TECHNICAL REFERENCE · METHODOLOGY EDITION

How an industrial filter cloth specification is built, and how to read one

For engineers and buyers specifying replacement cloth for horizontal vacuum belt filters, vacuum belt dewatering systems and vertical pressure filters.

EDITION	ISSUED	SOURCE
Methodology	2026-09	hvbfcloth.com

> **What this document is, and what it is not.**
>
> It explains how a filter cloth specification is arrived at, and what every figure on one means. The values in it are industry reference: properties published for the polymers themselves, dimensional limits imposed by the machines, and the test methods the industry uses. **None of it is our own mill's confirmed data, and none of it is a quotation.** A parameter edition carrying our own confirmed values will be issued when the mill confirms them in writing.

1 · Selection runs backwards from the slurry

A filter belt is not a catalogue item. Two plants in the same industry can run the same machine and still need different cloth, because the chemistry, the particle size distribution, the wash regime and the temperature are different — and because the machine itself has been rebuilt, re-tensioned and re-guided over its life.

1. **The liquor sets the polymer.** Chemistry and temperature decide which polymers are candidates at all.
2. **The solids set the yarn and the weave.** Particle size and whether clarity or release dominates — one decision, not two.
3. **The machine sets the dimensions, the seam and the edge.** Not preferences; whatever the machine is built for.
4. **The failure sets the correction.** How the last belt died tells more than the purchase order did.

2 · Polymers: the envelope everything else is chosen inside

Continuous temperatures below are the figures the industry works to for filtration fabrics. Construction and finish shift them, which is why they are given as approximate rather than as limits.

Polymer	Continuous, °C	Acid	Alkali	Hydrolysis	Abrasion	Cost
Polypropylene	up to ~90	Excellent	Excellent	Excellent	Good	Low
Polyester (PET)	up to ~150	Good	Limited	Limited	Excellent	Low
Polyamide (Nylon 6 / 6.6)	up to ~110	Poor	Good	Moderate	Excellent	Medium
Polyphenylene sulfide (PPS)	up to ~190	Excellent	Excellent	Excellent	Good	High
Polyvinylidene fluoride (PVDF)	up to ~140	Excellent	Moderate	Excellent	Good	High
Polytetrafluoroethylene (PTFE)	up to ~250	Excellent	Excellent	Excellent	Moderate	Very high
Polyethylene	up to ~80	Excellent	Excellent	Excellent	Moderate	Low

> **The most expensive mis-selection in this business.**
>
> Polyester in hot alkaline liquor. PET is the default industrial filter cloth polymer and is excellent at most of what a belt filter asks of it — but it hydrolyses in hot alkali, and the rate climbs with both temperature and concentration. A cloth entirely correct on one alkaline duty can fail quickly on another that is only slightly hotter.

3 · Yarn form, weave and finish

Yarn form

Monofilament

A single continuous smooth filament. The best cake release and the easiest cloth to wash back. Filtrate tends to be less clear than a multifilament of the same rating.

Multifilament

Many fine filaments twisted into one yarn. Higher tensile strength for a given thickness and finer particle retention. Holds more solids inside the yarn bundle, so it blinds more readily.

Mono + multi combination

Monofilament in one direction, multifilament in the other. A working compromise — release behaviour closer to monofilament, retention and strength closer to multifilament.

Staple / spun

Short fibres spun into a hairy yarn. The finest retention and a felt-like surface. The hardest to wash back and the most prone to blinding.

Weave

Plain

One over, one under. The most stable and the most rigid. Tight, uniform pores; lower permeability for a given yarn.

Twill

The crossing point steps sideways each pick, giving a diagonal rib. More flexible and more permeable than plain at the same yarn count, with better cake release.

Satin

Long floats, few crossing points. The smoothest surface of the three, so the best cake release and the easiest to wash back.

Double layer / multi-layer

Two or more interlaced fabric layers woven as one. A fine filtering face carried on a coarse structural back — high strength with fine retention, and drainage channels inside the fabric.

Finish

Heat setting

The woven fabric is taken through a controlled thermal cycle under tension. Locks in dimensions so the cloth does not shrink or grow in service. On a tensioned endless belt this is not optional — an unset cloth changes length on the machine.

Calendering

The fabric passes through heated rollers under pressure; one side or both. Flattens the surface, reduces permeability in a controlled way, and improves cake release. How hard it is calendered is a selection decision, not a finishing detail.

Singeing

Surface fibres are burned off. Used on spun yarns to clean up the surface. Not usually relevant to monofilament belt cloth.

