

UNITED INTERNATIONAL
HYDRO ENG. TECH



VACUUM BELT FILTER

United International Hydro Engineering Technologies (UIHET) provides total environmental and industrial solutions for better tomorrows. We owe these to future generations because we inherited a good environment from our past generations. **UIHET** with their technical and business partners and alliance strive to introduce proven and new technologies in the field of thickening and dewatering, for the Future of the next generations. **UIHET** believes that new challenges cannot be solved with old techniques. This philosophy necessitate **UIHET** to be on the edge of the technology and invest in the continuous research and developments as the main success factor for our company. **UIHET** advanced line of industrial sedimentation, thickening and dewatering equipment includes a wide range of modern technologies to meet your process requirements. With precision engineering to meet rigid standards, **UIHET** provides high torque, long life, and reliable equipment. **UIHET** sedimentation, thickening and dewatering equipment is supported by a reliable engineering staff with extensive experience. This experience aids our customers in creating solutions for today's complex problems and challenges.

TECHNICAL DETAILS

Vacuum Belt Filter is an efficient and reliable solid/ liquid separation unit suitable for dewatering a wide range of materials. Utilizing vacuum filtration, the filters have low capital, running and maintenance costs, thereby outperforming traditional rotary drum, disc, tilting pan and table filters in all situations where capacity, efficient cake washing and minimum liquor dilution are required. Furthermore, horizontal belt filters are being well accepted to dewater process plant tailings to be used as mine backfill or sent straight to the dry stack tailings impoundment. Vacuum Belt Filters provide a continuous vacuum on a horizontal plane. Slurries are fed onto a filter cloth supported by a traveling drainage belt. Horizontal belt filters are especially adaptable to applications where low cake moisture is desirable.

Each system has unique advantages that are applied to the filter based on the application requirements and your specific needs. The roller deck support system contains a number of low-friction rollers to support the belt, resulting in minimum drive power requirements. The rollers have internal bearings, which result in minimal maintenance and eliminate the need for a high-pressure blower. This reduces consumption of energy or lubrication water. The belt slides system is made up of disposable wear belts running on strips that utilize water to minimize friction. While this system eliminates the need for a high-pressure blower, more lubrication water is required. However, there are fewer moving parts so less maintenance effort is required.





VACUUM BELT FILTER MAIN COMPONENTS

Main Frame – The framework is manufactured in mild steel. The sections are bolted together to provide a rigid construction with an integrated transport frame also included to allow delivery and installation of completed machines direct from the workshop. All welding work will comply with local certifications or equivalent.

Cake Wash – To maintain process performance, the filter cloth and transport belt passes under spray bars for cleaning by high pressure water sprays. These spray bars can also be configured to saturate the cake prior to final dewatering in order to ensure full recovery of any soluble metals in the filtrate to be recovered through precipitation later.

Fishtail Feeder – The feed distributor is mounted over the filter and designed to distribute slurry evenly across the belt using a partitioned fishtail feeder whereby the actual partitioned “fins” can be adjusted and positioned for even slurry distribution. Spillage launders are included along both sides of the filter to collect spillage during upset conditions.

