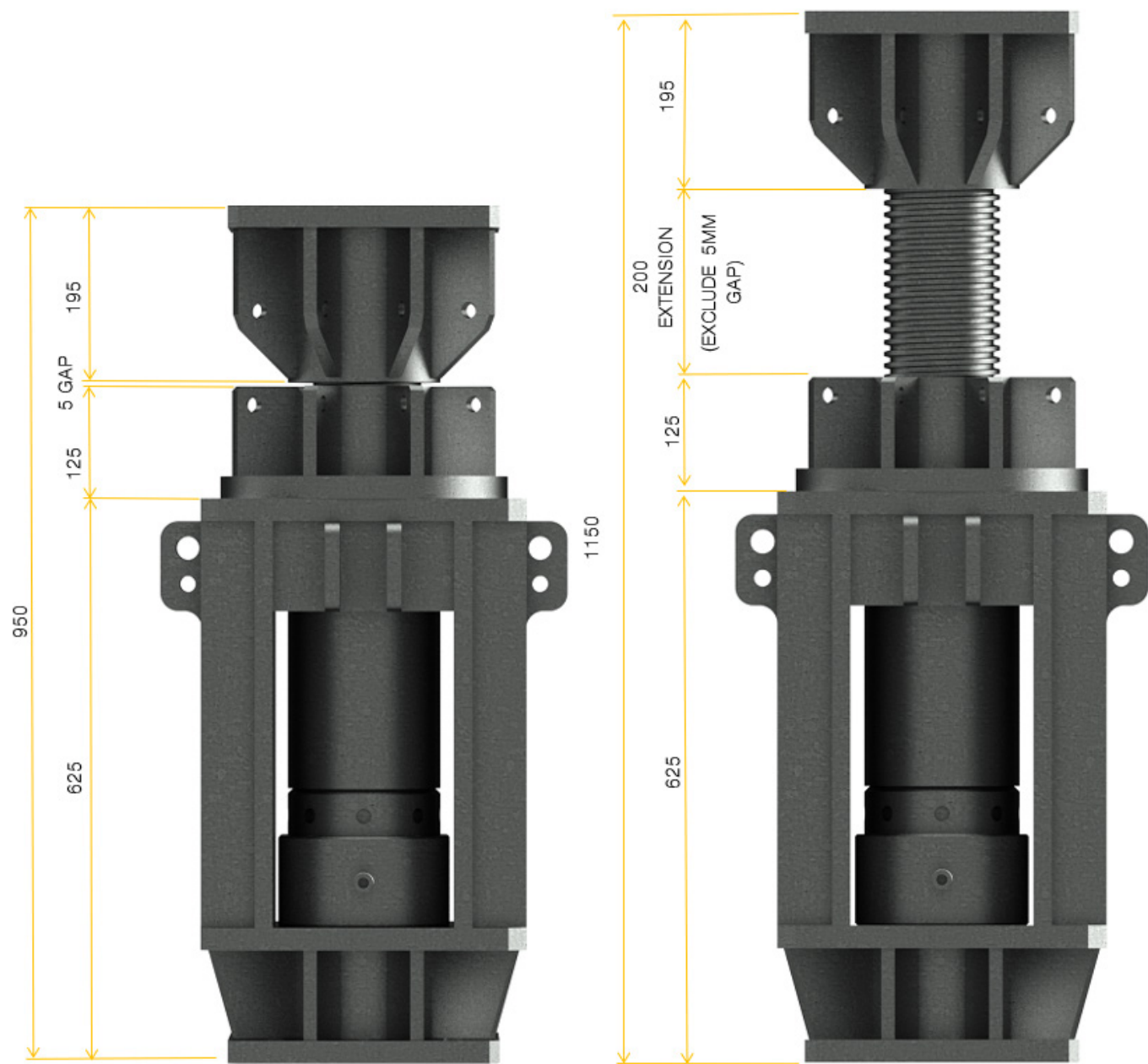
- Ø126.7 acme thread screw.
- Low-profile socket may be required for double base bolt group installation using the Jack Brace Adapter.



HYDRAULIC JACK UNIT ASSEMBLY 3D VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|----------------|--------|--------------|
| Hydraulic Jack | 331 kg | APS150HJ |

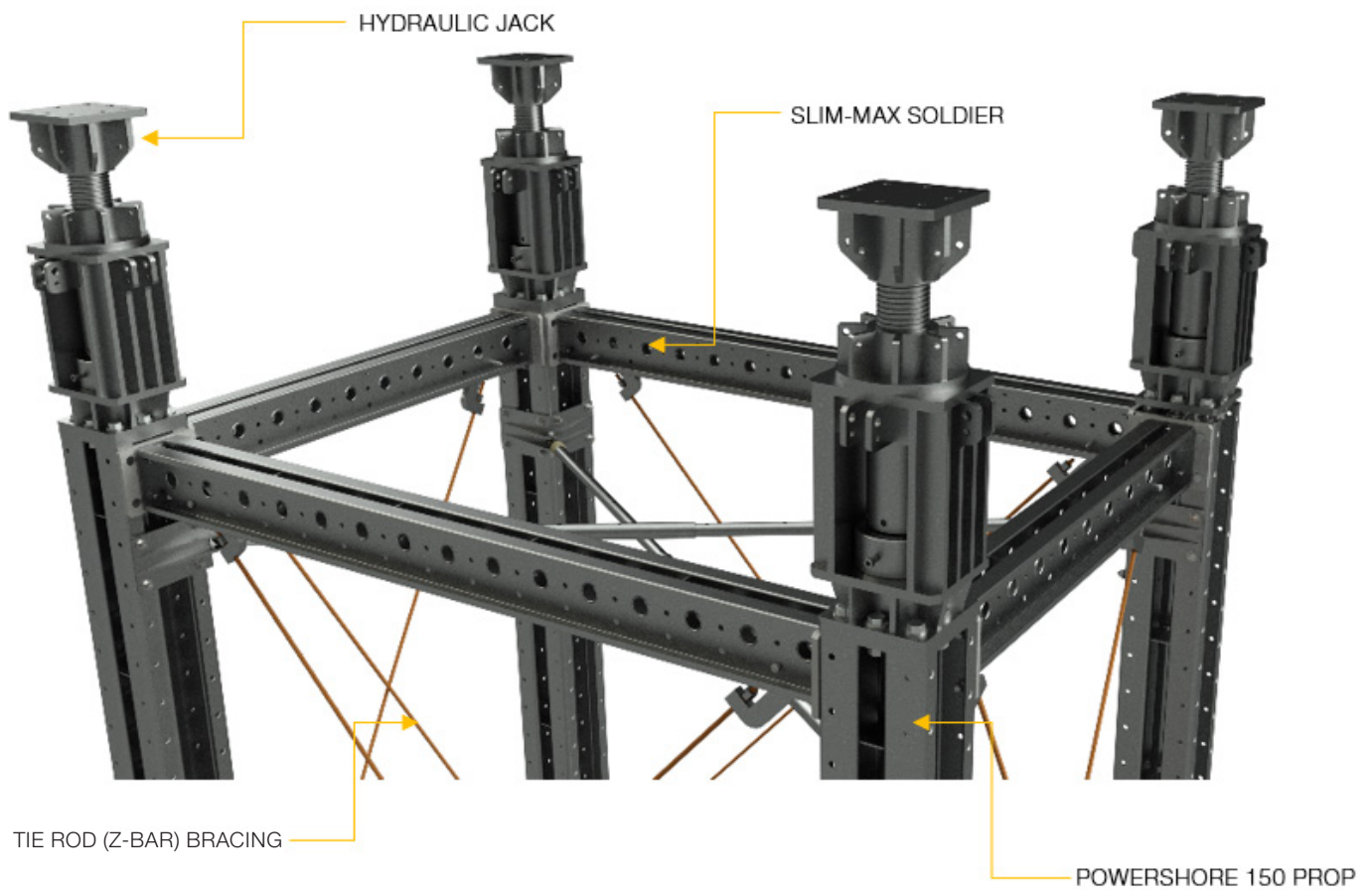
The physical dimensions of the Hydraulic Jack when fully contracted and extended are as follows:



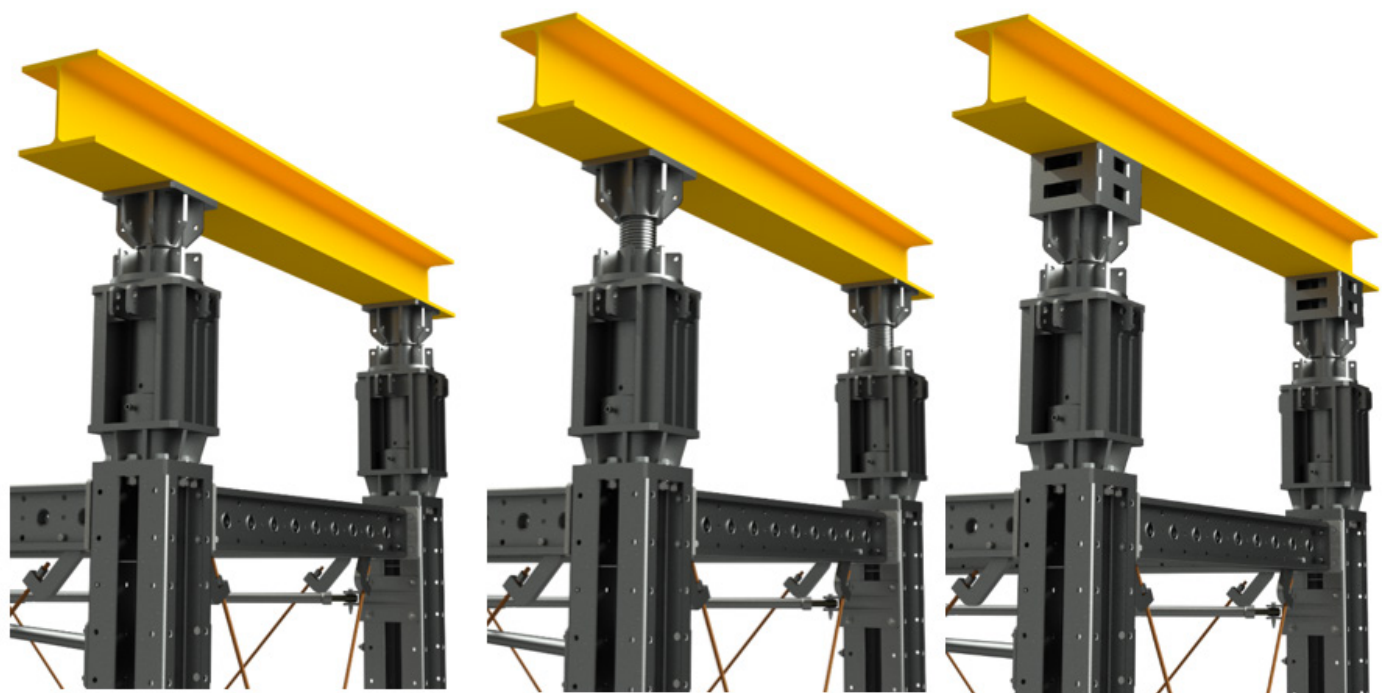
FULLY CONTRACTED HYDRAULIC JACK ELEVATION VIEW

FULLY EXTENDED HYDRAULIC JACK ELEVATION VIEW

The Powershore 150 Hydraulic Jack works in a 16mm stroke and the jack has a 200mm jacking capacity at 16mm intervals.



POWERSHORE 150 HYDRAULIC JACK CONFIGURATION 3D VIEW



**STARTING THE JACKING
PROCESS – HYDRAULIC JACK
FULLY CONTRACTED**

**HYDRAULIC JACK IN OPERATION
– FULLY EXTENDED**

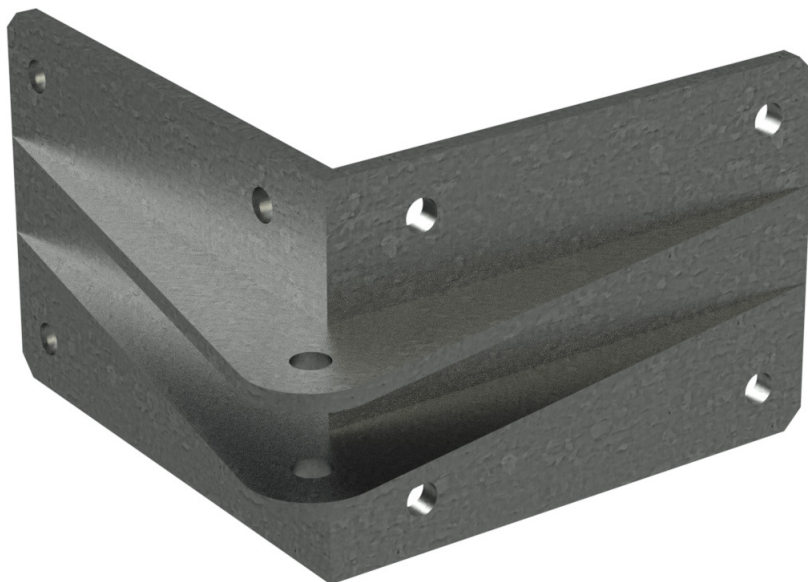
PACKERS INSTALLED

7.5 BRACE ADAPTER

The Brace Adapter is designed to plan brace the Powershore 150 Props structure using a turnbuckle assembly.

| | |
|-------------------------|---------------------|
| Material grade: | G350 |
| Capacity summary (WLL): | 90kN Tension, 0-90° |

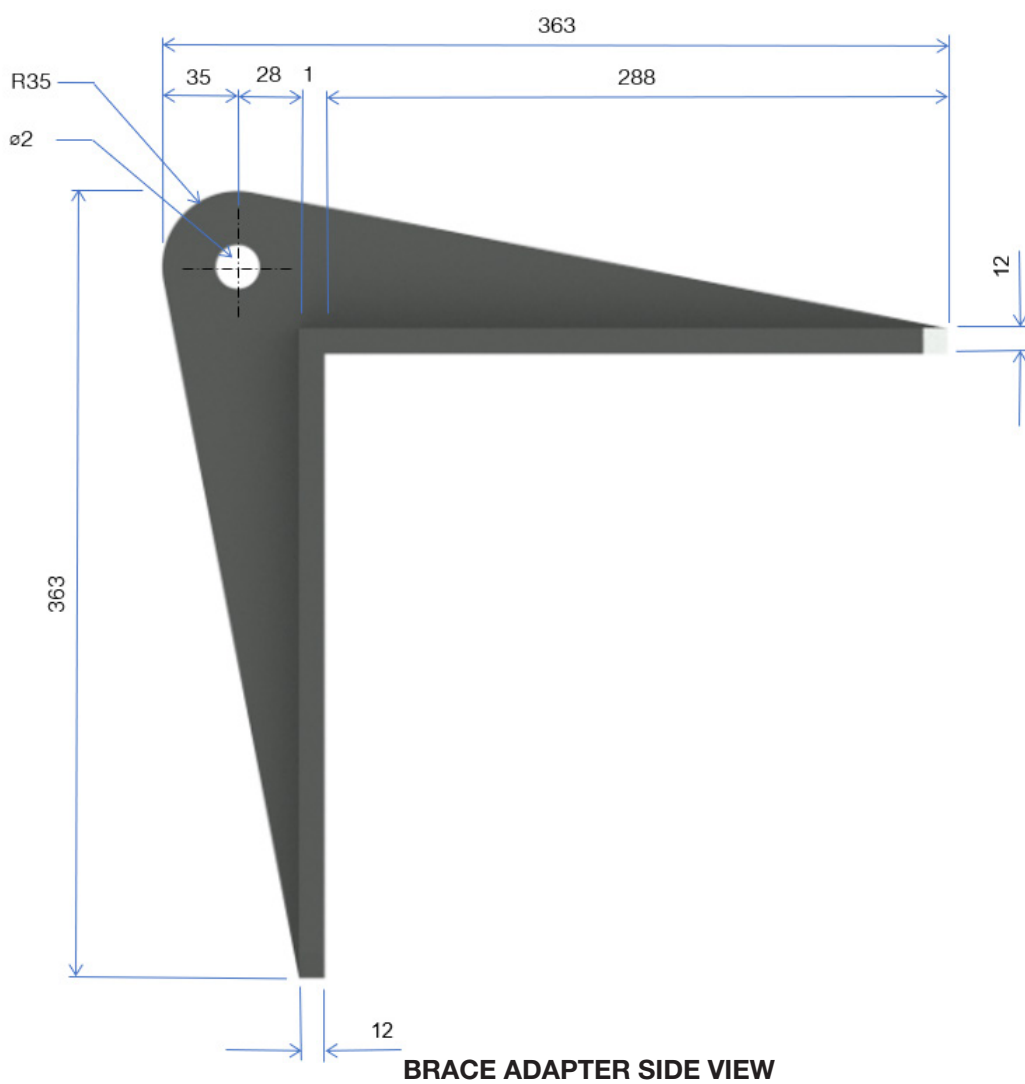
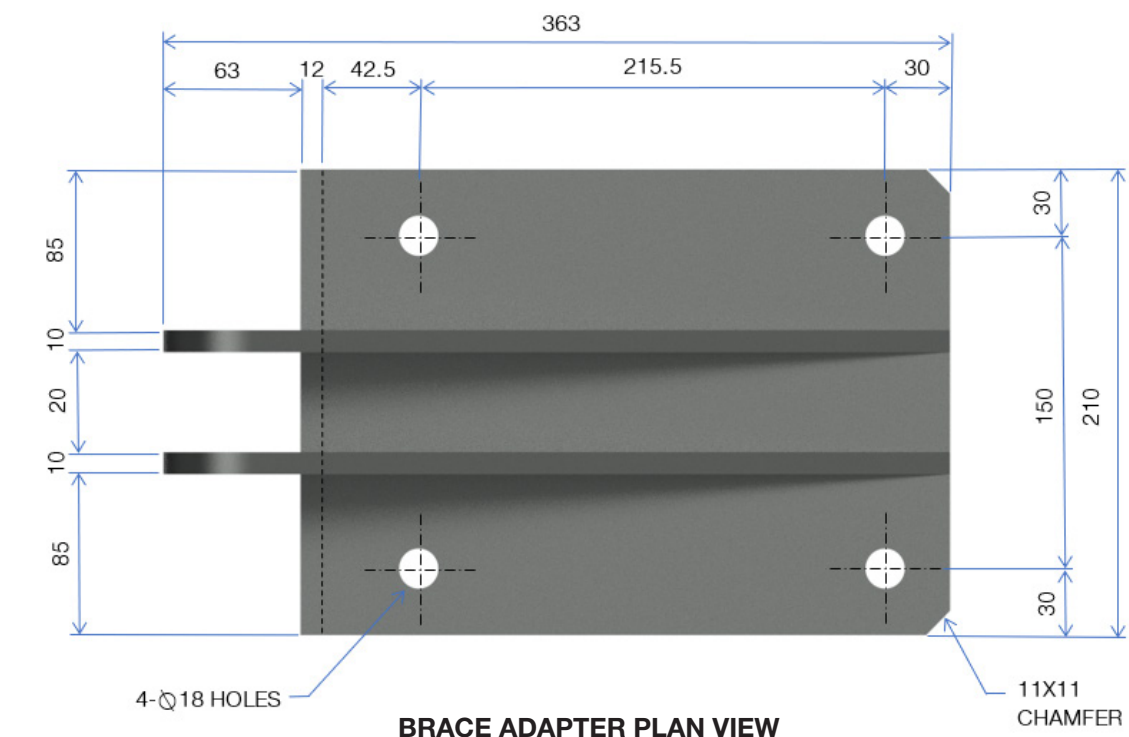
- The Brace Adapter shall be connected to prop wall with 8-M16 G8.8 bolts.
- Tension force directions shall be within the same plane of the parallel lugs.
- Prop torsional rotation along its axis shall be restraint if adapter applies any torque to the prop.



