



2.5m Backhoe Manhole Box Technical Data Sheet

This technical data sheet provides essential information for users of the GAP Group 2.5m Backhoe Manhole Box System. It highlights key aspects of manhole box assembly, installation, weight, dimensions, planning, and lifting operations that should be considered when compiling method statements.

Overview

The 2.5m Backhoe Manhole Box is a four-sided mechanical excavation support system designed to support trenches up to **2.9 meters deep**. It is specifically engineered for the construction of manholes and is not intended for other purposes.

System Features

- **Depth Capacity:** Up to 2.9 meters (achievable with a base and 1 extension).
- **Manhole Ring Sizes:** Suitable for ring sizes of 1050mm, 1200mm, and 1350mm.
- **Maximum Lateral Earth Pressure:** 20 kN/m².
- **Application:** Designed for use with GAP's manhole shutters, enabling rapid manhole construction without the need for workers to enter unsupported excavations.
- **Installation Methods:** Can be installed using either the "dig and push" method or the "excavate and lower in place" technique with an excavator.

Weight

- **Complete Base Box Weight:** 960 kg (includes 2 panels, 4 struts, and pins).
- **Complete Extension Box Weight:** 580 kg (includes 2 panels, 2 struts, and pins).

Planning & Safety Considerations

When planning for the use of the 2.5m Backhoe Manhole Box, consider the following:

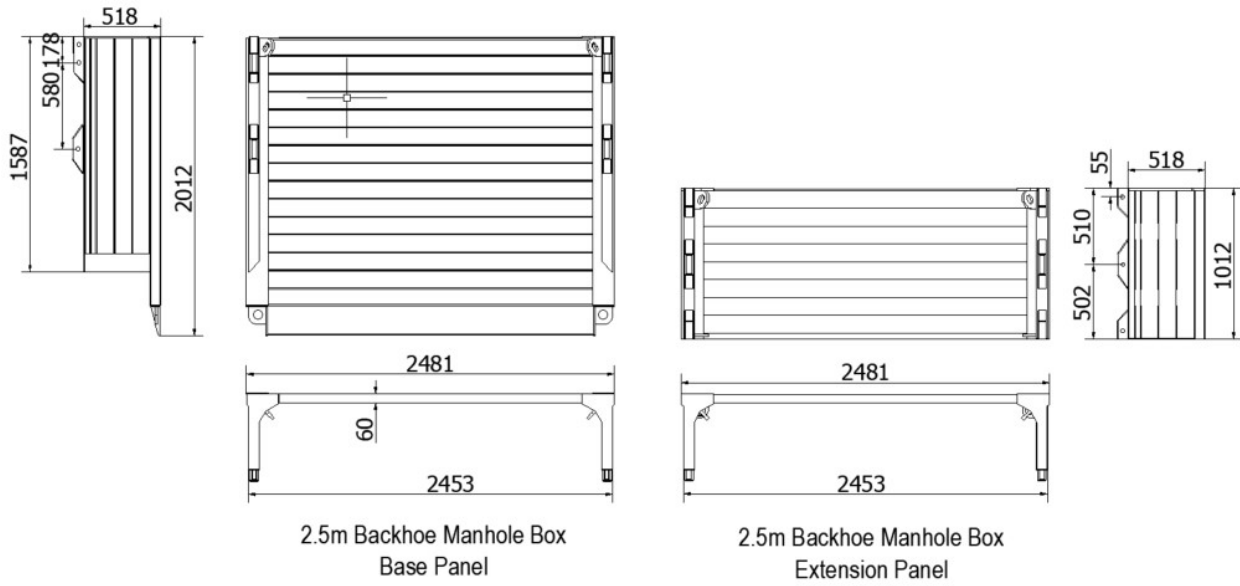
- **Lifting Operations:** Ensure that the excavator's lifting capacity is sufficient to handle the manhole box components.
- **Assembly & Installation:** Follow safe practices and procedures for assembling and installing the manhole box, as outlined in your method statement.
- **Site Conditions:** Assess site conditions such as soil type, trench depth, and groundwater levels before installation.

Important Note:

- It is assumed that users are familiar with general safety practices relevant to manhole box operations.

