



**NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA-769008 (ODISHA)**

An Institute of National Importance under Ministry of HRD, GOI

NOTICE INVITING TENDER

Tender Notification No: NITR/PW-SR/FP/2019/181

Dated: 12/12/2019

The National Institute of Technology, Rourkela invites bids from the eligible bidders for procurement of **Fabrication of Microwave-IR-UV-C Equipment**, at NIT Rourkela.

Last date of Submission of Bid : 09/01/2020 by 03:00 PM

Opening date of Techno-commercial Bid: 10/01/2020 at 03:00 PM

For Details: http://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx

Contact: Prof. P. P. Sutar, FP;

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Bidding through: <https://eprocure.gov.in/eprocure/app>

**Sd/-
REGISTRAR**



NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA-769008, ODISHA

(OPEN TENDER NOTICE NO: NITR/PW-SR/FP/2019/181

Dated: 12/12/2019)

(Tender for Fabrication of Microwave-IR-UV-C Equipment)

Sl. No.	Description of Goods/Service	Quantity
1.	Fabrication of Microwave-IR-UV-C Equipment	01

1. **Quantity required:** As mentioned above (All information provided in technical specification in Annexure I)
2. **Delivery** : Within **90 days** from the date of purchase order
3. **Last date of Submission of Bid** : **09/01/2020** by **03:00 PM**
4. **Opening date of Techno-commercial Bid:** **10/01/2020** at **03:00 PM**
5. The firm should not have been black listed at any time.
6. The submission of following bids by the tenderer should be through <https://eprocure.gov.in/eprocure/app> . Please follow the guidelines as per the portal.

Fabrication of Microwave-IR-UV-C Equipment

(Open Tender Notice No: NITR/PW-SR/FP/2019/181 Dated: 12/12/2019) Due on 09/01/2020 by 03:00 PM

7. Liquidated damage clause will be charged for any delay in supply of goods.
8. The validity of the tender shall be **120 days** from the date of opening of the bids.
9. Detailed advertisement including all tender documents is also available in our website at http://nitrl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx
10. NIT reserves the right to qualify or deny prequalification of any or all applicants without assigning any reasons.

REGISTRAR
NIT, Rourkela
Fax No- 0661-2462022
Ph. No -0661-2462021

Detail Specification for Fabrication of Microwave-IR-UV-C Equipment

Equipment should have a feeding section, microwave with water spray cooling cavity, infrared cavity, microwave excited UV chamber, and unloading section, control panel with computer interface suitable for continuous processing of food products. The detailed specifications are given below:

1. Feeding Section:

- Feeding section (made up of stainless-steel food grade material) should have 5 kg of product filling capacity (bulk volume < 0.1 m³) with the provision of the adjustable gate (thickness > 1 mm) at the bottom.

2. Microwave Assisted Water Spray Food Heating Cavity:

- This section should be provided with overhead water tank (5 -10 L) with water spraying arrangement (Pump power rating > 0.10 hp, pressure head > 4 m) along with return valve to increase the moisture content of the product.
- It should be fitted with IR temperature sensor (temp range: 0°C to 150°C) for the temperature measurement of the samples at the inlet.
- The material of the feeder should be rust proof (stainless steel) in case of wet material handling.
- This chamber should be able to process material at least 5 kg/h with MW power 4 kW.
- The bottom of this chamber should be:
 - a) Perforated so that product can be supplied with air and water can be drained, and
 - b) Non-perforated bottom for all types of products and excess water should be drained through a suitable valve and filter.

3. Infrared Peeler/Dryer (Sustainable and non-chemical IR system):

The section should have the following arrangements-

- Fitted with a minimum of 12 kW IR emitters in the cavity.
- The cavity should be fitted with a perforated belt conveyor with VFD.
- The IR emitter should be fitted on both the sides of the belt conveyor.
- The wavelength of IR emitters should be suitable for food heating.
- Conveyor should be provided in the chamber with the forwarding and backward movement arrangement.
- The wall of the cavity should have standard openings (1kW magnetron-international size) to connect with the waveguide of the magnetrons (4 nos. with 1 kW each).
- The internal material of the cavity should be microwave (2.45 GHz) reflecting and free from electron emission in the electromagnetic field.
- The wall of the cavity should be well insulated to avoid loss of heat. The cavity should have the suitable strength to support the 4 kW magnetrons and power system.
- The cavity should be fitted with microwave leak proof materials/screens (2.45 GHz frequency) at the transparent window to the surrounding.
- Air exhaust arrangement (>2 m³ per minute) should be provided for taking out the humid air from the cavity with a temperature sensor (range: up to 80°C), and humidity sensors (0 to 100% RH).
- There should be an arrangement of choke to prevent leakage of microwaves from the cavity.
- The whole cavity should be insulated with suitable material for avoiding heat loss.