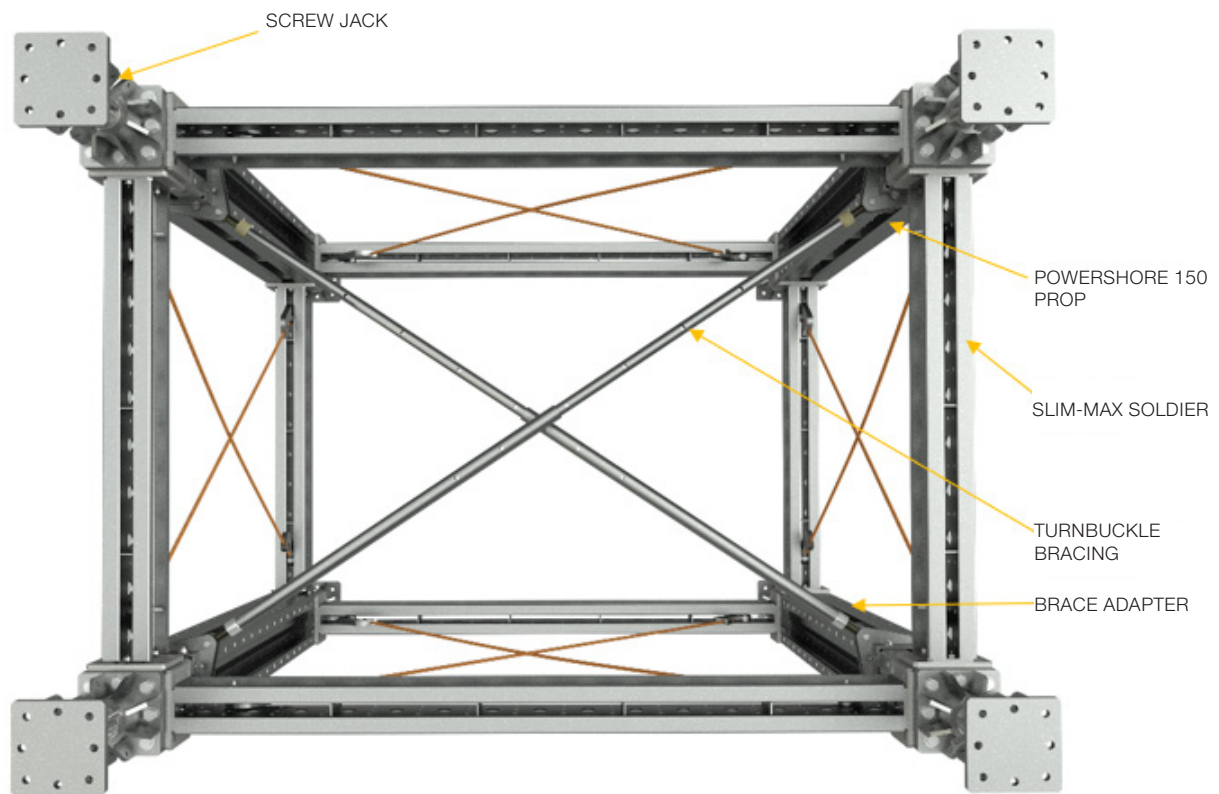
BRACE ADAPTER 3D VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|------------------------|----------|--------------|
| Brace Adapter Assembly | 14.68 kg | APS150BA |

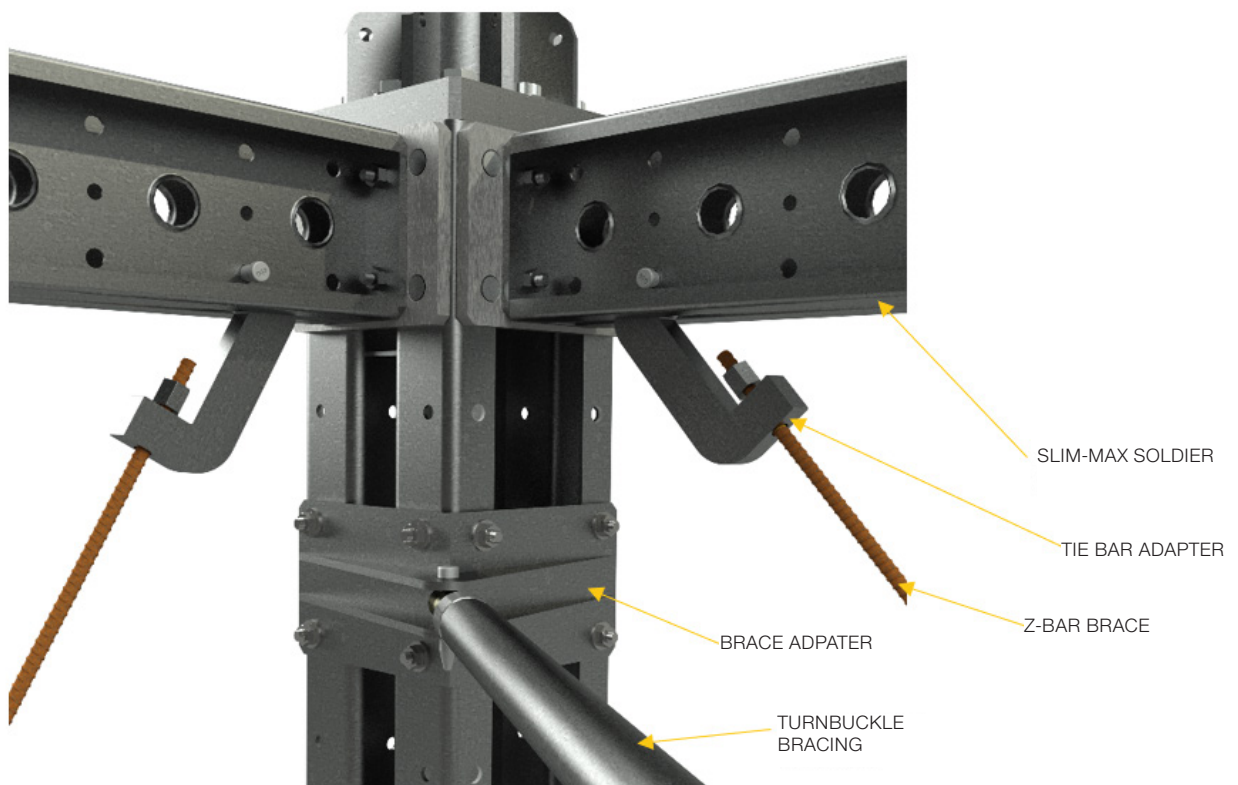
The physical dimensions of the Brace Adapter are shown below:



The typical Brace Adapter connection and brace configuration are shown in the images below.



**TYPICAL BRACE ADAPTER CONNECTION
3D - TOP VIEW**



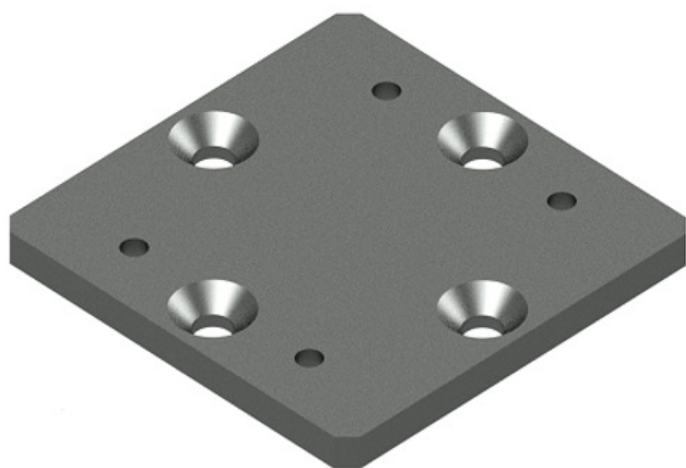
**TYPICAL BRACE ADAPTER CONFIGURATION
3D VIEW**

7.6 END PLATE ADAPTER

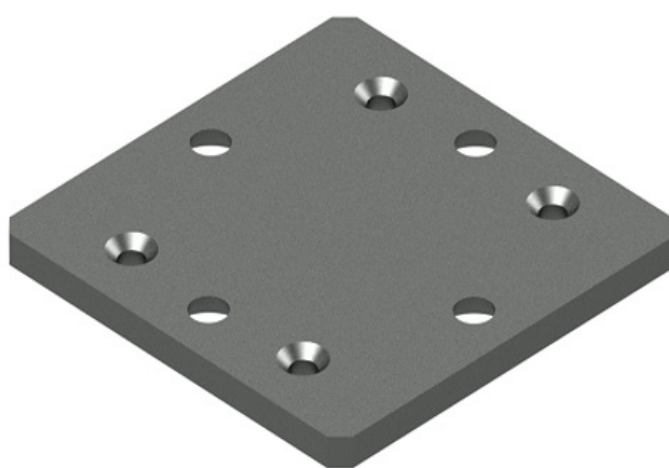
The End Plate Adapter is designed for the Powershore 150 Prop end plate connection to another Powershore 150 Prop side wall. The Powershore 150 Props will be acting as a beam or a soldier.

| | |
|--------------------------------------|-------------------|
| Material grade: | G350 |
| Capacity summary (WLL): | |
| • Shear: | 158kN |
| • Bending (connect to prop lips): | 3.5kNm |
| • Bending (connect to prop flanges): | 8.0kNm |
| • Combined: | |
| - Comb1 (connect to prop lips): | 79kN(V)+3.5kNm(M) |
| - Comb2 (connect to prop flanges): | 79kN(V)+8.0kNm(M) |

- The End Plate adapter shall be connected to prop wall with 2 groups of countersunk bolts: 4-M16 G8.8 and 4-M24 G8.8
- The End Plate Adapter has cone shaped holes on both sides to enable the connection to the props wall or end plate using countersunk bolts.



FRONT SIDE 3D VIEW

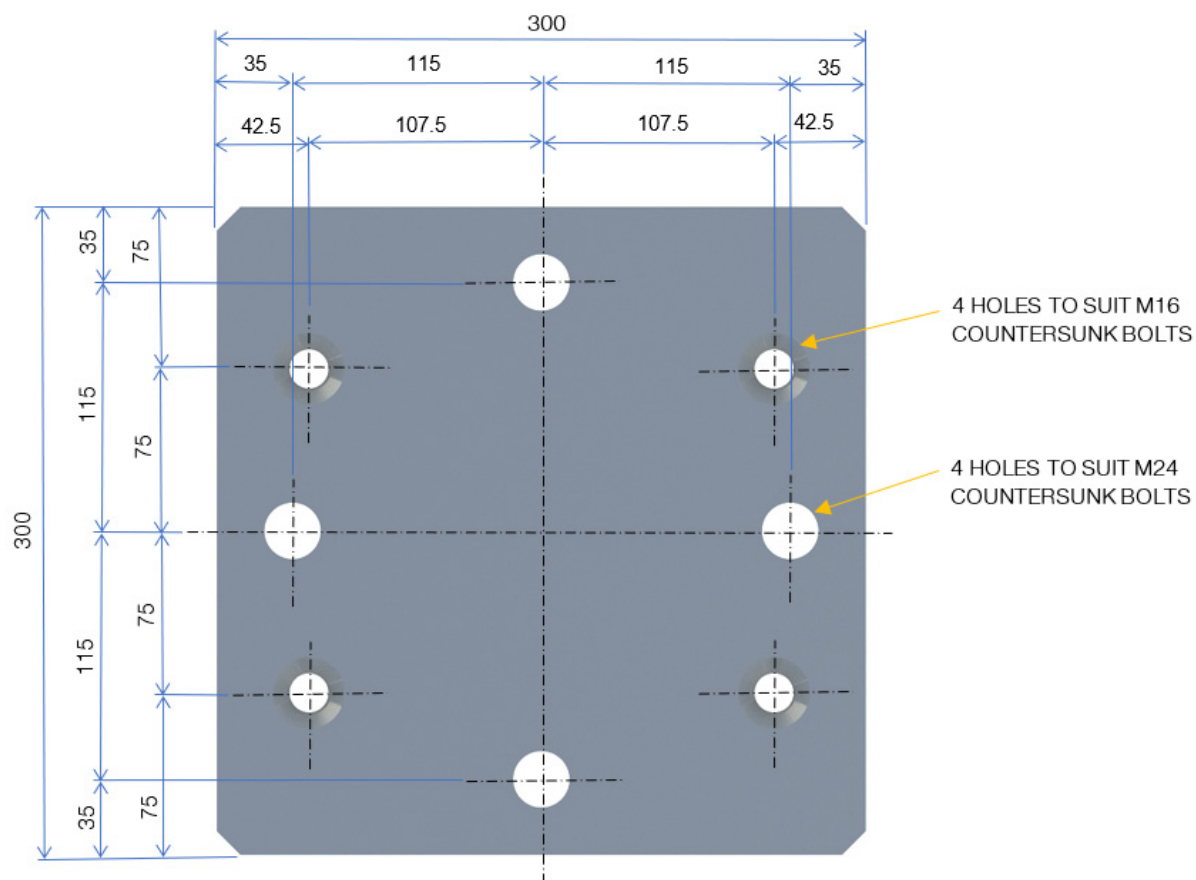


BACK SIDE 3D VIEW

END PLATE ADAPTER

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|-------------------|----------|--------------|
| End Plate Adapter | 17.03 kg | APS150EPA |

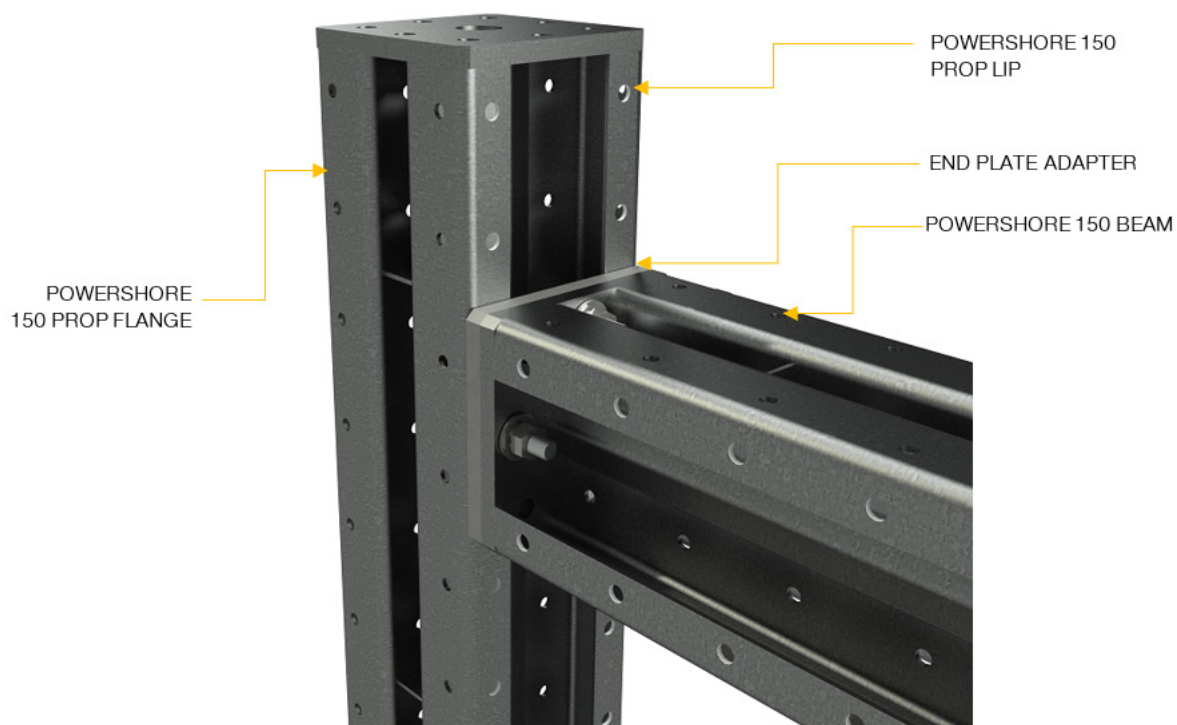
The physical dimensions of the 25mm thick End Plate Adapter are as follows:



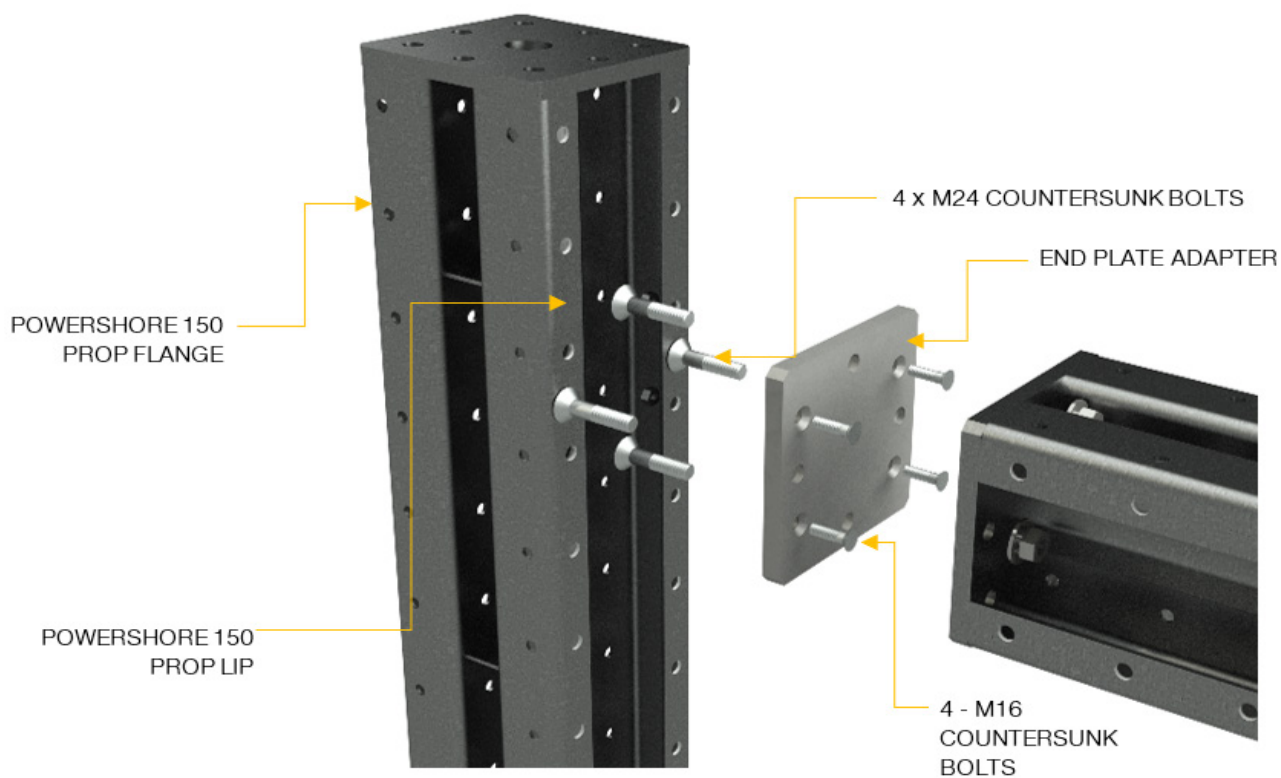
END PLATE ADAPTER PLAN VIEW

There are two methods to connect the Powershore 150 props using the End Plate Adapter, as follows:

Method 1 - (a): Connecting to the Powershore 150 side wall lip.