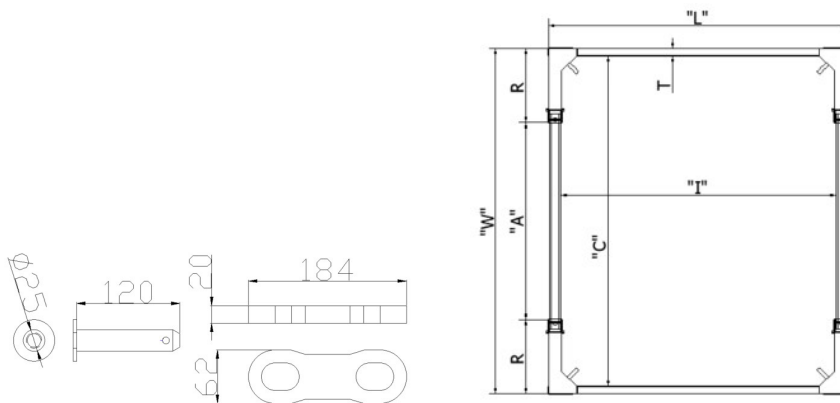
For further information or assistance, please contact GAP Group.

Box Component Identification, Range and Dimensions



Pin and Struts

There are 8No. pins and 4No. connectors required to attach one base box to the extension box.



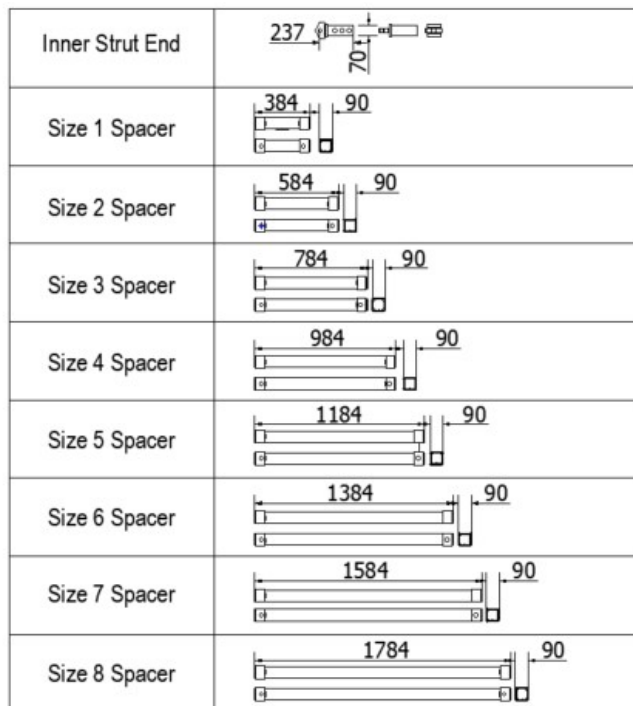
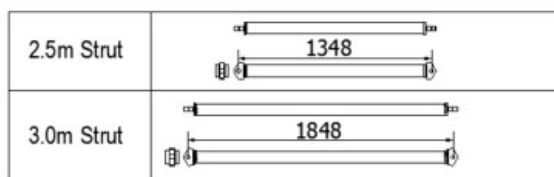
Strut Type	"A"		"R" Outside Face to Pin Centre (mm)	"C"		"I" Internal Clearance (mm)	"W"		Clearance Below Lower Strut (mm)	"L" Overall Length (mm)
	Pin to Pin Length (mm)			Internal Clearance (mm)			Overall Width (mm)			
	Min	Max	Min	Max	Min	Max				
Size 1	500	700	550	1485	1685	2298	1600	1800	1200	2480
Size 2	700	900	550	1685	1885	2298	1800	2000	1200	2480
Size 3	900	1100	550	1885	2085	2298	2000	2200	1200	2480
Size 4	1100	1300	550	2085	2285	2298	2200	2400	1200	2480
Size 5	1300	1500	550	2285	2485	2298	2400	2600	1200	2480
Size 6	1500	1700	550	2485	2685	2298	2600	2800	1200	2480
Size 7	1700	1900	550	2685	2885	2298	2800	3000	1200	2480
Size 8	1900	2100	550	2885	3085	2298	3000	3200	1200	2480
*2.5m	1348		550	2330		2298	2450		1200	2481
*3.0m	1848		550	2828		2298	2948		1200	2481

