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FAX COVER PAGE

DATE: May 1 90

TIME: _____

OUR REF. NO: _____

ATTENTION: H B Lewis

FROM: L Milton

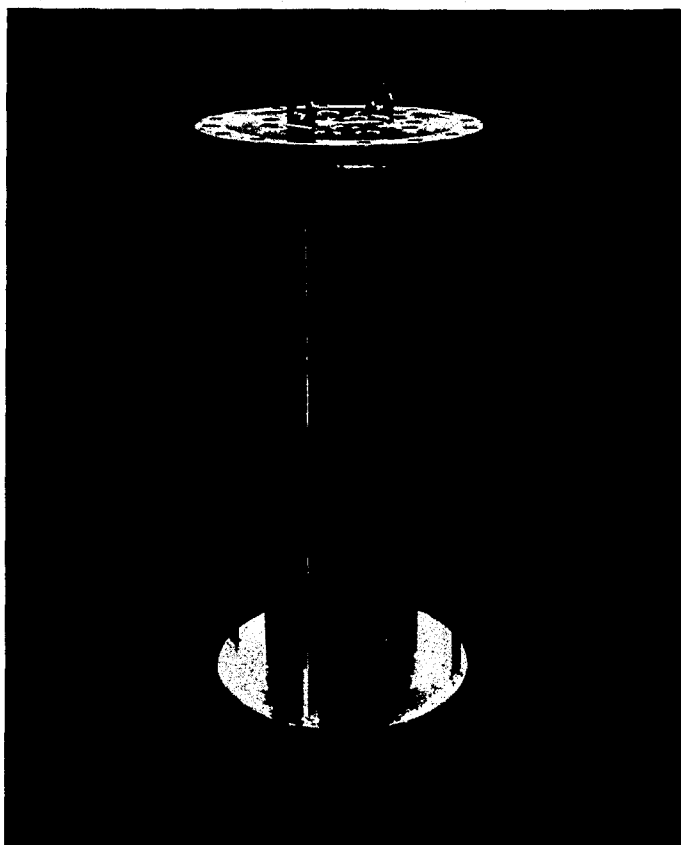
NO. OF PAGES: 7 (Including This Cover Page)

COMMENTS OR INSTRUCTIONS:

Here's some info on the sintered
fiber metal filters manufactured by
Fluid Dynamics. They claim much
higher flow rates for a given surface
area. I could probably arrange for
us to visit their Florida plant while we
are in the area. What do you think?

If there is a problem with this transmission, or if you wish to
contact us, following are our numbers:

Telephone: 403-873-6301
Fax: 403-873-2980

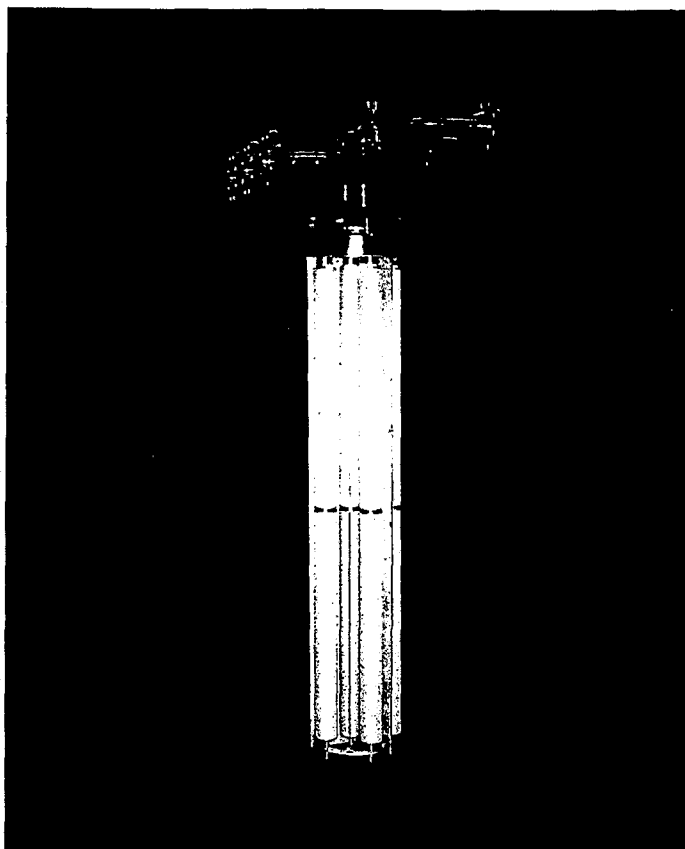


DYNALLOY GASTREAM™ Elements.

