

# PROCESS TECHNOLOGY

## Constant Temperature Bath Systems

SB Series, Super Bowl™ • RB Series, Reflux Bath • NE Series, Nitran™ Bath

Process Technology constant temperature bath systems are designed for the most demanding heated chemical requirements. These versatile baths can be configured to fit almost any process or application such as: SC1, SC2, HF, BOE, KOH, nitride etch, and sulfuric acid. Durable fluoropolymer construction provides reliability and longevity, with minimal maintenance. The bath systems are available with Process Technology's immersion heaters and/or in-line heaters, and a wide variety of process control options.

### COMMON SPECIFICATIONS FOR ALL BATH SYSTEMS:

**Service:** PFA process bath for virtually any wet chemistry application.

**Tank Sizes:** Range from one 4" (100mm) cassette to two 12" (300mm) cassettes.

#### Standard Features:

- Unbreakable PFA tank
- PTFE immersion heater with patented N<sub>2</sub> purge (see immersion heater brochure)
  - Typically sized for 30 to 45 minute heat up
- Temperature control module
  - +/- 1° C control
  - Membrane style switch panel with countdown process timer
  - Separate power module
- PTFE covered "J" type thermocouples for process and over-temperature control
- Capacitive style liquid level control
- Nitrogen purge flow regulator panel (see immersion heater brochure)
  - Flow regulator
  - Flow meter
  - Back pressure switch



NE tank with condensing head and fume bezel.

#### Safety Features:

- Capacitive style liquid level control
- Process over-temperature alarm
- Heater element over-temperature alarm
- Heater purge pressure monitor and alarm

#### Options:

- Fume bezel
- Lid: manual, hydraulic or pneumatic
- Tank integration into existing control system
- PLC temperature control/CE compliant temperature control
- Custom interfacing to match existing system
- Sparger plate and sparger regulator module
- In-line heater (fluoropolymer or quartz available)
- In-line filter chamber
- Chiller system
- Drain connection and drain valve
- Custom fitting of tank to match existing system

**Temperature Range:** Up to 180° C chemistry

**Heater Voltages Available:** 120 to 600 volts, single or three phase

**Warranty:** One year

## FEATURES AND BENEFITS FOR ALL BATH SYSTEMS:

**Improved process results:** Direct immersion heating/cooling results in faster heat up and improved recovery rates.

**Easy heater replacement:** If you choose PTFE immersion heaters they are easily replaced without replacing the entire tank assembly. (When an externally bonded heater on a quartz tank fails you must remove the entire tank and return it to the manufacturer.)

**Reduced cost of ownership (COO):** Durable PFA construction lasts longer than comparable quartz tanks and also eliminates the need for keeping expensive spare quartz tanks in stock. Purged PTFE heaters last much longer than comparable quartz tank heaters.

**Long heater life and clean operating:** Patented heater gas purge system continuously sweeps clean any chemical permeation and ensures exceptionally long element life. This system also protects against any potential ionic contamination of the chemistry.

**Reduced downtime (MTTR):** Not necessary to spend the time and expense of sending quartz tanks back to the manufacturer for repair/replacement.

**Rapid installation:** Systems are sized to closely match existing quartz tanks for easy retrofitting.

**Outstanding chemical compatibility:** All wetted parts are fluoropolymer and compatible with virtually any chemistry.

**Excellent temperature stability and uniformity:** The immersion heater occupies the entire bottom of the tank minimizing temperature gradients.

