

LEUPA

Package for Low Enrichment Uranium

DATABASE FOR THE DESIGN OF LEUPA PACKAGE

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1 PURPOSE

1. The purpose of the following document is regulate the design, manufacturing, tests and licensing for a package for transport of low enrichment uranium (lower than 20%) in solid physical form, no gaseous or liquid form.

2 QUALITY LEVEL

Table 1: Quality Level

Feature	Level	Notes
Package	Type B(U) – Airway	
Security	Not applicable	
For the Design	Level A	According to CDAD-3001-3PSGC-009-B
For the Manufacturing	Level A	According to CDAD-3001-3PSGC-009-B
Anti-seismic Level	Not applicable	

3 MATERIAL TO BE TRANSPORTED

Table 2: Material to be Transported

Material	Physical Form
Low Enrichment Uranium (lower than 20% in U^{235})	
Uranium Metal	Granulated metal and pieces
U_3Si_2	Powder and pieces
U_xAl_y	Powder and pieces
UO_2	Powder
U_3O_8	Powder

4 CONDITIONS OF EMPLOYMENT

1. The package shall maintain conditions during use, required by ARN 10.16.1 Standard for Type B(U) Packages for air way.
2. According to paragraph 637 of mentioned standard, the outer temperature that the package shall resist is between $-40^{\circ}C$ and $+70^{\circ}C$.
3. According to paragraph 619 of mentioned standard, the package shall maintain its radioactive content even if outer pressure descends to 5 kPa (absolutes).

5 COMPONENTS

1. The package contain the following principal components:
 - a. Inner Container
 - b. Container
 - c. Absorbent (Cadmium)
 - d. Thermal Insulator

e. Packaging

6 TRANSPORT CAPACITY OF THE PACKAGE

6.1 Inner Container

1. The enough volume to hold 12.5 kg of a material with a density of 8 gr/cm³.

6.2 Container

1. The enough volume to hold four (4) inner recipients.

6.3 Packaging

1. Drum type or similar with an approximate capacity of 200 l.

7 MATERIALS AND COMPONENTS TO BE USED

1. It should be used where possible standard components:

Table 3: Standard Components

Components	Material
Inner Container	Al
Container	SS
Absorbent	Cd sheathed in SS
Insulation	Cement integrated whit Vermiculite
Packaging	SS

8 CRITICALITY ANALYSIS

1. Should be performed the necessary analysis to transport up to 50 kg of U metal (enrichment to 20%) in the conditions that the standard AR 10.16.1 mentions, particularly article 671 and derivatives.

9 SISTEMS AND CODIFICATION

1. The coding of documents issued for the LEUPA project will done according to Document 0903-0000-EDSIN-001 "Encoder of Technical Papers of the Project Nuclear Minor Works".
2. In all cases for the digits 1, 2, 3 and 4 (Name or Project Number) corresponds to 0908, for digits 5 and 6 (Systems) corresponds LE, for digits 7 and 8 (Subsystem) it must use the described list below. The rest of the digests will be according to above document.

Table 4: Subsystem Digits

Number	Subsystem
00	General
01	Package
02	Tests
03	Licensing Activities

10 STAFF DIRECTLY INTERVENING

- Staff directly involved in this project is as follows:

Table 5: Responsible Sectors

Sector	Responsible
WP Management	Orticelli
WP Management	Ausas
Neutronic	Matzkin
Mechanics	Martínez
Administration	Sorda
Mechanical Design	Fabre (IISA)
	Barberis (IISA)
QA	Pereyra

11 APPLICATION STANDARDS

- For the design of tests and manufacturing of the package, is applied Standard AR 10.16.1. Rev. 1 "Transport of Radioactive Materials".
- For the container of inner containers, is applied ASME III Div. 1. Sub-section NB

12 RELATED DOCUMENTS

- | | | |
|-----|---------------------|---|
| [1] | CDAD-3001-3PSGC-009 | "Procedure for Determining the Quality Levels". |
| [2] | CDAD-3001-3PSGC-013 | "Quality Requirements for Level Altems". |
| [3] | CDAD-3001-3PSGC-019 | "Procedure for Development of Plans". |
| [4] | CDAD-3001-3PSGC-001 | "Procedure of the Quality and Environmental Division for the Coding Documentation". |