

PLEASE ADDRESS ANY CORRESPONDENCE TO WATER SUPPLY (NETWORK) DEPARTMENT

Our Ref: WSN 92413/46

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Date: 6 Sep 11

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To Relevant Government Agencies, Statutory Boards, Professional Engineers, M&E Consultants, Associations and Organisations

Dear Sir/Madam

NEW TIGHTENED MEASURES FOR WATER TANK SECURITY

Attached, please find a copy of our circular dated 27 Jun 11 to Town Councils, Management Corporation Strata Titles and building owners on the above.

2 The new tightened measures for water tank security apply to all water storage tanks for the supply of potable water with the exception of water storage tanks in residential premises which do not take their water supply through a master meter. Pursuant to Regulation 33 of the Public Utilities (Water Supply) Regulations, PUB directs all Professional Engineers who undertake water service work to ensure that the new tightened measures are also implemented for all such water storage tanks for potable water supply in new and on-going developments under their charge with immediate effect.

3 Hence, with immediate effect, Professional Engineers shall ensure that the following additional new tightened measures on water tank security are implemented for all such water storage tanks for potable water supply in new and on-going projects under their charge before certifying their satisfactory completion and submission of the Certificate of Satisfactory Completion of Water Service Work to PUB:

- a. All water tank covers are properly secured by bolting or fastening using stainless steel brackets/fasteners (please see attached slides for details and specifications). As far as possible, the bolting or fastening should be an integral part of the water tank (e.g. the base piece should be an integral part of the water tank).
- b. The room/enclosure housing the water tanks (e.g. pump/tank room, fenced-up enclosure, etc), access to the water tanks (e.g. rooftop access, intermediate level access, etc) and the water tank inspection covers are properly secured using high-quality, strong and durable hinges, latches and locks with non-duplicable keys.
- c. Have separate and different keys for tank cover, access door to rooftop, and access door to pump/tank room or enclosure. There shall be separate master keys for access doors to rooftop, access doors to pump/tank room & enclosure and water tank covers. The master keys to the access doors

to rooftop and pump/tank room & enclosure shall be limited to no more than 100 blocks or buildings. The master key for the water tank covers shall be limited to no more than 20 blocks or buildings. The master keys for access doors and tank covers in the different groupings (i.e. group of no more than 100 blocks/buildings for access doors to rooftop and pump/tank room & enclosure and group of no more than 20 blocks/buildings for water tank covers) shall be different.

4 We will appreciate it very much if you can help to disseminate the contents of this letter and attached circular and slides to the relevant officers/members in your company/organisation and ensure that the new water tank security measures are implemented in all your on-going and new projects with water storage tanks for potable water supply with immediate effect. Please note that non-compliance is an offence under the Public Utilities (Water Supply) Regulations which carries punitive penalties.

5 In addition to the above and other existing mandatory requirements, PUB would also like to encourage the provision of a dedicated room or enclosure for water storage tanks with separate locked access so that the tanks are segregated from other activities. The room or enclosure must be of an appropriate type that offers the tanks adequate protection and deterrence against unauthorised access. This will help to further protect the water tanks and strengthen water tank security.

6 If you have any queries concerning this circular or need any further clarification, please do not hesitate to contact any of the following PUB officers listed below.

Name	Email	Contact No.
Mr Christopher Chua	christopher_chua@pub.gov.sg	67313669
Mr Lee Cai Jie	lee_cai_jie@pub.gov.sg	67313250
Mr R Rajendram	rajendram_m_ramasamy@pub.gov.sg	67313859
Mr Tow Chuan Kwee	tow_chuan_kwee@pub.gov.sg	68852447

7 Thank you and best regards.

Yours faithfully



RAMAHAD SINGH
DEPUTY DIRECTOR (WATER DEMAND MANAGEMENT & INSPECTORATE)
for DIRECTOR
WATER SUPPLY (NETWORK) DEPARTMENT

Encs

PLEASE ADDRESS ANY CORRESPONDENCE TO WATER SUPPLY (NETWORK) DEPARTMENT

Your Ref :
Our Ref : WSN 92413/46
Date : 27 Jun 11

Tel : 67313669 Fax : 67313023
E-mail : christopher_chua@pub.gov.sg

*Town Councils
Management Corporation Strata Titles
Building owners*

Dear Sir /Madam

TIGHTENED MEASURES FOR WATER TANK SECURITY

I refer to our earlier circular of 27th May 2011 and our briefing sessions on 7th, 8th, 10th and 14th June 2011 on immediate measures to further tighten water tank security.

