

TECH TALK No. 27

**8 JULY 1997
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MANHOLE COVERS FOR PETROLEUM TANKERS

SUMMARY

Describes the Liquip "VOH" range of manholes; the reasons for the varying styles; and the wide range of options. These manholes are specifically for petrol (gasoline) style tankers.

MODEL NUMBERS DESCRIBED

- ◆ VOH200 series (clampband)
- ◆ VOH400 series (clampband)
- ◆ VOH700 series (bolt-down)

VOH100 is still available for spares and replacement purposes but is being phased out by the cheaper and lighter modern covers.

Similarly CH700 export shape oval manhole is available on request but it is costly compared with modern round units and is phasing out. CH103 oval manhole is an earlier Australian model not interchangeable with CH700 and also no longer in stock production.

These latter three are not part of the mainstream "mix and match" options availability.

COMMON DESIGN FEATURES

As road-tankers became more sophisticated, more and more functions were required on the tanker, such as overfill protection.

Placing these functions on the walkway created a driver trip-hazard due to the clutter: it physically weakened the tank structure: and it added weight and cost as so many new holes and flanges were fitted. So the designers looked at accommodating as many as possible of these fittings into the manhole casting to minimise cost and weight and allow off-tank assembly and test of the equipment. All covers are cast aluminium.

All "VOH" manholes have as a minimum:

- * Emergency Vent
- * Inspection hatch
- * Safety latch
- * Pressure-vacuum vent

Options include:

- * 400mm, 450mm or 500mm dia (500mm to come)
- * Clamp-band fixing or bolt-down
- * Australian Drop-Test Approval or lesser tests.
- * USA/UK pressure-vacuum settings or Australian
- * Vapour valve mount
- * Overfill probe mount
- * Dip fitting
- * Fill fitting
- * Gravity latch
- * Locking bridge
- * Customs seal points
- * Aluminium mechanism or steel
- * Aluminium weld ring or steel

HOW TO CHOOSE

Discuss with end user and tank builder, to specify a model with the right balance between price and features.

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Cost increases with size.  
Cost increases with number of mountings provided.  
Cost increases with the number of gadgets.  
Cost increases with Drop-Test severity.

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Ensure you are familiar with and specify correctly to meet local regulations and habits.

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Check List:-

VOH2\*0 series: One equipment mount and probe mount. 400 dia. Clamp-band.  
VOH2\*3 series: No mount holes of any type. 400 dia. Clamp-band.  
VOH4\*0 series: Three equipment mounts and probe mount. 450 dia. Clamp-band.  
VOH7\*0 series: Two equipment mounts and probe mount. 450 dia. Bolt-down.

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HELPFUL HINTS

- * Certain equipment such as dip and vapour valve require a particular position or orientation. Be aware of how each manhole will sit on the walkway in that regard and whether users prefer forward or rear hinging of the bridge and lid.
- * The steel bridge and handle was originally designed for the VOH200 series manhole to create a particularly low-cost manhole.

It can also be used of course on the VOH700 series but it must be assembled as shown on catalogue page E9 (93) of the export catalogue. This shows the bridge and lid hinging away from the dip point. If you try to reverse this hinging direction it is not a problem except you cannot then fit anything except a blank plate on the dip point.

- * A dip or fill square flanged fitting will also fit on the rounded vapour valve (vent) mount but the vapour valve will not fit on the dip mount. The poppet is too large.
- * VOH700-4U is hatch lid used on VOH200 series and VOH700 series manholes for overseas.

The two anti-rotation lugs, which sit on both sides of the bridge when assembled, were originally close together to suit the aluminium bridge.

They are now farther apart to suit the wider steel bridge but still have the same part number. The older (narrow) style is being used up as orders are processed then all units will be the wide type regardless of the style of bridge.

- * You may come across some special VOH700 covers in the store with no holes at all, these being cast full. These were specials done for a special job and are not a production item.
- * Hinge-pins may vary among the different models. Always check the parts lists.

SEE ALSO:

TECH TALK NO. 60, Drop Test Regulations and Code Worldwide

WHICH ARE DROP TEST APPROVED TO AS2809?

