# MEDICAL EQUIPMENT MAINTENANCE POLICY (2012)

**EMPLOYEES' STATE INSURANCE CORPORATION**
Panchdeep Bhawan, C.I.G. Road,
New Delhi-110 002

# FOREWARD

The Medical Equipment Maintenance Policy 2012 is a self-contained guidelines document for MSs/SMCs/SSMCs of ESIC/ESIS Hospitals, diagnostic centers, dispensaries & teaching institutions. This Policy will strive for effective and efficient maintenance of medical equipments used for diagnosis, treatment and prognosis of IPs, beneficiaries, staff & pensioners and also for educational purpose in ESI teaching institutions. This is for the first time that ESIC is bringing out a comprehensive manual for the maintenance of medical equipments.

I congratulate Dr. Surinder Kumar, Medical Commissioner and the dedicated band of officers and staff involved in preparation of this document. I believe this would go a long way in keeping the medical equipments used in ESIC/ESIS Hospitals in top working condition for long time.

**Dr. C.S. Kedar**
Director General

# PREFACE

The ESI Corporation has been providing comprehensive social security to the workers and their families in the contingencies of sickness, disablement and death for over six decades. The Corporation has been continuously striving to improve and upgrade the facilities for delivery of benefits as well as the quality of services. For providing the best available healthcare to IPs, Beneficiaries, Staff and Pensioners, costly equipments of latest technology are being used in ESIC/ESIS Hospitals.

In order to maintain the costly medical equipments being used for the diagnosis, prognosis and treatment of IPs, Beneficiaries, Staff and Pensioners, the corporation has established its own Medical Equipment Maintenance Policy 2012. As the process of Medical Equipment Maintenance involves various procedures, need was felt to have a Medical Equipment Maintenance Policy incorporating Life cycle of the equipment, Inventory & Documentation, Commissioning & Acceptance of equipment, Breakdown maintenance, Planned preventive maintenance, Equipment Audit to provide self-contained guidelines for MSs/SMCs/SSMCs for effective and efficient maintenance of Medical Equipments in all ESIC/ESIS hospitals, diagnostic centers, dispensaries & teaching institutions.

I congratulate the team comprising of Dr. S.K. Jain (Dy. Medical Commissioner), Dr. N.K. Arora (Dy. Medical Commissioner), Dr. R.K. Sharma (Dy. Medical Commissioner), Dr. A.K. Vaid (Medical Superintendent), Sh. Manish Agarwal (Assistant Director), Sh. Nitin Juneja (Bio-Medical Engineer), Ms. Khushabu Paliwal (Bio-Medical Engineer) - Headquarters and all other MSs of various ESIC/ESIS Hospitals and SSMCs/SMCs for bringing out this comprehensive Medical Equipment Maintenance Policy. I hope this document will serve the purpose it is meant for.

**Dr. Surinder Kumar**
Medical Commissioner

## INDEX


1. *Terminology* 1

2. *Introduction* 2

3. *Mission* 2

4. *Objective* 2

5. *Life Cycle of the Equipment* 3

6. *Equipment Maintenance Guidelines* 3

   I. *At ESIS/ESIC Hospital Level* 4

      1. *Inventory & Documentation* 4

      2. *Commissioning & Acceptance of equipment* 6

      3. *Monitoring of use and performance* 6

      4. *Maintenance of equipment* 7

      5. *Equipment Audit* 16

      6. *Training & Development* 17

   II. *At ESIC Hqrs. (Procurement Cell) Level* 18

7. *Organizational Structure* 19

8. *Summary* 21

*Appendices:-*

   *Annexure – I* 22

   *Annexure – II* 23

## 1. TERMINOLOGY

A. Policy: A document system which provides a logical framework and rationality of decision making for the achievement of intended objectives. It provides guidelines to be followed in order to achieve our objectives. It has three parts: objective, strategy and resource.

B. Equipment Maintenance: A set of activities conducted to keep an equipment in optimum working condition and consists of periodic inspection, preventive maintenance, and corrective maintenance.

C. Medical Equipment: The complex equipment that is used for diagnosis, treatment and monitoring purpose. The different uses can be classified as below:

I. Diagnostic – Used in estimation of body potentials, blood values, imaging and laboratory equipment.

II. Therapeutic – Used with radiation energy, prosthetic and orthopedic equipment used in resuscitation, special treatment and surgical support including the gas supply system.

