



U.S. Department  
of Transportation  
**Pipeline and  
Hazardous Materials  
Safety Administration**

East Building, PHH-23  
1200 New Jersey Avenue Southeast  
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION  
FOR A TYPE FISSILE  
RADIOACTIVE MATERIALS PACKAGE DESIGN  
CERTIFICATE USA/0577/AF-96, REVISION 4**

**REVALIDATION OF FRENCH COMPETENT AUTHORITY  
CERTIFICATE F/358/AF-96**

This certifies that the radioactive material package design described is hereby approved for use within the United States for import and export shipments only. Shipments must be made in accordance with the applicable regulations of the International Atomic Energy Agency<sup>1</sup> and the United States of America<sup>2</sup>.

1. Package Identification - COG-OP-30B.
2. Package Description and Authorized Radioactive Contents - as described in France Certificate of Competent Authority F/358/AF-96, Revision Fq (attached). Contents are restricted to those listed in Appendix 5 and Appendix 7 of the French Certificate of Competent Authority No. F/358/AF-96, Revision Fq (attached).
3. Criticality - The minimum criticality safety index is 5.0 for Appendix 5 contents and 0.0 for Appendix 7 contents. The maximum number of packages per conveyance is determined in accordance with Table X of the IAEA regulations cited in this certificate.
4. General Conditions -
  - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
  - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.

---

<sup>1</sup> "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

<sup>2</sup> Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

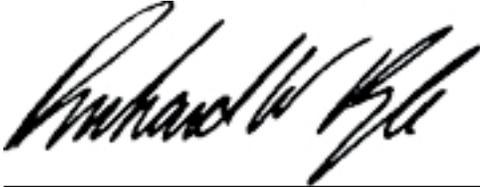
**CERTIFICATE USA/0577/AF-96, REVISION 4**

- c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.
  - d. This certificate provides no relief from the limitations for transportation of plutonium by air in the United States as cited in the regulations of the U.S. Nuclear Regulatory Commission 10 CFR 71.88.
  - e. Records of Quality Assurance activities required by Paragraph 310 of the IAEA regulations<sup>1</sup> shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.
5. Special Conditions -
- a. Cylinders used under this certificate must have been designed and manufactured in compliance with the ANSI N14.1 standard in effect at the time of manufacture.
  - b. Cylinders used under this certificate must be operated, maintained and handled in accordance with the ANSI N14.1 standard in effect at the time of shipment.
  - c. Packages used under this certificate must be compliant with IAEA regulations for Type AF packages and shipped as such. Transport of fissile contents as either Type B(U)F or industrial packages is not authorized. Transport of fissile excepted or non-fissile contents is not authorized.
6. Marking and Labeling - The package shall bear the marking USA/0577/AF-96 in addition to other required markings and labeling.
7. Expiration Date - This certificate expires on May 31, 2017.

**CERTIFICATE USA/0577/AF-96, REVISION 4**

This certificate is issued in accordance with paragraph 814 of the IAEA Regulations and Section 173.472 and 173.473 of Title 49 of the Code of Federal Regulations, in response to the April 05, 2012 petition by Areva - TN International, Montigny Le Bretonneux, Saint-Quentin-en-Yvelines, France, and in consideration of other information on file in this Office.

Certified By:



**Jun 08 2012**

(DATE)

 Dr. Magdy El-Sibaie  
Associate Administrator for Hazardous Materials Safety

Revision 4 - Issued to endorse French Certificate of Approval No.  
F/358/AF-96 (Fq).



