



# SERVICE GUIDE

FOR TUB SCRUBBER SYSTEM

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INSTALLATION, OPERATION & MAINTENANCE  
INSTRUCTIONS

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**TO BE USED IN CONJUNCTION WITH:**

**SERVICE GUIDE** for Gage Unit

**SERVICE GUIDE** for Blower Assembly

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## **1.0 PRE-INSTALLATION INSTRUCTIONS**

### **1.1 SAFETY CONSIDERATIONS**

- Read this Service Manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
- This manual should be retained with the unit because it contains the information necessary for proper maintenance. There is a pocket envelope provided for this purpose. Attach it permanently to the unit.
- Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.

#### **CAUTION:**

- Installer should be a trained, experienced service person.
- Disconnect power supply before wiring connections are made to prevent possible electrical shock or damage to equipment.
- Check the assembly and component weights to be sure that the rigging equipment can handle them safely.
- Be sure that the unit is balanced well in the transporting device.
- Always conduct a thorough check when the installation is complete.
- Never enter an enclosed blower cabinet or reach into a housing while fan is running.
- The motors in PURAFIL® equipment get very hot. This is normal and should not be regarded as a problem with the motor. However, take special care to avoid touching the hot areas.

### **1.2 RECEIVING INSTRUCTIONS**

**Systems are normally shipped assembled and with motors mounted.** All units are attached securely to skids. It is recommended that units be left on their skids for protection and ease of handling while transporting. Straps, rigging, slings, or hooks attached to the skids may be used, with proper care. The units are well protected with triple wall board and are secured with metal bands. Forklifts may be used under the skids, but exercise caution to prevent damage.

Upon receiving systems from Purafil, Inc., note any shipping damage, obvious or hidden, to your carrier and on your Bill of Lading. All problems should be handled between the customer and carrier except for U.P.S. shipments, which require the customer to contact Purafil, Inc. for action.

- If the unit is to be stored before use, see Section 1.4 in this manual.
- If the unit is to be installed immediately, be sure to check Section 3.0 in this manual.
- To uncrate unit, cut metal bands and remove packaging.
- For positioning and special handling, see Section 3.1 in this manual.

### 1.3 INSPECTION

The condition of the unit upon its arrival is critical to its proper operation. Prior to start-up, inspect the unit carefully, according to the check list below. Correct any inadequacies before start-up to prevent possible damage or inefficiency. Note, should there be any questions concerning the unit, refer to the numbers found on the unit identification plate, when contacting the PURAFIL® representative.

#### PRE-OPERATION CHECK LIST

YES	NO	CONDITION
___	___	1. Configuration and material are as specified on the sales order form.
___	___	2. Measurements fit submittal requirements
___	___	3. Parts are all present including particulate, filters, media, and gage units
___	___	4. Prefilter and final filters all fit properly
___	___	5. Latches hold securely and gaskets seal properly
___	___	6. Labels and serial numbers are present
___	___	7. Airflow direction is consistent with installation requirements (check labels attached to unit)

*Note: Checking specific points is also imperative after the unit is started up. See section 3.4 in this manual for check list.*

### 1.4 STORAGE

The unit should be protected from the elements during storage, especially when storage time is extensive. While indoor storage is considered best, outdoor storage can be adequate when precautions are taken:

## **OUTDOOR STORAGE PRECAUTIONS**

- Cover the equipment with a tarp. Intake and discharge openings must be well covered. (Use of black plastic as a cover may cause excessive condensation and rusting.)
- If there is the possibility of moisture collection, allow for proper drainage.
- Do not place heavy equipment on top of the unit.
- Store Purafil® media in a dry place with less than 95% relative humidity.

## **1.5 FOUNDATION AND CLEARANCES**

### **FOUNDATIONS**

Some units may require new or reinforced foundations, due to their weight. Always be sure to check that the existing foundation is adequate for the unit to be installed. Units to be used indoors require particular attention to strength of foundation. In some instances, a concrete base is best suited to the system. Concrete allows less chance for vibration than metal structures.

