Radon Regulation in Spain

Marta García-Talavera (CSN)
Regulatory Framework

1. National Radon Action Plan

2. Workplace Regulation

3. Building Regulation
Transposition & Implementation: Assignment of responsibilities, legal certainty, basic infrastructure, service providing, capacity building, regulatory enforcement, NRA’s human resources, public information, etc.
1. National Radon Action Plan

National Radon Action Plan

Directive 2013/59/EURATOM Article 103
1. **Radon Action Plan**

**EU-BSS Article 103**: “... for any source of radon ingress”.

- **2013/51/EURATOM DWD**
  
  Rn parametric value: 100 Bq/l

- **EU-BSS Article 75**
  
  $\gamma$-radiation: 1 mSv/y
1. Radon Action Plan

García-Talavera et al. 2013 J. Radiol. Prot. 33 605

Rn reference level: 300 Bq/m$^3$ (Article 54.1)
1. Radon Action Plan

- Core Knowledge & Infrast.
- Public Commun.
- Occupational Exposure
- Rn Priority Areas
- Building

Coordination & Follow-up
2. Workplace Regulation

Regulation on Health Protection Against Ionising Radiation (2001)

• Work activities involving increased exposure of workers or the public to natural ionising radiation
1. Underground workplaces (caves, mines...)
2. Workplaces processing or using groundwater
3. Workplaces in RADON PRONE AREAS (EU-BSS Article 54.2)

- **Notification:** > 300 Bq/m³ *(Article 54.3)*

  - Workers > 6 mSv/y, Planned exposure situation *(Article 35.2)*
    - (area classification & signage, area and personal dose monitoring, dose limitation, PPE, record keeping and information)

  - Workers < 6 mSv/y, Re-test Rn levels every 5 years
2. **Workplace Regulation**

- **Dose assessment**

  For inhaled Rn-222 + progeny:

  - 3 mSv per MJ h m$^{-3}$ in most circumstances
  - 6 mSv per MJ h m$^{-3}$ for tourist caves, work involving substantial physical activity

- CSN to release guidance on cases requiring site-specific calculations
2. Workplace Regulation

CSN Safety Guide 11.4

Guía de Seguridad 11.4
Metodología para la evaluación de la exposición al radón en los lugares de trabajo
2. Workplace Regulation

SG 11.4: Spatial sampling design

- Divide the workplace into Homogeneous Radon Areas (e.g.: individual rooms; HVAC zones. Consider: temperature gradients; room usage, fixed work areas, etc.)

- Place at least one detector per HRA, with a minimum of 2 detectors per workplace

<table>
<thead>
<tr>
<th>Total certified area within premises</th>
<th>Minimum number of sampling points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public-use buildings; offices</td>
<td>1 per office/room</td>
</tr>
<tr>
<td>&lt; 1000 m²</td>
<td>1 per 200 m²</td>
</tr>
<tr>
<td>1000-5000 m²</td>
<td>1 per 400 m²</td>
</tr>
<tr>
<td>&gt; 5000 m²</td>
<td>1 per 500 m²</td>
</tr>
</tbody>
</table>

Adapted from RPII
2. Workplace Regulation

SG 11.4: Spatial sampling design

✓ For large spaces classified as HRA with several fixed work areas, perform $\chi^2$ test:

$$\frac{S_{ext}^2}{S_{int}^2} = \chi^2_R$$

- ✓ PASS  Assign sample average
- ✓ FAIL   For fixed work areas, assign value of closest detector
SG 11.4: Temporal sampling design: Seasonality

- Underground workplaces: 1 full year (open-season) exposure *

Altamira cave, Spain (Lario et al., 2005)

Nerja cave, Spain (Dueñas et al., 2011)

Take prompt action if 1st 3/6-month measurement results elevated
2. Workplace Regulation

- Other workplaces: > 3 months during the heating season

Rn levels usually higher at winter. Yet a non-negligible fraction displays no seasonal pattern or follows the reverse behaviour.
SG 11.4: Temporal sampling design. **Short term**

- Working time vs. non-working time concentration (day/night; weekend; holiday)

**Ratio of correlated variables**: based on at least **5 independent determinations** (day/night: 24 h long; weekend: 72-h long) over non-consecutive days
EU-BSS Article 54.3: “...action taken in accordance with the principle of optimisation”

- Notification must include Documentary Evidence
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Provision of services

• **Rn measurement laboratories:** ISO 17025 accreditation

• **TRPU [RP advice, dose assessment]:**
  (> 300 Bq/m³): CSN authorisation. Duty to report on compliance breaches

• **Rn personal dosimetry services:**
  CSN authorisation
Building Regulation

New Section HS6
Protection against radon exposure

Guidance Documents
New Buildings

- Classification by municipality
3. Building Regulation

Class 0, Class 1, Class 2
3. **Building Regulation**

### Existing Buildings

- ✔ Sealing of cracks and joins
- ✔ Improvement of crawl-space ventilation
- ✔ Improvement of the building ventilation system (BM)
- ✔ Soil depressurisation
- ✔ Radon barrier
3. Building Regulation

2-month test

Coverage factor: 1.4
(measurements out of the heating season in zones C, D & E)
Thank you for your attention!

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