III. Monitoring of body parameters and analysis of hospital environment.

IV. General – Equipment used in routine patient care, CSSD etc.

V. Medical Equipment may be used for medical research and education.

D. Types of Equipments: Two Types as given below

I. Major Equipments: - required to be Tendered/Proprietary Item

II. Minor Equipments/Instruments: - which can be obtained by Local Purchase

**MEDICAL EQUIPMENT MAINTENANCE POLICY** – will provide broad logical framework of decision to be taken for guiding certain actions that are useful in prolonging the active life of equipment so that the equipment provides accurate results in diagnosing, monitoring and treating our IPs, staff & beneficiaries. The equipment may be useful for medical education and research.

## 2. INTRODUCTION

Employees' State Insurance Corporation has a number of hospitals (149), dispensaries (1402), few Medical/Dental/Post Graduate health institutes (PGIMSR) and some new Medical Institutions are in pipeline too. There is a need of large number of medical equipments for providing the best health care services to our IPs, staff & beneficiaries. In addition, we need medical equipment for teaching as well as research purpose.

There is a necessity of certain guidelines to be followed by the users of medical equipment so as to have maximum life of the equipment with minimum downtime and let these equipments give the accurate results during their life.

This policy has been developed to ensure that medical equipment is stored, deployed and maintained in such a way that the risks inherent in its use i.e. safety, radiation effect etc. are minimised and accurate & reliable results are provided by these equipments.

The Policy aims to ensure that whenever medical equipment is used, it is:

- Suitable for its intended purpose
- Properly understood by appropriately trained users
- Maintained in a safe and reliable condition.

Keeping Medical device safe and effective will require planned preventive maintenance and breakdown maintenance services carried out by competent people.

## 3. MISSION OF THE POLICY

To maintain all medical equipments to the appropriate standards as prescribed by equipment manufacturer, so as to ensure that all medical equipments to be used to provide the best health care services to patients (IPs, staff, pensioners & beneficiaries) should be safe, efficient, effective, reliable and long lasting.

## 4. OBJECTIVES OF THE POLICY

This Policy is intended for the maintenance of medical equipment that ensures:

a. Maximum availability and reliability of equipments

b. Minimum downtime and Maximum Uptime

c. Maximum return on investment

d. Prevention of wastage of consumables and spares

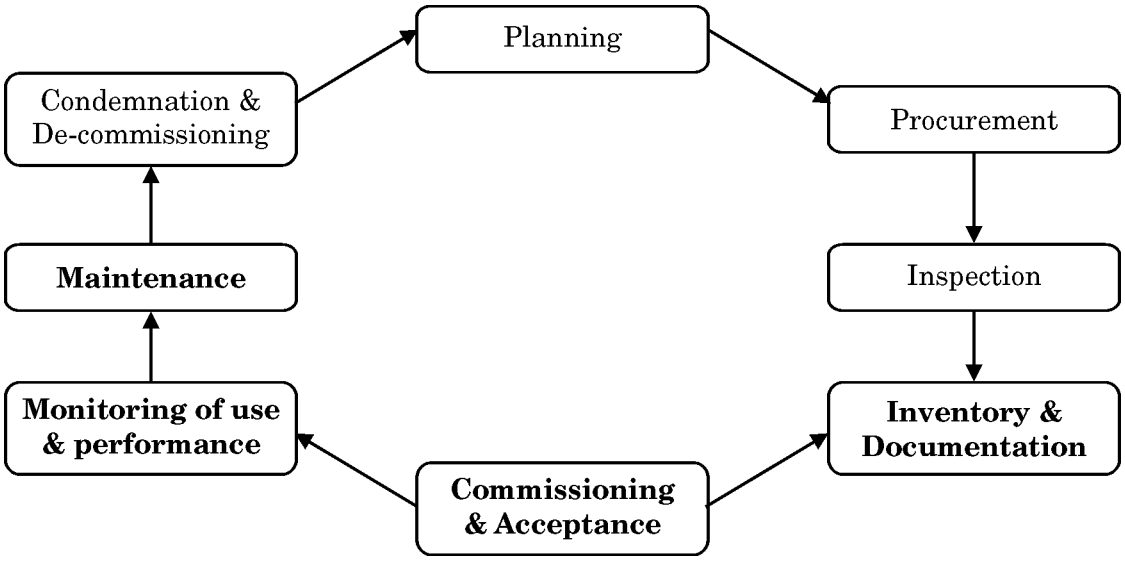
e. Extended useful life of equipments

f. Readiness of the equipment for emergency use whenever required

## 5. LIFE CYCLE OF MEDICAL EQUIPMENT

The delivery of the best healthcare services depends heavily on medical equipment, whether for life support, for diagnosis, for patient monitoring, or for the delivery of therapies or teaching and research purpose. The risks associated with the use of medical equipment can only be controlled by managing the whole life-cycle of the equipment.

