INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

PR No.1000021060 **RFx No. 6100000 823**

GENERAL TECHNICAL SPECIFICATION OF GAMMA CHAMBER-5000

1 BRIT is engaged in production of various self-shielded types of Cobalt-60 based Irradiators, out of one such as GAMMA CHAMBER-5000 having following Specifications. The unit is Type B(U) approved and is designed as per ANSIN.433.1.

1.1 Specification of the Unit:
· Maximum Co-60 source capacity : 518 TBq (14000 Ci)
· Dose rate at maximum capacity : 9.0 kGy/hr. [0.9 MRad/hr] at the centre of sample chamber
· Dose rate uniformity : Radial : + 25% or better & Axial : -25% or better
· Irradiation volume : 5000 CC
· Size of sample chamber : Sample Chamber: 17.2 cm [Ø] x 20.5cm [height]
· Shielding material : Lead & stainless steel
· Mass of the unit : ≈5600 kg approx.
· Size of the unit : ≈125 cm [L] x 106 cm[W] x 150 cm [H]
· Power requirement : 220/230V, 50Hz, 15 Amps, Single phase, A.C supply.
· Timer range : 6 Sec onward

1.2 Control system:
The unit can be operated in three (3) modes of operation as indicated below:

AUTO MODE:
Auto mode operation involves PLC based control system which is user friendly & having features of indicating on the panel, Dose, Dose rate, Real time & Date etc. along with pre-set time & automatic termination of irradiation time to facilitate easy operation of unit. The unit can be operated in both Time as well as Dose modes taking in to consideration of automatic cobalt-60 decay corrections.

ELECTRICAL MODE:
The unit can also be operated electrically, in case of the PLC based system gets isolated. The sample irradiation chamber up & down movement is controlled by using electrical push buttons. It has also got a Timer, which can be pre-set and after irradiation, the sample will come automatically at the pre-set time.

MANUAL MODE:
The movement of sample chamber can be also done with the help of a hand-crank in case of power failure or whenever Page 2 of 4 required.

1.3 Cobalt-60 Source:
It is housed inside the source container/lead flask of the unit. Sources are in form of pencils and Type approved by Atomic Energy Regulatory Board (AERB), India. These pencils are welded, decontaminated, tested for leakage and certified.

1.4 Dosimetry:
BRIT will provide dose rate profile at extreme points of irradiation chamber along with its central dose rate to assess the maximum & minimum doses given to any sample / product.

1.5 Power requirement:
The unit will be operated with single phase, AC supply of 220 / 230 V, 50Hz and 10 amps. Two power points of 15 & 5 Amps are required near to the unit for operation.

1.6 Installation:
The installation will be done by BRIT personnel. The unit need to be installed in a separate room in the ground floor. The cost of installation is included in the cost of the unit. However, all local assistance required for the installation such as providing a 10 tons mobile crane for a day, 6 riggers/labourers for 2-3 days & 1 skilled technician during installation by the users.

1.7 Maintenance:
BRIT's personnel will familiarise the user's personnel in the operation & maintenance aspects of the unit during the period of installation. The unit is designed as per our past experience and the users feedback is very simple to operate & maintain.

1.8 Operation Manual:
Two sets of operation manuals in English will be provided to users on free of cost at the time of installation of the unit. These manuals can be translated in to your local language at your cost.

2. Warranty:

A 12 months warranty will be given for any defective components and against bad workmanship. However BRIT will not be responsible for damage caused to the unit due to faulty operation by unauthorised personnel or not following the instructions mentioned in operation Manual. However, BRIT will be ready to supply any components as and when required by the users at additional cost. It will be endeavour of BRIT to see that unit remains operational with the users and in this connection technical information's & trouble shooting details would be provided in case of any difficulty experienced in the operation of the unit at any stage of its functioning.

3. Training of the user personnel:

Designated personnel from the users department will be trained both in operation and maintenance aspects of the unit during installation by our installation team. This training is sufficient for the safe operation of the unit. No additional training is required.

4. Source replenishment/ disposal:

BRIT will undertake replacement of sources and taking back old sources to India of BRIT supplied Unit / source pencils. However for the above, unit has to be dismantled & brought back to BRIT, Mumbai for source loading / source disposal and back to users country as the case may be under the supervision of BRIT personnel. The above services are available on chargeable basis.

INSTALLATION REQUIREMENTS FOR GAMMA CHAMBER 5000

GC–5000 unit weighs appx. 5600 kgs & measures 125cm (L) x 106 cm (W) x 150cm (H). The following are the details of the room and the installation requirements for the unit.

1. ROOM: The room is preferably has to be in the ground floor in view of its weight & floor loading capacity. The minimum room dimensions are indicated below:

1.1 MINIMUM SIZE : 4 meter [L] X 4 meter [W] X 4 meter [H] minimum
1.2 DOOR SIZE : 1.5 meters clear [W] X 2 meters [H]
1.3 FLOOR CAPACITY : Flooring in the room and installation path must withstand 10 T.m-2
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1.4 LOCATION OF THE UNIT : A clear 750 mm distance from each of the two adjacent walls of the room.
1.5 PIT SIZE : 35 cm Ø X 70 cm depth in floor

2. FACILITIES FOR INSTALLATION: The unit is transported packed inside steel cum wooden transportation crate (Yellow colour) weighing 7000 kg to the site. The unit has to be unloaded from the truck at the site with the help of a mobile crane and taken to the exact room (after de-crating from transportation crate) by rolling it on pipes. In view of this a suitable arrangement need to be made to facilitate smooth & safe handling of the unit from the truck unloading point to the exact location in the building with consultation of the users
department. A typical requirements of the installation are given below;

2.1 A mobile crane of 10.0 tons capacity for unloading and assembly of the unit.
2.2 A temporary steel structure/concrete platform (1.5 meters x 2.0 meters) suitable for taking 10 tons mass should be constructed at the level of floor at the entrance of building/room, if required, for unloading of the unit from the truck and later shifting to the room
2.3 A motorized / pallet trolley of capacity 10.0 tons ”or” 5 nos. of rollers / pipes size 30 mm Ø x 1 meter length for moving the unit inside the room after de-crating.
2.4 Skilled labourers for providing assistance during installation.
2.5 Technical support of an electrician and a mechanic during installation as they will be trained in preventive maintenance of unit by BRIT personnel.
2.6 The required crane & labourers for a day would be needed.

3. POWER SUPPLY:
3.1 220 / 230 Volts, 50 Hz, two plug points of 15 Amps & 5 Amps each.
3.2 Single phase, properly ground and fuse to be provided inside room.