This document was formerly published as GEX Doc. No. 100-253 *Dosimetry Lab Requirements*.

1 - Purpose

To provide basic requirements for a laboratory used for a dosimetry process incorporating the GEX DoseControl Dosimetry System.

2 - Applications

Dosimetry for commercial and research applications using B3, PMMA, FWT, GAFCHROMIC and/or CTA dosimeters.

3 - General Information

A dosimetry laboratory is used for a variety of activities. It may be strictly used for housing a dosimetry system workstation for measuring dosimeters, but often also includes areas for preparation performing dosimetry tests, unpacking, and assessing products for dose mapping, and storage areas for dosimeters and dosimetry-related supplies, test samples, and fixtures.

4 - Procedure

4.1 Area

4.1.1 Determine the area required for the laboratory based upon the expected application requirements and volume. Dosimetry laboratories range from small (100 ft2) to large (600 ft2) depending on the user's application, number of dosimetry workstations, products for irradiation, and volume of product and dosimetry to be stored in the lab.

4.1.2 A minimum of one PC workstation is required to which the system spectrophotometer will be attached.

4.1.3 A spare spectrophotometer is typically maintained in the lab, or the user may have additional dosimetry PC workstations each with a spectrophotometer.

4.1.4 A workstation at desk or bench, with a chair, that is at minimum 48" wide and 30" deep is typical. About 36 inches of headroom is typically sufficient.

4.1.5 Users of GEX B3 dosimeters will have one or more incubators for heat treatment of the dosimeters to stabilize them post-irradiation, each requiring 1 to 9 ft2 in addition to the workstation space requirements.

4.1.6 Oftentimes both desk and bench heigh workstations are useful in the lab and designs should be based on preference for working on the expected tasks. Semi-permanent benches and tables with locking wheels can also be useful along with a cart for moving boxes and tests into and out of the lab. As such, a 30" doorway or wider may be appropriate to move the furnishings, equipment and materials in and out of the lab.

4.1.7 The lab should be easy to clean, free of clutter and well organized. Gross particulate cannot be allowed to build up; the lab should be cleaned weekly at a minimum. Laboratory grade cabinets are preferred but not required.

4.1.8 At least one lockable cabinet may be helpful to maintain control over certain supplies or materials.

4.2 Fixtures & Furnishings

4.2.1 A variety of work surfaces can be used but a smooth surface, preferably of Formica, natural or fabricated stone, or sealed wood is preferred. Metal tables can also be used but should be grounded to reduce static potential particularly when using radiochromic film dosimeters.

4.2.2 Desk or benchtop height work surfaces is suitable for dosimeter measurements. A waist-height countertop is useful for preparing tests.

4.2.3 Excellent lighting should be employed to facilitate visible cleanliness, inspecting individual dosimeters, and taking digital images of tests or work being performed as part of the documentation that the lab technicians will execute.

4.2.3.1 For B3 and FWT radiochromic film dosimeters, it is usually necessary to remove UV light sources or protect the area from UV and to verify the lack of UV on a prescribed time interval.

4.2.3.1.1 UV-free LED lights are preferred.

4.2.3.1.2 Cover all UV light sources and any windows that allow UV light into the lab with a UV blocking film that is capable of eliminating 99 percent or more of indirect light and UV radiation.

4.2.3.1.3 Establish a process for initial and scheduled verification testing using a method similar to that described in *UV Control and Monitoring – Procedure*.

4.2.4 Duplex or quadplex power outlets with 20-40 Amps per outlet should be spaced every 4 to 6 feet along any walls where powered equipment will be placed.

4.2.5 Electrical line quality should be managed, or the user should employ surge protection and universal power supply (UPS) for spectrophotometers and instrumentation to allow safe shutdown during a power outage.

4.3 Environment

4.3.1 Instrument locations should be free from vibration which may affect the optical system of the spectrophotometer. It is suggested that instruments not be along the same wall as entrance doors or facing a warehouse with forklift traffic unless it can be proven first that the design of the lab eliminates vibration.

4.3.2 Airflow should be maintained around instruments to facilitate cooling; refer to the instrument guides for more information on requirements from the various manufacturers for details.

4.3.3 Average temperature should be maintained between 15°C and 30°C depending on local preferences. Variation of ±5°C is preferred, where possible, but is not required. See manufacturer's recommendations supplied with equipment and dosimeters for additional requirements.

4.3.4 Relative humidity should be maintained between 20% and 70% if B3 dosimeters are used outside their GEX factory packaging. If only pre-packaged dosimeters supplied by the manufacturer are used, deviation from these recommendations will not affect dosimeter readings. See manufacturer's recommendations supplied with equipment and dosimeters for additional requirements.

4.3.5 The laboratory area should avoid activities that generate particulate. Cleaning of surfaces should be accomplished by wiping with a wet cloth or a vacuum technique; dry dusting and sweeping practices should be discouraged.

4.4 Access

4.4.1 Limit access to the dosimetry laboratory equipment and instrumentation to properly trained personnel.

4.4.1.1 It is recommended that the dosimetry laboratory be in a controlled access area and an isolated room is preferred to a room that has multiple functions.

4.4.1.2 PCs should be access controlled using MS Windows controls and/or those available within the GEX DoseControl software to lockout the software after a few minutes of idle time.

4.5 IT/Network

4.5.1 PCs are an integral component of the dosimetry system. Refer to DoseControl Software User Guide for detailed requirements for the PC's and SQL database.

4.5.2 For configurations where the database is running on a SQL server separate from the PC workstation, continual connectivity to the server is required for the software to operate. Intermittent connectivity or extended outages are not acceptable.

4.5.3 Whether running on the PC workstation or on a separate server a plan for backup of the SQL database is essential and should be conducted at a frequency that is based on the level of risk and probability of data loss.

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