LUFRAN Ultra Pure Water Heater

by PROCESS TECHNOLOGY

LUFRAN UPDI HEATER SPECIFICATIONS

HEATER	Patented resistive heating system
SIZES	24 kW to 260 kW standard.
VOLTAGES	Up to 600 volt (three phase) available, 50/60 Hz
TEMPERATURE LIMIT	95° C, depending on operating conditions
TEMPERATURE ACCURACY	+/-.3° C, depending on operating conditions
FLOW RATE	1 LPM (.25 GPM) to 200 LPM (50 GPM)
EFFICIENCY	> 99%
PRESSURE RATING	100 PSIG (689 kPa) maximum operating
MTBF	9.39 years > 99% uptime
TEMPERATURE REGULATING SYSTEM	Distributive zero crossing SSR switched by PLC based DAC™ "Demand Anticipation Control" software
TEMPERATURE SENSORS	"J" type thermocouple (process), "E" type (element over-temperature), or customer specified
HEATING ELEMENT	Patented design utilizing a precision resistance wire, 15 w/in² (2 w/cm²) watt density
WETTED SURFACES	• Heating elements: continuous virgin PTFE Polytetrafluoroethylene (82%) • Chamber and plumbing: PVDF Polyvinylidine Fluoride (18%) • Chemraz® o-rings • No wetted metal or coated metal parts
ELEMENT GAS PURGE	Removes permeation to extend element life expectancy. Monitors integrity of element tubing.
EXHAUST VENTILATION	Not required
STANDARD FEATURES	• DAC™ "Demand Anticipation Control" (run by a PLC) • EMO circuit (local and remote) • Ground fault protection (GFP) • Fused 24 VDC control circuitry • CE, ETL, and Semi S2/S3 compliant • Disconnect • Data logging • Remote interface • Powder coated cabinet with sump leak detection • Capacitive liquid level sensor for element protection • Heater over-temperature circuit with independent limit control • Humidity monitor to verify element tubing integrity • Purge flow switch to verify element purge • System pressure monitor • Process high temperature alarm • PVDF mechanical pressure relief valve set @ 100 PSIG (689.5 kPa)
OPTIONS	• Custom communication protocol (Ethernet, DeviceNet, RS232, RS485, Mod Bus., etc.) • Color touch screen • Expanded remote interface signals • Digital resistivity monitor • Remote flow monitor signal • Extended warranty

DAC™ (Demand Anticipation Control):

- **Extremely precise temperature control and stability**: Utilizes a patented temperature/flow algorithm to calculate exact heater output requirements. Calculates and compares:
  - Required percentage power.
  - Inlet fluid temperature.
  - Outlet fluid temperature.
  - Flow rate.
  - Actual power applied.
  - Low temperature boost.
  - High temperature shut-off.
- **Quick reacting**: Responds instantly to flow changes rather than simply monitoring outlet temperature.
- **Better temperature stability**: Responds quickly to recipe (flow and temperature) changes.
- **Water conservation**: Faster heat up and recovery means less water usage.
- **Friendly operator interface** (User friendly HMI): Touch pad display with easy to understand commands.

FEATURES and BENEFITS

- **Outstanding MTBF**: Documented, real-world "mean time between failures" of nearly **10 YEARS**!
- **Fast response**: Heating elements are in direct contact with the DI water for maximum efficiency and fast response.
- **Non-contaminating**: Minimum amount of exposed surface area. Class 100 cleanroom assembled.
- **Sizes for any application**: 24 kW to 260 kW standard. Heaters can be utilized in combination.
- **Safe operation**: Redundant safety features ensure long, trouble-free life.
- **Able to handle difficult applications**: Capable of temperatures up to 95° C and pressures up to 100 PSIG at essentially any flow rate.
- **Better by design**: More responsive than steam systems. Significantly lower maintenance costs and higher efficiency than infrared systems. Field proven reliability.
- **Compact configuration**: Space-conscious design minimizes footprint requirements.
- **Maximized uptimes**: Uptimes of greater than 99% can be expected.
- **Easy tool interface**: Easy integration with existing tools with a variety of interface options.
- **Proven power switch gear**: Solid state relays standard.
- **Monitored heater integrity**: Patented heater purge ensures heater integrity and longevity.
- **Heater expertise you can trust**: Thousands of heater installations worldwide. Experienced engineering and worldwide field service support.