4. MW Excited UV Chamber:

- MW-UV capacity should be suitable for material same as that of IR section fitted with atleast 2 kW microwave installed power sources.
- The section should be provided with a conveyor minimum speed 1-3 cm/s, motor with VFD and it must have an arrangement to easily remove the product.
- UV chamber should be fitted with ambient air circulator for immediate cooling of the product.
- IR temperature and humidity sensors should be fitted to MW-UV chamber.
- one imaging camera (at least 1 MP) should be fitted for capturing the online images of the samples after treatment.

5. Unloading Section:

- It should be connected with the MW-UV treatment chamber and equipped with screw conveyor device (0-30 rpm should be provided with VFD) suitable for output at the rate at least 5 kg/h.
- The material of the section should be rust proof in case of wet material handling.

6. Magnetron, IR Lamps, UV lights, Power System, and Control Panel:

It should have:

- All magnetrons (2.45 GHz, 240V, 50 Hz) each with electric accessories of power regulation and cooling. The magnetrons must be connected with safety switches for automatic shutdown in case of overheating by magnetrons or microwave leakage by the mishandling of the operator.
- All infrared emitters (wavelength suitable for food heating) should be fitted with power regulators (1 kW- 4 kW), temperature indicators (range: 0°C-300°C) and timer (range: 0-999 sec).
- A control panel fitted with microwave power controller (1-6 kW) and timer. Also, it should be fitted with safety switches and digital displays for microwave and IR power.
- The electric connections should withstand the heavy-duty operations.
- A digital controller cum indicator should be provided for temperature, relative humidity, air velocity and power (MW, IR).
- A computer should be attached to the control panel to continuously monitor and display the air temperature, relative humidity, cooling air temperature, calculated psychrometric properties, magnetron body temperature, and IR sensors temperature. The computer should have 16-22" display with high speed x64 bit processor, Windows 8 operating system, RAM at least 4 GB (Ex), data printer, 100+ GB storage, UPS, and upsand compatible with MATLAB 7. The computer processor must be compatible with a standard high-speed data logger.

7. Safety Features:

- Equipment must be fabricated so that it should not generate plasma in presence of microwaves.
- It should be provided with a (3-4 step) ladder (height 4 ft and width 1 ft) made up of non-conducting material for the operator's safety.
- Magnetron should automatically be switched off when there is any cross connection by overheating in control panel.
- The equipment should not give vibrations to nearby working apparatus also should not interfere with other electronic devices, computer screen, mobile phone, telephone, and digital displays.
- It should be automatically tripped off when there is high voltage fluctuation.

8. General Terms:

- At least one-year warranty must be provided on all magnetrons, IR, UV lamps and other electronic devices.
- All electric circuit diagrams should be provided along with electric emergency repair kit.

Details of the configuration and deviation must be provided along with technical bid.

Other Terms and Conditions

1. Certificate from OEM or its Indian representative to have a complete after sales service set up unit in India.
2. If the bidder is not an OEM, the representative must submit a certificate from OEM for serving the same OEM in India at least for 5 years.
3. **Warranty and Comprehensive Maintenance Contract (CMC):**
 - (i) Comprehensive warranty for 1 years including spares and consumables. Warranty will be effective from the date of successful installation at NIT-Rourkela.
4. Price should include installation and delivery of the Microwave-IR-UV-C Equipment to NIT-Rourkela basis. Customs duty exemption certificate will be provided by the Institute.
5. **Release of EMD:** The EMD of the successful bidder shall be released after successful installation of the units.
6. **Validity of bids:** The rate quote should be valid for a minimum of 120 days.

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