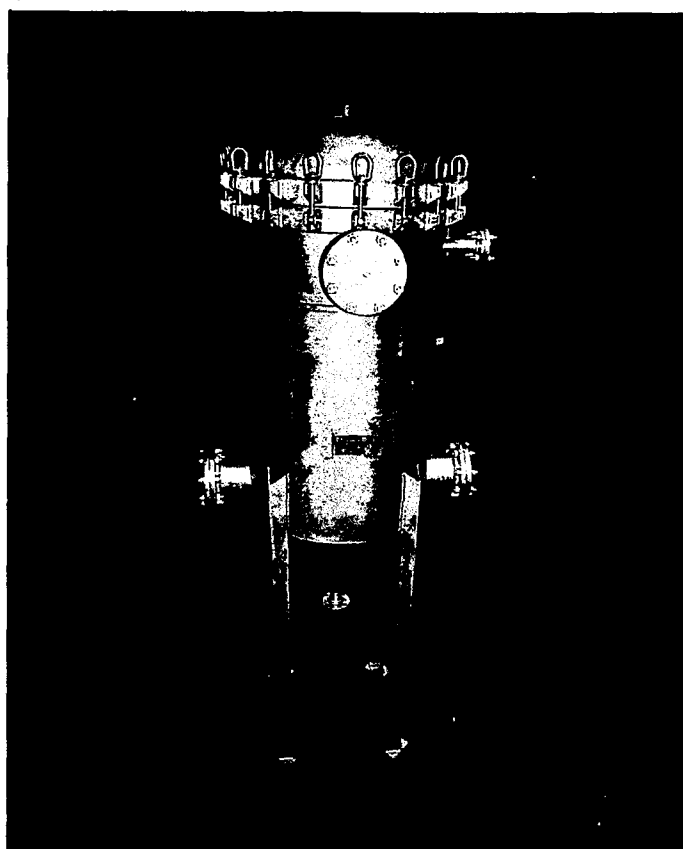
Fluid Dynamics new DYNALLOY GASTREAM™ fiber metal filter media dramatically improve the efficiency of gas stream solids removal/recovery systems. The unique filter media permit a 300% increase in flow, with less pressure drop than powdered metal filters. They also have over 200% greater dirt holding capacity, yet trap catalysts and contaminants absolutely.

DYNALLOY® fiber filter media are manufactured from extremely fine metallic fibers, in a process developed by Fluid Dynamics, who have worldwide patent coverage. DYNALLOY fiber media have a very high porosity (void volume) when compared to the thick dense structure of powdered metal filter media, presently used in gas stream applications.

The advantages of increased void volume are higher flow rates, and greater dirt holding capacity. The micron size metal fibers form an extra fine surface filtration layer which prevents solids penetration into the media and greatly enhances cleanability. DYNALLOY GASTREAM™ media are available in 304 or 316 stainless steel; can be ordered in exotic alloys for aggressive environments; and are available in removal ratings as fine as 0.3 μm .



DYNALLOY GASTREAM™ Catalyst Recovery Unit For Fluid Bed Reactor.



DYNALLOY GASTREAM™ Particle Fines Removal System.

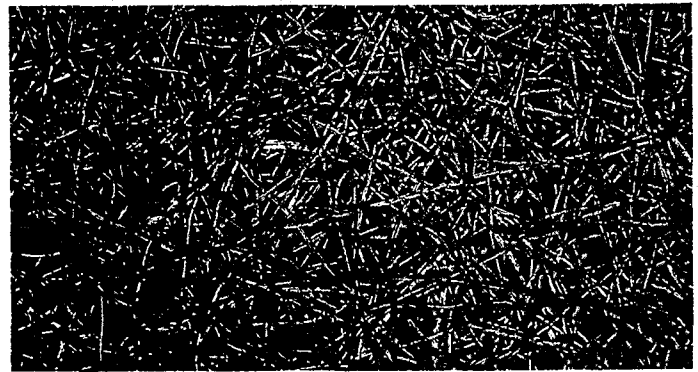
DYNALLOY filter media are made by forming non-woven structures of very fine metal fibers. A web is formed of loose random metal fibers, and then sintered, (a metallurgical bonding process). By varying the fiber diameters and the method of web construction, DYNALLOY GASTREAM™ filter media can have particle removal ratings as fine as 0.3 μm in gas applications.