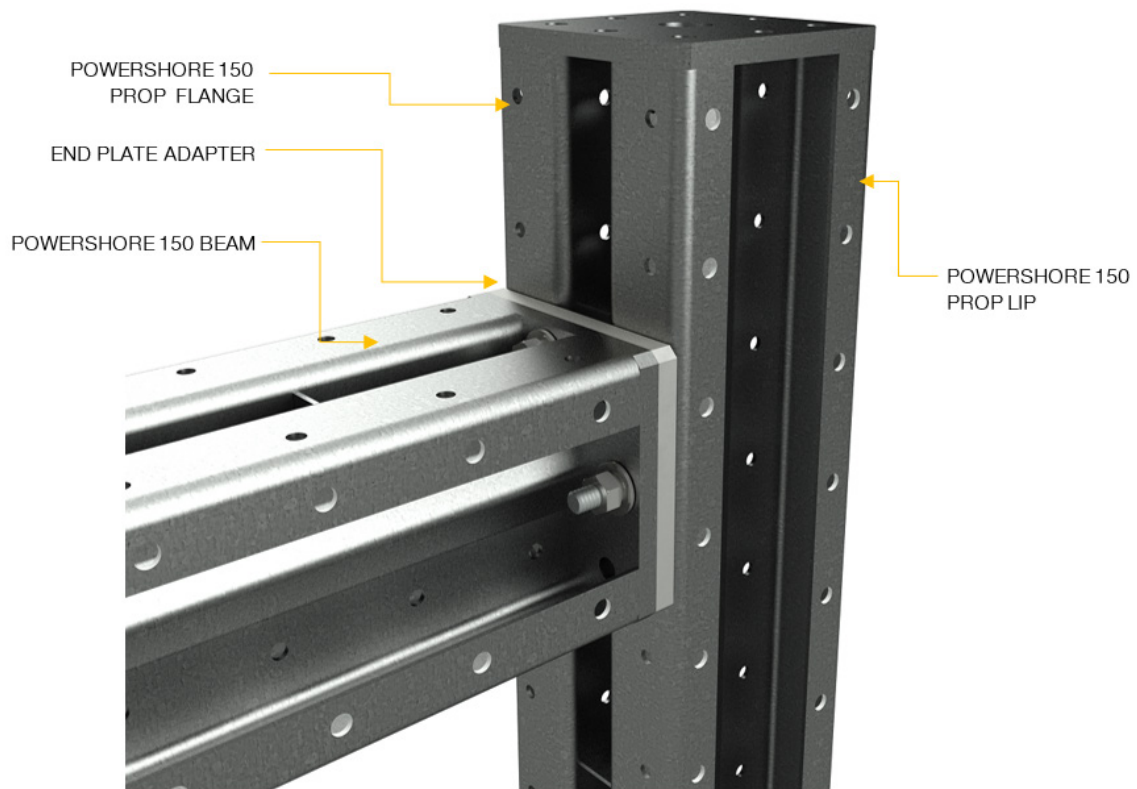


CONNECTION OF POWERSHORE 150 BEAM TO POWERSHORE 150 PROP LIP

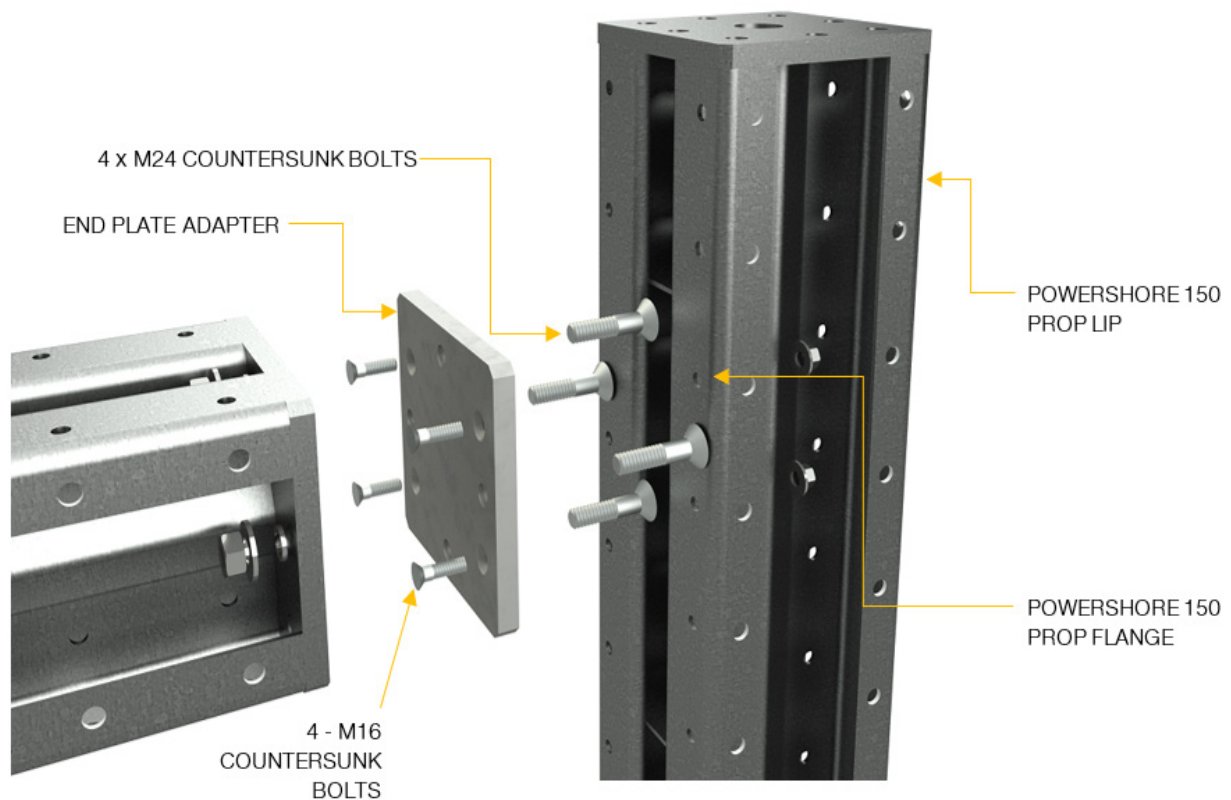


DETAILED VIEW OF BOLT CONNECTION TO POWERSHORE 150 PROP LIP

Method 1 - (b): Connecting to the Powershore 150 prop side wall flange.



CONNECTION OF POWERSHORE 150 BEAM TO POWERSHORE 150 PROP LIP

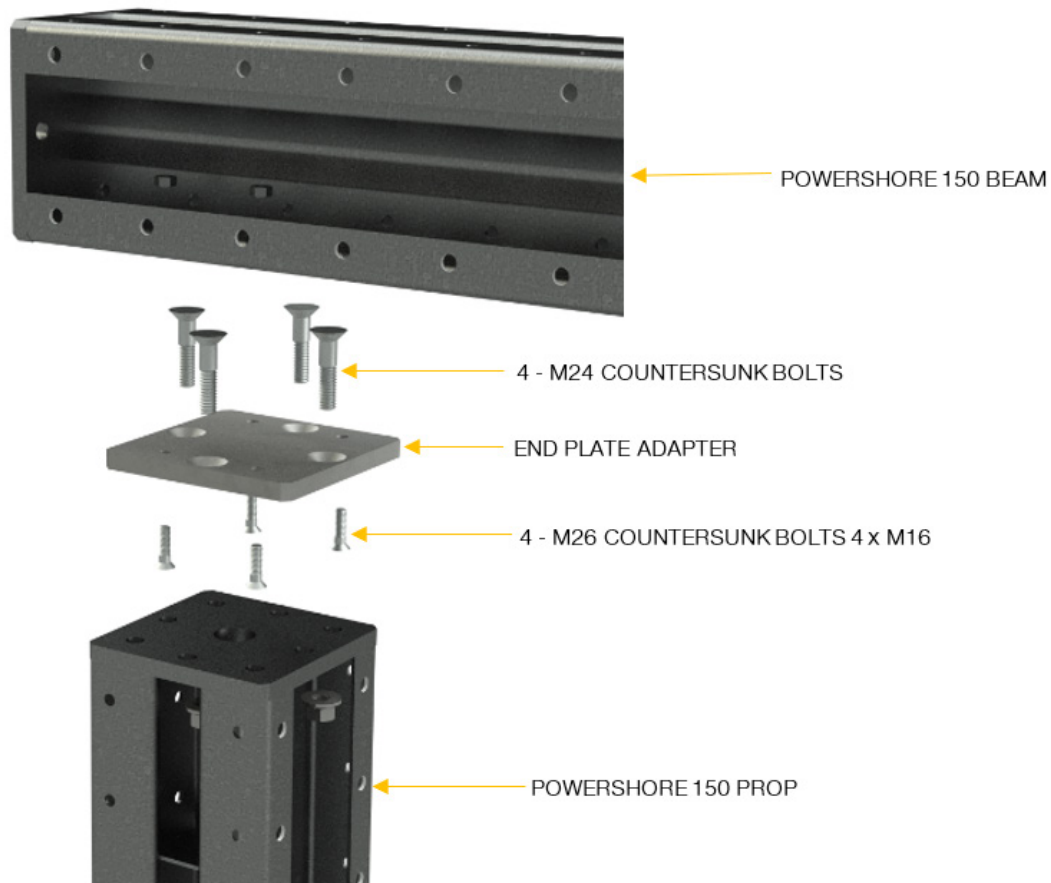


DETAILED VIEW OF BOLT CONNECTION TO POWERSHORE 150 PROP FLANGE

Method 2: Connecting Powershore 150 beam to Powershore 150 prop end plate.



POWERSHORE 150 BEAM TO PROP CONNECTION USING END PLATE ADAPTER



DETAILED VIEW OF BOLT CONNECTION USING END PLATE ADAPTER - POWERSHORE BEAM TO PROP

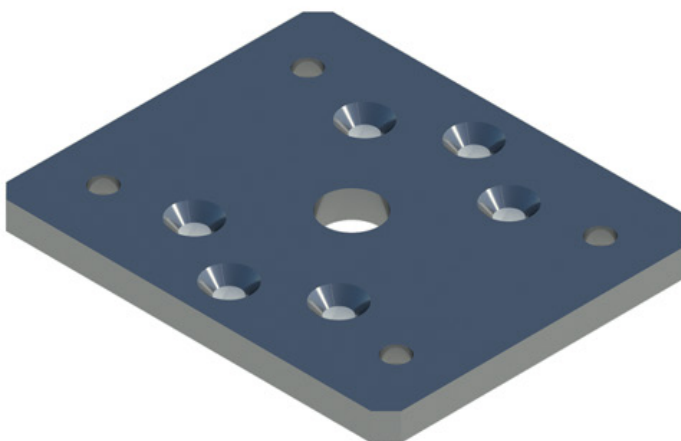
7.7 SOLDIER ADAPTER

The Soldier Adapter is designed for the Slim-Max soldier end plate connection to the Powershore 150 prop side wall.

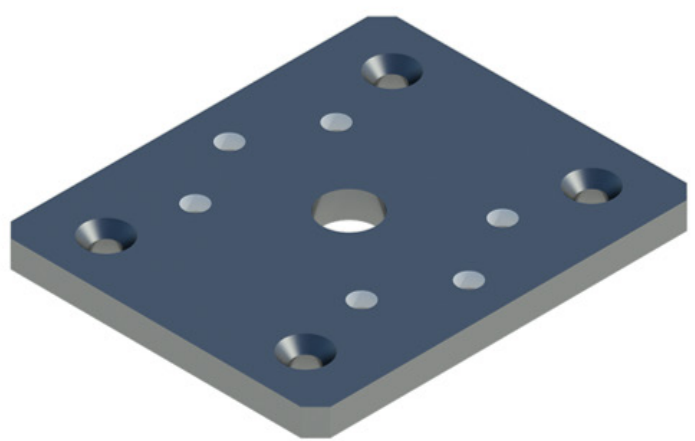
| | |
|--|-------------------|
| Material grade: | G350 |
| Capacity summary (WLL): | |
| • Shear (parallel to prop axis only): | 158kN |
| • Bending: | |
| - Connect to prop lips: | 3.5kNm |
| - Connect to prop flanges: | 8.0kNm |
| • Compression: | |
| - Connect to prop lips: | 87.7kN |
| - Connect to prop flanges: | 126.1kN |
| • Tension: | |
| - Connect to prop lips: | 60kN |
| - Connect to prop flanges: | 80kN |
| • Combined: | |
| - Combination 1 (connect to prop lips): | 79kN(V)+3.5kNm(M) |
| - Combination 2 (connect to prop flanges): | 79kN(V)+8.0kNm(M) |
| - Combination 1 (connect to prop lips): | 79kN(V)+60kN(T) |
| - Combination 2 (connect to prop flanges): | 79kN(V)+80kN(T) |

- The Soldier Adapter shall be connected to the Powershore 150 prop side wall with 2 groups of 4 - M16 G8.8 countersunk bolts.
- The Soldier Adapter has cone shaped holes on both sides to enable the connection to the props wall or end plate using countersunk bolts.

SOLDIER ADAPTER

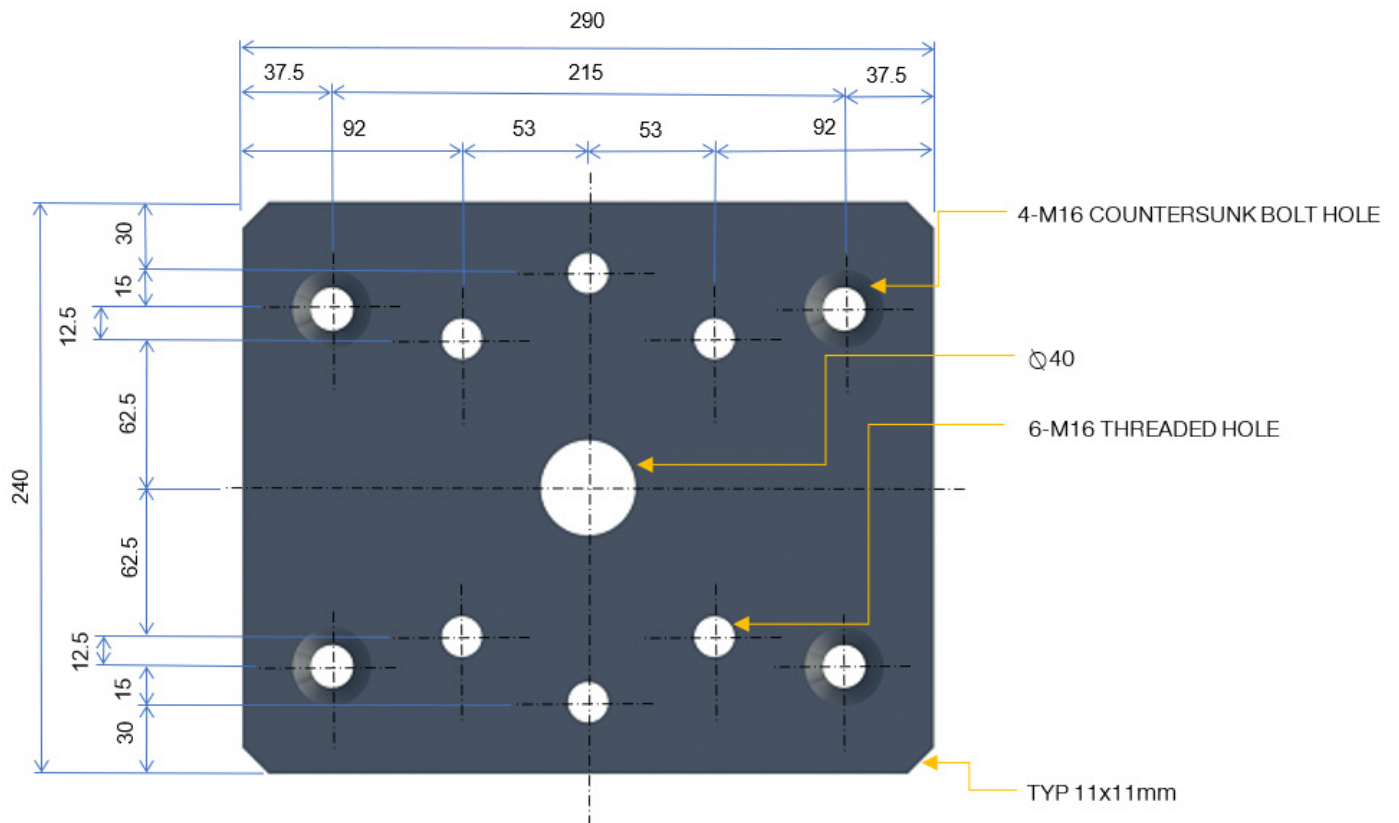


FRONT SIDE 3D VIEW

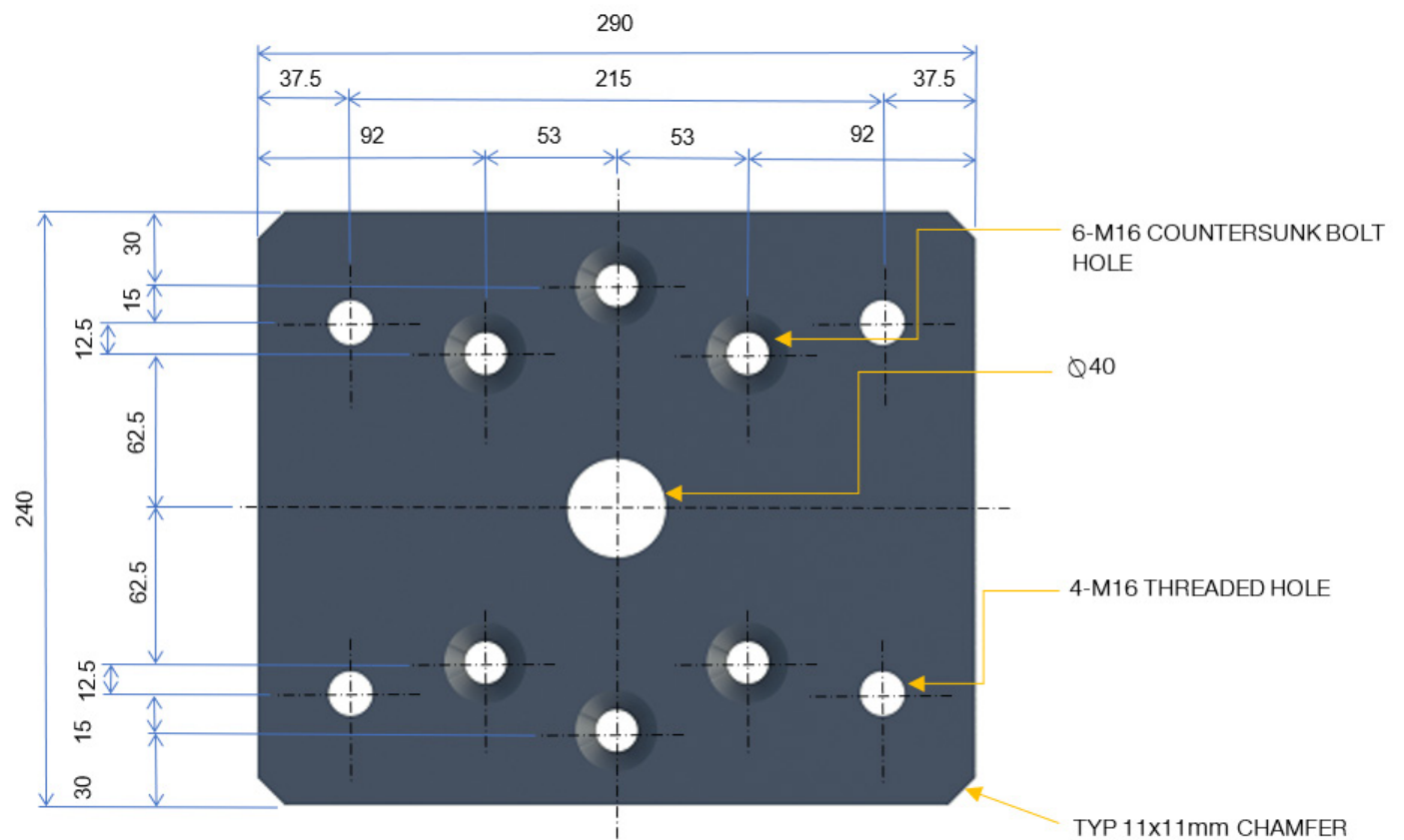


BACK SIDE 3D VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|-----------------|----------|--------------|
| Soldier Adapter | 10.36 kg | APS150SA |