Life cycle of Medical Equipment




***The bolded phases of the lifecycle of the equipment have been covered in this document.***

**6. STRATEGY: EQUIPMENT MAINTENANCE GUIDELINES** to be followed at:

**I. ESIS/ESIC Hospital Level**

**II. ESIC Hqrs. (Procurement Cell) Level**

**Details are given below:**

## 6(I). GUIDELINES TO BE FOLLOWED AT ESI HOSPITAL LEVEL

The tasks to be performed at hospital level are related to:

(i) inventory & documentation

(ii) commissioning & acceptance

(iii) monitoring of use & performance

(iv) maintenance of the equipment.

### 6I(1). Inventory and Documentation

*** It should be mentioned in the Tender Enquiry Document while floating the tender that manufacturer/supplier has to provide CMC (for all the major equipment(s)) for atleast three to five years after expiry of warranty period.**

Inventory provides information to support different aspects of medical equipment management.

The inventory of Medical Equipments should be maintained department wise at store level for the equipments:

- Purchased at MS/SMC/SSMC Level and
- Purchased through Procurement Agency (if any)

The inventory record includes the following details:

1. Reference ID
2. Equipment Name
3. Company/Make (with contact details)
4. Serial no.
5. Date of Indent
6. Tender No. /Local Purchase
7. NOA no. (With date)
8. Cost per unit
9. Date of issue of CRC (Consignee receipt certificate)

10. Date of Installation
11. Date of issue of FAC (Final acceptance certificate)
12. Warranty Period
13. Maintenance of Equipment
    a. In-House
    b. External Agency/Manufacturer Level
14. After warranty maintenance contract with period and charges*
15. Spare parts/ consumable inventory
16. Current status of functioning of equipments

The record should be maintained in table form as given in *Annexure-I*

***The inventory must be updated (at least Half Yearly) when:-***

a) additional equipment has been procured or equipment is replaced by new one
b) equipment has been condemned and is no longer in use
c) the equipment has been transferred to another location

*To ensure that all medical equipment is appropriately maintained, an inventory of this type of equipment must also be kept and maintained under the control of head of the department.*

***The above information in tabulated form shall be kept at Head Quarter level also if the cost of the equipment is above Rs. 10 Lacks per unit, So the information may be sent to ESIC, Head quarters for the same for the equipment of said cost.***

- **Maintenance contract -** *the process for* ***fresh maintenance contract*** *(AMC/ CMC) of the equipment should be initiated 3(three) Months before the expiry of the warranty period/AMC/CMC. The necessary concurrence from the finance department of the Institution required for renewal of contract/fresh contract shall be taken well in advance so that equipment remains functional and downtime is minimized. Also, the service provider should be located preferably within the city limits.*

- **Insurance -** If the Costly Equipments are not covered under AMC/CMC, then they should be got insured so that if any breakdown occurs the expenditure incurred for the same can be claimed from the Insurance Provider.

### 6I(2). COMMISSIONING AND ACCEPTANCE OF THE EQUIPMENT:

The competent authority should ensure installation and commissioning of the equipment by manufacturer/supplier. The process should be monitored by in-house technical staff so that any technical matters can be noted and recorded in the Maintenance Register (*Annexure- II*). This occasion also provides an excellent opportunity for in-house technical staff to gain familiarity with the new item and its operation. Ideally, in-house technical staff should also attend the operator's training session.

It is particularly important to bear in mind that normally the manufacturer/ supplier's warranty starts the day equipment is installed in the hospital. If equipment is not going to be used for some time after delivery, special arrangements must be made with the supplier to define the warranty period. Such an agreement should preferably be made in the purchase order. Final Acceptance Certificate (FAC) to the supplier should not be issued before the satisfactory performance has been confirmed by the in-house technical staff.

Regarding equipment with Turnkey project like CT/MRI Scanner, CSSD etc., the details will be handed over by the agency to the store manager or Medical Superintendent or authorized person in the presence of Head of the Department and in-house staff.

### 6I(3). MONITORING OF USE AND PERFORMANCE:

It is important that user should make a safe use of the equipment and also continuously monitor the performance of the equipment. User should also keep a direct link with manufacture/supplier/service provider and observe any supplier's technical services. Such services should be recorded in the Maintenance Register (*Annexure– II*). This will also provide a good learning opportunity for the in-house user.