Fluid Dynamics, the originator of metal fiber filter media, is also the world leader in developing metallic filter media for an ever increasing range of applications. Fluid Dynamics maintains its leadership position through:

- **Comprehensive Product Development and Testing.**
The most comprehensive in-house metal fiber media development and testing facility in the world.
- **Experienced Application Engineering.**
A metal fiber filter media engineering department which has over twenty years of experience in solving filtration problems.
- **Total Control of the Manufacturing Process.**
A total vertically integrated manufacturing facility in DeLand Florida, which assures consistent quality by controlling the entire manufacturing process of metal fiber media and filters. *No other metal fiber filter supplier has this degree of control on quality.*
- **Product Uniformity.**
A high volume manufacturing operation with vast experience in metal fiber filter media production. This experience results in closely controlled media uniformity providing consistent, repeatable filtration results.
- **Quality Recognition.**
A manufacturing facility which has received both customer and Government recognition awards for consistent high quality product and standards.



Modern Cad System Engineering and Design Capability.



Surface of DYNALLOY GASTREAM™ Medium. 100x Magnification.

Fluid Dynamics is the only manufacturer of micron sized metal fibers in the United States. This enables Fluid Dynamics to develop custom designed filter media for your individual filtration application.

These include:

- **Exotic Alloys.**
Although DYNALLOY is normally constructed of either 304 or 316 stainless steel, Fluid Dynamics has supplied DYNALLOY filter media in Hastelloy X^{®1}, Inconel 600^{®2} and DH-242^{®3} for applications in aggressive environments.
- **Custom Filter Media Development.**
The Fluid Dynamics Media Development Laboratory has developed and tested literally thousands of metal fiber filter media on a wide range of applications. This wealth of experience greatly simplifies the development of technically sound filtration media with optimum process economics for your application.



Fully Computerized Quality Assurance Laboratory.

¹Hastelloy X[®] is a registered trademark of Union Carbide Corporation.

²Inconel[®] is a registered trademark of International Nickel Company.

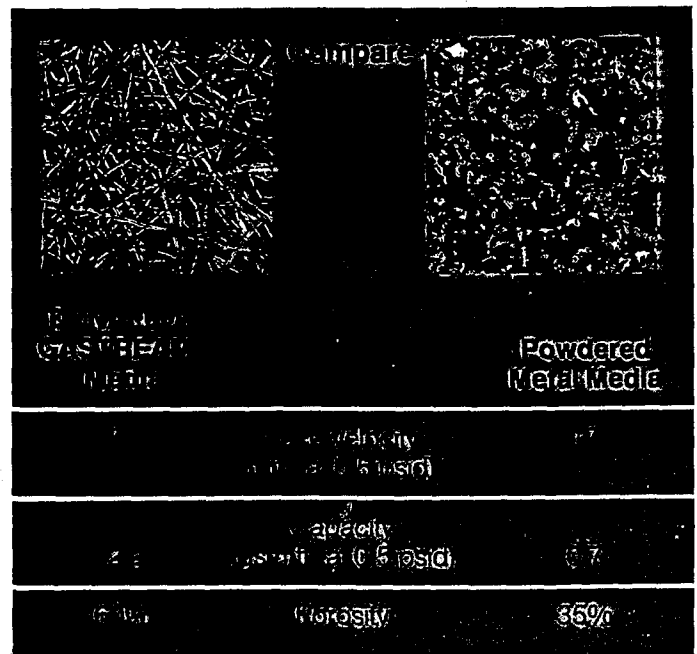
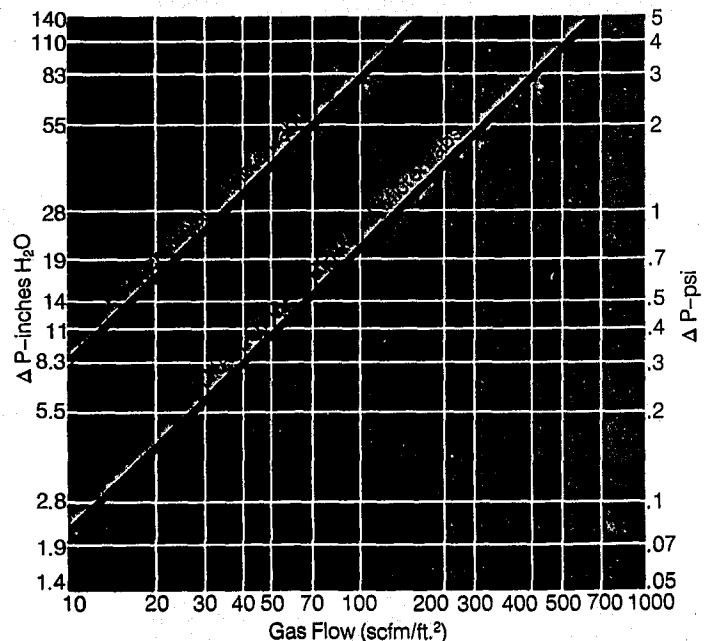
³DH-242[®] is a registered trademark of Driver-Harris Co.