- Covers:** For approved manhole covers, see the attached charts.
- Coamings:** Most VOH200 series with mild steel coaming are **APPROVED**. VOH200 series current stock of aluminium, VOH200U-15A in type 5005 material is **NOT** approved. A new coaming in 5083 material will have a new number and is not yet in stock, but **HAS** just been drop-test approved.
- Most VOH-400 are **APPROVED** with aluminium coamings and with VOH300-17 mild steel coaming.
- Should this style cover be developed for use with both aluminium and mild steel coamings it will acquire a new designation as it will have design changes to the main seal and hatch (to tee seal).
- Most VOH700 are **APPROVED** with both aluminium and steel coamings.
- Hatches (9" lids):** Note that the standard lids used on VOH200 and VOH700 are marked for overseas vent ratings and are not suitable for Australia and New Zealand.
- The die has removable labels and new castings are required to part number VOH700-4 with the correct vent settings for these countries.
- Pressure-Vacuum Vent:** The standard vent on the VOH200 series and VOH700 series is the PVV104U.
- This must be changed to PVV104 if sold in Australia and New Zealand.
- Clamp-band:** VOH200 series supplied only with VOH200u-16 spot-welded clamp band.
- VOH400 series supplied with VOH300u-16 spot welded clamp-band **EXCEPT** Marshall Lethlean insist on supply of special order VOH300-16 old style with cast and welded-on lugs.

MOUNTING HOLES

Probe Mounting Holes

Recess is identical on all.

VOH200 and VOH700 have through holes.
VOH400 has blind tapped holes.

Use VOH200-5 for all, the kit now includes a fibre washer.

VOH200-18 housing is as above but has blind tapped holes to mount to VOH200 and VOH700.
Pattern is ready but production never commenced.

Vapour Valve (Vent) Mounting Holes

These are the round shaped flanges with an inside diameter of 92mm.

ALL manhole covers have through holes to suit the AVV3L vent which has cast-in threaded inserts. Therefore, the screw fits in from underneath.

Dip and Fill Mounting Holes

These are the square shaped flange with an inside diameter of 87mm.

VOH400 is blind tapped.
VOH200 and VOH700 are both through holes.

Note: Dip and fill tubes for VOH100 are not included here for clarity. Also 100mm dia dip and fills are obsolete and excluded.

Dip and Fill Adaptors

While not strictly a part of the manhole, it is better to include the dip and fill components here to clarify what will fit where and how they fit.

- * Styles available are Bayonet (50mm and 80mm) and Camlock (63mm and 80mm).
- * They may have integral "skirts" to fit to 80mm tubes . . . or require separate mandrel-type adaptors.
- * Mounting may be by open holes on flange or tapped holes on flange or weld-on flange (Hockney).

If mounting is by through hole, fibre washers must be used on VOH200 and VOH700 series as the manhole covers are also through hole.

* **DTA80 and DTA65 Dip Adaptors.**

Standard camlock tops, through-hole square flanges, skirt on bottom of 74.5 diameter to suit standard 80mm dip tube DTS3 type. Weld to skirt or if pop-riveting it is essential to use steel rivets of the largest possible diameter.

Screw down on to VOH400 (which has blind tapped holes) or through-bolt using fibre washer under bolt head to VOH200 series and VOH700 series.

* **FTA80 and FTA65 Fill Adaptors.**

Standard camlock tops, through hole flange, skirt on bottom of 77mm dia to suit standard 80mm fill tube FTB3 type.

Otherwise exactly as dip adaptor above.

* **DTA80L and FTA80L Special Purpose.**

Exactly as above except the square flanges are drilled and tapped instead of being holed.

For special applications only.

* **DTA80-3 and FTA80-3 Weld-in.**

Exactly as above except having an integral weld-in flange for use with the Thomas tanker.

* **DBA80 is the Bayonet-type Adaptor, 80mm.**

It has the square flange with through holes but it does not have a skirt. It must be used in conjunction with one of the mandrels described below.

* **DBA50 is a Bayonet-type Adaptor, 50mm.**

It has the square flange but this unit has blind tapped mounting so must be screwed from underneath.

It does not have a skirt and so must be used with one of the mandrels described below.

* **DTA80-4 Flange Adaptor for Dip Tube (Mini-Mandrel).**

Essentially a through-hole square flange with a skirt, this is welded to the dip tube to provide a mount compatible with the 'DBA' adaptors.

If the walkway or manholes are completely flat, the mandrel and adaptor can bolt together with the walkway as a 'sandwich'. Alternatively the dip tube and mandrel assembly can be dropped down the manhole hole and the DBA adaptor bolted on top. Ensure gaskets are fitted to all joints and a fibre washer is fitted internally.

* **DTM80 is a Mandrel which includes:**

Large-port gauzed openings at the top to minimise tank pressuring. Otherwise it is the same style and function as the DTA80-4.

SPECIALIST PARTS

DSI50 Dipstick Interlock is sandwiched underneath the dip adaptor and above the mandrel flange. It is currently a UK-only item.

DBM80 is a one-piece ported mandrel complete with DTM80 integral top and integral Thomas-type weld flange. Currently Hockney-use only.

