Department of Health and Human Services
Population Health

Radiation Protection Act 2005 – Section 17

CERTIFICATE OF COMPLIANCE:

STANDARD FOR SEALED RADIATION SOURCE -

MOBILE SOIL DENSITY AND MOISTURE GAUGE

SECTION 1: REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION SOURCES

SECTION 2: PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD

This information can also be accessed at
http://www.dhhs.tas.gov.au/peh/radiation_protection

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Section 1 – REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION SOURCES

This Standard is to be used when assessing Radiation Sources, classified by Radiation Protection Act 2005 licences as "Mobile Soil Density and Moisture Gauge", for the purpose of issuing a certificate of compliance.

In order for a certificate of compliance to be issued the Radiation Source must be shown to fully comply with the requirements in Section 2.

†Where an item was demonstrated to comply at the time of manufacture or supply, on going compliance for that item may be stated only if it is reasonable to assume there has been no change, modification, damage or unacceptable wear and tear to that item since the time of manufacture.

The requirements in Section 2 are taken from the following:

RPS 5	*ARPANSA Radiation Protection Series 5 Portable Density/Moisture Gauges Containing Radioactive Sources (2004)*
RPS 2	*Code of Practice - Safe transport of radioactive material (2001)*
RAR	*Regulatory Authority Requirement, Department of Health and Human Services*

Section 2 - PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD

ITEM	Requirements
Radioactive Sources	
Only appropriate sources†	**Neutron** sources to be used in portable density/moisture gauges must only be americium-241/beryllium or californium-252 unless an alternate **radioactive substance** is approved by the relevant regulatory authority. ***RPS 5 A1.1***
Chemical and physical form†	Radioactive substances used in portable density/moisture gauges must have physical and chemical properties to minimise: (a) corrosion and the build up of internal pressure; and (b) dispersal or dissolution if the source encapsulation is breached. ***RPS 5 A1.2***
Minimum activity†	The radioactive source must have the minimum activity necessary to ensure that the radiation gauge will operate effectively during its projected life. ***RAR***
Radioactive source encapsulation†	Each radioactive source used in portable density/moisture gauges must be "special form radioactive material" as specified in the Transport Code (***RPS 2***). ***RPS 5 A2.1*** The design, construction and markings of each source used in portable density/moisture gauges must satisfy the applicable requirements of: ISO (International Standard) 2919-1999(E); ***RPS 5 A2.2 and RAR***

Gauges	
Construction requirements for a gauge	***RPS 5 Schedule B***
Exposure rates	When the source(s) is/are in the shielded position, the radiation levels must not result in an ambient dose equivalent rate or directional dose equivalent rate, as appropriate, exceeding: (a) 250 μSv h^{-1} at any point 0.05 m from the gauge surface; and (b) 10 μSv h^{-1} at any point 1 m from the gauge surface. ***RPS 5 B2.1***
Gauge resistant to heat and pressure†	The shielding must be designed and constructed to withstand, without loss of shielding integrity, temperatures and pressures arising during normal use, storage and transport. ***RPS 5 B2.3***
Damage to the gauge from vibration, acceleration and vibrational resonance†	The shielding must be designed and constructed to withstand, without loss of shielding integrity, all effects of vibration, resonance or acceleration arising during normal use, storage or transport. ***RPS 5 B2.2***
Integral in design†	The gauge incorporating the source(s), source assembly, source housing and associated electronics, power supply and displays, must be of an integral design. ***RPS 5 B1.1***
Source assembly fixed within gauge†	The source assembly, including the source(s), must not be capable of being physically separated from the shielded housing under normal operational, transport or storage conditions. ***RPS 5 B1.2***
Compatibility of materials used in constructing the gauge†	All components of the gauge, including the source(s), source assembly and shielding, must be constructed of physically and chemically compatible materials that perform satisfactorily under irradiation conditions. ***RPS 5 B1.9***
Withstand dust and corrosion†	The gauge must be designed to prevent wear, corrosion, dust, moisture, vibration, heat, or any other external factor, from adversely affecting the integrity of the source encapsulation, source assembly, or source shields, or interfering with the ease of operation of the gauge. ***RPS 5 B1.4***

Source securely fixed in source assembly	The source(s) must be fixed in the source assembly in such a manner to prevent loss, dislodgment or removal of any of the sources. ***RPS 5 B1.3***
Prevention of jamming for source control†	The source assembly and retraction mechanism must be designed to prevent jamming or sticking. ***RPS 5 B1.5***
Lockable source assembly	The source assembly must be capable of being key locked in the shielded position. ***RPS 5 B1.6***
Positive location of source assembly	The source assembly must be capable of being positively located in the: (a) correct operating position(s); and (b) shielded position. ***RPS 5 B1.7***
Indication of source position	A mechanical indicator must clearly and unambiguously indicate the source position, by a label or marking, or by the position of the source assembly. ***RPS 5 B1.8***
Labels and markings required on the gauge	B1.10 The gauge must be labelled on its exterior surface with a durable label incorporating the: (a) radiation hazard warning symbol; (b) name(s) of the radioactive substance(s); (c) activities of the radioactive substance(s) and the date(s) of measurement; (d) the maximum dose rate at the gauge surface when the source(s) is/are in the shielded position, and the date that this measurement was made; (e) the name and address of the manufacturer of the gauge; (f) the serial numbers of the source(s) and the gauge; and (g) any other information required by the relevant regulatory authority. ***RPS 5 B1.10***
Information that must be on a durable label on gauge and on transport case	B1.11 The gauge must be **durably labelled, marked or engraved** in a conspicuous location on the exterior surface of both the gauge and the transport case with: (a) the Licence Holder's name or organisation; and (b) the Licence Holder's full contact telephone number. ***RPS 5 B1.11***
Test for non fixed contamination	
	The gauge is to be wipe tested annually for the presence of non-fixed radioactive contamination.
	Non fixed contamination levels not to exceed 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for all other alpha emitters for a wipe test taken over an area of 100 cm^2 on the gauge. ***RAR***
Preventative maintenance	The gauge must be inspected annually to ensure all control mechanisms, including the shutter or source control mechanism, operate properly. ***RAR***