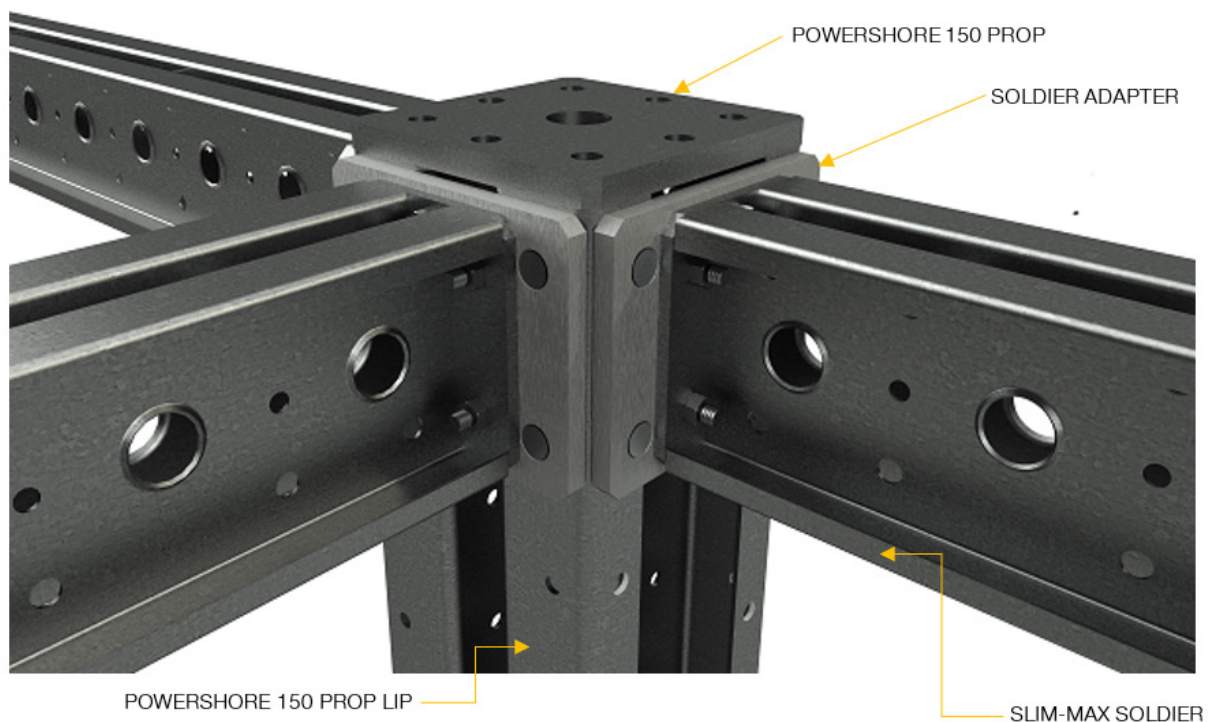
SOLDIER ADAPTER FRONT SIDE DIMENSIONS



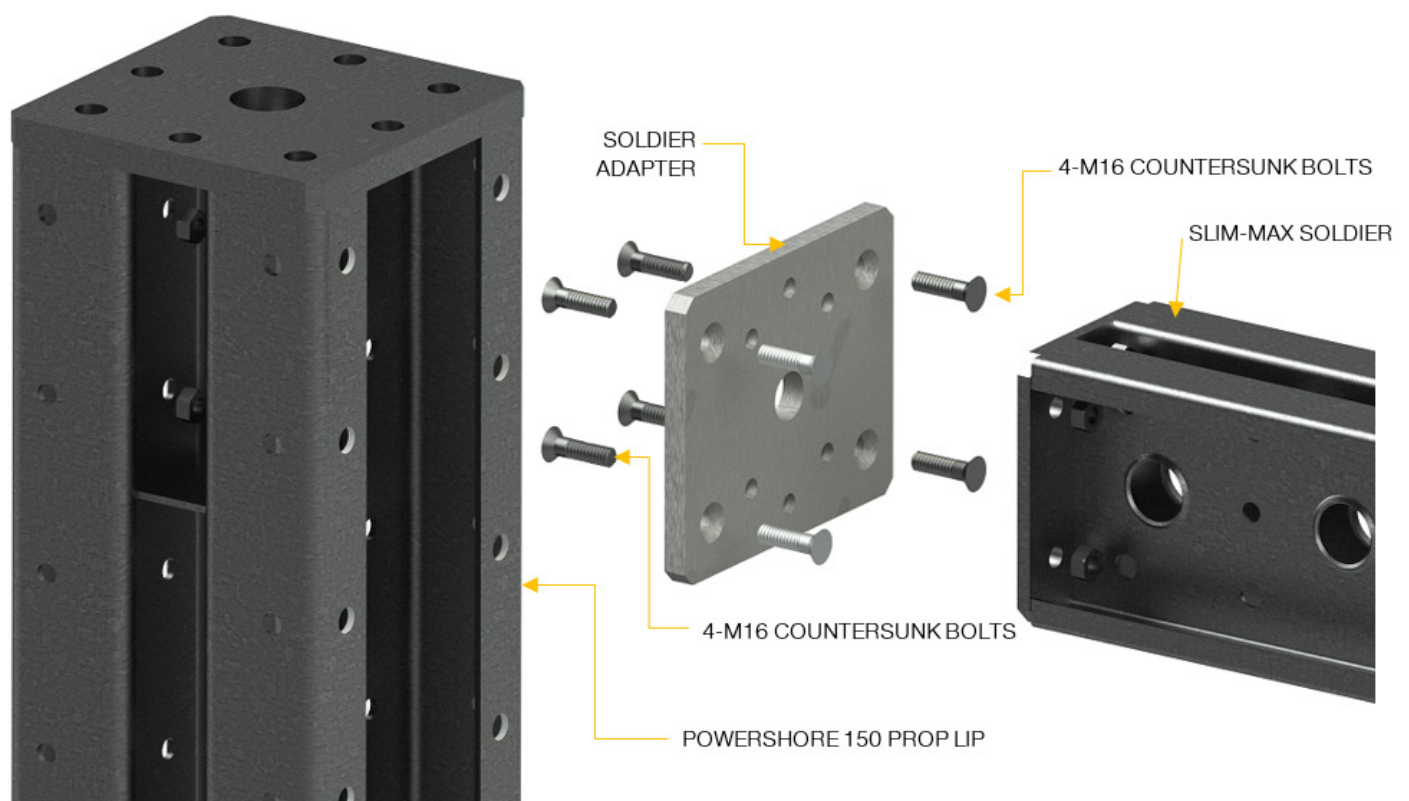
SOLDIER ADAPTER FRONT SIDE DIMENSIONS

The two methods of connecting of the Slim-Max soldier to the Powershore 150 prop's side wall using the Soldier Adapter are as follows:

Method 1: Connecting Slim-Max soldier end plate to Powershore 150 prop lip:

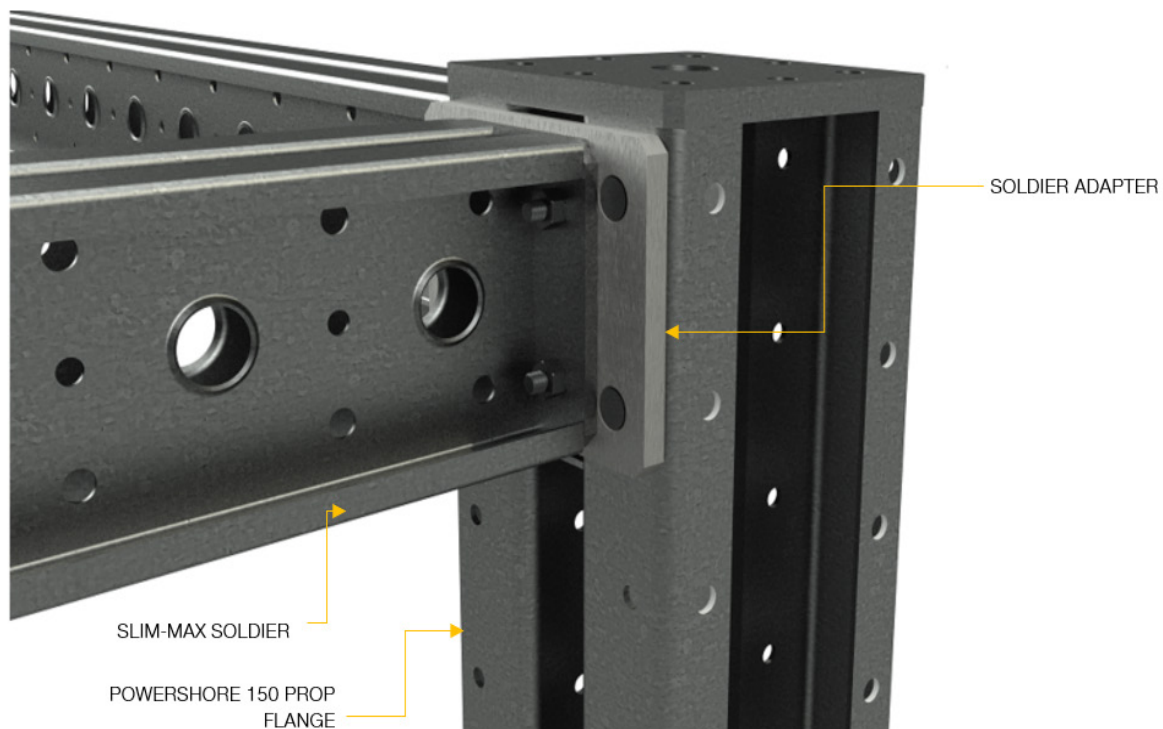


CONNECTION OF SLIM-MAX SOLDIER TO POWERSHORE PROP LIP

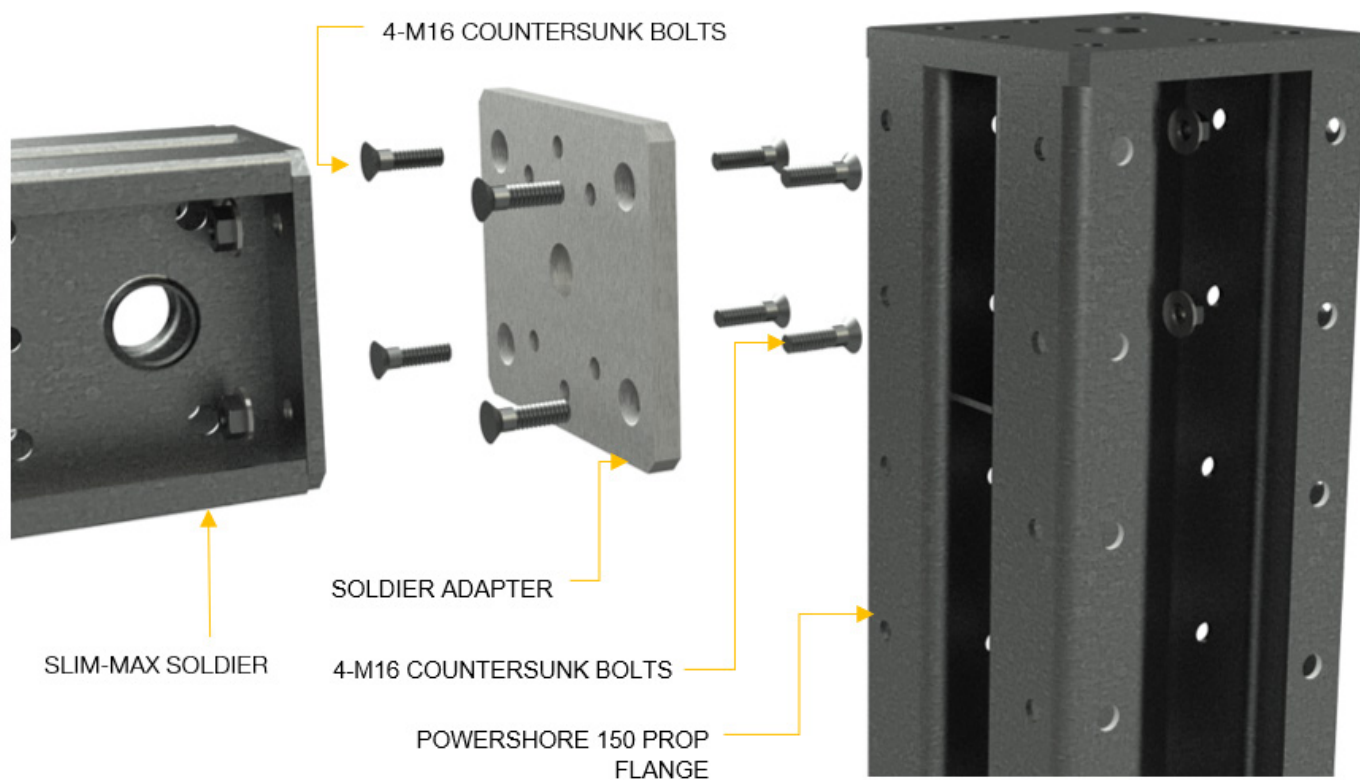


**DETAILED VIEW OF BOLT CONNECTION USING SOLDIER ADAPTER
SLIM-MAX SOLDIER TO POWERSHORE 150 PROP LIP**

Method 2: Connecting Slim-Max soldier end plate to Powershore 150 prop flange:



CONNECTION OF SLIM-MAX SOLDIER TO POWERSHORE PROP LIP



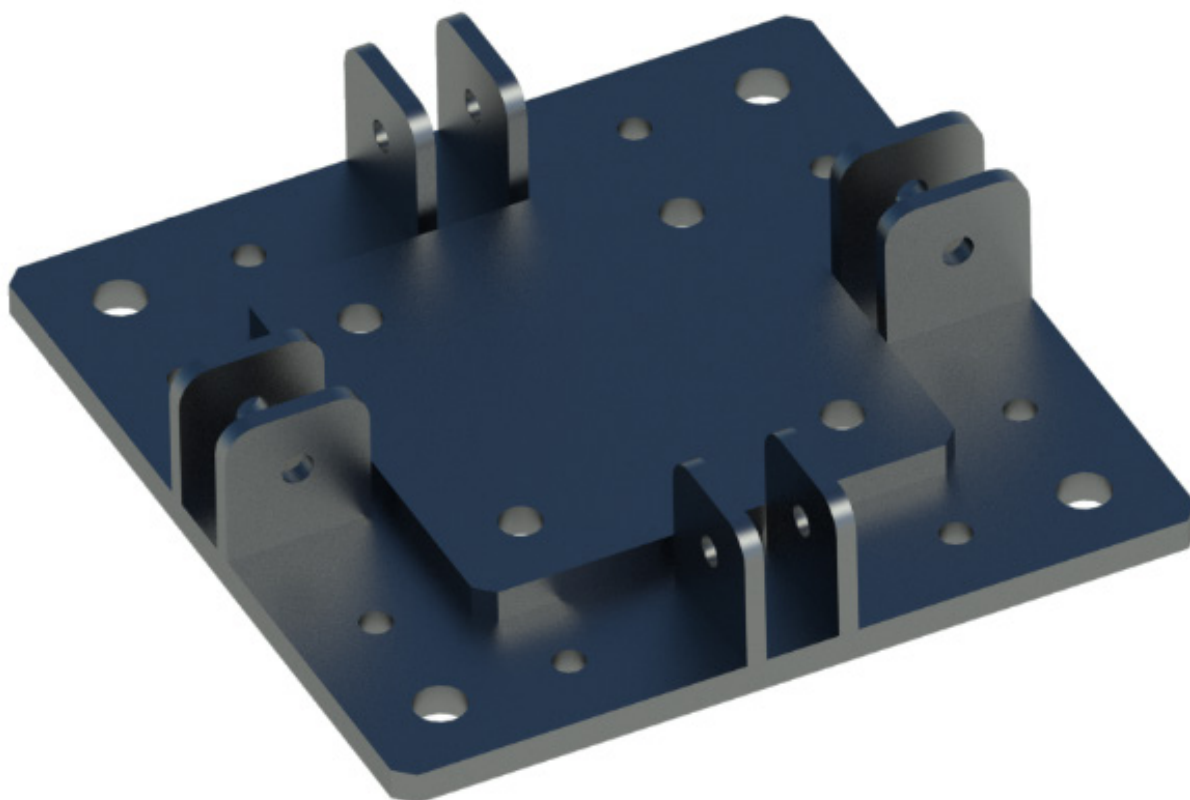
DETAILED VIEW OF BOLT CONNECTION USING SOLDIER ADAPTER SLIM-MAX SOLDIER TO POWERSHORE 150 PROP LIP

7.8 JACK BRACE ADAPTER

The Jack Brace Adapter is designed for the Z-bar brace connection to the Screw Jack (or Hydraulic Jack Unit).

