

**TECHNICAL SPECIFICATIONS AND OTHER ALLIED REQUIREMENTS**

SI No.	Description of items	Quantity
PUR/575583/ERT/SB/E/2019-20		
01.	Supply, Installation and commissioning of Waste Plastic Pyrolysis Plant to Process 50 kg Plastic Waste Per Batch and Convert it to Crude Oil.  Raw Material: Plastic Waste From Segregated Municipal Solid Waste.  Batch Processing Time: 4-6 Hours  (Detail Specification as per Annex. I)	01 No.

**1. DELIVERY & INSTALLATION SITE / FINAL DESTINATION**

- 1.1. The ordered goods is to be Delivered, Installed and Commissioned at Amrawati, CRPF Group Centre, Durgapur – 713214, West Bengal.

**2. WARRANTY**

- 2.1. One Year onsite Warranty to be provided by the Successful Bidder from the date of Satisfactory Installation/Commissioning and Acceptance.

## Annexure-I

**Supply, installation and commissioning of waste plastic pyrolysis plant to process 50 kg plastic waste per batch (Batch processing time: 4-6 hours) and convert it to pyrolysis oil: 01 Unit**

### **1 End user:**

The waste plastic pyrolysis plant will be installed in Amrawati, CRPF Group Centre, Durgapur, West Bengal 713214.

### **2 Detailed specification:**

#### **a) Waste plastic pyrolysis plant**

Sl. No.	Name of component	Description of item	Quantity
1	Pyrolysis reactor	<ul style="list-style-type: none"><li>• Configuration: Horizontal stainless steel (SS304 grade with 8 mm thickness) reactor with manual feeding. The outer insulation is jacketed with 80 mm (min) thick ceramic wool and clad with stainless steel sheets for protection</li><li>• Reactor capacity: 50 kg plastic waste</li><li>• Volume: 1.0 m<sup>3</sup> (min)</li><li>• Size: 800 (D) × 2000 (L) in mm (min)</li><li>• Furnace at the bottom for heating</li><li>• Thermocouple for temperature measurement at reactor door and furnace</li><li>• Thermocouple for temperature measurement at the inside of reactor, outlet pipe of reactor, exhaust gas pipe and furnace</li><li>• Pressure gauge in the reactor chamber and gas pipeline</li><li>• Automatic pressure release valve arrangement for Nitrogen / CO<sub>2</sub> purging for safety purpose</li><li>• Full door opening for feeding material</li></ul>	1 No.
2	Heating system	<ul style="list-style-type: none"><li>• Firing with independent burners</li><li>• 2A) One pyrolysis oil/LDO burner. Pyrolysis oil/ LDO burner to be provided with pumping unit comprising of 3φ gear pump along with filter and a 40 L capacity oil tank with intermediate piping</li><li>• 2B) One hydrocarbon/LPG gas burner with intermediate piping</li><li>• All fabrication in MS (IS2062) and seamless tube of Schedule 20</li></ul>	1 No. of each type (2A and 2B)
3	Condenser assembly	<ul style="list-style-type: none"><li>• Shell and tube type heat exchanger with provision for water inlet and outlet from cooling tower</li><li>• The maximum temperature rise of cooling water in the condenser must not exceed 10°C</li><li>• No. of stages: 4 (min)</li></ul>	1 set

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		<ul style="list-style-type: none"><li>Oil water separation tank mounted on stand connected for oil collection</li><li>All fabrication in MS (IS2062) and seamless tube of Schedule 40</li></ul>	
4	Oil Water Separator tank	<ul style="list-style-type: none"><li>Capacity: 100 L (min)</li><li>MOC: IS2062 of 5 mm thickness</li><li>Safety device to prevent flashback into the reactor</li><li>The level of the tank should be such that the separated oil is transferred to the oil receiver tank without any pumping</li><li>Tank level indicator mounted on side</li></ul>	1 No.
5	Oil Receiver tank	<ul style="list-style-type: none"><li>Capacity: 100 L (min)</li><li>MOC: MS IS2062 of 5 mm thickness</li><li>Tank level indicator mounted on side</li><li>Drain and discharge valve at bottom</li></ul>	1 No.
6	Hydrocarbon gas collection tank	<ul style="list-style-type: none"><li>Buffer tank to safeguard pressure build up with pressure gauge, pressure relief valve and diversion to use the gas in reactor heating or flaring system</li><li>Capacity: 100 L (min)</li><li>MOC: MS IS2062 of 5 mm thickness</li></ul>	1 No.
7	Cooling Tower	<ul style="list-style-type: none"><li>Recirculating type</li><li>Range of cooling tower: 5-10°C for an inlet temperature of 35°C</li><li>Fibre-reinforced plastic body and reservoir with capacity of 150 L</li><li>Control valve to circulate water in plant condenser and distillation condenser</li><li>0.5 hp, 1<math>\phi</math> water pump for recirculation of water (Make: Crompton/Kirloskar)</li><li>0.5 hp, 1<math>\phi</math> air circulation fan with canopy cover</li></ul>	1 No.
8	Chimney	ERW C class heavy duty pipe with bottom cone with diameter 100 mm, height 10 m and thickness 5 mm with canopy	1 No.
9	Control Panel	Manual operation with push button switch and indication lamps for burners, pumps, cooling tower fan, water pump, flare unit ignition and digital meters for temperature and pressure monitoring	1 No.
10	Plastic Shredder	Capacity: 50 kg/h Input material: Polyethylene bags, pet bottles, tetra pack etc. Motor: 5 hp, 3 phase with DOL starter switch Shredding size: 10 mm $\times$ 10 mm Blade: 2 set (additional)	1 No.
11	Flaring system for burning exhaust gases	Burner system with 0.5 hp blower	1 No.



### Annexure-I

12	Oil filtration system	<ul style="list-style-type: none"><li>Three filtration stages: 100 µm, 50 µm and 20 µm</li><li>Capacity: 5 LPM</li></ul>	1 No.
13	Oil distillation unit	<ul style="list-style-type: none"><li>Electric heating: 3 kW</li><li>Capacity: 50 L per batch</li><li>Shell and tube type two stage condenser with water circulation line connected to the reservoir of cooling tower through the water circulation pump</li><li>The oil temperature in the distillation unit must be controlled (up to 400°C) for distillation at different temperatures</li><li>Setting and display of temperature from the main control panel</li><li>Oil collection tank: 1 No. of 20 L capacity</li><li>MOC: SS304</li></ul>	1 No.
14	Catalyst	Suitable catalyst must be provided to control the rate of reaction	300 kg
15	Diesel (Initial fill)		100 L

### 3 Scope of supply & incidental services:

a) Waste plastic pyrolysis plant – 50 kg/batch: 01 unit

Batch processing time: 4-6 hours

The supplier shall be required to perform the following services:

- Complete installation and commissioning of the goods,
- Onsite demonstration to Scientists/ Technicians/ Staff is to be provided by Supplier for operation and maintenance of the equipment to the complete satisfaction of the user department,
- Supplying at least one number of operation & maintenance manual (hard printed copy) with the pyrolysis plant,
- Necessary cabling from control panel to each individual equipment items must be provided.

### 4 Inspection and Acceptance Tests required:

Trial run and full load test will be conducted for 3 days to the complete satisfaction of the end user in the presence of Scientists/Technical Officers from CSIR-CMERI.

### 5 Minimum Pre-Qualification Criteria:

None