RADIATION SAFETY EQUIPMENT

OBJECTIVES:

1. LIST THE DIFFERENT TYPES OF EQUIPMENT AND DEVICES USED FOR RADIATION SAFETY

2. STATE THE USES OF THE DIFFERENT TYPES OF EQUIPMENT USED FOR RADIATION SAFETY

3. DESCRIBE THE MAKEUP OF THE DIFFERENT TYPES OF EQUIPMENT AND DEVICES USED FOR RADIATION SAFETY
TYPES OF EQUIPMENT AND DEVICES USED FOR RADIATION SAFETY

1. GEIGER-MUELLER SURVEY METER
2. PANCAKE PROBE
3. SODIUM IODIDE SCINTILLATION DETECTOR SURVEY METER
5. POCKET DOSIMETER
4. "CUTIE-PIE"
6. FILM BADGE
7. TLD
8. LUXEL
GEIGER-MUELLER SURVEY METER

USAGE:

USED TO DETECT LOW ACTIVITY CONTAMINATION
ROOM SURVEYS
PERSONNEL MONITORING
RECEIVING RADIOACTIVE SHIPMENTS
THERAPY PATIENT MONITORING
G-M SURVEY METER MAKEUP:

ALUMINUM TUBE ENCLOSES GAS

THIN WINDOW FOR MEASURING PARTICULATE RADIATION

ELECTRIC FIELD ESTABLISHED BETWEEN TWO ELECTRODES

OPERATES IN THE GEIGER-MUELLER REGION

DISPLAY - CPM OR mR/hr

AUDIBLE SOUND EMITTED (If turned on.)
PANCAKE PROBE

USAGE:

USED TO MEASURE - BETA PARTICLES

VERY LOW ENERGY GAMMA RAYS

MORE SENSITIVE THAN A G-M SURVEY METER WITH AN ALUMINUM ENCLOSED GAS DETECTOR PROBE

MAKEUP:

A G-M SURVEY METER WITH A PANCAKE LOOKING PROBE

PROBE USES A THIN MICA WINDOW BETWEEN THE RADIATION TO BE MEASURED AND THE ENCLOSED GAS DETECTOR

THIN WINDOW IS EASILY PENETRATED BY BETA PARTICLES
SODIUM IODIDE SCINTILLATION DETECTOR SURVEY METER

USAGE:
PRIMARILY USED FOR RADIOACTIVE TRASH DISPOSAL
MUCH MORE SENSITIVE THAN A G-M SURVEY METER USED FOR MEASURING GAMMA AND X-RADIATION

MAKEUP:
EXTERNAL PROBE IS A NaI SCINTILLATION DETECTOR
DETECTOR CONNECTED TO A PHOTOMULTIPLIER TUBE TO GENERATE AN ELECTRICAL PULSE IN RESPONSE TO RADIATION/DETECTOR INTERACTION
PULSES COUNTED IF THEY EXCEED A THRESHOLD
ON SOME METERS AN ENERGY WINDOW CAN BE SET TO DETERMINE THE TYPE OF RADIONUCLIDE BEING MEASURED
DIAMETER AND THICKNESS OF THE PROBE CAN VARY DEPENDING ON ITS INTENDED USE
POCKET DOSIMETER

USAGE:

USED TO MONITOR THE AMOUNT OF RADIATION AN INDIVIDUAL ABSORBS OVER A SHORT PERIOD OF TIME

CAN GET AN IMMEDIATE READING

MAKEUP:

GAS-FILLED CHAMBER WITH TWO ELECTRODES

OPERATES IN THE IONIZATION REGION

DOSIMETER CHARGER REQUIRED

READOUT IN mR
"CUTIE-PIE"

USAGE:
USED TO MONITOR AREAS WHERE THERE ARE HIGH LEVELS OF RADIOACTIVITY

MAKEUP:
GAS-FILLED CHAMBER WITH TWO ELECTRODES
OPERATES IN THE IONIZATION REGION
RADIATION INTENSITY READ IN mR/hr
FILM BADGE

USAGE:
USED TO ESTIMATE THE AMOUNT OF RADIATION AN INDIVIDUAL RECEIVES

CAN DETERMINE THE TYPE AND ENERGY OF RADIATION EXPOSED TO

CAN DETERMINE HOW PENETRATING THE RADIATION IS

TYPICALLY WORN FOR ONE MONTH

FILM SENT TO AN APPROVED OUTSIDE AGENCY TO BE READ

MAKEUP:
FILM CONTAINED WITHIN PLASTIC HOLDER

FILM DARKENS WITH RADIATION EXPOSURE AND COMPARED WITH STANDARDS

FILTERS USED: SENSITIVE TO HEAT AND HUMIDITY
THERMOLUMINESCENT DOSIMETER

USAGE:
USED TO ESTIMATE RADIATION EXPOSURE TO PERSONNEL
CAN BE USED TO MONITOR EXTREMITIES:
RING BADGE
WRIST BADGE
CAN BE USED TO ESTIMATE RADIATION DOSE DELIVERED TO TISSUES SURROUNDING A THERAPEUTIC TISSUE IMPLANT SOURCE
THERMOLUMINESCENT DOSIMETER (CONTD.)

MAKEUP:

USUALLY CALCIUM OR LITHIUM FLUORIDE CHIPS HELD IN FILM BADGE HOLDER OR RING

CHIPS ABSORB IONIZING RADIATION

STORED ENERGY RELEASED WHEN TLD IS BROUGHT TO A CERTAIN TEMP. AND LIGHT WHICH IS GIVEN OFF IS READ

MORE SENSITIVE TO RADIATION AND LESS SENSITIVE TO HUMIDITY & TEMPERATURE
LUXEL DOSIMETER

USAGE:
USED TO ESTIMATE RADIATION EXPOSURE TO PERSONNEL
CAN MEASURE - X AND GAMMA RADIATION FROM 1 - 1,000 MREM
- ENERGETIC BETA FROM 10 - 1,000 MREM
DOSE EQUIVALENT FROM X AND GAMMA RAYS WILL HAVE A DEEP, EYE AND SHALLOW VALUE REPORTED
BETA READ AS SHALLOW ONLY
MULTIPLE DOSIMETERS WORN:
ONE WORN CLOSEST TO THE EYES GIVE EYE LENS DOSE
OTHER - WHOLE BODY DOSE

MAKEUP:
CONTAINS AN OPTICALLY STIMULATED LUMINESCENCE (OSL) DOSIMETER AND FILTER PACKET
AFTER THE DETECTOR IS EXPOSED TO RADIATION, THE DETECTOR IS STIMULATED WITH LASER LIGHT CAUSING IT TO BECOME LUMINESCENT PROPERTITIONAL TO THE EXPOSURE
DOSIMETER HOUSED IN A WATER RESISTANT BLISTER PACK

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