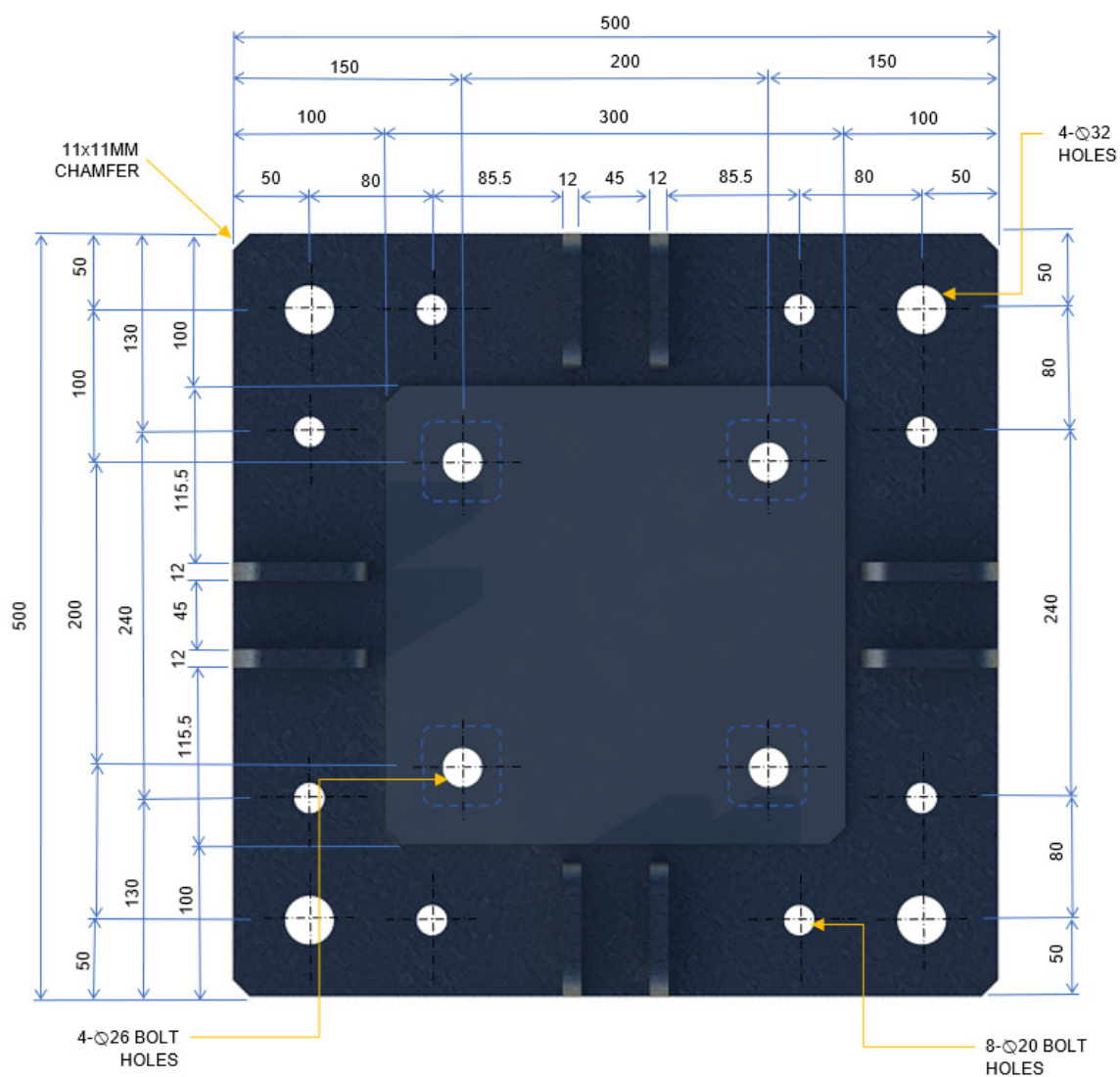
| | |
|--------------------------------------|---------------------|
| Material grade: | G350 |
| Capacity on lugs: | 90kN tension, 0-90° |
| Design assumptions and restrictions: | 158kN |

- Adapter fixings to footing tension and shear capacities to be checked by others
- Tension force directions shall be within the same plane of the parallel lugs

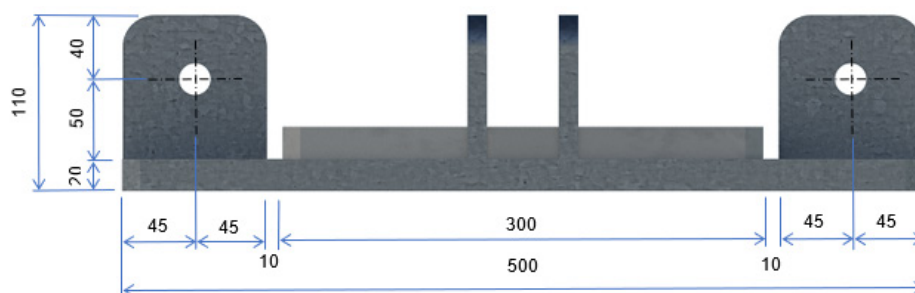


JACK BRACE ADAPTER 3D VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|--------------------|----------|--------------|
| Jack Brace Adapter | 54.87 kg | APS150JBA |



JACK BRACE ADAPTER PLAN VIEW



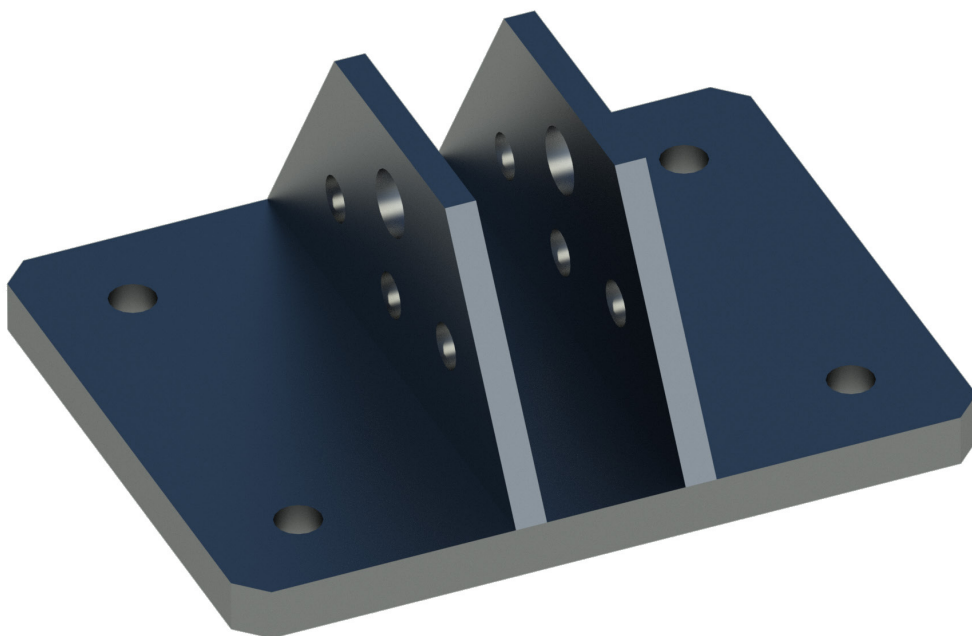
JACK BRACE ADAPTER FRONT ELEVATION

7.9 PROP/TURNBUCKLE ADAPTER

The Prop/Turnbuckle Adapter is designed for the Slim-max Prop or Turnbuckle connection to Prop side wall.

| | |
|-------------------------------------|--|
| Material grade: | G350 |
| Capacity summary (WLL): | |
| • 0-180° (connect to prop flanges): | 50kN total resultant Tension/Compression on lugs |
| • 0-180° (connect to prop lips): | 30kN total resultant Tension/Compression on lugs |

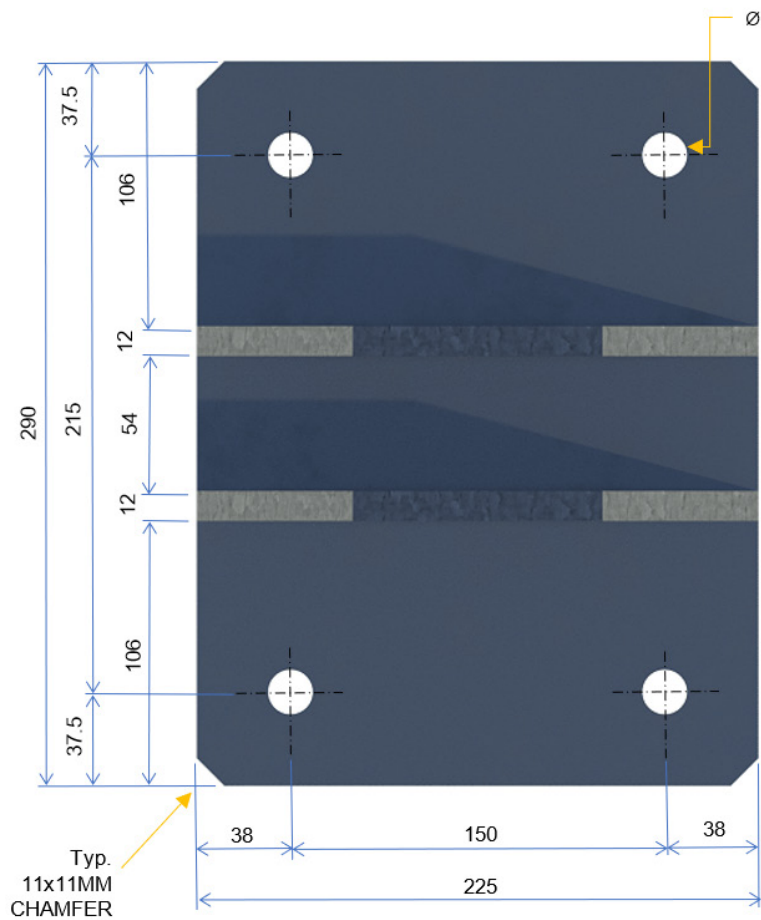
- Adapter shall be connected to prop wall with 4-M16 G8.8 bolts.
- Tension/compression force directions shall be within the same plane of the parallel lugs.



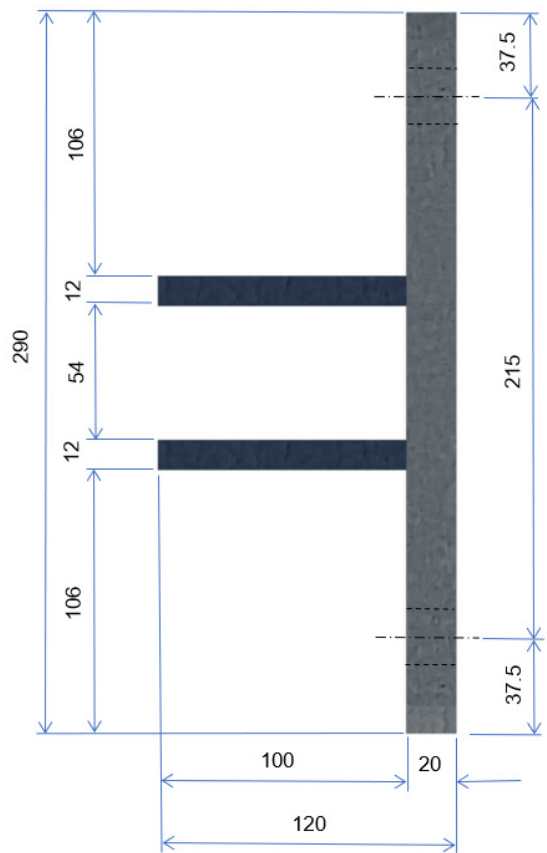
PROP/TURNBUCKLE ADAPTER 3D VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|-------------------------|----------|--------------|
| Prop/Turnbuckle Adapter | 12.87 kg | APS150PTA |

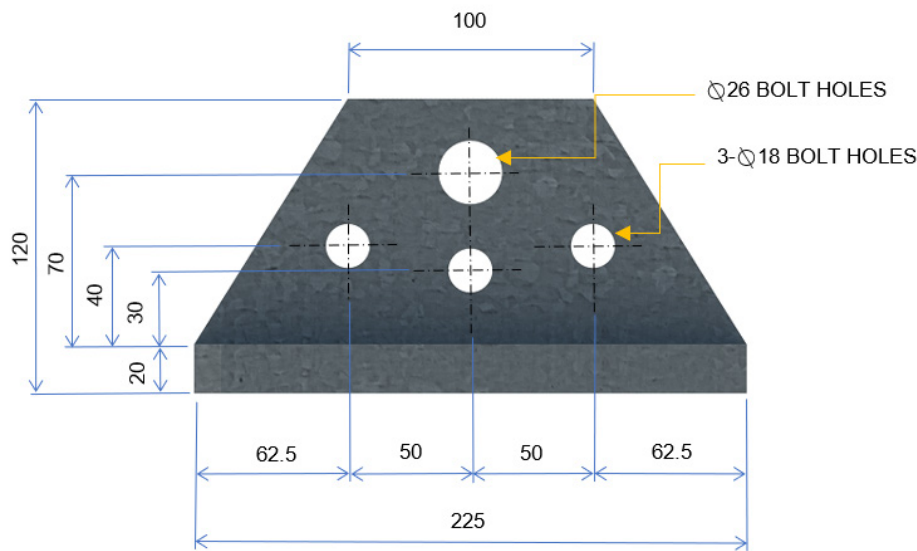
The physical dimensions of the Prop / Turnbuckle Adapter are shown below:



**PROP ADAPTER
PLAN VIEW**

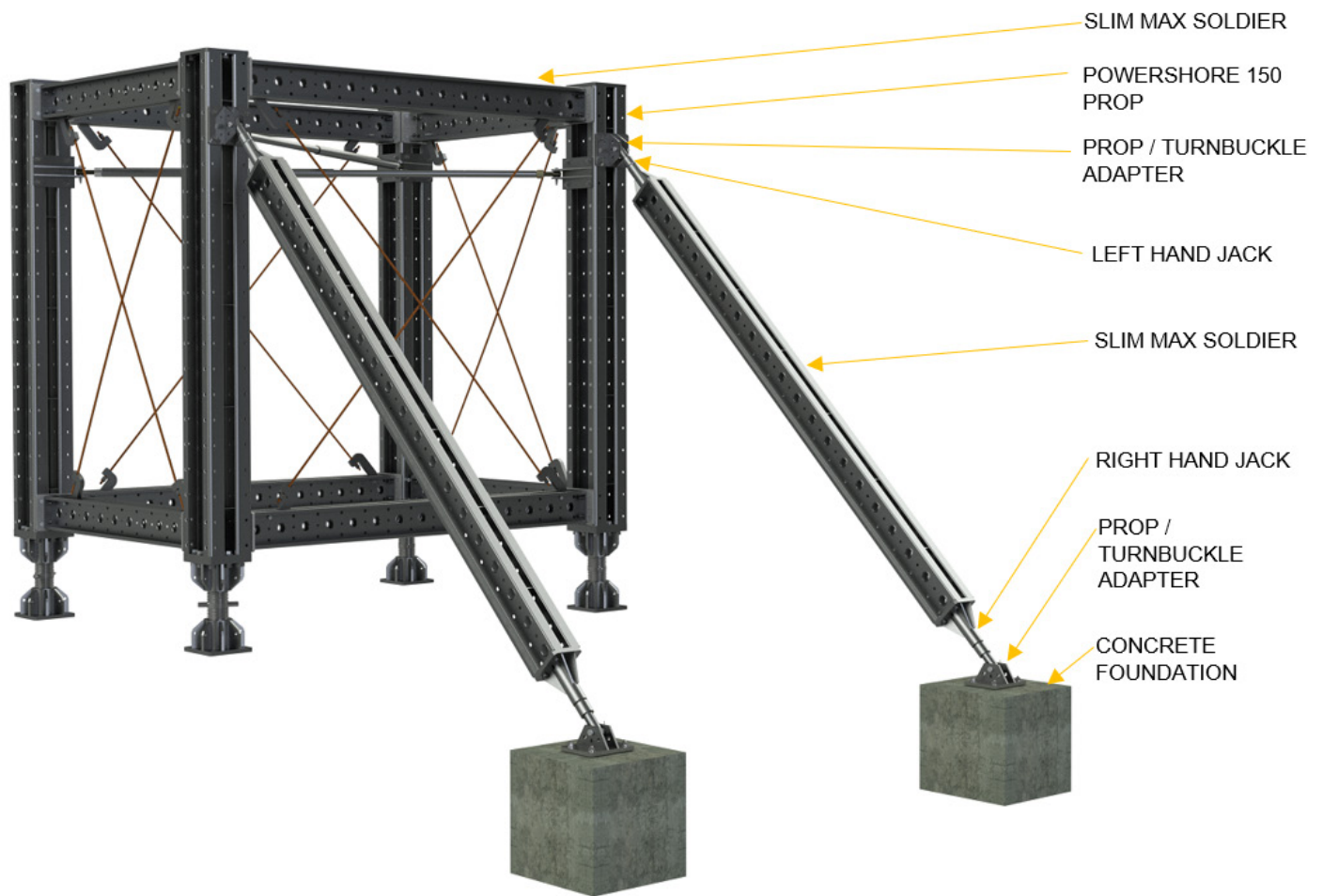


**PROP ADAPTER
SIDE ELEVATION**

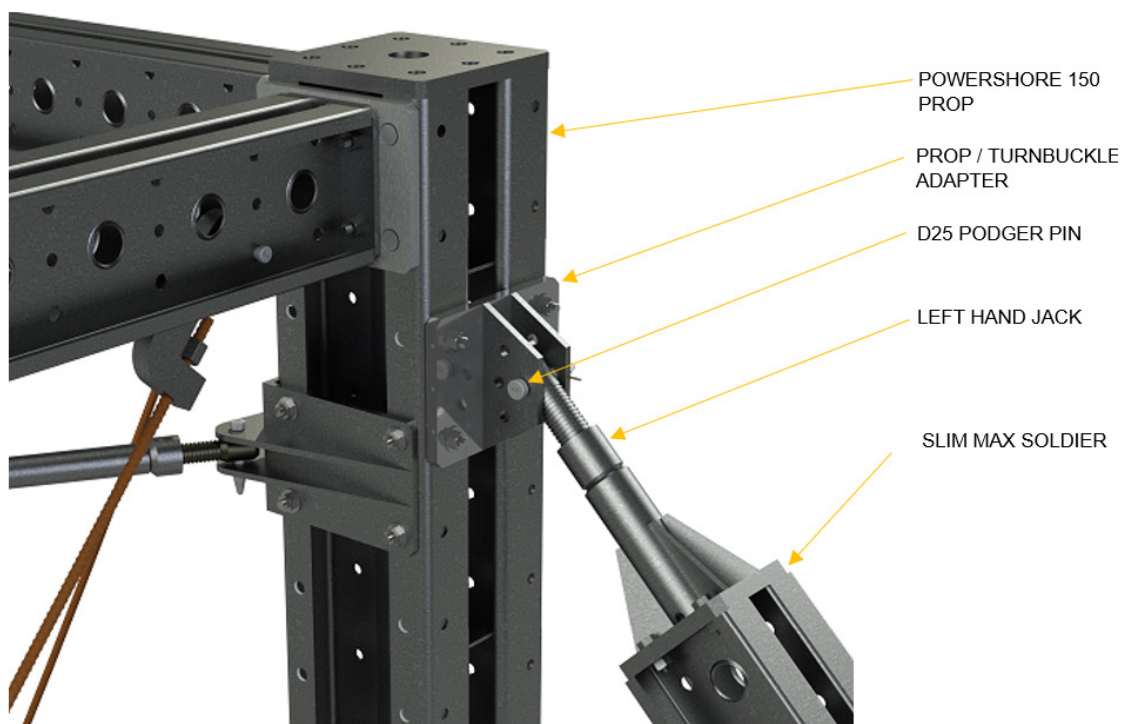


**PROP ADAPTER
FRONT ELEVATION**

The following demonstrates the method of propping the Powershore 150 props using a Slim-Max soldier and Prop/Turnbuckle Adapter.