**Unlimited process options:** PFA and PTFE are compatible with virtually any chemistry (unlike quartz tanks).

## SB Series, Super Bowl™

### SB Series Applications:

- SC1 (ammonium hydroxide and hydrogen peroxide)
- SC2 (hydrochloric acid and hydrogen peroxide)
- Buffered oxide etch (BOE) process (hydrofluoric acid and ammonium fluoride)
- Piranha bath (sulfuric acid and hydrogen peroxide)
- Various acids such as:
  - Hydrochloric (HCL)
  - Hydrofluoric (HF)
  - Acetic (CH<sub>3</sub>COOH)
  - Nitric (HNO<sub>3</sub>)
  - Sulfuric (H<sub>2</sub>SO<sub>4</sub>)
  - DI O<sub>3</sub> (DI water with ozone)

<b>SB SERIES, SUPER BOWL BATH*</b>				
MODEL NUMBER	CARRIER	TOP INSIDE	BOTTOM INSIDE	DEPTH
		LENGTH x WIDTH In./(mm)	LENGTH x WIDTH In./(mm)	
SB3	(2) 3" (75mm)	10.0 x 8.0 (254 x 203mm)	9.1 x 7.1 (231 x 180mm)	6.6 (168mm)
SB41	(1) 4" (100mm)	8.4 x 5.9 (213 x 150mm)	7.6 x 5.0 (193 x 127mm)	7.8 (198mm)
SB4	(2) 4" (100mm)	11.4 x 9.5 (290 x 241mm)	10.6 x 8.7 (269 x 221mm)	7.6 (193mm)
SB4N	(2) 4" (100mm)	12.1 x 8.0 (307 x 203mm)	11.0 x 7.0 (279 x 178mm)	9.0 (229mm)
SB5	(2) 5" (125mm)	14.9 x 10.2 (378 x 259mm)	14.0 x 9.2 (356 x 234mm)	8.6 (218mm)
SB5N	(2) 5" (125mm)	14.1 x 8.1 (358 x 206mm)	13.0 x 7.0 (330 x 178mm)	10.1 (257mm)
SB6N	(2) 6" (150mm)	16.0 x 8.0 (406 x 203mm)	14.8 x 6.8 (376 x 173mm)	11.0 (279mm)
SB81	(1) 8" (200mm)	11.8 x 11.8 (300 x 300mm)	10.8 x 10.8 (275 x 275mm)	15.0 (381mm)
SB8	(2) 8" (200mm)	22.7 x 11.8 (577 x 300mm)	21.8 x 10.9 (554 x 277mm)	15.0 (381mm)

\* Dimensions do not include the condensing head or fume bezel options.

# RB Series, Reflux Bath

## RB Series Applications:

- Potassium hydroxide (KOH)
- Sodium hydroxide (NaOH)
- Tetramethyl ammonium hydroxide (TMAH)

## RB Series, Additional Standard Features:

- All the features of the SB Series bath plus:
- Tight sealing PTFE condensing head and cover
  - Typically city water or DI water is used as the condensing medium
    - 18 to 22° C
    - 25 gph to 30 gph (95 lph to 114 lph), with a maximum of up to 50 gph (190 lph)
    - 20 to 40 PSI

RB SERIES, REFLUX BATH*					
MODEL NUMBER	CARRIER	INSIDE TANK	INSIDE TANK	OVERALL DEPTH WITH CONDENSING HEAD	BENCH CUT-OUT DIMENSION
		(BOTTOM) In./(mm)	DEPTH In./(mm)	In./(mm)	In./(mm)
RB3-T	(2) 3"	9.1 x 7.1 (75mm)	6.6 (168mm)	12.3 (312mm)	13.3 x 11.3 (338 x 287mm)
RB41-T	(1) 4"	7.6 x 5.0 (100mm)	7.8 (198mm)	13.5 (343mm)	11.8 x 9.3 (300 x 236mm)
RB4-T	(2) 4"	11.0 x 7.0 (100mm)	9.0 (229mm)	14.7 (373mm)	15.5 x 11.5 (394 x 292mm)
RB5-T	(2) 5"	13.0 x 7.0 (125mm)	10.1 (257mm)	15.8 (401mm)	17.5 x 11.5 (445 x 292mm)
RB6-T	(2) 6"	14.8 x 6.8 (150mm)	11.0 (279mm)	16.7 (424mm)	19.5 x 11.5 (495 x 292mm)
RB81-T	(1) 8"	10.8 x 10.8 (200mm)	15.0 (381mm)	20.7 (526mm)	17.5 x 15.8 (401 x 401mm)
RB8-T	(2) 8"	21.8 x 10.9 (200mm)	15.0 (381mm)	20.7 (526mm)	26.8 x 15.8 (680 x 401mm)

\* Dimensions include a condensing head, but no fume bezel. For dimensions including a fume bezel, refer to the NE Series chart.

