


Power and Energy Group
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Gas Turbine Air Filter Elements

Technical Specification

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מכון התקנים הישראלי

Gas Turbine Air Filter Elements Technical Specification

1. General Description

Request to quote for GE Frame 9E, 9FA & 6B inlet cylindrical and conical air filter and SIEMENS SGT5-2000E cylindrical only, air filter Gas Turbine elements according to this specification.

The filter elements are installed in Donaldson TTD and GDX type of gas turbine inlet air filter house.

IEC Cat. No. 3862752 cylindrical – TTD and GDX filter house installation.
IEC Cat. No. 3862760 conical - GDX installation.

The operation modes of the gas turbine where the requested air filters will be installed are varying from peaking to continuous.

The purchase order will be given to one supplier for the 2 items

2. General Requirements

- 2.1 The purchase procedure includes 2 stages. During the technical stage (first stage), the supplier will submit all documents according to requirements in this specifications (table 2 and 3), for review by IEC.
- 2.2 The air filter elements will be manufactured and tested according to the standards specified in this specification. Other standards – to which IEC is not obligated to agree - will be submitted for evaluation during the technical stage (first stage).
- 2.3 The supplier will include in his technical proposal, dimension sketch for conical and cylindrical air filter element.
- 2.4 The air filter elements will be manufactured in factory which holds ISO-9001 or other quality assurance management standard.
- 2.5 Together with his technical proposal, the supplier will submit reports of filter performance inspections conducted by a certified laboratory for filter elements which operated at least 8,000 working hours.



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- 2.6 By participating in this tender, the bidder agrees to commence his technical qualification process to become a certified IEC supplier. This process must be completed by the time of completion of this tender.
- 2.7 The supplier will allow an IEC representative to visit his factory.
- 2.8 The supplier will submit his recommendation for best preservation mode to the air filter at IEC warehouse and will include the average life time in that state.
- 2.9 The air filter will be installed in TTD & GDX type filter house and will be serving GT unit that accrues low operational hours, supplier will submit air filter average life time in that condition.
- 2.10 The cylindrical - conical air filter set IEC cat 3862760 will be manufactured from the same media type and will have same characteristics like it was manufactured in one piece. This set will be installed in GDX air filter house type.

3. **Applicable standards**

- 3.1 EN 779:2012. Particulate air filters for general ventilation – Determination of the filter performance. Supersedes EN 779:2002.
- 3.2 ASHRAE 52.2-2007. Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
- 3.3 EN 20811:1992. Textiles - Determination of resistance to water penetration - Hydrostatic pressure test.
- 3.4 DIN 53438-1. Testing of combustible materials; reaction to a flame of a burner; edge and surface flame action.



4. Technical Requirements

Table 2: Spec No.1 Cylindrical, Pulse-cleaning Cartridges Data Sheet

No	Parameter	Standard	Value	Notes
1	Environment	Not Applicable (N/A)	Agriculture, Light industrial Inland, 15-25 km off sea cost	Manufacturer Data sheet
2	Filter element dimension	N/A	OD 324 mm, ID 212 mm, L 660mm	Manufacturer's Data sheets
3	Filter Type	N/A	Pulse cleaning	
4	Number of elements per GT unit	N/A	1150-1280	General information only
5	Filter element configuration	N/A	Vertical, separate elements	Manufacturer Data sheet
6	Filter Media	To be supplied by the filter manufacturer	synthetic or blend with minimum 20 % synthetic	Manufacturer's Data sheets
7	Filter Class	EN 779 ASHRAE 52.2	F9 MERV 15	Manufacturer's Data sheets
8	Design (rated) air flow	N/A	1000 m ³ /h	Manufacturer's Data sheets
9	Initial (new) dP at design (rated) flow	EN 779 ASHRAE 52.2	200Pa (max)	Manufacturer's Data sheets
10	Min Allowable dP	N/A	200 Pa (min)	Manufacturer's Data sheets
11	Dust Holding Capacity at the recommended final dP (min)	EN 779 ASHRAE 52.2	1000g	Manufacturer's Data sheets ~ 2 year operation
12	Strength of the filter media: - Tensile (wet, dry) - Mullen burst	To be supplied by the filter manufacturer	Suitable to operation mode, environment, life cycle	Manufacturer Data sheet
13	Water Repellence (min)	EN 20811	1500Pa	Manufacturer Data sheet
14	Filter structural design Info about : Liners, End Caps, Pleat tips/Pleat-to-Caps Bonding, Gaskets, Pleat Spacers etc.	EN 779 Item 5	TTD installation In service At least 3-5 years	Manufacturer Data sheet
15	Allowable Temperature/humidity (min)	N/A	70C/100%	Manufacturer Data sheet
16	Flammability class	DIN 53438	K1/F1	Manufacturer Data sheet
17	Media loading type: Surface/Depth	N/A	Surface	Manufacturer Data sheet
18	Media electrostatic charge	EN 779 ASHRAE 52.2	no	Manufacturer Data sheet



