



SEPARATION

EFFICIENT CROSSFLOW FILTRATION

**KRAUSS-MAFFEI
DYNAMIC CROSSFLOW FILTER DCF**

ANDRITZ

ENGINEERED SUCCESS

Do you want to increase your throughput?
Or intensify your process? Or perhaps reduce
your energy costs? Regardless of the demands
placed on your production, we can help you
lower your operating costs and improve your
product quality thanks to ANDRITZ Krauss
Maffei Dynamic Crossflow Filter (DCF).



High-end crossflow filtration

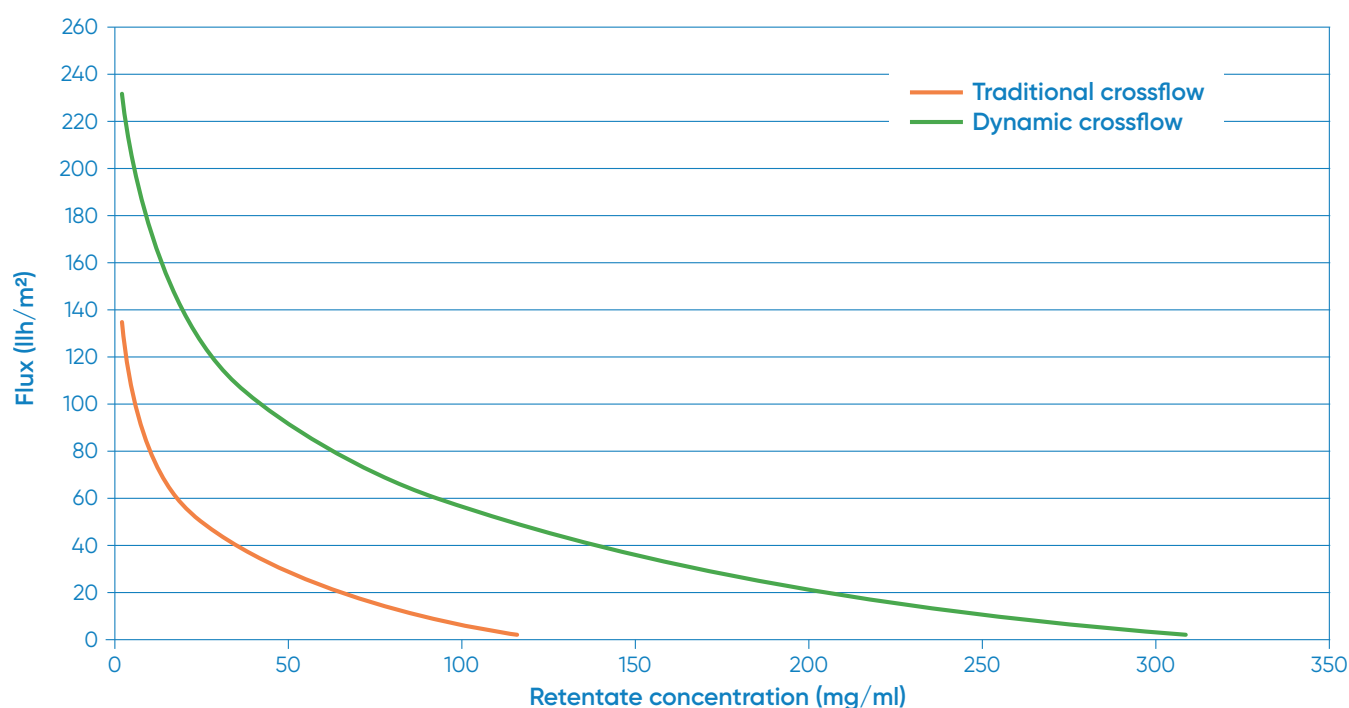
Whatever your requirements and expectations, the Krauss-Maffei Dynamic Crossflow Filter (DCF) is a recognized and proven solution for various food and chemical applications, including pharmaceuticals, to proceed up to nanofiltration.

Generally, the main reason for installing a DCF is to overcome capacity bottlenecks. It represents compact technology that is straightforward to install. Retrofitting is possible in practically any building and is simpler than adding a larger dryer or a second one.

When it comes to existing, conventional crossflow filters, a downstream DCF steps up the process: energy consumption is decreased, while the yield and the throughput are increased. When preparing circuit flows, contaminating particulates can be reduced significantly. For example, the Krauss-Maffei Dynamic Crossflow Filter can be installed in the bypass of a separator.