# NE Series, Nitran™ Bath

## NE Series Applications:

- Nitride etch/strip: Phosphoric acid (H<sub>3</sub>PO<sub>4</sub>) and DI water

## NE Series, Additional Standard Features:

- All the features of the RB Series bath plus:
- Automatic DI water replenishment system to maintain consistent phosphoric/water ratio (with manual override capabilities)
  - Flowmeter regulates the introduction of DI water under the solution level for increased ratio uniformity
  - Drip rate range = 0 to 4.7 ml/minute
  - Typical drip rate = 1.0 ml/minute
  - Typical drip rate at 160° C = 2.0 ml/minute
  - Drip pressure = 20 to 40 PSI (40 PSI maximum)

## NE Series, Additional Benefits:

- **Higher etch rates:** Typical etch rates
  - At 165° C = 60 to 65 Ångstroms/minute.
  - At 170° C = 80 to 85 Ångstroms/minute.
- **Improved etch uniformity:** The combination of consistent fluid concentration and uniform temperature assures consistently uniform etch rates across the surface of the substrate.
- **Improved selectivity ratio:** System design enhances nitride to oxide etch ratio.

NE SERIES, NITRAN BATH*					
MODEL NUMBER	CARRIER	INSIDE TANK	INSIDE TANK	OVERALL DEPTH W/ FUME BEZEL	BENCH CUT-OUT DIMENSION W/ FUME BEZEL
		(BOTTOM) In./(mm)	DEPTH In./(mm)	In./(mm)	In./(mm)
NE3-T	(2) 3"	9.1 x 7.1 (75mm)	6.6 (168mm)	14.6 (371mm)	13.8 x 11.8 (351 x 300mm)
NE41-T	(1) 4"	7.6 x 5.0 (100mm)	7.8 (198mm)	16.0 (406mm)	12.4 x 9.9 (315 x 251mm)
NE4-T	(2) 4"	11.0 x 7.0 (100mm)	9.0 (229mm)	17.0 (432mm)	16.0 x 12.0 (406 x 305mm)
NE5-T	(2) 5"	13.0 x 7.0 (125mm)	10.1 (257mm)	18.0 (457mm)	18.0 x 12.0 (457 x 305mm)
N-6-T	(2) 6"	14.8 x 6.8 (150mm)	11.0 (279mm)	19.0 (483mm)	20.0 x 12.0 (508 x 305mm)
NE81-T	(1) 8"	10.8 x 10.8 (200mm)	15.0 (381mm)	23.0 (584mm)	16.3 x 16.3 (414 x 414mm)
NE8-T	(2) 8"	21.8 x 10.9 (200mm)	15.0 (381mm)	23.0 (584mm)	27.3 x 16.3 (693 x 414mm)

\* Dimensions include fume bezel. For dimensions without fume bezel, refer to RB Series chart.

ALL Process Technology bath systems come standard with FIVE levels of safety for reliable operation:

