

**N66V4-72 THERMAL EVAPORATOR**



**N66V4-72  
ENCON Thermal  
Evaporator**

- Handles Different Wastewater Streams Simultaneously
- Dramatically Reduces Disposal Volume and Cost
- Eliminates Need to Discharge Wastewater
- Dramatically Reduces Disposal Volume and Cost

ENCON Thermal Evaporators and Distillation Systems are engineered to provide you with an effective and economical method of wastewater minimization. All ENCON systems are assembled with the highest quality components, ensuring years of trouble free operation.

Our unique heat exchanger design provides extremely efficient heat transfer, resulting in reduced fuel costs.

Key to the effectiveness of ENCON evaporation systems is the mist eliminator. This feature of the ENCON design captures unwanted contaminants before exhausting, thus enabling you to comply with today's stringent emissions regulations (evaporation) or to return high quality water to your process (distillation).

**Model Number Nomenclature**

- N** Heat source, in this case Natural Gas
- 6** Tank material of construction, in this case 6% Molybdenum
- 6** Heat exchanger material of construction, in this case 6% Molybdenum
- V4** System controls, in this case Koyo Click PLC & Automation Direct C-more HMI
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- 72** System evaporation rate based on tap water, in this case 72 GPH

**Put our Engineering and Regulatory Expertise to Work for You!**

ENCON Evaporators provides the following services relative to evaporation/distillation projects:

- Free Wastewater qualification analysis to ensure application feasibility
- Regulatory compliance and paperwork
- System design and compliance for hazardous applications
- PLC Programming to optimize system automation
- Closed loop recycling evaluation and analysis



<b>PHYSICAL</b>	
Dimensions (L x W x H):	112" x 57" x 86" (system) / 120" x 62" x 95" (crated system)
Weight (Empty):	2200 lb (system) / 2500 lb (crated system)
Exhaust Blower Outlet Diameter:	6"
Exhaust Stack Diameter:	8"
Exhaust Blower:	1200 CFM, 1-1/2 HP, 1725 RPM
Evaporator Feed Connection:	1" FNPT
Evaporator Residue Connection:	6" Flanged Cap with 1-1/2" FNPT coupling
Heat Exchanger:	Elevated with Cylindrical Firing Chamber
Tank Capacity:	342 gallons @ Low Level, 425 gallons @ Auto Level, 475 gallons @ High Level

<b>UTILITIES</b>	
Burner Type:	Direct Spark Ignition with FM Gas Train
Total System Throughput:	780,000 Btu/hr
Gas Supply Pressure (Dynamic):	7-14" of Natural Gas (dynamic while burner(s) are running)
Gas Connection:	1-1/4" FNPT (Manifold)
Electrical Requirements:	110 VAC, 1 PH, 60 Hz

<b>FABRICATION</b>	
Tank:	6% Molybdenum, 14 ga
Heat Exchanger:	6% Molybdenum, 11 ga
Mist Eliminator Pad:	316L Stainless Steel
Skins and Lids:	Polished 304 Stainless Steel, 18 ga
Insulation:	All 6 sides, rated to 450F, R = 4.3

<b>CONTROLS</b>	
Burner Controller:	Spark Ignition, loss of airflow shutdown
Temperature Controls:	Type J Thermocouples with 4-20 mA analog input
	Monitoring of liquid and heater temperature
Control Inputs:	Frequency Shift Level Probes and Exhaust Fan Proving Switch
	Redundant Low Level Shut-off
Remote Connection:	Ethernet port for direct connection by ENCON Engineers
Control Panel:	UL Listed, NEMA 4, PLC Control Panel
	7" widescreen touch panel Human Machine Interface (HMI)
	Main power selector switch and indicator lights for main power, heater(s) and alarms
	Full data logging, alarm management, and trend screens

<b>QUALITY</b>	
Pressure Test:	Pressure leak test performed on every heat exchanger
Leak Test:	Dye penetrant test performed on tank welds
I/O Simulation:	All I/O and controls are fully tested to ensure accuracy/functionality
Warranty:	Two Years for Parts and Workmanship Issues

Specifications subject to change without notice.

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### V4 Integrated Control and Monitoring System

NEMA 4 PLC control panel with touch screen display provides advanced monitoring of liquid and heater temperatures, water level, cycle time, pump, valve & heater status as well as continuous probe diagnostics. Offers data logging, alarm management, trend analysis, the ability for remote access through browser or app, as well as control system integration through Modbus TCP/IP.

### 7" Widescreen Touch Panel

The large 7" touchscreen combined with a completely redesigned HMI offers unparalleled control of every aspect of the evaporation process while being completely intuitive for daily operation.



