FB-100DUK

Fluid Filtration Systems

ERIEZ®

HYDROFLOW® EUROPE

HydroFlow® Filtration Systems

Eriez is a leader in comprehensive coolant and fluid management technology serving the metalworking industry. These industrial filtration and fluid recycling systems maximise coolant effectiveness and longevity improving machine tool productivity and reducing disposal costs.

Today's precision machine tools operate at higher speeds and increased feed rates demanding high pressure "clean coolant" at the tool. Eriez HydroFlow® systems can deliver filtered coolant to 1 micron at flow rates up to 37,854 LPM (10,000 GPM).

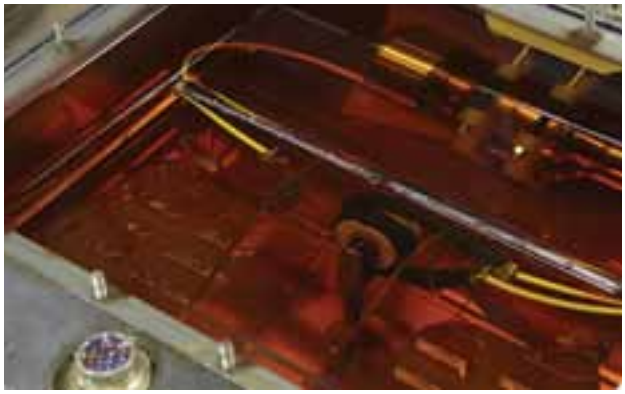
Whether it's for an individual machine tool or complete plant-wide centralized system using water-based coolant or straight oil lubricant, Eriez offers a variety of filtration solutions including:

- **Media and Media-free Vacuum Filters**
- **Centrifuge Filter System**
- **Gravity Filter Systems**
- **Magnetic Roll Separators**
- **Fluid Transfer Systems**

HydroFlow Filters incorporate synthetic permanent media, wedge wire, disposable roll media or cellulose precoated elements for use with low pressure flood coolant or high pressure directed coolant.

High speed machining requires "clean coolant"

Precision grinding using high pressure cutting fluids



EDM demands effective filtration

SCOTT STANG

Manager Manufacturing Technology • Hi-Tek Manufacturing

"Our HydroFlow STAR Filters have proven to be real workhorses delivering high pressure, ultra-clean coolant to our 21 precision grinding centres... we installed a third to handle our EDM filtration needs."

Common Filtration Applications

Machining – Drilling, milling, boring and turning require significant volumes of “flood coolant” to move chips from the work area to the coolant sump.

Conventional Grinding – Centreless, ID/OD, surface and form grinding produce a difficult combination of metal and wheel breakdown.

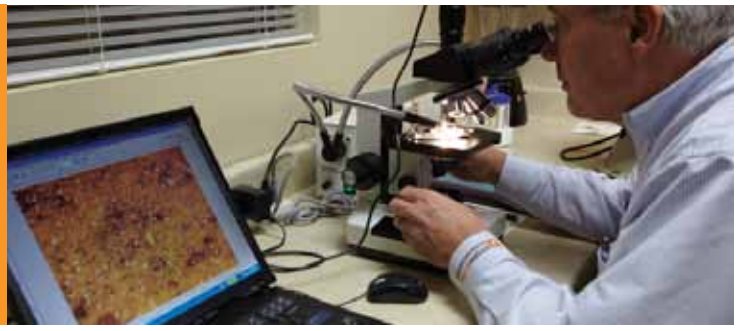
Creep Feed Grinding – Large volumes of high pressure coolant combined with heavy stock removal and abrasive wheel breakdown creates a very demanding filtration application.

CBN Grinding / Superabrasive Machining – High speed process of metal removal requires the use of heavy oils at pressures up to 69 bar (1000 PSI) resulting in aeration and cavitation challenges.

Eriez complete coolant management and recycling solutions include coolant transfer systems, temperature control, tramp oil removal and proper make-up systems.
These solutions include:

- **Coolant Recycling Systems**
- **Solids-from-Liquid Centrifuges**
- **Liquid-from-Liquid Centrifuges**
- **Coalescers and Oil Skimmers**
- **Sump Cleaners**
- **Magnetic Chip Conveyors**
- **Magnetic Separators**

Contents



Laboratory Services

Eriez test laboratory will diagnose exact particulate and oil contaminants in your coolants, fluid and cutting oils and then submit a complete analysis along with a recommended course of action. Contact your sales representative or the factory for details.

Low Volume Filtration

Liquid-Solid Particle Separation

For low volume solids filtration or scalping operations, Eriez offers a variety of gravity induced filtering equipment. These range from gravity beds, magnetic rolls and conveyors, cartridge filters and centrifuges. Some of these options use disposable media to provide differing levels of filtration.

Gravity Bed Filters
Ideal for low flow rate applications requiring automatic operation and medium level of filtration. The gravity bed filters are used in general grinding and light machining applications and can be sized for either water based coolants or straight oil.

Magnetic Conveyors
Self contained motorised magnetic chip conveyors are submersed into sump for continuous chip removal.

Cartridge Filter Systems
Provide positive inline filtration, to protect high-pressure pumps, polish coolant or provide side loop filtration.

Magnetic Roll Separators
As a stand-alone unit or in conjunction with the Gravity Bed Filters, the Magnetic Roll provides media free removal of ferrous contaminants down to 15 micron.

