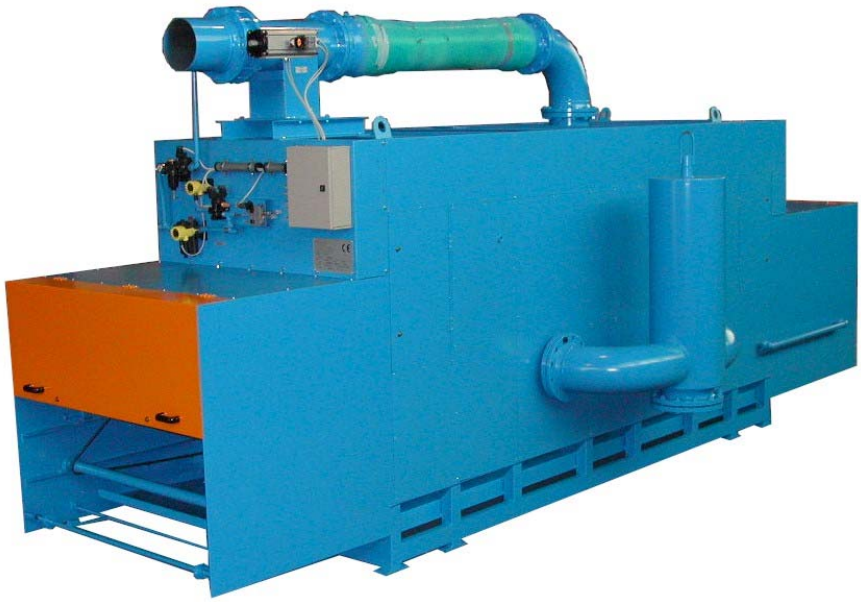
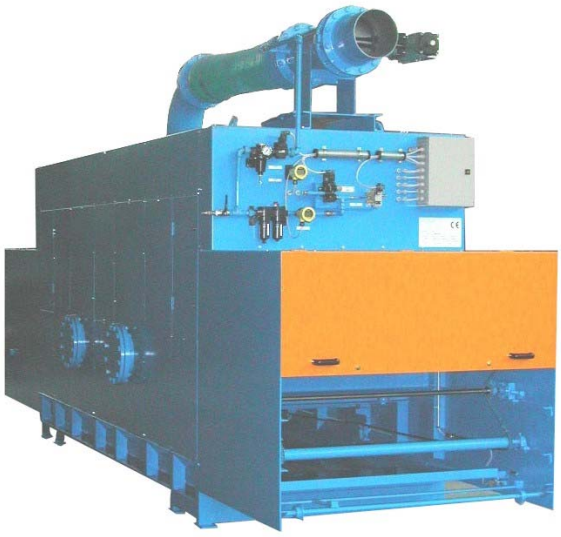
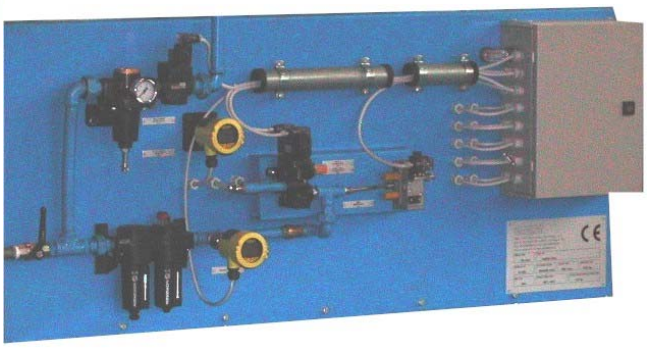
WATER AND MECHANICAL TECHNOLOGY S.R.L.



FLAT BED PRESSURE FILTER





FEATURES

This is the versatile, pressure filter capable of cleaning a range of liquids at throughput rates of 180 to 10,000 gallons-per-minute. It can remove particles as small as one micron (0.000039 inch) and achieve liquid clarity of five parts-per-million.

