

GUIDANCE NOTE

2015 Regulation Change relating to Shielding Design in Package Design Safety Reports

Purpose

The purpose of this note is to communicate ONR's expectations with regards to package designs, renewals and modifications following a recent change to the IAEA regulations, for self-approved and competent authority approved packages which have now been incorporated into GB and UK law¹.

Timing

GB legislation for transport by road and rail requires that from 1st July 2015, all new package designs, design modifications and renewals demonstrate that a package will meet the shielding requirements set out in [SSR-6](#), the 2012 edition of the IAEA Transport regulations¹.

Scope

These expectations are applicable to new designs, modifications and periodic renewals of all package designs i.e. Excepted, Industrial, Type A, Type B and Type C packages.

Change to the Regulations

ONR's advice in the [Guide to an application for UK competent authority approval of radioactive material in transport](#) that applications should demonstrate that radiation dose rate limits will be met for routine as well as for normal and accident conditions of transport. This has now become a legal requirement as a consequence of a change in the [IAEA Regulations for the Safe Transport of Radioactive Material 2012 Edition \(SSR-6\)](#) (which forms the basis of UK and GB law) from the previous edition ([TS-R-1, 2009](#)). Paragraph 617 of SSR-6 states:

A package shall be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum radioactive contents that the package is designed to contain, the radiation level at any point on the external surface of the package would not exceed the values specified in paras 516, 527 and 528, as applicable, with account taken of paras 566(b) and 573.

The guidance [SSG-26 para 617.1] states:

The intention of para. 617 is to demonstrate by calculation or other methods that the package is correctly designed to transport the maximum permitted contents without exceeding the radiation level limits specified in the Transport Regulations

This change was brought about to ensure that packages are correctly designed to carry the maximum contents without exceeding statutory radiation dose levels. The change effectively

¹ Although this guidance note refers to SSR-6 and various paragraphs within SSR-6, duty holders are reminded that the legal requirements are contained in the modal regulatory texts: European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) 2015 Edition, Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) 2015 Edition, International Maritime Dangerous Goods (IMDG) Code 2014 Edition incorporating Amendment 37-14 and the Technical Instructions for the Safe Transport of Dangerous Goods by Air 2015-2016 Edition.

extends the package and vehicle (or conveyance) dose rate levels to be demonstrated within the design process in addition to those required by the transport controls. The requirements for demonstrating compliance with Normal and Accident Conditions of Transport are unchanged.

SSR-6 (IAEA, 2012) has been transposed into UK legislation via an update to The [European Agreement concerning the International Carriage of Dangerous Goods by Road 2015](#) (ADR).and the equivalent legislation for transport by rail, air and sea.

Demonstration of Shielding Design

For both competent authority approved and self-approved packages (where the design does not require competent authority approval), in general, the method of demonstrating the shielding element of the package design should be commensurate with the level of hazard and the safety margin derived from the design. ONR expects the package design safety case to address the following, as applicable:

- **Routine Conditions of Transport (RCT)**
Designs for all packages should demonstrate compliance with radiation dose rate levels for the contents they are designed for (*SSR-6, paras 516, 527, 528 and 566*). Designs should also take account of conveyance (vehicle) dose rates (*paras 573b and c*)
- **Normal Conditions of Transport (NCT)**
In addition to RCT, designs for IP-2, IP-3, Type A, Type B and Type C packages should prevent the external surface dose rate increasing by >20% (para 648) following NCT testing (paras 719 to 724)
- **Accident Conditions of Transport (ACT)**
In addition to RCT and NCT, designs for Type B and Type C packages should demonstrate that the dose rate at 1m from a package does not exceed 10mSv/h (para 659) following ACT testing (paras 727, 728 and 729).

Competent Authority Approved Designs

For existing competent authority approved packages, any periodic renewal or modification of a design must address the requirements of SSR-6 in the next application. ONR will take one of the following positions:

- **The package is compliant with SSR-6 design requirements**
 - ONR is satisfied that the package design has been demonstrated to meet regulatory requirements.
 - A *five year certificate* with Tier 2 advice (where appropriate) will be issued².
- **The application contains shortfalls, i.e. the justification is missing /incomplete, but the ONR is confident that the package design has been demonstrated to meet**

² “Tier 1” questions are considered to be essential to the safety case being made in the submission, and must be answered satisfactorily before the requested Competent Authority approval is granted. “Tier 2” questions, while still being safety-related, are not considered to be essential to the safety case being made in the submission, and can be answered in a longer timeframe.

regulatory requirements. Supporting evidence is not documented, incorrect assumptions in calculations, etc. but ONR is confident that the actual package design meets the transport regulations, (i.e. self-evident safety margins, calculations supported by empirical data, confirmatory calculations done by ONR, etc.).

- All other requirements of the regulations are demonstrably met.
 - A short term, typically one year certificate (possibly with additional limits on the package's use) will be issued.
 - The purpose of the short term certificate is proportionately to allow continued transport operations for a limited period whilst the applicant provides documentary evidence of compliance with RCT, NCT, ACT in the Package Design Safety Report.
- **The application contains safety significant shortfalls and ONR is not confident that package design meets regulatory requirements**
 - Supporting evidence is not documented, incorrect assumptions may outweigh safety margins, lack of safety margins, ONR calculations do not demonstrate compliance, etc. then the applicant would be asked to resubmit the application.

Self-Approved Packages

The same approach to demonstrating safety should be evident in the safety case for self-approved packages (where the design does not require competent authority approval) as would be for competent authority approved packages, although the level of hazard posed by the package should be taken into account in the extent to which safety is demonstrated. The ONR expectation for packages approved by the duty holder's design authority under TS-R-1, with the intention to use the package post-June 2015 (when TS-R-1 based regulations cease to apply), is that, the safety case should be approved under SSR-6 at the next renewal, so long as that renewal period is equal to or less than the competent authority approved renewal period of 5 years. ONR may ask to view duty holders' processes that stipulate the package renewal period. ONR as Competent Authority may also request necessary safety documentation for inspection under the Carriage of Dangerous Goods section.26 (ADR section 1.8.1 and 5.1.5.2.3), particularly if we consider that there may be shortfalls in the package safety case.

If a self-approved package is acquired from a design authority (domestic or foreign), then it is the responsibility of duty holders to ensure:

- compliance with design regulations,
- that the package is operated in accordance with the package design requirements, and
- compliance with any government requirement of any country that the package may be transported through or into.

Further Information

Package designers should refer to the [Guide to an application for UK competent authority approval of radioactive material in transport](#) and the [European Package Design Safety Reports for the](#)

[Transport of Radioactive Material](#) for details of the regulatory expectations on demonstrating compliance with design requirements.

A [presentation](#) was given at ONR's recent Transport's 2015 Stakeholder Event that explains the recent changes to the regulations with regard to shielding and ONR's expectations.

[Regulations for the Safe Transport of Radioactive Material - 2012 Edition Specific Safety Requirements SSR-6](#)
[European Agreement concerning the International Carriage of Dangerous Goods by Road 2015](#) 

[Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material \(2012 Edition\), SSG-26](#)