***2.5m and 3.0m Struts are Fixed Struts.**

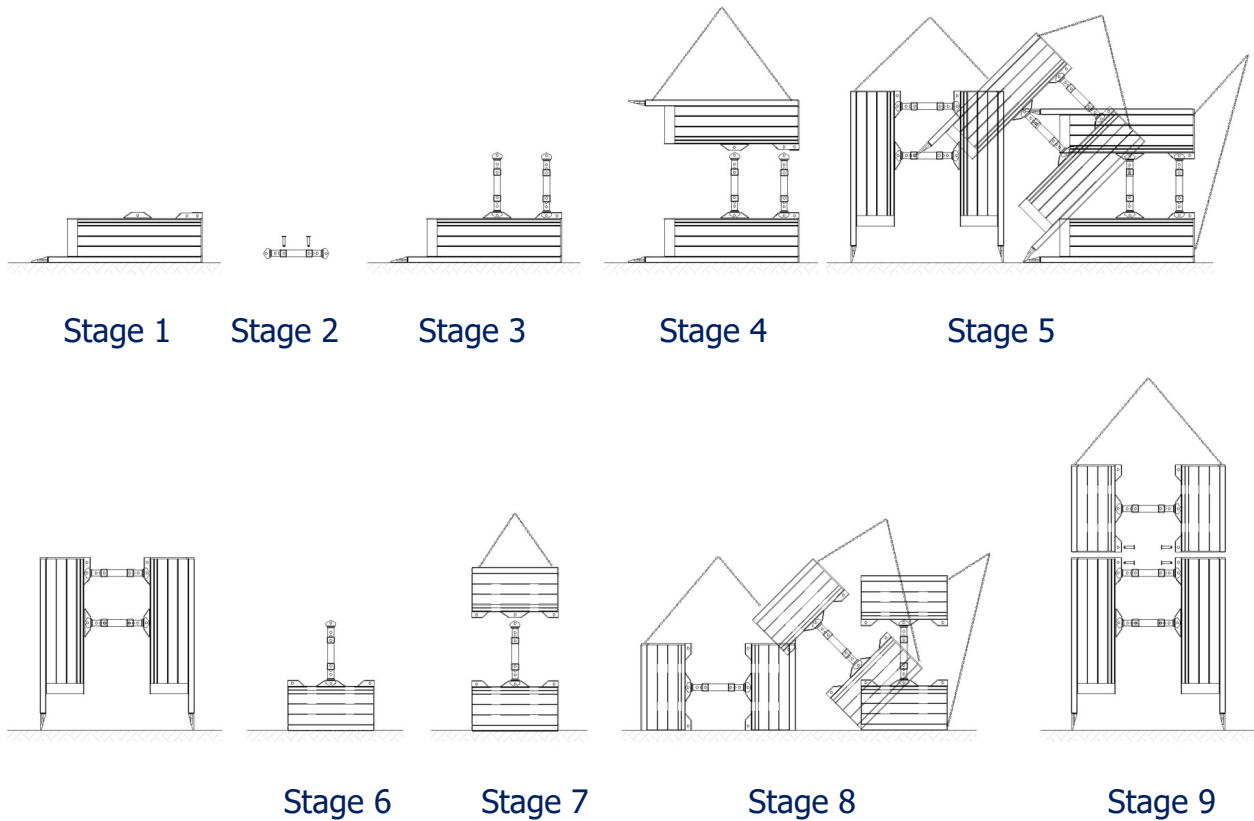
Struts: There are two types of struts for Backhoe manhole and Trench boxes.

1. Fixed Struts

2. Adjustable Struts



Site Assembly



Manhole Box Assembly and Installation Procedure

Stage 1: Prepare the Base Panel

- Place one of the base panels on the ground with the strut connector points facing upwards.

Stage 2: Assemble the Struts

- Assemble 4 struts to the required length:
 - 2 inner struts.
 - 1 spacer with 2 pins.

Stage 3: Attach Struts to the Base Panel

- Attach the assembled struts to the base panel using pins, ensuring they are securely connected.

Stage 4: Complete the Base Assembly

- Attach the second base panel to the other end of the struts using pins to complete the base box assembly.

