

## WIRELESS ULTRA-HIGH PRESSURE PIERCING NOZZLE

The wireless ultra-high pressure piercing nozzle shall provide a hand operated trigger control for remote operation of water and aggregate flow. The system shall incorporate remote controlled communications using a wireless transmitter/receiver. In addition to this system, the unit shall include an 'override' system whereby both the water flow and abrasive flow can be controlled by a second operator at the pump panel utilizing "dead-man" control override switches.

For piercing operations both trigger and toggle switch shall be actuated, which shall remotely open the water valve and abrasive control valve. The nozzle shall include:

1. One (1) trigger to control the flow of water from the ultra-high pressure water pump unit. The trigger mechanism shall control the flow of water at a rate of 10 GPM (40 LPM)
2. One (1) toggle switch to control the flow of abrasive material from the storage vessel.
3. Piercing operation:
  - a. The nozzle tip shall be placed against the surface to be pierced.
  - b. Initially the operator shall activate the toggle switch and pull the trigger for combined flow of water and abrasive material flow at extremely high velocity.
  - c. The nozzle shall quickly cut a small hole through the material.
  - d. After the material is penetrated, the operator shall de-activate the abrasive switch toggle and shall continue the flow of ultra-high pressure water into the hazardous area.

### Nozzle Design

The nozzle barrel shall have an internal diameter of 1" (25 mm) which shall extend through the nozzle body. The rigid hollow barrel extends between the rear inlet and nozzle tip. The overall Lance design shall be approximately 38" in length.

An ergonomically designed shoulder support shall be mounted to the rear nozzle barrel area and positioned to provide additional support to an operator. The forward nozzle barrel shall have an integral grab handle to allow the operator to safely and accurately direct the fluid flow against a surface. The nozzle shall also be equipped with a three prong offset fixture with a splash plate to protect the operator from spray-back of fluid and debris during the cutting operations.

A replaceable nozzle tip shall be mounted at the forward end of the nozzle barrel. When the nozzle is activated the abrasive material and high pressure water shall exit the nozzle tip in a focused water jet capable of cutting through various materials.

After penetration, the ultra-high pressure water shall continue through the nozzle projecting a jet stream having water droplets of appropriate size and velocity to effectively knock-down a thermal column within a closed space.

### Wireless Transmitter

The nozzle shall be equipped with an enclosed manifold area which shall house a micro-switch for each function (primary water flow trigger and abrasive material flow toggle switch).

A wireless transmitter shall send command signals back to the pump assembly micro-processor electronic control center. The nozzle wireless transmitter shall be battery powered with an operating time of no less than one day of continuous use.

The nozzle shall be also equipped with an emergency manual override system at the power unit panel with switches to activate abrasive and water flow. This shall enable use of the system should transmission be lost due to excessive RF interference or "out-of-line-of-sight" deployment of the hose line.