



Although Fibreglass has different characteristics from steel, it is in some ways stronger, lighter and more flexible than steel, however it is also subject to cracking and chipping if proper handling and transporting methods are not used.

Handling

- Good rigging methods shall be practised at all times.
- Only non-metallic slings or webbing shall be used.
- Where lifting lugs are provided on a vessel, slings should be attached to these only.
- For vessels not provided with lifting lugs, place slings around tank so that when lifted the tank will be at approx. 45°.

The following practices are expressly forbidden:

- Striking the vessel or permitting the vessel to strike an obstruction.
- Hoisting or lowering a vessel without attaching a rope.
- Sliding the vessel unless mounted on a sledge.
- The use of any lifting device or practice that involves high point loading on the fibreglass surface, or high distortion stresses on the structure.
- The use of ladders or scaffolding inside a vessel unless contact surfaces are well cushioned.
- Rolling of a vessel unless on two smooth wooden planks, placed as near as possible to ends of vessel, and of sufficient thickness as to give clearance to nozzles and fitting.
- Hoisting a vessel by manhole or nozzles.

REFER DRAWINGS PD10

Installation

- Flat bottomed vessels shall be placed on a smooth surface which shall be free of any projections. It is recommended that a 20-25 mm layer of fine sand be placed evenly over the surface of the plinth to facilitate bedding in. Precautions must be taken to prevent the bedding material being eroded away by the elements.
- Care must be taken that vessels fitted with nozzles whose flanges protrude below the



bottom of the vessel do not rest on surrounding plinth or support work.

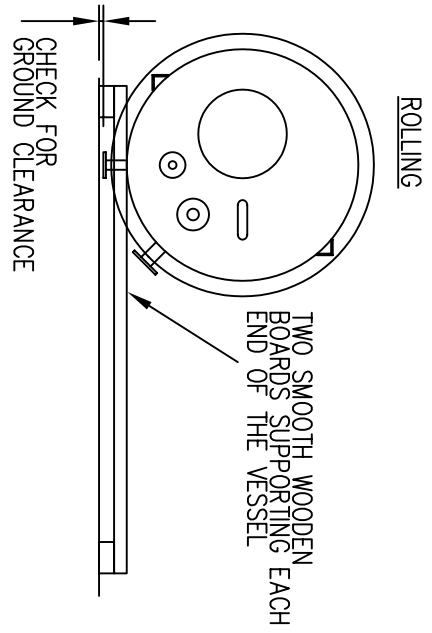
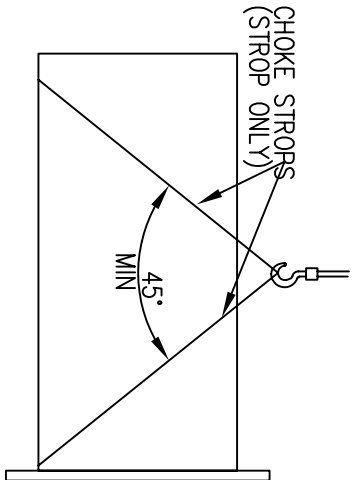
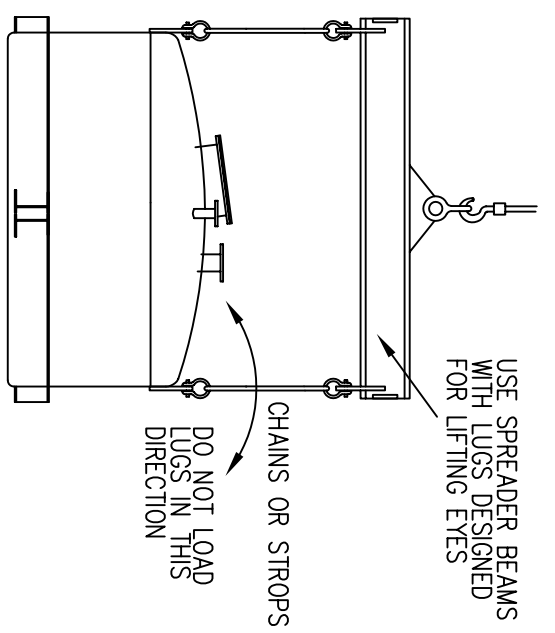
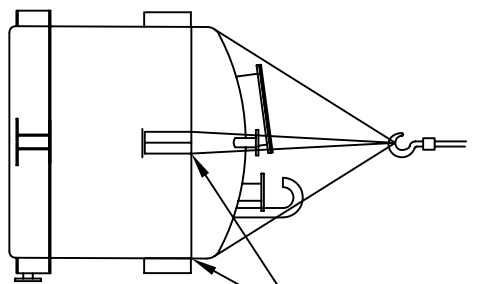
- Under no circumstances shall any packing of any description be placed under the bottom edges of the vessel as this causes increased stress on bottom corner.
- When righting vessel from horizontal position care should be taken that bottom corner is cushioned on a soft material to prevent damage.
- Should the vessel be subjected to any accidental abuse, the nature of the abuse shall be noted, reported to engineer and the position marked clearly on the vessel to enable necessary examinations and repairs to be effected.
- Ensure correct gaskets and bolt torques are applied to all nozzles.
- Ensure that pipe work and valves connected to the vessel are independently supported and that no loading are placed on the nozzles by incorrectly aligned pipe work or pipe work expansion.
- Workmen working inside a vessel shall wear soft soled footwear and provide protective coverings to save the surface from damage due to the dropping of tools or equipment.