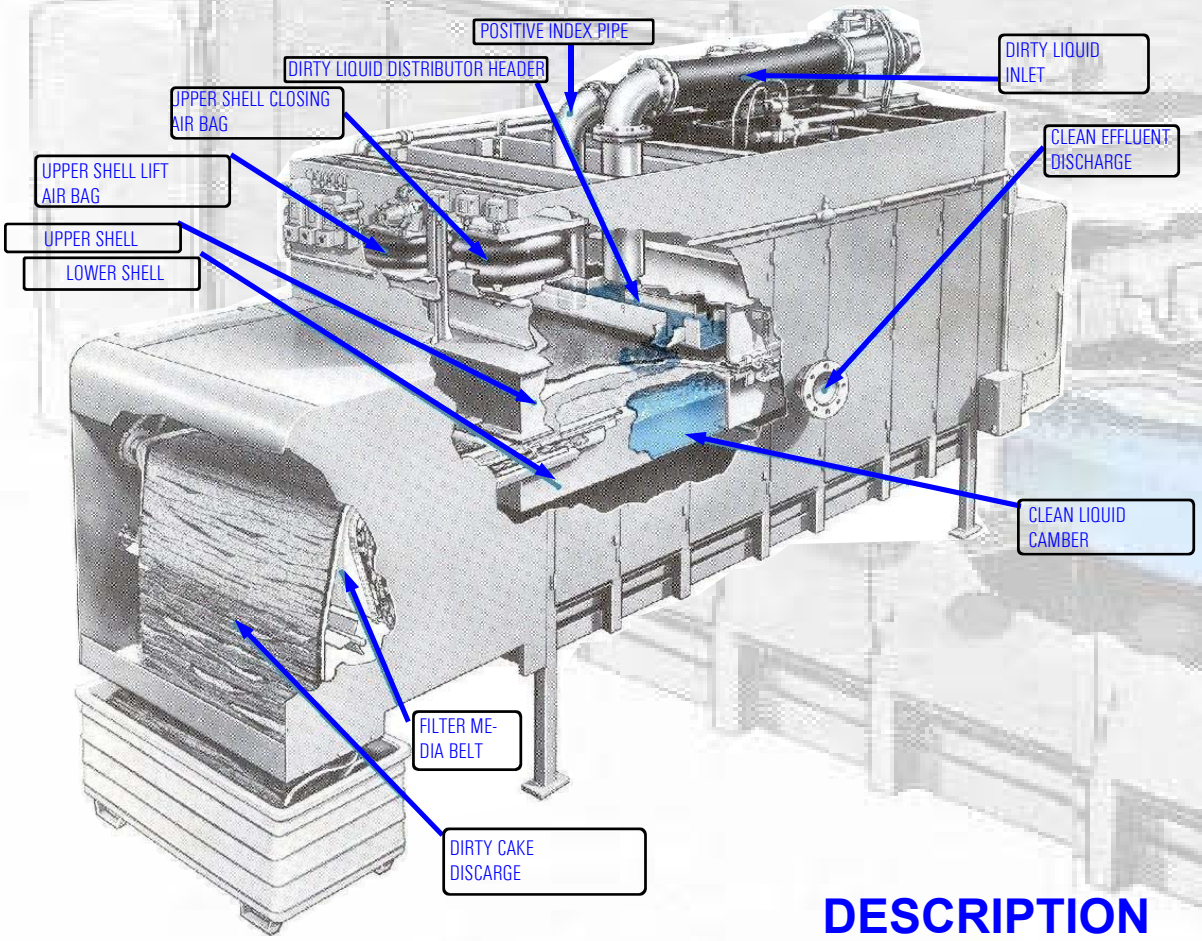
The Flat-Bed filter is capable of meeting a wide range of filtering needs in its standard configuration, and operating on a self-contained basis. It can also be used as the core of a filtering system with special characteristics.

For example, provision can be made to pre-coat the filter media with diatomaceous earth to 'polish-filter' the liquid, so the average particle size passed is in the sub-micron range.

It can be placed in series with settling ponds or drag tanks which remove extra-large chips, scale and 'trash' before filtration.

The Flat-Bed filter can employ special equipment, special construction materials or design modifications to cope with 'hot' or problem liquids.

The Flat-Bed filter is suitable for dewatering many types of sludge, and for secondary-recovery of particulate that is suspended in process liquors.



DESCRIPTION

The Flat-Bed filter's design features two horizontally-stacked chambers (shells) divided by a septum plane which is covered by a 'membrane' of filter media.

Dirty liquid is introduced to the upper chamber and it is pumped at pressures that rise gradually as the cake of filtered-out solids builds on the septum plane.

It is pumped through the filter media, into the lower shell which serves as a clean reservoir tank, and out from there for disposal or for re-circulation.

The filter is entirely automatic in operation, including initiation and execution of the periodic self-cleaning (cake-discharge) cycle.

The indexing action to discharge solids is actuated when a pressure monitor senses that the accumulating cake of solids has reached a point where it is unduly impeding flow (i.e., blinding-off).

Indexing proceeds automatically as a quick and reliable sub-cycle of the filter's operation.

