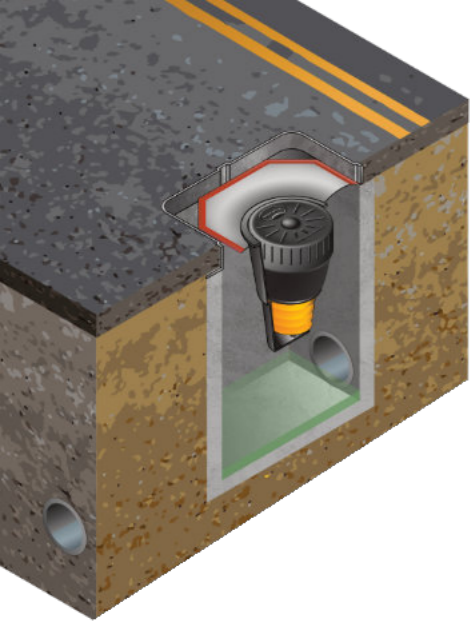


Odour Abatement Device

Manhole Chamber for Pressure
& Gravity Sewer Systems





The Mill-Pro Odab™ (Odour Abatement Device), is an activated carbon filter cartridge designed to absorb odours created in pressure and gravity sewer pipeline systems. Hydrogen Sulphide (H₂S) is an unpleasant “rotten egg” odour that vents to atmosphere through manholes. The replaceable Odab cartridge contains a special media formulation comprised of activated carbon and other compounds that indicate with colour when the cartridge is exhausted. The media formulation maximises flow through the entire absorption bed, capturing H₂S and related odours that are generated when raw sewer is exposed to air in pipelines and chambers.

The Odab is licensed from Inventive Resources Inc in the United States, where it has been in operation successfully in the US and other countries since 2010. The design includes patented expanding bellows, drains for surface water, non-return valves and other features that ensure the media is only exposed to peak flow H₂S. Peak flow is a fraction of the typical exposure, this extends cartridge life 10x more than media constantly exposed to H₂S.

THE PROBLEM

Hydrogen Sulphide (H₂S) and other Sewer gases are created when raw sewer reacts with the atmosphere (air), this can occur in both gravity pipelines that have a varying level of air above the sewer and in high points in pumped pressure rising mains where it vents through sewer air valves in valve chambers. H₂S gas is deadly in confined spaces, highly flammable, explosive if contained, and unpleasant for the public when vented through manholes. Sealing a manhole simply multiplies the gas sending it to the next available outlet and creating significant safety risks.

The amount of H₂S in any given sewer system is a function of: Air to liquid ratio, relative humidity, temperature, and dwell time, when air mixes with raw sewerage.

In typical gravity sewers, liquid volumes in the system are minimal late at night and high during early mornings and evenings. As the levels fall, fresh air is sucked into the sewers through manholes, this oxygen in the air reacts with the surface of the sewerage creating H₂S gas. As drainage activity increases (for example in the mornings) sewer levels in pipes and chambers rise and these H₂S gases are expelled out through manhole chambers, creating unpleasant odours at street level.

THE SOLUTION

The Odab is designed to allow the manhole to safely vent treated odourless air, whilst capturing the Hydrogen Sulphide from that air through absorption in a replaceable activated carbon cartridge, which can be safely disposed of in landfill once saturated.



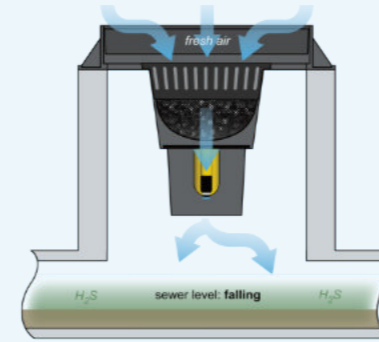
Watch the video here



Placing the stainless steel frame



Installation is complete and a final seal check

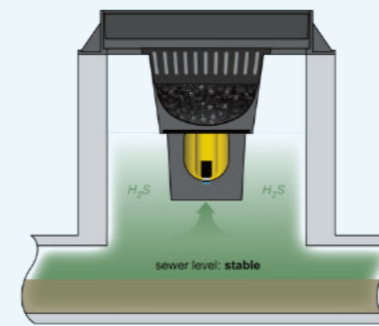


Sewer level: FALLING

When activity is low, sewer levels drain and fresh air is sucked into a gravity drainage system through manholes.

