

Transport Packages for the Morsleben Repository

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INTRODUCTION

The Repository for Radioactive Waste in Morsleben, Germany ("Endlager für radioaktive Abfälle Morsleben", ERAM) is the only repository for low and medium active waste in operation today. It was established by the former German Democratic Republic and had been in operation several years before the reunification of Germany. During this first phase of operation a transport system was designed and has successfully been used for the transport of medium active waste on public routes and remote handling during loading and unloading in order to reduce the exposure of the workers. After reunification the license for ERAM stayed valid, and in 1994 the second phase of operation started. The transport system is now mandatory for the acceptance of medium active waste at ERAM (see the acceptance criteria (BfS 1993)).

In 1993 Nuclear Cargo + Service GmbH (NCS) took over the responsibility for the transport system. The existing packagings and containers were evaluated in view of the regulations having changed since they were designed and manufactured.

The major changes to be considered were:

- The definition of the IP-2 packaging type in the IAEA-Regulations SS 6 (IAEA 1990).
- Special licensing for IP-2 freight containers in Germany.
- New regulations concerning quality assurance (QA).

This paper describes the necessary modifications and organizational measures which were required to qualify the transport system.

THE TRANSPORT SYSTEM

The NCS-transport system for medium active waste consists of following components:

- the primary packaging;
- the shielding container (as an example, see design FC 75 shown in Fig. 1); and
- the 20'-ISO-container equipped with different tie-down systems (see Fig. 2).