SIZING

To determine wattage required, use one of the following equations:

(△°C X LPM) ÷ 14.318 = kW

(△°C X GPM) ÷ 3.784 = kW

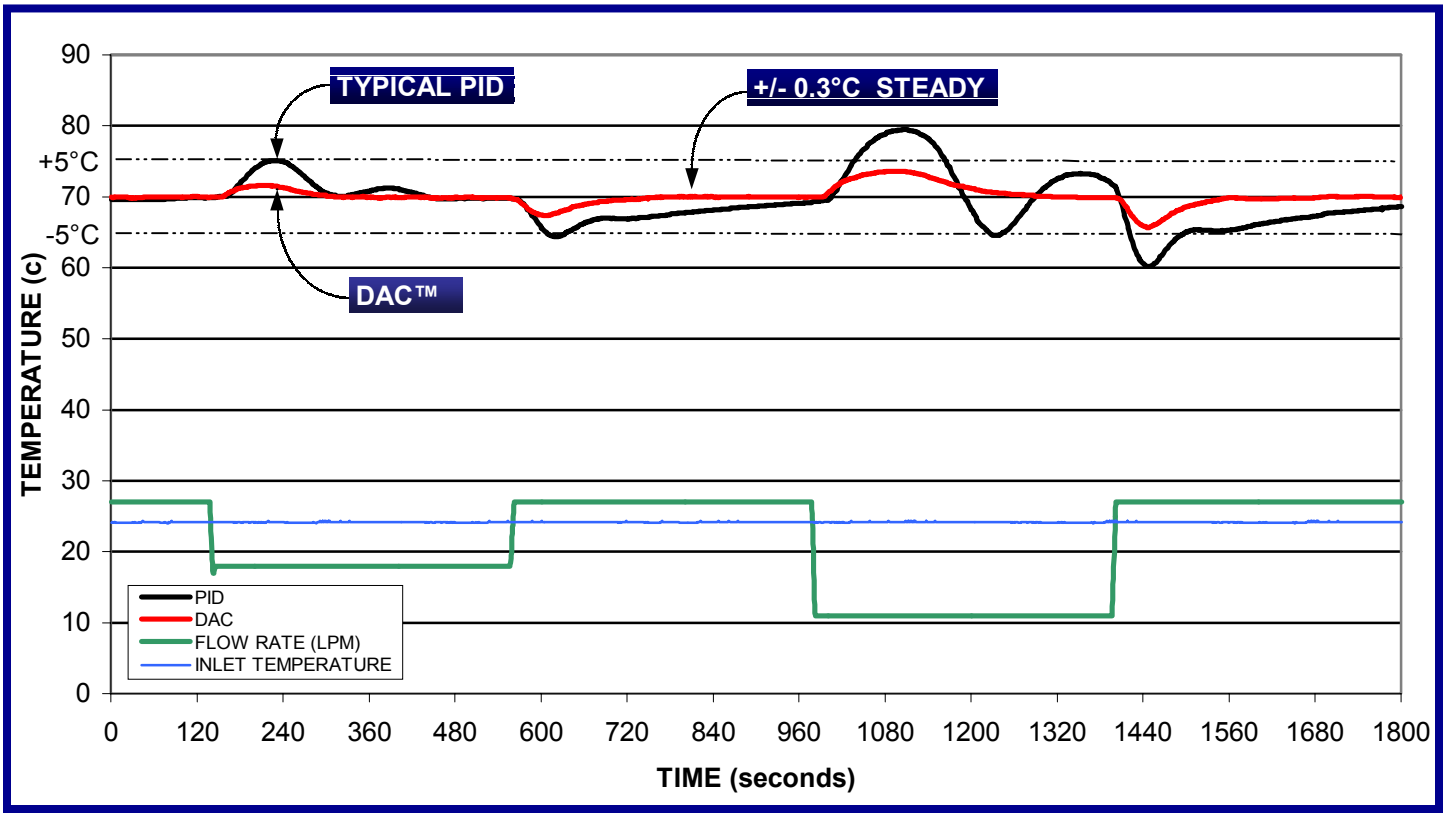
(△°F X GPM) ÷ 6.81 = kW

Example: $\frac{55° \text{ C} \times 15 \text{ LPM}}{14.318} = 65 \text{ kW}$

55°C temperature rise (delta) x 15 liters per minute divided by 14.318 = 65,000 watts

