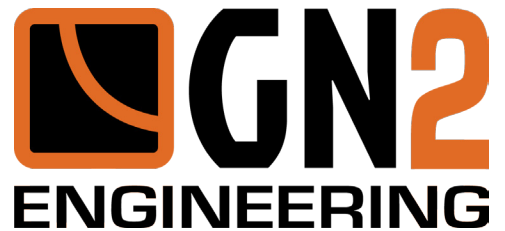




MFT Dredging Solutions



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- Pneuma s.r.l. is subsidiary of Dott. G. Isidoro & C. Group
 - 40+ years dredging experience for reclamation of polluted sediments and cleaning of very deep dams
 - 100+ machines in 30+ foreign countries
 - Technical support to analyze client needs and customize equipment
 - Albertan owned and operated company with a combined 80+ years of Oil Sands experience
 - 200+ KM of on site pipeline design
 - Tailings transfer system design including on pond assets
 - Process equipment / skid design
 - New technology development & implementation
 - Official Canadian distributor of Pneuma pumps and systems

The Pneuma Dredge Concept

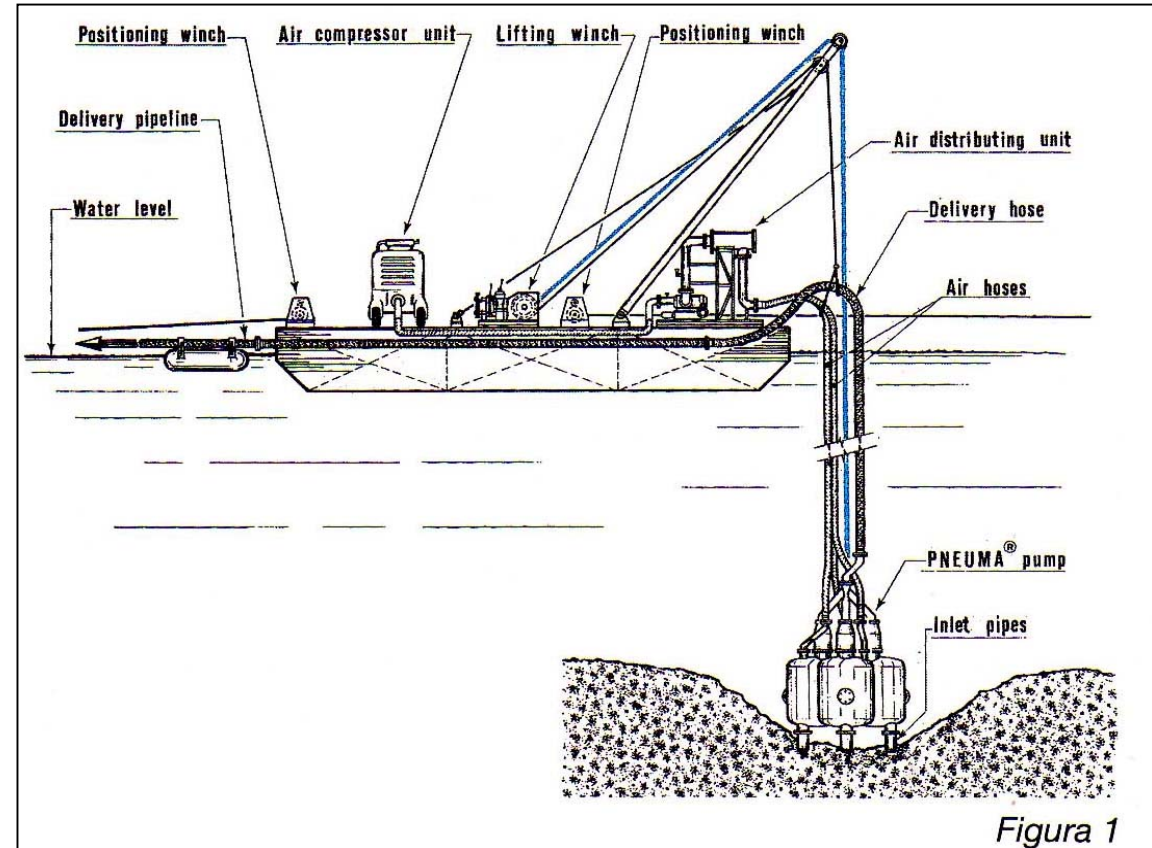
A three cylinder, positive displacement pump is placed in the material to be dredged

A distributor regulates the flow of compressed air that is used to drive the mixture to the delivery pipeline

Compressor station may be on barge or on shore

Winches raise and lower the pump assembly to the required depth, up to 100m

Per pump capacity up to 1800 m³/hr
(7924 GPM)