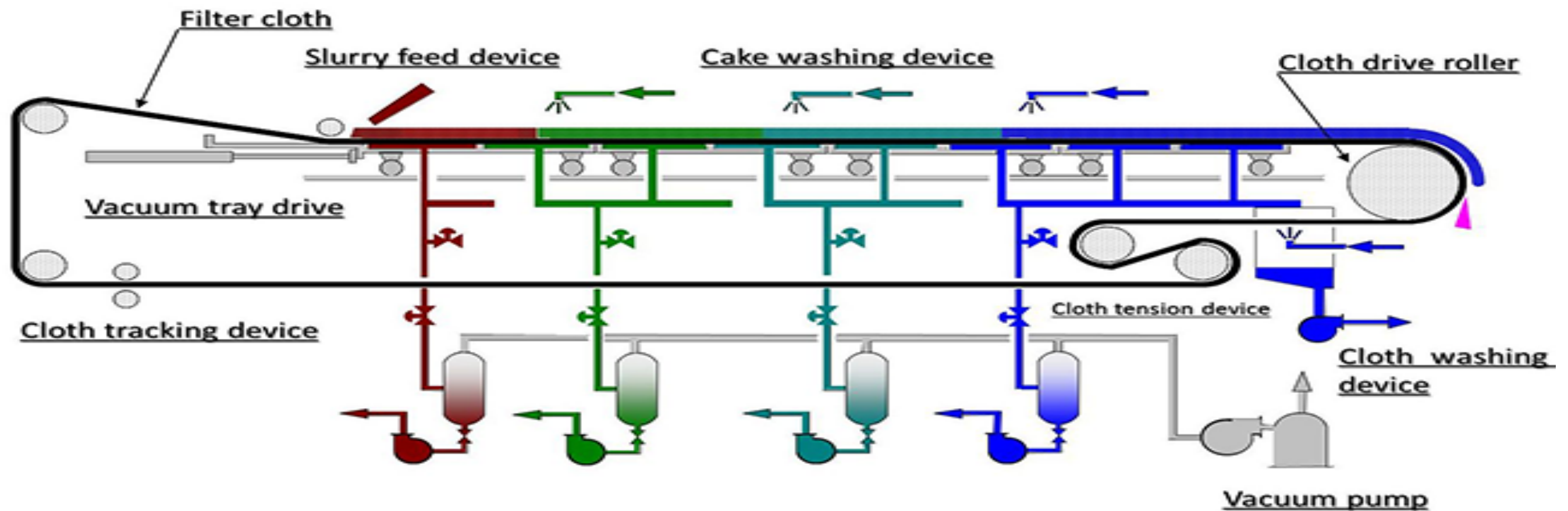
Carrier Belt – The endless rubber belt with traverse grooves drains the filtrate towards holes positioned along the centre of the belt. The side of the belt has static stainless steel skirting that contains the incoming slurry and the cake as it moves towards the discharge end. The belt includes a soft rubber ridge on the edge leading up to the skirting sides and guided using strong belt guide rollers.



VACUUM BELT FILTER MAIN COMPONENTS

Filter Cloth – A filter cloth, the media which separates the slurry and cake from the vacuum system is made from needle felt, monofilaments, multi filaments or a combination of both (multi mono). Mono filaments are supplied in polyesters polyamides or polypropylenes. Polypropylene cloths are hydrophobic, best for chemical resistance and filtration however not necessarily abrasion resistant and they are prone to stretching. Monofilament polyester cloths generally have the better longevity. The cloth provides for a very clear filtrate and captures all fines. The cloth is washed on the return to ensure continuous good filtration rates. The cloth can be joined by a clipper seam or can be glued on a $\pm 75 - 100$ mm overlap using SC 2000 (rubber glue).

Vacuum Box & Wear Belts – A vacuum box is located below the belt and creates a seal with the carrier belt. The vacuum box collects the filtrate through a manifold to the receivers. The vacuum box's topside has two wear strips made of low friction synthetic Polyamide that seal through intermediate wear belts between the bottom side of the belt and the surface of the wear strips. Since the belt is the most expensive part of the filter these endless narrow wear belts serve as a sacrificial component that absorbs the wear between the surfaces; they protect the rubber belt and secure it against vacuum leaks.



HOW IT WORK?

The Horizontal Vacuum Belt Filter operates simply by creating a vacuum pressure below the filtration belt and cloth, which pulls the water out from the influent, drying the wastewater and producing a concentrated solids in form of cake. The cloth will enable the water only to pass downside, and thickened sludge will be collected after the belt for disposal to landfill area. The slurry is fed to the Horizontal Vacuum Belt Filter via the Slurry Feeding Device, and the belt and filter fabric/ cloth are running via the driving motor, to rotate and transfer the slurry along the Horizontal Vacuum Belt Filter.

Vacuum Boxes are installed below the belt, and connected to the Vacuum Receiver Tanks, where the Vacuum Pump suck out air creating Vacuum Pressure below the belt. As the slurry pass through the HVBF, the water get extracted from the slurry and through the filter fabric, and gets trapped Vacuum Receiver Tanks. On the other hand, the dried slurry forms a solid cake that gets discharged by the scraper installed at the end of the Horizontal Vacuum Belt Filter. Filter cake is formed, dewatered, washed, and dried all on the top of the belt as it travels across the filter and into the discharge zone.

