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Original Equipment Manufacturer

Manual for

Scan Section with Isokinetic Probes

Forward

P&G Mfg's scan housing with isokinetic probe is designed to provide in-place filter evaluation. Filter scanning is a manual process that allows the user to cross sample the face of the filter and sealing surface. External ports provide the ability to attach a particle counter* or photometer (depending customer specifications).

*When using particle counters, a diluter (e.g. 1000/1) is required to obtain correct upstream concentrations and to determine downstream leak rate.

The P&G Mfg scan section has the following features:

- An air sampling (isokinetic) probe incorporated with the housing design
- Flexible tubing attached to the probe and to a bulkhead fitting allowing free movement during the scanning process. The bulkhead fitting is hard mounted to sample ports.
- For single (1 x 1) and multistage housings (e.g. 1 x 2 and 1 x 3), a probe is supplied for each filter.
- The scan housing design incorporates a fixture for probe placement when not in use.
- When the scan housing is supplied on the downstream side of the P&G Mfg High Efficiency Particulate Air filter (HEPA) housing, it is a "one system" design that allows ease in the scan process.

Disclaimer

P&G Mfg's responsibility is limited to the design, workmanship, and operation of the scan housing. P&G Mfg will not be held liable for the misuse of the equipment or inferior/inadequate testing practices that could result in sickness, injury, death, loss of manufacturing time, damage or loss of equipment. Testing practices are the sole responsibility of the end user. This manual only defines how to use the equipment and is not intended as a "how to" guide for scan testing. Consult specifications relevant to your application when performing scan testing.

Terms and Definitions

These terms are relative to the scan operation process and will be referred to throughout this document. They are included to aid in the understanding of the scan operation.

Challenge aerosol: An aerosol generated upstream of the HEPA filter to identify leakage. Generally poly alpha olefins (POA) oil is a sufficient challenge aerosol. The specific challenge aerosol can be unique to the specifications and equipment application.

HEPA filter: High efficiency particulate air filter. A pleated dry filter with a rigid casing that has a minimum efficiency of 99.97% when tested with an aerosol monodispersed 0.3-micron challenge aerosol. Note: Only filters previously factory scanned should be used for scanning applications and with filters rated at 99.99%.

Leakage (specific to testing): The challenge aerosol the passes through or around the HEPA filter and is present downstream of the filter. This is picked up by scanning the filter with the scan probe and identified by the photometer or particle counter. Leakage is determined using the following equation:

$L = 100\{Cd/Cu\}$
L = percent leakage
Cd = downstream concentration of aerosol
Cu = upstream concentration of aerosol

Penetration: The ratio of the particle count downstream of the filter to the particle count upstream.

Start Up Procedure

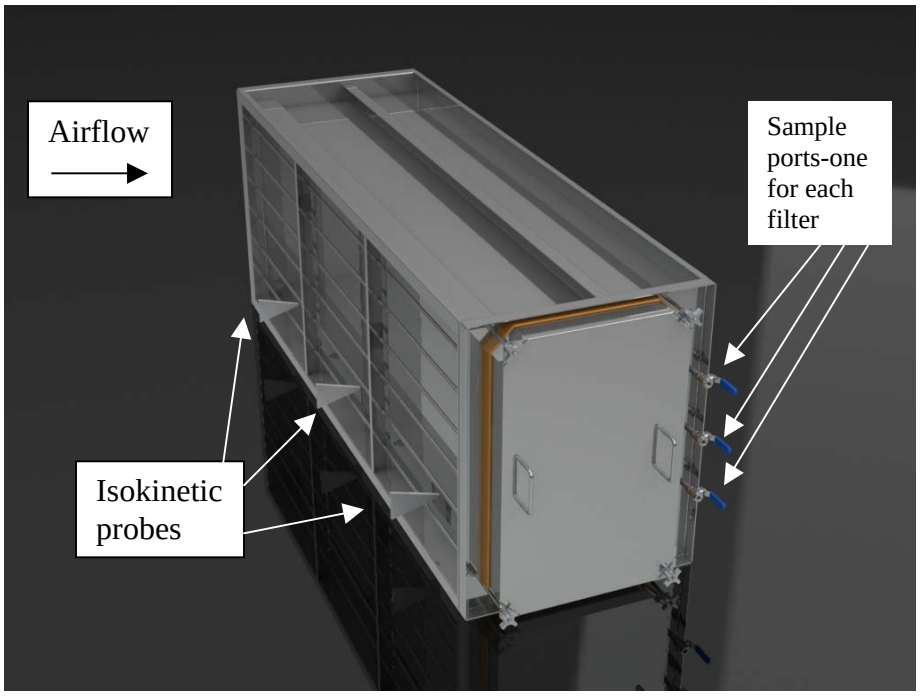
1. Once the system has been installed and operational, the HEPA filters must be installed in the filter housing (upstream of the scan housing).
2. Remove the door of the upstream HEPA housing. Making sure there are not obstructions (dirt, construction debris, etc.), install the filters and achieve proper seal, install the door and tighten the door retainers. Note: If the filter housing is a bag-in/bag-out housing, a bag should be installed around the sealing lip and secured by the strap provided for that housing.
3. Remove the door of the scan housing and install the scan bag. The scan bag is clear Poly vinyl chloride (PVC) with two gloves incorporated in the bag. The scanning process will be performed through the bag.
4. The PVC scan bag is installed around the bagging ring. The bagging ring has two raised ribs. The scan bag should be installed with the elastic cord pushed completely to the back of the bagging ring. The strap should be installed between the two ribs and securely tightened.
5. Locate the scan probe assembly that is secured by the fixture located inside the housing.
6. The scan probe assembly wil1 have a probe for each filter, depending on the depth of the filter housing (either 1, 2 or 3 probes).
7. The probe has “hooks” that will fit on the round rods mounted horizontally in the scan housing and allow the complete scan of the filter face (media) and at each edge (filter seal).

