



SPECIFICATIONS

ThermoClean – RR-500 (TC-500) SINGLE TRAILER, RAPID RESPONSE

Description: Thermal Desorption soil remediation system mounted on a single trailer that has the Feed and Discharge conveyors onboard. The system is composed of a Patented Thermal Processor using a unique soil cascading system to allow the heat from the burner units to be used effectively throughout the processor. The TC-500 is a top-loading system with a central soil discharge conveyor allowing for redistribution of cleaned soil back to the site or to be stockpiled for other applications. The TC-500 system includes a filtration and recirculation system for the soil particulate, (fines), an Induction Fan to draw off the vapors with monitoring controls for airflow, a Thermal Oxidizer with a secondary heat source for the destruction of VOC's, Power Generator for remote operations, Compressor for cleaning the filters and supplying any needed auxiliary air, complete electronic control system, fuel supply train and all associated motors, drives and equipment.

Contaminant Levels: Hydrocarbons to 45,000 mg/kg and up to Carbon Chain 40 (at reduced throughput) TC-500 allows for a much higher contaminant level that can be treated due to its unique processor design and high-temperature filter bags.

Trailer: Trailer is a specially designed double-drop lowbed, rated for up to 70,000 lb., (32,000 kg) and designed for standard highway movement without special permits.

Unit size: Trailer: +/- 40 feet (14.5m) long X 8.5 feet (3.0m) wide X 13.5 feet high (4.0m)

Unit weight: Approximately 66,400 lb for Process Trailer

Feed Rate: 4-7 tons per hour (Rated at 5 tons/hour nominal average)

Feed Metering: Not equipped with metering device, although machine can be fitted with a volumetric or weight scale at an extra cost.

Feed system: Feed system consists of a feed hopper, conveyor belt and shaker screen mounted on the trailer

Processor Temperature: 320 – 800 °C

Processor Characteristics: Specially designed cascading system consisting of three main chambers where the soil is captured and then evenly distributed so as to fall in a cascading or 'waterfall' pattern into the next chamber. A negative internal pressure is maintained within the processor by the effective use of patented soil sealing designs at both the feed end and discharge end of the TC-500. Soil seals prevent outside air from entering the machine and the negative pressure prevents any internal gases from escaping into the atmosphere. Patented processor design for cascading system and chamber air sealing systems are covered under: US Patent #5,111,756, #8,147,772 and much proprietary knowledge.

Burners: Primary heat source, (main burner), is a gas-fired burner that is capable of operation on propane, Liquid Natural Gas or diesel. TC-500 uses Maxon or Eclipse Burners with a capacity of ~4.5 million BTU/hour. Main burner is enclosed in a chamber lined with refractory and the flame is directed towards the discharge auger in the processor. Heat from the burner then makes its way upward through the three chambers of the processor, passing through the soil cascading downward and vaporizing the hydrocarbon contaminants and moisture contained in the soil.

Secondary heat source, (Thermal Oxidizer burner) is similar to the main burner but contained within the proprietary Thermal Oxidizer. It is capable of producing up to 5 million BTU/hour for destruction of the Volatile Organic Compounds, (VOC) that have been released by vaporizing the contaminants. Thermal Oxidizers are custom-made.

Fuel: Propane or Liquid Natural Gas (LNG). Switching between these fuel supplies is very simple and quick. Burners can also be set up for waste oil or diesel fuel.

Fuel Consumption: Fuel consumption is determined by the throughput that the TC-500 is operating at. Current operation on propane is approximately 35 - 50 gals/hour when operated at full output. TC-500 rarely is needed at full output as it utilizes the fuel value of the contaminated soil, so a *maximum* of 2/3 this amount is ever needed.

Gas Train: The fuel supply gas train is BC Gas Certified for operation on either propane or Liquid Natural Gas. Fuel sources can be easily changed over from one to the other by following the Operator's Manual. BC Gas Certification has worldwide acceptance.

Generator: Generator producing 3-phase 60 Hz electrical operating voltage of 480 volts and ~125 amperes. Different operating voltage and frequency as per customer-supplied information is available. TC-500 can be operated remotely using this generator or connected to available electrical power source. (grid)

Compressor: Compressor producing up to 20 CFM at 150 psi air pressure is mounted on the trailer to provide filter cleaning air and auxiliary air for the operation of air tools during maintenance.

Soils: The TC-500 will operate on Inorganic subsoil classification as per ASTM D2487-83, GW, GP, SW and SP. TC-500 will remove 95 – 98% of contaminants from soil.

Volatile Organic Compounds, (VOCs): Meets or exceeds legal requirements for destruction of 99% to non-detect @ 1,500°F, (815°C) at Thermal Oxidizer.