### **CLEARANCE**

All units should be easily accessible for the required periodic maintenance. Do not block return and discharge grilles. Sufficient minimum clearances can be recommended by the local PURAFIL® representative.

## **2.0 BASIC DESIGN OF THE T.S.S.**

The T.S.S. is a blow through system which includes an inlet duct with a prefilter housing, a blower, a three foot up-flow media bed, (actual media depth dependent on the application), and a discharge ducting with a final filter housing. Inlet and outlet rainlouvers with birdscreen and gage units are optional.

The T.S.S. is divided into five component parts which can be fabricated in aluminum, stainless steel, fiberglass or a combination of these materials available on the design specification sheet.

The T.S.S. features an easy access fill chute and component parts for fewer maintenance concerns. A damper controlled air inlet allows adjustment of pressurization air so that the room is not over pressurized and conditioned air lost in leakage.

Pre-engineered in a single unit, the T.S.S. should be applied to deliver pressurization air to recycled air systems. The T.S.S. provides for the application of PURAFIL®, PURAKOL® or PURACARB® media, and has a lower horsepower through lower pressure drop. It is ideal for retrofit in existing rooms where a higher quantity of pressurization air is required.

The TSS includes one or more of the following sequential components:

1. **PREFILTER-** as the air enters the unit it passes through a particulate filter. The prefilter collects atmospheric dust and larger particles, thereby protecting the blower and preventing clogging of the perforated surfaces and pellet pores in the next stage of the unit.
2. **BLOWER-** the air is then propelled by the blower assembly which includes a general industrial motor or a FRP radial fan exhauster.
3. **MEDIA BED-** the air passes up through the bed of PURAFIL® chemisorbant media, PURAKOL® activated carbon, or PURACARB® media dependent upon the atmosphere to be controlled.
4. **PREFINAL FILTER-** after the air passes through the media bed, it goes through a medium efficiency (30%) particulate filter thus extending the life of the final filter.
5. **FINAL FILTER-** any remaining contaminants, such as media dust and airborne contaminants are removed in this final stage by a high efficiency (90%) JFL 90 final filter.

### **3.0 INSTALLATION**

After the entire pre-operative inspection is finished (Section 1.3), complete the following sequence for installation by referring to the instructions below:

1. Position the unit in the designated operation location. Adjust leveling nuts on anchor bolts if needed for duct connection.
2. Hook up the electrical connections and check for proper rotation. (See Blower Assembly Service Guide)
3. Install media manufactured by Purafil, Inc. into the media bed. (See section 3.2)
4. Install the particulate filter. (See section 3.4)
5. (Optional) Install and check the gage units. (See Gage Unit Service Guide and Section 3.6)
6. Start the unit. (See section 3.7)
7. Perform post-start inspection check. (See section 3.7)

### **3.1 POSITIONING THE UNIT**

Review Section 1.5 in this manual for foundation and clearance instructions. The standard unit can simply be lifted from its skid and “walked” or transported

by lift to its predesignated operation location (if in close proximity to the skid), according to facility safety requirements.

### **3.2 MEDIA BANK FILLING INSTRUCTIONS** (FOR INITIAL START-UP)

Proper filling, installation, and maintenance of the chemical filtration media is critical to the unit's efficient operation. The media bank is designed specifically for media manufactured by Purafil, Inc. and allows the system to perform to its maximum efficiency, through proper shape and bed depth.

Filling the media bank is a relatively easy task, not requiring tools or specially skilled labor.

- To fill, pour the media through the fill chute openings located at the top of the unit and fill the media bank to the prescribed bed depth.

### **3.3 MEDIA BANK FILLING INSTRUCTIONS** (FOR MEDIA REPLACEMENT)

Once media analysis has determined that it is time for a replacement supply of media, recharge the media bank according to the instructions below: (See Section 4.2)

- Exhausted media can be disposed of by vacuuming or shoveling.
- To vacuum the exhausted media from the unit: Use an industrial vacuum and remove the media from the top of the unit through the fill chute.
- To shovel the media: open the access door located on the side of the unit as the media pours out, shovel to desired location for disposal. See Section 4.3 for disposal precaution of PURAFIL® media.