2 Thank you for attending the briefing session and your valuable feedback on the measures and implementation timeline mentioned in our circular of 27th May 2011.

3 Based on your feedback on operational constraints, we have fine-tuned some of these measures which need to be implemented by 1st July 2011. We have already briefed on these fine-tuned measures at the briefing session.

4 We also understand that some of you will require more time to undertake the prescribed infrastructural security measures, especially that of bolting or fastening of tank covers. Hence, PUB will extend the implementation date for these measures to 31st December 2011. Nevertheless, you are advised to endeavour to implement the prescribed infrastructural security measures as soon as possible to ensure the security of your water tanks is tightened. Please contact us to inform of your revised implementation date.

5 Please refer to Annex A for the updated list of measures and implementation dates. The key changes from the measures listed in the earlier circular on 27th May 2011 are highlighted in Annex B.

6 PUB will continue to work with you to implement the new measures as soon as possible.

7 Should you require any clarification or further assistance, please do not hesitate to contact the following officers:

Officer	Telephone No	Mobile No	Email Address
Rajendram	67313859	90184186	rajendram_ramasamy@pub.gov.sg
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Yours faithfully



CHRISTOPHER CHUA
EXECUTIVE ENGINEER (INSPECTORATE)
for DIRECTOR
WATER SUPPLY (NETWORK) DEPARTMENT

ANNEX A

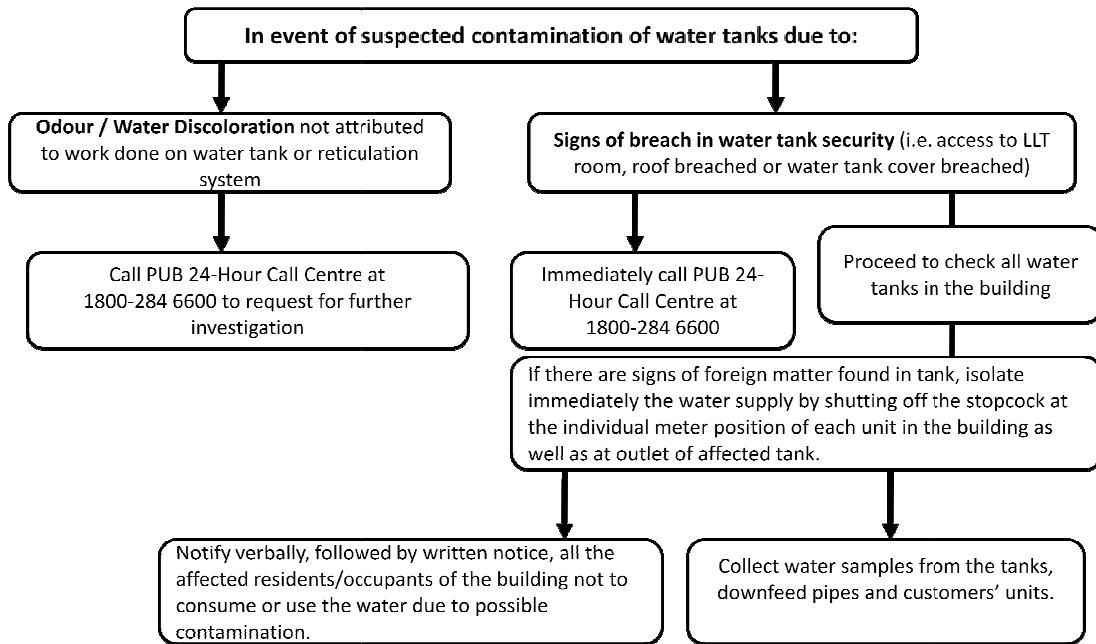
Town Councils (TCs)/Management Corporation Strata Title (MCSTs)/building owners are to implement the following measures to ensure security of water tanks:

