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CENTRAL FILES NUMBER

CF- 57-6-6

DATE: June 6, 1957
SUBJECT: SPECIFICATIONS FOR CLEANLINESS REQUIREMENTS
HIGH LEVEL VOLATILITY LAB. 4507
TO: R. P. Milford
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COPY NO. 3

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OAK RIDGE NATIONAL LABORATORY
Operated By

UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

Process Design Section
Chemical Technology Division

SPECIFICATIONS FOR CLEANLINESS REQUIREMENTS
HIGH LEVEL VOLATILITY LAB. 4507

SCOPE

This specification covers cleanliness requirements during the installation of certain piping and equipment in the High Level Volatility Laboratory, Bldg 4507.

PURPOSE

The materials to be processed through all the nickel, Monel, or Inconel lines, most of the copper tubing, the stainless steel tubing, and the vessels are extremely reactive with oil, grease, and other organic compounds, as well as dust and fine particles of metals and inorganic matter. The results of such reactions would be harmful either to the components of the system or result in the loss of valuable process material. Solids left in the system could do serious damage to the pump and valves.

The fluid to be circulated in the coolant system must be maintained dry and free from suspended solids. Any loose solids left in this system may cause damage to the circulating pump and/or the shutoff valves on the system.

Nitrogen is used for purging and blanketing in order that oxygen and moisture will never come in contact with process reagents. The nitrogen tubing system must not serve as a source of contamination for the process system.

APPLICATIONS

These requirements are applicable to all lines and equipment shown on Dwg. E-21446.

REQUIREMENTS

Cleanliness Inspection Methods

1. Visual Inspection: One of the best methods of locating foreign material in pipe and equipment is by a thorough visual inspection. When ever helpful a boroscope, flashlight, and/or mirrors should be used to aid in visual inspection.

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2. Standard Wipe Test: Use a clean, white, lintless cloth, dry or moistened with trichloroethylene. Wipe the cloth over the surface to be inspected with a single stroke for a distance of approximately four inches. The cloth should be clean.

Work Area

Before any of the above systems or parts thereof may be installed, all possible building structural work shall have been completed and the following conditions established:

1. All construction litter, scrap, and debris should be removed.
2. Insofar as is practical, all interior walls, floors, and structural members shall have been vacuum cleaned, and sponged or mopped if dust is not removable by vacuum cleaning.
3. All possible concrete chipping and grouting operations shall have been completed.

During installation of tubing the following requirements shall be observed:

1. A diligent effort must be made to maintain the dust level in the air as low as possible. This may require watering the area adjacent to Bldg 4507 to avoid bringing dust into cells through the ventilation system.
2. Special care shall be exercised to avoid tracking dust and dirt into the area and to avoid bringing in dirt and dust on tools or other equipment.
3. Chipping or drilling concrete shall be done only on an off-shift or by methods approved by the Process Design Section representative.

Tubing and Equipment

The following requirements are necessary to obtain the degree of cleanliness required:

1. The interiors of all installed tubing and equipment must be free of all foreign material such as oil, grease, loose dirt, grit, rust, smut, and moisture. All tubing, except ASTM B68-55 copper tubing sealed by the manufacture shall be flushed with clean trichloroethylene solution and be visually inspected to be certain that it is free from solids and all other materials.
2. Clean components and subassemblies must remain capped with dustproof enclosures until just before welding or flanging in place.

3. Whenever it is necessary to touch the interior surfaces of tubing or vessels, degreased neoprene or clean lintless gloves shall be worn.
4. All tools used for "fit-up" or adjustment shall have been degreased and in a clean condition during their use.
5. Whenever it is necessary to flare or file tubing ends in making joints, foreign material must be kept out of the tube, or the foreign material must be removed and the soiled portion degreased.
6. Process tubing and equipment may be installed only when the building conditions comply with the requirements of the "Work Area" subsection.
7. Storage of cleaned tubing shall be such that it does not accumulate dirt and dust or absorb moisture through the caps.
8. The exterior of all equipment, tube, and assemblies shall be dry and free from dust, dirt, or other contaminants when brought into an area in which process tubing and equipment is being installed.

Valves

Because of the stringent cleanliness requirements for process valves in the High Level Volatility Laboratory, the following procedure shall be used for all valves.

1. Type V-1 and V-3 (Hoke 490 and 341 series) shall be disassembled and degreased with a suitable trichloroethylene solution. The teflon chevron packing and all other internal components of the valve shall be washed free of grease and all other foreign material. Air drying or wiping with a lintless cloth prior to reassembly will be required. Care to prevent contamination from handling will be required. The valve when cleaned shall be sealed with clean lint free sealing plugs, and remain sealed until time for installation.
2. Type V-2 valves shall be visually inspected. Any foreign material should be blown from the valve, and the valve should be sealed until installation. It will not be necessary to disassemble these valves.
3. Type V-4 (Durco Type F) valves shall be cleaned internally with trichloroethylene by washing the solution through the plug, and then turning the plug several times while immersed in the solution, in order to satisfactory degrease the teflon liner, without disassembling the valves.

Prepared by: J. B. Ruch

Adopted in part from CF, 56-3-80 and section VI-E, K-987 and K-25 Maintenance Procedure No. EF-73.