The Filter Fabric (Cloth) is cleaned at the end of each cycle via cleaning brushes accompanied by pressurized rinsing water, to prepare the filter for the following cycle.



VACUUM BELT FILTER DESIGN

The filter uses a screen cloth and rubber vacuum carrier belt in combination. As the fishtail feeder deposits slurry onto the surface of the filter cloth, the belt moves in a horizontal linear direction under the dam roller to form a cake of varying thickness. As the belt travels, negative vacuum pressure draws free filtrate out of the slurry, through the cloth, along the grooves in the carrier belt and through the centre of the carrier belt into the vacuum box. This process continues until the slurry has formed a solid filter-cake, which is then discharge at the head pulley end of the filter.

VACUUM BOX LIFTING DEVICE

On belt filters the use of counterweights is the conventional mechanism for lowering or raising of the vacuum box. The Vacuum Belt Filter developed a proprietary pneumatic system that does this automatically, saving intensive labour and maintenance costs. This system dramatically improves cleaning fines that may have settled inside the vacuum boxes and the replacement of wear strips and wear belts. This mechanism is designed to accurately seal between the underside of the main belt and the two narrow wear belts that move together along the wear strips attached to both sides of the vacuum box and apply a constant even pressure. Another problem faced by other belt filters is that as the wear belts and slides wear, the seal between the belt and vacuum box degrades. This reduces the vacuum levels gradually and needs monthly adjustment. The pneumatic vacuum box lift creates a constant pressure on the belt and constant vacuum for the life of the wear belts and wear strips.

CLOTH TENSIONING & TRACKING

A pneumatic cloth tracking mechanism prevents the filter cloth from slipping sideways by moving the pivoted tracking roller forwards or backwards guiding the cloth to the left or to the right as necessary to keep the cloth centered.



VACUUM BELT FILTER SIZING & SPECIFICATION

Model	Filtration Length (m)	Filtration Width (m)	Filtration Area (m ²)	Overall Length (m)	Overall Width (m)	Overall Height (m)	Weight (kg)
UVBF-0020	4	0.5	2.0	8.0	2.0	2.0	3,000
UVBF-0025	5		2.5	9.0	2.0	2.0	3,200
UVBF-0030	6		3.0	10.0	2.0	2.0	3,400
UVBF-0050	10		5.0	14.0	2.2	2.0	3,800
UVBF-0048	6	0.8	4.8	10.0	2.5	2.0	5,000
UVBF-0064	8		6.4	12.0	2.5	2.0	5,500
UVBF-0080	10		8.0	14.0	2.5	2.0	6,000
UVBF-0096	12		9.6	16.0	2.5	2.0	7,000
UVBF-0050	5	1.0	5.0	9.0	2.5	2.0	5,300
UVBF-0060	6		6.0	10.5	2.6	2.0	5,800
UVBF-0080	8		8.0	12.5	3.0	2.0	6,300
UVBF-0100	10		10.0	14.5	3.0	2.0	6,800
UVBF-0120	12		12.0	16.5	3.0	2.0	7,300
UVBF-0140	14		14.0	18.5	3.0	2.0	7,800
UVBF-0078	6	1.3	7.8	10.4	3.2	2.0	7,200
UVBF-0104	8		10.4	12.4	3.2	2.0	8,300
UVBF-0130	10		13.0	14.4	3.2	2.0	9,000
UVBF-0156	12		15.6	16.4	3.2	2.0	10,500