Operational Measures to be implemented by 1 Jul 2011

- (a) Restrict access to the keys to tanks and pump/tank rooms to only TC/MCST/Managing Agent staff and Emergency Personnel.
- (b) Have separate and different keys for tank cover, access door to rooftop, and access door to pump/tank room or enclosure. The keys for the tank covers must be kept separate from other keys with access to the tank cover keys strictly controlled by authorised persons and restricted to only authorised persons.
- (c) There shall be separate master keys for access doors to rooftop, access doors to pump/tank room & enclosure and water tank covers. The master keys to the access doors to rooftop and pump/tank room & enclosure shall be limited to no more than 100 blocks or buildings. The master key for the water tank covers shall be limited to no more than 20 blocks or buildings. The master keys for access doors and tank covers in the different groupings (i.e. group of no more than 100 blocks/buildings for access doors to rooftop and pump/tank room & enclosure and group of no more than 20 blocks/buildings for water tank covers) shall be different. If a master key is lost, all corresponding locks shall be replaced.
- (d) Ensure that personnel authorised to work at rooftops, pump/tank rooms & enclosures and tanks are properly attired (e.g. identification vests, badges, etc) for easy identification as authorised personnel for work in these designated areas.
- (e) Conduct spot checks on works carried out at rooftops, pump/tank rooms & enclosures and tanks, and keep proper records of these checks.
- (f) For work involving tanks or within pump/tank rooms & enclosures, conduct checks and ensure that all access doors (i.e. access doors to rooftop and pump/tank room & enclosure, where applicable) and tank covers are properly and securely locked at the end of each day and upon completion of work. Proper records of these checks must also be kept.
- (g) In case of suspected contamination of water tanks, to immediately:
 - Notify PUB at 24 Hour Call Centre at 1800-2846600.
 - Isolate water supply & collect water samples.
 - Notify verbally, followed by written notice, all residents not to consume or use water due to possible contamination.
 - Shut off stopcock at meter position of each unit.

The SOP to be adopted in the event of suspected contamination of water tanks is given below.

Flowchart for Dealing with Suspected Contamination of Water Tanks



Infrastructural Measures to be Implemented by 31 Dec 2011

- (h) Properly secure all water tank covers by bolting or fastening.
- (i) Properly secure the room/enclosure housing the water tanks (e.g. pump/tank room, fenced-up enclosure, etc), access to the water tanks (e.g. rooftop access, etc), and the water tank inspection covers using high-quality, strong and durable hinges, latches and locks with non-duplicable keys.

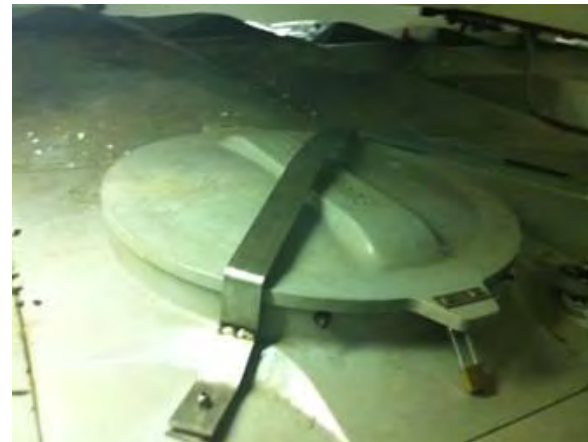
Key Changes from Measures Listed in Earlier Circular on 27 May 2011

S/No	Measures listed in circular on 27 May	Revised measures
1	Different keys each for tank cover, pump room and roof access	Separate keys for tank covers, pump room and roof access One master key each for <ul style="list-style-type: none"> • Access doors of not more than 100 blocks • Tanks of no more than 20 blocks • Corresponding locks shall be replaced if key is lost.
2	Standing supervision during works carried out on rooftops, pump/tank rooms & enclosures and tanks	Conduct spot checks on works carried out at rooftops, pump/tank rooms & enclosures and tanks, and keep proper records of these checks.
3	Screening of personnel allowed access to the water tank area and/or water storage tanks	Ensure that personnel authorised to work at rooftops, pump/tank rooms & enclosures and tanks are properly attired (e.g. identification vests, badges, etc) for easy identification as authorised personnel for work in these designated areas.