Flow rates from 56 to 302 LPM filtration to 5 microns

Low Volume Filtration

Machine-Side

HydroFlow® Centrifuge Filters
HydroFlow centrifuges feature an open-topped rotor bowl design fitted with a long-life, removable, flexible liner, and are available in standard or high performance single and double bowl models with a variety of tank sizes and pump pressures. These systems provide affordable filtration for low flow rates and are often combined with high capacity cartridge filters to polish the fluid to an even greater level.

Features:

- **Inexpensive with low operating costs**
- **Quick and easy sludge disposal**
- **Reusable sludge collection liner**
- **Compact size with low inlet height**

Applications include carbide, glass, ceramics, tool and cutter, and CBN grinding as well as honing, vibratory and micro-finishing, and wire drawing.

Standard Single Rotor Centrifuge:

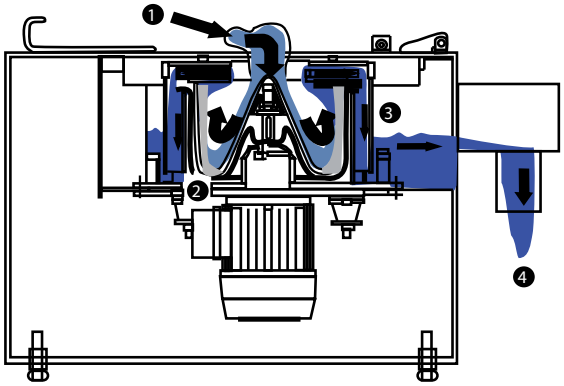
Model	Water Based Flow Rate (LPM)	Neat Oil 20 cSt.	Tank Capacity Litres	Nominal Clarity (microns)
20-22-0	91	80	0	10
20-22-25	91	80	114	10
20-22-40	91	80	182	10
20-22-55	91	80	250	10
20-22-70	91	80	318	10

Standard Twin Rotor Centrifuge:

Model	Water Based Flow Rate (LPM)	Neat Oil 20 cSt.	Tank Capacity Litres	Nominal Clarity (microns)
40-22-0	182	160	0	10
40-22-50	182	160	227	10
40-22-75	182	160	342	10
40-22-100	182	160	454	10
40-22-125	182	160	567	10

Note: Custom tank capacities available to suit particular application needs

Centrifuge Operation:



1. Dirty fluid is pumped to inlet & directed down the centre of the bowl liner.
2. Solids are trapped along the circumference of the bowl liner
3. Clean fluid exits the top of the bowl & flows through the centrifuge housing
4. The filtered fluid exits the centrifuge by gravity

Machine Tool Fluid Recycling

Inline Machine Tool Fluid Filtration and Recycling

The mobile **SumpDoc**™ provides "inline" coolant filtration and replenishment without shutting down the machine tool. It's faster, easier and cheaper than how you maintain your cutting fluids today. No more draining tanks, lost production time, wasted labor, moving hundreds of gallons of new and old fluids around the shop, disposing of valuable/recyclable coolants, and high coolant bills. SumpDoc can process water-soluble coolants, synthetics, semi-synthetics, and soluble oils.

SumpDoc is fully automated, filtering dirty sump coolant in a three-phase process. The first phase is vacuuming out chips and sludge at a rate of 321 LPM (50 microns). The second phase filters fine solid particulate to 3-5 microns and removes tramp oils to less than 0.5% at flow rates of 340 to 454 litres per hour. Once clean, the coolant is analysed and the SumpDoc is set to deliver a lean, medium or rich new coolant mix back to the sump in the third and final phase. Depending on the regularity of cleaning, a 757-litre (200-gallon) sump could be processed in about two hours.

The unit is mounted on a battery powered pallet jack for exceptional manoeuverability, and has onboard hookups and extensions to receive compressed air, plant water, and 120 Volt, single phase electrics in UK are 240Volt (US is 120 Volt).

MOBILE SUMPDOC™

Integrated Pallet Jack for Easy Mobility!

"SumpDoc is a cost-effective alternative to a central fluid recycling system or batch processing," says Barry Nehls, General Manager - Eriez HydroFlow. "The economic advantages stem from the elimination of downtime and savings from re-use of fluids."

Onboard waste and coolant concentrate tanks

Fully automated with touch screen controls

Provides “inline” fluid recycling faster, easier & cheaper than how you maintain your cutting fluids todays.

Flow rates from 151 to 5,680 LPM filtration to 8-10 microns

Media Vacuum Filtration

Rolled Media Vacuum Filter

With flow rates and sizes from 151 to 5,680 LPM and higher, these filters are designed for individual machines or to serve as a central system. Eriez HydroFlow Rolled Media Vacuum Filters are fully automatic systems capable of filtering to 8-10 microns through an innovative seal preventing solids by-pass. These filters provide continuous service with minimal operator attention and a consistent level of solids separation, maximising coolant life and increasing productivity.

