

Industry Codes of Practice for the Safe Transport of Radioactive Material in the United Kingdom

Transport Container Standardisation Committee (TCSC) been established:

“to examine the requirements for the safe transport of radioactive material with a view to standardisation and, as appropriate, produce and maintain guidance in the form of Standards documentation”.

Its primary role is the maintenance and development of codes of practice that support the safe transport of radioactive material. The design codes support standardisation for package design, whilst others provide guidance for promulgate good practice and substantiate safety documentation. In addition, the documentation is used by designers working in a wide range of engineering disciplines.

The codes of practice are available for use in the UK. The Poster will present the content of the current codes of practice:

- Design and Operation to Minimise Seizure of Fasteners, **TCSC 31 - June 2005** provides guidance to designers and operators on the precautions that can be taken to minimise the risk of galling for fasteners.
- The securing / retention of radioactive material packages on conveyances, **TCSC 1006 - December 2012** provides guidance on the design and operation of package tie-down systems. It suggests suitable stress limits, provides fatigue data together with simple methods for calculating design loads. This document has been recently updated to reference the requirements of TS-R-1 & TS-G-1.1.
- Design of transport packaging for radioactive material, **TCSC 1042 - December 2002** contains a range of advice and data useful to designers. The code provide guidance and advice on criticality, containment, shielding, thermal and impact performance to meet the regulatory requirements and includes information on miscellaneous related issues such as lightweight packages & galling. It is applicable to IP, Type A and Type B packages.
- Shielding integrity testing of radioactive material transport packaging, **TCSC 1056 - December 2005** provides details of the methodology for assessing the quality of gamma shielding using the source and scintillation technique.
- Leakage tests on packages for transport of radioactive materials, **TCSC 1068 - March 2008** covers a wide range of techniques that can be used to assess and measure the leakage rate through package containment. The sensitivities of the various qualitative methods are given, together with the theoretical background to pressure drop techniques.
- Format for supplementary labelling of packages used for the safe transport of radioactive material, **TCSC 1073 - June 2011** provides guidance of typical supplementary information that should be included on a transport packaging, together with recommendations for good practice with examples of typical formats. It should be noted that this includes details of maintenance due dates along with other regulatory requirements.
- Self Assessment and Approval of Package Types IP-1, IP-2, IP-3 and Type A, **TCSC 1078 - May 2013**. This TCSC code of practice was developed using all relevant information contained in both the UK DfT Applicants Guide and the EU Technical Guide. The IAEA graded approach has been taken into consideration as this standard is solely intended to be used for packages that do not require Competent Authority Approval. This code further explains a system to be followed for the self assessment

approval process as well as providing documentation templates to assist the user in compliance with both the regulations and assist to harmonise UK industry for self assessed packages.

- Lifting points for radioactive material transport packages, **TCSC 1079 - June 2003** makes recommendations on design, testing and inspection, and includes a detailed guide to the application of BS 2573. This code has been recently updated to reference the requirements of LOLER & PUWER regulations. The appendix gives general methods for the correct design of welded and bolted lugs.
- Finishing systems for transport containers, **TCSC 1080 - June 2010** is a comprehensive guide on the specification and application of coating systems to a range of commonly encountered surfaces, which, despite the title, are not limited to transport containers. As well as providing detailed descriptions of these coatings, a series of look-up tables allows a complete finishing system to be matched with the substrate to provide the optimum protection under selected conditions.
- Testing radioactive materials transport packagings, **TCSC 1086 - December 2001** and **TCSC 1096 – May 2013** is complementary guidance to the IAEA advisory material (TS-G-1.1) on the technical aspects of testing. **TCSC 1086** provides guidance for Type B packagings and **TCSC 1096** provides similar guidance but for package Types IP-2, IP-3 and Type A. Testing a package design is often a time consuming and expensive exercise. It is therefore important that not only is it carried out correctly, but that the testing, and all the associated activities, are performed efficiently so as to minimise cost. A perfectly executed series of tests are useless if subsequently the philosophy of the test method is challenged and rejected. Hence guidance is offered on designing and building a prototype, getting the test methodology right, carrying it out successfully, and preparing a suitable report.
- The Application of Finite Element Analysis to Demonstrate Impact Performance of Transport Package Designs - **TCSC 1087 – July 2012**. This Guide sets out current 'good practice' in using explicit FEM for the analysis of impact behaviour of transport packages and specifically for the demonstration of compliance with the UK regulations for public domain transport when applying for the necessary approval from the UK Department for Transport. The objective is to raise the standard of Finite Element (FE) analyses so as to improve the confidence that can be placed in FE analyses, so that FE analyses can take a more central role in demonstrating regulatory compliance.
- Surface Finish Guide for Transport Containers Manufactured from Stainless - **TCSC 1088 - March 2008**. The purpose of this Code of Practice is to provide designers in-depth guidance on surface finish for transport containers manufactured in stainless steel. The IAEA publish advisory material, TS-G-1.1, which contains some advice on aspects of packaging design.
- Safe Transport of Radioactive Material as an Excepted Package - **TCSC 1089 - August 2008**. This code of practice has been developed to help consignors understand the requirements for transporting radioactive material as an Excepted Package. It is suggested that the approach taken to ensure the safety of an Excepted Package should be in a standard format.
- The Design, Manufacture, Approval and Operation of an ISO Freight Container for use as an Industrial Package Type 2 (IP-2) - **TCSC 1090 - March 2009**. This Code of Practice gives guidance on the requirements for the design, manufacture, testing, approval, operation and maintenance of ISO freight containers for use as Industrial Packages Type 2 (IP-2), which are appropriate for their intended use whilst satisfying the requirements of the IAEA Regulations for the Safe Transport of Radioactive Material.

- Thermal Analysis and Testing - **TCSC 1093 – March 2012**. Thermal performance is an important aspect of the design of any transport package and a key feature in regulatory testing and approval. This document provides guidance on the thermal testing and analysis of packages, to supplement and support the information provided in the IAEA Regulations and the accompanying advisory material. It is intended to assist packaging designers in selecting their approach to thermal testing, as well as experimentalists performing thermal tests, and analysts modelling the thermal performance of transport packages. It describes what is required from a thermal assessment and the issues which should be considered. It also provides guidance on which method (i.e. testing or analysis) might be most appropriate for different types of package.
- Procurement Guide - **TCSC 1094 – March 2011**. Procurement Guide for Transport Packagings provides guidance for the supply of services required to enable the procurement of transport packagings that meet the requirements for the safe transport of radioactive material. It should be noted that these services are considered to include the minimum requirements to enable the user to procure goods and services in a responsible manner and to operate as an Intelligent Customer.

In particular this guidance document provides advice on:

- Specification of functional requirements
- Activities associated with design, manufacture and testing
- Extent of build records

The aim of the guidance document is to promote good practice in the procurement of goods and services that are used for the safe transport of radioactive material. In particular this document aims to cover supply of approved single use or reusable transport packagings.

- Packaging Repair **TCSC 1095 – September 2012**. This Guide to Packaging Repair provides guidance on the process to be applied for the repair of packaging to enable them to remain compliant with the requirements for the safe transport of radioactive material. It should be noted that these activities are considered to include the minimum requirements to enable the user to repair packaging in a responsible manner and to operate as an Intelligent Customer.

In particular this document aims to ensure the packaging is compliant with the design intent.

For further information or to find out how to access and download the codes of practice, visit the TCSC website at www.tcsc.org.uk

THE FULL PAPER