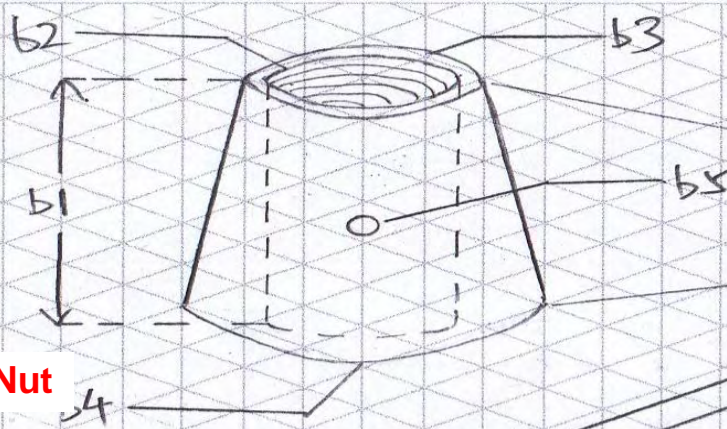
NEW MEASURES TO TIGHTEN WATER TANK SECURITY



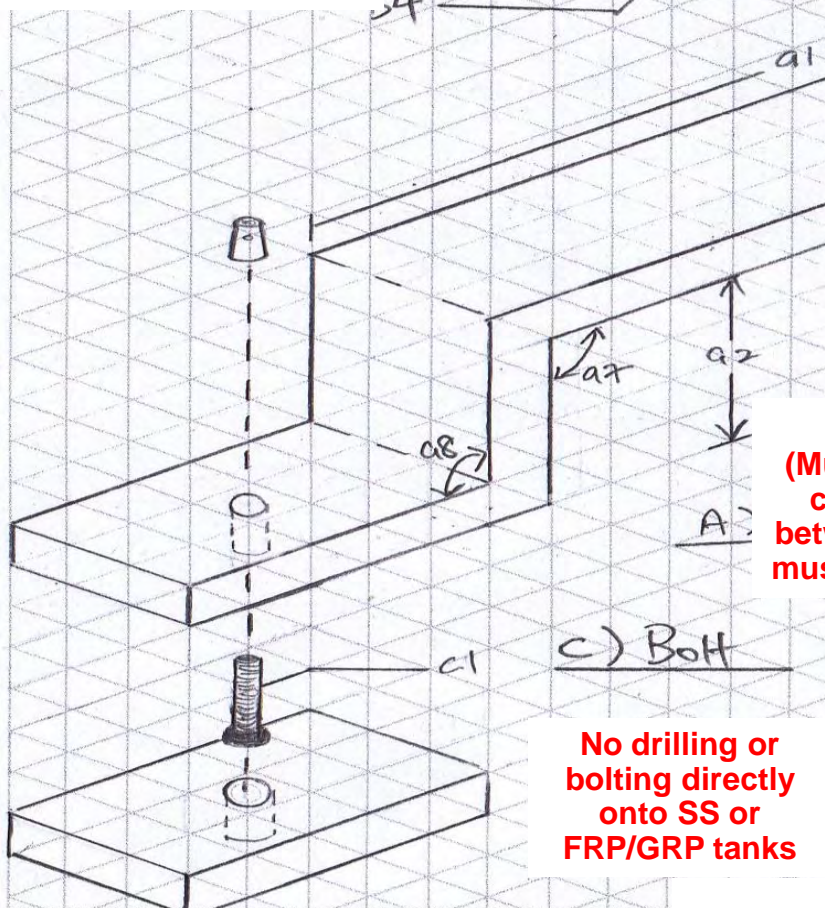
SECURE ALL TANK COVERS BY BOLTING/FASTENING