BLANKING PLATES

<u>Probe Hole</u>	VOH200-14 (through hole)
	VOH700-14 (blind tapped)
<u>Square Hole</u>	VOH16 (through hole)
	VOH700-13 (blind tapped)
<u>Round (Vapour) Hole</u>	VOH16 (through hole)
	AVV3.0-10 (blind tapped)

WEATHER-COVERS

Use HWC301 for VOH400.

There are no current production designs for weather covers for VOH200 and VOH700 manholes. This is simply because there has not yet been any demand.

PARTICULAR SELLING FEATURES

- * The widest range of manholes made by any manufacturer. If you can't find one here it's becoming impossible!
- * All pressure-vacuum vents have full positive-seal roll-over protection. Not the ball-bearing-in-a-hole that is token sealing only, as used by many companies.
- * Cast aluminium bodies and lids cannot rust.
- * Hollow tee-seal on lids and hatches provides superb sealing with ease of replacement.
- * Lid has opening to 100° only to ensure closure with vehicle movement should driver forget to shut before departure.
- * Full range of blanking plates if mounting bosses are not being used.
- * Wide range of equipment attachment options.
- * We get more equipment (probe, PVV, vapour vent, dip, fill) on our manhole cover than anyone else achieves. Less holes in tank, less cost, less weight.

SUMMARY OF DROP TEST APPROVALS AS OF JUNE 2005

MANHOLE REF No/SPEC	CLAMPBAND & COAMING MATERIAL No /SPEC	EMERGENCY VENT SUB ASSEMBLY No/SPEC	NOTES	STANDARD COMPLIED WITH
EH9 SERIES	ALL LISTED	ALL LISTED	SUPERSEDED SEE EH230 SERIES	Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
EH230-A	ALUMINIUM	ALL SUB ASSEMBLIES LISTED FOR EH230 ASSY	REPLACES EH9 SERIES	Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
EH230-M	MILD STEEL GRD 250	ALL SUB ASSEMBLIES LISTED FOR EH230 ASSY	REPLACES EH9 SERIES	Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
EH230-S	STAINLESS STEEL GRD 316	ALL SUB ASSEMBLIES LISTED FOR EH230 ASSY	REPLACES EH9 SERIES	Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
CH700			OBSOLETE	Australian AS2809 Drop Test
SH303				Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
SH304				Australian AS2809 Drop Test CEN 1.2 Metre Drop Test
VOH100			OBSOLETE	Australian AS2809 Drop Test

MANHOLE REF No/SPEC	CLAMPBAND & COAMING MATERIAL No /SPEC	EMERGENCY VENT SUB ASSEMBLY No/SPEC	NOTES	STANDARD COMPLIED WITH
VOH200U Alum T6 SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-30 ALUM 5083-T0 Coaming	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies		Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH203U Alum T6 SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-30 ALUM 5083-T0 Coaming	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies		Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH213U Alum SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-15A ALUM 5005-H31Coaming	VOH200-2U Bridge only All other parts standard to all sub assemblies		NONE
VOH210U Alum SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-15A ALUM 5005-H31Coaming	VOH200-2U Bridge only All other parts standard to all sub assemblies		NONE
VOH220U Alum SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-15A ALUM 5005-H31Coaming	VOH500-2&VOH500-3 STEEL Bridge & Handle only All other parts standard to all sub assemblies		NONE
VOH223U Alum SERIES	VOH200U-16 Clampband/ VOH200U-15M STEEL.GRD 250 Coaming & VOH200U-15A ALUM 5005-H31Coaming	VOH500-2&VOH500-3 STEEL Bridge & Handle only All other parts standard to all sub assemblies		NONE
VOH200 Alum	VOH200-35 Clampband/ VOH200U-15M Steel GRD 250 coaming	VOH500-30A MILD STEEL VOH500-30U MILD STEEL		NONE