The advantages of Fluid Dynamics DYNALLOY metal fiber filter media have resulted in outstanding process and product improvements due to improved filtration. Since Fluid Dynamics makes its own metal fibers, the specific alloy and diameters of fiber needed for the optimum construction can be specified.

Fluid Dynamics metal fiber media have been applied to a wide range of filtration problems because of their superior performance characteristics:

- Superior Particle Removal Efficiency.**
 DYNALLOY GASTREAM™ media are a precision non-woven structure of metal fibers whose diameters are tightly controlled throughout their manufacturing process. This yields a medium with narrower pore size distribution, better uniformity, and finer filtration rating than can be achieved in sintered powdered metal. This narrow pore size distribution and consistent uniformity gives you superior efficiency with repeatable results.
- Low Pressure Drop.**
 DYNALLOY GASTREAM™ media exhibit extremely low pressure drop due to their unique construction. This provides opportunities for higher face velocities with finer filtration at lower operating pressures.
- Superior Cleanability.**
 Metal fiber media not only have a finer more uniform pore size distribution than powdered metal media, they also have far greater porosity. The result is an even, less dense cake build-up at lower pressure with much less particle penetration into the filter medium and improved cake release properties.
- No Media Migration.**
 Fluid Dynamics DYNALLOY is a sintered structure of metal fibers. Sintering is a metallurgical bonding process, without the need of binders, to form an integral interconnected structure of fibers held in place by literally thousands of "spot" welds at their common contact points. They will not enter your filtrate stream, nor will they unload trapped contaminants, even under the most severe operating conditions.
- High Strength.**
 Fluid Dynamics DYNALLOY media have high strength built into them with the sintering of the metal fibers. DYNALLOY GASTREAM™ media also have excellent mechanical strength for long service in cycling reverse flow blowback applications.
- Temperature Resistance.**
 DYNALLOY GASTREAM™ filter media can handle extreme temperature conditions from cryogenic to superheated industrial process gases.
- Chemical Compatibility and Corrosion Resistance.**
 Fluid Dynamics DYNALLOY media are constructed of 304 or 316 stainless steel which have excellent chemical compatibilities and resist corrosion in most applications. In addition DYNALLOY filter medium can be ordered in exotic alloys for the more aggressive environments.
- No Extractables.**
 Fluid Dynamics DYNALLOY GASTREAM™ media are a fully welded structure and do not contain binders which could contaminate your filtrate stream.