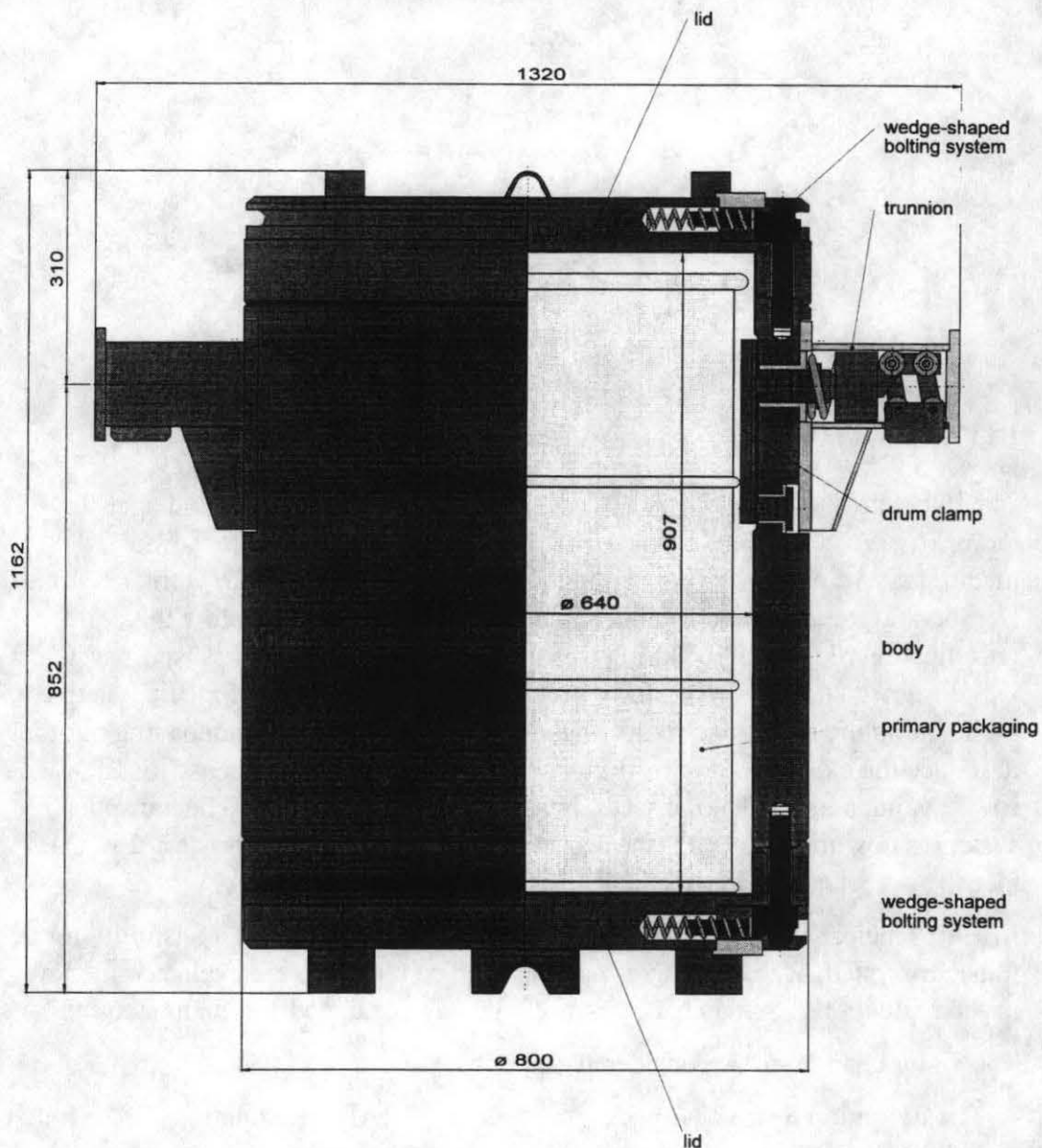


Figure 1. Drum Container FC 75 (dimensions in mm).

As primary packaging for the waste standard 200-l drums are used. These drums are loaded in shielding containers for the transport.

The shielding containers consist of a cylindrical body and an upper and lower lid. The lids are connected to the body by a special locking system which is suitable for remote handling. Trunnions are attached to the container body for handling and for tie-down during transport. For remote loading and unloading, the shielding containers are equipped with a drum clamp operated through the trunnion or a drum gripper operated through the upper lid. Figure 1 shows the basic design of

the drum container FC 75 with a shielding thickness of 75 mm steel. Other designs are available with different shielding thicknesses and material.

For transport, the shielding containers are loaded into open hardtop 20'-ISO-containers. These containers are equipped with tailor-made tie-down systems for the shielding containers in order to ensure satisfactory tie-down and to minimize the exposure of the personnel during loading and unloading. Figure 2 shows the design of the ISO-container with the tie-down system for four shielding containers (e.g. four FC 75, as shown in Fig. 1). Other tie-down systems are available for shielding containers with a higher mass.

