

OPERATION & MAINTENANCE MANUAL – GM375 AIR FILTRATION SYSTEM



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1 Introduction

The McBerns Air Filtration System has been designed to treat foul air generated from sewer and wastewater systems. Odorous gases from this facility will be passed through the inlet pipework in to the filtration unit, where it will undergo treatment, before being discharged to atmosphere.

2 Description of Equipment and Process

McBerns Air Filtration Systems utilise a combination of zeolites, oxidising agents and micro-porous, impregnated, pelletised activated carbon media for the treatment of waste airstreams containing noxious gases. Gases may contain toxic and odorous compounds, including hydrogen sulphide gas, acidic gases, volatile organic compounds (VOC's) and hydrocarbons. The combined media filters operate by adsorbing and retaining chemical compounds, which may undergo chemical adsorption, chemical conversion and/or biological treatment. This system is designed to operate as an unmanned facility.

The foul air from the odour source is passed through the inlet pipework and into the air filtration unit, where the foul air first undergoes treatment by the McBerns combined media cartridges. The filtered air is then vented to atmosphere. All condensation from the air filtration system falls to the filtration unit and drains back to odour source.

3 Design Detail

3.1 Design Criteria

Foul air at 20°C and <90% relative humidity from the odour source is passed through the inlet pipework and in to filtration unit; the air from the odour source is driven by the hydraulics of the sewage network. Odour reduction efficiency in the filter is approximately 99%. A differential pressure transmitter may be utilised to monitor the pressure drop across the activated carbon filter, and a hydrogen sulphide monitoring system may be used to determine McBerns combined media performance.

3.2 Process Design

Emissions enter the inlet compartment at the bottom or side of the filtration unit via DN150 uPVC pipework. Treatment occurs through the combined media cartridges, completing the filtration process.

3.3 Equipment Description

3.3.1 Filtration Unit

Corrosion resistance is imperative due to the nature of the gases being treated. The unit is fabricated from uPVC materials, with an external anti-corrosion coating to improve UV-stability.

3.3.2 Design Load

The air filtration system compartment shall be an enclosed design, structurally engineered in accordance with AS/NZS 1170:2002 Structural Design Actions – General Principles, enabling transport and placement at site on a suitable foundation. On-site assembly of components, mainly uPVC connectors, may be required. Vandalism proof methods shall be incorporated in the overall site design.

3.3.3 Sealing Gaskets

Gaskets shall be resistant to typical sewage gases, temperatures and environmental conditions the gasket will be subjected to during service. The sealing gaskets shall be comprised of EPDM rubber material.

3.3.4 Fasteners

All fasteners are to be grade 316 Stainless Steel and shall comply with AS 1111.1:2000, AS 1112.3:2000, AS 1237.1 and AS 1237.2. Torque wrenches are recommended when tightening nuts and fasteners to a maximum value of 8.0 Nm.

3.3.5 Dimensions

The dimensions of the air filtration system shall be determined by the gas concentration and flow rate of the inlet waste airstream. The dimensions of the air filtration system housing shall be in accordance with the published product specification and site-specific requirements.

3.3.6 Asset Life

Stainless steel and stainless-steel fittings have a 30-year life. All uPVC and PE fittings have a 10-year life. All coatings have a 5-year life.

3.3.7 Interchangeability

All components shall be interchangeable between air filtration systems of the same size or type, either supplied or manufactured by McBerns. The GM series air filtration systems are modular in their design. Air filtration system requirements may necessitate units to be placed in parallel to achieve the design treatment capacity.

4 Commissioning and Testing

It is recommended to follow the McBerns Inspection and Test Plan (ITP) for installation and commissioning of the air filtration system. This includes the following commissioning requirements:

- Inspect installation is as per site specific design and/or McBerns standard drawing,
- Inspect all pipework and fittings, ensuring there are no leaks present by using a soapy water mixture,
- Ensure the condensation drain is in operative condition with continuous drain back to source,
- Monitor the inlet & outlet hydrogen sulphide concentrations to comply with performance, and
- Test differential pressure of the filter media to ensure it complies with specifications.

If the filter fails to achieve the specified hydrogen sulphide gas reduction or operate within specified noise requirements after the initial testing phase, faults shall be identified and corrected prior to re-testing. Following a further period of two to four weeks, repeat testing is undertaken to ensure the filter is capable of meeting the performance specification.

5 McBerns GM375 Replacement Media Kit

The standard replacement media kit consists of:

- 2 x McBerns F375MC cartridges.

6 Preventative Maintenance

6.1 Maintenance Schedule

The following maintenance schedule should be carried out at the frequency indicated in the table below.