Gas Flow vs. ΔP

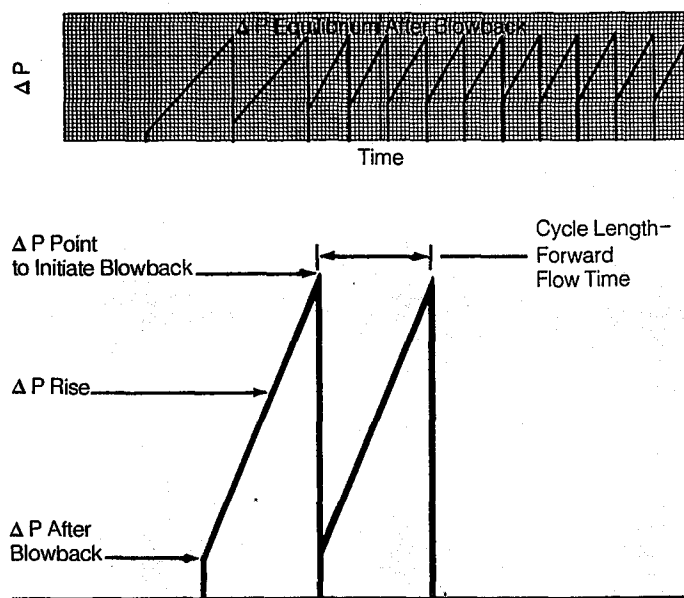


The separation of fine particles from gas streams has many applications. The recovery of precious catalysts or product in fluidized bed reactor processes, the removal of objectionable particulate from flue gases, or the filtering of gases to protect systems components are typical. One of the most efficient methods of separating fine particles from gas streams is a gas blowback continuous filtration system.

In gas blowback filtration, an extra fine surface layer of filtration medium is *required* to minimize particle penetration which results in premature blinding and short life. The filter medium actually serves as a septum in that it provides a fine surface on which a cake of particles build up. This particle layer will continue to build until a predetermined pressure differential is reached. At this time a reverse flow gas is introduced which releases the cake from the filter septum. The cake drops to the bottom of the filter housing for recovery or removal.

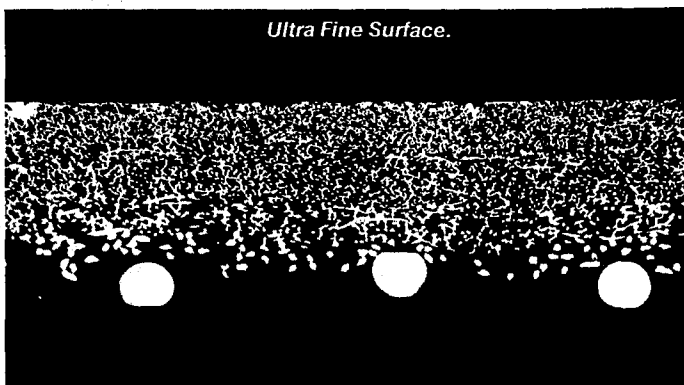
A fine layer of particles remain on the filter where they actually assist the filter by acting as a fine protective precoat. When this precoat stabilizes, the filter reaches a point of equilibrium in which the clean pressure differential immediately following blowback remains constant through thousands of cycles.

Media Equilibrium ΔP



ADVANTAGES OF DYNALLOY GASTREAM™ FILTER MEDIA IN GAS BLOWBACK APPLICATIONS

Ultra Fine Surface.



DYNALLOY GASTREAM™ Media Cross-Section Showing Unique Ultra Fine Surface Layer.

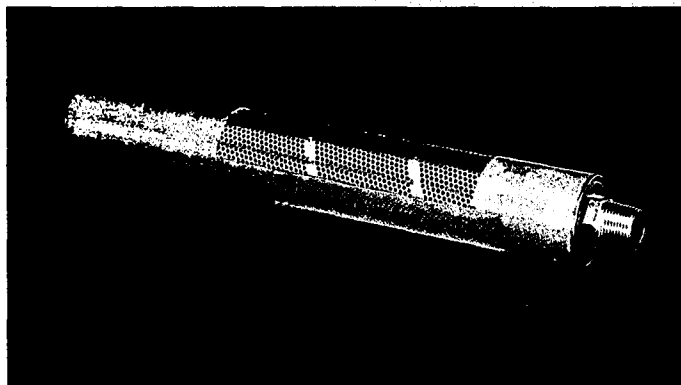
Fluid Dynamics DYNALLOY provides the ideal filter media for gas stream particle separation applications. Some of the advantages of DYNALLOY GASTREAM metal fiber filter media are:

- **Ultra Fine Filter Media Surface.**

DYNALLOY GASTREAM media incorporate a unique ultra fine surface layer containing a pore size structure considerably finer than any other metal media. This provides a superior surface on which to build a particulate cake and one which will give you a quicker and cleaner release on blowback, less particle penetration and longer life.