Many equipment will require daily/weekly inspection and simple maintenance. This type of maintenance is vital for the continuous, safe, effective and reliable operation of medical equipment so as to get accurate and reliable results.

Daily/Weekly Inspection and Maintenance includes:

a. Visual Inspection

b. Performance Tests

c. Calibration

d. Checkout etc.

These tasks can and must be carried out by the users as per the manufacturer's instructions and suitable documentation should also be maintained for the same. Any discrepancies if found, should be brought into the notice of the controlling authority for necessary corrective action.

## 6I(4). MAINTENANCE OF THE EQUIPMENT :

Proper maintenance of medical equipment is essential to obtain sustained benefits and to preserve capital investment. Medical equipment must be maintained in working order and periodically calibrated for effectiveness and accuracy of the results.

The Maintenance consists of:

**a. Planned Preventive Maintenance**

**b. Breakdown Maintenance**

### a. Planned Preventive Maintenance (PPM)

Planned Preventive Maintenance involves maintenance performed to extend the life of the equipment and prevent its failure. Planned Preventive Maintenance is usually scheduled at specific intervals and includes specific maintenance activities such as lubrication, calibration, cleaning (e.g. filters) or replacing parts that are expected to wear (e.g. bearings) or which have a finite life (e.g. tubing). The procedures and intervals are usually established by the manufacturer. In special cases the user may change the frequency to accommodate local environmental conditions.

Planned Preventive maintenance will be a statutory requirement for most of the medical equipments. It will enhance the efficiency, effectiveness and reliability of medical equipment and must be carried out at appropriate frequency as suggested by the manufacturer/service provider.

Each equipment on the inventory will show whether it is

a. maintained in-house

b. maintained by external agency or manufacturer.

The conditions for preventive maintenance required for medical equipment can vary due to factor such as type of equipment, age of the equipment, frequency of use of the equipment, etc.

The record of Planned Preventive Maintenance should be maintained department wise and must include following details:-

1. Reference ID as per inventory
2. Equipment Name
3. Company/Make
4. Serial No.
5. Date of Installation
6. Warranty Period
7. Under AMC/CMC
8. Frequency of Preventive Maintenance/Calibration
    a. as per manufacturer guidelines
    b. presently being followed
9. Preventive Maintenance/Calibration Done On
10. Preventive Maintenance/Calibration Due On
11. Expenditure with cost and details
12. Remarks with Functional Status

The record should be maintained in table form as given in *Annexure-II.*

***Here is given the frequency of Planned Preventive Maintenance (PPM) of some of the medical equipment as a guideline.***

***Table showing broad based basic frequency of Planned Preventive Maintenance of some of the equipments is as given below:***

| S.No. | Equipment Name | Frequency* |
|---|---|---|
| 1 | X-Ray (Complete System) | Quarterly |
| 2 | CT Scanner (Complete System) | Quarterly |
| 3 | MRI Scanner (Complete System) | Quarterly |
| 4 | Mammography (Complete System) | Quarterly |
| 5 | Cath Lab System | Quarterly |
| 6 | C-Arm Machine | Quarterly |
| 7 | Heart & Lung Machine | Quarterly |
| 8 | Arterial Blood Gas analyzer | Quarterly |
| 9 | Electrosurgical Unit | Quarterly |
| 10 | Autoclave | Quarterly |
| 11 | Ultrasonic Washer | Quarterly |
| 12 | Dental X-Ray Machine | Quarterly |
| 13 | Ultrasound Machine | Half Yearly |
| 14 | IABP (Intra aortic balloon pump) | Half Yearly |
| 15 | Echocardiography Machine | Half Yearly |
| 16 | TMT Machine | Half Yearly |
| 17 | PFT Machine | Half Yearly |
| 18 | Patient Monitor | Half Yearly |
| 19 | Cardiac Monitor | Half Yearly |
| 20 | ECG Machine | Half Yearly |
| 21 | Defibrillator | Half Yearly |
| 22 | Anesthesia Machine | Half Yearly |
| 23 | Ventilator | Half Yearly |