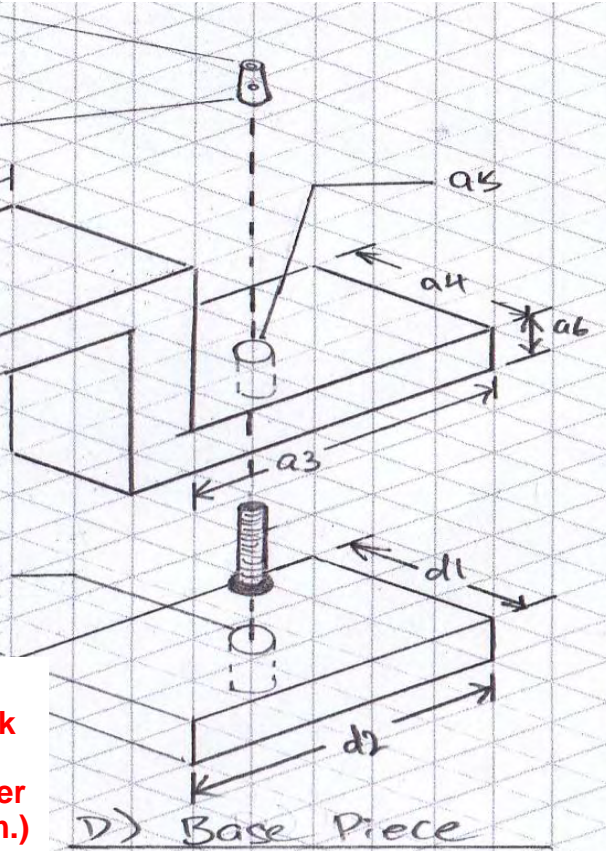
SECURE TANK COVERS BY BOLTING/FASTENING



Tapered Round Nut



Bracket
(Must follow contour of tank cover closely. Clearance between bracket & tank cover must not be more than 5 mm.)



D) Base Piece

C) Bolt

No drilling or bolting directly onto SS or FRP/GRP tanks



Base Piece & Bolt
(bolt to be welded onto base piece)

Base piece to be installed onto concrete tanks by raw bolting. Qualified Engineer or Tank Specialist to be consulted to avoid damaging water-proofing.

Base piece to be installed onto SS & FRP/GRP tanks using 2.3 mm thick 3M VHB Tape

SECURE TANK COVERS BY BOLTING/FASTENING

BRACKET

- Must follow contour of tank cover closely. Clearance between bracket & tank cover must not be more than 5 mm.
- To be installed half the length or diameter of tank cover away from locking end
- Material: SS304
- Width: 38mm
- Thickness: 3mm
- Holes: M8
- Length, Height, Base Length, Bending Angles: Vary according to site



SECURE TANK COVERS BY BOLTING/FASTENING

BASE PIECE & BOLT

Base Piece

- Material: SS304L
- Thickness: 3mm
- Hole: for M8 bolt (tack weld)
- Width & Length: Vary according to site

Bolt

- Material: SS304L
- Diameter: M8



SECURE TANK COVERS BY BOLTING/FASTENING

BASE PIECE & BOLT

- Base piece to be installed onto tank or manhole frame
- No drilling or bolting directly onto SS or FRP/GRP tanks
- Base piece to be installed onto SS & FRP/GRP tanks using 2.3 mm thick 3M VHB Tape
- Base piece to be installed onto concrete tanks by raw bolting. Qualified Engineer or Tank Specialist to be consulted to avoid damaging water-proofing.
- Bolt to be welded onto base piece



SECURE TANK COVERS BY BOLTING/FASTENING

3M VHB TAPES FOR CONSTRUCTION APPLICATIONS

- Used to install base piece onto SS & FRP/GRP tanks
- 25mm x 2.3mm thick
- To specify audit (& training, if required) when ordering



SECURE TANK COVERS BY BOLTING/FASTENING

INSTALLATION PROCEDURE: INSTALLING BASE PIECE ONTO TANK



Step 1: Clean base piece using 3M sharpshooter to get rid of dirt



Step 2: Apply 3M tape primer to prepare base piece for bonding

SECURE TANK COVERS BY BOLTING/FASTENING

INSTALLATION PROCEDURE: INSTALLING BASE PIECE ONTO TANK



Step 3: Stick 3M VHB tape to base piece



Step 4: Use a roller to apply even pressure for 30 seconds

SECURE TANK COVERS BY BOLTING/FASTENING

INSTALLATION PROCEDURE: INSTALLING BASE PIECE ONTO TANK



Step 5: Clean tank surface using 3M sharpshooter to get rid of dirt



Step 6: Apply 3M tape primer to prepare the tank surface for bonding

SECURE TANK COVERS BY BOLTING/FASTENING

INSTALLATION PROCEDURE: INSTALLING BASE PIECE ONTO TANK



Step 7: Peel off 3M VHB tape (halfway) & prepare to position base piece onto tank surface



Step 8: Position base piece onto tank surface and pull tape off completely

SECURE TANK COVERS BY BOLTING/FASTENING

INSTALLATION PROCEDURE: INSTALLING BASE PIECE ONTO TANK



Step 9: Use a roller to apply even pressure for 30 seconds



Step 10: Secure bracket to base piece using round nut with c-tool

SECURE TANK COVERS BY BOLTING/FASTENING

TAPERED ROUND NUT

- Material: SS304
- Height: 20mm
- Internal Diameter: M8
- Top External Diameter: 10mm
- Bottom External Diameter: 15mm
- Hole (x2 centre to centre): 4mm dia, 4mm depth