REFER DRAWING PD11

NOTES

1. USE ALL LIFTING LUGS AVAILABLE ON THE EQUIPMENT, OTHERWISE LUG FAILURE MAY RESULT.
2. STROPS MAY BE REPLACED BY WELL PROTECTED METAL SLINGS/HOOKS AS NECESSARY.
3. CHECK CONDITION AND LOAD RATING OF STROPS, EYES, CHAINS ETC BEFORE USE. DON'T USE DAMAGED STROPS.
4. NEVER SLING NOZZLES/ MANHOLES FOR LIFTING.
5. NEVER HANDLE EQUIPMENT IN A WAY THAT POINT LOADS THE FRP SURFACE. DO NOT PLACE ON THE FRP SURFACE UNPROTECTED LADDERS/ SCAFFOLDING STRIKE THE FRP EQUIPMENT OR LET FRP EQUIPMENT STRIKE OTHER OBJECTS. DO NOT WEAR SOFT SOLED SHOES WHEN WORKING INSIDE EQUIPMENT AND AVOID BRINGING STONES INTO THE AREA. PROTECT SURFACES FROM ACCIDENTAL DAMAGE FROM TOOLS ETC.
6. ALL INCIDENTS DETAILED IN NOTE 5 SHALL BE FOLLOWED BY INSPECTION OF INTERNAL AND EXTERNAL SURFACES FOR DAMAGE.
7. INSPECTION SHALL BE CARRIED OUT BY LH/FRP ENGINEER BEFORE EQUIPMENT LEAVES: FACTORY – HANDLING INCIDENTS @ FACTORY
INSTALLATION – HANDLING INCIDENTS @ SITE
8. FOLLOWING INSPECTION, AREAS OF DAMAGE MUST BE NOTED FOR REPAIR / REPLACEMENT.

LIFTING



ARMATEC ENVIRONMENTAL LTD

THIS DRAWING IS THE PROPERTY OF ARMATEC ENVIRONMENTAL LTD. IT IS LOANED TO YOU SUBJECT TO RETURN ON DEMAND. ITS CONTENTS ARE CONFIDENTIAL AND MUST NOT BE COPIED OR SENT TO ANY THIRD PARTY FOR USE OR EXAMINATION UNLESS AGREED TO IN WRITING BY ARMATEC ENVIRONMENTAL LTD.