** These are broad guidelines. However, frequency can be altered depending upon manufacturer's guidelines*

| S.No. | Equipment Name | Frequency |
|---|---|---|
| 24 | OT Table | Half Yearly |
| 25 | OT Light | Half Yearly |
| 26 | Suction Machine | Half Yearly |
| 27 | Insufflators | Half Yearly |
| 28 | Endoscope/Laparoscope | Half Yearly |
| 29 | Syringe & Infusion Pump | Half Yearly |
| 30 | Infant Warmer | Half Yearly |
| 31 | Phototherapy Unit | Half Yearly |
| 32 | Fetal Doppler | Half Yearly |
| 33 | Patient Bed | Half Yearly |
| 34 | Pulse Oximeter | Half Yearly |
| 35 | ACT Machine | Half Yearly |
| 36 | Tourniquet System | Half Yearly |
| 37 | Blood and Fluid Warmer | Half Yearly |
| 38 | Electromyogram Machine | Half Yearly |
| 39 | Electroencephalogram Machine | Half Yearly |
| 40 | Bi-Pap Machine | Half Yearly |
| 41 | Humidifier | Half Yearly |
| 42 | Holter System | Half Yearly |
| 43 | Pace Maker | Half Yearly |
| 44 | Bubble CPAP (Continuous positive airway pressure) System | Half Yearly |
| 45 | Infant Resuscitator | Half Yearly |
| 46 | Microwave Diathermy | Half Yearly |
| 47 | Hot Pack Unit | Half Yearly |
| 48 | Traction Unit | Half Yearly |
| 49 | Continuous Passive Motion System | Half Yearly |

| S.No. | Equipment Name | Frequency |
|---|---|---|
| 50 | Cold Pack unit | Half Yearly |
| 51 | Ultrasonic Tens System | Half Yearly |
| 52 | Hemodialysis Machine | Half Yearly |
| 53 | Continuous renal replacement therapy (CRRT) Machine | Half Yearly |
| 54 | Donor Couches | Half Yearly |
| 55 | Microscopes | Half Yearly |
| 56 | Centrifuge/Cryofuge | Half Yearly |
| 57 | Hot Plate | Half Yearly |
| 58 | Cell Counter | Half Yearly |
| 59 | Cell Separator | Half Yearly |
| 60 | PH Meter | Half Yearly |
| 61 | Refrigerator | Half Yearly |
| 62 | Deep Freezer | Half Yearly |
| 63 | Bio-safety Cabinet | Half Yearly |
| 64 | Water Bath | Half Yearly |
| 65 | Laminar Flow | Half Yearly |
| 66 | Incubator | Half Yearly |
| 67 | Urine Analyzer | Half Yearly |
| 68 | Micropipettes | Half Yearly |
| 69 | Weighing Balance | Half Yearly |
| 70 | Plasma Thawing Bath | Half Yearly |
| 71 | Platelet Agitator | Half Yearly |
| 72 | Tube Sealer | Half Yearly |
| 73 | ELISA Reader | Half Yearly |
| 74 | Immuno Assay System | Half Yearly |
| 75 | Microtome | Half Yearly |

| S.No. | Equipment Name | Frequency |
|---|---|---|
| 76 | Refractometer | Half Yearly |
| 77 | Ophthalmoscope | Half Yearly |
| 78 | Slit Lamp | Half Yearly |
| 79 | Keratometer | Half Yearly |
| 80 | Auto Perimeter | Half Yearly |
| 81 | Image Capturing system | Half Yearly |
| 82 | Dental Chair | Half Yearly |
| 83 | Dental Sterilizer | Half Yearly |
| 85 | Lithotripsy Machine | Half Yearly |
| 86 | Lithotripsy Table | Half Yearly |
| 87 | Uroflowmeter | Half Yearly |
| 88 | ENT Examination Unit | Half Yearly |
| 89 | Harmonic Scalpel System | Half Yearly |
| 90 | Chest Vibrator | Half Yearly |
| 91 | Fibrillator | Half Yearly |
| 92 | VDRL Rotator | Half Yearly |
| 93 | Hormone Analyzer | Half Yearly |
| 94 | Air Sampler | Half Yearly |
| 95 | Wax Bath | Half Yearly |
| 96 | Surgical/Operating Microscope | Half Yearly |
| 97 | Phaco-emulsification Machine | Half Yearly |
| 98 | Tissue Flotation Bath | Half Yearly |
| 99 | Vortex Mixer | Half Yearly |
| 100 | Transport Incubator | Half Yearly |

***This is not the end of the list; other equipments may also be added in the list as per the requirement of the ESIC Health Institution(s).***

For above and rest of the Medical Equipment, advice of manufacturer/supplier/ service provider should also be taken into consideration.

