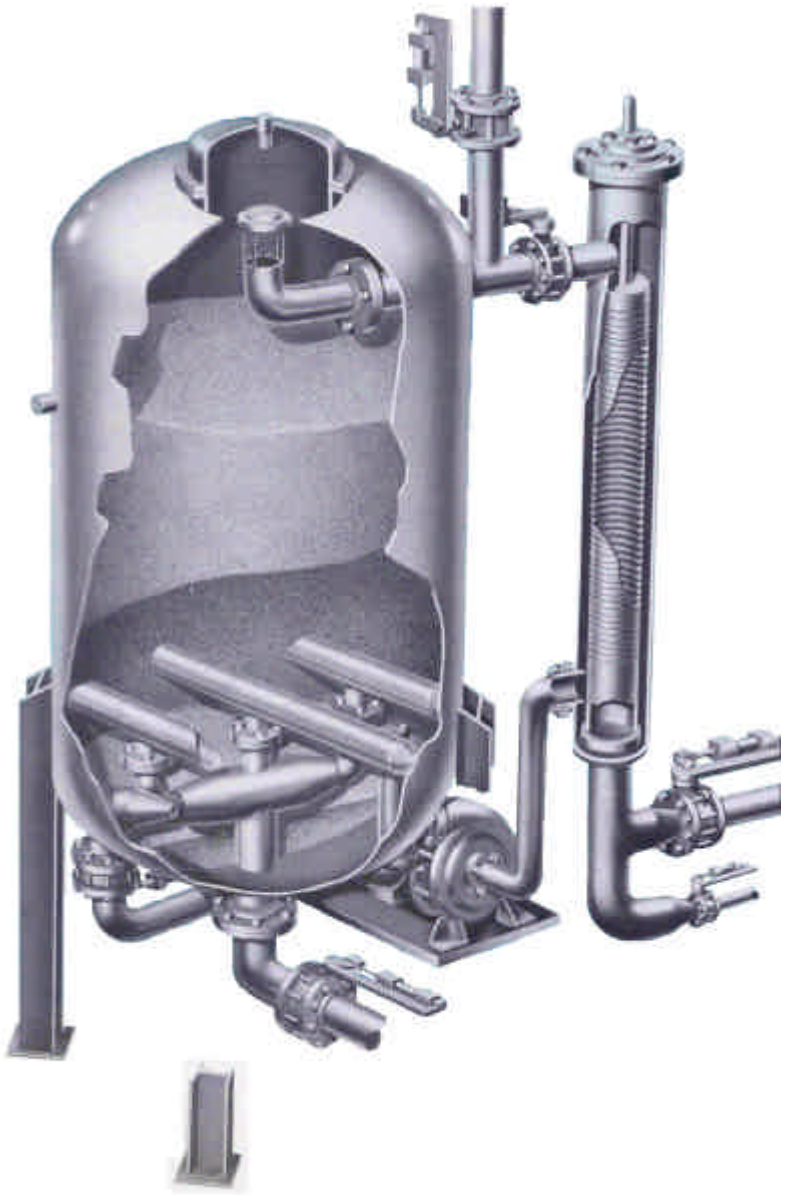
WATER AND MECHANICAL TECHNOLOGY S.R.L.



DEEP BED FILTER

MAJOR STEP FORWARD IN DEEP BED FILTRATION

The W.M.T. In-Depth deep bed filter is a space-saving system that processes up to 6,500 gallons of liquid-per-minute, removing particulate down to the sub-micron range.

Influent with solids (or entrained hydrocarbons) in the range of 300 ppm can be routinely cleaned to 15 ppm. If even cleaner effluent is required the filter can be part of a system that clarifies a liquid to the ultra-clean range.

The filter is particularly effective in removing particles that are oily or sticky-the kinds of dirt other bed filters have great problems in handling.

The high capacity of the In-Depth filter is based on an unusually high flow rate per-square-foot of bed surface area. Up to 20 gpm/Ft2 is practical with many types of solids!.

The In-Depth filter features considerably higher efficiency and flow rates than conventional deep bed filters. This is a difference deriving directly from how much cleaner* this filter can keep the media as filtering progresses from cycle to cycle.