Direction of transport and sources

## APPROVAL CERTIFICATE OF A PACKAGE MODEL

F/358/AF-96 (Fq)  
page 1/3

The French Competent Authority,

Further to the request made by **TN International** in letter CEX-11-00032035-046 of March 8<sup>th</sup> 2011,

In light of Safety Analysis Report TN International DOS-08-00117711 Revision 2,

Hereby certifies that the package design comprising the **COG-OP-30B** overpack, described hereafter in Appendix 0 at index q, constituted by a 30B type cylinder placed in an overpack called COG-OP-30B, filled with uranium hexafluoride or heels of uranium hexafluoride enriched to a maximum of 5% in uranium 235 compliant to the definitions given in appendix 5 and 7 at index q, is compliant as **a type A package model for fissile material**,

in conformity with the requirements of the regulations, agreements and recommendations listed below :

- Regulations for the Safe Transport of Radioactive Materials of the International Atomic Energy Agency, Safety Standard Series, N° TS-R-1 - 2009 edition;
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) ;
- European Agreement concerning the International Carriage of Dangerous Goods by Internal Water way (ADN) ;
- International Regulations concerning the Carriage of Dangerous Goods by Rail (RID) ;
- International Maritime Dangerous Goods Code (IMDG Code of OMI);
- Modified decree of May 29, 2009 concerning the carriage of dangerous goods by road (TMD decree);
- Modified decree of November 23, 1987 concerning the Safety of Ships (RSN), attached regulations, division 411 (RSN decree).

This certificate does not exempt the consignor from complying with the instructions established by the authorities of the countries through or to which the package will be transported.

This certificate expires on: May 31<sup>st</sup> 2017

Register number : CODEP-DTS-2012-005230

Paris, January 31<sup>st</sup> 2012

SUMMARY OF CERTIFICATE ISSUES

Issue	Expiry	Type of issue and modifications	Authority	type of certificate	Revision index												
					body	t	0	1	2	3	4	5	6	7	8		
24.12.98	31.12.03	First issue	DSIN	B(U)F-85	Aa	-	a	a									
11.05.00	31.12.03	Modification of the maximum mass of the package	DSIN	B(U)F-85	Ab	-	b	b									
23.03.04	30.11.06	Extension	DGSNR	B(U)F-96	Bc	-	c	c	c	c	c	c	c	c	c	c	c
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 7	DGSNR	B(U)F-96	Bd		d										d
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 4 and 5	DGSNR	AF-96	Be	-	e				e	e					
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 2 and 3	DGSNR	IF-96	Bf	-	f		f	f							
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 7	DGSNR	B(U)F-96	Cg		g										g
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 5	DGSNR	AF-96	Ch		h				h	h					
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 3	DGSNR	IF-96	Ci		i		i	i							
06.02.09	31.03.11	Renewal	ASN	B(U)F-96	Dj	-	j										j j
06.02.09	31.03.11	Renewal	ASN	AF-96	Dk	-	k				k	k					
06.02.09	31.03.11	Renewal	ASN	IF-96	Dl	-	l		l	l							
14.12.10	31.05.12	Renewal	ASN	B(U)F-96	Em	-	j										j j
14.12.10	31.05.12	Renewal	ASN	AF-96	En	-	k				k	k					
14.12.10	31.05.12	Renewal	ASN	IF-96	Eo	-	l		l	l							
31.01.12	31.05.17	Renewal	ASN	B(U)F-96	Fp	-	p										
31.01.12	31.05.17	Renewal	ASN	AF-96	Fq	-	q					q	q				q q
31.01.12	31.05.17	Renewal	ASN	IF-96	Fr	-	r	r	r	r							

