1. Acceptable Manufacturers
   1. Nippon Muki
   2. Other Approved Manufacturer
2. HEPA/ULPA Filters
   1. Filters construction shall be 16 ga. type 304 or type 430 stainless steel for use in clean air delivery devices such as ovens and depyrogenation tunnels, high temperature exhaust or others. Frame style will be determined by filter application. The term “HEPA” shall be used generically to describe all high-efficiency filters that meet the following specifications.
   2. Construction Criteria
      1. The media shall be borosilicate glass microfiber type with manufacturer QC data to ensure quality requirements and traceability are maintained. The pleats shall be equally spaced and supported with corrugated stainless steel separators. Separators are corrugated at a slight angle to minimize particle generation during thermal ramping, maintain pack rigidity and to avoid nesting adjacent separators. Actual filter depth shall be 11.5 or 5.875 inches.
      2. The media pack shall be sealed to the frame with glass fiber capable of 350ᵒC continuous or 400ᵒC for up to an hour operation.
      3. Filter frame shall be designed for use in Gasket Seal systems using a glass paper gasket shipped loose for field installation, by others.
      4. Each filter shall have the following information permanently laser etched into the frame including filter size, unique serial number, model number, tested efficiency, and pressure drop at volumetric test airflow.
3. Shipping, Storage and Handling of HEPA Filters
   1. Filter Assemblies are to be packaged discretely in corrugated carton of sufficient strength.
      1. Manufacturer shall characterize packaging against industry standards for:
         1. Drop
         2. Compression (i.e. stacking of cartons)
         3. Vibration
   2. The carton shall be labeled with the manufacturer’s part number, serial number, and test performance data.
   3. Filter Assemblies shall be shipped air freight in fully enclosed crates and in original, unopened packaging.
   4. Appropriate care must be exercised in handling cartons to avoid dropping, vibration, and rough handling to prevent potential for damage.
   5. HEPA filters shall be stored per manufacturer’s instructions for proper orientation, stacking configuration and limitations, and must remain in unopened cartons to prevent damage and exposure to potential contaminants.
   6. Cartons stored longer than one week shall remain unopened in a climate controlled environment of 60-80F and 30-70%RH.
   7. Filter Assemblies shall remain in the sealed, unopened carton until inspection, testing and installation.
4. Filter Performance Criteria/Factory testing:
   1. Factory Efficiency and Resistance Test:
      1. The filter shall have a minimum overall efficiency of 99.99% on 0.3 micron particles at rated flow.
         1. The filter global efficiency will be determined using a thermal condensation aerosol generator and photometer which will measure downstream penetration as compared to the upstream concentration.
      2. Each Filter shall be tested for initial (clean) pressure drop at rated flow.
         1. The nominal initial pressure drop, rated air flow and overall efficiency rating are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Filter Size  (mm) | Efficiency  (on 0.3µm) | Rated Airflow (CMM) | Max. initial ΔP  (Pa) |
| 610 x 610 x 150 | 99.99% | 24 | 250 |
| 610 x 610 x 292 | 99.99% | 35 | 250 |

iii) Filter shall have a maximum ramp speed of 10ᵒC/minute to minimize ramp time.

* + - * 1. Labeling and Reporting:

Each filter shall have a laser etched unique labeling indicating filter size, unique serial number, model number, tested efficiency, pressure drop at volumetric test airflow.

A test certificate shall be provided for each filter indicating filter specific test data including the lot and serial number along with the pressure drop and efficiency. A test certificate at a minimum should contain filter size, the filter’s unique serial number, model number, tested efficiency, tested pressure drop at volumetric test airflow.