TYPICAL PROP/TURNBUCKLE ADAPTER CONNECTION – 3D VIEW

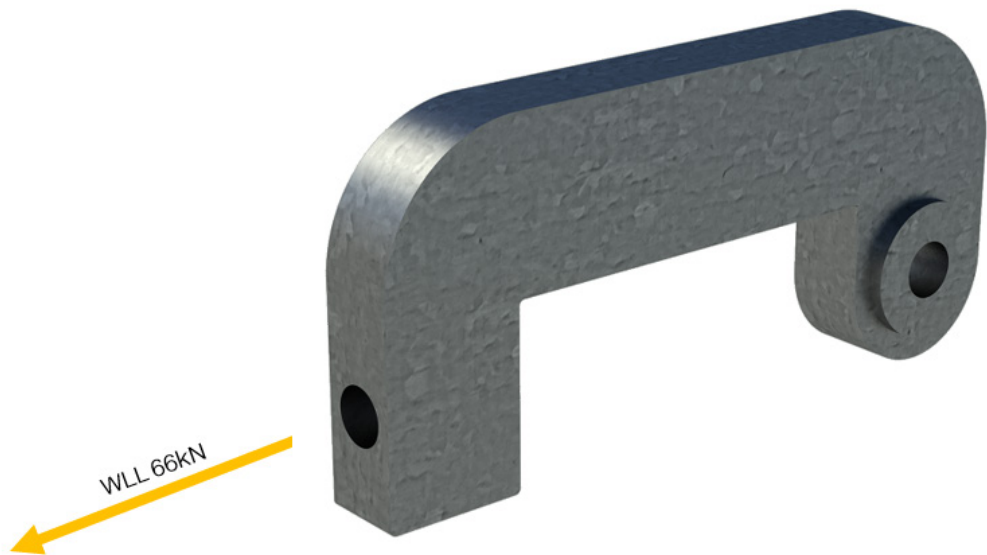


TYPICAL PROP/TURNBUCKLE ADAPTER CONFIGURATION 3D VIEW

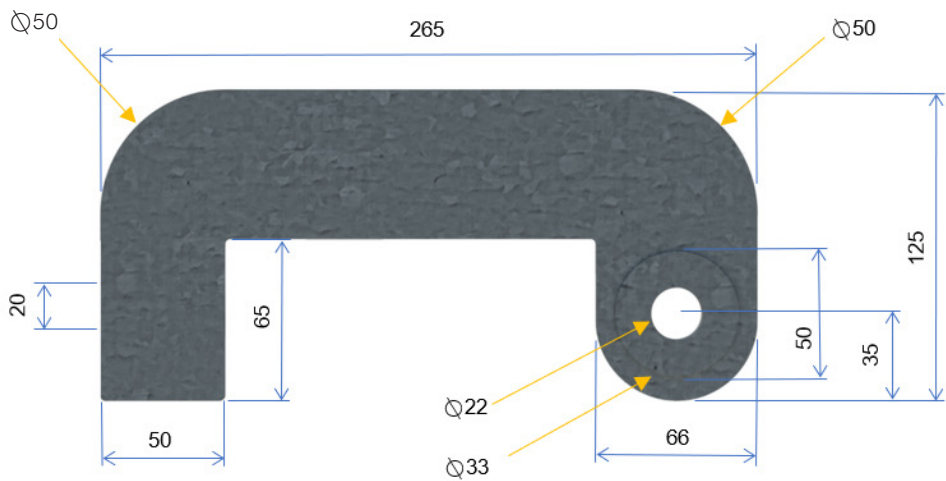
7.10 TIE BAR ADAPTER

The Tie Rod Adapter, also known as Z-Bar Adapter, is designed for bracing the Powershore 150 structure. The Tie Rod adapter is fixed into members using D19 podger pin. A 15mm diameter HT Thru Tie Rod with HT Thru Tie Hex Nut are used as bracing members.

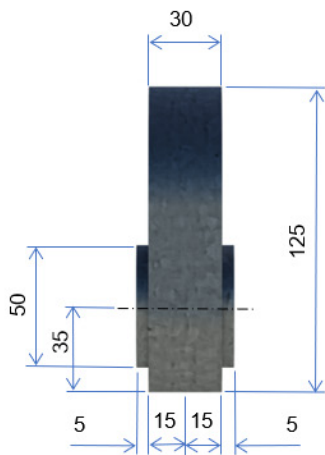
| | |
|-------------------------|------|
| Material grade: | G300 |
| Capacity summary (WLL): | 66kN |



TIE ROD ADAPTER 3D VIEW



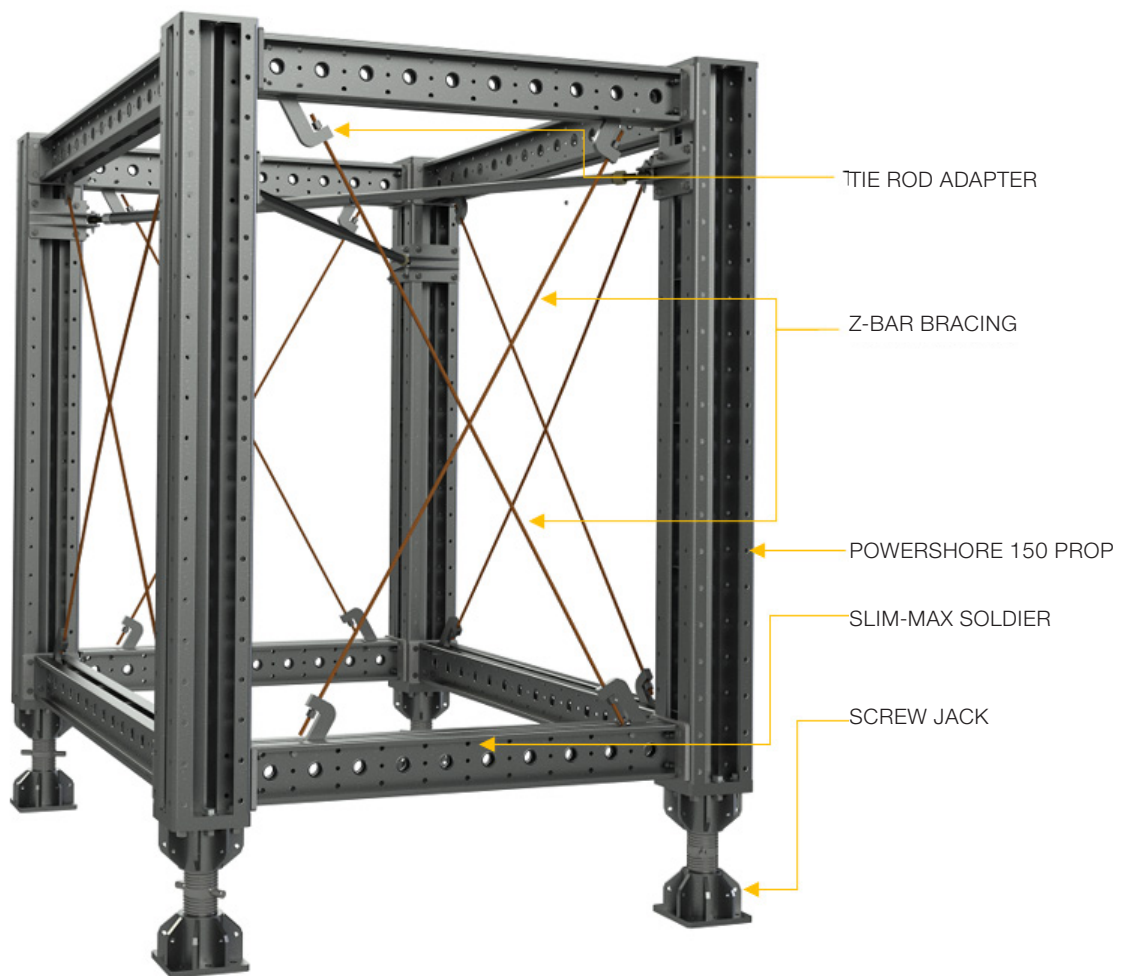
TIE ROD ADAPTER
ELEVATION



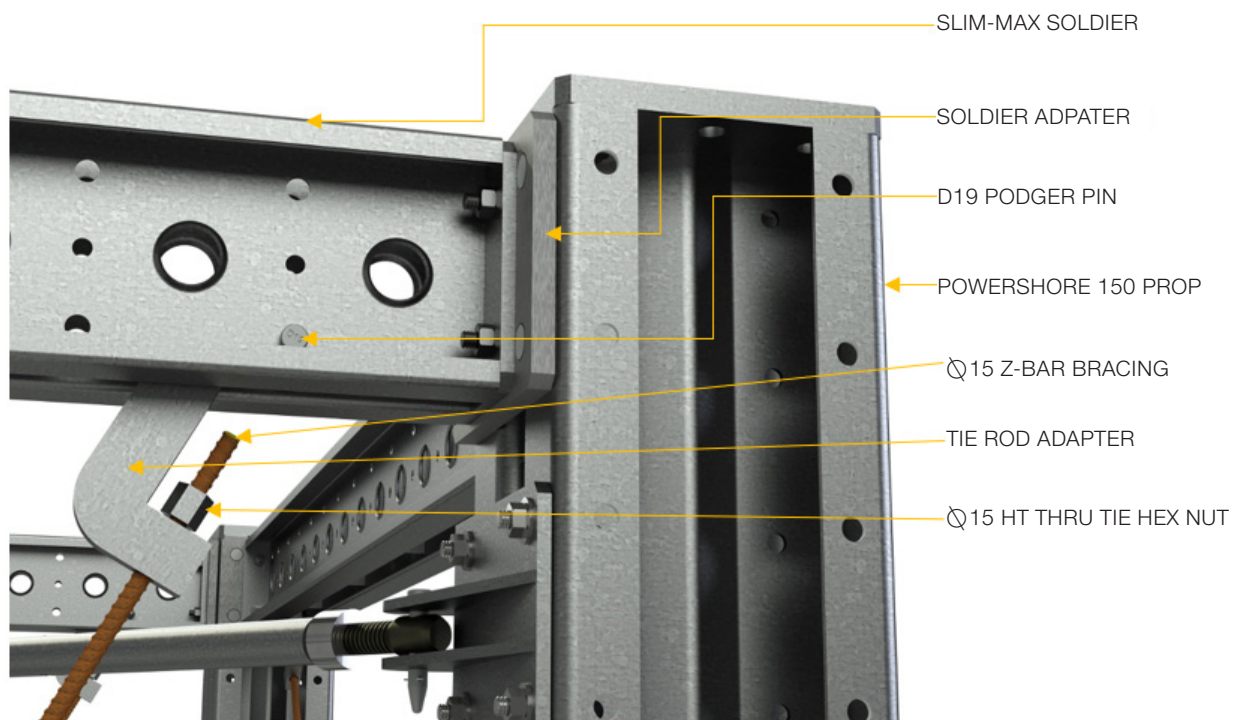
TIE ROD ADAPTER
SIDE VIEW

| DESCRIPTION | WEIGHT | PRODUCT CODE |
|------------------|---------|--------------|
| Thru Tie Adapter | 5.16 kg | APS150TBA |

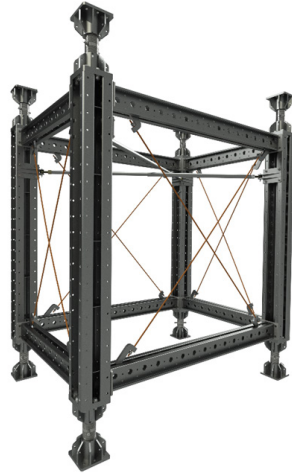
The cross-bracing arrangement using the Tie Rod Adapter is as follow:



TYPICAL TIE ROD ADAPTER CONNECTION 3D VIEW



TYPICAL TIE ROD ADAPTER CONFIGURATION 3D VIEW



SECTION THREE

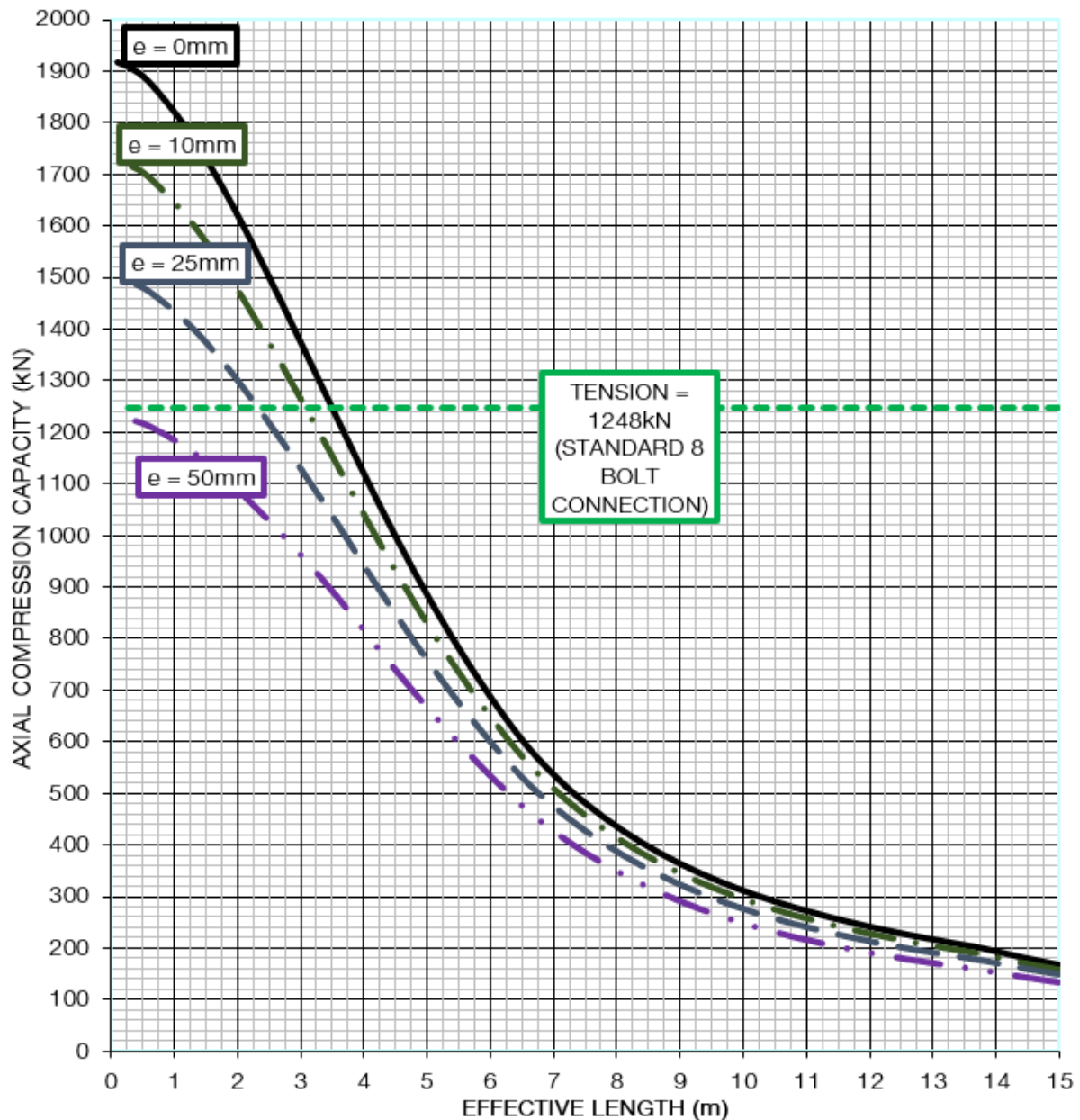
WORKING LOAD LIMITS (WLL)



8. POWERSHORE 150 WORKING LOAD LIMITS

8.1 POWERSHORE 150 PROP AXIAL WORKING LOAD LIMIT

Eccentricity in XX Axis:

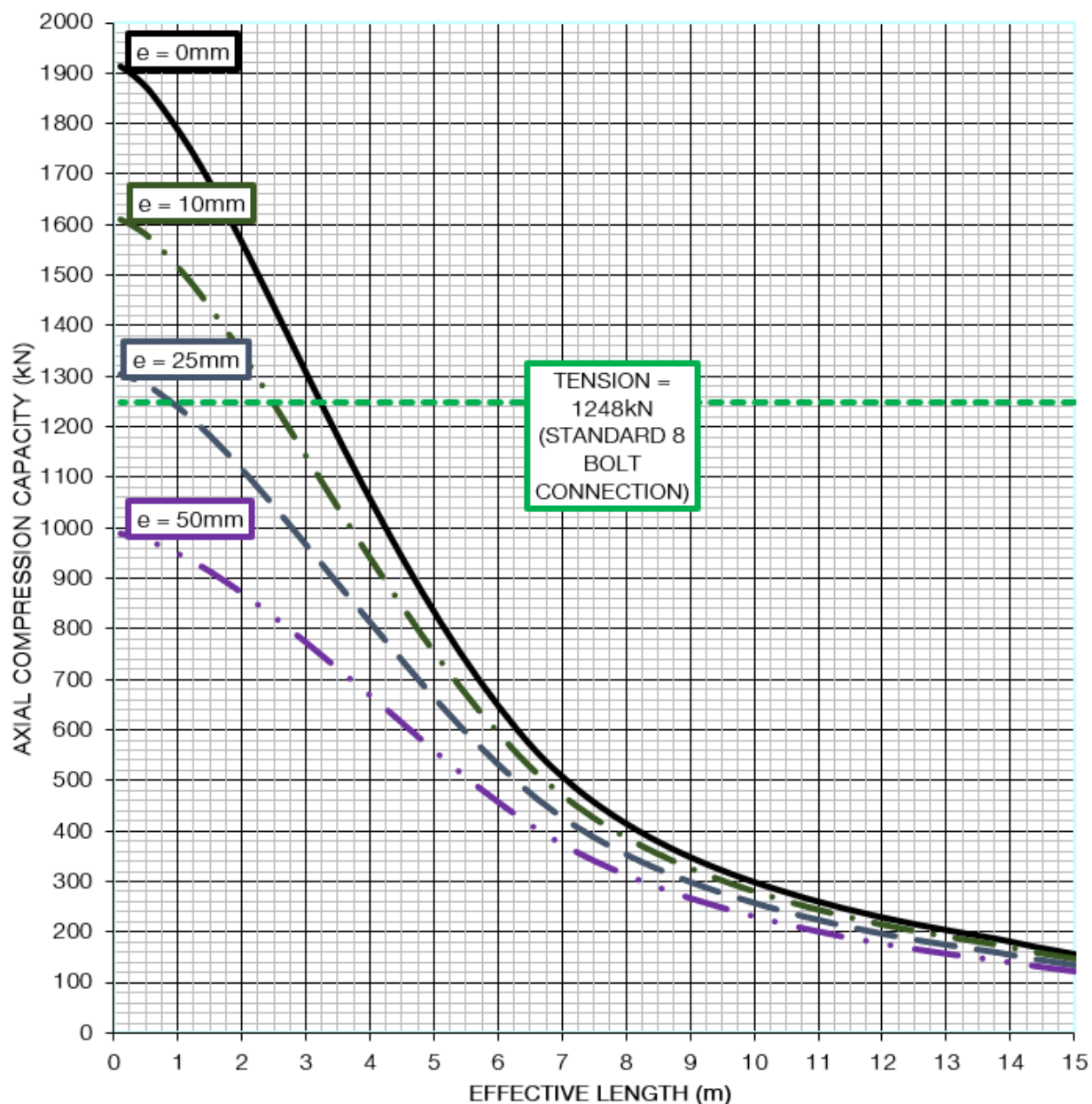


NOTES FOR AXIAL WORKING LOAD LIMIT (XX AXIS):

1. Maximum capacity is with component configured as shown. Other components may limit capacity. All system components must be checked to ensure sufficient capacities.
2. Fixing at the base and top plates to be suitably capable to transfer loads. Loads are based on a prop pinned at each end.
3. Maximum capacity is with components in working condition.
4. Initial eccentricity due to the possibility of the strut being set L/400 out of plumb (about the XX axis) has been considered for all eccentricities of load.
5. Limit State Conversion Factor (LSCF) of 1.5.