The filter improves even further on the flow capability of traditional deep beds because it uses only five to seven percent of its cycle time for backwashing, and uses *none* of its previously filtered liquid for backwash. A traditional deep bed may sacrifice as much as fifty percent of its service time to backwashing and *take back* 15 to 30 percent of previously filtered liquid for the clean-up job. An operating advantage of 2-or 3-to-1 for an In-Depth filter may thus turn into a 4-or 5-to-1 total flow advantage when total on-stream time as well as net throughput is considered.

Consider how this capacity advantage reduces the size of the filter needed for a job, and how floor space is conserved !

The reason for this filter's on-stream difference ***is.*** the same reason why its flow rate is higher-quick *effective* clean up of the media. This filter's media clean-up method copes with "mudballing" as no backwash ever has before.

The In-Depth filter has a backwash scrub action that breaks up mudballs, and within 20 minutes returns clean** media to service, ready for another lengthy duty cycle. Conventional filters, by contrast, may take twice that much time for each backwash, and if dirt loading is heavy, require backwashes at very close intervals because they cannot deal with growing mudballs. Non-scrub type backwashing is almost totally inadequate against mudballing.

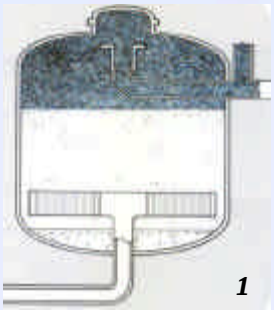
In most situations the In-Depth filter carries out its backwash automatically when an increase in pressure signals that the bed is dirt-loaded, or when it is called for by a timer.

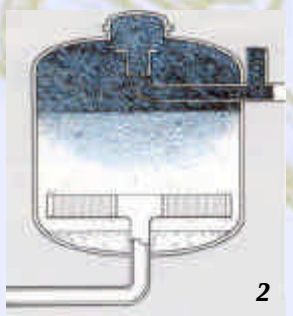
**The W.M.T. In-Depth filter, employing* a *patented scrubber action, restores media to near its peak condition and efficiency with each scrub cycle, thus the media can be rated at its best capability* continuously. *Meanwhile, filters that depend on conventional backwash techniques are not able to keep their media clean...in fact must tolerate progressive deterioration of the bed condition. They must* down rate *their filter flow rates to well below .possible peak conditions* as a *practical compensation for mudballing and* losses of effective surface area.

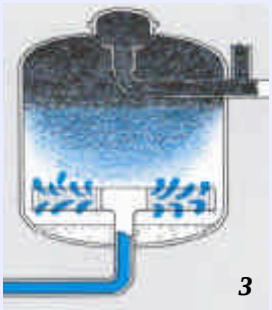
***"Clean" media means media free enough of dirt that it is able to return to rated filtering efficiency and able to pass acceptable filtrate for* a *full operating cycle.*

DEEP BED FILTRATION

1. “Dirty liquid is pumped into filter vessel and enters the bed of media.
2. Liquid travels downward in the bed, under pumping pressure, maling its way through the micro space (interstices) between the granules of the media.
3. Dirt is trapped in the interstices. Clean liquid decants into collector tubes and flow out.







HIGH VELOCITY SCRUB SPEEDS BACKWASH

Save permanent media.

Save time. Increases flow.

Key contributors to this filter's high capacity are a special media and a new, patented way of scrubbing the media clean when the bed has become fully loaded. Fast and effective, the dynamic scrubbing technique normally needs only 20 minutes to do its work. It returns the media to the bed clean enough to go through another lengthy duty cycle before losing filtering ability. Mudballs that agglomerate in the bed are broken up and cleaned out in this scrub. They are not returned to the bed.