Stage 5: Position the Base Box Upright

- Using 4 chains, lift and stand the box onto its cutting edge by securing the chains to the upper lifting eye points.

Stage 6: Prepare the Top Panel

- Place one of the top panels on the ground with the strut connector points facing upwards. Attach 2 struts to the top panel as in the previous steps.

Stage 7: Complete the Top Panel Assembly

- Attach the second top panel to the struts using pins to complete the top panel assembly.

Stage 8: Position the Top Panels Upright

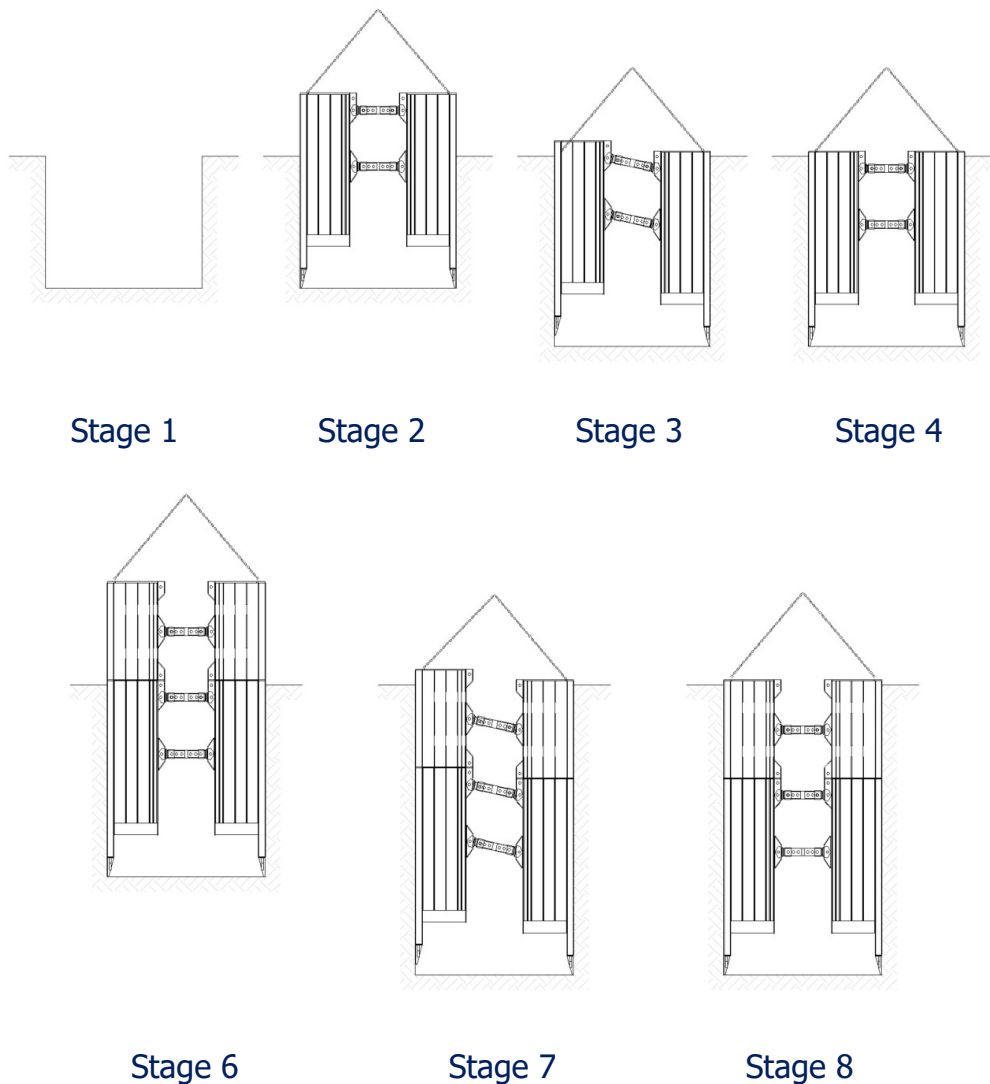
- Stand the assembled top panels in an upright position, similar to how the base panels were handled.

Stage 9: Attach Top Panels to Base Box

- Lift the assembled top panels and carefully position them on top of the base panels, securing them in place.

