

Alfa Laval NX Decanter Centrifuges

Processing proteins and fat from meat, fish and insects



Application

Decanter centrifuges are an important component, in the processes used to extract protein from **meat, fish and insects**. These include rendering and hydrolyzed protein processing.

Alfa Laval decanter centrifuges are used in 2- or 3- phases configurations, as an integral part of most rendering processes.

- Wet and dry rendering for meat, fish and Insects
- Hydrolyzed meat and fish protein
- Bones and gelatin processes
- Blood meal
- Surimi and krill
- Skimming

Alfa Laval NX decanter centrifuges benefit from many years of as well as constant innovation and improvement. The product

range enables improve and optimize recovery of valuable proteins fractions – as well as fats and oils – in the most efficient manner possible.

Benefits

- Stable interphase: Open outlets ensure very high levels of purity for each liquid phase.
- Baffle disc: Improved separation efficiency as a result of a clear separation between solids and liquid(s) in the bowl. This makes it possible to improve effective defatting and dewatering of the solids and to ensure higher purity for both liquid phases.
- Low-speed flush: Easy to clean, due to the open outlets. These can be cleaned- effective by using very little water.
- Easy rapid service.

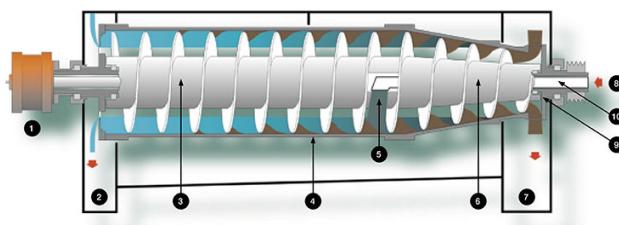
Working principle

Separation takes place in a horizontal, cylindrical bowl equipped with a screw conveyor. The feed is led into the bowl through a stationary inlet/feed tube [10] and smoothly accelerated by an inlet distributor [5] in – the feed zone. Centrifugal force causes sedimentation of the suspended solids inside the bowl [4].

The conveyor [3] rotates in the same direction as the bowl, but at a different speed – called the differential speed. This

difference moves the solids to the conical end, where they are lifted out of the liquid level (pond) into a dry zone (beach). Here the capillary liquid is drained centrifugally, before being discharged through the solids outlet [7] the casing.

Separation takes place over the entire length of the cylindrical part of the bowl. The clarified liquid or liquids leave the bowl by flowing over an adjustable weir into the casing.



1: Gearbox
2: Liquid outlet
3: Screw conveyor
4: Wall of the bowl
5: Inlet distributor
6: Conical end
7: Cleaned slurry/muck outlet
8: Feed inlet
9: Discharge ports
10: Feed tube

Design

NX decanter centrifuges are specially designed with a focus on performance, reliability, efficiency, easy access and quiet running. The cover is fitted with hinges to make access easy. The rotating assembly is mounted on a compact, welded box beam frame with main bearings at both ends. The motors are mounted in-line on the decanter itself to ensure the smallest possible footprint. The bowl is driven at the conical end by an electric motor with a V-belt transmission. NX decanter centrifuges are available in 2-phase or 3-phase configurations that are easy to adapt to the demands associated with a specific operating requirements. Each unit can also be adjusted on site.

The centrifuge can be equipped with a CIP bar with nozzles/spray head to clean the bowl exterior and the casing/cover, as well as the inside of the bowl.

Drive system

In all Alfa Laval decanter centrifuges, the bowl is driven towards the conical end by an electric motor and V-belt transmission. Power is transferred to the conveyor via a planetary or Direct Drive gearbox.

The speed difference is controlled in different ways, depending on the type of unit:

- NX countershaft decanters feature a countershaft transmission, in which pulleys can be changed manually to regulate the input shaft speed of the gearbox, and thereby the differential speed
- NX VFD-driven decanters are equipped with an automatic back drive system for the main motor.
- The back drive motor is coupled to a Direct Drive (DD) gearbox that continuously adjusts the differential speed during operation.

Direct Drive is a unique system developed and manufactured by Alfa Laval, to enable processing at maximum torque, thus resulting in best possible dryness of the solids.