Issue	Expiry	Type of issue and modifications	Authority	Type of certificate	Index of revision			
					Body	9	10	11
24.12.98	31.12.03	First issue	DSIN	B(U)F-85	Aa			
11.05.00	31.12.03	Modification of the maximum mass of the package	DSIN	B(U)F-85	Ab			
23.03.04	30.11.06	Extension	DGSNR	B(U)F-96	Bc			
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 7	DGSNR	B(U)F-96	Bd			
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 4 and 5	DGSNR	AF-96	Be			
08.10.04	30.11.06	Restriction of the certificate F/358/B(U)F-96 (Bc) to the content 2 and 3	DGSNR	IF-96	Bf			
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 7	DGSNR	B(U)F-96	Cg			
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 5	DGSNR	AF-96	Ch			
31.03.06	31.03.09	Modification of the maximum heel mass of UF6 in content 3	DGSNR	IF-96	Ci			
06.02.09	31.03.11	Renewal	ASN	B(U)F-96	Dj			
06.02.09	31.03.11	Renewal	ASN	AF-96	Dk			
06.02.09	31.03.11	Renewal	ASN	IF-96	Dl			
14.12.10	31.05.12	Renewal	ASN	B(U)F-96	Em			
14.12.10	31.05.12	Renewal	ASN	AF-96	En			
14.12.10	31.05.12	Renewal	ASN	IF-96	Eo			
31.01.12	31.05.17	Renewal	ASN	B(U)F-96	Fp	p	p	p
31.01.12	31.05.17	Renewal	ASN	AF-96	Fq			
31.01.12	31.05.17	Renewal	ASN	IF-96	Fr			

## APPENDIX 0 COG-OP-30B PACKAGING

### 1. DESCRIPTION OF THE PACKAGING

The package consists in a 30B type cylinder and a protective overpack, known as the COG-OP-30B overpack.

In all cases, the maximum weight of the package comprising the COG-OP-30B overpack containing a 30B type cylinder loaded with uranium hexafluoride is 4 232 kg.

#### 1.1 Description of the COG-OP-30B overpack

The cylindrical COG-OP-30B overpack is made up from two halves surrounding the 30B cylinder and held together by snap-fasteners (see figures 0.1 and 0.2). Each half overpack is made up of two half-shells in stainless steel. Inside of these, thermal protection is provided by non-corrosive phenolic foam.

At the end of each half overpack the phenolic foam is replaced by balsa wood and red cedar providing damping in the event of drops in normal and accidental conditions of transport.

The overpack is closed at the ends, from the inside towards the outside, by a stainless steel plate, then by thermal protection made up of the same phenolic foam as in the radial part, and finally with an outer stainless steel sheet. The package model is as presented in the chapter 0 of the safety analysis report DOS-08-00117711 Révision 2 and the main elements are described below :

- Overall dimensions :
  - Length :  $2\,420 \pm 12$  mm ;
  - Width :  $1\,340 \pm 8$  mm ;
  - Height :  $1\,356 \pm 8$  mm.
- Dimensions of the cavity :
  - Diameter :  $780 \pm 6$  mm ;
  - Length :  $2\,100 \pm 12$  mm.

The maximum weight of the overpack is 1 295 kg.

The overpack is designed, manufactured, inspected, tested, maintained and used in compliance with:

- Safety analysis report TN International DOS-08-00117711 Revision 2;
- Design drawing Cogema Logistics 5188-05E Ind. J ;
- the specifications related to the acceptance test indicated in Section 7A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2 ;
- the principles of quality assurance described in Section 8A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2.

The packaging is to be handled by two ways. Following the option 1 or 2 of the design drawing (See figure 0.2), Equipped with a forks passage, it can be handled by means of a lift truck. Two shackles fixed on the upper part of the shell allow the handling of the shell containing a loaded or emptied 30B cylinder. The handling can also be achieved by means of the binding supports by screwing lifting rings in the holes foreseen for the fixation of the bended shell.

The stowage of the Overpack on the means of transport is made through a cradle receiving the Overpack and not attached to the Overpack.

## 1.2 Description of the 30B cylinder (See figure 0.3)

All activities of design, manufacturing, using and maintaining of 30B cylinders shall be or shall have been performed in accordance with the applicable version at the time when the activity is performed of standards ISO 7195 Packaging of uranium hexafluoride (UF<sub>6</sub>) for transport and ANSI N14.1 "Uranium Hexafluoride - Packaging for Transport".