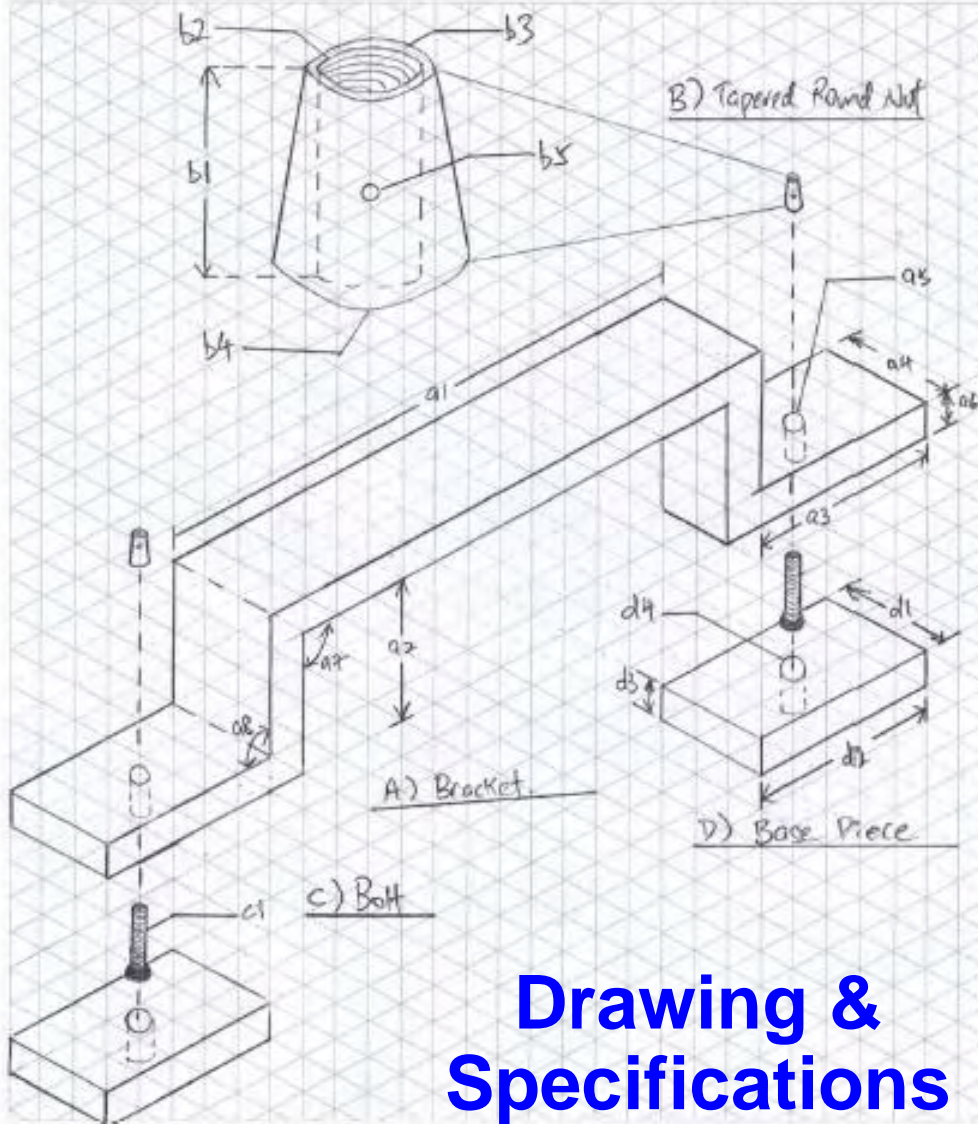
SECURE TANK COVERS BY BOLTING/FASTENING

HOOK WRENCH OR C-TOOL

- For locking or unlocking round nut



SECURE TANK COVERS BY BOLTING/FASTENING



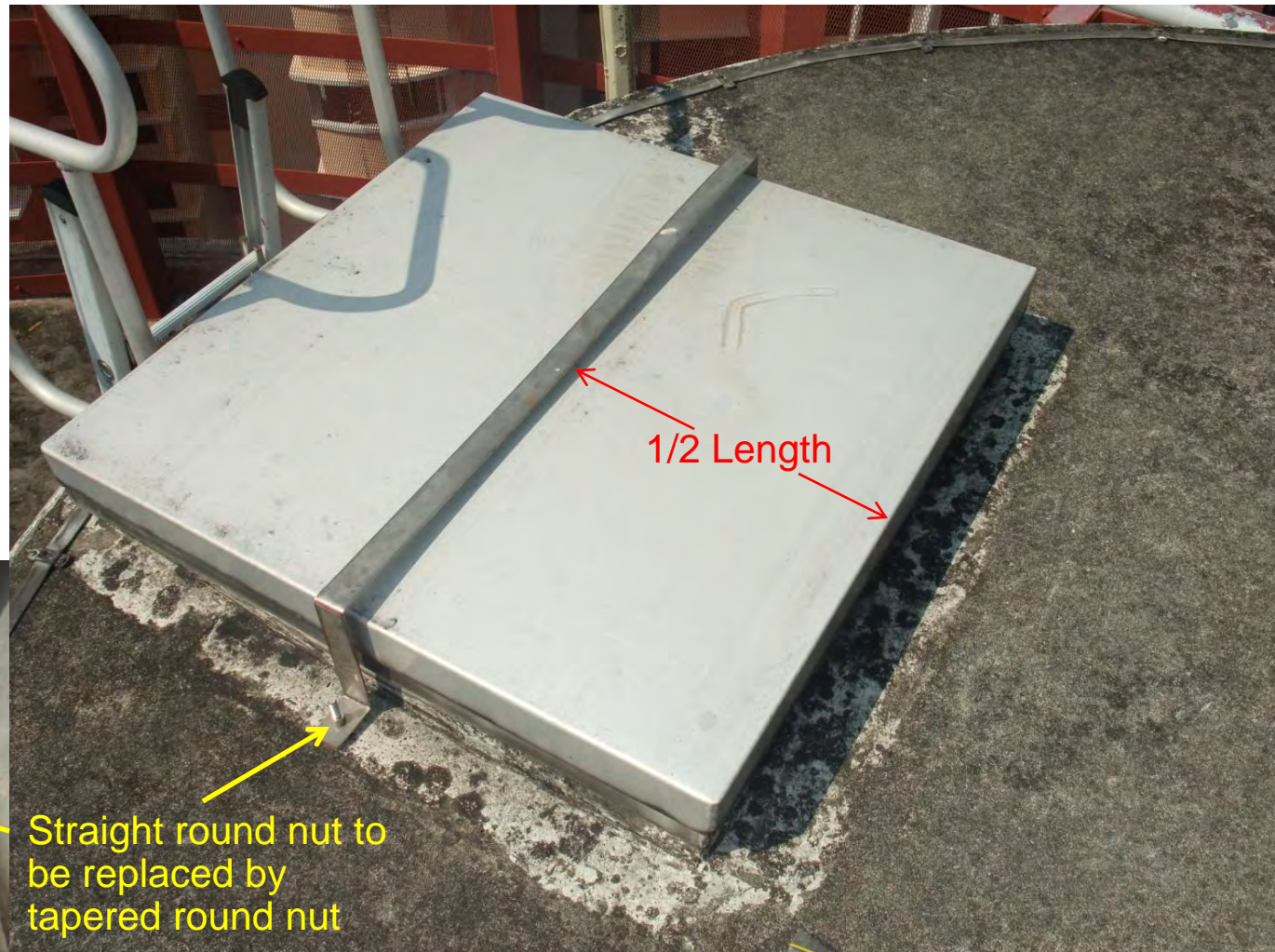
Drawing & Specifications

Part List		
A) Bracket SS304		
Part	Description	Dimension
a1	length	vary according to site
a2	height	vary according to site
a3	base length	vary according to site
a4	width	38mm - 50mm
a5	hole	M8
a6	thickness	3mm
a7	1st bending angle	vary according to site
a8	2nd bending angle	vary according to site
B) Tapered Round Nut SS304		
Part	Description	Dimension
b1	height	20mm
b2	internal dia	M8
b3	top external dia	10mm
b4	bottom external dia	15mm
b5	hole (x2 centre to centre)	4mm dia, 4mm depth
C) Bolt SS304L		
Part	Description	Dimension
c1	Diameter	M8
D) Base Piece SS304L		
Part	Description	Dimension
d1	width	vary according to site
d2	length	vary according to site
d3	thickness	3mm
d4	hole	for M8 bolt (tag weld)

SECURE TANK COVERS BY BOLTING/FASTENING

CONCRETE TANKS

- Base piece installed onto concrete tanks by raw bolting.
- Qualified Engineer or Tank Specialist consulted to avoid damage to water-proofing.

