



Pall (Canada) Limited

□ ONTARIO SALES OFFICE
2205 Millcreek Drive
Mississauga, Ontario
L5N 3R3
(416) 542-0330
Fax: (416) 542-0331
Telex No. 06-960411

□ QUEBEC SALES OFFICE
216 Rue Migneron
St. Laurent, Quebec
H4T 1Y7
(514) 735-5311
Telex No. 05-824075

January 11, 1989

Fenco
2235 Sheppard Ave. East.
Willowdale, Ontario
M2J 5A6

Attention: Mr. Nick Figgess

SUBJECT: PALL POROUS METAL (PSS) BLOWBACK FILTERS FOR
WAROX PROJECT AT GIANT YELLOWKNIFE MINES LTD.

Pall Budget Proposal # B7BB77L184

Dear Nick,

On behalf of Dave Howson (our area technical sales representative), Rene Shanks (our AEC Marketing Specialist), and myself, Pall (Canada) Ltd. is pleased to provide the following budget proposal for a Pall PSS Blowback Assembly to suit the needs of your client for the referenced high temperature filter application.

After careful review the basic application parameters, as "faxed" to us on Dec. 8, 1989, we believe a Pall Porous Metal filter can be well tailored to this application utilizing existing Pall Filter technology found in similar, high flow applications throughout the world.

Background

The application of Pall sintered metal filter assemblies to remove particulate from high temperature gas streams has been practiced for over 30 years. We have built virtually hundreds of units for self-cleaning blowback applications and wish to utilize this experience and work with you on this very important Roaster Exhaust Gas project.

Blowback Filter Design Criteria

In order to achieve a successful installation, Pall Corporation has learned that the design of porous metal blowback filters is based on the following criteria:

continued

CORPORATE AFFILIATES

Pall Trinity Micro Corporation, Cortland
Pall Europe Ltd., Portsmouth, England

APM, St. Petersburg, Fla.
Pall Corporation, Glen Cove, N.Y.

Pall (Canada) Limited

Fenco

Quote No. B7BB77L184

Page # 2

1. Cleanability- Capable of being efficiently blown back while in service, to provide repeatable self-cleaning cycles once an equilibrium pressure drop is achieved.
2. Efficiency- Must be able to remove 100% of (extremely fine) particulate.
3. Media- Must be such that surface texture is compatible with particulate.
4. Uniformity- Pore structure should be fairly uniform to insure even filtration and blowback over the entire filter surface.
5. Fabricated element strength- Able to withstand the mechanical and thermal stress of the application.
6. Alloy- Proper alloy relative to the specific environment.
7. Element Configuration -Proper element spacing, and relationship to housing and hardware with the proper diameter versus length ratio.
8. Assembly Design- Proper housing configuration and tube sheet/element bundle-support design. Housing/element relationship must be considered.
9. Particulate- Should identify Solids loading, as well as nature and size distribution of particulate.
10. Cycle Time- Proper blowback cycle technique and dewpoint considerations.
11. Housing configuration -For proper flow profile and solids deposition.

Once the above criteria is established, our engineering and SLS personnel study the information, enabling us to design an optimum blowback filter.

continued

Pall (Canada) Limited

Fenco

Quote No. B7BB77L184

Page # 3

Design Conditions Considered

Gas Flow Rate:	1785 ACFM
Gas Temperature:	750 F
Process Line Pressure:	To be determined
Process Line Size:	10 inch
Dirt Load:	75 grams/ACF
Particle Size Distribution:	100% less than 10 microns

Particle Composition : Iron Oxides
Insoluble Compounds
Arsenic Trioxide
Antimony

Gas Composition:	Water Vapour	6%	by volume
	Carbon Dioxide	4%	
	Arsenic Trioxide	8%	
	Nitrogen	79%	
	Oxygen	2%	

FILTER ASSEMBLY DESIGN

For this application, we propose our automated Jet Pulse Blowback filter concept (see Pall product bulletin GSS-V3 attached for an general design description). This technique utilizes downward vectorial force created by the movement of inlet gas flow, to assist in particulate collection during filter element blowback cycle after the fluid particulate has been separated and terminal pressure drop has been reached across the filter media. The approach is well suited to applications of higher flow densities where the process contaminant is fine and low in bulk density.