Materials

The bowl, conveyor, inlet tube, outlets, cover and other parts that are in direct contact with the process media are all made of stainless steel or duplex steel. The frame is made of mild steel with an epoxy enamel finish. The discharge ports, conveyor flights and feed zone are protected with materials that are highly resistant to abrasive solid particles.

Solids transport

Depending on the application, the inner surface of the bowl features either grooves or ribs. These ensures good solids conveying efficiency and limits how much the product slides along the inner surface on the bowl, which tends to generate abrasion, particularly if the solids are hard.

Feed zone

The feed zone is available with exchangeable wear liners made of tungsten carbide for additional wear protection.

360° solids discharges

The spokes are protected against wear by use of "saddles" made of tungsten carbide. The 360° solids discharge is extremely effective because there is no thing to hinder or restrict scrolling the cake out of the bowl.

Automation

Decanter centrifuges equipped with variable frequency drives (VFD) are also available with control solutions to comply with your specific operating requirement. Whether you are looking for a control system that operates the decanter only or to more advanced control systems with additional functionality. Alfa Laval decanter automation can help you achieving your specific process performance goals by easy process adjustments, real-time status feedback, automated process adjustments and automated cleaning cycles.

Additional features

Improved performance

The specially designed architecture of the bowl and conveyor in Alfa Laval decanter centrifuges makes it possible to effectively separate the solids and liquid phase(s) in order to maximize retention times. Keeping the input material in the bowl longer gives higher level of purity in the liquid's phase(s) and greater dryness in the solid phase. The open outlets make it possible to maintain a stable interphase, even when the feed flows and composition vary by +/- 20%. A stable interface layer between oil and stick water is important for achieving the best possible separation efficiency in both liquid phases, even with emulsions. Open outlets also help ensure that the bowl can be kept very clean, and make it easy to carry out visual inspections. This design also simplifies the decanter's flush and CIP sequences.



Protecting the flights

The conveyor is protected by a coating that contains micro-grains of tungsten carbide, which are sprayed onto the upper 1/3 of the pushing face of the flights while hot. For particularly abrasive applications, the conveyor's flights can be protected with tungsten carbide tiles and flame sprayed tungsten carbide.



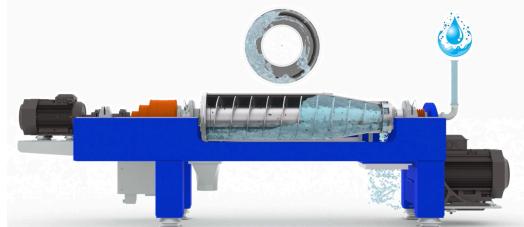
Easy to clean

Decanters fitted with an automation control system can execute a high-speed cleaning mode, followed by a low-speed cleaning mode by using frequency converters on the main and back drive motors. Cleaning-in-place (CIP) media are introduced inside and outside the bowl. A spray bar (optional) on the cover effectively completes the cleaning by spraying water on the outside of the bowl external face. A CIP program featuring repeated sequences of high- and low-speed modes for water, caustic and acid cleaning agents ensures supremely effective CIP cycle. The duration of each sequence, can be adjusted to your particular operating conditions



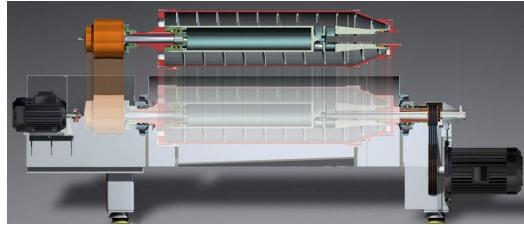
Low-speed cleaning-in-place

This is done by switching the direction in which the bowl rotates, at low speed. As the bowl periodically changes rotation direction, a wave of liquid moves from one end to the other, coming into contact with all the internal parts. At the same time, the turbulence resulting from this liquid movement effectively cleans all the outlets and enhances the overall cleaning effect.



