

TECHNOLOGY INFORMATION SHEET

VETT-in-a-Box (VBox)

VETT-in-a-Box's low-cost design centres on VerdErg's innovative and patented use of the Venturi effect for hydropower sites of up to 5m head. The Venturi effect acts like a pressure amplifier to increase the pressure differential across a turbine.

Instead of providing the turbine with a large volume of water at low pressure, the VETT system provides the turbine with a smaller water volume but at a higher pressure by passing the majority of the flow through a Venturi pipe. The large Venturi pipe does not contain moving parts and is fish friendly.

PLUG & PLAY INSTALLATION OPTIONS TO MEET YOUR SITE NEEDS

To minimise civil works for smaller low-head hydropower sites, VETT-in-a-Box houses all mechanical and electrical equipment in a prefabricated, pressurised duct, rather than an open tank. This means excavation and concrete works are significantly reduced.

VETT-in-a-Box can be installed in shallow excavations, just deep enough to ensure the outfall is submerged whilst angling the installation from upstream to downstream. Offsite fabrication reduces time on-site and the risk of costly delays. All M&E equipment is delivered on a structural skid which is lifted into the VBox onto a pre-assembled frame. The VBox is connected via standard pipe flanges, further simplifying the installation. A dry generator positioned outside of the VBox reduces installation and maintenance costs further.

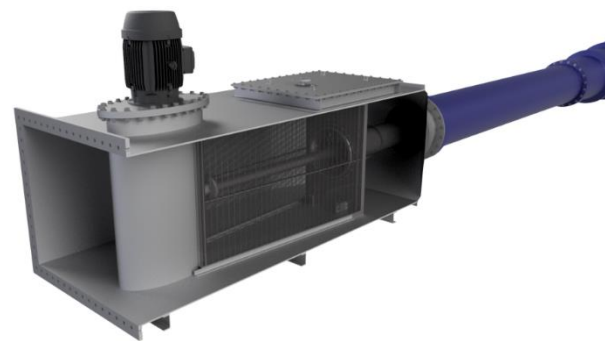


Figure 1: VETT-in-a-Box system

ANGLED DOWNSTREAM

VETT-in-a-Box can be installed directly on a bank, at an angle, with the downstream system lower than the upstream water level and turbine. The main duct is above the water when shut down. The unit shown here has an upstream sluice gate. The whole unit can be built into an excavation to avoid visual interference.

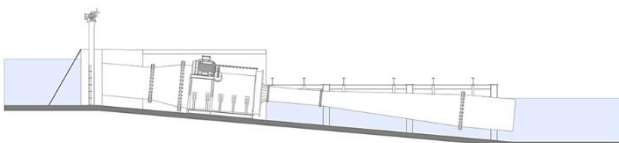


Figure 2: VETT-in-a-Box installed at a downwards angle, in bank, for example

SIPHONED INTAKE

This visual shows a siphoned intake with simple debris screen. The intake goes over a pre-existing structure, such as a weir or riverbank, with no need to break into it, reducing excavation costs.

An air pump creates a natural siphon to draw water into the system.

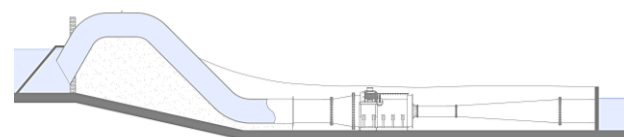


Figure 3: Siphonic installation of VETT-in-a-Box

POWERING OFF-GRIDS, MINI-GRIDS, OR THE NATIONAL GRIDS

VETT-in-a-Box produced energy can be consumed directly off-grid such as by battery storage units, or it can be connected to consumers like domestic homes, enterprises or farms. It can power whole communities through decentralised mini grids, or VETT-in-a-Box can operate grid connected.

The technology allows for a locally distributed energy supply model to be realised, reducing transmission losses and the impact of local grid failures. Its predictable, reliable operation makes it an ideal partner for grids connected to variable wind or solar power.

VETT-in-a-Box technology can help build sustainable economies by offering economic support through low-cost reliable energy with an operational life of 120 years.

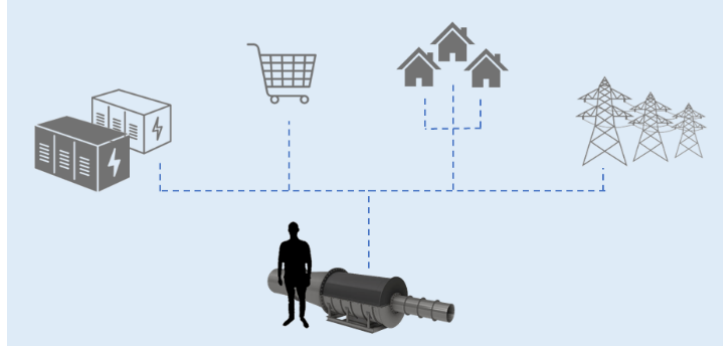


Figure 4: Electricity produced by a VETT-in-a-Box can be consumed off-grid, through mini-grids or it can operate grid connected.

OPERATING RANGE & POWER

VETT-in-a-Box can be deployed at sites with up to 5m of head and each unit can take up to 2.7m³/s (multiple units can be installed in parallel). To reduce costs, VETT-in-a-Box is configured with standard pipe sizes and off-the-shelf components. This reduces design time and project development costs. Various model sizes are available which cover a wide operating range.

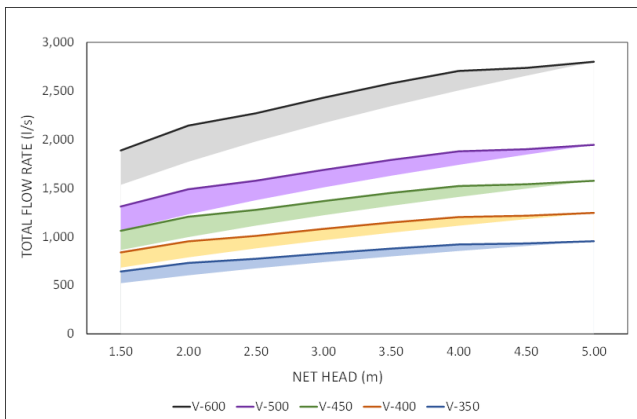


Figure 5: Head and Flow of VETT-in-a-Box units

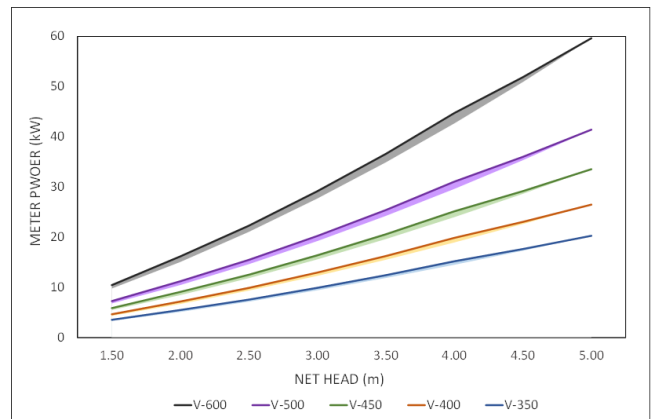


Figure 6: Head and Power of VETT-in-a-Box units

EFFICIENT OPERATION

- High speed turbine without gearbox
- Zero noise or visual pollution
- Remote operation and monitoring
- Reduced service complexity

RELIABLE DESIGN

- Standardised design and components
- Reduced components list
- Flexible supply chain
- Proven 'off-the-shelf' components