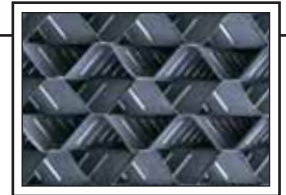


DURA-PAC

Trickling Filter Media

DURA-PAC crossflow and vertical flow PVC sheet media for trickling filters, submerged fixed beds and other wastewater treatment applications

DURA-PAC is a self-supporting PVC sheet media, capable of withstanding loads in excess of industry standards. DURA-PAC modules are available in various sizes and specific surface areas of 30, 31, 48 or 68 ft²/ft³.



DURA-PAC is a plastic sheet media available in two basic designs. DURA-PAC XF is a cross flow media recommended for low to medium BOD loading applications. DURA-PAC VF is a vertical flow media recommended for high BOD loading applications. DURA-PAC's volumetric void ratios of at least 95% allow for uniform redistribution of wastewater and air while maximizing contact between the biomass and the wastewater.

DURA-PAC is available in specific surface areas of 30, 31, 48 and 68 ft²/ft³. 31 ft²/ft³ media is typically used for BOD removal and 48 ft²/ft³ media can be used for nitrification to reduce the size of new nitrifying trickling filters.

The DURA-PAC media is non-toxic to microorganisms and immune to rot. It is resistant to degradation by ultraviolet light, fungi, bases and acids, and other compounds normally found in wastewater.

DURA-PAC consists of thermoformed flat PVC sheets. Sheets are sized in varied thicknesses indexed to applications. For cross flow applications (DURA-PAC XF) these sheets are corrugated horizontally

and bonded to one another in a honeycomb pattern module. Vertical flow media modules (DURA-PAC VF) are formed by alternating flat and corrugated sheets. DURA-PAC modules typically measure 2' x 4' x 2'. Custom module sizes are available. DURA-PAC sheets can also be shipped to the job site for assembly, if the application requires.

DURA-PAC is one of five trickling filter media designs from Jaeger Environmental. Jaeger Environmental has manufactured trickling filter media since 1979, with system installations worldwide. We offer random and structured media for municipal and industrial applications.

Product specifications for DURA-PAC are detailed on the reverse side of this presentation. For further information, or to discuss your application, contact Jaeger Environmental via phone, fax or e-mail.



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Locations/Production Sites
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Espenhain, Germany
Houston, Texas
El Dorado, Kansas
Monterrey, Mexico



DURA-PAC TRICKLING FILTER MEDIA

A. Standard Product Specifications

- The media shall be fabricated from rigid PVC sheets completely corrugated forming a cross-corrugated pattern with adjacent sheets to permit continuous horizontal redistribution of both the air and wastewater throughout the depth of the media. The PVC roll stock sheets shall be of uniform thickness with no sections less than ± 0.002 inch manufacturing tolerance. The media shall be specifically designed for use in the biological oxidation of municipal and industrial wastewater.
- The polyvinyl chloride used in the media shall be resistant to degradation from ultraviolet radiation, rot, fungi, bacteria and other forms of microorganisms. The media shall be chemically resistant to concentrations of common inorganic mineral acids or alkalies and organic solvents or compounds normally experienced in sewage.
- Each module shall consist of several PVC sheets, bonded together to form a structurally self-supporting block measuring 24" wide x 24" high x 48" or 72" long. The modules shall be designed with a minimum specific surface area of 30 (or 31, 48 or 68) square feet per cubic foot with a minimum 95% void volume ratio. Each module shall be capable of withstanding a minimum load of 35 pounds per square foot per foot of media depth. Maximum allowable deflection shall be limited to 2%.
- The manufacturer shall submit test reports for the mil thicknesses to be supplied. Test reports shall comply with the requirements of paragraph C. If there are no test reports or if there are any alterations to the media in respect to materials or design, the manufacturer shall test the modules in accordance with paragraph C.
- Individual sheets used in the manufacture of the media shall conform to commercial standards ANSI/ASTMD1784-78:12454C with the following physical properties when tested in accordance with the method indicated:

