Backhoe Trench Box Technical Data Sheet

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

Overview

The Backhoe Trench Box is a two-sided mechanical excavation support system designed for trenches up to **2.9 meters deep**. It is specifically engineered for use with small excavators with limited lifting capacities. The trench box is not intended for any other purposes.

System Features

- **Depth Capacity:** Up to 2.9 meters (with base and 1 extension)
- **Maximum Lateral Earth Pressure:** 20 kN/m²
- **Application:** Suitable for use in conjunction with Backhoe Manhole Boxes to connect two manholes.
- **Installation Methods:** Can be installed using the "dig and push" method or the "excavate and lower in place" technique.

Weight

- **Complete Base Box:**
  - Weight: 900 kg
  - Components: 2 panels, 4 struts, pins and R-clips
- **Complete Extension Box:**
  - Weight: 415 kg
  - Components: 2 panels, 2 struts, pins and R-clips

Planning & Safety Considerations

When planning for the use of the Backhoe Trench Box, the following must be taken into account:

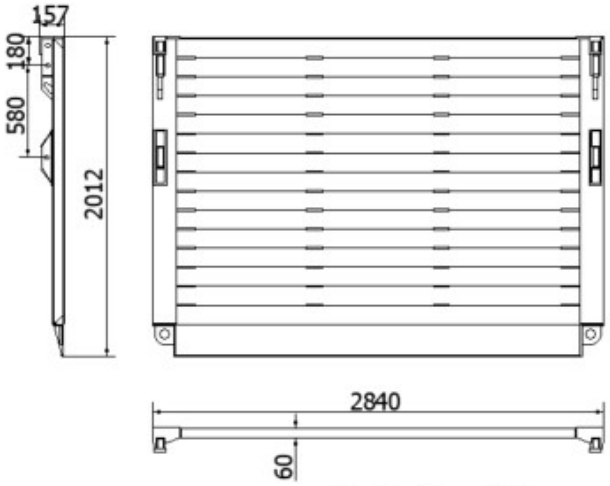
- **Lifting Operations:** Ensure that the excavator's lifting capacity is sufficient for handling the trench box components.
- **Assembly & Installation:** Follow safe practices and procedures for assembling and installing the trench box, as outlined in your method statement.
- **Site Conditions:** Assess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

Important Notes

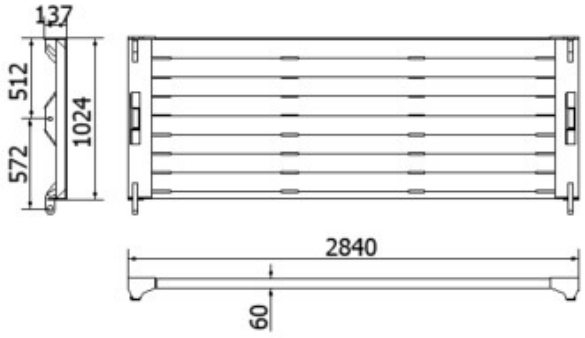
- The maximum depth of 2.9 meters is achievable with a base box and one extension.
- It is assumed that users are familiar with general safety practices relevant to trench box operations.

For further information or assistance, please contact GAP Group.

Box Component Identification, Range and Dimensions



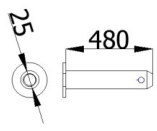
Backhoe Trench Box
Base Panel

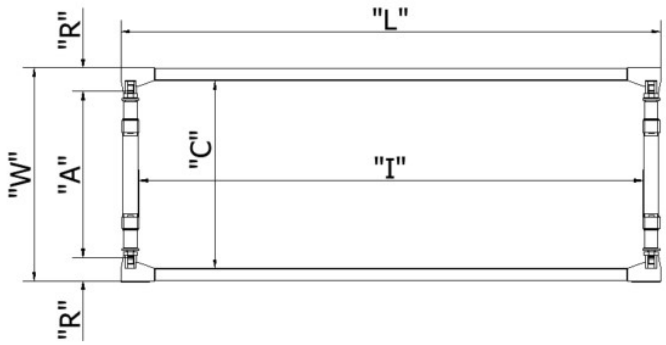


Backhoe Trench Box
Extension Panel

Pin and Struts

There are 4No. Pins required to attach one extension box with the base box.