YOUR BENEFITS

- Higher permeate flux achievable inducing a higher product throughput
- Higher yield due to higher retentate concentration
- Processing of highly concentrated suspensions with viscosities of up to 7,000 mPas to fit with more applications
- Reduced operating pressure thanks to more effective cleaning of the clogging layer (no pressure drop as in tubular membranes)
- Homogeneous trans-membrane pressure over the entire membrane surface for homogeneous process conditions in process area
- Very low process volume in relation to the membrane surface for more efficient filtration and more efficient dia-filtration (washing process)
- Easy to inspect because the filtration surface is outside on the membrane
- Product subjected to low thermal load by reducing the energy input by 80% compared to conventional crossflow filters
- Low or no cooling required and thus less peripheral equipment needed
- Substantial energy savings for subsequent drying processes



Performance operation

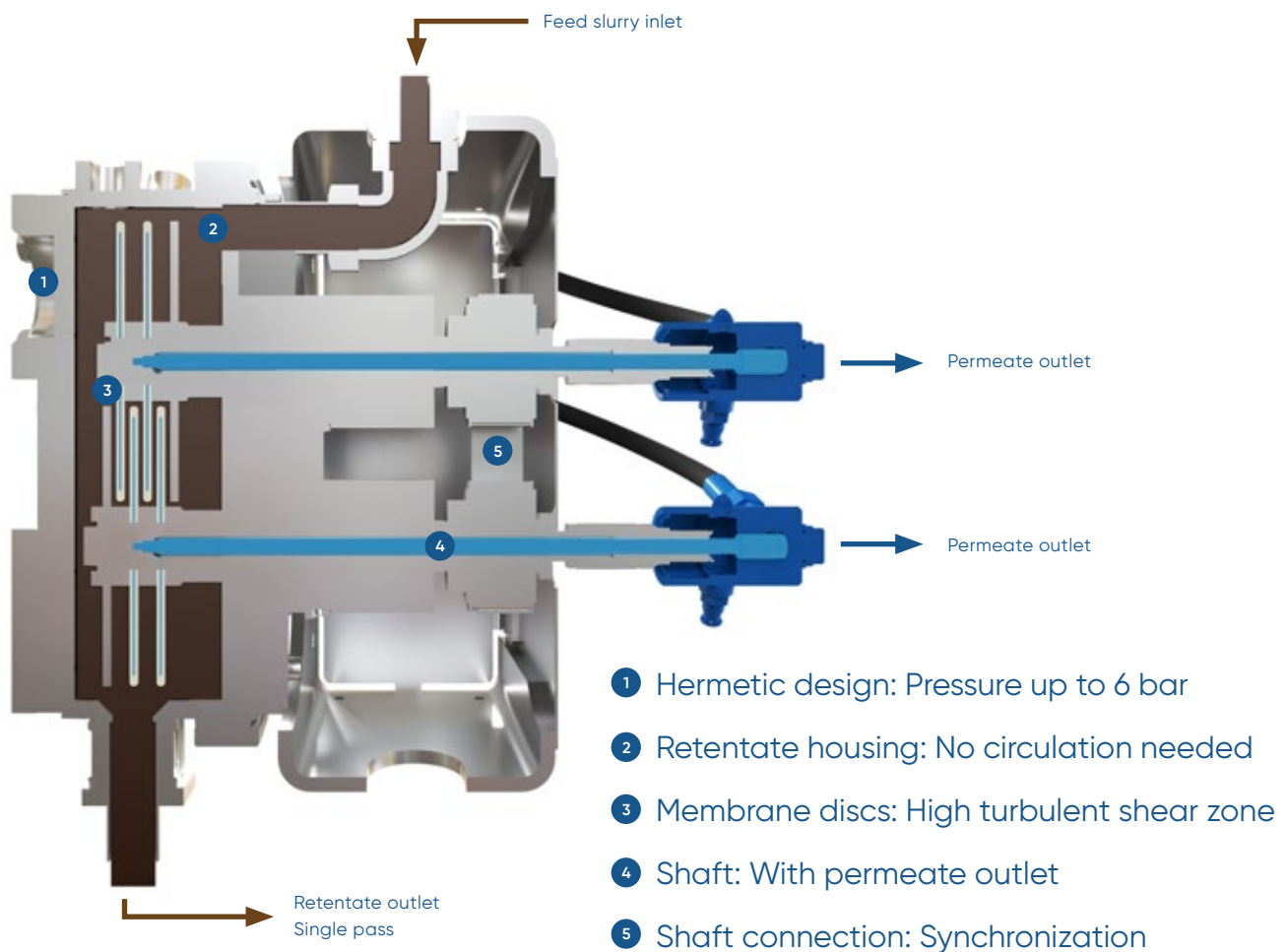
Filtration for challenging separation tasks

Crossflow filters are state-of-the-art for substances with poor filtration characteristics or when other separation processes do not achieve the desired results.