Task	Action	Interval	Resource Type	Expected Duration
McBarns GM375 Air Filtration System				
Operate drain	Visual inspection of drain pipework and connections for leaks. Operate condensation drain.	Monthly	Operator	5 mins
Replace filter media	If odour removal efficiency drops with outlet levels of hydrogen sulphide increasing steadily above 5ppm, check all operating parameters and if within design limits, replace media.	Client Specified	Operator	1 day

6.2 Maintenance Procedures

6.2.1 Operate Drain

1. Conduct a visual inspection of the piping to ensure no cracks or potential leaks.
2. Operate the condensation drain, if applicable, to drain to a suitable environment (ensuring it complies with local environmental regulations and procedures).
3. Return the drain to the original position.

6.2.2 Replace Filter Media

1. Purchase McBarns media replacement kit (Part No. **F375MC** x 2).
2. Remove the top access cover of the McBarns GM375 Air Filtration Unit.
3. Remove and dispose of cartridges as per McBarns media disposal instructions.
4. Wipe the seals with a damp cloth where the media cartridges will be seated and ensure to remove any dust or grit which will prevent a good seal around the base of the media cartridges; replace seals if necessary.
5. Apply a bead of Hydroseal on the top of the rubber seal to create a seal between the cartridge and the rubber seal.
6. Remove the cartridge from the protective plastic bag and install two (2) off cartridges into the filter housing; please ensure the cartridge is installed in the correct position (please see label), with the rubber seal installed between the two cartridges.

Fit and secure top cover using bolts, nuts and washers supplied.

7 Appendix B – McBerns Combined Media SDS

Section 1 - Identification of The Material and Supplier

McBerns Pty Ltd 11 Tectonic Cres Kunda Park, Qld 4561	Phone: +61 7 5445 1646 (office hours) Fax: +61 7 5445 1743 mail@mcbarns.com
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Chemical nature:	Zeolite in a plastic cartridge.
Trade Name:	McBerns Media
Product Use:	A deodorant for sewerage vent areas.
This version issued:	July, 2020 and is valid for 5 years from this date.

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Not classified as hazardous according to the criteria of SWA.

Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: Not Hazardous - No criteria found.

Safety Phrases: S22, S36, S24/25. Do not breathe dust. Wear suitable protective clothing. Avoid contact with skin and eyes.

SUSMP Classification: None allocated.

ADG Classification: None allocated. Not a Dangerous Good under the ADG Code.

UN Number: None allocated

GHS Signal word: NONE. Not hazardous.

PREVENTION

- P102: Keep out of reach of children.
- P262: Do not get in eyes, on skin, or on clothing.
- P281: Use personal protective equipment as required.

RESPONSE

- P353: Rinse skin or shower with water.
- P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P370+P378: Not combustible. Use extinguishing media suited to burning materials.

STORAGE

- P402+P404: Store in a dry place. Store in a closed container.

DISPOSAL

- P501: Dispose of small quantities and empty containers by wrapping with paper and putting in garbage. For larger quantities, if recycling or reclaiming is not possible, use a commercial waste disposal service.

Emergency Overview

Physical Description & Colour: Off white to buff coloured granular solid in outer packaging.

Odour: No odour.

Major Health Hazards: no significant risk factors have been found for this product.

Potential Health Effects

Inhalation:

Short Term Exposure: Available data indicates that this product is not harmful. However product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.

Long Term Exposure: No data for health effects associated with long term inhalation.

Skin Contact:

Short Term Exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. However product may be irritating, but is unlikely to cause anything more than mild transient discomfort.

Long Term Exposure: No data for health effects associated with long term skin exposure.

Eye Contact:

Short Term Exposure: This product may be irritating to eyes, but is unlikely to cause anything more than mild transient discomfort.

SAFETY DATA SHEET

Issued by: McBerns Pty Ltd

Phone: +61 7 5445 1646 (office hours)

Poisons Information Centre: 13 1126 from anywhere in Australia, (0800 764 766 in New Zealand)

Long Term Exposure: No data for health effects associated with long term eye exposure.

Ingestion:

Short Term Exposure: Significant oral exposure is considered to be unlikely. This product, while believed to be not harmful, is likely to cause headache and gastric disturbance such as nausea and vomiting if ingested in significant quantities. However, this product may be irritating to mucous membranes but is unlikely to cause anything more than transient discomfort.

Long Term Exposure: No data for health effects associated with long term ingestion.

Carcinogen Status:

SWA: No significant ingredient is classified as carcinogenic by SWA.

NTP: No significant ingredient is classified as carcinogenic by NTP.

IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m ³)	STEL (mg/m ³)
Zeolite	12173-10-3	>60	not set	not set
Other non hazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The SWA TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this SDS with you when you call.