Chemical / surface treatment

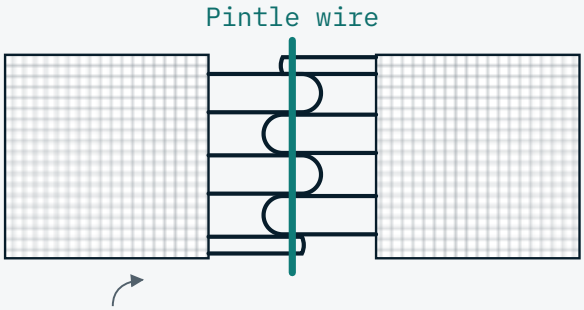
Anti-blinding, hydrophilic or release treatments applied to the finished fabric. Targets a specific failure — blinding or cake adhesion — after weave and polymer have already been settled. Not a substitute for either.

4 · Seams

The joint is where the belt carries its load and where it loses its vacuum seal. Your machine usually dictates which construction it takes, which is why a close-up photograph of the existing joint tells us more than the model number does.

01 · Clipper — metal hook seam

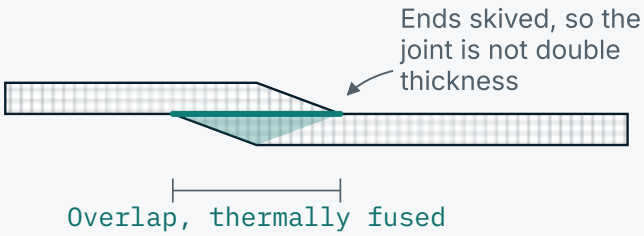
VIEWED FROM ABOVE THE BELT



Recognise it by: a visible metal line right across the belt, and a single wire you can pull out to open the joint on the machine.

02 · PAD / welded overlap

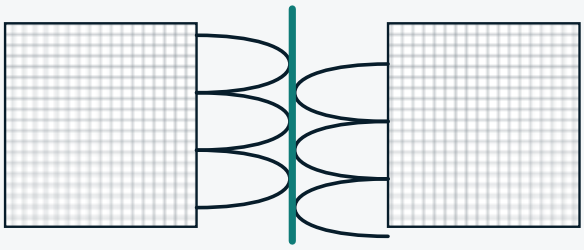
SECTION THROUGH THE BELT THICKNESS



Recognise it by: no metal anywhere, and a joint you cannot open — the belt comes off the machine to be re-made.

03 · Spiral seam

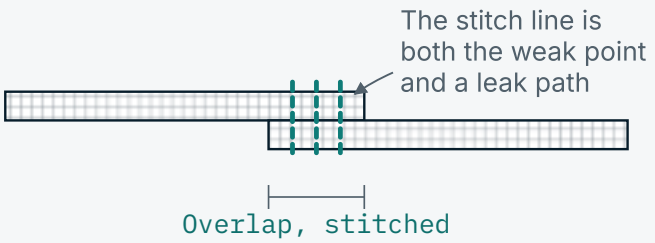
VIEWED FROM ABOVE THE BELT



Recognise it by: coils rather than hooks, and an open line across the belt — the joint drains through, so it does not seal.

04 · Sewn overlap

SECTION THROUGH THE BELT THICKNESS



Recognise it by: visible thread rows, and a joint that is a step in thickness rather than a fused taper.

The four joint constructions used on industrial filter belts. Your machine usually dictates which one it takes — which is why a close-up photograph of the existing joint tells us more than the model number does.

5 · Edge treatments

The edge is the highest-stress zone on a belt filter. A belt that keeps failing at the edge while its body is sound is an edge-treatment question, not a cloth question.

Cut and sealed

The cut edge is thermally sealed against fraying. The baseline. Adequate where the machine edge seal is in good condition.

Folded / hemmed

The selvedge is folded back and secured. Adds thickness and stiffness at the edge where the seal rubs.

Reinforced edge band

A separate band is bonded along the selvedge. For machines that chew edges — the usual answer when a belt keeps failing at the edge while its body is sound.

Coated / sealed band

A polymer band is applied to the edge. Seals the edge against vacuum bypass as well as protecting it mechanically.

Guide strip / tracking profile

A profile bonded to the underside to run in the machine guide. Only where the machine is built for it. Fitting one to a machine that is not is a common and expensive mistake.

6 · How to read an air permeability figure

It is the number everyone compares, and it is easy to quote in a way that cannot be compared.

A permeability value means nothing without two things beside it: the test pressure and the unit. The same cloth reports very different figures at different pressure drops, and the common units — l/dm²·min, m³/m²·h and CFM — are not interchangeable. The methods generally used are ISO 9237, at a stated pressure drop, and ASTM D737 (Frazier).