Table 3: Spec No.2 Cylindrical +conical, Pulse-cleaning Cartridges Data Sheet

No.	Parameter	Standard	Value	Notes
1	Description		GDX horizontal, Inland.	General info
2	Filter Type	N/A	Pulse	Manufacturer Data sheet
3	Filter element configuration	N/A	Cylindrical + Conical	Manufacturer Data sheet
4	Filter element dimensions	N/A	For Cylindrical see table2, Conical: L 660mm; OD 445/324 mm, ID 333/212 mm	Manufacturer Data sheet sketch
5	Filter Media	To be supplied by the filter manufacturer	synthetic or blend with minimum 20 % synthetic	Manufacturer Data sheet
6	Filter Class	EN 779 ASHRAE 52.2	F9 MERV 15	Manufacturer Data sheet test reports
7	Design flow	N/A	2530 m3/h	Per cyl/con set
8	Initial (new) dP at design flow	EN 779 ASHRAE 52.2	300Pa (max)	Manufacturer Data sheet
9	Min Allowable dp	N/A	200 Pa (min)	Equal to alarm dP
10	Dust Holding Capacity at the recommended final dP	EN 779 ASHRAE 52.2	2650g (min)	~ 2 year operation - see gen. notes Manufacturer Data sheet
11	Strength of the filter media: - Tensile (wet, dry) - Mullen burst	To be supplied by the filter manufacturer	Suitable to operation mode, environment, life cycle	Manufacturer's Data sheet
12	Water Repellence (min)	EN 20811	1500Pa	
13	Filter structural design Info about Liners, End Caps, Pleat tips/Pleat-to-Caps Bonding, Gaskets, Pleat Spacers etc.	EN 779, Item 5	Supplied by the filter manufacturer if	Manufacturer Data sheet
14	Allowable Temperature/humidity (min)	N/A	70C/100%	Manufacturer Data sheet
15	Flammability class	DIN 53438	K1/F1	Manufacturer Data sheet Self-extinguishing
16	Media loading: Surface/Depth	N/A	Surface	Media (it.9)
17	Media electrostatic charge	EN 779 ASHRAE 52.2	no	Media (it.9)



4.1 Additional technical requirements.

4.1.1 The filters are expected at least for life time of 16,000 operation hours.

4.1.2 Design & Materials

4.1.2.1 The filter element shall be designed so that when correctly mounted in the filter house, no leak occurs along the sealing edge.

4.1.2.2 The filter element shall be made of suitable material to withstand normal usage and exposures to those temperatures, humidity and corrosive environments that are likely to be encountered.

4.1.2.3 The filter element shall be designed so that it will withstand mechanical constraints that are likely to be encountered during normal use.

4.1.2.4 The media strength will be suitable to Base Load mode, ambient temperature from 0 to 45C, relative humidity from 10 to 100%, life cycle – See requested data in Table 3 below.