***Note: -*** *1. Preventive Maintenance of all the equipments whether in use or not shall be done periodically as advised by manufacturer/supplier, so that functioning status of the equipment could be known and equipment is readily available whenever its use is needed.*

*2. In critical care areas like Casualty, ICU, OT etc., if the number of equipments are less (one or two), then authority may look into that a standby active unit should be kept ready so that patient does not suffer in case the equipment in use goes out of order.*

*3. Life of equipment and quality of testing : Ensure usage of good quality consumables for prolonging life of equipment and maintaining quality of testing.*

** Service report after every repair or schedule service (PPM) should be taken by the user in which all the details like warranty on spare parts need to be added and same should be updated in the inventory register as well as in the Maintenance Register. If any deficiency is observed, the same may be communicated to service provider and Head of the institution for necessary action. (Performance Bank Guarantee is meant for such problems)*

### b. Breakdown Maintenance

Breakdown Maintenance is a task performed to identify, isolate, and rectify a fault so that the out of order equipment, machine, or system can be restored to an operational condition.

All medical equipment in use should be free from any fault or defect and all repair work should be carried out to accepted standards by competent person(s).

Faulty or defective equipment shall not be used regardless of how minor is the problem and must be reported in the first instance to the manufacturer/supplier/agency hired for maintenance of the equipment as soon as possible.

User department should:

1. Record details of the defect(s).
2. Attach label to the faulty equipment(s).
3. Contact Service engineer of manufacturer/supplier/hired agency by telephone number/fax/email supplied and keep a record of the same.
4. Ensure that information regarding breakdown is passed to all staff, including any shift changes and head of the institution.

All the breakdowns occurring in the department should be maintained on record and must include following details:-

1. Reference ID as per inventory
2. Equipment Name
3. Company/Make
4. Serial No.
5. Date of Installation
6. Warranty period
7. Under AMC/CMC
8. Breakdown Date and Time
9. Breakdown Details (Technical fault or other reasons)
10. Date and Time of Rectification
11. Total Time Taken (Rectification Time – Breakdown Time)
12. Rectification Details with expenditure including cost (if any)
13. Remarks with functional status

The record should be maintained in the table form as given in *Annexure-II*

**Note**: - ***The replacement of the defective part(s) should be done at the earliest feasible after taking the necessary concurrence from the finance department and sanction from the Competent Authority. The reason(s) for the delay if any, should be recorded.***

Information regarding Planned Preventive Maintenance and Breakdown Maintenance can be kept on a single sheet. The desired information recorded and analyzed are as given below (also given in Annexure – II)

| S.No. | Information | |
|---|---|---|
| 1. | Reference ID | "Information about the equipment" |
| 2. | Equipment Name | |
| 3. | Company/Make | |
| 4. | Serial No. | |
| 5. | Date of Installation | |
| 6. | Warranty Period | |
| 7. | Under AMC/CMC (with cost) | |
| 8. | Average Life (as per manufacturer) | |
| 9. | Contact details of the company (manufacturer/supplier) | |
| 10. | Location of the equipment | |
| 11. | Contact details of External contractor (if any) | |
| 12. | Frequency of Preventive Maintenance/Calibration<br>a. as per manufacturer guidelines<br>b. presently being followed | "Information about PPM of the equipment" |
| 13. | Preventive Maintenance/Calibration Done On | |
| 14. | Preventive Maintenance/Calibration Due On | |
| 15. | Expenditure with cost and details | |
| 16. | Remarks of Service Engineer | |
| 17. | Remarks of HOD/User | |
| 18. | Breakdown Date and Time | "Information about Breakdown of the equipment" |
| 19. | Breakdown Details (Technical fault or other reasons) | |
| 20. | Date and Time of Rectification | |
| 21. | Total Time Taken (Rectification Time – Breakdown Time) | |
| 22. | Rectification Details with expenditure including cost (if any) | |
| 23. | Remarks of Service Engineer | |
| 24. | Remarks of HOD/User | |

**Note: -** ***Due care should be given for the safety and security of the equipment so as to prolong its active life.***

### 6I(5). Equipment Audit

Equipment audit is a periodic evaluation system to measure the quality of performance of the medical equipments.