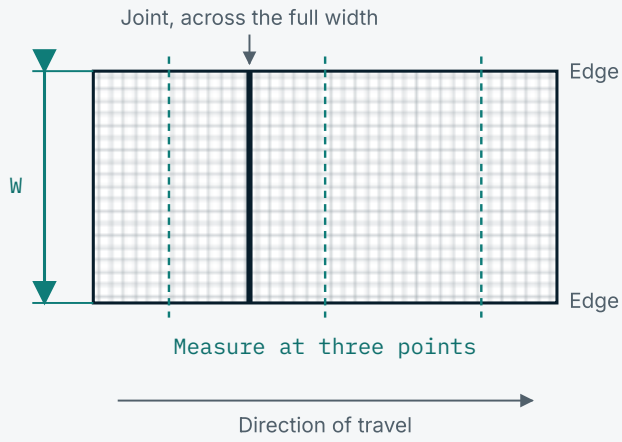
So the question to ask any supplier, including us, is: *at what pressure, in what unit, by what method, on how many samples, and from which lot?* A datasheet that answers all five is comparable. One that gives a bare number is not.

The same discipline applies to tensile strength (warp and weft measured separately, commonly to ISO 13934-1 or ASTM D5034 — and on a belt the weft direction usually governs), to mass per unit area (ISO 3801 / ASTM D3776) and to thickness (ISO 5084 / ASTM D1777, under a stated pressure).

7 · What to measure before you enquire

Width — measured across the cloth face

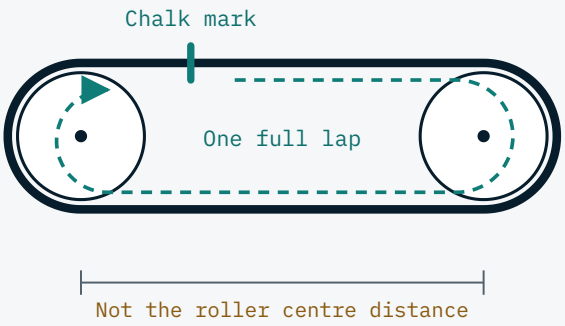
PLAN VIEW, LOOKING DOWN AT THE BELT



Take the tape along the cloth face, not as a straight chord across a sagging belt. If the three figures differ, send all three — that difference is information.

Developed length — one full lap

SIDE VIEW OF THE ENDLESS BELT



Mark a start point, then follow the cloth for one whole lap back to the mark. A used belt has stretched: send what you measure today and say it is off a used belt — do not correct it yourself.

The two dimensions every quotation starts from. Everything else can be worked out from photographs; these two have to be measured.

8 · The full parameter set

Every parameter that ends up on a filter cloth confirmation, what it governs, where the industry reference comes from, and what has to come from you.

CLOTH CONSTRUCTION

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Polymer Polymer property	The chemical and thermal envelope. Everything else is chosen inside whatever the polymer allows.	PP / PET / PA / PPS / PVDF / PTFE / PE — see the polymer table for the envelope of each.	Chosen from your slurry chemistry and temperature.	Slurry name, pH, temperature, and any cleaning chemistry.
Yarn form Polymer property	Cake release, wash-back behaviour and how readily the cloth blinds.	Monofilament / multifilament / mono+multi / staple.	Chosen from particle size distribution and whether release or clarity dominates.	PSD or a d50, and which of the two is hurting you today.
Weave Polymer property	The balance between filtrate clarity, permeability and resistance to blinding.	Plain / twill / satin / double layer.	Chosen with the yarn form as one decision, not two.	Same inputs as yarn form.
Fabric weight g/m² Set per order	A proxy for how much material is in the structure — strength and life, and freight.	Follows from polymer, yarn and weave; not specified independently.	Falls out of the construction.	Nothing directly — it is an output.
Thickness mm Set per order	Whether the cloth clears the machine geometry, and how the seam sits.	Measured per ISO 5084 / ASTM D1777 under a stated pressure — the pressure matters.	Follows from the construction; checked against your machine clearances.	Thickness of the cloth you are running now, if you have it.

FILTRATION BEHAVIOUR

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Air permeability l/dm²·min or CFM Test method	The headline number everyone compares — how open the cloth is.	Commonly measured per ISO 9237 (at a stated pressure drop, often 200 Pa) or ASTM D737 (Frazier). A value with no stated pressure and no stated unit is not comparable to anything.	Targeted from the duty, then confirmed on the finished lot.	The value and the test pressure for your current cloth, if it is on a datasheet.
Pore size / retention rating µm Test method	The particle size the cloth is aimed at holding.	For a woven cloth this is a nominal rating, not an absolute cut-off — woven media do not have a single pore size, and the cake quickly becomes the real filter.	Targeted from PSD and required filtrate clarity.	PSD, and your filtrate spec if you have one.
Filtrate clarity target mg/l or NTU Set per order	Whether the downstream process accepts the filtrate.	Set by your process, not by the cloth.	Used as an acceptance target.	Your current figure and your required figure.
Cake release behaviour Set per order	Discharge, carry-over and how hard the machine has to work at the roller.	Driven by surface finish and yarn form more than by rating.	Tuned through weave, calendering and surface treatment.	Photographs of the discharge point and a description of the carry-over.