In particular, the 30B cylinder is a cylindrical reservoir of outer diameter 762 mm (30"), which is closed at each end by a domed base of the same thickness (12.7 mm nominal). The orifices permitting the filling and emptying of the cylinder consist of a valve fitted on a domed base and of a plug screwed at the opposite on the other domed base. A skirt at each end extends the cylindrical shell and protects the valve and the plug during the normal operation handling. The material constituting the cylinder (except the valve and the plug), is carbon steel. The main characteristics of the 30B cylinder, as described in the International standard ISO 7195 and the American standard ANSI N14.1 are the following:

- Total nominal length : 2 070 mm (81 ½ ") ;
- Outer nominal diameter : 762 mm (30 ") ;
- Cylinder nominal weight : 635 kg (1 400 lb) ;
- Minimum cavity free volume : 736 litres (26 ft<sup>3</sup>) ;
- Test pressure : 2,8.10<sup>6</sup> Pa (400 psig).

The only difference with regard to these standards, affects the brazing which secures the leaktightness at the valve/cylinder and plug/cylinder boundaries: the thread of the valve is to be tinned with an alloy for lead-tin brazing per ASTM B32, with at least 45 per cent tin, as for example ASTM B32 SN50 alloy.

## 1.3 Safety fonction

The main safety functions and main components important for safety are : :

- **the containment**, ensured by the 30B cylinder ;
- **the radiological protection**, ensured by the 30B cylinder and the steel of the overpack;
- **the criticality safety**, ensured by the confinement system as described in Section 5A of the Safety Analysis Report ;
- **the internal heat release**, ensured by the 30B cylinder ;
- **the protection against shocks**, ensured by the shock absorbers of the overpack ;
- **the protection against fire**, ensured by the phenolic foam of the overpack.

## 2. VERIFICATION TO BE MADE BY THE CONSIGNOR BEFORE SHIPMENT

The packaging must be used according to procedures in compliance with the Instructions of Operating from the section 6A (reference DOS-08-00117711-600 Revision 01) of the Safety Analysis Report.

The 2978 UN number will be marked on the package in case of shipment of fissile excepted UF<sub>6</sub>.

The 2977 UN number will be marked on the package in case of shipment of non fissile excepted UF<sub>6</sub>.

Before closing the COG-OP-30B packaging containing the empty 30B cylinder with heels (unwashed), the consignor has to make sure the absence of shock or deformation on the valve.

Moreover, before each shipment:

- an inspection procedure before departure, to respect paragraph 420 of the TSR-1 (Edition 2009), shall be applied.
- the respect of the regulatory criteria of the equivalent dose rate around the package (Full or empty) shall be verified.

### **3. MAINTENANCE PROGRAM**

The maintenance of the package is described in section 7A (reference DOS-08-00117711-700 Revision 2) of the Safety Analysis Report.