At any given point of time, a substantial number of equipment in the hospital may be non-functional. The reasons for the same could be:

1. Want of Minor repairs
2. Lack of Preventive Maintenance
3. Lack of corrective Maintenance
4. Lack of essential Spares
5. Electrical Faults
6. Unfavorable environmental conditions
7. Mishandling of equipment by untrained and unskilled manpower
8. Purchase of equipment without justifiable demand etc.
9. False Reporting, Willful Damage and Overuse than rated

For this, there is a need for periodic evaluation of the quality of performance of the equipment in a hospital. If such an audit is performed, it will be an advantage to all ESI Hospitals so that not only better utilization of medical equipment is ensured but also it contributes to the improvement in the quality of health care to beneficiaries and judicious use of resources.

The Equipment Audit should be done by a committee (Equipment Audit Committee) at Hospital Level on half yearly basis.

**The Equipment Audit Committee** should consist of:

1. The Medical Superintendent/designated medical officer of the hospital
2. The head of the concerned department
3. Head of maintenance (If Posted)
4. Representative from Administration
5. Representative from Finance Department
6. Hospital Store In-charge
7. Nursing Superintendent

**Focus of the Audit is to:**

1. Check the current status of the medical equipment
2. Analysis of the records such as Breakdown Register, Preventive maintenance Register
3. Questioning the user about the usage and performance of the equipment.
4. Suggesting measures to optimally utilize the equipment for quality health services.

**Advantages of the equipment audit are to:**

- Evaluate the performance and utilization of the equipment
- Provide an objective method for planning of equipment procurement in future
- Analyze various inadequacies (including downtime) in the utilization of an equipment and recommendation of remedial measures (including training to the users) so as to maximize the efficiency and effectiveness of the equipment.

**6I(6). Training and Development**

For the safety of the patient and the user, proper training is critical for both the user and the technical staff. Training and education is not a one-time activity but a continuous process.

Training may be:

1. In-House
2. At recognized institutions

**1. In-House Training**

a. For operating the equipment – to be given by Manufacturer/Supplier periodically and preferably to be mentioned in Tender Enquiry Document.

b. To deal with routine maintenance and repairs

- Use of tool kit
- Knowledge about common and recurrent causes of failure of the equipment and how to rectify minor causes of failure
- Calibration of the equipment

**2. Training outside at recognized institutions** – workshops etc.

a. For operating the equipment (if required)

b. To deal with routine maintenance

## 6(II). GUIDELINES TO BE FOLLOWED AT ESIC HQRS. (PROCUREMENTCELL) LEVEL

The tasks to be performed at ESIC Hqrs. level:

1. To assist Head of the ESI Institutions in planning, managing and implementing the maintenance of medical equipment with the help of Bio-Medical Engineer(s) whenever request received.

2. Maintaining information obtained from all ESI Hospitals regarding Inventory, Planned Preventive Maintenance (PPM) and Breakdown.

   The information received will be kept hospital-wise as well as equipment-wise in the format given in Annexure-I & II.

3. Analyzing the above information for Quality Management of Medical equipments being used at different ESI Health Institutions. This will be done through assessment and analysis of:

   a. **Downtime of Major Equipments** such as in OT, ICU, Imaging, Dialysis and Laboratory etc. It needs to be compared quarterly.

      **Formula: -**

      $$\textbf{Downtime of equipment} = \frac{\textbf{Total Breakdown time}}{\textbf{Total Uptime}} \textbf{ X 100}$$

   b. **Maintenance Cost Index***

      $$\textbf{Formula :-} \quad \frac{\textbf{Maintenance Cost}}{\textbf{Capital Cost}} \textbf{ X 100}$$

***** To check that maintenance cost should not increase 80% of the capital cost of equipment.

***The above information will help in issuing necessary guidelines to ESI Health institutions (whenever required) in relation to maintenance of equipment.***

**7. ORGANIZATIONAL STRUCTURE:** should be

**I. At Hospital Level**

Head of the Institution
↓
Head of the Department
↓
Sr. Technician
↓
Technician(s)

**Duties Assigned should be:-**

| | |
|---|---|
| **Head of the Institution**: | 1. Guiding Head of the department regarding maintenance of equipment and periodic checkup of records.<br>2. Interference if problem is not solved at the Head of the Department level. |
| **Head of the Department**: | 1. Supervision and monitoring the work of technicians<br>2. Guiding Technicians regarding usage and maintenance<br>3. Frequent communication with medical superintendent regarding functioning of equipment. |
| **Sr. Technician:** | 1. Supervision of Technicians for:<br>a. Safe & sound use of the equipment<br>b. Periodic (Daily/Weekly etc.) maintenance of the equipment.<br>c. Frequent communication with Head of the department and designated persons.<br>2. Frequent communication with Head of the Department regarding functioning of equipment. |

| | |
|---|---|
| **Technician**: | 1. Safe & sound use of the equipment<br>2. Periodic (Daily/Weekly etc.) maintenance of the equipment.<br>3. Frequent communication with Sr. Technician and designated persons. |