### **3.4 PARTICULATE FILTERS**

Proper selection and installation of particulate filters for use in PURAFIL® systems are necessary steps in obtaining the air quality best suited to the user's needs. Particulate filters are available in different sizes and efficiencies, and variations in either of these characteristics may affect the efficiency of the PURAFIL® system.

**PP-30 PREFILTER:** Install this filter by sliding it along the inlet prefilter housing channel so the airflow moves through the accordion panels first.

**PP-25 PRE-FINAL FILTER:** Install this filter by sliding it into the lower final filter channel in the discharge duct, with the filter orientation so the airflow moves through the accordion panels first.

**JFL-90 FINAL FILTER:** Install this filter with the frame side on the bottom in the upper final filter channel in the discharge duct.

### **3.5 GAGE UNIT**

The T.S.S. unit has an optional gage unit which houses two magnehelic gages. Their purpose is to insure consistency within the recommended guidelines for

airflow by reading pressure across particulate filters, thereby determining when to replace them.

As the particulate filters become soiled, pressure drop across them will increase, and the air volume actually moving through the system will decrease. Pressure drop is measured in terms of IWG.

Also available is a gage unit measuring room pressurization and T.S.S. airflow. See Gage Unit Service Guide for further information.

### 3.6 TAP HOLE LOCATIONS

There are four pressure taps on units requiring the optional gage unit. All taps should be 13/32" in diameter and have the tip of the probe pointing into or away from the direction of airflow. It is recommended that the probes for each filter housing are located in a straight line on the side closest to the gage unit. The air sampling port is located on the side of the Tub Scrubber.

To locate your taps, follow this procedure:

- Beginning at the prefilter section, install a probe in the plenum before the prefilter.
- The second probe is to be installed in the space after the prefilter, yet before the blower.
- The third probe is to be installed on the discharge duct, yet before the final filters.
- The fourth probe is to be installed in the plenum section after the final filter.

### 3.7 POST-START INSPECTION/CHECK

Before initial start-up of system, contact your local PURAFIL® representative. Their name and phone number are attached to your system.

YES	NO	CONDITION
___	___	1. Fan rotation is in proper direction (See Blower Assembly Service Guide).
___	___	2. Joints, seals, and gaskets do not leak.
___	___	3. Media bank is filled to the specified level.
___	___	4. Volume control damper is adjusted for the proper airflow.
___	___	5. Particulate filters have been installed.
___	___	6. After 1-2 weeks of operation, check belt(s) and tighten if necessary (See Blower Assembly Service Guide)



## **4.0 MAINTENANCE**

### **4.1 REPLACEMENT PARTS AND MATERIALS**

While Purafil, Inc. products are built with durability, some parts of the PURAFIL® unit will require replacement during the normal lifetime of the equipment. Replacement items may be ordered from your local PURAFIL® representative or from Purafil, Inc.

**Consumables:** In order to maintain proper performance levels, particulate filters and PURAFIL® media must be replaced periodically, as they have a finite life (See Sampling Procedure Service Guide.)

**Gages (Optional):** No lubrication or periodic servicing is required. The gage unit cover and housing should be kept clean, however solvents are not recommended as a cleaning agent, as they will fog the cover. Occasionally disconnect pressure lines to vent both sides to the atmosphere; then re-zero (set) the gage. (See Gage Unit Service Guide).

**Moving Parts:** Bearings, sheaves, motors, belts, etc. are all subject to gradual deterioration and/or sudden breakdown. (See Blower Assembly Service Guide).

### **4.2 MEDIA REPLACEMENT**

PURAFIL® engineered dry-chemical media has a finite life. Our media contains special active ingredients that react with odors and gaseous pollutants to remove them from the airstream. Once the active ingredients are spent, it is time to replace the media in your system. After start-up, your local PURAFIL® representative will work with the owner to periodically secure media samples. Purafil, Inc. will provide regular laboratory analysis of such samples to establish life cycles. Note, color change of media does not indicate level of remaining life.