- **Higher Face Velocity.**

DYNALLOY GASTREAM™ media, with its significantly greater porosity can operate at a much higher face velocity—as much as 4 times higher than powdered metal filter media at equal pressure drops. This gives you greater throughput and can save you money with smaller systems sizing on new installations or increased flow in existing systems.



DYNALLOY GASTREAM™ Element Cutaway Showing High Strength All Welded Center Core Construction.

- **Lower Differential Pressure.**

DYNALLOY GASTREAM™ metal fiber filter media exhibit a much lower differential pressure than any other metallic media. This allows you to build a lower density cake which will release easier with back pressure, achieve pressure equilibrium faster and at much lower pressure, and minimize the possibility of particulate impaction and penetration, causing premature blinding of the media.

- **Longer Filtration Cycles.**

Fluid Dynamics DYNALLOY GASTREAM™ media give you longer filtration cycles than any other metallic filtration media. This results in a significant savings in energy costs and assures long filter life.

- **Greater Mechanical Strength.**

DYNALLOY metal fiber media have superior mechanical strength. Additionally, DYNALLOY GASTREAM filter elements are constructed with a high strength center core. Unlike typical powder metal elements which contain no core, DYNALLOY GASTREAM elements do not exhibit stress cracking under extreme flow cycling conditions.

6 PARTICLE DISCHARGE OPERATING SYSTEMS

DYNALLOY GASTREAM Particle Separation Systems are custom designed for your application—from selection and testing of the DYNALLOY filter media, to the on-site start-up and operator training. In addition to being able to offer the optimum alloy and formula in your DYNALLOY GASTREAM™ medium, Fluid Dynamics will design your system, utilizing the most efficient particle discharge method for your application. The two types of particle discharge operating systems are:

- **Reverse Flow Particle Discharge.**

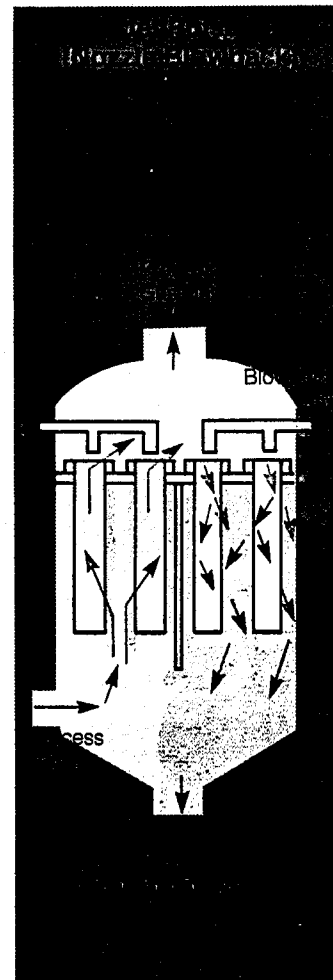
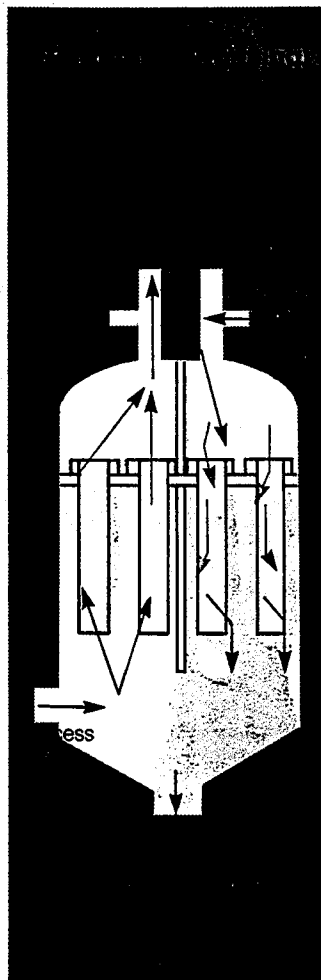
In reverse flow particle discharge systems, the filter elements are cleared by a reverse flow of either some of the filtered gas or with a separate gas. The released cake of particles drops to the bottom of the filter housing where it is removed for further processing or disposal.

This system requires the filter elements be isolated from the filter stream for a few seconds in order to complete the blowback cycle. Therefore, if you want or need a continuous process stream, multiple filter housings or partitioning of your filter housing will be required.

