Engineering Advisory

8203

Product: MPak® Corrugated Plate Separator Manufactured By Facet International, Inc.

Process Description

The MPak® is an oil/water separator device that utilizes:

- *Polypropylene plastic rather than fiberglass plates*. Polypropylene is used because it is said to enhance particle coalescence and thus performance. **FACT**: corrugated plates enhance particle coalescence regardless of the material of construction. Polypropylene is a less expensive material of construction than fiberglass. Additionally, polypropylene is oleophilic (oil-loving) which results in a rather sticky plate surface after but a short period of operation (months rather than years). Oleophilic plates must be cleaned frequently to maintain their effectiveness. Non-oleophilic inclined fiberglass plates, by comparison, need not be cleaned for 10-20 years because they successfully exhibit self-cleaning characteristics.
- *Short inclined plate lengths of about 8-10 inches.* **FACT:** true inclined plate separators have full length plates which enable separated particles to migrate to the top and bottom of the separator vessel without reentering the active flow stream. Particle reentrainment is an inherent design deficiency of the MPak® product whereas particle reentrainment is virtually eliminated in a **true** cross flow inclined plate separator. Figure 1 shows the MPak® cross flow design and Figure 2 shows a true inclined plate separator design.

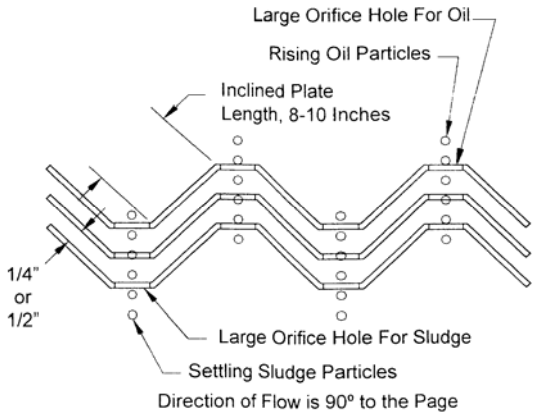

Figure 1

- *Plate spacing of 1/4 and 1/2 inches.* **FACT**: The PuriSep™ cross flow inclined corrugated plate separator modules manufactured by WaterSmart Environmental, Inc. are spaced at a generous 3/4 inches to eliminate plugging of plate module inlet face with vegetation fluff and other coarse debris. Insufficient plate spacing

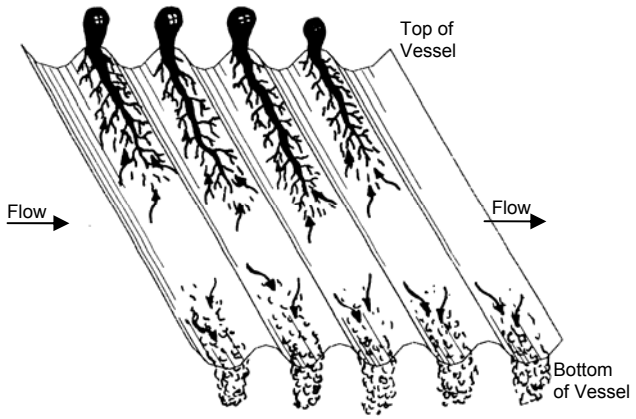

Figure 2

results in increased maintenance on the part of the owner with an associated probability of inadequate performance.

- *Two or more separator modules in series flow* (see Figure 3). **FACT:** whenever a second and third separator module is used in series flow, the hydraulic continuum is interrupted. Therefore, the projected plate area represented by the second and third modules is equivalent to the use of two and three clarifiers in series flow, which is contrary to standard sanitary engineering practice. (See Manual of Practice FD-8 Clarifier Design, Water Pollution Control Federation, 1985). PuriSep™ separator modules are always used in a single module configuration for that reason.
- ***Gross Misrepresentation*** *of projected plate area.* **FACT:** projected (or effective) plate area is represented by the shadow of the inclined plate at high noon. (See Figure 4.) Rather than claim the actual projected area, the MPak® distributors fraudulently claim twice the projected area on the theoretical basis that both sides of the polypropylene plates attract oil. The term "effective coalescing area" is used for the purpose of creating the *illusion* that Stoke's Law projected or effective plate separation area is intended. This *creative* explanation fails to account for the fact that oil rises upwards and therefore cannot readily settle onto the bottom or floor of a plate surface. The particle separation principles of Stoke's Law are to be applied rather than the adsorption phenomena associated with oleophilic plastics. The technologies are distinct rather than additive. The double area misrepresentation, if successful, enables the distributor to provide but 1/2 of the sq. ft. of projected separation area specified, to the ultimate detriment of the end user.