8.2 POWERSHORE 150 PROP AXIAL WORKING LOAD LIMIT

Eccentricity in YY Axis:

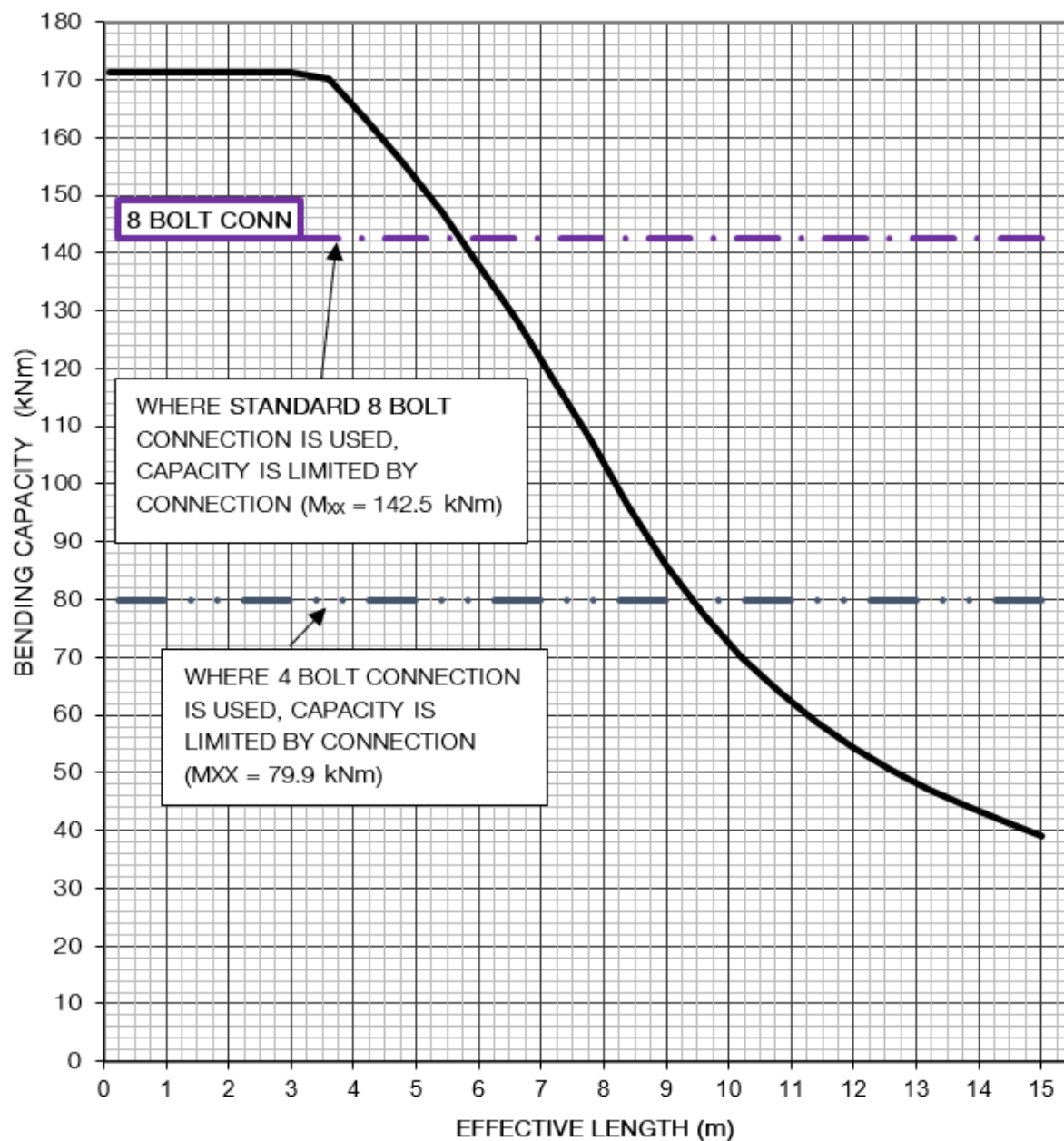


NOTES FOR AXIAL WORKING LOAD LIMIT (YY AXIS):

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Fixing at the base and top plates to be suitably capable of transferring loads. Loads are based on a prop pinned at each end.
3. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
4. Initial eccentricity due to the possibility of the strut being set L/400 out of plumb (about the YY axis) has been considered for all eccentricities of load.
5. Limit State Conversion Factor (LSCF) of 1.5
6. Tension capacity is based on standard 8 bolt pattern applied to the connection. Maximum tension capacity of the prop section is 1818kN (WLL).

8.3 POWERSHORE 150 PROP BENDING WORKING LOAD LIMIT

XX Axis:

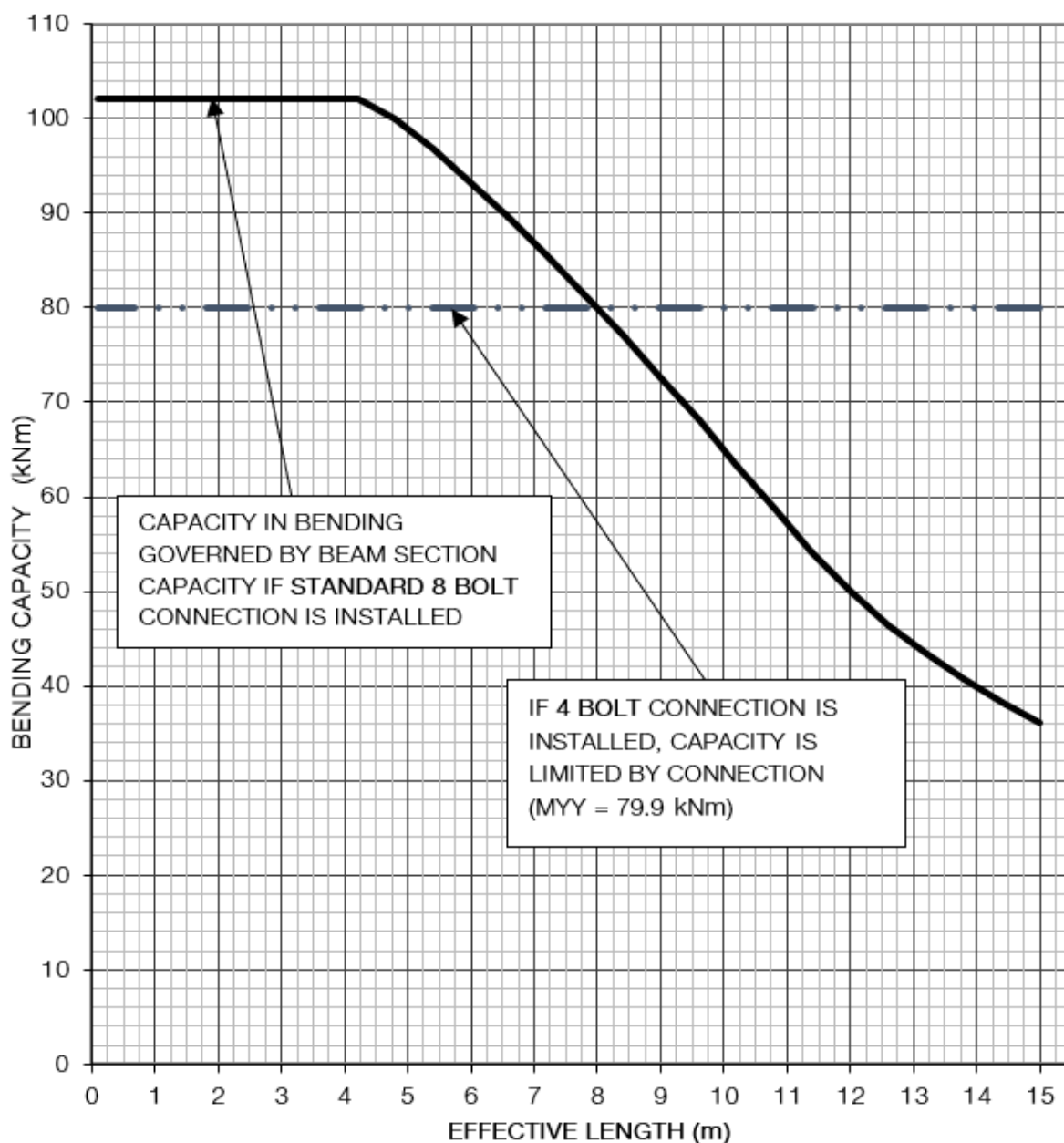


NOTES FOR BENDING WORKING LOAD LIMIT (XX AXIS):

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Maximum capacity in X-X is governed by the bolt group when a standard 8 bolt connection is installed.
3. Fixing at the base and top plates to be suitably capable of transferring loads. Loads are based on a prop pinned at each end.
4. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
5. Limit State Conversion Factor (LSCF) of 1.5

8.4 POWERSHORE 150 BEAM BENDING WORKING LOAD LIMIT

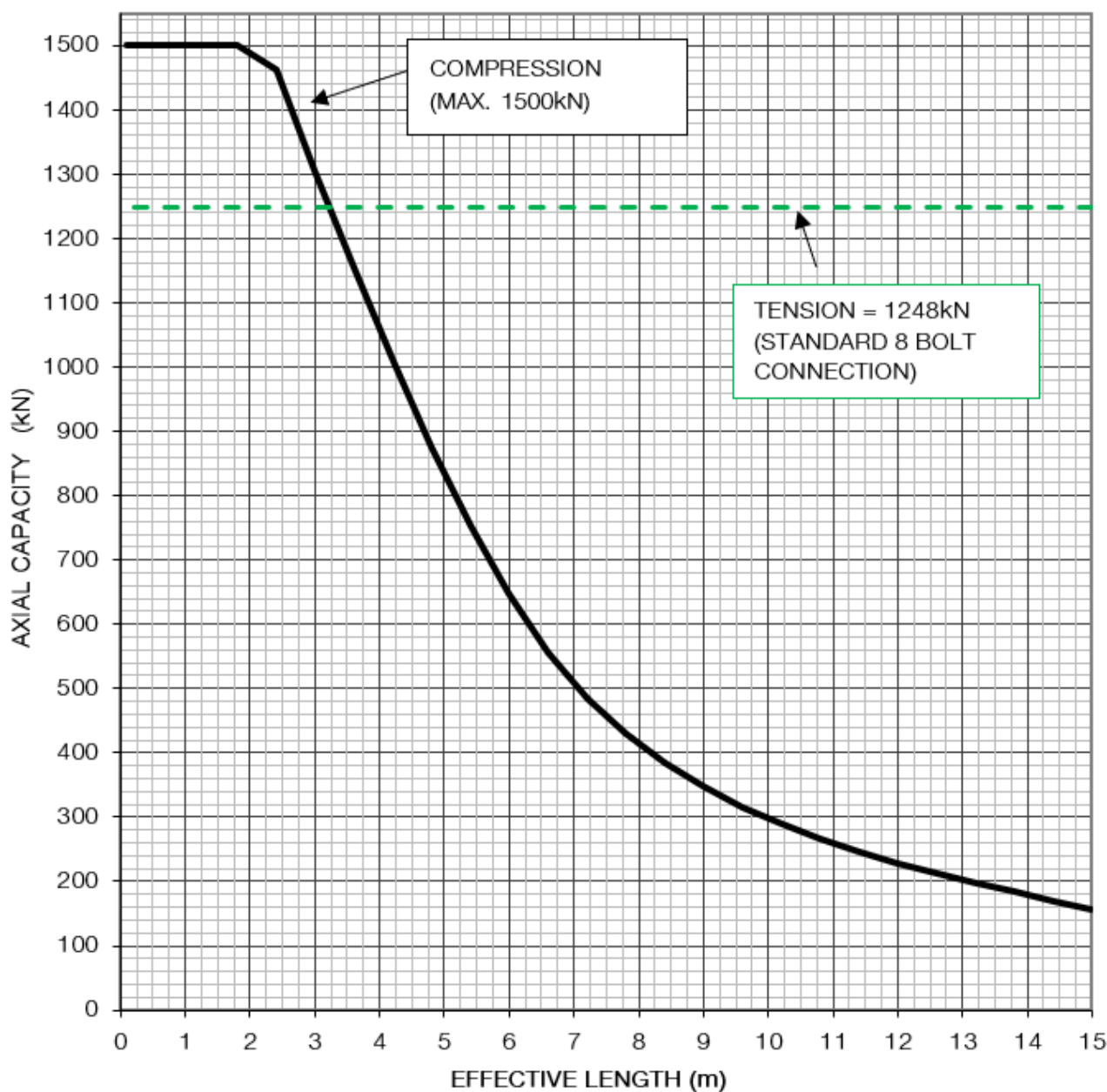
YY Axis:



NOTES FOR BENDING WORKING LOAD LIMIT (YY AXIS):

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Maximum capacity in Y-Y is governed by the beam section when a standard 8 bolt connection is installed.
3. Fixing at the base and top plates to be suitably capable of transferring loads. Loads are based on a prop pinned at each end.
4. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
5. Limit State Conversion Factor (LSCF) of 1.5

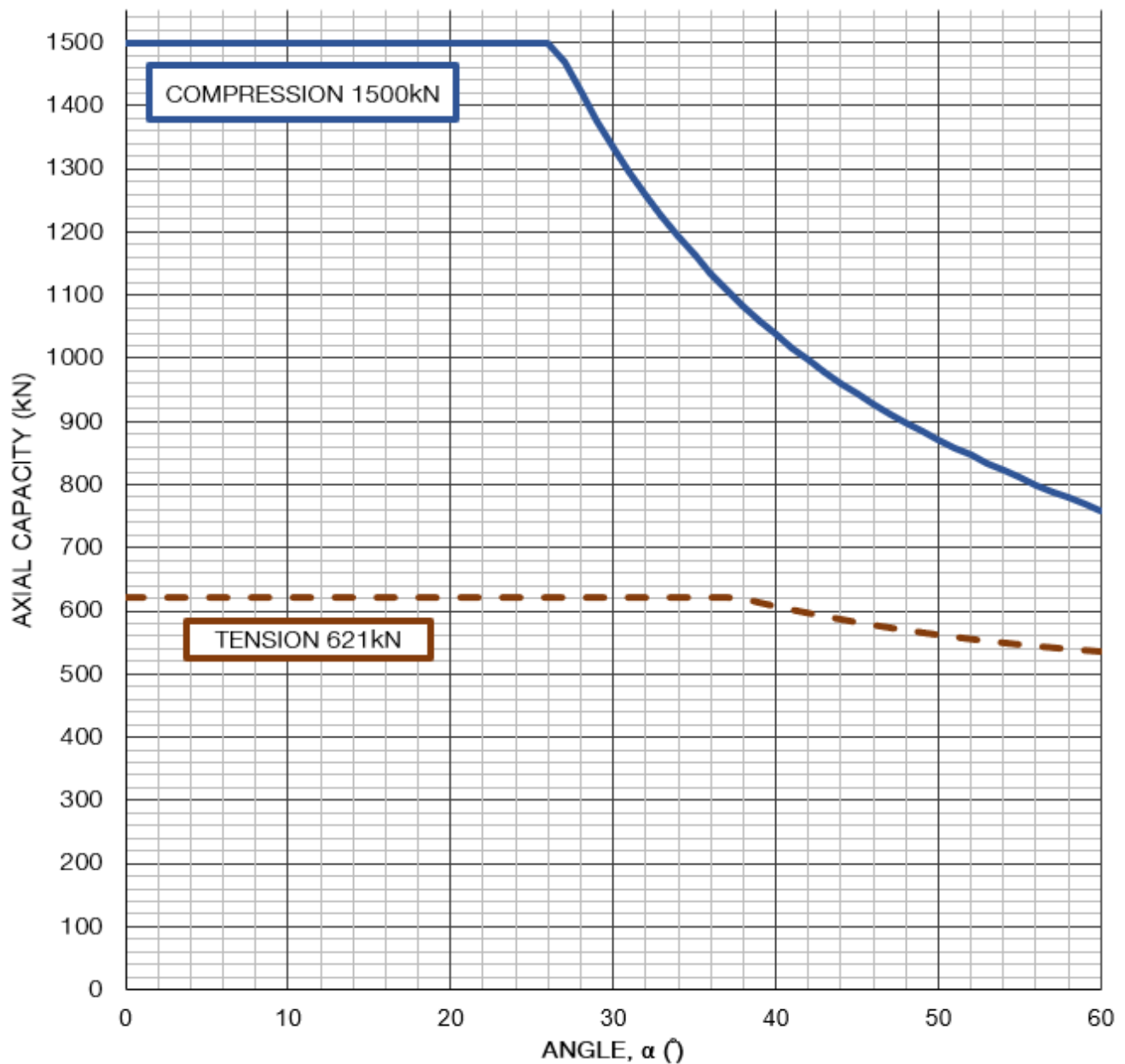
8.5 AXIAL WORKING LOAD LIMIT POWERSHORE 150 PROP COMBINED WITH SCREW JACK



NOTES FOR AXIAL WORKING LOAD LIMIT - PROP COMBINED WITH SCREW JACK:

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Fixing at the base of screw jack and top plate of beam to be suitably capable of transferring loads. Beam to screw jack connection via standard 8 bolt connection. Loads are based on a prop pinned at each end.
3. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
4. Initial eccentricity due to the possibility of the strut being set L/400 out of plumb (about the YY axis) has been considered for all eccentricities of load.
5. Limit State Conversion Factor (LSCF) of 1.5