Note: For disassembly and removal, follow the procedure in reverse order.

Installation Procedure



Post-Assembly Check:

- Ensure all bolts are tight and all pins and 'R' clips are securely in place.
- Lift the box using a 4-leg chain sling attached to the lifting eyes at the top of each manhole box panel.

Stage 1: Initial Excavation

- Dig the manhole approximately 500 – 1000mm deep to the required width.

Stage 2: Position the Box

- Use the 4-leg chain sling to place the box into the excavation.

Stage 3: Lower the Box

- Dig between the box panels and push down on the corners of the panels to lower the box to the correct depth.
- Always dig below the panels while pushing down, focusing on the corners—never in the middle.

Stage 4: Final Adjustments

- Once the box reaches the required depth, ensure the struts are horizontal and perpendicular to the panels before entering the excavation.

Stage 5: Adding an Extension (if needed)

- If an extension is required, do not push the base unit fully into the ground. Leave 300mm of the base panel above ground to attach the extension.
- Use the 4-leg chain sling to position the extension box over the base panel.

Stage 6: Attach the Extension

- Ensure the struts of the extension are aligned correctly with the base box.
- Attach one side of the extension unit to the base unit first, fitting one connector with 2 pins per corner. Repeat for the other side.

Stage 7&8: Final Depth Adjustment

- When the extension is at the required depth, ensure the struts are horizontal and perpendicular to the panels before entering the excavation.

Extraction Procedure

The method of extraction should be determined by a thorough Risk Assessment.

Due to consolidation, extracting the Manhole Box (MHB) may be more challenging than its installation. Follow these guidelines to ensure safe and efficient extraction:

Use Proper Extraction Points:

- Use only the extraction/lifting points located on the underside of the driving cap.
- Ensure that the chain sling used is strong enough for this operation.

Safety Precautions:

- Be aware that chains may snap if improperly used, posing a risk of severe injury. Therefore, never allow personnel to be near the lift during the extraction process.

Methods of Extraction (listed in increasing order of difficulty):

- **Straight Pull:**

- i. Attach the chain sling to the two extraction/lifting points on each panel.
- ii. Lift the MHB using all four legs of the chain sling.

- **Half Pull:**

- i. Attach the chain sling to the two extraction/lifting points on one panel only and lift that panel.
- ii. When it reaches its maximum movement, remove the chain sling and connect it to the other panel. Lift the second panel.
- iii. Repeat this procedure until the MHB is fully extracted.

- **Single Pull:**

- i. Attach a single leg of the chain sling to one extraction/lifting point and raise the corner of each panel in turn.
- ii. Once the MHB moves freely, remove it using the straight pull method.

Product Notes: 2.5m Backhoe Manhole Box

- **Safety Precautions:**
 - Do not use any unsupported part of the excavation for access.
 - Always leave the top of the box **100mm** above the surrounding ground level.
 - Ensure all '**R**' clips are fitted to the pins.
 - Do not use more than **1 extension units** on a box.
 - Ensure no voids exist between box panels and trench sides to prevent sideways movement.
 - Do not leave the base of the box floating above excavation level.
- **End Closure:**
 - Use end closure panels when closing the trench end. Do not use box struts as trench sheet supports unless advised by GAP Group Engineering.
- **Usage Guidelines:**
 - Only use the boxes in configurations shown by competent persons and following GAP Group installation guidelines.
 - Avoid use in very weak ground or where significant groundwater is present.
 - The open ends of the box can be closed using end closure panels or sheet piles if telescopic struts are used.
 - Exercise caution when selecting a lifting machine due to the box's weight; use timber packers to separate panels during stacking.
- **Special Considerations:**
 - In cohesive or very weak soils, the earth pressure/adhesion on panels may increase over time, potentially requiring additional extraction force.
 - Do not fly the box above the excavation base.
 - Inspect all lifting points for damage before each operation.
- **Personnel Safety:**
 - Always enter the manhole box via a ladder located within the box, never from an unsupported edge.
 - No personnel are allowed within the excavation until the box is fully installed.
 - Personnel must not be inside the excavation during lifting or extraction operations.
 - Do not climb up or down the struts.
 - Never move the box when personnel are inside.