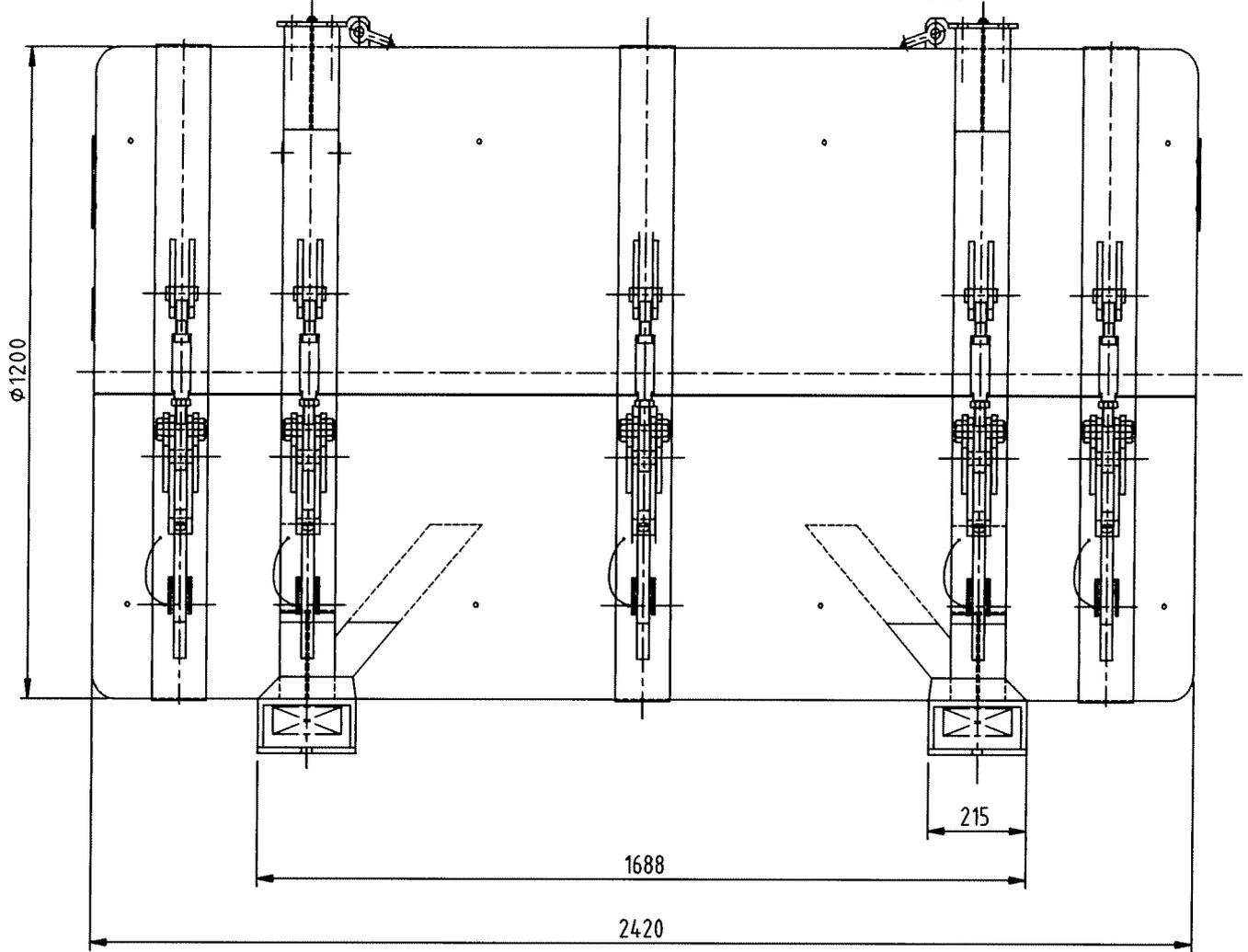
### **4. NOTIFICATION AND REGISTRATION OF SERIAL NUMBERS**

Should a packaging be disposed of or change ownership, this must be notified to the competent authorities. Accordingly, the party relinquishing ownership of a packaging shall forward the name of the new owner.