These general purpose filters are ideal for:

- **Grinding and Machining**
- **Creep Feed and CBN grinding**
- **All types of alloys**
- **Filtering light oils or water-soluble coolants**

Features:

- **Restrictive solids by-pass vacuum design**
- **Smooth proprietary conveyor system**
- **Automated coolant make-up system**
- **Rugged construction**
- **Coolant delivery systems**

Specifications:

Model	Media Width (mm)	Filter Area (m^2)	Total Capacity (litres)	Flow Rate Range (LPM)*
HVF-8A	990	0.7	1,892	151 - 454
HVF-12A		1.1	2,271	227 - 681
HVF-16A		1.48	3,217	302 - 908
HVF-20A		1.85	3,596	378 - 1,135
HVF-24A		2.23	3,974	454 - 1,362
Medium Volume				
HVF-24B	1,295	2.23	6,056	454 - 1,362
HVF-30B		2.79	7,192	568 - 1,703
HVF-36B		3.34	8,328	681 - 2,044
HVF-42B		3.9	9,463	795 - 2,385
HVF-48B		4.46	10,599	908 - 2,725
HVF-60B		5.57	12,870	1,135 - 3,406
High Volume				
HVF-72C	1,829	6.69	20,441	1,362 - 4,088
HVF-84C		7.8	23,091	1,589 - 4,769
HVF-96C		8.9	25,740	1,817 - 5,451

**Based on standard flux rates of 3.4 to10.2 L/m^2.s.*
Lower or higher flux rates can be used for special applications.

HydroFlow Advantage

The HydroFlow Vacuum Filter provides significant advantages over conventional flat bed pressure filters, cyclonic and precoat pressure filters.

Low Cost, Ease of Operation
Vacuum Filtration eliminates costly, complex hydraulic or air closure systems used to seal flat bed pressure filters.

Reduced Wear
Vacuum filters pump “clean” coolant only eliminating the wear of pumping dirty coolant.

Packaged System
The Vacuum Filter is a packaged system combining a conveyorised dirty tank and filter section into one assembly, eliminating the settling, backflow and balance problems associated with pressure filters.

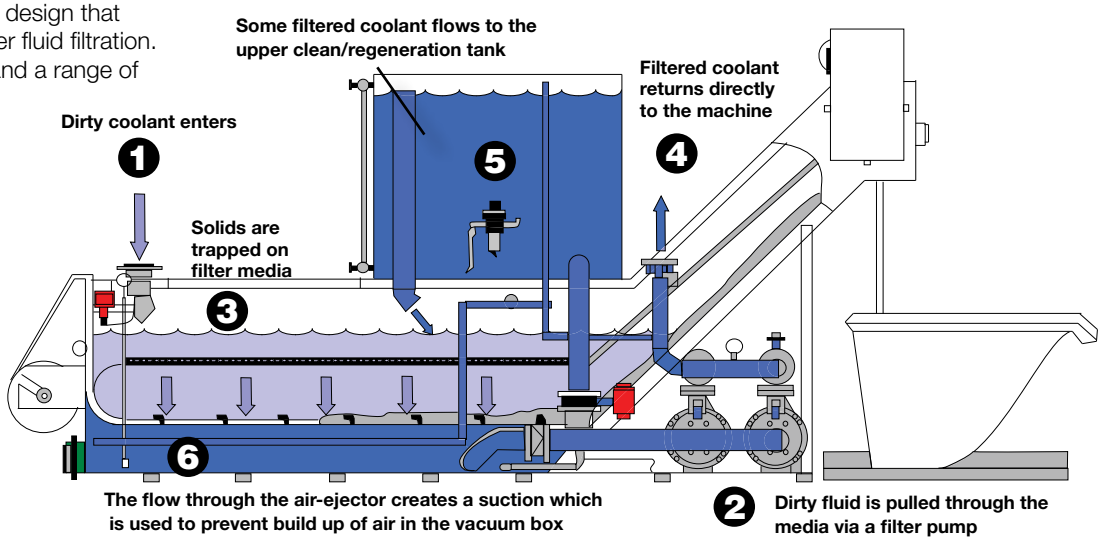
Automatic Regeneration
A small clean tank provides uninterrupted flow of clean fluid. By introducing only a small section of new media into the filter section, the Vacuum Filter eliminates the filtration spikes of pressure filters that index the entire filter bed.

Conveyorised Dirty Tank
Continuous removal of solids and settled solids from the dirty tank.

No Backwash
No air is used for backwash or to dry the solids discharge, eliminating the need for additional air compressors, accumulators or mist collectors.

Principles of Operation:

Eriez HydroFlow Rolled Media Vacuum Filters feature a proprietary vacuum box design that provides a superior seal and better fluid filtration. Eriez offers three RMVF models and a range of media options to provide the right combination of capacity, throughput and filtration. The diagram to the right provides the principles of operation.



Flow rates from 151 to 1,362 LPM filtration to 8-10 microns

Media Vacuum Filtration

"A" Series Low Volume Rolled Media Vacuum Filter

Eriez HydroFlow "A" Series is an entry level rolled media vacuum filter providing economical fluid filtration for a single machine or small cells. This filter handles flow rates from 151 to 1,362 litres per minute while delivering filtration from 8- 10 microns. Each model features fully automated controls to minimise operator involvment and ensure continuous flow of clean fluids to the machine. Eriez offers a wide assortment of accessories to meet your specific fluid handling needs.