**II. At ESIC Hqrs. Level**

Medical Commissioner
↓
Deputy Medical Commissioner
↓
Bio-Medical Engineer(s)

| | |
|---|---|
| **Medical Commissioner**: | 1. Guiding Deputy Medical Commissioner about the actions to be taken in relation to equipment maintenance at various hospitals.<br>2. Informing to Director General about the actions taken in relation to equipment maintenance policy.<br>3. Interference if problem is not solved at MS/ DMC level. |
| **Deputy Medical Commissioner**: | 1. Supervision and monitoring the work of Bio-Medical Engineer(s)<br>2. Guiding Bio-Medical Engineer in maintaining records<br>3. Issuing necessary instructions to all ESI Hospitals whenever required.<br>4. Informing Medical Commissioner about the actions taken in relation to equipment maintenance policy. |

**Bio-Medical Engineer**:

1. Guiding Head of the Institution(s) regarding maintenance and providing information to Deputy Medical Commissioner about the status of equipment and their functioning at various ESI Hospitals.
2. Maintaining the Inventory/PPM/Breakdown record hospital wise where the cost of the equipment is more than 10 Lakh rupees per unit and analyzing them. To suggest measures in appropriate situations.
3. Calculating Downtime of the equipments & maintenance cost index periodically, comparison with other ESI Health Institution(s) having the same equipment and suggesting measures.

***There will be a frequent contact between functionaries at ESI hospitals and ESIC Head quarters through correspondence telephone/email/fax.***

***Note: - Once IT Roll out is fully operational, the data fed can be utilized at Head Quarters and periphery at the same time.***

## 7. SUMMARY:

To provide the best healthcare services, there is a need of the best quality medical equipment which helps in diagnosis, treatment, monitoring of patients (IPS, Staff & beneficiaries). Some of the equipments are also to be used for teaching and research purpose. These guidelines have been framed to keep these equipments well maintained so as to get the accurate results in order to provide the best healthcare services to IPs, staff & beneficiaries. It is expected that these guidelines shall be followed by all in true spirit so to achieve our (ESIC) objectives and mission.



**ANNEXURE-I**

# INVENTORY REGISTER

| S. No. | Reference ID | Equipment Name | Qty. | Company/ Make (with Contact Details) | Serial No. | Date of Indent | Tender No. / Local Purchase | NOA No. (with date) | Cost per unit | Date of issue of CRC | Date of Installation | Date of issue of FAC | Warranty Period (with Expiry Date) | After warranty maintenance contract with period and charges | Spare parts/ Consumable inventory | Current status of functioning of equipment with Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

**Note: - Inventory register should be updated half yearly for current status of functioning of the equipment, with name and signature of the concerned person by whom equipment has been checked.**
**Necessary action should be taken if required so that equipment is nearly always available for the right use.**

**ANNEXURE-II**

# MAINTENANCE REGISTER

| | |
|---|---|
| ***Equipment Name with Reference ID:*** | ***Company/Make:*** |
| ***Serial No.:*** | ***Date of Installation:*** |
| ***Warranty Period (Date of Expiry):*** | ***Under AMC/CMC (with cost):*** |
| ***Average Life (as per manufacturer):*** | ***Frequency of Planned Preventive Maintenance (as per manufacturer) :*** |
| ***Contact details of the company(manufacturer/supplier):*** | ***Location:*** |
| ***Contact details of External Contractor (if any):*** | |

| S. No. | Preventive Maintenance/ Calibration | | Expenditure with cost (If any) | Remarks of the Service Engineer with full name signature | Remarks of HOD/User with full name signature | Breakdown Date and Time | Breakdown Details (Technical fault or any other reasons) as examined by user | Date and Time of Rectification | Total Time Taken | Rectification Details with Expenditure (If any) | Remarks of the Service Engineer with full name signature | Remarks of HOD/User with full name signature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | | (3) | (4) | (5) | (6) | (7) | (8) | (9) = (8 - 6) | (10) | (11) | (12) |
| | Done on | Next Due On | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Note :- 1. Planned Preventive Maintenance column should be filled with ***GREEN PEN*** in Register and with ***GREEN COLOR*** in computer.
2. Breakdown column should be filled with ***RED PEN*** in Register and with ***RED COLOR*** in computer.