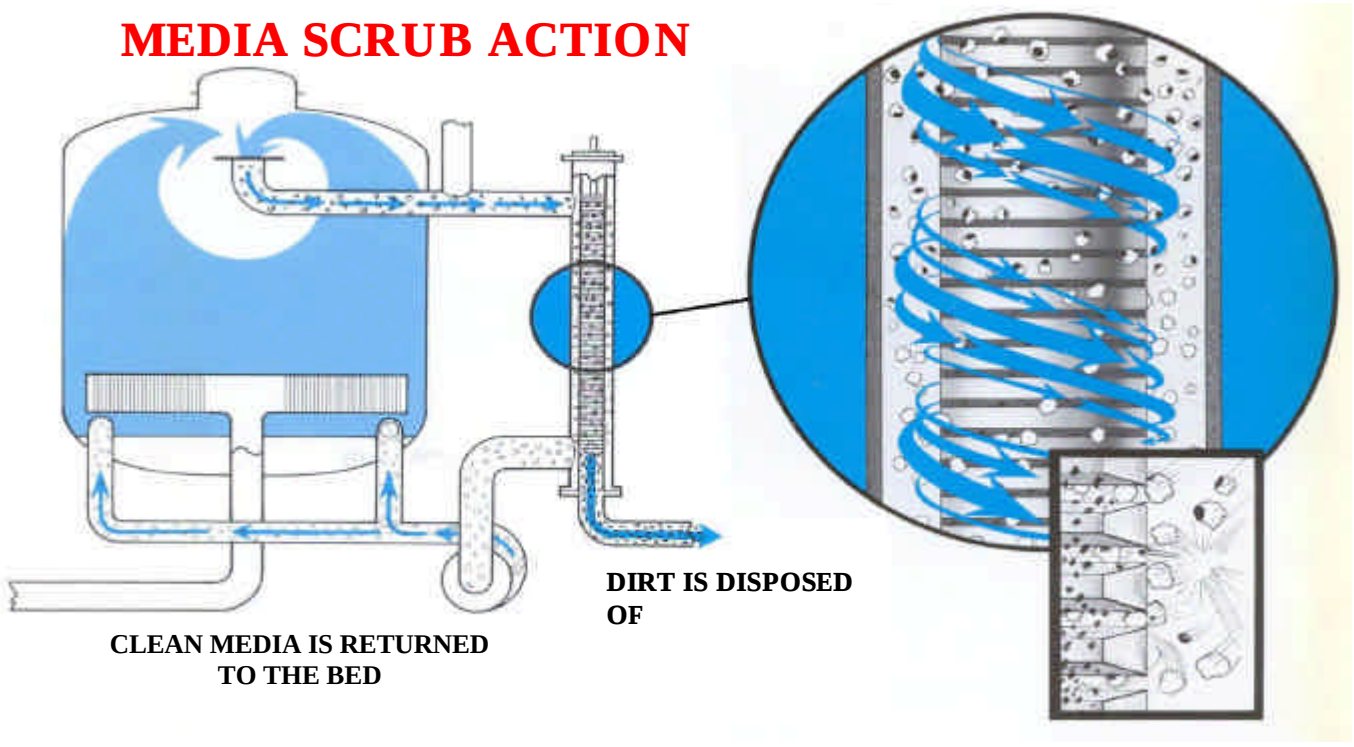
Here is how the dynamic scrub works: When a change in pressure differential across the bed is sensed it initiates a media cleaning cycle. The cycle begins with the filter's main inlet being sealed off and a quantity of the dirty liquid being diverted *up- ward* through the bed to provide a backwash. The media, dirt and liq- uid become a slurry at this point, as with conventional backwashes. However, unlike conventional back- washing, the process does not depend on dirt coming to the top and floating over a weir. Instead, this slurry is vigorously pumped into and through a uniquely effective scrubber-separator chamber.

Separation of media and dirt occurs in the chamber because the chamber has an inner, dirt- collector tube with a series of calibrated slots around its circumference. The slots are big enough for dirt to pass through for disposal, but smaller than the graded size of the media grains. Media granules pass over this separator grating in a state of high-speed agitation and are purged of attached dirt.

The slurry is recirculated through the scrubber tube, the pump and the main vessel many times during the scrub cycle to free even the most stubbornly clinging dirt from the media granules.

New media developed by W.M.T. has made this scrub-action possible. The media used is tough enough to keep its size so that only a fraction of its volume is normally lost with the dirt during a full year of opera- tion. Yet the media is resilient enough not to damage pumps, as sand or other abrasive granules would.