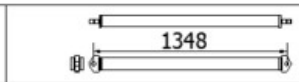
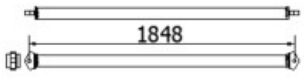




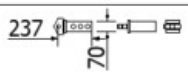
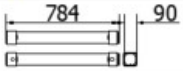
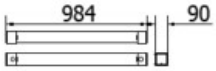
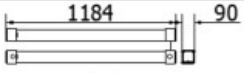
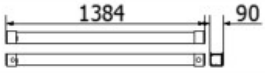
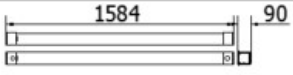
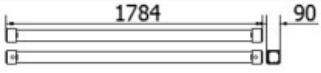
Strut Type	"A" Pin to Pin Length (mm)		"R" Outside Face to Pin Centre (mm)	"C" Internal Clearance (mm)		"I" Internal Clearance (mm)	"W" Overall Width (mm)		Clearance Below Lower Strut (mm)	"L" Overall Length (mm)
	Min	Max		Min	Max		Min	Max		
Size 1	500	700	110	600	800	2298	720	920	1200	2840
Size 2	700	900	110	800	1000	2298	920	1120	1200	2840
Size 3	900	1100	110	1000	1200	2298	1120	1320	1200	2840
Size 4	1100	1300	110	1200	1400	2298	1320	1520	1200	2840
Size 5	1300	1500	110	1400	1600	2298	1520	1720	1200	2840
Size 6	1500	1700	110	1600	1800	2298	1720	1920	1200	2840
Size 7	1700	1900	110	1800	2000	2298	1920	2120	1200	2840
Size 8	1900	2100	110	2000	2200	2298	2120	2320	1200	2840
***2.5m**	1340		110	1448		2298	1568		1200	2840
***3.0m**	1848		110	1948		2298	2068		1200	2840
***2.5m and 3.0m Struts are Fixed Struts.**										

