**TWO BTU BDF-4 FOUR STACK DIFFUSION FURNACES MANUFACTURED IN 1984 ARE AVAILABLE :**

**- "A-BANK" IS A RIGHT HAND SYSTEM. (when facing the furnace load island to the right)**
**- "B-BANK" IS A LEFT HAND SYSTEM. (Load island to the left)**

Each furnace is a 4- tube horizontal diffusion furnace with heavy duty BTU BOATLOADERS and UNIT INSTRUMENT MFC'S for gas control. A BTU 7351C DDC PROCESS CONTROLLER is provided at each tube level. The furnace system is currently designed to process wafers up to 125mm. However 150mm (6 inch) wafers can be processed by installing the largest possible quartz tube.

**Electrical Specifications:** (each 4-stack)
- Connected Load ~ 96 KVA at 480 VAC
- Supply Voltage 440/480 VAC, 60 HZ, 3 phase
- Instrument power is provided by a 10 KVA step down transformer W/ 120 VAC single phase output.
- Circuit breaker for each furnace element (4ea.) (70 Amps single phase, shunt trip type)
- Circuit breaker, main power (170 Amps 3 phase)

**Elements & Control:**
8.25" ID, 3-zone canister type elements with a 1300 C max. temp. rating. The flat zone is 30" with ± 0.05 C temp. control. Five type "S" spike t/c's are provided, three are for temperature control and two are for overtemperature protection. Each element is powered with a 26 KVA single phase transformer.

| | | | |
|---|---|---|---|
| LOAD.....52 VAC | (at the element) | 110 Amps (typical actual full power measurement) | ~ 5.7 KVA |
| CENTER....120 VAC | " | 100 Amps " | ~ 12.0 KVA |
| SOURCE.....52 VAC | " | 110 Amps " | ~ 5.7 KVA |

NOTE: Elements with a larger ID can be purchased for this furnace.

**Cooling System:**
- Fans on top of furnace cabinet pull 2000 CFM of heated air up through a water cooled heat exchanger and cooled air returns to the room. (~ 5 GPM of chilled water required per 4-stack)

**Load Island:**
- Nitrogen purged individual stainless steel chambers at each tube level contain the boatloaders and SIC cantilevers.
- Sliding glass doors are provided adjacent to the furnace and removable stainless steel panels are are provided at the far end of the chamber.

**Source Cabinet:**
- An in-line style source cabinet is included. The cabinet has stainless steel adjustable shelves on the furnace side and gas control systems on the other side.
- Stainless steel gas manifolds with regulators, filters, and manual valves are installed for the following gases. N2, H2, O2, HCL, and Ar
- A compressed air manifold with manual valves at each tube level for air-operated valves is installed.
- Gas system electronics are mounted in the doors at each tube level.
- A low N2 pressure switch in the N2 manifold interlocks H2 flow.
- Exhaust required: (600 CFM 6" duct at top of cabinet)

**Scavengers:**
- A Stainless steel exhaust scavenger is installed at the load end of each tube. -
Exhaust requirements: (100 CFM each 400 CFM total)

**Approx. size of furnace sections:**

| | L | W | H |
|---|---|---|---|
| Load Island | 102” | x 30” | x 92” |
| Main Furnace + Scavenger | 87” | x 30” | x 96....Note: |
| Source Cabinet | 48” | x 30” | x 94” |

- B-Bank is an additional 28” wider at scavenger area with DDC controller cabinet installed.
- A-Bank has a “stand alone” DDC control cabinet which is wired to be installed at the end of the load island. Other locations are possible w/cable length modification.

A-Bank Total Length: 237” + (24” “stand alone” DDC cabinet) ~ 261” (21.75 feet)
B-Bank Total Length: 237” (19.75 feet)

**A-Bank Gas control Systems:**

All four gas control systems are custom H2/O2 steam torch oxidation/anneal systems which can be used for:
- Wet Oxidation
- Dry Oxidation
- Anneal
- Drive-In

These gas control systems are designed to eliminate dead space in the outlet manifolds and valves. This allows complete fast switching between wet, dry, and anneal processes. Nupro Air-Operated Manifold Valves are used at the MFC to manifold connections. An Ar/N2 MFC is installed at the beginning end of each of two outlet manifolds. When N2 or Ar is selected the manifolds are quickly cleared of other gases.
6 Unit Instrument MFC’S are installed. The sizes are listed below.
- H2 40 SLM UFC 2000
- O2 20 SLM “
- N2 30 SLM “
- Ar 30 SLM “
- O2 5 SLM UFC 1000
- HCL 2 SLM ”

Safety design and interlocks:
- N2 pressure low inhibits H2
- H2 flow restricting orifice installed near MFC.
- Under temperature circuit with spike t/c installed near H2/O2 torch will inhibit H2 if temperature is below auto ignition set point.
- H2 flow set point voltage is derived from O2 flow read out voltage. (H2 flow tracks O2 flow)
- O2 flow switch inhibits H2 flow if O2 is not flowing at flow switch set point.
- Auto N2 purge through manual metering valve and normally open air-operated if power or compressed air fail.

Gas systems also include manual shut-off valves for each gas, check valves, and filters.

**A-Bank additional information**:
- A used NORTON SIC CANTILEVER is included for each tube (4ea.), their condition and doping levels are unknown.
- Quartz tubes, boats, etc. are not included.
-The process controllers have an auto profile feature. Profile thermocouples are not included.

**B-Bank Gas Control Systems**:

Tubes 1, 2, and 3 have the same custom H2/O2 steam torch oxidation/anneal systems as A-Bank (see A-Bank gas control systems)
Tube 4 is a POCL3 doping system 6 MFC’S are installed. Gases used are N2, Ar, O2, and HCL. The MFC sizes are not known at this time. A J.C. Schumacher model 100/107 STC and canister are included.

**B-Bank additional information**
- A used NORTON SIC CANTILEVER is included for tubes 1, 2, and 3. (3ea.), their condition and doping levels are not known. -

Tube 4 (POCL3) is set up for a quartz roller boat (not included) instead of a cantilever.
- Quartz tubes, boats, etc. are not included.
- The process controllers have an auto profile feature. Profile thermocouples are not included.