With the Krauss-Maffei Dynamic Crossflow Filter DCF, ANDRITZ was able to successfully enhance dynamic crossflow filtration using two shafts. The improved process is especially suited for processing sensitive or viscous products. The DCF is able to concentrate the retentate to achieve a pasty or sludge consistency. As a result, it is more efficient in recovering valuable elements than any other crossflow filtration technology. Conventional, circulating crossflow filtration minimizes the formation of a clogging layer on the filter's surface

by passing a process medium over the membrane. However, this procedure is inefficient when processing sensitive or viscous products and is generally not advisable. Under these conditions, the feed cannot be concentrated into a high-viscosity retentate.

The technology of the Krauss-Maffei Dynamic Crossflow Filter DCF generates a differential speed in the opposite direction between overlapping membrane discs rotating in the same direction.





Rotation
of discs

Inner speed
of discs

Outer speed
of discs

Relative speed
of discs

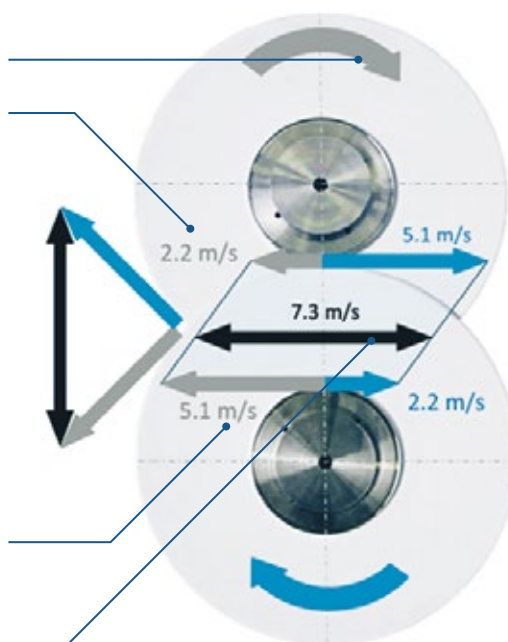


Illustration of wall shear stress

This design generates a turbulent crossflow without using a pump to circulate the retentate. The wall shear stress generated is 50% higher than found in conventional crossflow filters. This greatly reduces formation of a clogging layer, while substantially improving the filtration rate at the same time. This advantage is most evident when dealing with high-viscosity retentates.

Krauss-Maffei Dynamic Crossflow Filter DCF –
an open design

From biopharmaceuticals to beverages and the chemical industry

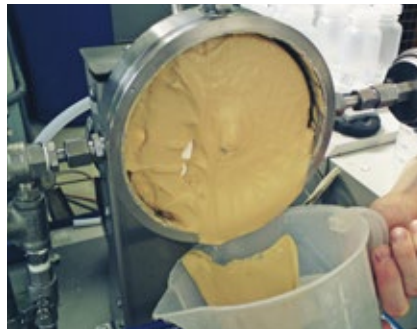
The Krauss-Maffei Dynamic Crossflow Filter crossflow filter is suitable for processing solids and liquids, coming from chemical, pharmaceuticals, and food and beverages.

BIOPHARMACEUTICALS



Cell harvesting, proteins, and enzymes

FOOD AND BEVERAGES

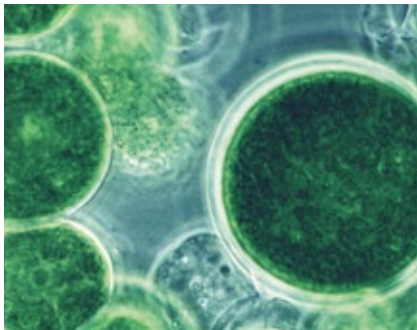


Biomass and aromatics



Wine, beer, juices, vegetable oils, gelatin, enzymes, water recovery in starch processes, and sterilization of juices

ALTERNATIVE ENERGY SOURCES



Micro-algae, silicon-cutting slurry, and BTL (biomass to liquid)

CHEMICAL INDUSTRY



Hydroxides, colloids, pigments, polymers, titanium oxide, and calcium carbonate



Recovery of solvents and valuable liquids

ENVIRONMENT



Mineral oils

INSULIN AND WEIGHT MANAGEMENT MEDICATION



Commitment to healthy lifestyle

Modernize the biotechnology-based insulin production

The Krauss-Maffei Dynamic Crossflow Filter, with overlapping ceramic membranes and hermetic design, is an ideal solution for insulin production.

