



Aspects of Safety Assessments for Package Designs with Additional Equipment Components

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1 Introduction

Many paragraphs in TS-R-1 [1] contain the terms “package” or “packaging”. These terms are defined in TS-R-1 paras 230 and 231 and explained in TS-G-1.1 [2] paras 230.1 – 230.6. The importance of a consistent understanding of these definitions has been shown by recent discussions during the assessment of applications for package design approval. There was disagreement, if equipment components attached to the container body during transport, e.g. a transport frame, should be considered part of the package and taken into account in the safety assessment for the package. Discussions were also caused by the way inner design components are treated in the safety assessment of the package. This paper summarises the regulatory requirements to such additional equipment components and presents the way of their inclusion into the package design approval process in Germany.

2 Definition of package and packaging

Regarding the definition of the term package the components of a shipment concept for radioactive material could be basically classified as

- (a) Radioactive material,
- (b) Container body with lid and devices permanently fixed to it (e.g. trunnions, fixed inner structure to hold the content),
- (c) Inner equipment not permanently fixed to the container body (e.g. cans, inner containers),
- (d) Equipment outside the container body used during handling and transport but not permanently fixed to the container body (e.g. a transport frame),
- (e) Conveyance.

Obviously, the container body with lid and devices permanently fixed to it belongs to the packaging, and the radioactive material belongs to the radioactive contents. Para. 230.3 of TS-G-1.1 [2] excludes the usual conveyances from being assigned to the packaging.

For the assessment of the remaining components (c and d), the use of these components during handling and transport has to be taken into account.

3 Equipment outside the container body

Explanations which components should be considered part of the package are given in TS-G-1.1 [2]:

“ ... If a package can only be transported with certain structural equipment, it is normal to consider that equipment part of the packaging. ...” (230.3)

“Because the package may be transported either with or without certain structural equipment, it may be necessary to evaluate both situations in determining packaging suitability and compliance.” (230.4)

“ If certain equipment is attached during transport for handling purposes, it also may be necessary to consider its effect in normal and accident conditions of transport. In the case of Type B(U), Type B(M), Type C and packages designed to carry fissile material, the designer must reach agreement with the competent authority for certification.” (235.5)

These requirements should be seen in connection with para. 611 of TS-R-1 [1]. This paragraph demands that any equipment added to the package at the time of transport which is not part of the package shall not reduce the safety of the package.

This means, that a transport frame, that is attached to the package during the whole transport including loading and unloading of the conveyance, has to be considered part of the package. Compliance of the package with the regulations must be shown with the transport frame attached to the container body. In the case, that a special equipment is used only during transshipping, both cases with and without transport frame must be considered.

4 Equipment inside the container body

Equipment inside the container body that is not permanently fixed to the container can be considered part of the packaging or part of the content. Irrespective of this decision, the influence of this equipment on the compliance of the package with the regulations has to be assessed. If the equipment ensures safety relevant properties of the package, a detailed specification, testing and quality assurance during manufacturing and handling are required, as for other safety relevant parts of the packaging.

Example: If the safety assessment of a package relies on the integrity of some can holding the radioactive material during normal or accident conditions of transport, this can has to be included in the safety assessment report with requirement according to its safety function. If the integrity of the can need not be guaranteed, at least its influence on the other parts of the package during normal or accident conditions of transport has to be assessed.

5 Consequences for the approval of package designs in Germany

The above mentioned considerations indicate, that the safety assessment of packages with structural equipment not permanently attached is closely connected to the intended use of the package during transport and including transshipment. This is one reason for the German competent authority to ask for a detailed description of the handling procedure for every application for package design approval or validation of a package design approval certificate issued by a foreign competent authority. To decide if inner and outer equipment components are treated adequately the complete safety assessment report including the handling instructions is taken into account.

6 Conclusions

It is strongly recommended to consider additional equipment necessary during transport in an early phase of the package design process. TS-R-1 [1] and TS-G-1.1 [2] define provisions to decide if additional structural equipment should be considered part of the package or not. If the package design needs competent authority approval agreement with the competent authority has to be reached. With the same care inner equipment should be treated to show the influence on the packaging and to show that all safety functions are met.

7 References

- [1] Regulations for the Safe Transport of Radioactive Material, 1996 Edition (As Amended 2003), Safety Standard Series No. TS-R-1
- [2] Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Standards Series No. TS-G-1.1 (ST-2)