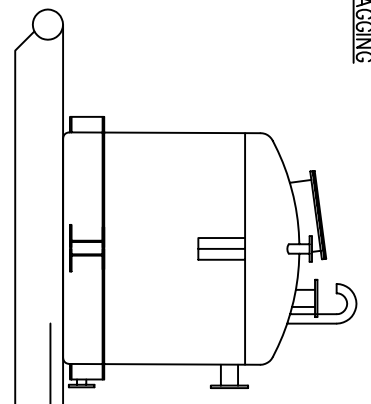
PROJECT NUMBER		NAME (PRINTED)		SIGN		DATE	
DESIGNED	-	J. STANCLIFFE	-	9/99			
DRAWING CHK	K. KOTZE			9/99			
DESIGN CHK	-						

PROCEDURE DETAILS HANDLING

SCALE	AREA	APPROVAL FOR CONSTRUCTION	DRAWING NUMBER	SHEET	REV
NTS		APP. CONSULT	PD10	1/2	0
APP. CLIENT					



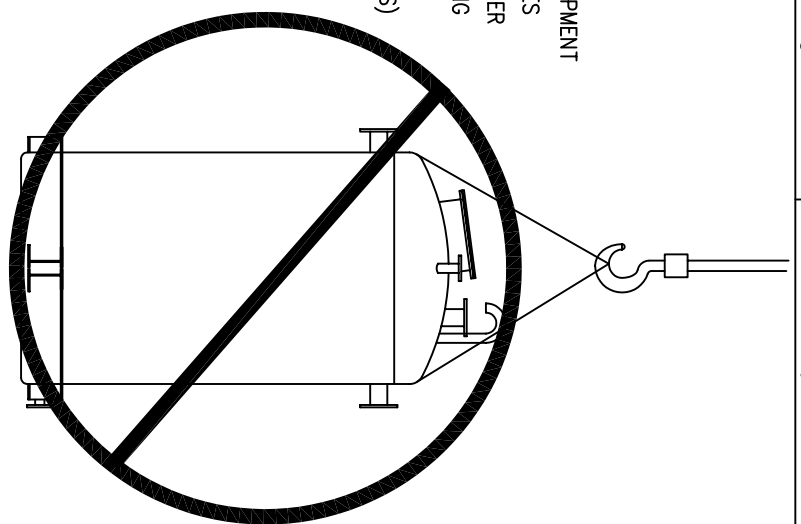
DRAGGING



DO NOT DRAG/SCUFF/ROLL FRP EQUIPMENT UNPROTECTED ACROSS THE GROUND
 DRAGGING OF FRP EQUIPMENT IS PERMISSIBLE ONLY ON SKIDS (PREFERABLY PURPOSE DESIGNED).

LIFTING

DO NOT LIFT EQUIPMENT SLUNG TO NOZZLES MANWAYS OR OTHER NON LOAD BEARING FIXTURES. (USE LIFTING LUGS)



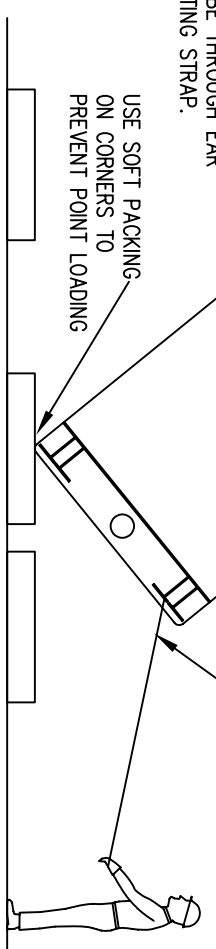
UPRIGHTING
 MINIMUM OF 2 LIFTING LUGS
 NORMALLY 4 LIFTING LUGS
 ALWAYS HAVE LUGS

USE LIFTING LUGS WITH STROPS OR SHACKLES WITH LIFTING EYES AS APPROPRIATE.

USE CONTROL ROPES WHERE POSSIBLE

LOAD STRAP AROUND VESSEL TO MAKE CRADLE & TO BE THROUGH EAR OF LIFTING STRAP.