Scan Procedure

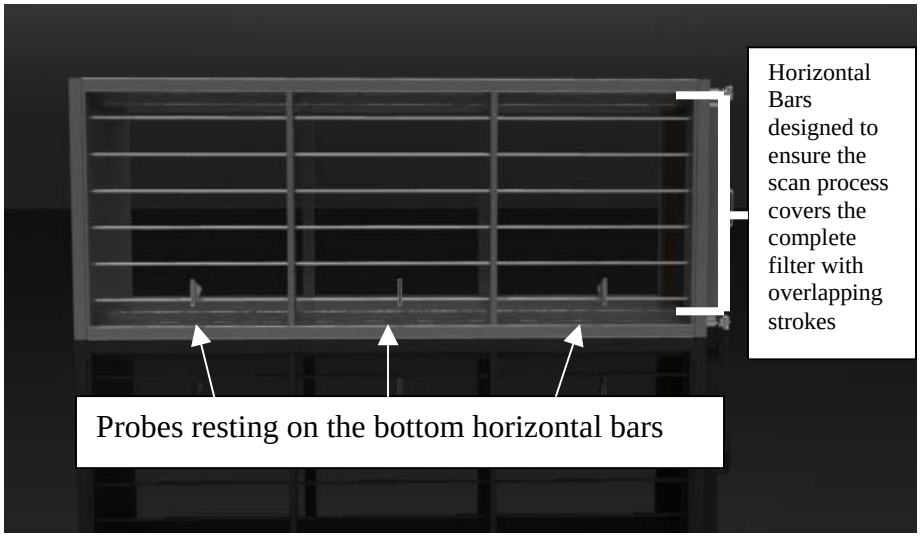
1. It should be determined at what cubic feet per minute (CFM) the system will be operated. Never exceed the CFM listed on the filter labels.
2. Start the fan and allow the flow rate to become constant. Note: filter face velocity should be no more than 100 feet per minute. This may require slowing the airflow down to properly scan the filter.
3. A device (e.g. Laskin nozzle or thermal generator) is required to deliver a challenge aerosol agent. The aerosol should be injected approximately 10 duct diameters upstream of the filter. Should a P&G Mfg in-place test section be part of the system, injection can be accomplished in the ports provided.
4. Once the aerosol agent has been injected, an upstream sample should be taken to determine concentration levels.
5. With the upstream aerosol concentration present, a particle counter or photometer can now be attached to the sample port(s) incorporated in the scan housing.
6. Scanning will be performed through the scan bag. This avoids undue exposure with harmful contaminates that may exist inside the filtration system. The operator, using the arm sleeves incorporated in the scan bag can now position the scan probe on the horizontal bars.
7. The design of the isokinetic probe is engineered to scan approximately 1 inch from the face of the filter and overlap each area at during the next pass.
8. When moving the probe, travel is important. The probe travel speed should not exceed 10 feet per minute or 1.5 – 2 inches per second.
9. By monitoring the particle counter or photometer leaks will be identified.

A. Particle counter Scanning: If a particle count is detected and the count exceeds the specified leakage threshold, the filter will require repairing or replacing.
B. Photometer Scanning: If a penetration has enough volume to be indicated, the alarm on the photometer will sound. If the % of penetration exceeds the specified threshold, the filter will require repairing or replacement

10. Should a leak be pin pointed, the area of the filter media should be rescanned to verify the location of the leak.
11. During scanning, the probe hook should travel on each bar. This will allow the entire filter to be scanned with overlapping strokes.
12. Only one (1) filter can be scanned at a time. Scan sections with 2 or 3 deep filters have specific sample ports for each filter. The photometer or particle counter must be attached to the correct port when performing the scan operation.
13. Each sample port has a valve mounted externally. Make sure the valve is open when scanning the appropriate filter.
14. Should a filter fail, it must be removed through the HEPA housing door, repaired and/or replaced depending on the customer requirements and specifications.
15. Once scanning is complete, reattach the probe assembly to the fixture.
16. With the scan bag still in-place, install the door making sure the bag does not interfere with the door sealing to the front pan, then tighten the door retainers.



P&G Mfg (Model No. SIH-10H30W-304) 1 x 3 scan housing shown with door attached



P&G Mfg (Model No. SIH-10H30W-304) 1 x 3 scan housing shown in upstream view