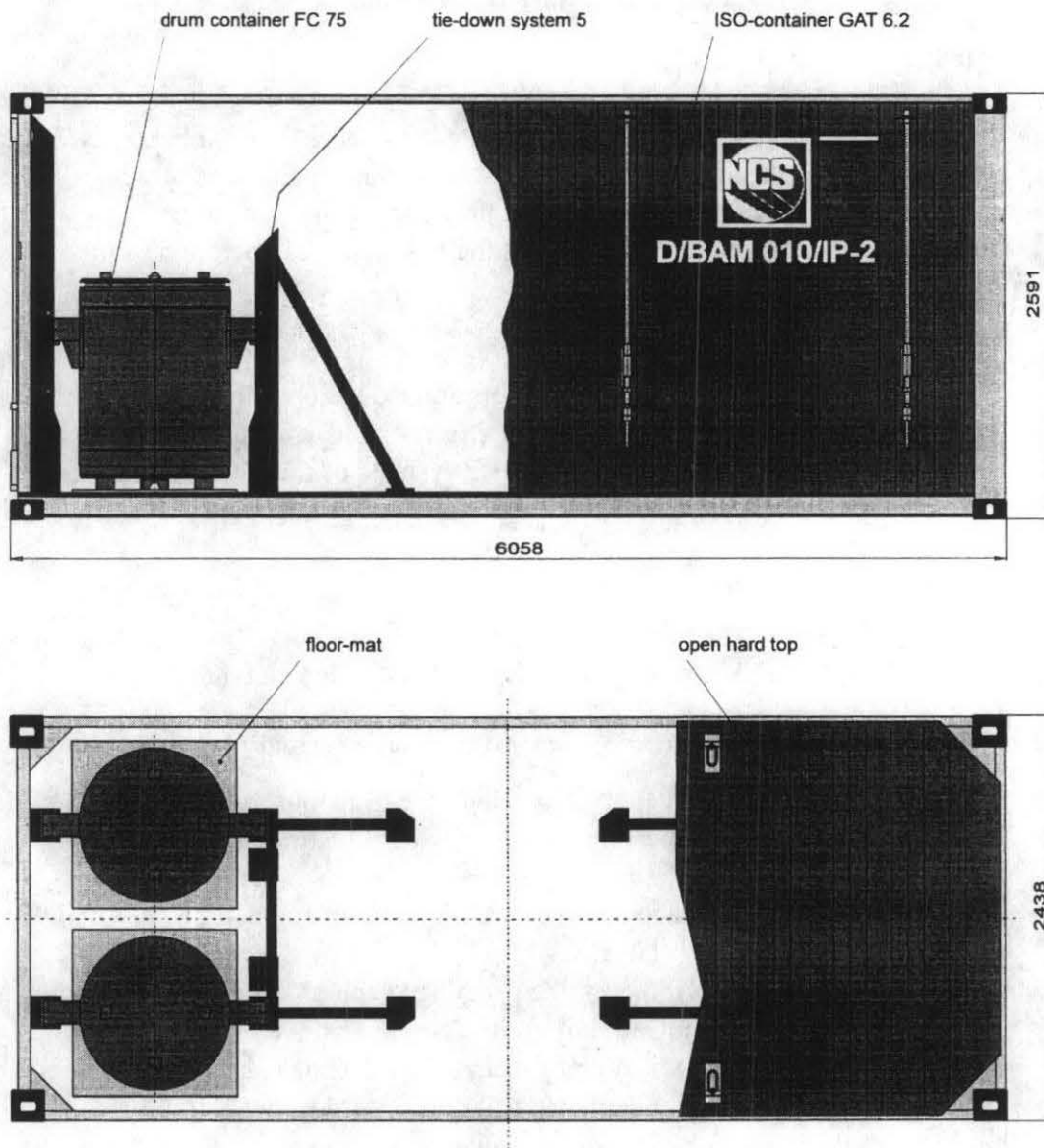


Figure 2. 20'-ISO-container with tailor-made tie-down system (dimensions in mm).

QUALIFICATION OF THE TRANSPORT SYSTEM

The shielding containers as well as the special 20'-ISO-containers had been designed and manufactured in the former GDR. They have been used for transports during the first phase of operation of the repository Morsleben.

When the second phase of operation after the reunification of Germany started, new or revised standards and regulations had to be considered. Therefore technical, administrative and organizational measures were necessary in order to fulfill the requirements of the German Competent Authority (Bundesanstalt für Strahlenschutz, BfS) and the Supervisory Board of the Repository (also BfS).

TECHNICAL MEASURES

All technical measures were based on a requirement checklist established by NCS in cooperation with its clients. This checklist was then considered for the modification and preparation of drawings and technical specifications. Furthermore, the experience gained during the first phase of operation of the repository was considered as well.

The technical measures were:

- Modification of drum clamps and grippers and extension of the usable height of some shielding containers, because new drum designs were to be transported;
- Reinforcement of the tailor-made tie-down systems of the ISO containers;
- Complete disassembly, inspection, and maintenance of the parts, assembly, and function tests;
- New paint and corrosion protection.

ADMINISTRATIVE AND ORGANIZATIONAL MEASURES

The administrative and organizational measures were necessary because,

- the Competent Authority responsible at the time of manufacture differs from the Competent Authority responsible now (the Federal Institute for Material Research and Testing, BAM),
- there are new regulations and laws (traffic regulations, regulations for Quality Assurance(QA) (BMV 1991), (BMV 1987),
- special regulations are in force for the use of ISO containers as IP-2 packages in Germany (BMV 1995). In Germany freight containers in compliance with ISO 1496 and CSC-approved are not accepted as IP-2 packages in contradiction to the IAEA SS 6 recommendations (IAEA 1990). Additional requirements have to be fulfilled which basically are related to tie-down of the contents, and
- there is a new owner of the transport system.

The changes described above led to following actions:

- Specifications, handling instructions, and test procedures for retesting had to be prepared by NCS.
- The QA documents had to be filed with BAM for review.
- The design of the special ISO container had to be reviewed by BAM.
- BAM had to issue certificates of compliance for the transport system.

The required documents were prepared by NCS and reviewed by BAM. The certificates have been issued.

NCS can provide a qualified transport system for transports of medium active waste to the Repository for Radioactive Waste Morsleben.

EXPERIENCE

The transports of medium active waste to the Repository for Radioactive Waste Morsleben started in 1995. Several transports have been carried through and the transport system performed excellently and in full compliance with the licenses and specifications.

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