This incoming air collapses the bellows in the Odab and exits into the sewer to fill the space left by falling sewer levels.

The media is protected from surface water entering the manhole by a rainproof cap. Surface water drains into the sewer through a one way valve in the bucket of the Odab.

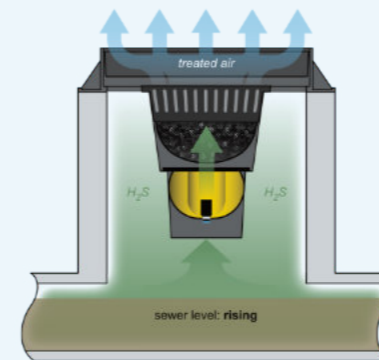


Sewer level: STABLE

Oxygen in the incoming air reacts with the raw sewerage, creating H₂S gases in the pipeline and chamber.

At this stage, there is insufficient pressure to fully inflate the bellows. The bellows expand and contract, buffering variations in the sewer levels / gas pressure.

This buffering prevents the H₂S gases from saturating the media.



Sewer level: RISING

As activity in the sewer increases, fluid levels rise, creating pressure for H₂S to be expelled from the chamber.

Once the bellows are fully expanded, further pressure of around 6 mm of water column opens the valve and the bellows ‘burps’ H₂S gas into the media bed, which absorbs 95% of the H₂S gas.

These ‘burps’ of H₂S are absorbed as the gas is forced evenly through the entire media bed and treated odourless air exits the manhole.



TREATING PEAK FLOW

Some authorities have tried suspending an absorbing media, such as an activated carbon bed in the chamber. As soon as the chamber lid is closed, the top layer of carbon media is exposed to H₂S gas continuously and is saturated in a matter of days, rendering the media and its ability to remove odour completely useless.

The concept of the bellows and associated valve arrangements is to ensure that **ONLY** peak H₂S flow is treated. This concept has been well-proven in the US by multiple studies on the sister product: the *Manhole Odor Eliminator MOE*.

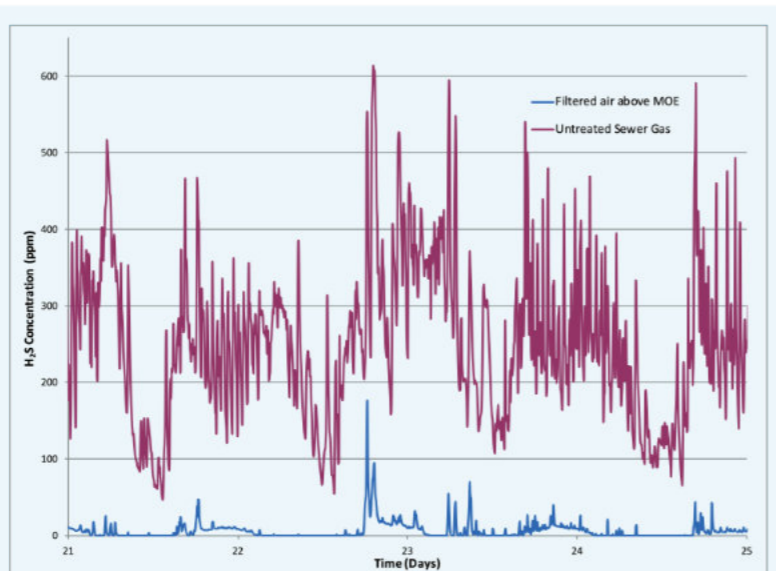
One such independent study conducted in 2012 by the University of the Pacific, Stockton California, inserted a H₂S meter both above and below the pan in a chamber, measuring values at 5s intervals of H₂S in the chamber above and below the manhole cover. Results over 96 hours show the effectiveness of the bellows valve system, the media bed is only exposed to approximately 1/30th of the mean average H₂S in the chamber, preserving the media to only treat peak gas flows.