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

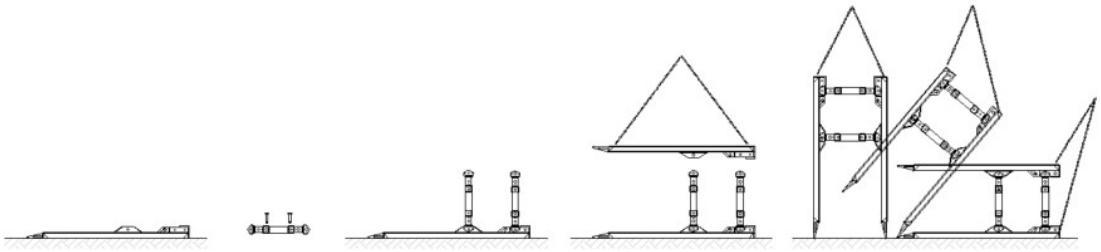
1. Fixed Struts

2.5m Strut	
3.0m Strut	

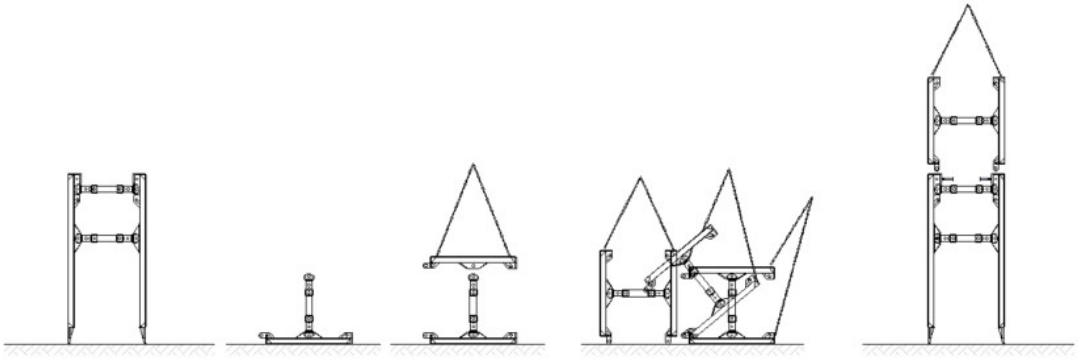
2. Adjustable Struts

Inner Strut End	
Size 1 Spacer	
Size 2 Spacer	
Size 3 Spacer	
Size 4 Spacer	
Size 5 Spacer	
Size 6 Spacer	
Size 7 Spacer	
Size 8 Spacer	

Site Assembly:



Stage 1 Stage 2 Stage 3 Stage 4 Stage 5



Stage 6 Stage 7 Stage 8 Stage 9

Trench 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 and R-clips.

Stage 3: Attach Struts to the Base Panel

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

Stage 4: Complete the Base Assembly

- Lower the second base panel into position. Attach the second base panel to the other end of the struts using pins and R-clips to complete the base box assembly.

Stage 5: Position the Base Box Upright

- Using a set of 4-Leg lifting 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 and R-clips to complete the top panel assembly.

Stage 8: Position the Top Panels Upright

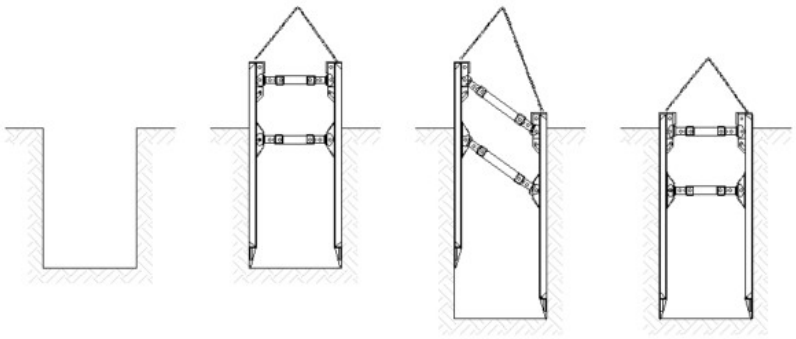
- Stand the assembled top panels in an upright position, similar to how the base panels were handled.

Stage 9: Attach Top Panels to Base Box

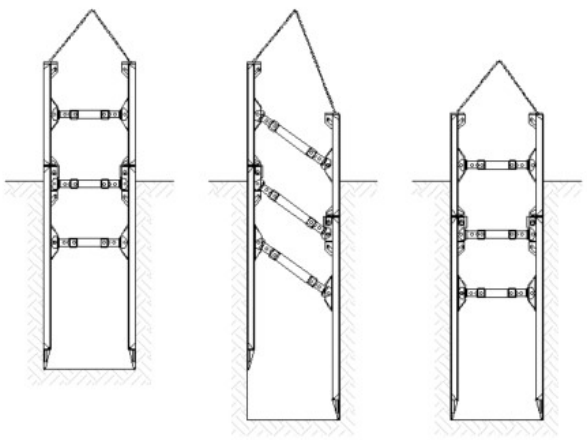
- Lift the assembled top panels and carefully position them on top of the base panels, securing them in place with pins and R-clips provided.

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

Installation Procedure



Stage 1 Stage 2 Stage 3 Stage 4



Stage 5 Stage 6 Stage 7

Post-Assembly Check:

- Ensure 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 trench box panel.

Stage 1: Initial Excavation

- Dig the Trench 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.
- 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 2 pins and R-clips per corner. Repeat for the other side.

Stage 6: 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 7: 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 Backhoe Trench Box (BTB) 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.
- 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 BTB 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 BTB 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 BTB moves freely, remove it using the straight pull method.

Product Notes: Backhoe Trench 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 unit** 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.
  - 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 trench 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.