Our preliminary sizing indicates that our system would comprise one 38 inch O.D. vessel of carbon steel construction, with 10 inch inlet and outlet connections and a conical shaped vessel bottom to accommodate for solid discharge. The vessel would house a total of approximately ninety six (96) 95 inch long by 2 3/8 inch O.D. Pall Porous Metal S-Series filter elements having an absolute removal rating of 5 microns. The elements have a Venturi style nozzle configuration, and are welded into a removable tube sheet assembly.

continued

Pall (Canada) Limited

Fenco
Quote No. B7BB77L184
Page # 4

The element would utilize 304 SS solids and 316 SS porous metal materials.

An automated, programmable controller would provide the automation for the high temperature quick action butterfly valves used in the blowback system.

Total Filter Assembly Budget Price: \$250,000CDN

Technical Comments

Our basis for the design of this system (i.e. removal efficiency and flow density / sq. ft. of porous metal media) is a result of numerous discussions with Mr. Ross Gilders of the Research and Productivity Council (RPC) in New Brunswick. However, our 40 years of experience with Porous Metal technology leaves us with some design concerns regarding blowback technique and optimum flow density. For these reasons, we strongly suggest a meeting of our Scientific and Laboratory Services (SLS) personnel, those of GYM/RPC and/or Fenco at your earliest possible convenience.

As per our experience we can also comment on the following:

1. A minimum of a 30 SCFM at a 60 PSIG blowback gas supply would be required to provide the pulse gas necessary for the blowback function.
2. With regards to interrupted flow operation, in order to avoid problems associated with damp filter cake and vessel and element corrosion, the assembly would have to be maintained at a temperature above the lowest possible process gas dewpoint with a margin of safety to be determined after evaluation of the application particulate. We can only assume that a bleed of process gas would be incorporated to satisfy this requirement. Alternately a side stream heating method may also be the most practical choice.
3. Insulation of the assembly, vessel support structure, conduit to the control panel, and solids recovery handling equipment, are not included in our pricing or supply scope.

continued

Pall (Canada) Limited

Fenco
Quote No. B7BB77L184
Page # 5

Dimensions- For study purposes please refer to Bulletin GSS-V3 which provides a basic overview of the dimensions of the assembly quoted.

Delivery can be estimated at 14 to 16 weeks from receipt of formal approval to manufacture from the purchaser to Pall (Canada) Ltd.

Terms Unless otherwise negotiated, Net 30 days F.O.B. Mississauga, Ontario.

Pall Scientific Laboratory Services (SLS)

Laboratory Testing

Performing a simulated test, either at our SLS facility in Glen Cove, New York, or at your plant will be necessary to the establishment of optimum design criteria.

Testing in our lab facilities is provided to the customer on a nocharge basis.

The lab analysis will include:

1. Identification of the sample(s) particle size distribution.
2. Total particulate fluidization in a test filter rig, at several flow densities to establish the interface characteristics of the contaminant and several grades of our filter media.
3. Actual scale cycling in the test rig, to establish filter media in-situ cleanability for a representative period of time. (Generally in excess of 2000 cycles).
4. Media compatibility with all operation conditions.

We understand that the particulate involved is considered toxic and may limit our test efforts at our corporate facilities. We feel that a logical option would be to have our SLS personnel visit RPC to assist with the design testing.

continued

Pall (Canada) Limited

Fenco

Quota No. B7B877L184

Page # 6

We welcome yourself and other members of your firm to witness these tests in our facilities once the basic design criteria has been established.

Field Testing

A representative scale field side stream test at your facility will also provide valuable performance data of our filters in your application.

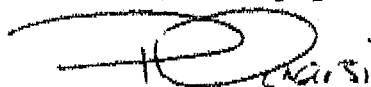
SLS assistance will also be made available at no-charge, to help set-up, run and collect performance data necessary for your purchase evaluation.

Successful Installation Reference

To further demonstrate the capabilities of Pall PSS blowback filters, we attach a selection of Filter installations for your review. The same design approach as per the above resulted in the effective operation of the systems at these locations.

We trust that the information provided is to your company's satisfaction and certainly look forward to the opportunity to work with you on this project. Should you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,



Paul Vaarsi
Applications Engineer

CC: B. McLeod
R. Shanks
B. Ferneyhough
P. Vaarsi
N. Cathcart