Inhalation: No first aid measures normally required. However, if inhalation has occurred, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.

Skin Contact: Gently brush away excess particles. Wash gently and thoroughly with water (use non-abrasive soap if necessary) for 5 minutes or until chemical is removed.

Eye Contact: Quickly and gently brush particles from eyes. No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the product is removed. Obtain medical advice if irritation becomes painful or lasts more than a few minutes. Take special care if exposed person is wearing contact lenses.

Ingestion: If product is swallowed or gets in mouth, do NOT induce vomiting; wash mouth with water and give some water to drink. If symptoms develop, or if in doubt contact a Poisons Information Centre or a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: There is no risk of an explosion from this product under normal circumstances if it is involved in a fire.

Only small quantities of decomposition products are expected from this product at temperatures normally achieved in a fire.

Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.

Extinguishing Media: Not combustible. Use extinguishing media suited to burning materials.

Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade.

Flash point: Does not burn.

Upper Flammability Limit: Does not burn.

Lower Flammability Limit: Does not burn.

Autoignition temperature: Not applicable - does not burn.

Flammability Class: Does not burn.

Section 6 - Accidental Release Measures

Accidental release: This product is sold in small packages, and the accidental release from one of these is not usually a cause for concern. For minor spills, clean up, rinsing to sewer and put empty container in garbage. Although no special protective clothing is normally necessary because of occasional minor contact with this product, it is good practice to wear impermeable gloves when handling chemical products. In the event of a major spill, prevent spillage from entering drains or water courses and call emergency services.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: Make sure that containers of this product are kept tightly closed. Keep containers dry and away from water. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits **TWA (mg/m³)** **STEL (mg/m³)**

Exposure limits have not been established by SWA for any of the known significant ingredients in this product.

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.

Ventilation: No special ventilation requirements are normally necessary for this product. However make sure that the work environment remains clean and that dusts are minimised.

Eye Protection: Eye protection such as protective glasses or goggles is recommended when this product is being used.

Skin Protection: You should avoid contact even with mild skin irritants. Therefore you should wear suitable impervious elbow-length gloves and facial protection when handling this product. See below for suitable material types.

Protective Material Types: There is no specific recommendation for any particular protective material type.

Respirator: If there is a significant chance that dusts are likely to build up in the area where this product is being used, we recommend that you use a suitable Dust Mask. Otherwise, not normally necessary.

Safety deluge showers should, if practical, be provided near to where this product is being handled commercially.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Off white to buff coloured granular solid in outer packaging.
Odour:	No odour.
Boiling Point:	Not available.
Freezing/Melting Point:	Plastic coating may melt at 100-150°C, but contents will remain solid to very high temperatures.
Volatiles:	No specific data. Expected to be low at 100°C.
Vapour Pressure:	Nil at normal ambient temperatures.
Vapour Density:	Not applicable.
Specific Gravity:	1.5-1.7
Water Solubility:	Insoluble.
pH:	No data.
Volatility:	Nil at normal ambient temperatures.
Odour Threshold:	No data.
Evaporation Rate:	Not applicable.
Coeff Oil/water Distribution:	No data
Viscosity:	Not applicable.
Autoignition temp:	Not applicable - does not burn.

Refractive index: Not applicable.
Optical rotation: Not applicable.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: Keep containers tightly closed. Containers should be kept dry.

Incompatibilities: No particular Incompatibilities.

Fire Decomposition: Only small quantities of decomposition products are expected from this product at temperatures normally achieved in a fire. Combustion forms carbon dioxide, and if incomplete, carbon monoxide and possibly smoke. Water is also formed. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.

Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Local Effects:

Target Organs: There is no data to hand indicating any particular target organs.

Classification of Hazardous Ingredients

Ingredient

Risk Phrases

No ingredient mentioned in the HSIS Database is present in this product at hazardous concentrations.

Section 12 - Ecological Information

This product is unlikely to adversely effect the environment. Salts, acids and bases are typically diluted and neutralised when released to the environment in small quantities. Expected to not be an environmental hazard.

Section 13 - Disposal Considerations

Disposal: Dispose of small quantities and empty containers by wrapping with paper and putting in garbage. For larger quantities, if recycling or reclaiming is not possible, use a commercial waste disposal service.

Section 14 - Transport Information

ADG Code: This product is not classified as a Dangerous Good. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: We are unable to verify that all of the ingredients in this product are complaint with NICNAS regulations. There are several possible reasons why this may occur. If you have any reason to be concerned about this, we suggest you call us on the number below.

Section 16 - Other Information

This SDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7 th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS. OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.