The filter is operated with either permanent or disposable media depending on what is being filtered.

The permanent media is normally a continuous belt made of fine-mesh, high-strength Nylon.

Disposable media employed to obtain finer filtration with low operating cost, is typically a non-woven 'cloth' made of nylon, polyester, rayon or a blend of natural and synthetic fibres.

Disposable media is inserted in 500 or 1000 yard rolls, and is indexed out for disposal with the built-up cake of solids.

Simplicity is featured throughout the Flat-Bed filter's design to assure very high reliability.

Heavy-steel construction is a super-rugged answer to the need for long life in a tough enviornment.

Operating cost for the Flat-Bed filter is very low, because the unit is entirely automatic and it requires no filter-aid chemicals in ordinary service.

Human attention can ordinarily be limited to infrequent maintenance checks.

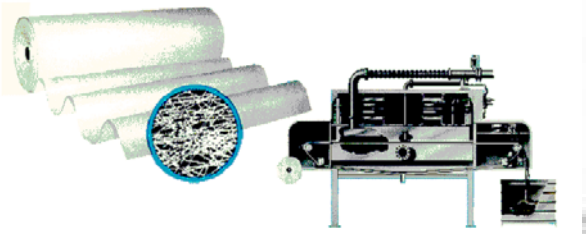
A range of sizes of Flat-Bed filters is offered.

All support engineering needed to place the unit in operation is normally included in W.M.T.'s sales proposal.

W.M.T. is equipped by both facility and experience to supply an entire liquid system where the filtration task is large or complex.

W.M.T. offers to support this equipment throughout its service life.

FILTER MEDIA TYPOLOGIES

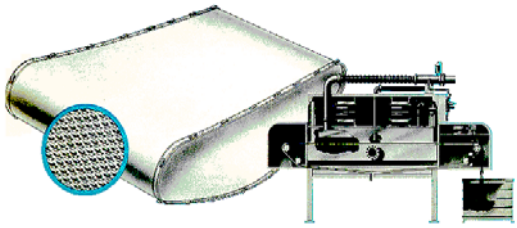


The septum though which the Flat Bed filter passes liquid for filtration is the plane at which filtered-out solids are retained. This septum is constructed of stainless steel screen and is covered by media. The media may be either a permanent blow-off belt, made of synthetic fibre woven into a fine mesh, or it may be a disposable non-woven 'cloth' that is roll-fed automatically. W.M.T. supplies both items.

Which media is best? That is dictated by the job to be done. A very wide variety of liquids and types of particulate pose many different filtering problems, and call for different characteristics of the mesh, the fibre's chemistry, or other media characteristics.

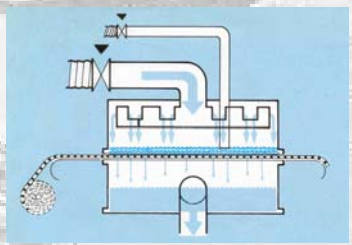
Remember, however, that much of the fine filtering done by any filter is done by the cake of filtered out solids that accumulates on the media. Ideally the cake provides a gradually thickening, three-dimensional honeycomb-like mat and it traps particles that are much finer than particles the media's own webbing can trap. This means the right media is, firstly, the one which will promote good cake accumulation.

If the particulate that is being filtered out will not build a cake -perhaps because of its super-fineness-diatomaceous earth can be introduced with the influent to form one. The diatomaceous earth powder need form only a thin layer to trap sub-micron size particles.



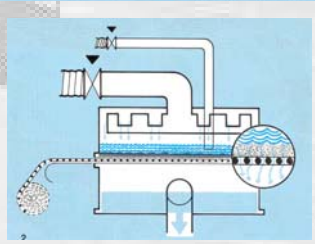
WORKING LOGIC & FILTER INDEX

1



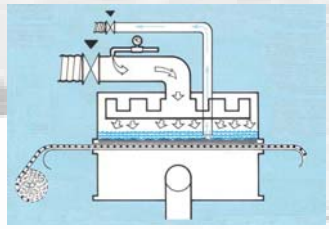
Dirty liquid is pumped into the upper chamber (shell) by way of a distribution header, and through the septum, which is covered with a filtering 'cloth'. Clean liquid flows into the lower chamber.

2



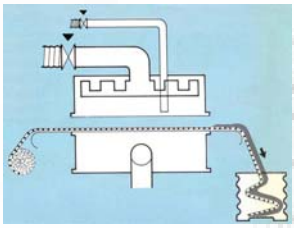
Solids accumulating on the filter plane form a gradually thickening 'filter cake' which increases filtering effectiveness. The cake gives a three-dimensional effect to the media, intercepting finer particulate than media alone could intercept.