USE SOFT PACKING ON CORNERS TO PREVENT POINT LOADING



ARMATEC ENVIRONMENTAL LTD



THIS DRAWING IS THE PROPERTY OF ARMATEC ENVIRONMENTAL LTD. IT IS LOANED TO YOU SUBJECT TO RETURN ON DEMAND. ITS CONTENTS ARE CONFIDENTIAL AND MUST NOT BE COPIED OR SENT TO ANY THIRD PARTY FOR USE OR EXAMINATION UNLESS AGREED TO IN WRITING BY ARMATEC ENVIRONMENTAL LTD.

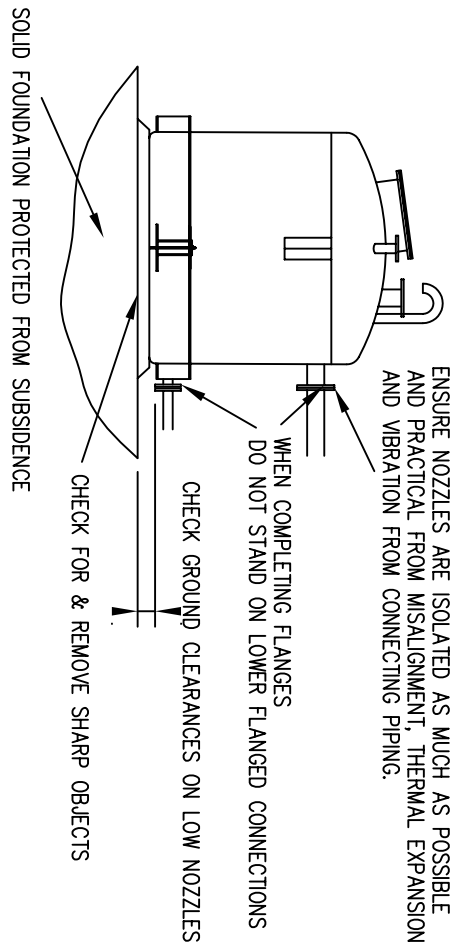
REV	REV NO.	DESCRIPTION	DRN	CHK	APP	DATE
1	-	ISSUE FOR CONSTRUCTION	JS	KK		7/99
0	-					

PROJECT NUMBER		NAME (PRINTED)		SIGN		DATE	
-		J. STANCLIFFE		-		7/99	
-		K. KOTZE		-		6/99	
-		APPROVAL FOR CONSTRUCTION		-		-	
SCALE		AREA		APP. CONSULT		APP. CLIENT	
NTS							
DO NOT SCALE		DRAWING TITLE		DRAWING NUMBER		SHEET	
DO NOT SCALE		PROCEDURE DETAILS HANDLING		PD10		2/2	
DO NOT SCALE		Factory Documents Manual				REV	
DO NOT SCALE						1	

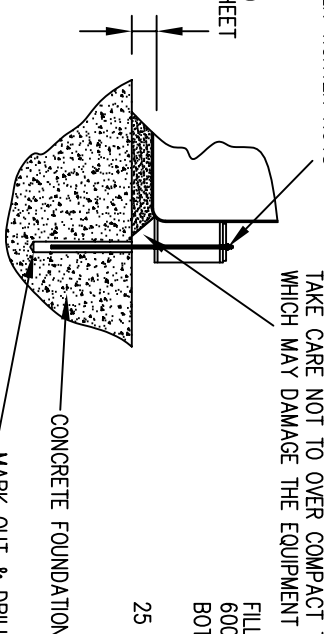


NOTES

ENSURE CORRECT GASKETS & BOLT TORQUES
DO NOT DRIFT BOLT HOLES
ENSURE NOZZLES ARE ISOLATED AS MUCH AS POSSIBLE
AND PRACTICAL FROM MISALIGNMENT, THERMAL EXPANSION
AND VIBRATION FROM CONNECTING PIPING.

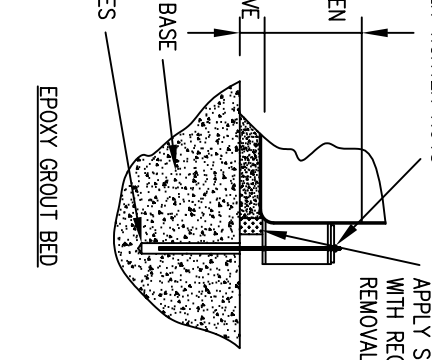


SEAL EDGE 45° WITH GROUT
OR BITUMEN & SAND MIX TAMPED DOWN.
TAKE CARE NOT TO OVER COMPACT THE EDGE
WHICH MAY DAMAGE THE EQUIPMENT FLOOR.