VACUUM BELT FILTER SIZING & SPECIFICATION

Model	Filtration Length (m)	Filtration Width (m)	Filtration Area (m ²)	Overall Length (m)	Overall Width (m)	Overall Height (m)	Weight (kg)
UVBF-0182	14	1.3	18.2	18.4	3.2	2.0	11,500
UVBF-0208	16		20.8	20.4	3.2	2.0	12,500
UVBF-0144	8	1.8	14.4	12.6	4.0	2.2	12,700
UVBF-0180	10		18.0	14.6	4.0	2.2	13,700
UVBF-0216	12		21.6	16.6	4.0	2.2	15,300
UVBF-0252	14		25.2	18.6	4.0	2.2	16,600
UVBF-0288	16		28.8	20.6	4.0	2.2	17,900
UVBF-0160	8	2.0	16.0	12.7	4.2	2.2	14,200
UVBF-0200	10		20.0	14.7	4.2	2.2	15,400
UVBF-0240	12		24.0	16.7	4.2	2.2	17,200
UVBF-0280	14		28.0	18.7	4.2	2.2	18,700
UVBF-0320	16		32.0	20.7	4.2	2.2	20,200
UVBF-0360	18		36.0	22.7	4.2	2.2	21,700
UVBF-0250	10	2.5	25.0	14.5	4.8	2.2	22,000
UVBF-0300	12		30.0	16.5	4.8	2.2	25,300
UVBF-0350	14		35.0	18.5	4.8	2.2	27,400
UVBF-0400	16		40.0	21.5	4.8	2.4	29,500
UVBF-0450	18		45.0	23.5	4.8	2.4	31,600

VACUUM BELT FILTER SIZING & SPECIFICATION

Model	Filtration Length (m)	Filtration Width (m)	Filtration Area (m ²)	Overall Length (m)	Overall Width (m)	Overall Height (m)	Weight (kg)
UVBF-0500	20	2.5	50.0	25.6	4.8	2.4	38,600
UVBF-0336	12	2.8	33.6	17.6	5.0	2.5	20,500
UVBF-0392	14		39.2	19.6	5.0	2.5	24,100
UVBF-0360	12	3.0	36.0	17.6	5.5	2.8	22,000
UVBF-0420	14		42.0	19.6	5.5	2.8	24,000
UVBF-0480	16		48.0	21.6	5.5	2.8	28,000
UVBF-0540	18		54.0	23.6	5.5	2.8	30,600
UVBF-0600	20		60.0	25.6	5.5	2.8	35,200
UVBF-0448	14	3.2	44.8	19.5	5.7	3.1	35,300
UVBF-0480	15		48.0	20.5	5.7	3.1	36,200
UVBF-0512	16		51.2	21.5	5.7	3.1	37,700
UVBF-0576	18		57.6	23.5	5.7	3.1	40,100
UVBF-0640	20		64.0	25.5	5.7	3.1	42,500
UVBF-0720	22	4.0	70.4	28.5	5.7	3.1	52,400
UVBF-0720	18		72.0	24.0	7.1	3.3	56,200
UVBF-0800	20		80.0	26.0	7.1	3.3	58,800
UVBF-0880	22		88.0	28.0	7.1	3.3	66,600
UVBF-0960	24		96.0	30.0	7.1	3.3	69,400

VACUUM BELT FILTER SIZING & SPECIFICATION

Model	Filtration Length (m)	Filtration Width (m)	Filtration Area (m ²)	Overall Length (m)	Overall Width (m)	Overall Height (m)	Weight (kg)
UVBF-1040	26	4.0	104.0	32.0	7.1	3.3	72,200
UVBF-0900	20	4.5	90.0	26.5	7.5	3.6	72,000
UVBF-0990	22		99.0	28.5	7.5	3.6	75,200
UVBF-1080	24		108.0	30.5	7.5	3.6	78,400
UVBF-1170	26		117.0	32.5	7.5	3.6	81,600
UVBF-1260	28		126.0	34.5	7.5	3.6	84,800
UVBF-1350	30		135.0	36.5	7.5	3.6	88,000
UVBF-1440	32		144.0	38.5	7.5	3.6	93,000



DEWATERING APPLICATIONS

- General Tailings
- Gypsum
- Phosphate Rock
- Coal Fines
- Magnetite
- Iron Ore
- Lithium

WASHING APPLICATIONS

- Leached Materials
- Zinc
- Copper/ Cobalt
- Soda Ash
- Gypsum
- Flue Gas Desulfurization (FGD)
- Potash

FEATURES & BENEFITS

- **Various slurry feeder designs** to ensure even distribution of slurry and full coverage of filtration area for various applications.
- **Co-current and counter-current** for cake washing using plug flow displacement to allow for maximized product recovery.
- **Various possible methods of supporting the rubber carrier belt** to reduce downtime during maintenance work and increase availability.
- **Unique vacuum box lifting and lowering device** for easy inspection and replacement of wearing parts resulting in reduced downtime of the filter.
- **High-pressure cloth washing** to minimize cloth blinding and maximize filtration rates.