Automatic Flow Bypassing

Figure 3 is from the 1992 Utility Vault (then called Oldcastle) Sales Catalogue. Note that the static liquid level is properly below the elevation of the outlet weir. Due to widespread plugging of the modules, the basic design was modified to automatically bypass flow **over** the module. Figure 5 is from the 1995 Utility Vault Sales Catalog. Note that the static water level is incorrectly at the same elevation as the outlet invert elevation. Under all dynamic flow conditions, flow bypassing over the module must occur. Water flowing over the module cannot plug the module. Of course, it won't receive any treatment either. For what its worth, the 1992 unit was rated at 650 GPM. The 1995 version (same modules) is rated at 877 GPM. Perhaps the increased capacity is attributed to the automatic flow bypassing capability!

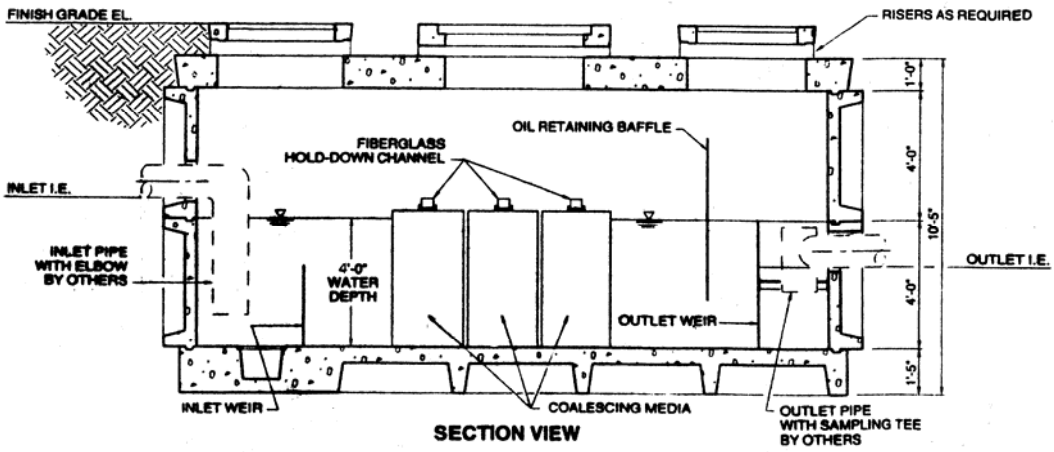

Figure 3

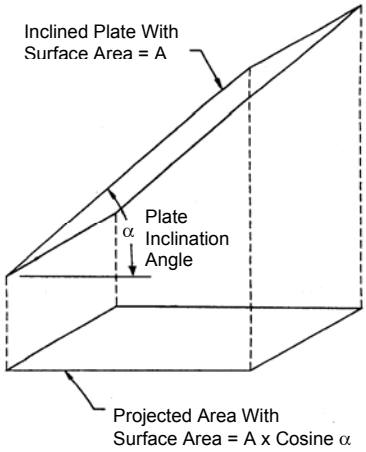

Figure 4

Technical Services

WaterSmart Environmental, Inc. is willing to technically review the MPak® submittals for the purpose of establishing conformance to the project plans and specifications.

References

For an in depth discussion of the MPak® design, see WSE Publication 394, pages 9-12, attached.

Note: Facet International, Inc.'s MPak® modules are distributed nationally by Utility Vault Company in precast concrete vaults (see Figure 3) and Fluid Containment, Inc. in fiberglass vessel construction.