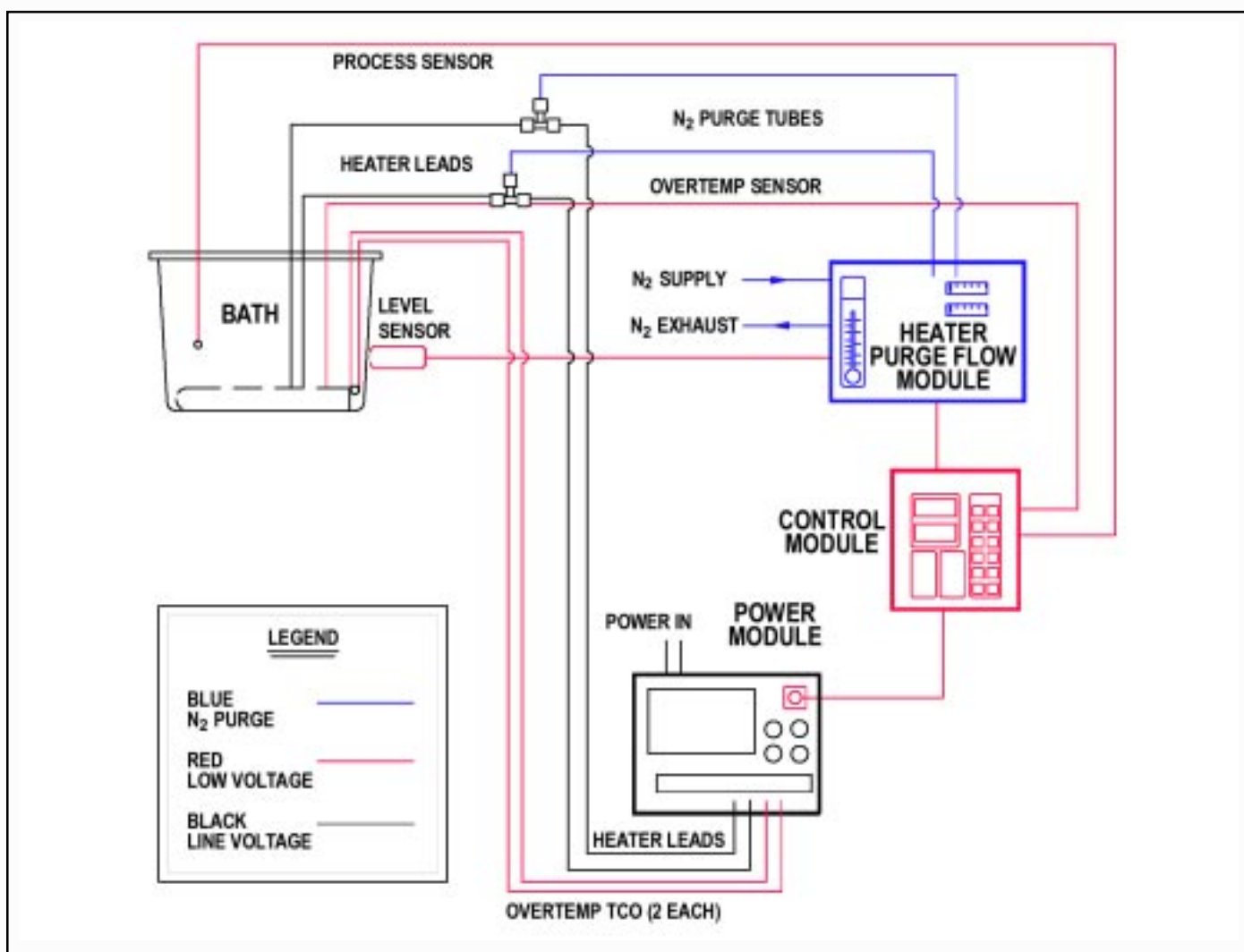
- 1 Liquid level sensor shuts off the heater if the solution level goes below a safe level.
- 2 Back pressure switch in the nitrogen purge module monitors the heater purge pressure and shuts off the heater if there is a breach of the fluoropolymer sheath.
- 3 An over-temperature thermocouple in the heater is the primary thermal shutoff device in the event of an unsafe condition.
- 4 Thermal over-temperature cut-off switch acts as a redundant backup to the over-temperature thermocouple.
- 5 Second thermal over-temperature cut-off switch wired in series with the first switch.



Typical heater purge flow module.



Typical temperature control module (non-CE model).



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