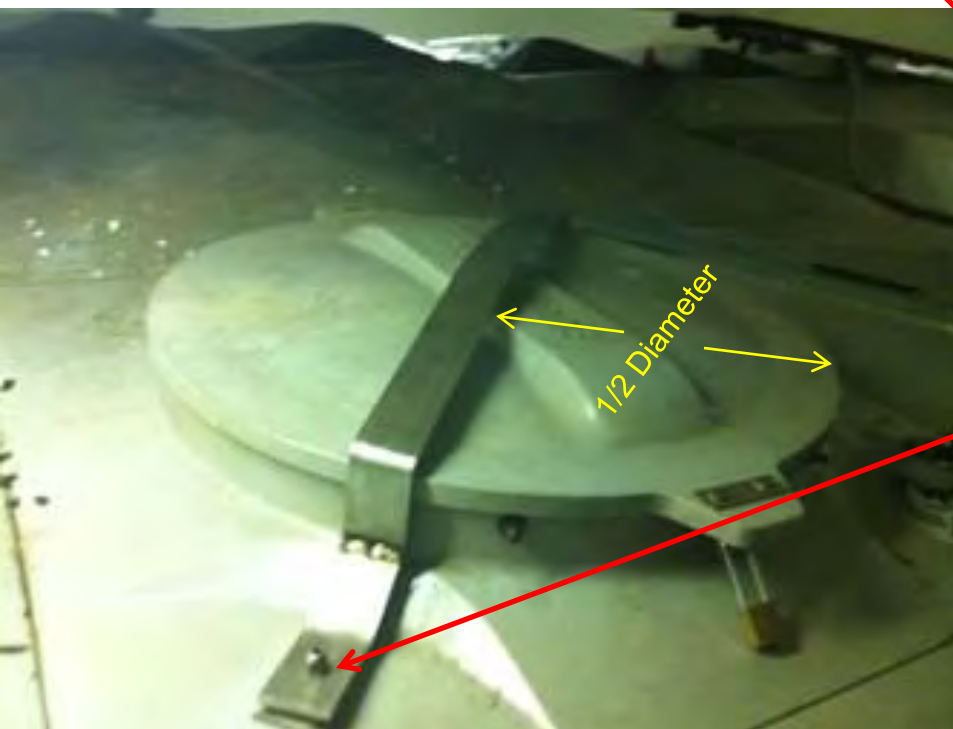


SECURE TANK COVERS BY BOLTING/FASTENING

FIBRE REINFORCED POLYESTER (FRP) & GLASS REINFORCED POLYESTER (GRP) TANKS

Base piece installed onto FRP/GRP tank using 2.3 mm thick 3M VHB Tape

Hexagonal nut to be replaced by tapered round nut

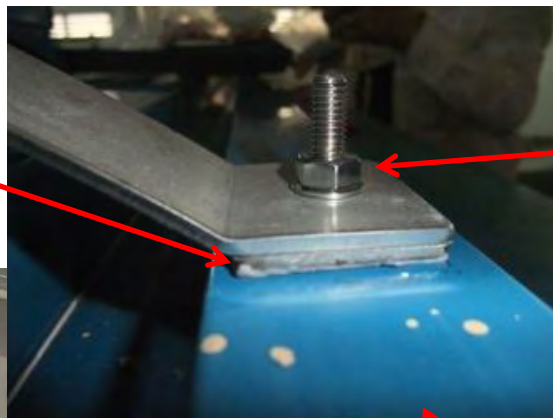


Brackets must follow contour of tanks closely. Clearance between bracket & tank cover must not be more than 5 mm.

SECURE TANK COVERS BY BOLTING/FASTENING

STAINLESS STEEL TANKS

Base piece installed onto SS tank using 2.3 mm thick 3M VHB Tape



Hexagonal nut to be replaced by tapered round nut



1/2 Length

Brackets follow contour of tanks closely. Clearance between bracket & tank cover must not be more than 5 mm.