Features:

- **Flow rates from 151 to 1,362 LPM**
- **Filtration to 8-10 microns**
- **Inexpensive with low operating costs**
- **Quick and easy sludge disposal**
- **Compact size with low inlet height**

Specifications:

Model	Media Width	Filter Area (m^2)	Total Capacity (litre)	Flow Rate Range (LPM)*
Low Volume				
HVF-8A	990mm	0.7	1,892	151 - 454
HVF-12A		1.1	2,271	227 - 681
HVF-16A		1.48	3,217	302 - 908
HVF-20A		1.85	3,596	378 - 1,135
HVF-24A		2.23	3,974	454 - 1,362

**Based on standard flux rates of 3.4 to10.2 L/m^2.s.*
Lower or higher flux rates can be used for special applications.

Media - Rolled media and cartridge filters in stock and ready for immediate delivery.

Chiller - Maintain coolant at set temperature or track ambient +/- 1° F.

Option - High pressure clean coolant return pump.

Flow rates from 454 to 3,406 LPM filtration to 8-10 microns

Media Vacuum Filtration

"B" Series Medium Volume Vacuum Filters

Eriez "B" Series HydroFlow Vacuum Filters typically serve a single machine or a medium cell. Models range from 454 - 3,406 litres per minute and can be outfitted with gravity or high pressure coolant delivery systems. These mid-range filters feature automated coolant make-up systems, the restrictive by-pass vacuum box design and the rugged proprietary conveyor system for smooth continuous operation.

Features:

- **Restrictive solids by-pass vacuum design**
- **Smooth proprietary conveyor system**
- **Automated coolant make-up system**
- **Rugged construction**
- **Coolant delivery systems**

Specifications:

Model	Media Width	Filter Area (m^2)	Total Capacity (litres)	Flow Rate Range (LPM)*
Medium Volume				
HVF-24B	1,295mm	2.23	6,056	454 - 1,362
HVF-30B		2.79	7,192	568 - 1,703
HVF-36B		3.34	8,328	681 - 2,044
HVF-42B		3.90	9,463	795 - 2,385
HVF-48B		4.46	10,599	908 - 2,725
HVF-60B		5.57	12,870	1,135 - 3,406

**Based on standard flux rates of 3.4 to 10.2 L/m^2.s.*
Lower or higher flux rates can be used for special applications.

DONNY COLLYER

Engineering Coordinator - Machining • ASAMA Coldwater Manufacturing

"Our HydroFlow Vacuum Filters with the optional magnetic scalping roll has dramatically cut down on our disposable media costs and improved filtration and longevity of our coolants. We liked our first HydroFlow Filter so much, we installed two more units."

Heavy duty construction of internal tracks provides a positive vacuum seal.

Cast iron can be scalped using magnetic rolls improving the efficiency of the filter and reducing media consumption.

Flow rates from 1,362 to 5,450 LPM filtration to 8-10 microns

Media Vacuum Filtration

"C" Series High Volume Rolled Media Vacuum Filter

The Eriez HydroFlow "C" Series rolled media vacuum filters are larger, robust filters designed to support multiple machine tools. These large central system filters are constructed with heavy duty chain and flight conveyors to handle heavy loads of chips and swarf. Vacuum chambers are constructed to maintain high transport velocities. Multiple pumps provide filtered coolant flow to cleanliness and pressure requirements for meeting the demands of precision metalworking processes.

Features:

- **Special highloft media increases cycle time in blinding applications**
- **Sized for individual machines or small cells in either gravity or pumped entry designs**
- **Optional top-mounted refrigeration unit conserves floor space**

Specifications:

Model	Media Width	Filter Area (m^2)	Total Capacity (litres)	Flow Rate Range (LPM)*
HVF-72C	1,829mm	6.69	20,441	1,362 - 4,088
HVF-72C		7.80	23,091	1,589 - 4,769
HVF-72C		8.90	25,740	1,817 - 5,451

**Based on standard flux rates of 3.4 to 10.2 L/m^2.s.*
Lower or higher flux rates can be used for special applications.

Sifter Feeder provides additional cellulose fiber to improve filtration performance.

Touch screen control of all critical filter operations.

Filtration to 1 Micron Flow Rates > 18,924 LPM (5,000 GPM)

Media-Free Vacuum Filtration

The Patented Star Filter®

Unmatched Filter Performance for the Machine Tool Industry

Eriez innovative HydroFlow **Star Filter**® is a patented, automatic system using a centrifugal pump to draw liquid through a permanent media element with an optional feed of cellulose filter-aid for extra fine filtration.

The STAR Filter system eliminates problems common with rotating vacuum drum filters. Typically, STAR Filters are installed as central systems with flow rates above 950 lpm and filtration to 1 micron. Applications requiring this level of filtration include grinding, machining, superfinishing and rolling mills working steel, carbide, glass, ceramic, aircraft alloys, cast-iron and aluminum. Filter operation is simple and is very easy to service making it ideal for blinding applications where roll media filters are challenged.