Single-pass filtration and minimal thermal and mechanical impacts provide optimal separation and quality. Reduced feed pressure and trans-membrane pressure that is the same across the entire surface keep impact low and ensure that there are no inlet or outlet zones in the membranes.

Insulin customers choose DCF technology for its outstanding process performance, but the control system also plays a major role. With one of the most innovative automation solutions on the market today, which is based on the Metris addIQ control system, ANDRITZ also provides the entire control system, incorporating all GMP-relevant software functions and enabling a fully automatic process. Calibrated instruments' measurements are logged and reports generated so that the compliance with the specifications of any batch produced can be verified at any given time. The system also logs every operator action and modification of the operation recipes, and a very strict change control system is implemented.

SPECIFIC BENEFITS FOR YOUR INSULIN PRODUCTION

- **Hermetic design:** 100% pure final product, with no contamination
- **Retentate housing, no circulation:** High efficiency due to high solid content
- **High-turbulence shear zone:** High filtration rates, even with "difficult" products
- **Single-pass filtration:** Optimum insulin quality with minimal thermal and mechanical impact
- **Fully automated process solution:** No manual intervention needed
- **Measurement and instrumentation:** Quality reports and batch verification
- **GMP software functions:** Batch logs and quality reports



Technical data and design

Model	Membrane Ø [mm]	No. of membranes [mm]	Filter area [m²]	Retentate volume [l]	Length [mm]	Width [mm]	Height [mm]	Operating weight [kg]	No. of shafts
DCF 152/S	152	1	0.03	0.4	500	400	600	30	1
DCF 152/0,14	152	4	0.14	2.5	900	700	500	150	2
DCF 152/0,8	152	24	0.81	12/8*	900	700	500	180	2
DCF 312/2	312	16	2.1	60/40*	1,700	1,500	1,800	1,200	2
DCF 312/4	312	32	4.2	100/60*	1,700	1,500	1,800	1,280	2
DCF 312/6	312	48	6.3	130/80*	1,300	1,500	1,900	1,350	2
DCF 312/8	312	64	8.4	170/100*	1,300	1,000	2,100	1,400	2
DCF 312/10	312	80	10.5	200/120*	1,300	1,000	2,300	1,450	2
DCF 312/16	312	128	16.4	300/180*	1,400	2,300	2,500	2,550	2
DCF 312/20	312	160	20.5	350	1,450	2,400	2,500	2,900	4
DCF 312/24	312	192	24.6	400	1,500	2,500	2,500	2,900	4
DCF 312/28	312	224	28.7	450	1,500	2,600	2,600	3,150	4
DCF 312/32	312	256	32.8	500	1,600	2,600	2,600	3,400	4

All technical data are approximate and subject to change without notice.

* housing available in special designs for optimized retentate volume and process requirements



Krauss-Maffei Dynamic Crossflow Filter DCF, smart designs to meet your needs

TECHNICAL DATA (PER MODULE)

Filter area	0.03–32.8 m²
Viscosity	up to 7,000 mPas
Membrane pore size	1 nm–2 µm

CUSTOMIZED DESIGN

Normally, standard ceramic filter membranes are installed. Upon request, we also offer metal filter membranes.



Your full-service provider

With ANDRITZ, you gain access to one of the world's largest OEM manufacturers for solid/liquid separation systems, including such well-known brands as 3Sys Technologies, Bird, Delkor Capital Equipment (Pty) Ltd., Escher Wyss dryers, Guinard Centrifugation, KHD Humboldt Wedag, Krauss-Maffei centrifuges, dryers, and filters, Lenser, Netzsch Filtration, Rittershaus & Blecher, Royal GMF Gouda, Sprout Bauer, and Vandenbroek.

Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ is your true full-service provider. From initial consulting through to service agreements, process optimization, and training programs, we are always looking for ways to minimize downtime and increase

predictability in operations while raising your overall production efficiency. Wherever you operate, our network of 550 service specialists and global service centers ensures we'll always be there to support you for many life cycles to come. Let's sit down and see how we could take your operations to the next level.



LOCAL SUPPORT

Responsive local service centers and field service technicians



REPAIRS & UPGRADES

Optimization of machine and process performance, repair work, retrofitting, and modernization



SECOND-HAND & RENTALS

Certified second-hand and rental machines



TRAINING

Operator training and tailored seminars for operating and maintenance personnel



OEM SPARE PARTS

Filter cloths, spare and wear parts from OEMs or with OEM level quality, all readily available



SERVICE AGREEMENTS

Preventive maintenance, contracts for spare parts, maintenance, inspections, repairs, upgrades, operation, and equipment monitoring



PROCESS OPTIMIZATION

Automation tools and process expertise to boost your profit



LAB AND ON-SITE TESTS

Lab and testing capabilities for process optimization and machine upgrades

Intelligence for machine and process control

With Metris addIQ, you have a well-proven, intelligent control solution for industrial processes and machines. Our solid/liquid separation specialists use their in-depth expertise to provide scalable solutions that are individually tailored to regional and application requirements. Whether you're automating new equipment or upgrading to extend the lifecycle of existing systems, we find the ideal solution for you.

METRIS addIQ CONTROL SYSTEMS

Our tailored turnkey systems from a single supplier can improve entire plants or individual machines. By providing state-of-the-art automation technologies and digitalization, we ensure best-in-class performance. Automating machine and plant equipment measurably reduces gaps in many different production process steps. By using automation from ANDRITZ, you can reduce downtime thanks to features such as predictive analysis that allow you to optimize productivity.

Metris addIQ covers all levels of automation, starting at basic automation (machine, process, and plant control), to upgrades, and add-ons for process optimization. Together, you have a full range of optimized solutions that help reduce maintenance efforts and ensure preventive service for your machines and plants. These are all delivered from a single source and always individually tailored to your business demands. addIQ control systems are part of Metris, the ANDRITZ brand for digital solutions.

ANDRITZ offers a broad and constantly growing range of innovative products and services in the industrial digitalization sector under the brand name Metris, helping customers to enhance plant efficiency and profitability, optimize the use of resources, achieve constant and highest product quality, reduce production downtime, and maximize user-friendliness.

Improving your operation with Metris Digital Twin

Metris Digital Twin technology has evolved as an important building block of today's digital transformation, unfolding the combined power of process simulations and data analytics.

Metris Digital Twin solutions are backed by more than 30 years' process and simulation expertise. Their informative, real-time dashboard offers comprehensive insights for improving process performance, operational visibility, and proactive decision-making. These solutions combine real-time process information and OEMs' knowledge and custom design calculations to serve as a technical decision-making and advisory platform.

WHAT IS A DIGITAL TWIN?

The Metris Digital Twin represents a digital replica of the physical process using asset-specific information such as actual physical dimensions and equipment characteristics. When connected to online plant data, the Metris Digital Twin acts like a performance information tool similar to an MRI of the human body—

both can be used to find otherwise undetectable anomalies and highlight the gaps between actual and optimal operation.

The system runs in parallel with your operations, continuously calculating key process parameters that sometimes cannot be measured or are difficult to measure with traditional instrumentation.

Thanks to its proven simulation capabilities and combined with live plant data, the Metris Digital Twin provides virtual plant transmitters, it calculates optimal setpoints, and performs what-if scenarios analysis. The data reconciliation helps with online model correction and replaces faulty measurements with plausible values.



Process calculations by Digital Twin: All trends accessible on Metris platform

Benefits

- Real-time process optimization
- Safe operation and ease of use
- Complements advanced process control
- Anomaly detection
- Virtual transmitters
- What-if scenarios
- Inventory and production calculations
- Operational guidance
- Building block for digital transformation
- Data reconciliation





WHAT'S YOUR SEPARATION CHALLENGE?

ANDRITZ Separation is the world's leading separation specialist with the broadest technology portfolio and more than 2,000 specialists in 40 countries. For more than 150 years, we have been a driving force in the evolution of separation solutions and services for industries ranging from environment to food, chemicals, and mining & minerals. As the OEM for many of the world's leading brands, we have the solutions and services to transform your business to meet tomorrow's changing demands – wherever you are and whatever your separation challenge. **Ask your separation specialist!**

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