

# The Revolutionary DryVac Dewatering & Drying System



ENVIRONMENTAL SOLUTIONS

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**Organic and inorganic sludges and  
slurries dewatered and dried  
in one operation**



*Safe*      *Energy Efficient*      *Simple & Flexible*

**DES, inc.**  
Dehydration & Environmental Systems, Inc.

# DryVac – How it Works

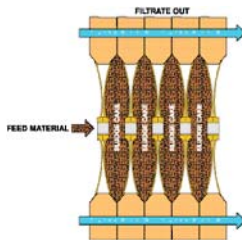
The DryVac technology provides a cost effective integrated process for dewatering and drying, handling organic and inorganic waste streams equally well. In a single operation involving two stages, the liquid waste is first dewatered and then dried. While the DryVac unit appears physically similar to standard plate filter presses, the actual plates are replaced by *DryVac Elastic Envelope Modules (DEEMs)*{patent pending}. These modules expand and contract according to pressure being applied either externally or internally.

**Stage One:** The dewatering takes place in a very similar way as with conventional plate presses; that is, conditioned sludge is pumped into the sludge chambers, which are lined with filter cloths, solids are retained in the press while liquids are forced out.

**Stage Two:** This is where the DryVac process differs from standard plate filtration presses. In the drying stage, low-pressure steam is used to inflate the DEEMs and at the same time, a vacuum is applied to the filtrate ports. During this process the cake is squeezed as the DEEMs inflate. The process applies heat to the filter cakes and the pulling of a vacuum on the filter chambers result in the remaining water being vaporized at low temperature. The walls of the expanding DEEMs remain in contact with the sludge ensuring effective heat transfer. By regulating the duration of the drying stage, the dry solids of the end product can be accurately controlled. Because the cake is much drier than with a conventional press, at the end of the drying cycle the solids drop out easier, leaving the DEEMs relatively clean.

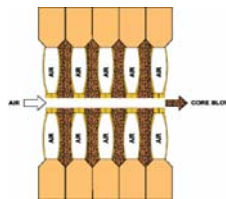
The process is energy efficient and allows wide flexibility of design when retrofitting existing presses. The DryVac systems are available in capacities ranging from 0.06m<sup>3</sup> to 20m<sup>3</sup> or more. The system is supplied in modular formats for ease of installation allowing maximum flexibility; fully mobile units are also available.

## The DryVac Dewatering and Drying Process



### Feed Cycle

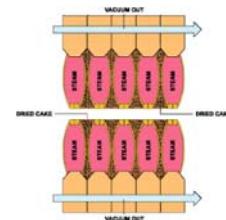
Conditioned sludge is fed into the chambers with the feed pump.



### Pressure and Air Blow Cycle

Pressurized air is introduced into the chamber to squeeze the cake.

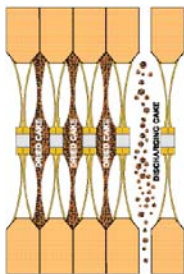
Pressurized air is blown through the cake to remove water.



### Drying Cycle

Steam is applied to the steam chamber.

Vacuum is drawn on the 'cake' via the filtrate ports.



### Discharge

Steam and vacuum are turned off and DEEMs{patent pending} deflate. Dry product drops out as the press is opened.

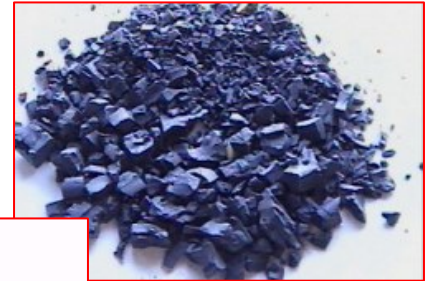
Materials can be tested  
at our main facility or  
by our mobile DryVac units;  
call for information

**Toll Free 1-800-992-9113**

# The Benefits

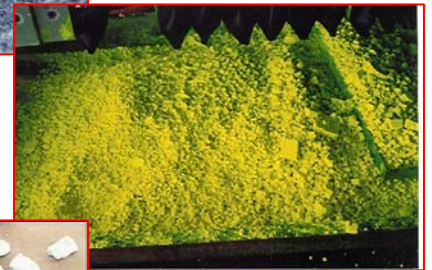
## SAFE

- Automated units are available
- Negligible odor emissions
- No explosive dust environment
- 1 BAR steam (15 PSI)



## ENERGY EFFICIENT

- Dewatering and thermal vacuum dehydration
- Combined effect of pressure, heat and vacuum
- Can make use of waste heat
- Excellent heat sink for CHP schemes



## SIMPLE & FLEXIBLE

- Surplus activated, primary or digested materials
- Variable feedstocks
- Dewateres to 20-40%
- Dry materials to 99%
- Low Maintenance
- Automated Operation
- Skid mounted if desired
- Modular Construction
- Retrofits to Existing presses

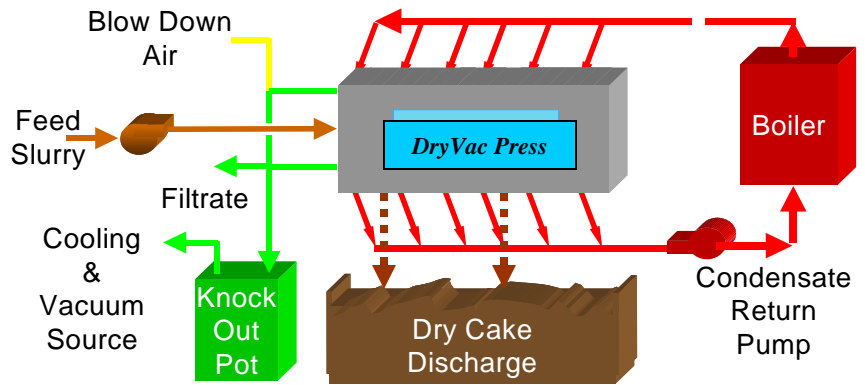


## The Possibilities

- Fuel sources
- Recovered products
- Reusable water
- Renewable materials
- Lower Disposal Costs



## Basic system Layout



## DryVac in Wastewater Treatment

There are DryVac installations worldwide with several plants in the USA in applications involving municipal wastewater treatment; other units worldwide are processing industrial bio-solids as well. In most of these applications, plants are typically fed with sludge ranging from 0.5% to 7% solids. The dewatering process typically requires chemical treatment.

The sludge is dewatered over 45 minutes to one-hour in the beginning of the process; this usually achieves a dryness of between 20-40% solids depending on materials and chemical pre-treatment. Low-pressure steam (120c) is then applied to the DEEM's{patent pending} as vacuum is applied to the filtrate ports, and the drying phase proceeds.

The remaining moisture is 'boiled off' in a process that can be halted at any time to achieve the desired moisture level. At the conclusion of the drying phase the DryVac equipment is opened up and the dried sludge drops to a conveyor or auger below.

### Summary of DryVac Advantages

- The process is virtually odorless.
- Low energy costs
- From a health and safety viewpoint the process is relatively simple with minimal risk.
- The potential to achieve higher dry solids means less cost of transport and disposal.
- Flexibility of disposal options.
- Excellent fit with waste to energy projects.
- Potential for Combined Heat and Power applications with DryVac providing an excellent heat sink.

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