B. Installation

- The media shall be placed inside the filter by crane or mechanical conveyor. The media modules shall be transported by cranes or placed on wooden slides or conveyors to the working level. The media modules shall be placed by hand in their final location.
- Use 1/2 inch thick plywood, pegboard or other suitable temporary planking to protect the media from foot traffic. Do not allow workers to directly walk or stand on the media.
- Place each module as close as possible to each other while avoiding damage to the modules. The sheets of all modules in a layer shall be placed parallel to each other in order to maximize uniform and continuous horizontal movement of air and water.
- Modules in each layer shall be rotated 90° to the layer immediately below to enhance water redistribution and to maximize self-supporting of the media.
- The media modules shall be carefully trimmed or cut to fit within 2 inches (50.8 mm) or less of the center column. Cut or trim modules to fit within 2 inches (50.8 mm) or less of the filter perimeter wall.
- Shaping, trimming and cutting of the media may be done in the filter provided appropriate measures are taken to prevent any chips, broken pieces or similar debris from falling into the media. Canvas or similar working materials shall be used to cover the media modules. Before a new layer of modules is added, the existing layer shall be cleared of all construction material or objects that may have fallen on it. The top layer of media shall also be protected from damage caused by falling material due to any subsequent work until start-up of the system.
- The media modules in the bottom layer shall be placed on the supports provided. Support ledge (a minimum of 4 inches wide) should be provided around the center column and the tank perimeter wall. The top of the support beams and ledges should be at the same elevation and within a maximum tolerance of $\pm 1/8$ inch (3.18 mm) in their elevation.

C. Module Testing

- Structural testing of fabricated modules shall be performed by an independent testing laboratory approved by the engineer.
- All tests shall simulate service conditions and conform to the following criteria.
 - The test samples shall consist of a stack of modules at least two modules high. The arrangement of the stack shall simulate the geometry as placed in the filter towers.
 - Modules intended for the base layer shall be tested on a simulation of the support system. Modules intended for all other layers shall be tested on a flat base.
 - Test loads shall be the design loads of the media specified.
 - The test load shall be uniformly applied at a temperature of 75° F, ($\pm 2^\circ$ F) and the design load shall be applied as follows:
 - A pre-load, equal to 10 percent of the design load, shall be applied for 1 hour to seat modules and to establish a baseline flexural condition.
 - The loading shall be increased in 100-pound-per-square-foot intervals. Each loading shall be held for a minimum of 5 minutes and the deflection recorded at the end of the 5-minute period.
 - Incremental loading shall continue until recorded deflections are 1 percent and, subsequently, 2 percent.
 - Maximum allowable compressive deflection of the individual modules shall be 2 percent.
 - If more than 10 percent of the modules tested in any strength gradation exhibit a compressive deflection of greater than 2.0 percent, or if any one module exhibits a deflection greater than 4.0 percent, additional testing may be required as considered necessary to determine the structural suitability of the media. If the tests indicate the media is structurally unsuitable for its intended use, the media may be replaced with new media meeting the specifications and passing the structural testing.

D. Product Handling And Storage

- If storage is required, assembled media modules shall be stored on a flat, clean surface to prevent damage to the module edges.
- Modules should be checked at least once per week. Modules that may have fallen shall be inspected for any damage and undamaged modules should be restacked and secured. Damaged modules should be either repaired or discarded.
- During shipment and storage, modules shall always be stacked on their long face with the plastic sheets in a vertical position. Modules shall not be stacked more than four high, and modules in each layer shall be set at right angles to those below. Weathered or otherwise damaged media are not acceptable and will be replaced as deemed necessary or appropriate.

E. Cleaning

As installation of each module layer is completed modules surfaces should be inspected for the presence of debris or other construction materials. Any foreign material detected should be removed and all surfaces cleaned. Upon completion of the media installation, a final check of the media surface should be conducted for the presence of foreign material and any material detected removed prior to the application of water. Following completion of the inspection and the removal of all foreign material, the media should be thoroughly flushed with clean water.

Properties	Test Method	Results
A. Tensile Strength (psi)	ASTM D-638/882	4,000-8,000
B. Tensile Modulus	ASTM D-638/882	300,000-550,000
C. Modulus of Elasticity (psi)	ASTM D-746	Min 325,000
D. Impact Strength (ft-lb/in of notch)	ASTM D-256	1.0 - 5.0
E. Gardner Impact	ASTM D-4226	Proc.A 0.8in. lb./mil
F. Heat Distortion Temp (°F@264 psi)	ASTM D-648	155 – 170° F
G. Izod Impact (ft-lb/in)	ASTM D-256	0.5 - 2.2
H. Maximum Service Temp		135° F
I. UL Flammability	94	V - 0
J. Specific Gravity	ASTM D-792	1.3 - 1.5
K. Resistance to Grease, Fats & Oils	ASTM D-722	Excellent
L. Resistance to Acids & Alkalies	ASTM D-534	Excellent
M. Flammability	ASTM D-635	<5 secs, <5mm burn

DURA-PAC Is Represented By: