

Tube Cleaning Systems

Tool Talk™ - From Hand-held to Mechanized Systems

Tube Cleaning

Tube cleaning refers to a job where there are straight tubes ranging from .375 to 2 inches and lengths from 5 to 70 feet. These tubes compose heat exchangers, evaporators, coolers and spargers. Tube cleaning may be done by hand-held flex lancing, machines that feed flex, or rigid lances mounted on a machine with rotation provided by a motor. There are two basic tube cleaning jobs, polishing tubes with scale on the walls but the tubes are otherwise open, and unplugging completely plugged tubes.



Nozzle Selection

Basically, tube nozzles come two ways: either with a non-rotating tip and as many as 20 orifices, or a rotary head with 2 to 7 orifices. The use of fewer jets in rotation is a superior

technique, and provides more complete coverage with larger, hard-hitting jets. Consequently we design all of our nozzles to rotate. The tube size determines the maximum size of the lance tip and the lance. When cleaning plugged tubes, the nozzle used should be no larger than 2/3 to 3/4 of the tube diameter. The nozzle diameter should be larger than any couplings or hose ends to prevent material from catching on these.



Jetting Configurations

Flex lance nozzles are usually jetted to produce several pounds of pulling force; this is accomplished by the use of rearward facing jets. In unplugging patterns, this requires about 60% of the water go to the back jets; this water is practically wasted, as the rearward facing jets are too poor in jet quality to do much effective material removal. They are only there to provide counterbalance to the forward facing jets, and when a rigid lance is used on a securely supported lancing machine, there is no need for backward facing jets. Because of the small sizes of hoses or lances used, the flow rate may need to be limited to minimize pressure losses.



Rotation Speed

The same surface speed parameters apply in tube cleaning as in pipe cleaning, the biggest difference being the much smaller size of the tubes. In a 25 mm (1 in.) tube, the rotation speed to achieve the maximum recommended surface speed of 17 m/s (55 ft/s) is 13,000 rpm, which is why the high speed self rotary nozzles can be effective in small tube cleaning. But with this high speed comes rapid deterioration with standoff distance, so a nozzle with a larger diameter should be used in larger tubes.

Feed Rate

When using rotary nozzles it is important to control the feed rate so as to keep the nozzle from hitting bottom and jamming. A jammed nozzle stops turning and losing its effectiveness. Pushing too fast can also cause hydraulic-ing when cuttings compact behind the jet head and pressure forces the tool out of the tube. A good operator will learn to feel and listen to keep the nozzle working.