Features:

- **Interchangeable Elements**
- **Positive Seal Connection**
- **Permanent Filter Septum**
- **Easily Remove Individual Elements**
- **Automatic Precoat Cycle**
- **Backflow Cake Removal**
- **Fully Automatic Operation**
- **Solids Removal**

Specifications:

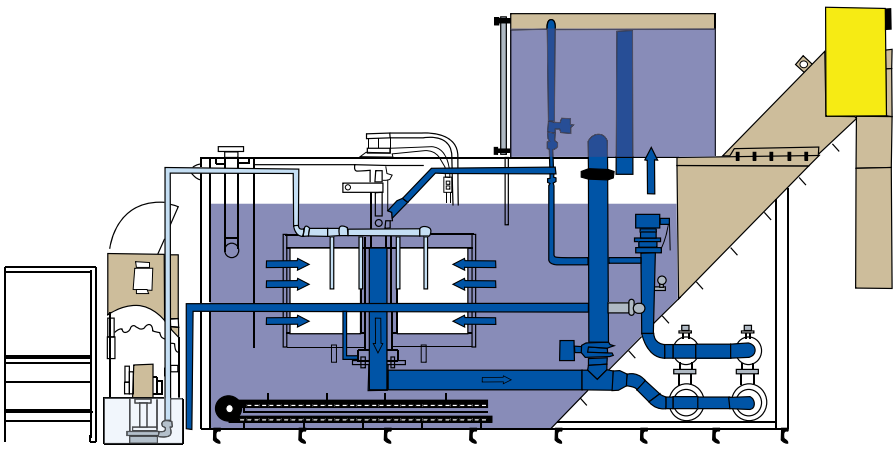
Star Filter Area (m^2)	Water-based Coolant Flow Rate (LPM)	20cSt (100 sus) Oil Flow Rate (LPM)	Nominal Clarity (microns)*
3.7	473 - 2,271	363 - 757	2-40
5.95	605 - 3,406	454 - 946	2-40
8.9	946 - 1,892	757 - 1,419	2-40
10.4	1,135 - 7,273	946 - 1,608	2-40
11.9	1,514 - 8,637	1,135 - 1,892	2-40
13.3	2,045 - 9,546	1,324 - 2,081	2-40
14.8	1,892 - 10,910	1,514 - 2,365	2-40

** Clarity is a function of the grade of Hydrofiber™ cellulose filter media used. Larger systems are available, unlimited flow rates can be obtained using multiple elements and larger tanks.*

The STAR Filter is a patented, automatic system using a centrifugal pump to draw liquid through a permanent media element with an optional feed of cellulose filter-aid for extra fine filtration.

Advantages:

- **Large filter area**
- **2-stages of filtration**
- **Depth filtration using cellulose**
- **Pressurized wet seal–virtually eliminates solids by-pass**
- **Regeneration of entire surface maintains low velocity**
- **Element backwash, no moving belt**
- **No vacuum box**



Filtration to 1 Micron Flow Rates > 18,927 GPM

High Volume Filtration

The Patented Star Filter® - Principles of Operation

Filtration Cycle

- Cellulose precoat is used to provide a true depth cake and achieve filtration down to 1 micron
- The powdered cellulose is stored in a hopper that is equipped with an automatic feeder
- The cellulose is mixed with clean coolant and the slurry is pumped to the distribution ring on the STAR element
- The cellulose is quickly drawn to the filtering surface creating a filter cake for trapping solids

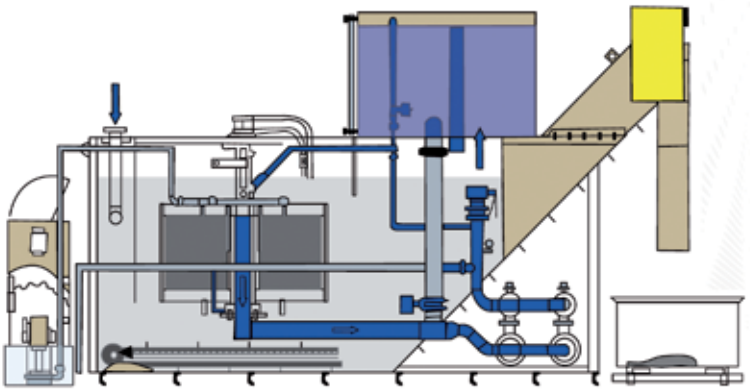
Filtration Cycle - Operations

- Dirty coolant enters the filter and heavy solids settle to the drag conveyor
- The fines in the coolant are drawn by the pump to the STAR element and trapped in the cellulose depth cake
- The filtered coolant is returned directly to the machine tools
- Full recirculation design is available to provide 100% filtration at all times.

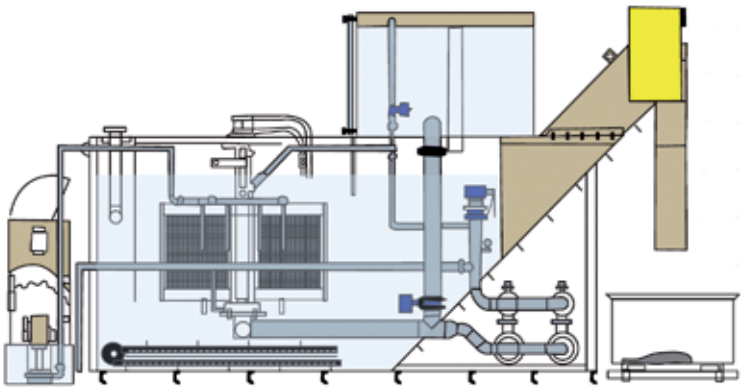
Regeneration Cycle

Solids trapped in the cellulose cake become compressed and dense. As the cake builds, it restricts the flow and creates a negative pressure in the suction pipe. The system senses the increase in vacuum and initiates the automatic regeneration cycle.

