CORNELL PUMP COMPANY HYDROTURBINES HARNESS THE POWER OF EXCESS HEAD

Soloctric



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HARNESS THE POWER OF EXCESS HEAD

Industries, municipalities, HVAC systems, and farms are discovering the potential of utilizing excess head to generate electricity and reduce energy consumption. Using turbines driven by this extra head can generate power for various applications, such as driving pumps or generators. This technology enables cities, farmers, resorts, industrial plants, and buildings to incorporate hydro turbines into their power systems.

EFFICIENT AND LOW-MAINTENANCE DESIGN

You don't need a fast-flowing river to benefit from Cornell's hydro turbines. Even with low heads as low as 50 feet and flows as low as 90 gallons per minute, usable energy can be produced. Cornell's turbines offer high efficiency comparable to specially-built imported turbines but with more straightforward installation and reduced maintenance requirements. With various configurations and mounting styles available, Cornell's turbines are versatile and designed for optimal performance.

EXPERT SUPPORT FROM CORNELL

Cornell's commitment to performance is backed by actual tests conducted by professional engineers in their advanced hydraulic lab. Their engineers and sales staff are ready to provide specialized assistance in selecting and applying the suitable hydro turbine for your needs. Whether your requirements call for series or parallel turbines or a single unit, Cornell is here to guide you in choosing the perfect hydro turbine solution.

TYPICAL CONFIGURATIONS

GENERATOR TYPES

INDUCTION

The generator must be connected to an existing power grid. The speed is controlled by being connected to the grid, the same way motor speed is maintained. It requires an automatic disconnect from the grid when grid power fails.

SYNCHRONOUS

The generator is stand-alone. It can be used where there is no electrical grid nearby. It requires a load controller (not provided by Cornell) to maintain standard speed, voltage, and phase.

PRESSURE SURGE (WATER HAMMER) PROTECTION

A reaction turbine speeds up during grid power loss and the flow drops. The magnitude of the flow depends on the turbine's design and operating conditions. The flow change may occur rapidly and can cause a pressure surge (water hammer) that is strong enough to damage or destroy the turbine and piping. The pressure surge can be reduced by:

- Adding mass in the form of a flywheel
- Installing a quick opening bypass valve in parallel with the turbine

A municipal installation of a 6TR2 using control valves on the turbine lines to throttle the water pressure and regulate power generation.

CONTROLS

Hydro turbines need to be equipped with a control valve at the inlet of the turbine. This valve serves as an isolation device and can be used to control the head and flow through the turbine. The controls should include speed measuring devices. The control system should be designed so that during normal operation electrical contact is made or broken at or near the generator nominal (no load) speed. When power fails, the control system must break the electrical contact and close the inlet valve. It is advisable to contact your utility to determine if there are any special requirements.



STANDARD TURBINE CONSTRUCTION					
Turbine	Cast Iron, Bronze fitted is standard.				
Body	Ductile Iron, Steel, Bronze, or Stainless				
	Steel models also available.				
Seal	Mechanical shaft seal is standard,				
	packing is optional.				
Generator	Standard ODP generator-optional TEFC.				





CLOSE-COUPLED, DOUBLE ENDED

This assembly allows the turbine to reduce a pumping load. The pump and turbine share a typical motor, with the turbine on one end and the pump on the other. Both are close-coupled, with all the features to suit a unique installation and are especially suited to HVAC installations.





CLOSE-COUPLED

A close-coupled design is the simplest of assemblies. There is no coupling to align, and it saves space. Available only with induction generators.

FRAME-MOUNTED WITH GENERATOR

A frame-mounted turbine can be coupled to a generator and assembled on a fabricated steel base.







SIDE-BY-SIDE BELT DRIVE

When space does not allow for a standard frame mount unit, it may be possible to belt drive the generator.

CLOSE-COUPLED VERTICAL WITH CUSTOM DRAFT TUBE

For added space saving or simplicity of manifolding, close-coupled, vertical mount with custom draft tube (available less draft tube for manifold discharge mounting).



FRAME MOUNT DRIVING A PUMP

Especially useful when a low-head, high-flow water source is available to provide power for a pump moving water to a higher elevation.





CLOSE-COUPLED VERTICAL WITH BASE ELBOW

A vertical unit may be the best option when floor space is at a premium.

HYDRO TURBINE DATA WORKSHEET (for Preliminary Evaluation)										
PROJECT NAME										
CONTACT NAME										
ADDRESS										
PHONE										
EMAIL										
SITE INFORMATION										
WATER SOURCE	STREAM RESERVOIR (USES ENTIRE SYSTEM HEAD)									
GROSS HEAD (STATIC)		NET HEAD (INCLUDES FRICTION LOSS)		AVAILABLE FLOW						
PENSTOCK DIAMETER			PENSTOCK LENGTH							
PRESSURIZED SYS	TEM (PRESSURE REE	DUCTION)								
INLET PRESSURE		OUTLET PRESSURE REQUIRED		DESIGN FLOW						
ELECTRICAL CHARACTERISTICS										
MOTOR TYPE	INDUCTION (GRID INTERFACE)			ODP						
	SYNCHRONOUS (STAND-ALONE)			TEFC						
VOLTAGE		PHASE	THREE SINGLE	CYCLES (HERTZ)	60 HZ 50HZ					

Complete this form online at **www.cornellpump.com/hydro-turbine-worksheet** for evaluation by Cornell staff.



Two units in parallel between an inlet manifold above and outlet manifold below.



TURBINE SELECTION CHART - 1200 RPM

CORNELL PUMP COMPANY MARKET & PRODUCT LINE



AGRICULTURE	FOOD PROCESS	INDUSTRIAL	MINING	MUNICIPALITIES	WATER TRANSFER	REFRIGERATION	CONSTRUCTION
SLURRY PUMPS	SLURRY SM	MANURE PUMPS	CUTTERPUMPS	SELF PRIMING	CLEAR LIQUID PUMPS	MX SERIES	N SERIES PUMPS
VT SERIES	EDGE™	HYDRAULIC SUBS	IMMERSIBLE	CD4MCU	RUN-DRY™	PRIMING SYSTEMS	CYCLOSEAL®

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Cornell pumps and products are the subject of one or more of the following U.S. and foreign patents:

6,074,554; 6,036,434; 6,079,958; 6,309,169; 6,104,949.

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