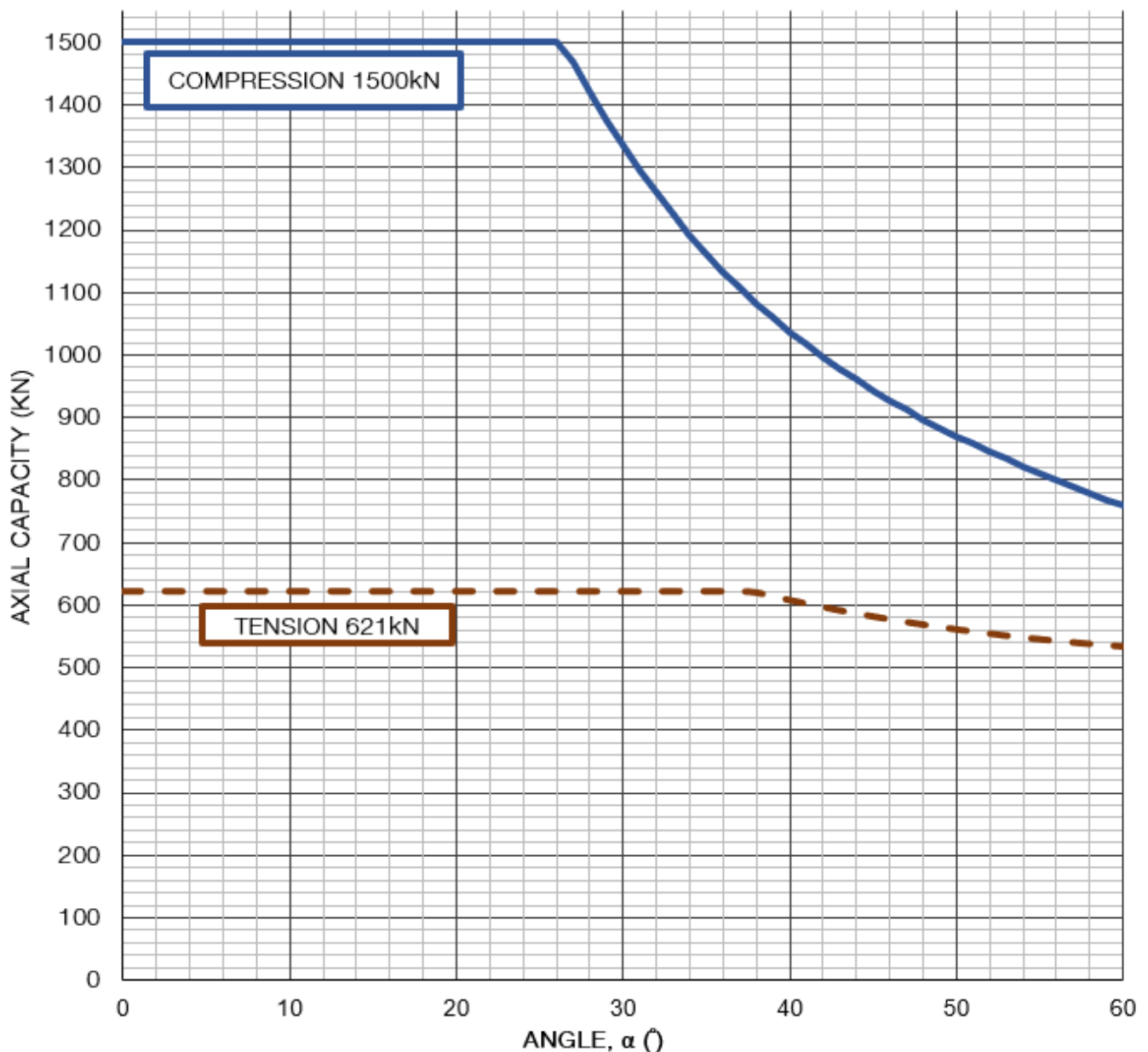
8.6 AXIAL WORKING LOAD LIMIT POWERSHORE 150 PROP COMBINED WITH RAKING BRACKET ASSEMBLY



NOTES FOR AXIAL WORKING LOAD LIMIT - POWERSHORE PROP COMBINED WITH RAKING BRACKET ASSEMBLY:

- Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
- Angle α (degrees) measured from vertical.
- Fixing at the base of raking bracket and substrate to be suitably capable to transfer loads. Beam to raking bracket connection via 6 bolt connection (6 No. M24 Grade 10. 9 bolts, nuts and washers).
- Maximum compression capacity is subject to raking bracket orientation:
 - Max. compression is limited to 1500kN for raker main ply parallel to beam webs
 - Max. compression is limited to 900kN for raker main ply perpendicular to beam webs
- Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
- Limit State Conversion Factor (LSCF) of 1.5

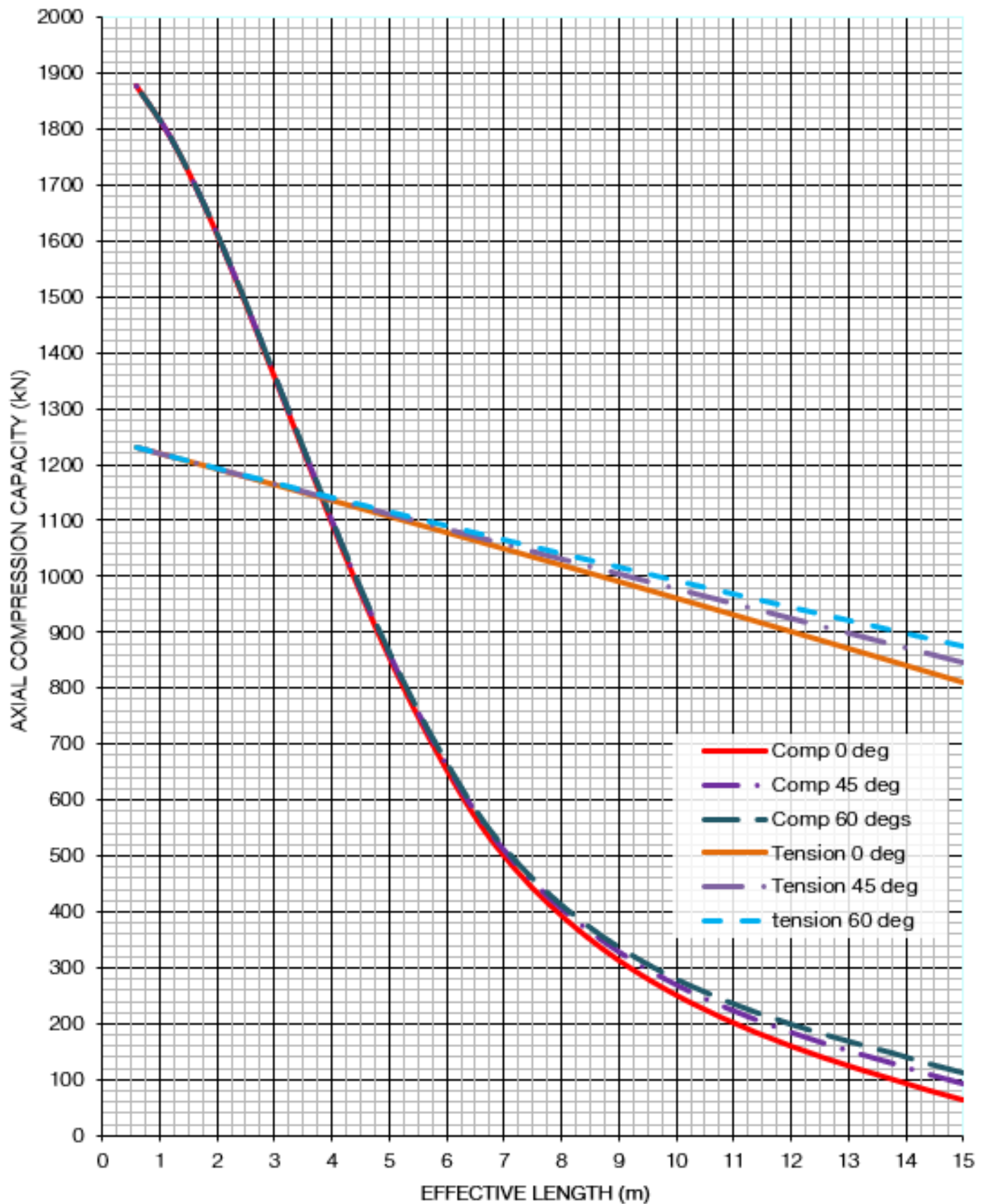
8.7 AXIAL WORKING LOAD LIMIT POWERSHORE 150 PROP COMBINED WITH SCREW JACK AND RAKING BRACKET



NOTES FOR AXIAL WORKING LOAD LIMIT - BEAM SECTION COMBINED WITH RAKING BRACKET AND SCREW JACK:

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Angle α (degrees) measured from vertical.
3. Fixing at the base of raking bracket and substrate to be suitably capable to transfer loads. Beam to screw jack connection via standard 8 bolt connection and screw jack to raking bracket connection via 6 bolt connection (6 No. M24 Grade 10.9 bolts, nuts and washers).
4. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
5. Limit State Conversion Factor (LSCF) of 1.5

8.8 AXIAL WORKING LOAD LIMIT POWERSHORE 150 PROP (RAKING BRACKET WITH XX-AXIS TAKING BENDING)

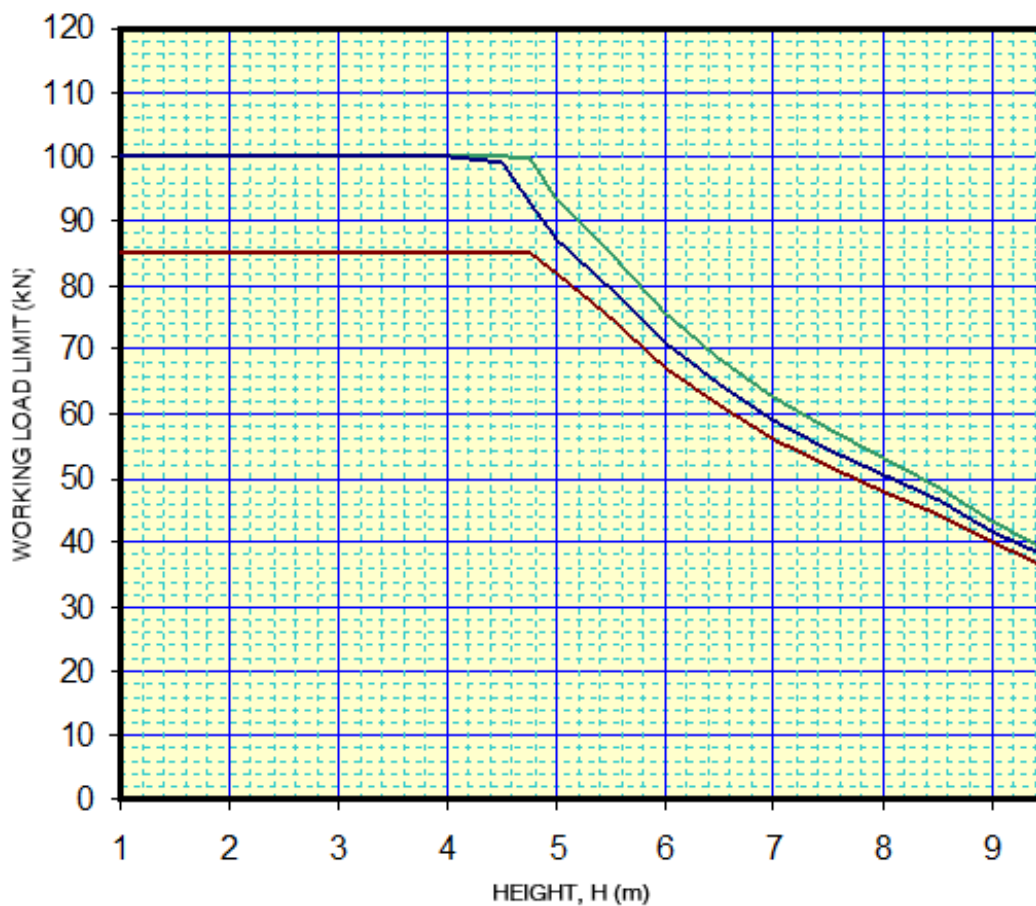


NOTES FOR AXIAL WORKING LOAD LIMIT - RAKING BRACKET WITH X-X AXIS TAKING BENDING:

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Designers shall check and ensure all components in the system have sufficient capacity.
2. Fixing at the base and top plates to be suitably capable of transferring loads. Theoretical model is pinned at each end with 0 eccentricity.
3. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
4. Maximum initial straightness tolerance of the strut = $L/400$ (about the XX axis) has been considered.
5. Second order effects have been considered.
6. Limit State Conversion Factor (LSCF) of 1.5
7. Tension capacity is limited by typical:
 - a. 8 bolts pattern Powershore 150 prop to prop connection
 - b. 6 bolts pattern Raking Bracket to Powershore 150 prop connection
8. Raking Prop webs shall be in the vertical planes when loaded (X-X axis in bending to counter self-weight gravity).
9. Effective length from 0.6m to 15m with 0.6m increment. Length excludes jack and Raking Bracket
10. Min. average segment length 2400mm. Segments less than 2400mm in length shall be positioned at prop ends whenever possible.

9. SLIM-MAX SOLDIER CAPACITY

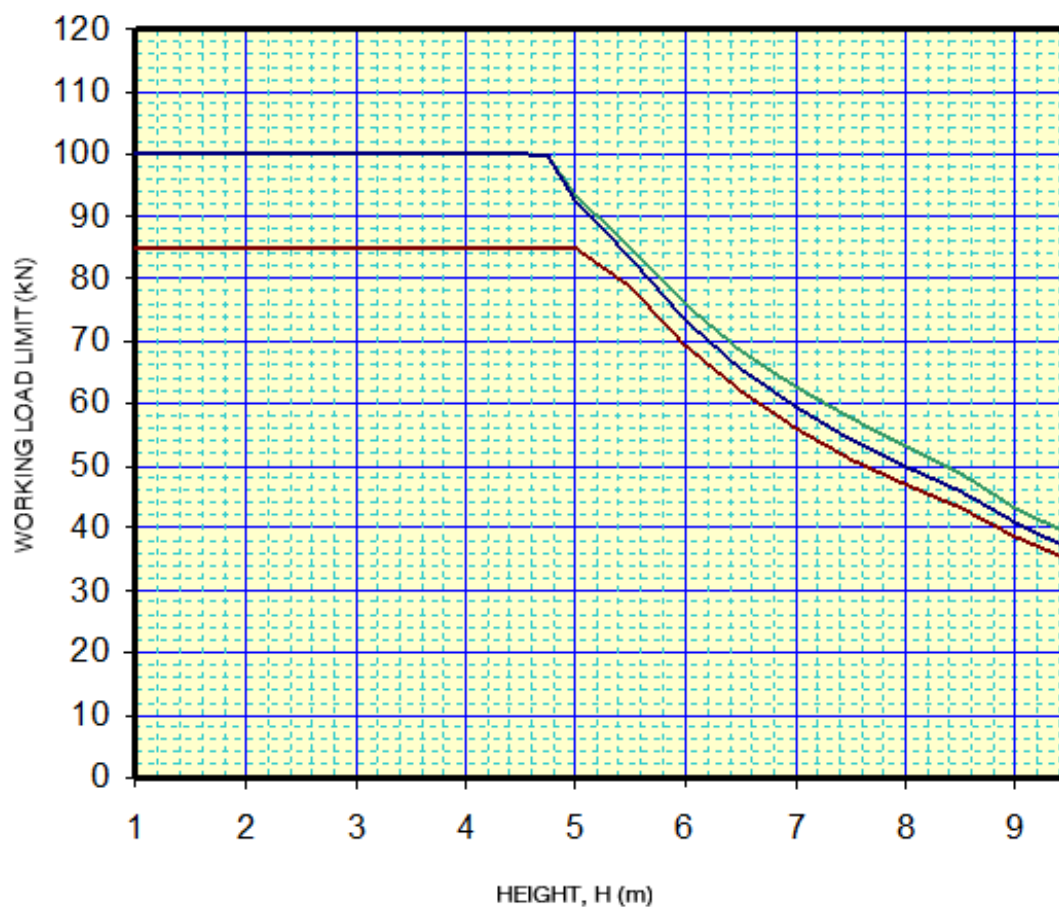
9.1 SLIM-MAX AXIAL WORKING LOAD LIMIT (ECCENTRICITY IN XX AXIS)



NOTES FOR AXIAL WORKING LOAD LIMIT - (XX AXIS):

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Fixing at the base and top plates to be suitably capable of transferring loads. Theoretical model is pinned at each end.
3. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
4. Initial eccentricity due to the possibility of the strut being set L/400 out of plumb (about the XX axis) has been considered for all eccentricities of load.

9.2 SLIM-MAX AXIAL WORKING LOAD LIMIT (ECCENTRICITY IN YY AXIS)



NOTES FOR AXIAL WORKING LOAD LIMIT - (YY AXIS):

1. Maximum capacity is with component configured as shown, capacity may be limited by other components. Users shall check and ensure all components in the system have sufficient capacities.
2. Fixing at the base and top plates to be suitably capable of transferring loads. Theoretical model is pinned at each end.
3. Maximum capacity is with components in working condition. Contact Acrow Engineering if components are damaged during site use.
4. Initial eccentricity due to the possibility of the strut being set $L/400$ out of plumb (about the YY axis) has been considered for all eccentricities of load.

LOCATIONS

NEW SOUTH WALES

National Head Office Formwork & Scaffold

2a Mavis Street
Revesby NSW 2212
P: 02 9780 6500
F: 02 9780 6499
E: info@acrow.com.au

Screens Head Office

13-15 Vallance Street
St Marys NSW 2760
P: 02 9219 1566

QUEENSLAND

Formwork & Scaffold

280 Bilsen Road
Geebung QLD 4034
P: 07 3265 2266
F: 07 3865 0277

Screens & Formwork

2 Morrison Lane
Beenleigh QLD 4207
P: 07 3807 9800

Industrial Scaffold

22a Spanns Road
Beenleigh QLD 4207
P: 07 3442 4000

SOUTH AUSTRALIA

Formwork & Scaffold

26 Circuit Drive
Hendon SA 5014
P: 08 8359 9700
F: 08 8359 1366

TASMANIA

Formwork & Scaffold

93 Lampton Avenue
Moonah TAS 7009
P: 03 6277 1212
F: 03 6277 1290

Formwork & Scaffold

65 Boland Street
Launceston TAS 7250
P: 03 6324 8282
F: 03 6324 8250

VICTORIA

Formwork, Scaffold & Screens

159 Wellington Road
Clayton VIC 3168
P: 03 9582 2777
F: 03 9582 2790

WESTERN AUSTRALIA

Formwork & Scaffold

11 Jackson Street
Bassendean WA 6054
P: 08 9373 7200
F: 08 9379 3488

We help build Australia **smarter.**



Contact

Phone: 1300 138 362

www.acrow.com.au