

Ultrasonic Tube for cleaning heat exchangers used in oil refineries and the petrochemical industry;

- Steel frame with double coating
- Stainless steel cladding
- Thickness of stainless steel inner cladding (wet section) of the bath: min. 3 mm
- Thickness of stainless steel outer cladding (dry section) of the bath: min. 1.5 mm
- Construction material: AISI (ANSI) 316L (304 for dry sections) (materials resistant to alkalis and acids)
- Minimum dimensions of the bath's working/usable area:
 - Width: 2000 mm
 - Length: 7000 mm
 - Height: 2000 mm
- Working platform with protective railing for operators
- Air-conditioned control cabinet
- Push-pull ultrasonic cavitation technology (minimum 5 W ultrasonic power per liter of solution)
- Ultrasonic probes mounted on the longer side walls of the bath
- Ultrasonic probes hot-bonded
- Ultrasonic frequency: 28 kHz
- All functions controlled via PLC through a minimum 10" color HMI touchscreen: • Multilingual HMI (including Serbian) • Manual and automatic operating modes • All operating parameters adjustable • Adjustable timer for heaters and ultrasonic probes • Monitoring of electrical energy consumption • Monitoring of chemical cleaning agent consumption • Preventive maintenance scheduling program • Operating hours and start counter
- Multi-step ultrasonic probe power selector (min. 3 steps)
- Solution temperature sensor
- Dual safety water level sensor for full and half-full bath
- Drain valve included
- Overflow pipe and overflow tank included
- Hybrid heating of solution via steam + electric heater in stainless steel 316L housing
- Protective cage for heating system (electric + steam heater) and ultrasonic probes
- Immersed ceramic heaters for solution heating: $U = 400 \text{ V}$
- Immersed steam heater: $P = 16 \text{ bar}$, $T = 300 \text{ }^{\circ}\text{C}$. Minimum steam heater power identical to electric heater power
- Operating temperature of cleaning solution: $60\text{--}85 \text{ }^{\circ}\text{C}$
- Lift for tube bundle handling, enabling efficient removal of deposits inside and around tubes
- Lift (hydraulic cylinder, hoses, couplings, seals, etc.) positioned to prevent damage from ultrasound or cleaning solution during operation or downtime, while ensuring safe operation for equipment and personnel
- Filter with circulation pump for removing impurities from cleaning solution
- Automatic water refill system
- Automatic liquid reagent dosing system
- Supply of reagent (detergent) with ultrasonic bath for initial filling
- Useful static load/capacity of bath approx. 25 t tube bundle + cleaning solution

- Centrifugal pump capacity sufficient to drain the bath within 3 hours
- Mandatory delivery of equipment with all auxiliary devices and tools to enable commissioning at customer site
- Delivery address: Oil Refinery Pančevo, Spoljnostarčevačka 199, Pančevo, Serbia
- Inspection during production and prior to delivery (2x witness test – WT)
- Delivery of necessary construction documentation for installation 6 months before equipment delivery
- Installation, user training with certification, and commissioning at site by supplier's authorized personnel
- Inspection after installation, prior to commissioning (SAT)
- Price list of recommended spare parts for 2-year maintenance
- Proof of factory performance on trial tube bundle at customer site
- Protection rating against water and dust: min. IP55 (suitable for outdoor use)
- Post-sales spare parts support: 10 years
- Supplier's technical evaluation form "Annex 2" must be fully completed and submitted
- Supplier's obligation to provide a written guarantee on company letterhead that the equipment, in accordance with supplier's recommended procedure, can effectively clean deposits "inside" and "on" tube bundles formed by fluid flow as specified in "Annex 3"
- Reference list of companies (customers, with contact persons) supplied with at least 2 ultrasonic baths of min. 25 m³ volume in the oil-petrochemical industry within the last 5 years
- Written confirmation that the ultrasonic bath is intended for continuous operation (24/7) or at least continuous operation for 30 days
- Availability of service center and response time for service interventions: 72 h
- Provide information regarding electrical supply:
 - Installed power
 - Simultaneity factor
 - Rated current
 - Recommended power cable for lengths over 200 m
 - Specify all protective equipment in transformer station distribution cabinet (breaker, fuse)
- Desired delivery date: 01.09.2027
- Minimum warranty period: 24 months
- After-sales support