

**LEUPA**

**Package for Low Enrichment Uranium**

**DATABASE FOR THE DESIGN OF LEUPA  
PACKAGE**

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February 22, 2016

Page 1 of 6



## CONTENTS

1	PURPOSE .....	4
2	QUALITY LEVEL .....	4
3	MATERIAL TO BE TRANSPORTED .....	4
4	CONDITIONS OF EMPLOYMENT .....	4
5	COMPONENTS .....	4
6	TRANSPORT CAPACITY OF THE PACKAGE .....	5
6.1	INNER CONTAINER .....	5
6.2	CONTAINER.....	5
6.3	PACKAGING .....	5
7	MATERIALS AND COMPONENTS TO BE USED.....	5
8	CRITICALITY ANALYSIS.....	5
9	SYSTEMS AND CODIFICATION.....	5
10	STAFF DIRECTLY INTERVENING .....	6
11	APPLICATION STANDARDS .....	6
12	RELATED DOCUMENTS .....	6

## 1 PURPOSE

- 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 <sup>235</sup> )	
Uranium Metal	Granulated metal and pieces
U <sub>3</sub> Si <sub>2</sub>	Powder and pieces
U <sub>x</sub> Al <sub>y</sub>	Powder and pieces
UO <sub>2</sub>	Powder
U <sub>3</sub> O <sub>8</sub>	Powder

## 4 CONDITIONS OF EMPLOYMENT

- The package shall maintain conditions during use, required by ARN 10.16.1 Standard for Type B(U) Packages for air way.
- According to paragraph 637 of mentioned standard, the outer temperature that the package shall resist is between -40°C and +70°C.
- 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

- The package contain the following principal components:
  - Inner Container
  - Container
  - Absorbent (Cadmium)
  - 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/cm<sup>3</sup>.

### 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 SISTEMAS 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". |