Easy to maintain

The frame casing is a box beam profile, featuring an integral casing fitted with hinges. The casing and cover are made of AISI 316 stainless steel, with stainless steel cladding in the neutral bowl's compartment. Due to their particularly smart design, Alfa Laval decanter centrifuges can be serviced very quickly. For example, it takes less than 3 hours to remove and replace a complete rotating assembly.

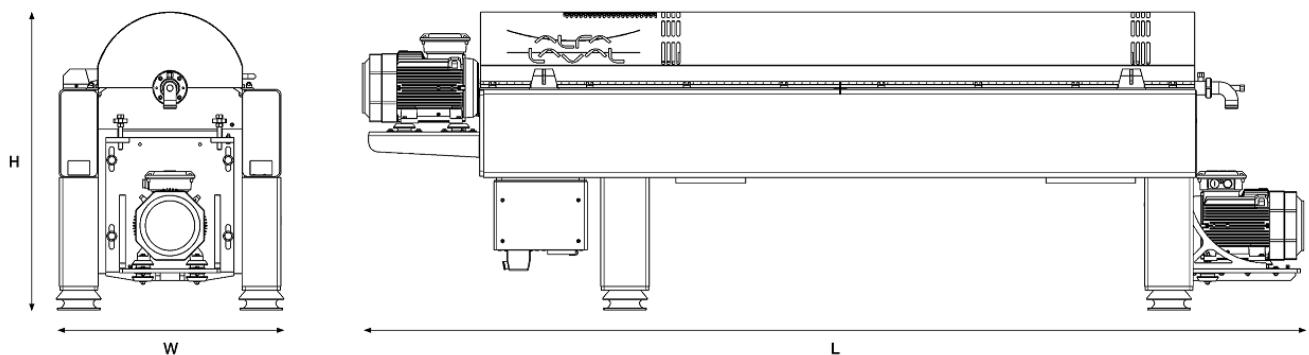


Connected services

Alfa Laval decanter centrifuges that feature decanter automation can also be fitted with IoT connectivity hardware that can provide you with full operating data, along with condition monitoring and process optimization. Please refer to the Alfa Laval website for more information.

Service

Investing in an Alfa Laval decanter centrifuge solution is the first step towards a unique partnership with Alfa Laval Service. Our strong service presence in local market, combined with the capabilities of skilled Field Service Engineers, provides you and your operations with the support that you need to maximize processing uptime. A Service Agreement takes this one step further. Contact your local Alfa Laval sales for more information.



Dimensions

Designation	NX912/913	NX3650	NX4450	NX438	NX5040	NX5540	NX6540	NX7240
Length (L) (mm/inches)	3,216/126.6	4,071/155.66	4,734/186.96	4,925/193.90	4,976/195.9	5,416/215.60	6,174/246.06	6,459/254.27
Width (W) (mm/ inches)	780/30.7	990/39.98	1,060/41.73	1,190/46.9	1,190/46.9	1,300/51.2	1,450/57.09	1,510/59.45
Height (H) (mm/inches)	960/37.8	1,304/51.32	1,376/54.17	1,445/56.9	1,651/65	1,696/66.8	1,791/70.51	1,852/72.91
Gross weight (kg/lbs)	1,500/3,300	2,300/5,100	3,200/7,100	4,800/10,582	4,900/10,800	5,120/11,300	6,500/14,350	8,300/18,300

Technical specifications

Designation	NX912/913	NX3650	NX4450	NX438	NX5040	NX5540	NX6540	NX7240
Available angles in °	10, 20	6, 10 or 20	6, 10 or 20	10	6, 10 or 20			
Bowl diameter in mm/inches	280/11.02	360/14.17	440/17.32	480 / 18.89	500/19.7	550/21.65	650/25.59	720/28.35
G-force, max. x g	3,030	3,549	3,551	3,574	3,622	3,554	3,491	3,384
Total weight, net in kg/lbs	1,500/3,350	2,300/5,100	3,200/7,100	4,800/10,582	4,900/10,800	5,120/11,300	6,500/14,350	8,300/18,300
Sound pressure level ¹⁾ dB(A) re. 20mPa	81	79	81	85	83	83	83	84

1) In compliance with EN ISO 4871 and EN 12547

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