DIMENSIONS

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Belt width mm Set by the machine	Fit. A belt that is wrong on width is scrap.	Rubber-belt HVBF machines commonly run to about 4.5–4.8 m. The machine sets it; we build to it.	Built to your measured width.	Measured width of the old belt, or the machine width.
Developed length / circumference mm Set by the machine	Whether the belt tensions correctly on the machine.	Set entirely by your machine and its take-up range.	Built to your measured developed length.	Developed length of the old belt, measured along the running direction.
Filtration area (pressure filters) m² Set by the machine	The equivalent of width×length for a tower or chamber machine.	Set by plate size and plate count.	Built to your plate dimensions.	Plate size and number of chambers, or the machine model.
Dimensional tolerance mm Set per order	Whether the belt tracks. Out-of-square is a tracking fault before it is anything else.	Squareness matters as much as the nominal dimension.	Agreed with the order.	Any tolerance your maintenance standard requires.

FABRICATION

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Seam type Set by the machine	Change-out time, vacuum loss at the joint, and where the belt will eventually fail.	Clipper / PAD or welded / spiral / sewn overlap. The machine usually dictates which.	Matched to what the machine is set up for.	A close-up photograph of the existing joint.
Seam strength % of fabric Test method	Whether the joint or the fabric is the weak link.	A joint is always weaker than the body; the question is by how much.	Stated with the confirmation.	Nothing — this is ours to state.
Edge treatment Set by the machine	Edge life and vacuum bypass at the seal.	Cut and sealed / hemmed / reinforced band / coated band / guide profile.	Matched to the machine edge seal and to how the last belt failed.	Photographs of both edges of the old cloth and of the machine edge seal.
Guide / tracking profile Set by the machine	Whether the belt runs true on a machine built for a guide.	Only fitted where the machine has the matching guide. Fitting one otherwise causes the fault it was meant to prevent.	Only on confirmation that your machine takes one.	A photograph of the underside of the old belt and of the guide rail.

OPERATING ENVELOPE

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Continuous service temperature °C Polymer property	Which polymers are even candidates.	Approximate continuous figures by polymer: PE ~80, PP ~90, PA ~110, PVDF ~140, PET ~150, PPS ~190, PTFE ~250. Finish and construction shift these.	The polymer is selected so your duty sits inside its envelope, not at its edge.	Normal and peak slurry temperature.
pH range pH Polymer property	Chemical attack, and for PET specifically the hydrolysis risk.	PP and PTFE span effectively the whole scale; PET is limited on the alkaline side, PA on the acid side.	Polymer chosen against your measured pH, including during cleaning.	Operating pH and cleaning pH — they are often different and the cleaning one is often the killer.
Chemical exposure Polymer property	Long-term strength loss that does not show up as abrasion.	Specific species matter, not just pH — fluoride, chloride, oxidisers and solvents each behave differently.	Assessed per species, not per industry label.	What is actually in the liquor, including trace species you consider minor.
Abrasion exposure Set per order	Mechanical life where the slurry is hard and angular.	Driven by particle hardness and angularity, not by the mineral the plant is named after — silicate gangue is often the abrasive.	Addressed through yarn, weave and surface, and by pointing out the machine-side causes we cannot fix.	A mineralogical breakdown or assay if you have one.

MACHINE INTERFACE

Parameter	What it governs	Industry reference	How it is set for your order	What we need from you
Machine family Set by the machine	Everything. The cloth form for one family does not fit another.	Rubber-belt HVBF / vertical tower press / indexing or tray vacuum / drum, disc, leaf, chamber press.	Confirmed before anything else is discussed.	Machine brand and model, or a nameplate photograph.
Cloth form Set by the machine	How the cloth is made up — endless belt, zigzag loop, cut panels.	Endless belt for rubber-belt HVBF; endless low-elongation zigzag for tower presses; panels for chamber presses.	Follows the machine family.	Nothing beyond the machine.
Elongation under tension % Polymer property	Whether the belt stays within the machine take-up range in service.	Low-elongation construction is a defining requirement on tower presses. Heat setting is what holds it.	Controlled through construction and heat setting.	Take-up range of the machine, if known.

9 · What to send

1. Company and country.
2. Machine brand and model — or a photograph of the nameplate, or "unknown".
3. Belt width and developed length, or plate area for a pressure filter.
4. Photographs of the old cloth, its joint (both faces) and both edges.
5. The slurry: what it is, its pH and temperature, and the particle size distribution if you have one.
6. What failed, and roughly when.

> **Replacement cloth fabricated to your machine dimensions. Not an OEM spare part.**