Since every installation varies due to the type and quantity level of the contaminant, each operator must develop a sample schedule best suited to their system. However, until a schedule can be established, we recommend that a sample is taken from each vertical media bank and sent for analysis, so that a replacement date can be projected with a recommended sampling schedule.

Media Life Analysis (MLA) is a complimentary Purafil, Inc. service. MLA Sample Kits are available through Purafil, Inc. If analysis reveals that it is time to replace the media, order the appropriate pounds of media required per module used in the unit. See Media Sampling Service Guide for instructions on how to take a media sample from your unit.

## **5.0 SPECIAL PRECAUTIONS**

### **DISPOSAL**

PURAFIL® media is a non-toxic, non-flammable substance. Filtration of contaminants through PURAFIL® media causes molecular changes to occur, and the resulting product is usually not harmful to the environment. Although special precautions are generally not required when disposing of spent media, government regulations may require specific disposal procedures if the resulting product could be harmful to the environment. Large quantities of PURAFIL® media should not be disposed of in dumpster-like equipment because the weight of the media could cause difficulties in handling the dumpster.

Independent laboratory analysis for Environmental Protection Agency toxicity characteristics may be required if the contaminants eliminated from your environment include heavy metals and pesticides.

### **INHALATION**

A well-ventilated work area is suggested for changing the PURAFIL® media, as dusting occurs in fresh media due to handling abrasion.

Workers should avoid direct inhalation of considerable PURAFIL® dust, as it induces sneezing. In closed, unventilated spaces, dust masks such as the 3-M No. 8500 are suggested.

### **WATER**

Avoid exposing the PURAFIL® media to water or precipitation, as this dissolves permanganate content. Storage of media should be in a dry place with less than 95% relative humidity. Exposure of permanganated solution to the skin causes brown staining which is temporary and not harmful. This staining can be removed by washing in a diluted solution of water and sodium bisulfite.

### **EYE CONTACT**

If dust is exposed to the eyes or delicate membrane, flush thoroughly with water and seek treatment by a physician. Follow normal procedures for exposure to abrasive dust.

## **6.0 PURAFIL® STAIN REMOVAL**

The following stain removal procedure is stated here as information only, and neither Purafil, Inc., any of its subsidiaries, nor any agent or employee of Purafil, Inc. make any warranty or other representation regarding the efficacy or safety of this procedure. The stain removal could cause further damage to the garment or to the item from which one may attempt to remove the stain.

If the dust from PURAFIL® II permanganate media comes in contact with organic material, there are two possible stain problems:

1. Manganese dioxide ( $MnO_2$ ) which is insoluble, characterized by a medium brown color, and is found in expended PURAFIL® media, can usually be removed by normal washing.
2. New (unused) PURAFIL® media contains potassium permanganate ( $KMnO_4$ ) or sodium permanganate ( $NaMnO_4$ ) which is a strong oxidant and will react with and discolor any organic material with which it comes in contact. These stains, which will be brownish black in color, may be removed using a solution of sodium bisulfite in water, after the garment has been removed from the person.

However, if the fiber has been damaged by the permanganate, removal of the stain may make the damage more apparent.

CAUTION: This procedure should start with a very weak solution, gradually increasing the strength until the stain is removed. Use of too strong a solution could conceivably cause additional fabric damage.

NOTE: Sodium bisulfite gives off sulfur dioxide ( $SO_2$ ) gas; therefore, it must be used in a well-ventilated area.

## **7.0 WARRANTY INFORMATION**

PURAFIL® warrants hardware equipment manufactured by PURAFIL® to be free from defects in material and workmanship under normal use and service for twelve (12) months from startup date or eighteen (18) months from shipment date. PURAFIL'S obligation under this warranty shall be limited to replacing any parts thereof which shall be demonstrated to have been defective. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

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## **8.0 TROUBLE SHOOTING**



Represented By:

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