MEDIA SCRUB ACTION

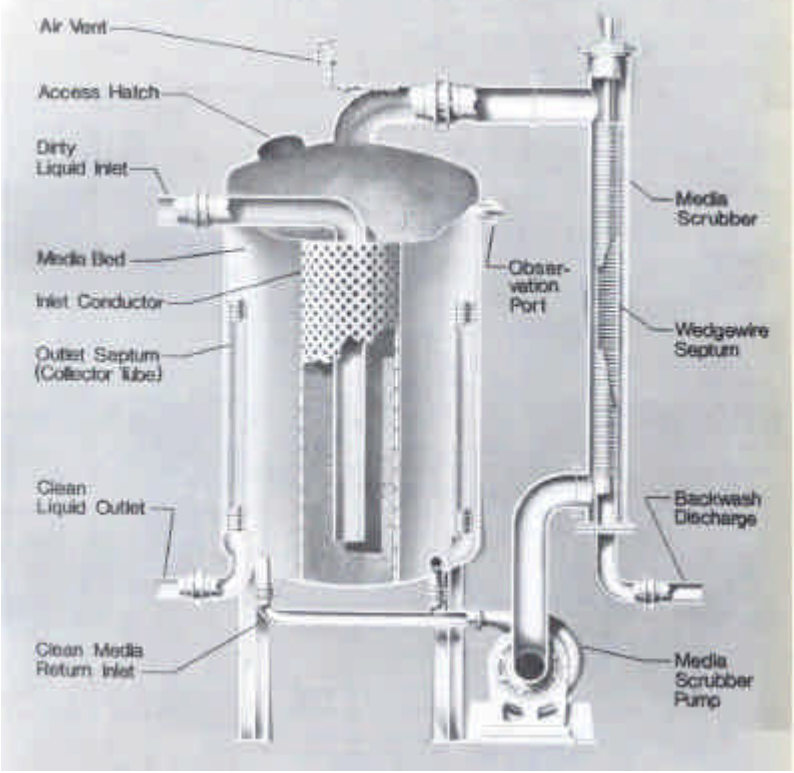


DIRT IS DISPOSED OF

CLEAN MEDIA IS RETURNED TO THE BED

PERMANENT MEDIA RENEWS ITSELF IN SCRUB CYCLE

Space saving vertical bed configuration



Deep bed filtration that features outward (radial) flow, rather than downward flow, is provided in this model of the W.M.T. In-Depth filter. It gives more filter surface area in a given floor space, and unique flow geometry that in. creases flow rates without reducing removal efficiency.

All other filter benefits and features of the W. M.T. In-Depth design are incorporated. Media is the same that is used in the horizontal models, and its continuously "clean" condition is maintained by the same patented scrubber action.

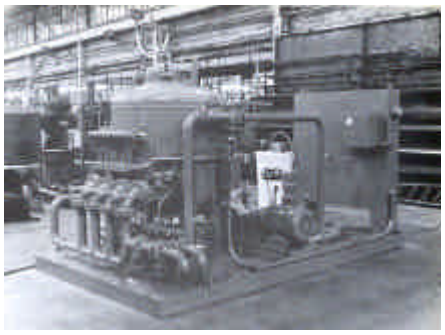
Greater flow rates are possible without reduction of removal efficiency because the surface area of the bed at the plane where liquid is forced into the bed is considerably less than the bed area at the point where liquid is decanted into the collector tubes. This means velocity of the liquid-high when the liquid is being driven into the bed-slows significantly as liquid travels toward the array of collector tubes. Such a velocity reduction gives much the same improvement to filtering effect as is obtained by expanding the bed surface area and operating the filter at lower flow rates.

LABORATORY UNIT

The photograph shows a standard laboratory or demonstration model Deep-Bed filter. This type of unit is often used for on site evaluation of difficult filtration problems and for feasibility studies.

PACKAGED SYSTEM

This photograph shows a complete Deep-Bed filtration package. This and other compact units can be furnished as preassembled platform-mounted package including: filter, scrubber, media pump, electrical panel, complete piping and wiring



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