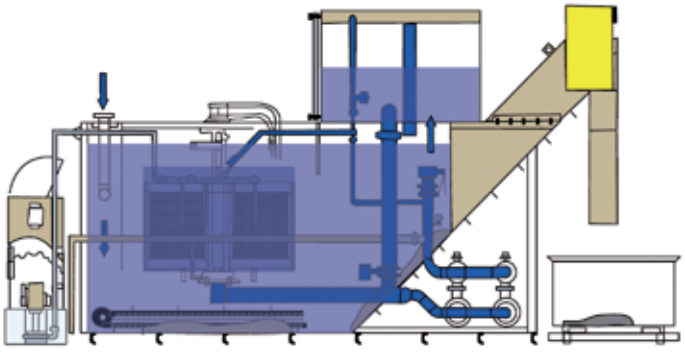
- The regeneration valve opens
- Clean coolant flows from a raised tank supplying coolant to the process
- Additional coolant flows back towards the Star Element
- The backflow of coolant gently releases the element's compressed filter cake
- The dense solids mass quickly settles on the conveyor for removal
- A pneumatic cylinder then lifts the element and "bumps it" in the wet seal to further clean the surface
- The regeneration valve closes, tanks return to normal operating levels and the precoat cycle begins
- A conveyor moves the solids out allowing them to dry on the incline before being dumped



In operation



Regeneration starts; cake drops



Refilling clean tank

The STAR Filter® Element

The unique design of the **STAR FILTER** Element provides the maximum filtration area in the most economical use of space. Based on your application, selecting either the synthetic double layer weave media, stainless steel wedgewire or patented fuse-bonded stainless steel microscreen filter panels will provide reliable, maintenance-free, effective filtration down to one micron.

The element's star shape and the filter panel's compact, rectangular design maintains structural integrity after removal from the filter. With the end caps removed, cleaning on both sides of the filter panels is simple, unlike the circular construction used in drum filters. The STAR Element is designed with an internal support structure that allows continuous, efficient removal of entrained air.

Each STAR Element is precision built and interchangeable. Individual panels are positioned to provide a vertical drop to dislodge filter cake allowing a gentle yet thorough settling of the vacuum compressed filter cake. Each STAR Element can be removed for inspection and reinstalled into the STAR SEAL without concern for misalignment or proper sealing and can be accomplished without stopping the system when multiple elements are installed.

Hydrofibre cellulose filter media

Hydrofiber™ Comparison Chart:

HydroFlow Part #	HydroFlow Standard Grade	Typical Degree of Filtration	Bulk Density (#/m³)	Weight Per Bag	# Bags Per Skid	Purifiber® LLC Cellulose	J.M. Celite D.E. Grade	Eagle-Picher D.E. Grade	Dicalite® Perlite
H.77.70564	Hydrofiber™ "C"	15µ - 20µ	0.05 - 0.08	9 kg	35	Purifiber® 20	n/a	n/a	n/a
H.77.70562	Hydrofiber™ "M"	10µ -15µ	0.1 - 0.13	13.6 kg	21	Purifiber® 40	n/a	n/a	n/a
H.77.70561	Hydrofiber™ "F"	5µ -10µ	0.12 - 0.16	15.8 kg	21	Purifiber® 70	n/a	n/a	n/a
H.77.70563	Hydrofiber™ "XF"	2µ - 5µ	0.19 - 0.25	22.6 kg	21	Purifiber® 90	560 545	FW-80 FW-60	5000 4200

Various grades available to achieve filtration levels of 2-microns or better.


The STAR element glides into tracks in the tank for a positive seal.

Central Filtration System Designs

Our engineering and sales professionals are involved in the early stages of plant design and layout in order to plan the most efficient and cost effective filtration plan. Our team will design the systems to your process with recommendations and complete specifications. Contact Eriez HydroFlow group for more details.