Saturated **Blue media** is visible through the cartridge bag.



Black media on the Left is new condition. **Blue media** on the right is saturated media – cartridge needs replacing.



An Independent study in California 2012 measures H₂S gas above an installed Manhole Odor eliminator.

The **purple results** are the H₂S Values occurring in the sewer below the Manhole Odor eliminator.

The **blue results** are the H₂S values occurring under the manhole cover, above the Manhole Odor eliminator.

The air above the Odab only contains a fraction of the H₂S gasses that are occurring in the chamber, **over 95% of the H₂S is removed from air exiting the chamber through the manhole Odor eliminator.**

COLOUR INDICATED MEDIA

The Odab uses a special media formulation that indicates H₂S saturation with a colour change from **black** to **blue**. The cartridge design and formulation, using a combination of different media, ensures the entire absorption bed is utilised, maximising cartridge life and extending replacement cycles.

TYPICAL QUESTIONS

How long will the cartridge last?

Experience in the United States is that cartridge life varies considerably due to pipe size, sewer volume, humidity, temperature and pipeline route complexity. Cartridge replacement can be a cycle anywhere from 6 to 18 months, each manhole chamber is different. We recommend inspection within a 12-month cycle until a repeating pattern can be established. Inspection cycles should be reduced for cartridges that are repeatedly found to be saturated at the 12 month inspection point, if odour is an ongoing problem at that location.

How can I tell if the cartridge is ready for replacement?

Typically, odour emanating from the chamber is a tell-tale sign. Next step would be to lift the manhole lid and inspect the removable cartridge. A clear cut-out window in the base of the cartridge will show the saturation level/colour change in the media. Once completely blue, cartridge replacement is required. A new cartridge can be dropped in at the same time, replacing the exhausted one.

What chambers will the device fit in Hong Kong?

The standard Odab is designed to fit directly into a Drainage Services Department (DSD) DS1077 manhole chamber frame and cover. We have alternate 316 Stainless Steel pans for other frame designs such as DS1033 & DS1034, these are typically used in rising main chambers containing air valves, however any chamber can be accommodated with a custom cut pan.

What materials is the Odab made of?

The Odab is a combination of PE, Nylon, PVC, EPDM seals and other polycarbonate materials that are completely resistant to H₂S gas. The pan, fasteners and brackets are 316 Stainless steel to provide maximum life in the manhole chamber.

What about surface water and dirt washed into the manhole?

The stainless-steel pan is designed to be free draining to avoid pooling of water. The pan will capture surface debris and should be wiped clean each time the cartridge is replaced. Also, at this time the bucket can be lifted out and cleaned of any debris and checked for operation.

Why is the media cartridge vacuum sealed?

The media materials in the cartridge are affected by humidity and moisture. Cartridges must remain sealed until they are ready to be installed to maximise service life.



Pressure sewage main before installation



Pressure sewage main with the **Odour Abatement Device** frame installed



Components / Replacement Parts



Mill-Pro assembles the Odab and manufacturers cartridges at our warehouse in Hong Kong. We stock a comprehensive range of replacement parts and provide replacement filter cartridges ex stock. Contact our sales team for further information or visit our website:



Odab Complete Assembly

Without cartridge

for DS1033	PM.A00
for DS1034	PM.A02
for DS1077	PM.A01

Odab Replacement Filter Cartridge

Activated carbon media with integrated rain guard and clear inspection panel

Reorder Code **PM.A10 Standard Mix**

Odab Bellows Assembly

Bellows with vent disc and filter cartridge mounting spindle

Reorder Code **PM.A30**

Odab PE Bucket Housing

Plastic bucket container

Standard **PM.A32**

Odab Manhole Pan and Seals

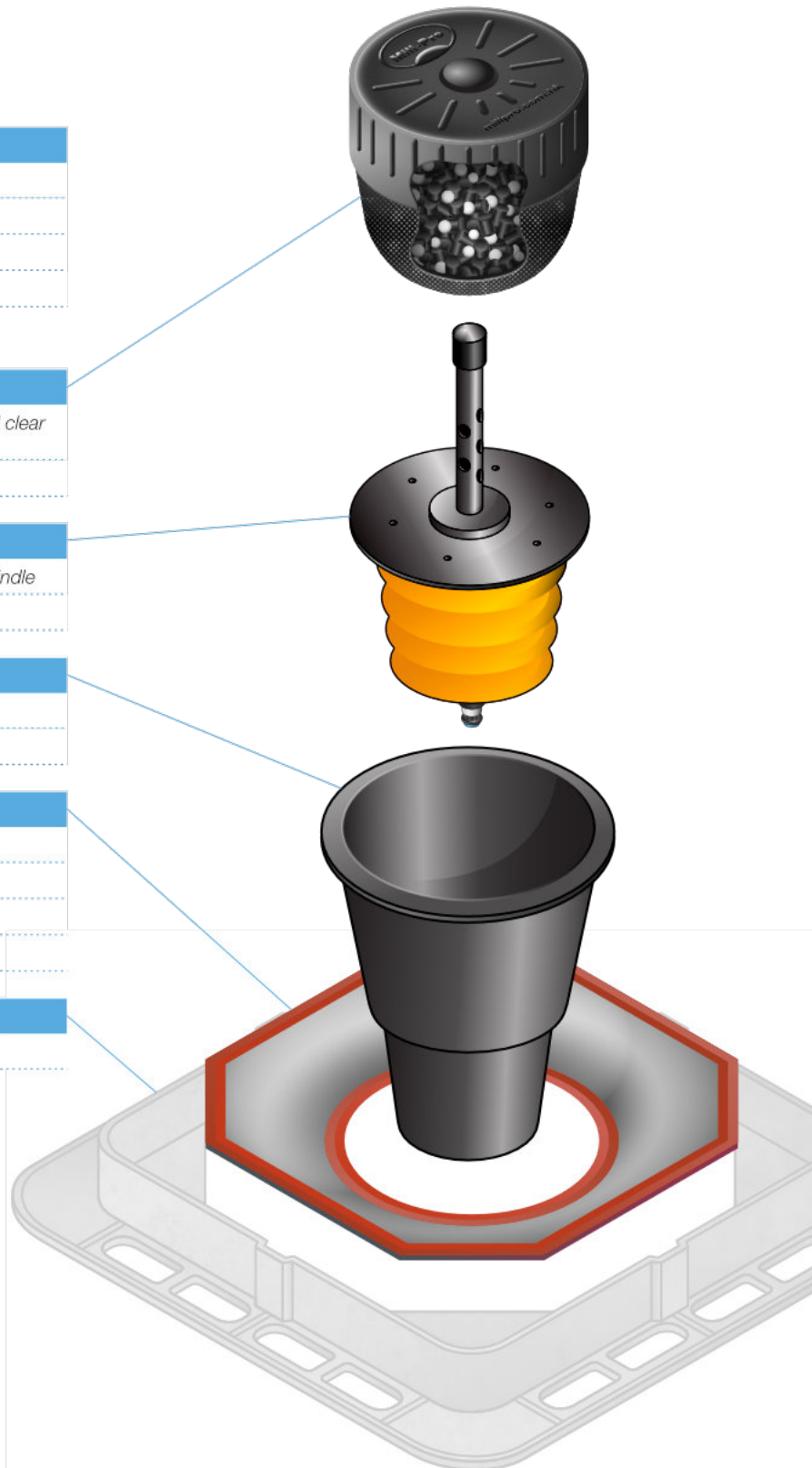
316 Stainless steel pressed pan with integral seals

for DS1033	PM.A20
for DS1034	PM.A22
for DS1077	PM.A21

DSD DS1077 Manhole Chamber Frame

Installed in ground

Supplied by others



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