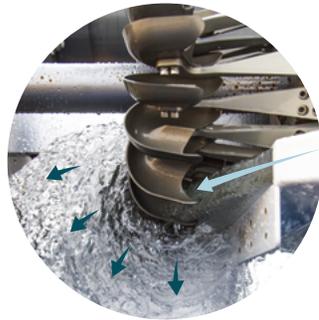
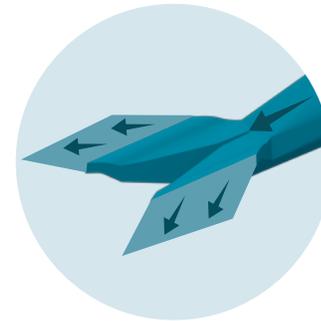


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Flow

After the high velocity water exits the nozzle, its momentum is captured by the buckets. Water exits with just enough velocity to cleanly exit the buckets. The buckets are designed with rounded edges to be fish friendly.

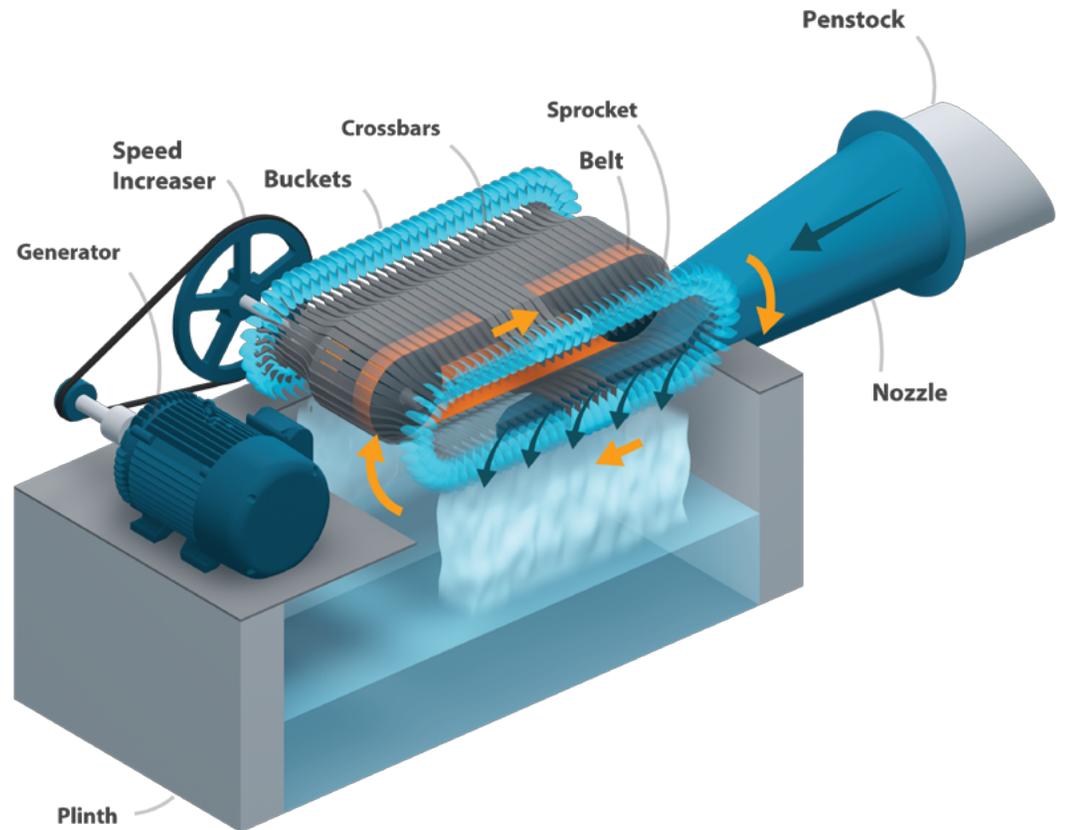
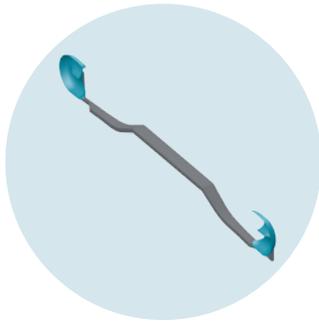


Nozzle

Water entering into the machine passes through the penstock and then a nozzle. The nozzle distributes the water along a linear array of buckets.

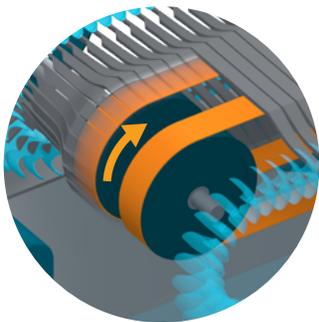
Buckets / Crossbars

After the water's momentum has been transferred to the buckets, force is delivered to the belt through a metal part called the crossbar. The buckets and crossbars are carefully designed to minimize rolling and pitching moments. This dramatically simplifies the crossbar to belt attachment.



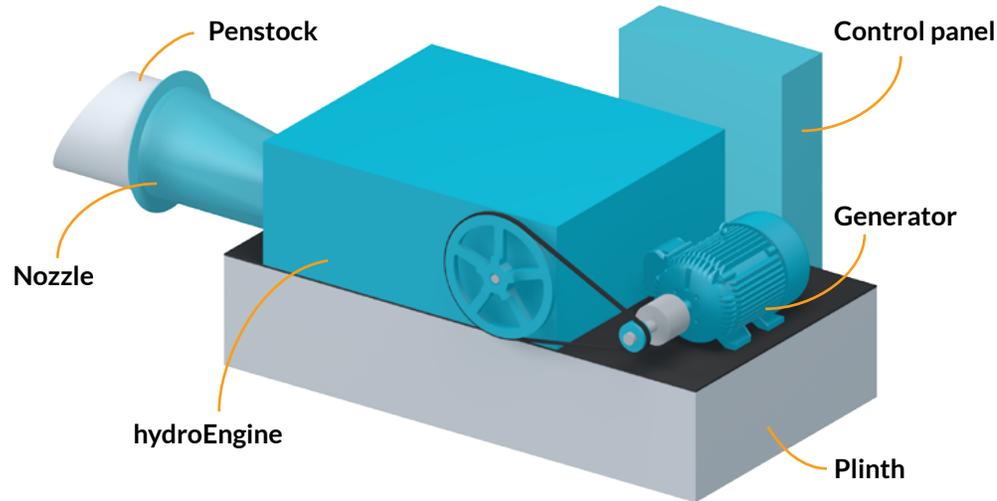
Belt / Sprocket

The machine's composite belts transfer force from the crossbars to the sprockets. The sprocket and the belt convert the machine's linear motion into rotary motion, which is then converted to electricity by a conventional generator.



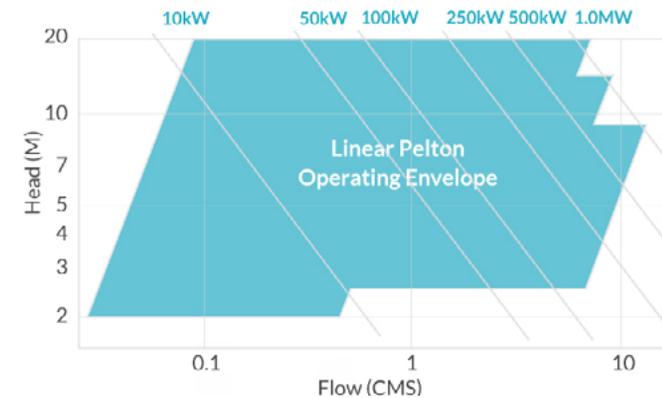
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Equipment included in the water-to-wire package



Operating envelope

Natel currently offers two basic configurations: a Fully Flooded model and a Linear Pelton model. See graphic below to explore flow and power rating for the Linear Pelton hydroEngine units.



ITEMS INCLUDED

Hydro-mechanical equipment

	Base hydroEngine	Water-to-wire Package
hydroEngine	•	•
Intake adapter	•	•
Inlet nozzle	•	•
Design guidance for outlet or plinth	•	•
Speed increaser (gearbox or belt drive)		•
Special assembly tools	•	•

Electrical equipment

Generator		•
Power Factor Correction (if required, and as specified, by customer)		•
Generator protection relay (as specified by customer)		•
Grid protection relay (as specified by customer)		•

Instrumentation and control equipment

Unit SCADA control system (hardware and software)	•	•
Integrated Sensors:		
- hydroEngine shaft speed	•	•
- Nozzle flow control	•	•
- Powertrain health	•	•
- Generator output		•
- Water levels (upper and lower pools)		•

ITEMS NOT INCLUDED

All other related balance of plant designs, hardware, and civil works are not part of Natel's scope of supply, including, but not limited to, the following:

- Intake and bypass gates
- Trash rack or screen
- Power house
- Plinth
- Plant wiring
- Transformers and utility interconnection hardware