Moisture Levels: Moisture content of the soil for the TC-500 is specified at a maximum 15%. Operation of the TC-500 at levels above 10% will have a declining impact on soil throughput as the moisture level increases. The TC-500 is not designed to process soils above 20% moisture level and pre-treatment is recommended at higher levels in order to bring the moisture level to within an efficient range for the TC-500 to process.

Thermal Oxidizer: Direct Thermal with heat recovery up to 60%. Thermal Oxidizer has an adjustable residence time of 1.5 – 3.0 second at up to 900 °C. Thermal Oxidizer has an independent auxiliary air supply controlled by the operator to raise or lower the internal temperature. Residence time and air speed are adjustable depending on feed stock. Residence time is a balance between preventing CO emissions and NOX emissions: too short residence time may produce CO, too long could produce NOX. Monitoring system can be included to adjust this automatically to produce desired results.

Continuous Air Discharge Monitoring System: Available as an add-on and this system will automatically feed the air discharge readings back to the Control Panel and adjust the Thermal Oxidiser to assure continuous air regulations compliance.

Filtration System: Two part filtration system. First stage is a multi-clone system to remove any gravel and much of the heavier dust that may get pulled out of the Processor by the ID fan. This material is then recycled back into the Processor to homogenate with cascading soil and be re-processed. Second stage consists of high temperature bag or cartridge particulate filters. System is capable of removing airborne dust particulate to below 20 mg/m³ (usually to below 10 mg/kg) and is controlled to a maximum 210 °C using specially designed high temperature filter material. Filters are cleaned using pulse air jets at adjustable intervals in order to maintain a pressure drop of not more than 6 inches across the filters. It is estimated that the cartridge filters shall have a life-expectancy of approximately one year, provided proper cleaning and maintenance is performed. Filters can be quickly removed when require changing. All dust removed from the system is sent back to the Processor for re-treatment.

Electronic Control System: The TC-500 incorporates an electronic control system. This system enables the operator to monitor and control all aspects of the operation, either automatically or in manual mode. The system has all solid state components, CSA Certified. Augers are frequency drive controlled in order to vary their operation speed to adjust to changes in soil type, moisture content, contaminant level and contaminant type. The operator has complete control of the soil exit temperature, which determines the level of cleaning the soil has been subjected to. TC-500 systems have a generator to develop 3-phase electrical current or they can be operated off grid power where available.

Motors, Drives and Mechanical Parts: All motors, drives and mechanical parts conform to CSA Standards. Drives are frequency controlled by the operator depending on the above variables and weather conditions and ambient temperature. All components

have a regularly scheduled maintenance program that the operator must adhere to for optimum operation.

Hours of Operation: The TC-500 is capable of continuous operation with two (2) hours of maintenance shutdown every twenty-four hours recommended. Proper maintenance assures optimum operation. Operation time will depend on the parameters of each project and may be more or less.

Repairs, Spare Parts: With proper maintenance, the only recurring parts that will be required will be drive belts, drive chains, filters and other similar parts. Operator should maintain a complete set of these spare parts at all times for ease of change-out. Should major repairs become necessary, an Operator's Manual is provided to aid in these repairs.

Operator's Manual and Training: Only personnel adequately trained in the operation of the TC-500 shall be allowed to operate the equipment. A complete Operator's Manual showing regular maintenance schedules, sample of operator's log, troubleshooting tips and descriptions of all major components is included with each TC-500 system.

Technical Support: Jentek Environmental Inc. can offer technical support via telephone or e-mail, and in person upon financial agreement from the owner.

Air Emissions: The TC-500 meets all air emission criteria in North America, including California Air Standards. Emissions of CO, CO₂ and NO_X are below that of a highway truck, at about 48 – 67 mg/kg, and the TC-500 can be tuned to give very low readings on stack testing. Particulate emission is below 20 mg/kg. (Usually below 10mg/kg).

Contaminant Reduction: The TC-500 is capable of removing between 95 – 98% of contaminants from the soil. The parameters of the soil type, contamination type, level and the moisture content will affect removal. Desired results requested by customer may vary.

NOTE: Throughput of the TC-500 is determined by five (5) variable factors:

- Type of soil
- Type of contaminant(s) (Setup for worst-case scenario)
- Level of contaminant(s) (%)
- Moisture content of soil (%)
- Desired contaminant reduction levels

Warranty: TC-500 carry a one (1) year warrant on major components. Motors, drives, compressor, electrical components and generator will carry a manufacturer's warranty which the customer will activate first in the event of failure. Most smaller components will be available locally for quick replacement, however Jentek can source and ship spare parts as required. Wear of augers/belts should be minimal unless operated in extreme conditions. Replacement augers/belts will most likely be available locally or can be supplied at cost by Jentek.