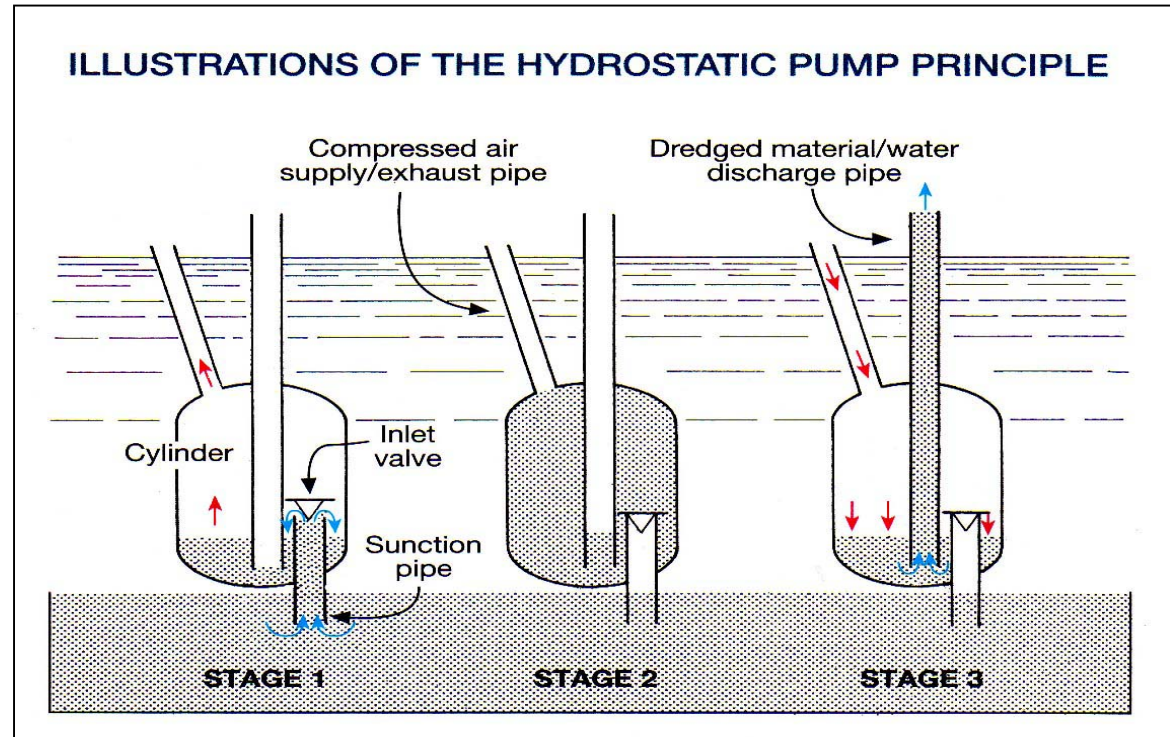
The Pneuma Work Cycle

Hydrostatic pressure fills the pump cylinder with the fluid

When filled the inlet valve closes and compressed air forces the fluid up the discharge pipe

When emptied, the air supply is closed and the cycle begins again

Multiple cylinders ensure uniform flow



The Pneuma Advantage

High solids content > 1.5 SG achievable

No cutter head = no contamination of MFT with water

Interrupted flow to each cylinder prevents coning of MFT

Wide dredging depth up to 100m

No internal rotating equipment

Debris tolerant design allows passage of large particles and self clearing

Customizable inlet configurations

Lower pump capacity and cost allows multiple deployment of dredges to provide system redundancy and reliability



Tested In MFT Service

In 2010 the Pneuma pump was tested on Pond 2/3 at Suncor Energy site in Fort McMurray.

MFT was delivered to shore at densities between 1.3 and 1.5 SG. From depths of 15 to 45 ft.

The 150/30 version of the Pneuma Pump was tested maximum flow rate of 180 m³/hr (792 USGPM).

Pneuma along with GN2 can provide the full range of Pneuma dredging systems designed and fabricated to Canadian Codes and Suncor requirements.



Dredging Comparison

Characteristic	Cutter Dredge	Pneuma Dredge
Per pump capacity	3000 m ³ /hr +	1800 m ³ /hr
Maximum dredging depth	15m	100m+
Coning prevention	Requires inlet modifications	Inherent
Maximum MFT S.G.	1.3 (typical)	1.5+
Barge Size	Large	Small
Fluid contamination	Significant	Negligible
Debris tolerance	low	Inherent
On Pond Equipment	Diesel Engine on board with Fuel line from Shore	Air Compressors on shore for maintenance and fueling

pneuma S.r.l.
Environmental reclamation and dams desilting

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GN2
ENGINEERING

We are ready to support your
MFT dredging needs

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