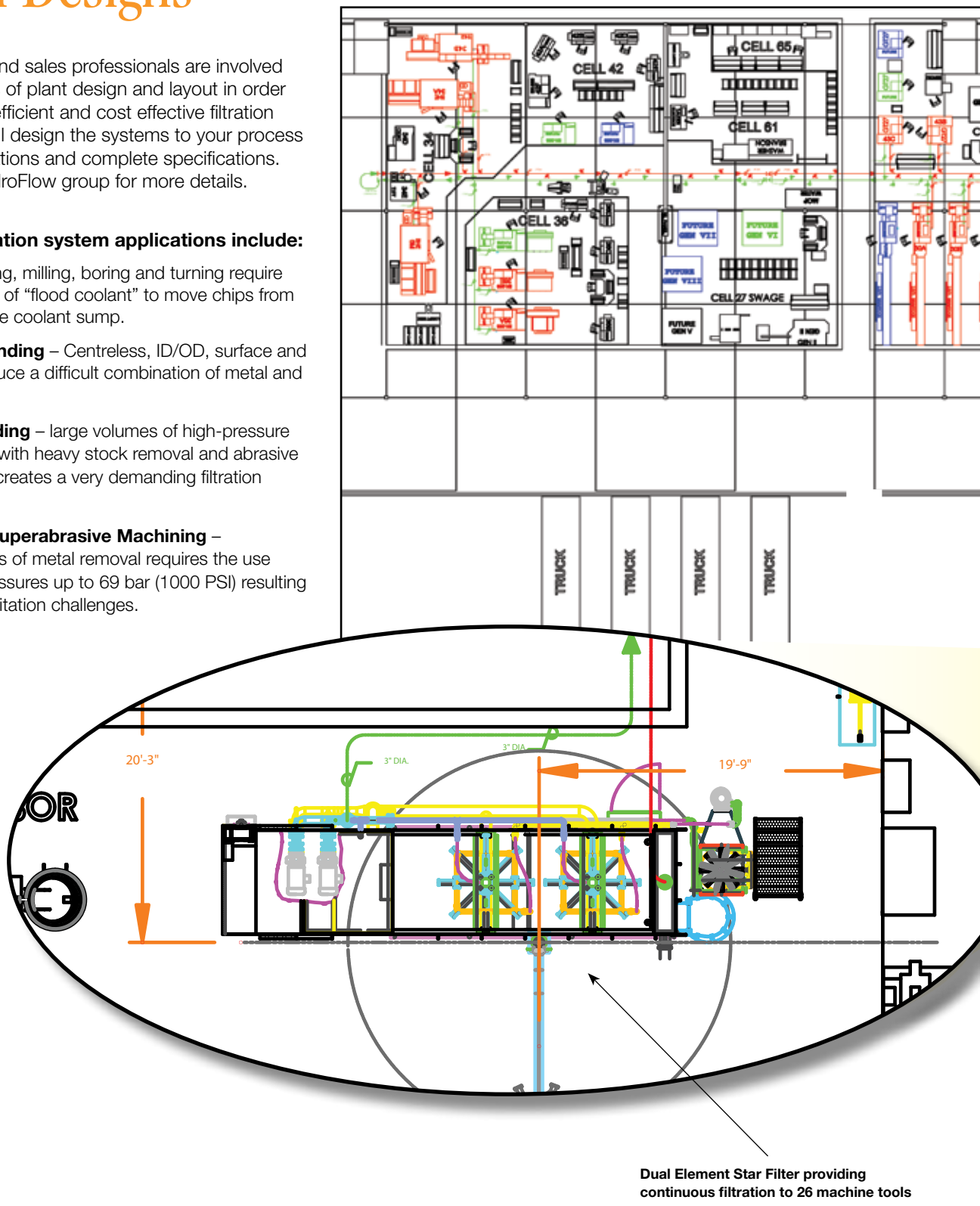
Centralised filtration system applications include:

Machining – Drilling, milling, boring and turning require significant volumes of "flood coolant" to move chips from the work area to the coolant sump.

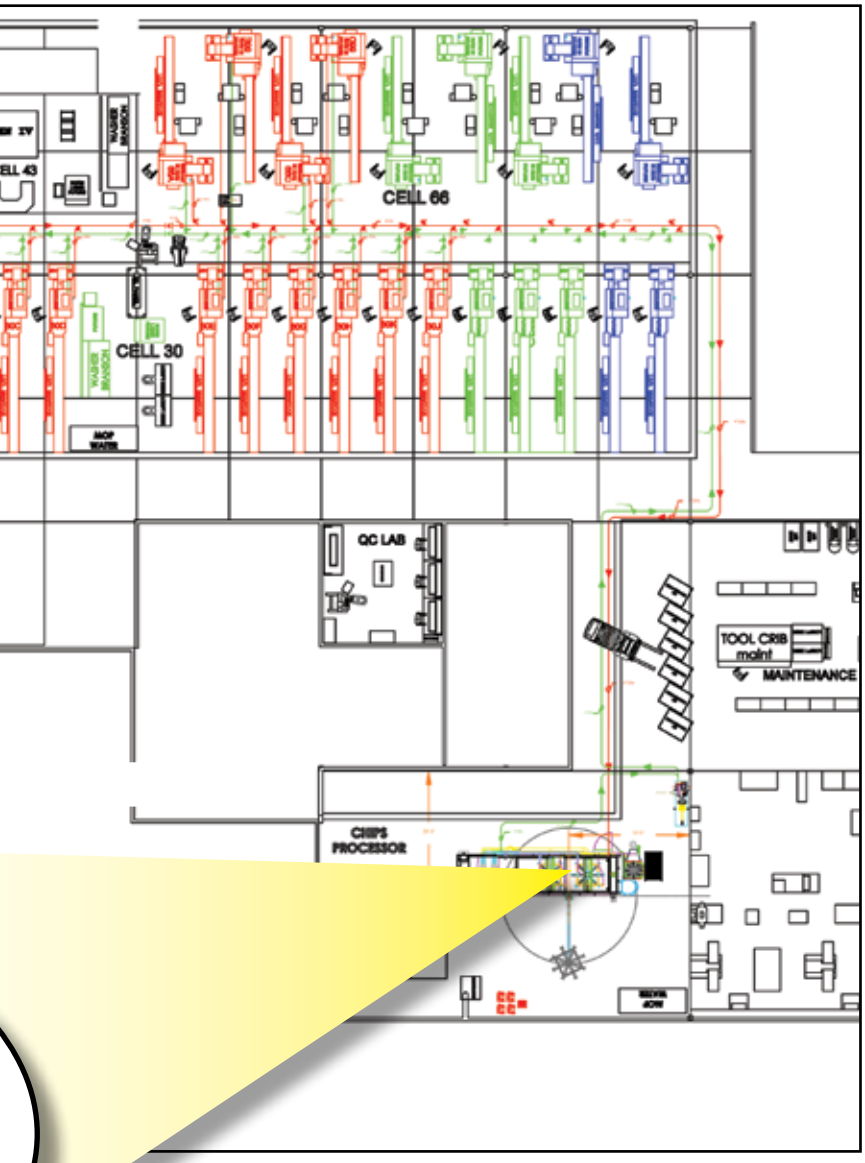
Conventional Grinding – Centreless, ID/OD, surface and form grinding produce a difficult combination of metal and wheel breakdown.

Creep Feed Grinding – large volumes of high-pressure coolant combined with heavy stock removal and abrasive wheel breakdown creates a very demanding filtration application.

CBN Grinding / Superabrasive Machining – high-speed process of metal removal requires the use of heavy oils at pressures up to 69 bar (1000 PSI) resulting in aeration and cavitation challenges.



Dual Element Star Filter providing continuous filtration to 26 machine tools



Central filtration systems ensure optimum tool performance and repeatable results in critical grinding and machining operations.

Components of a Central System

Controls & Automated Functions

HMI Touch screen controls incorporate equipment graphics and simple “pop up” controls of pumps, conveyors, and system components. Operator interface provides alarm enunciation, timer and critical equipment settings, as well as historical equipment operation data.

Complete system control.

Pump systems delivering coolant to machine tools.

Clean coolant delivery and dirty return piping.

Other Filtration Equipment

Eriez recommends and supplies a wide range of optional equipment to facilitate the most comprehensive fluid management program available. Below are a few of these options.

Chillers – Temperature Control. If a plant has a chilled water source, Eriez can provide a simple plate and frame or shell and tube heat exchange package with modulating valve.

High Pressure Coolant Supply – Units are designed for pressures up to 103 bar (1500 psi).

Constant Pressure Control – VFD
Customer can program VFD From enclosure door – set min. and max. speed (frequency) as well as pressures.

Coolant Header Designs – Clean supply and dirty return.

Solids Processing – Vacuum sludge receiver, sludge presses.

Scalping Conveyors –To remove bulky and heavy chips loads

Dirty Coolant Transfer Sumps – Returning the coolant and contaminates to the filter.

Coolant Make-up Stations

Rolled Media Re-winders

Sludge Hoppers

Cellulose Feeders – Auger style feeder, sifter feeder

Chip Processing and Recovery

Mist Collection

Sifter feeder

Automatic media rewind

Coolant return flush valve.

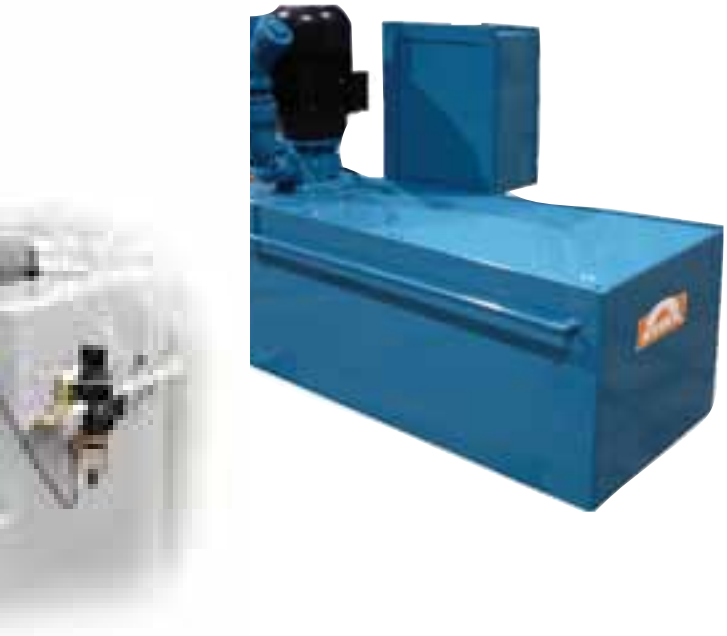
Pump Back Sump Systems

HydroFlow filter systems are available with a variety of pump back sump stations. Pump backs can include virtually any size sump tanks or can be provided in a “zero tank” configuration along with pumps able to deliver most water or oil based fluids to the central filtration system. HydroFlow’s satellite stations have both clean and dirty reservoir and deliver high-pressure clean fluid direct to the machine tool or spindle. Various designs include:

- **Wedge sump tanks and pumps with flow rates from 75 to 757 LPM**
- **For aerated grinding oils, a large sump with a drop-in vertical centrifugal pump**
- **For pumping chips from aluminum machining operations, a swirl-type sump with a vertical vortex or vertical “chopper” pump**
- **A “zero tank” return pump is used with existing customer tanks or when coolant discharge is low profile**
- **Return sumps built directly into the machine tool or grinding machine**
- **In-floor sumps return dirty fluid through a flume or trough in the floor into a large, round conical bottom sump with lift pumps**
- **For machine tools requiring high pressure, a satellite tank provides a high-pressure coolant supply to the spindle as well as a dirty coolant return sump**

“Zero tank” return pump

Large scale pump backs.



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