### Evaporator Safety

Critical components are operated by the control circuit through the PLC with appropriate control interlocks. The safety circuit monitors all Emergency STOP conditions. The control circuit is interrupted by the safety circuit which includes a safety relay (with force guided contacts) and a redundant contactor setup.



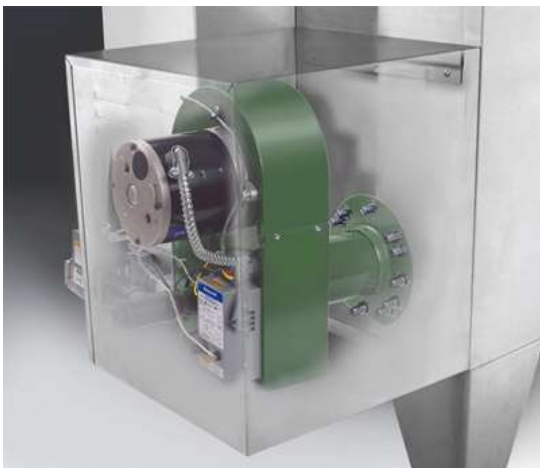
### Level Sensing

Tuning fork level probes provide reliable auto-filling and shutdown operations even in conditions of severe foam. The durable level probes are made of stainless steel for excellent corrosion resistance. Hastelloy level probes are available for highly corrosive applications.



### **Mist Eliminator System**

The stainless mesh filter is designed for easy removal from its compression fit housing. The system is monitored for contaminant loading and airflow, which is interlaced to the control panel for maximum operator feedback.



### **Forced Draft Burner**

Each gas or propane fired system consists of a burner with an integrated blower, that along with the induction from the exhaust blower, supplies make-up air for combustion. It also includes: burner controller(s), gas pressure gauge, airflow detection and lockout, spark ignition, and a redundant main valve and burner contactors for maximum safety. FM gas trains and gas flow transmitters are standard on systems 96gph and larger. The stainless steel burner protection shroud is mounted on a track hanger for ease of removal and reattachment. Other combustion heat sources such as oil, diesel and waste oil are available. Non-combustion heat sources such as electricity, steam and waste heat are also offered.

### **Blower System**

Thermal 72 gallon per hour units and smaller use a 1725 RPM, TEFC motor with class B insulation rated for high temperatures. The unit's design provides extremely quiet operation and as much as three times the longevity of 3450 RPM motors. Heavy gauge aluminum blower provides durability and longevity. Larger units use variable frequency drive motors, which maximize motor longevity by allow adjustment from 1750 to 3450 RPM.



### **Cleanout Flange**

Large 6 inch cleanout with flange cover and a 1 ½" NPT fitting for pump connection and ease of residue removal.

## **PROCESS DESCRIPTION OF NATURAL GAS FIRED ENCON EVAPORATORS**

1. Wastewater is collected in a holding tank, sump or pit upstream of the evaporator.
2. Water is either pumped or gravity fed into the evaporator through a 1" NPT fitting on lid.
3. The evaporator is equipped, as standard, with three level probes:
  - a) The Low Level Probe acts as a safety to protect the heat exchanger(s) from uncovering.
  - b) The Auto Level Probe controls water level in the tank and the burner(s) operation (on/off) when in Auto Run Mode.
  - c) The High Level Probe acts as a redundancy to the Auto Level Probe.
4. Upon initiation of Auto Run Mode, wastewater water will flow into the evaporator tank. The wastewater feed will stop and the burner(s) will enable when the Auto Level Probe is covered.
5. Once the fluid comes to a boil and the evaporation process begins, the liquid level in the evaporator will begin to fall. The feed/refill sequence will activate a set amount of time after the Auto Level Probe is uncovered. When the feed cycle is initiated, fresh wastewater will be fed into the evaporator until the fluid reaches the Auto Level Probe.
6. When activated, the burner(s) will fire into the combustion area of the heat exchanger. The hot gases travel around the vertical tubes inside the heat exchanger until they reach the insulated chimney outside the evaporator tank. If the customer has chosen an Evaporation Unit (vent to atmosphere), the hot gases are pulled back into the Evaporator above the liquid level and drawn across the water's surface by the exhaust blower. The exhaust blower pulls the combined water vapor and flue gases through the mist eliminator and pushes them through the stack to the outside of the building.
7. As long as there is wastewater available to the evaporator, this process will continue until either the fluid temperature reaches the target endpoint temperature or the cycle timer counts down to zero. If the feed tank level probe detects a low level condition, the evaporator will de-energize the burner(s) and wait for the feed tank level to recover.
8. The concentrated fluid is purged from the evaporator, after which a new evaporation cycle may commence

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