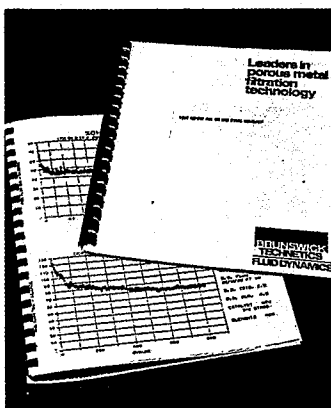
- **Jet Pulse Particle Discharge.**

In jet pulse particle discharge systems, the filter elements are cleared by a short pulse, (0.5–1.0 sec.) of high pressure gas. This pulse is applied via a blowback nozzle located above each element and only to the filter elements to be cleared in that cycle. The released cake drops to the bottom of the filter housing as it does with the reverse flow system.

The jet pulse particle discharge system can be used with one or more filter housings and does not require isolation of the filter elements to be cleared. Since the pulse of blowback gas is sufficient to overcome the process flow pressure, individual elements can be cleaned while the process flow continues through the remaining filter elements.



7 FLUID DYNAMICS GAS BLOWBACK TESTING FACILITY

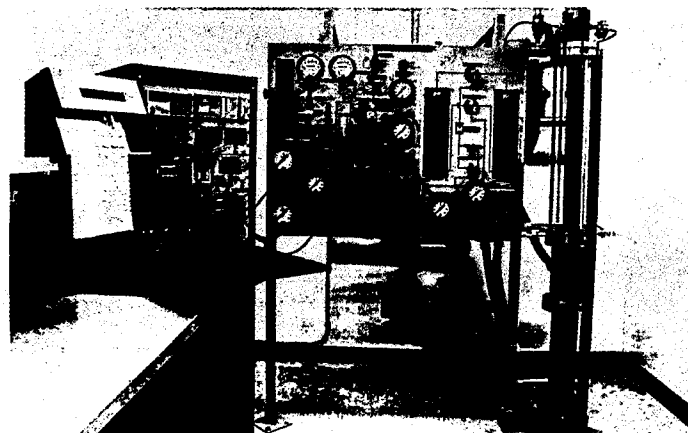


Detailed Test Reports.

The Fluid Dynamics gas blowback testing facility in DeLand, Florida offers you the unique opportunity to investigate the savings possible in your present or proposed gas stream particle separation applications. Here operating conditions can be simulated utilizing the actual catalyst or contaminant which is to be removed. A number of different Dynalloy Filter constructions are tested over a range of blowback methods and cycles.

This series of tests will identify the optimum cost/performance criteria for your application.

The Fluid Dynamics gas blowback testing facility provides you with the opportunity to develop preliminary test data to justify your further commitment of funds for pilot or process level tests. A complete and detailed report is provided with each test. This service is provided by Fluid Dynamics in most cases without charge.



Gas Blowback Testing Facility Specifications

Pressure:	Plexiglas housing 100 psi Steel housing 300 psi
Gas Flow:	2-80 scfm
Fluidizing Gas:	Clean dry air
Operating Temperature:	Ambient (60-80° F)
Test Element:	2½" dia. x 30" long (max. dimensions)