CONSULT OUR FACTORY FOR DETAILED SIZING INFORMATION AND APPLICATION ASSISTANCE

DAC™ Control Compared to Typical PID Control:



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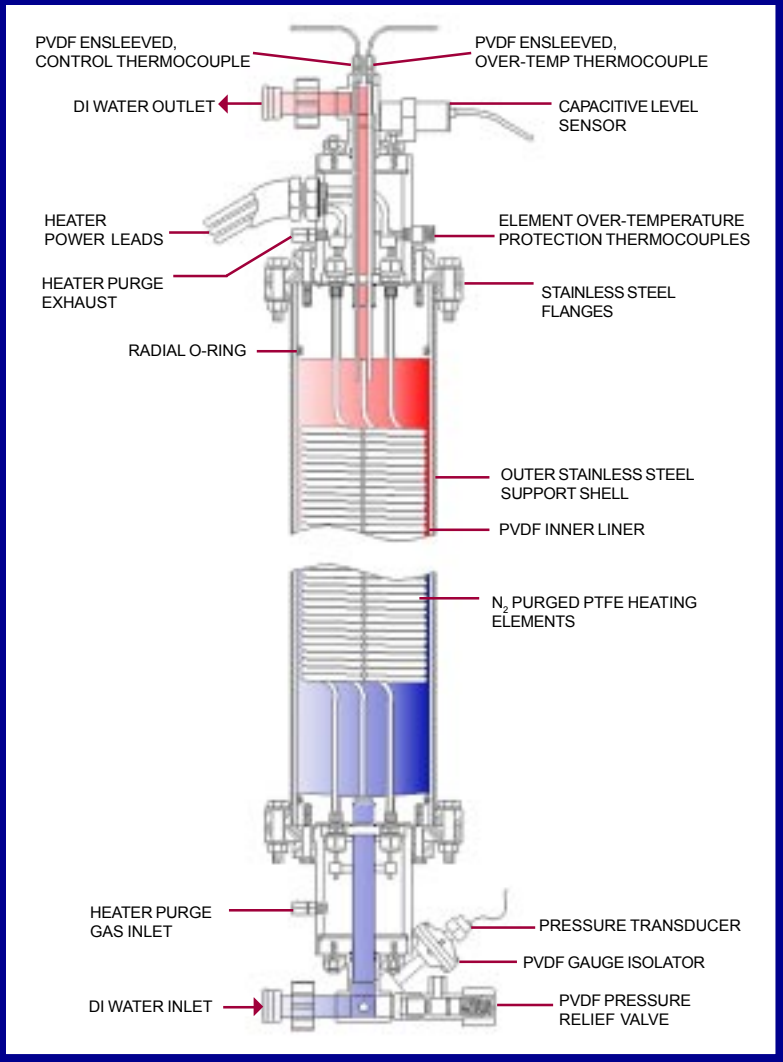

HEATER SELECTION MATRIX (by standard heater sizes)

	TEMPERATURE DIFFERENTIAL (RISE) , degrees C / F								
FLOW RATE, LPM / GPM	35 / 63	40 / 72	45 / 81	50 / 90	55 / 99	60 / 108	65 / 117	70 / 126	75 / 135
5 / 1.3	024	024	024	024	024	024	024	036	036
10 / 2.6	036	036	036	036	052	052	052	052	052
15 / 3.9	036	052	052	052	065	065	072	105	105
20 / 5.3	052	065	065	072	105	105	105	105	105
25 / 6.6	065	072	105	105	105	105	130	130	144
30 / 7.9	105	105	105	105	130	130	144	210	210
35 / 9.2	105	105	130	130	144	210	210	210	210
40 / 10.6	105	130	130	144	210	210	210	210	210
45 / 11.9	130	130	144	210	210	210	210	260	260
50 / 13.2	130	144	210	210	210	210	260	260	260
55 / 14.5	144	210	210	210	210	260	260	*	*
60 / 15.8	210	210	210	210	260	260	*	*	*

*** consult factory**