

# EK 26. TEMİZ MONTAJ PROSEDÜRÜ (BUILD IT CLEAN) ÖRNEĞİ

## BUILD IT CLEAN PROCEDURE

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### 1. BUILD IT CLEAN POLICY (BIC)

The "Build It Clean Policy" is established for "Trouble free and Smooth Start-up Program". Build it Clean is not just a phrase. It starts at the warehouse, for material handling/storage, continues during the various stages of fabrication, erection and ends up at the Ready for Start-Up of the Project.

When this Policy is applied, the cleaning during the Precommissioning phase of the project will require less time and results with an early start-up of the facilities.

The 'Build it Clean Policy' shall be applied for all lines, during the construction phase, especially for the large bore piping, where the blowing and/or flushing cannot be done effectively and therefore mechanical cleaning to be applied. The piping systems which require mechanical cleaning shall be identified in marked-up P&IDs.

### 2. APPLICATION

#### Storage and Fabrication Stage:

- The warehouse will accept only clean items and stores them in such a way that the items are kept clean until the installation teams withdraw the materials. The storage of materials shall be in compliance with the "Field Material Control Procedure".
- Store and keep the piping materials; piping, elbows, flanges T's etc. at the warehouse and transport them in a protected way when required.
- Prior to spool fabrication, internally clean piping and fittings from preservation material and dirt.
- Check the spool after fabrication and clean if necessary. Ensure that spools are cleaned, capped and tagged, and prior to delivery to site, they are inspected.
- Ensure that caps are intact as long as the materials are in the warehouse and free from vandalism and stay intact in any weather condition.
- All cut off pieces shall have the ends covered immediately after the cuts are made.
- Large bore piping spools to be inspected and checked for cleanliness before erection and welding.
- Piping which is installed in the unit shall have all ends covered at all times, except during bolting or end preparation for fit up is being made.
- When installing the pipe, the caps shall be removed and depend upon the size and length of spool, spool will be checked and if necessary, the pipe will be blown out with air, before installation. After installation, end covers will be put immediately.
- All piping shall be visually inspected by piping foreman to ensure that there is no foreign material, debris or trash left inside the pipe.
- When grinding on open ends of pipe, if possible, a pipe plug shall be placed on the inside of the pipe to prevent shavings and debris enter the pipe.
- Wipe out the inside of the pipe before making bolt ups or fits with a lint free rag. Wear proper PPE when wiping the inside of piping.
- After each weld, clean the inside of the weld, where possible, with a non-copper abrasive type wheel.

- A daily cleanliness audit to be performed by the piping area supervisor responsible for the area.
- Inspect valves' internal cleanness for debris, before installing.
- In line instruments to be checked for debris, before installing.
- Equipment openings will be covered and kept closed until the connection to be done.
- Control valves, safety valves, meter-runs, will be provided with flange covers, to prevent ingress of debris etc.
- Specific piping systems which requires cleaning before erection, will be identified for special cleaning e.g. grit blasting, chemical cleaning, mechanical cleaning, chemical cleaning, etc. These will be marked-up on P&ID.
- Mechanical cleaning such as grit blasting or wire brush cleaning shall be done before closure. If required, Boroscope inspection camera will be used for inspection.

#### **Installation and Testing Stage:**

- The installation department to verify the cleanliness of the withdrawn materials. When the materials are not clean, they have to be cleaned before the piping spools are prepared.
- The installation department shall carry-out "Spool Internal Cleanliness Check" prior to erection and shall record it.
- The installation department will assure the cleanliness of the piping spools when erected into position. A final check before welding will be performed.
- The open ends of the piping spools will be capped also in the mounted position to prevent the ingress of dirt/debris etc.
- Preservation record will be kept for the equipment or piping that are meant to be stored free of moisture and debris. The preservation to be monitored closely and the record should be counter signed by Construction Superintendent on weekly basis.

#### **Precommissioning:**

- The Contractor's Precommissioning Team will identify the cleaning requirement per piping line or system number and according to this, construction team will perform the installation. "Spool Internal Cleanliness Check" prior to erection and recording will be done as per applicable ITP.

### **3. MECHANICAL CLEANING**

Mechanical cleaning should be applied to large bore pipe (greater than 24 inches) while cleaning by flushing or blowing methods are less reliable. Mechanical cleaning will be done by hand cleaning (clean internal surface by hand or cloth or special tools.)

#### **Preparation of Mechanical Cleaning**

Following shall be completed before start of the mechanical cleaning work:

- Work permit for entry to confined space from HSE Department shall be available.
- Mechanical cleaning shall be carried out after pressure testing.
- All pieces of in-line instruments (control/shutdown valve, orifice, flow element, relief valve, etc.) shall be isolated at block valve or disconnected. Small in line instruments can be stored at warehouse to keep clean and good condition. Large instruments can be protected with plastic cover or blue sheet or ply wood.
- Barricade the area with warning sign and make sure that there is no electrical equipment inside the barricaded area.
- Safety personnel shall always be on stand-by during mechanical cleaning execution and inspection, emphasizing on safety during cleaning. Persons who involved with mechanical cleaning activities shall use proper personal protection equipment.
- Person who involved in mechanical cleaning activities shall be trained and examined as a level of knowledge, training and practical experience in confined space entry.
- Provide safety equipment such as fan blower, flashlight, rope, radio, fresh air, O<sub>2</sub> bottle. Make sure that those tools are in good condition and ready to use.
- Provide tools for mechanical cleaning such as cloth, broom, mop, bucket (for carrying dirt).

- Piping system that will be cleaned shall be disconnected or protected (covered by plastic, blue sheet or ply wood) from other system that related with cleaning activities.
- Equipment that have connection with piping system that will be cleaned, shall be disconnected and protected ( covered by plastic, blue sheet or ply wood) so that the foreign materials (cleaning waste) such as soil, debris, slag, grit, welding spatters, oil content and other materials shall not enter the equipment.

### **Mechanical Cleaning Execution**

Mechanical cleaning execution shall be carried out as below :

- Prepare a “preparation list”.
- Check and make sure that all activities listed in “preparation list” are completed.
- Complete the safety requirement for confined space entry, before entering the pipe.
- Make sure all manholes or all piping connections have already opened to ensure air flow.
- Make sure fan blower is ready to be used to make air circulation in pipe.
- Make sure that the safety rope have already stretched inside the pipe.
- Make sure worker and safety person outside the pipe, use radio to communicate regularly.
- To clean vertical lines, rope ladder may be used.
- The sequence of mechanical cleaning should be such that vertical pipes are cleaned first, then each straight pipes independently and branches cleaned to the end.
- Cushion cleaner could be used for final cleaning to wipe out remaining sand, soil, debris, rust, welding slag, sludge, stones, etc.
- Cleaning will be repeated as per acceptance criteria.

### **4. RESTORATION / REINSTATEMENT**

After the completion of mechanical cleaning, the following restoration shall be done:

- Cover end points of pipe at clean condition.
- Remove all temporary parts, including temporary blind and restore all permanent piping parts including support, if required.
- For reinstatement piping parts, make sure the equipment and connecting pipe are in clean and good condition.

### **5. ACCEPTANCE CRITERIA**

Cleaning team will inform and invite Client to witness the activity and check whether it has met the requirement or not.

Completion of mechanical cleaning shall be usually judged by visually checking the inside surface of piping and confirming that it is clean with no scales, sand, welding sludge, and any raw materials.