- MARK OUT & DRILL HOLD DOWN BOLT HOLES
1. $\phi 50$ X 350/300 DEEP (M16)
 2. $\phi 50$ X 450/400 DEEP (M20)
- GROUT BOLTS IN PLACE USING:
1. ARMAGROUT UW FOR WET CONDITIONS
 2. ARMAGROUT MG FOR DRY CONDITIONS

FILL TANK WITH
600 DEEP WATER TO FLATTEN
BOTTOM BEFORE GROUTING



APPLY BOXING
WITH REGARD TO
REMOVAL

1. AIR POCKETS BETWEEN EQUIPMENT BASE & FOUNDATION SHALL BE ELIMINATED WHERE THE BASE IS SUBJECT TO CYCLIC LOADING SUCH AS TANK FILLING/EMPTYING.
2. CONCRETE BASES SHALL BE FREE OF CRACKS, DEPRESSIONS AND VERTICAL PROJECTIONS > 13mm IN DEPTH.
3. DO NOT GROUT UNDER THE HOLD DOWN CHAIRS (THEIR FUNCTION IS TO RESIST OVERTURNING MOMENTS ONLY).
4. ACCIDENTALLY DAMAGED AREAS OF FRP EQUIPMENT SHALL BE NOTED/MARKED FOR INSPECTION & REPAIR AS NECESSARY (FRP ENGINEER TO INSPECT). TO AVOID DAMAGE WEAR SOFT SOLED SHOES WHEN WORKING INSIDE EQUIPMENT AND AVOID BRINGING STONES OR OTHER SHARP OBJECTS INTO THE AREA. PROTECT SURFACES FROM ACCIDENTAL DAMAGE FROM TOOLS ETC.
5. SWEEP CLEAN THE FOUNDATION / BASE / SADDLE BEFORE SETTING THE ITEM DOWN GENTLY.
6. FOR BURIED PRODUCTS CONSULT A LOCAL QUALIFIED CIVIL ENGINEER CONCERNING PROPER SOIL CONDITIONS AND LOCAL CODES WHICH MAY APPLY.
7. BOND & GAP FILL HORIZONTAL VESSELS TO SADDLES OTHERWISE LINE SADDLE WITH FLEXIBLE FILLER SHEET SUCH AS NEOPRENE.
8. SHIM AS NECESSARY EQUIPMENT LEGS, FEET ETC BEFORE BOLTING & GROUTING.

ARMATEC ENVIRONMENTAL LTD

THIS DRAWING IS THE PROPERTY OF ARMATEC Environmental Ltd. IT IS LOANED TO YOU SUBJECT TO RETURN ON DEMAND. ITS CONTENTS ARE CONFIDENTIAL AND MUST NOT BE COPIED OR USED TO ANY THIRD PARTY FOR USE OR EXAMINATION UNLESS ADVISED TO BE WRITTEN BY ARMATEC Environmental Ltd.

REV	NO.	DESCRIPTION	ISSUE FOR CONSTRUCTION	DATE
0	-		JS KK	7/99
REFERENCE DRAWINGS				
REV	NO.	DESCRIPTION	DRN CHK	APP

PROJECT NUMBER	DESIGNED	NAME (PRINTED)	SIGN	DATE	DRAWING TITLE
					PROCEDURE DETAILS INSTALLATION
SCALE	DRAWN	J. STANCLIFFE		7/99	
AREA	DRAWING CHK	K. KOTZE		6/99	
	DESIGN CHK				DRAWING NUMBER
	APPROVAL FOR CONSTRUCTION				PD11
	APP. CONSULT				SHEET
	APP. CLIENT				1
					REV
					0

DO NOT SCALE

PLEASE CHECK CURRENT REVISION