- **Higher Face Velocity.**
DYNALLOY GASTREAM™ media will operate at up to 4 times the face velocity of powdered metal media, giving you higher throughput and an opportunity to save money on new and existing installations.
- **Unique Ultra Fine Surface Layer.**
DYNALLOY GASTREAM™ media incorporate an ultrafine surface layer on which to build a particulate cake and which will release the cake upon blowback more efficiently. This ultrafine layer is *unique* to DYNALLOY GASTREAM™ media and prevents particulate penetration into the media structure.
- **Superior Particle Removal Efficiency.**
DYNALLOY's precision non-woven structure of sintered metal fibers provides a filter which can be rated for 0.3µm particle removal in gas applications.
- **Greater Porosity.**
DYNALLOY has much greater porosity than any other type of metal filter media. Nearly twice the porosity of powdered metal filter media.
- **Lower Differential Pressure.**
DYNALLOY's greater porosity results in initial and clean equilibrium differential pressures approximately 1/4 of that experienced with powdered metal filter media.
- **High Mechanical Strength.**
Fluid Dynamics DYNALLOY GASTREAM™ filter elements' superior mechanical strength and sturdy center core design minimize the possibility of element stress cracking from repeated blowback cycling.
- **Longer Filtration Cycle.**
DYNALLOY GASTREAM™ elements give you longer filtration cycles than any other metallic filter, saving you money and assuring long life.
- **No Media Migration.**
DYNALLOY's metallurgically bonded structure of metal fibers will not migrate or unload removed particulate even under the most severe operating conditions.
- **No Extractables.**
DYNALLOY, which is manufactured in a high temperature sintering process has no binders or extractables which could contaminate your filtrate stream.
- **Temperature Resistance.**
DYNALLOY metal fiber filter media can handle extreme temperature conditions from cryogenics to superheated industrial gases.
- **Exotic Alloys.**
Fluid Dynamics has considerable experience in the manufacture of DYNALLOY media in a variety of alloys, such as 304 and 316 stainless steel, Hastelloy X®, Inconel 600®, and DH-242®, for applications in aggressive environments.
- **Total Control of the Manufacturing Process.**
Fluid Dynamics is the *only* total vertically integrated manufacturer of metal fiber media. This complete control of the manufacturing process provides unmatched quality in the final DYNALLOY product.
- **Consistent Uniformity of Product.**
Fluid Dynamics high volume manufacturing operation and twenty years experience assure a uniform DYNALLOY GASTREAM™ filter which will give you consistent results and quality in your filtration process.
- **Comprehensive Product Development.**
Fluid Dynamics, with its dedication to metallic media filtration, has built the most comprehensive in-house metal fiber media development and testing facility in the world.
- **Custom Media Development.**
Fluid Dynamics has formulated literally thousands of custom DYNALLOY media to provide the optimum in cost effective performance.
- **Experienced Filtration Systems Application Engineering.**
Fluid Dynamics' filtration applications engineering department has over twenty years experience in designing DYNALLOY metal fiber media and systems to solve filtration problems.
- **Testing and Analysis.**
Proposed Fluid Dynamics DYNALLOY GASTREAM™ Particle Separation Systems are thoroughly tested at our gas stream testing facility in DeLand, Florida. This is done to provide optimum cost/performance for your application and assist you in your decision to proceed with pilot or process level tests.
- **Start-up Assistance and On-Site Training.**
Fluid Dynamics provides assistance in start-up and on-site training of your operating personnel to assure your satisfaction with your Fluid Dynamics DYNALLOY GASTREAM™ Particle Separation System.

FLUID DYNAMICS GAS BLOWBACK SYSTEMS

In addition to providing DYNALLOY GASTREAM™ filter media and elements, Fluid Dynamics has the engineering and manufacturing expertise to design and build the optimum gas blowback system for your application. This is the total capability you receive from Fluid Dynamics and it includes:

- **Product and Application Seminars.**

An introductory slide seminar detailing how our unique Fluid Dynamics DYNALLOY GASTREAM™ Media and Systems operate and can optimize your specific process is available for presentation in your facility at your convenience.

- **Analysis.**

Analysis of gas stream and particulate to be removed or recovered.

- **Media Development.**

Custom filter medium development, using an exotic alloy or special medium formulation if required to provide the best overall economics and performance.

- **Testing.**

Evaluation of proposed DYNALLOY GASTREAM™ media by simulating your gas stream application at our testing facility in DeLand, Florida. This provides you with preliminary test data to justify your further commitment of funds for pilot and process level tests.

- **System Design.**

Complete system design by the Fluid Dynamics engineering department, which has over twenty years experience in engineered filtration systems.

- **Complete System Manufacture.**

Our modern vessel manufacturing facility will provide your complete specially designed DYNALLOY GASTREAM™ System to ASME code specifications including "U" or "UM" stamps.



Complete ASME Code Vessel Manufacturing Facility

- **Start-Up.**

Fluid Dynamics provides the assistance in start-up of your DYNALLOY GASTREAM™ Filtration System with a service staff who has installed systems all over the world.

Fluid Dynamics has a long history of quality engineering in designing, fabricating and installing filtration systems around the world. How may we serve you?

APPLICATIONS OF FLUID DYNAMICS GAS BLOWBACK SYSTEMS

Solids Recovery
Polyethylene Fines

Fumed Silica

Solids Removal

Catalyst Regeneration

Environmental Restrictions

Catalyst Recovery

Polychrystalline Silicon

Pharmaceutical Products

Catalyst Preparation

Incineration Processes

Char-ash Removal

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