MANHOLE REF No/SPEC	CLAMPBAND & COAMING MATERIAL No /SPEC	EMERGENCY VENT SUB ASSEMBLY No/SPEC	NOTES	STANDARD COMPLIED WITH
VOH200 Alum	VOH200-35 Clampband/ VOH200U-15M Steel GRD 250 coaming	VOH500-31A FIXED BRIDGE VOH500-31U FIXED BRIDGE VOH500-32A PLAIN BRIDGE VOH500-32U PLAIN BRIDGE VOH500-33A LOCK BRIDGE VOH500-33U LOCK BRIDGE		NONE
VOH200 Alum	VOH200-35 Clampband/ VOH200U-30 Aluminium Coaming	VOH500-31A FIXED BRIDGE VOH500-31U FIXED BRIDGE VOH500-32A PLAIN BRIDGE VOH500-32U PLAIN BRIDGE VOH500-33A LOCK BRIDGE VOH500-33U LOCK BRIDGE		NONE
VOH200 Alum	VOH200-35 Clampband/ VOH200U-30 Aluminium Coaming	VOH500-30A MILD STEEL VOH500-30U MILD STEEL		NONE
VOH400 Alum	VOH300-16 Clampband/ VOH300-15, VOH300-15P Coamings ALUM	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH410 SERIES	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH400 Alum	VOH300-16 Clampband/ VOH300-17 Mild Steel Coamings GRD 250	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH410 SERIES	NONE
VOH410 Alum	VOH300-16 Clampband/ VOH300-15, VOH300-15P Coamings ALUM 6065 T595	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SEE VOH00310 TEST DOC	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH410 Alum	VOH300-16 Clampband/ VOH300-17 Mild Steel Coamings GRD 250	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SEE VOH00309 TEST DOC	Australian AS2809 Drop Test

MANHOLE REF No/SPEC	CLAMPBAND & COAMING MATERIAL No /SPEC	EMERGENCY VENT SUB ASSEMBLY No/SPEC	NOTES	STANDARD COMPLIED WITH
VOH500 Alum T6 VOH500D-1 & VOH500-1	VOH500-14M Coaming Mild Steel GRD 250	VOH500-32A PLAIN BRIDGE VOH500-32U PLAIN BRIDGE VOH500-33A LOCK BRIDGE VOH500-33U LOCK BRIDGE	SEE VOH00505 TEST DOC	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH500 Alum T6 VOH500D-1 & VOH500-1	VOH500-14A 5005 H31 6 mm thick Rolled Coaming	VOH500-30A MILD STEEL VOH500-30U MILD STEEL		NONE
VOH500 Alum T6 VOH500D-1 & VOH500-1	VOH500-14M Coaming Mild Steel GRD 250			NONE
VOH500 Alum T6 VOH500D-1 & VOH500-1	VOH500-14A 5005 H31 6mm thick Rolled Coaming	VOH500-32A PLAIN BRIDGE VOH500-32U PLAIN BRIDGE VOH500-33A LOCK BRIDGE VOH500-33U LOCK BRIDGE	SEE VOH00205 TEST DOC	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
Fort Vale 859/9950 500mm Hatch Assy GRD316 Stainless Steel	STAINLESS STEEL GRD 316	NOT APPLICABLE		Australian AS2809 Drop Test USA MC306 Pressure Test UK 1 Metre Drop Test CEN 1.2 Metre Drop Test

MANHOLE REF No/SPEC	CLAMPBAND & COAMING MATERIAL No /SPEC	EMERGENCY VENT SUB ASSEMBLY No/SPEC	NOTES	STANDARD COMPLIED WITH
VOH700 Alum	NONE TESTED	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH750 SERIES	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH710 Alum	NONE TESTED	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH750 SERIES	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH710112 Alum	NONE TESTED	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH750 SERIES	
VOH710113 Alum	NONE TESTED	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH750 SERIES	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH730 Alum	NONE TESTED	VOH400-2U Alum T6 Bridge only All other parts standard to all sub assemblies	SUPERSEDED SEE VOH750 SERIES	Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test
VOH750 Alum	VOH700-26 Alum 5005 H31	VOH500-30A MILD STEEL VOH500-30U MILD STEEL		NONE
VOH750 Alum	VOH700-26 Alum 5005 H31	VOH500-32A PLAIN BRIDGE VOH500-32U PLAIN BRIDGE VOH500-33A LOCK BRIDGE VOH500-33U LOCK BRIDGE		Australian AS2809 Drop Test USA MC306 Pressure Test CEN 1.2 Metre Drop Test

VOH400	All-aluminium trim.	To Australian Standard
VOH200 Series	All-aluminium trim plus T6 cover	To Australian Standard
VOH700	All-aluminium trim	To Australian Standard
SH303 and SH304	Any material	To Australian Standard
Fort Vale	859/9950, 500mm stainless steel "Rushmore"	To Australian Standard
VOH700 Series	Steel handle and bridge, as - cast cover	NONE
VOH200 Series	Steel handle and bridge, as - cast cover	NONE
EH9 Series	Inspection Hatches	To Australian Standard
VOH100	(no longer in production)	To Australian Standard
CH700	(no longer in production)	To Australian Standard
VOH500D	All-aluminium& Steel trim (Steel Bridge not approved)	To Australian Standard

APPROVAL PROCEDURE

From this date, Australia has adopted self-certification and no further approvals or approval numbers will be issued by NSW Dangerous Goods. The attached Certificate of Conformity will be completed by us to provide evidence to any customers.