4.1.2.5 Dust or fibers released from the filter media by the air flow through the filter element shall not constitute a hazard or nuisance for the people (or devices) exposed to filtered air.

4.1.2.6 The filter media and filter parts (end caps, gaskets, bonding material) shall provide the required (reasonable) oil, acid, alkali, hydrolysis resistance according to the operational environment. Steel parts must at the least be galvanized.

4.1.2.7 Pleat/end cap and gasket/end cap bonding ensures no air bypass from the dirt to clean side of the filter elements.

5. Data and documents to be supplied by the bidder.

The bidder is kindly requested to fill the data in table 4 and to submit the below requested information and documents for stage 1 of the purchase procedure.



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Table 4

No.	Parameter	Standard	Value/Description
1	Recommended final dP in excess to initial dP (note 1)	N/A	Supplier Data
2	Strength of the air filter media: - Tensile (wet, dry) - Mullen burst	To be defined by the Supplier	Supplier Data
3	Air filter structural design Info about Liners, End Caps, Pleat tips/Pleat-to-Caps Bonding, Gaskets, Pleat Spacers etc.	EN 779, Item 5 EN1822, items 6.1, 6.2	Supplier Data
4	Air filter maximum recommended shelf life while in storage	N/A	
5	Air filter maximum recommended life while installed in the GT	N/A	Supplier Data

Note 1: The dP at which rapid increase of the filter resistance begins

- 51 Firm and formal statement that the proposed product fit to all the requirements as were defined in the technical requirements chapter (table 2 and the additional requirements).
- 5.2 Data sheets and drawings (including tolerances) that will support the above mentioned statements. The following information (among others) shall be provided for each filter element type:
- 5.2.1 Filtration area (m²);
 - 5.2.2 Number of pleats;
 - 5.2.3 Pleats depth;
 - 5.2.4 Gasket height and location diameter.
 - 5.2.5 Filter media type manufacturing standard.
- 5.3 Description of the company laboratory capabilities, including formal approvals.
- 5.4 Name and details of authorized external "third party" laboratories that will perform tests as required in this bid.



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5.5 Test reports. The supplier will submit the following test reports for the air filter elements.

- 5.5.1 Filter Class.
- 5.5.2 Max. initial (new) dP at the design flow.
- 5.5.3 Strength of the media filter: Tensile (wet & dry) and Mullen burst.
- 5.5.4 Water repellence. Raw material for the air filter will be tested.
- 5.5.5 The supplier will submit a price offer of a laboratory test for a single filter. The price will include transportation cost. IEC will have the privilege to send up to 12 filters from every set supplied under the agreement. For price comparison the price of testing is 6 for each set, i.e 120 filters will be taken.

5.6 General notes for the above mentioned tests:

- 5.6.1 The tests will be done by a third party laboratory.
 - 5.6.2 The tests will be according to the standards specified in table 2 above.
 - 5.6.3 For the relevant inspections, if the required design flow rate cannot be provided with the test device, then the test conditions shall be agreed in advance.
 - 5.6.4 The quantity of tested samples will be according to the supplier quality assurance manual and procedures. The samples will be taken from the batch that includes IEC actual productions.
The supplier will inform IEC two weeks before the tests in order IEC would be able to witness the tests.
 - 5.6.5 The reports will be sent to IEC before delivery of the products. The supplier must have IEC approval before the delivery.
 - 5.6.6 In order to minimize conflicts and lack of communication, the supplier will submit with his proposal, for stage 1, sample reports from previous similar productions.
- 5.7 The supplier recommendation for best preservation procedure of the air filters at IEC warehouse.
- 5.8 General description of the company, manufacturing sites and facilities.
- 5.9 Quality assurance manual and list of standards that are implemented by the company.
- 5.10 The filters will be supplied wrapped in sealed plastic, inside cardboard box, topped on wooden pallets placed inside the shipping containers which will be returned to the supplier up to 6 months after assembly of the filters.



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