3



Pump pressure rises automatically to assure full flow against growing filter-cake resistance. At a point, pumping resistence rises sharply, indicating that "blind-off"** of the filter cake has occurred. Then, even a steep rise in pump pressure cannot sustain full flow. Index is automatically triggered.
** A Positive Index routine shuts off the influent and acts to clear the upper shell of residual liquid before, opening it. Air pressure is introduced to force the remaining liquid out through the P-I pipe. That completed, the air blows through the cake to further dry it.

4



The upper shell lifts and the belt indexes to discharge the cake.

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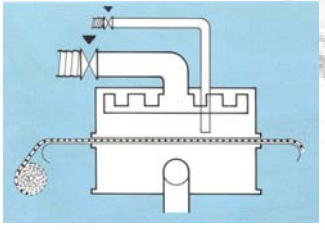
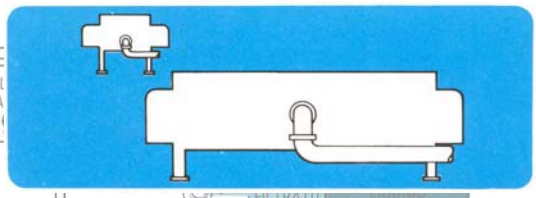


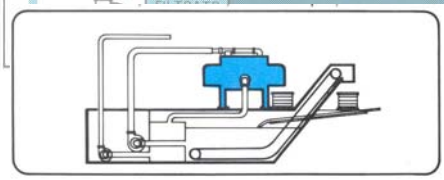
After fresh media has automatically indexed into place on the septum, the upper shell closes and is sealed tight under pressure of hold down cylinders. Filtering resumes.
A sixth step - washing of the cake with a solvent - can be added at this point if cake disposal problems make it desirable or if secondary recovery values suggest it.

FLAT-BED ADAPTABILITY & VERSATILITY

W.M.T.'s Flat-Bed filter can adapt to a range of services. For example a body-feed of diatomaceous earth can be introduced to the septum with the influent to provide submicron filtration. Diatomaceous earth is a fine powder which is actually the fossilized skeletons of marine micro-organisms. Deposited as a thin cake on the septum, it provides a system of micro-pores through which the liquid flows to be ultra-cleaned.

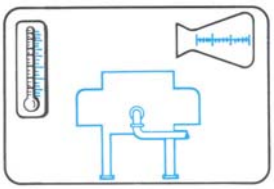
The Flat-Bed filter is available in 14 sizes. Beginning with the 180 gallons-per-minute model, which requires only 15 ft^2 of floor space, the range includes models able to handle any gpm requirement up to 10,000! The largest, using 287 ft^2 of area can clean 600,000 gallons of dirty effluent in an hour!





The Flat-Bed filter's adaptability for use in a system must be remembered, too. Take for example, filtration of liquid heavily loaded with solids such as rough grinding chips. Instead of passing everything through the filter, good engineering might place the filter in tandem with a drag tank. The fast settling, heavy particulate would then be removed in advance, so a smaller, less costly filter - cycling less frequently - could be employed, and the total filtration cost would be minimized.

The Flat-Bed's simple design and uncomplicated construction mean it can be modified for special duties as other filter can't. Nuclear generating plants, for example, require a filter with sheilding, with construction that won't harbor residual particulate, and with wash-down facility. Their filters must provide specially-lined chambers; and drive motors, bearings, etc. must be placed outside the shielding for simplest service or replacement. The Flat-Bed filter is specified for all of these reasons by the nuclear power plant builders.



Chambers of the Flat-Bed filter can be constructed of special metals or lined with inert materials such as Teflon, thus adapting the filter for use in chemical processing or other service in which the filtrate must be kept from acquiring minerals from the filter's metal shell. The Flat-Bed has special suitability for handling liquids at high-temperatures because it keeps liquids under pressure. This discourages the liberation of any dissolved gasses, and keeps liquid more stable.

The Flat-Bed can be used to recover valuable solids being filtered out since the disposal cycle can be extended to include a sub-cycle for washing-down the cake with special solvents. And the solvents can be recovered, too.

Uffici ed Amministrazione	Via G. Brodolini, 33 - I 20032 CORMANO (MI)	*Headquarter*
Telefono	+39-026101342	*Phone*
Fax	+39-026102518	*Fax*
URL	www.wmt.it	*URL*
Posta elettronica	wmt@wmt.it	*E-mail*