

Fig 1



Screw-Lid

SA Patent 2005/06650 (lid)
& SA Pat application 2015/07179 (lock & key assembly)

Two lockable concrete 'screw-lids' (see fig 1) are used to provide extreme protection against vandalism of a valve chamber in a new pump station in Mogale city. Other measures taken to prevent vandalism of the pump station include walls, roof, and doors also made of concrete, and small air holes in the walls are used for ventilation in preference to steel louvres.

Manufactured & installed by
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Fig 19



Fig 18

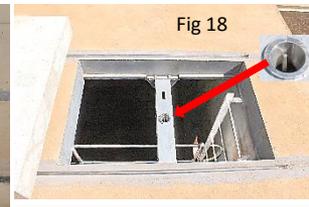


Fig 20



Fig 17



Fig 16



Fig 15



Fig 14



Fig 13



Fig 12

To start with steel frames (3CR12) are placed on the shutter boards at the time of fixing the reinforcing (see fig 2). Each frame has two rails welded above that run the full length of the frame. In fig 3 the concrete has been cast and the screw-lids have been installed in their frames. At the centre of each lid is an 'access tube' that goes all the way through the lid and facilitates the locking/unlocking and opening/closing of the lid.

Figs 4 to 6 show the plug being lifted out of the access tube using a magnet that is attached to the back end of the 'key assembly'. Figs 7 to 10 show the sequence of unlocking and lifting out the lock, this time by using the other end of the 'key assembly'. The 'opening tool' is now lowered into the open access tube (see fig 11) until its threaded section (screw) makes contact with the brass nut at the lower end of the access tube (see inset). Now the tool's handle is turned and it continues downwards until its male conical tip seats into a female conical bush (see inset in fig 18) in the centre of the 'box-beam' (see fig 18), and with continued turning the lid begins to rise above the slab (fig 12). With the lid completely above the slab and the rails, two sets of wheels, attached to the underside of the lid, come into view (fig 13).



Fig 2



Fig 3

The lid may now be rotated by hand (see fig 14) until it has moved through 90 degrees (fig 15). At this point the two sets of wheels will line up with the rails, and the opening tool may now be turned counter-clockwise until the wheels come to rest on the rails (fig 16). With continued turning the male cone exits the female conical bush. The lid may now be pulled open (fig 17), revealing the box-beam (fig 18) that supports the opening tool during the lifting (or lowering) cycle. It is also evident from fig 18 that the space between the box-beam and the ladder is sufficient for human entry. If however, a large valve for example needs to be replaced, then the four bolts holding the beam to the frame may be removed and the beam removed. (The box-beam is light enough to be lifted out with one hand!). Fig 19 gives a view of the underside of the steel frame, and shows one lid in the raised position while the second lid is closed. The lids are made from 60MPa concrete and have multi-layers of reinforcing bars that are so closely spaced (see fig 20) that the lid is in effect chisel proof.

The various components and locking mechanisms in fig 1 through 13 are made from stainless steel. Screw-lids are made for manhole sizes : 750 wide x 950 / 1150 /1550 /1950 mm long.

See www.concretedoorsandvaults.com for other anti-theft/vandalism products in our range.



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8



Fig 9



Fig 10



Fig 11



Fig 12