

FIELD SERVICE OFFERINGS AND FURNACE STARTUP

Centorr Vacuum Industries offers field service startup on all jobs manufactured in our Nashua, NH site. It is either included in our standard quotations or provided as an option in our proposal.

This is intended to assist our customers in the furnace startup, ensure the equipment operates as it did during our in-house witness test, and provide a basic level of training, routine maintenance, and operation.

Field Service Assistance -Domestic

Five, (Seven, or Ten) working days on-site services of a Centorr Vacuum Industries field service technician for post installation system checkout, supervision of initial startup, and training of operating personnel. Customer to arrange for furnace to be positioned into plant, install hot zone, and make electrical/gas/air/water service connections. Air travel, car rental, and living expenses are included. Reference C/VI Field Service Terms and Conditions (Form FSTC2000) for more details.

Field Service Assistance -International

Same as above except that customer to supply local ground transportation.

FIELD SERVICE OVERVIEW

At the time of shipment, the customer is encouraged to determine the extent of time required for in-house assembly and contact CVI to schedule a time for a Field Service visit.

Field Service will:

- Take ultimate vacuum readings and leak-up rates to ensure a tight chamber, and pumpdown times per the specification.
- Run the unit to maximum temperature with power levels taken and compared to the witness data at CVI.
- Demonstration of instrumentation.
- Inspect overall equipment.
- Demonstration of equipment operation, safety, alarms, and interlocks.
- Review spares list and general maintenance items / schedule.

Advantages of the C/VI Field Service

- Ensures safe operation of your new furnace
- Provides basic level of training on equipment, sensors, and programming.
- Review spare parts list and general maintenance.
- Understand recipe generation and event strategy.
- Working knowledge of vacuum technology and good vacuum practices.
- Available for routine preventative maintenance

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- Any additional items as specifically stated in the sales order to be performed during on-site installation.

Note: We are equipment manufacturers, therefore, process with end-users' products will not be run in the furnace at the customer's site until the Field Service installation form is signed off and the unit has achieved final acceptance meeting all of its basic requirements.

CUSTOMER FURNACE STARTUP/INSTALLATION DETAIL

- Customer to inspect all crates as soon as furnace arrives to confirm shipment arrived intact, or if there is the possibility of shipping damage. Take inventory of all items against "tag" list to ensure all components are present (it is important to determine this as soon as possible after shipment, prior to scheduling field service to ensure our engineer does not arrive on site if parts are missing, causing delay and additional field service expenses to the customer).
- Customer to place all major components (chamber, power supply, pumping system, control cabinet, etc. . .) in proper locations per the GA drawing.
- Customer to make match connections (A-to-A, B-to-B) on all electrical lines from control cabinet to chamber, water lines, rigid and/or flexible power busswork, inert (and/or Hydrogen) gas lines, pneumatics, and pumping manifolding.
- Customer to bring their in-house inert/process gas, water, air, and electrical drops up to the chamber connection point, using personnel licensed in your State or Country and make final connections. To ensure safe operation and your warranty coverage, do not *turn on the electrical power, or water, or inert/Hydrogen gas lines to the unit or power supply until C/VI Field Service personnel arrives on-site and can review all connections including the electricals and turn on the power supply/control cabinet for the first time on-site.*
- Customer to install the hot zone and elements inside of chamber (Note: if customer is inexperienced and feels uncomfortable in performing this step, C/VI's field service technician can install the hot zone with customer assistance, but this will *either* take away from the training time available at the end of the field service visit, or the customer will need to pay for 1-2 additional days of field service time.
- Confirm final schedule of Field Service personnel after the above has been completed.



Centorr/Vacuum Industries
55 Northeastern Blvd.
Nashua, NH 03062
Ph: 603-595-7233
Fax: 603-595-9220
Toll: 1-800-962-8631

FIELD SERVICE TRAINING DETAIL

I. TRAINING OUTLINE (OPERATION AND MAINTENANCE)

- A. Basic Furnace Training
 - 1. Pumping Apparatus:
 - a. Theory of operation
 - b. Hardware (pumping)
 - c. Integration with control logic
 - d. Maintenance/Troubleshooting
 - e. Leak checking/vacuum integrity discussion
 - 2. Hot Zone:
 - a. Shields and element: maintenance
 - b. Power feedthroughs: maintenance
 - c. Retort/retort connect: maintenance, recommended repair strategies during long term operation
 - d. Troubleshooting and general maintenance
 - 3. Gas Systems:
 - a. Configuration and operation
 - b. Hardware discussion
 - c. Maintenance, troubleshooting
 - d. Debinding Condensers/Traps
 - 4. Control System:
 - a. Review of controls manual
 - b. General system operations
 - c. Data acquisition use
 - 5. General/Summary:
 - a. Recommended maintenance planning
 - b. Recommended spare parts