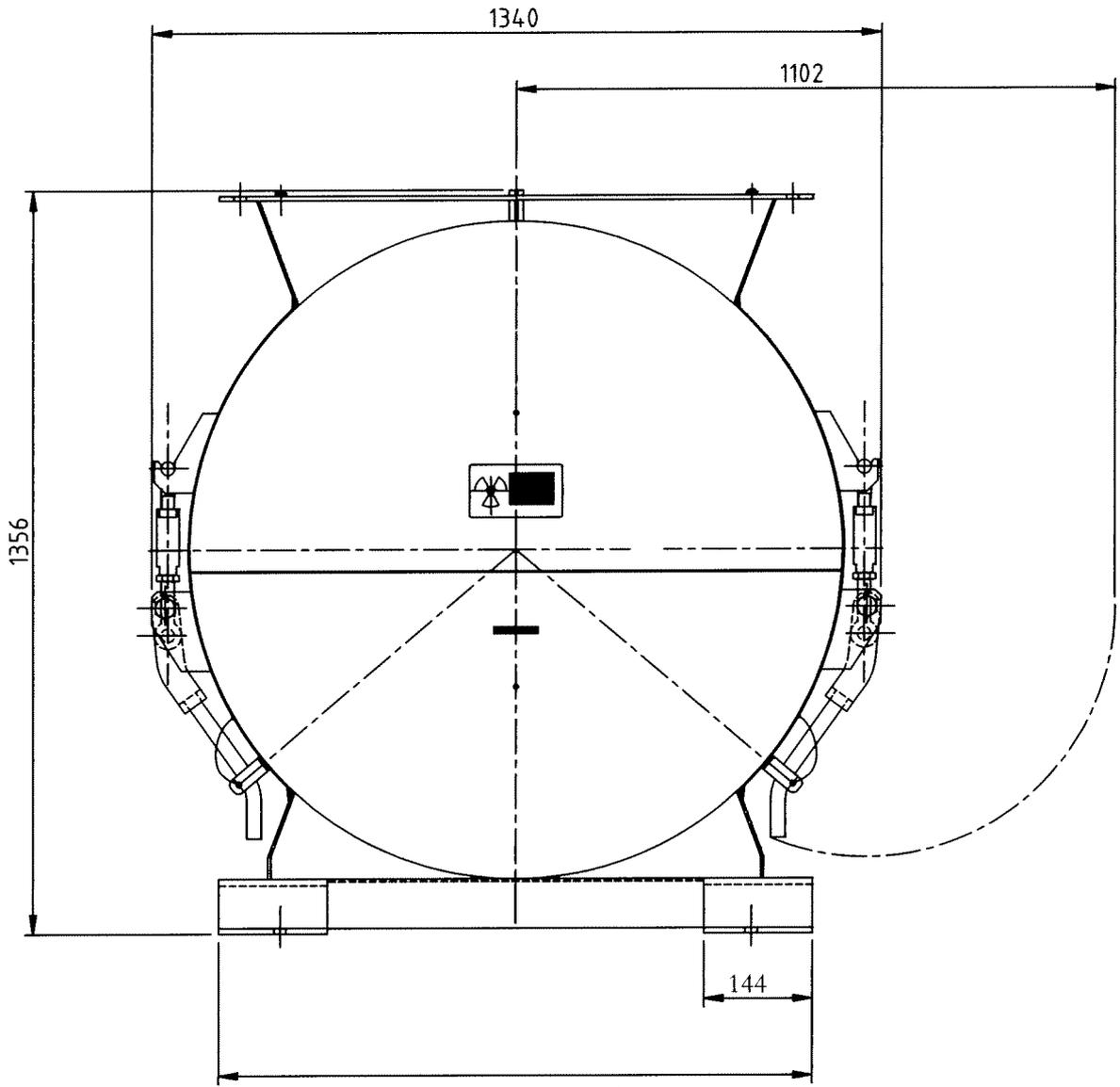
### **5. QUALITY ASSURANCE**

The principles of quality assurance to be applied during the design, manufacturing, inspection, tests, maintenance and use of the package must be in compliance with those described in chapter 8A (reference DOS-08-00117711-800 Revision 0) of the Safety Analysis Report.

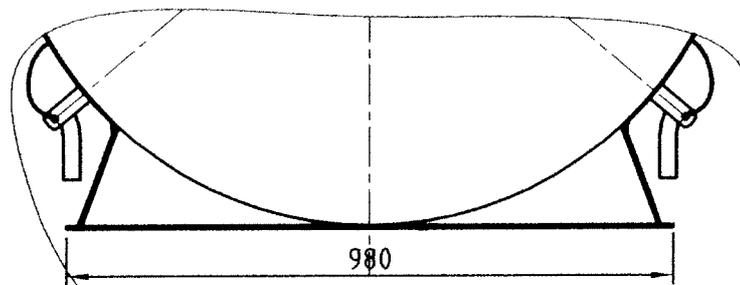
FIGURE 0.1  
SKETCH OF COG-OP-30B OVERPACK



**FIGURE 0.2**  
**SKETCH OF COG-OP-30B OVERPACK**

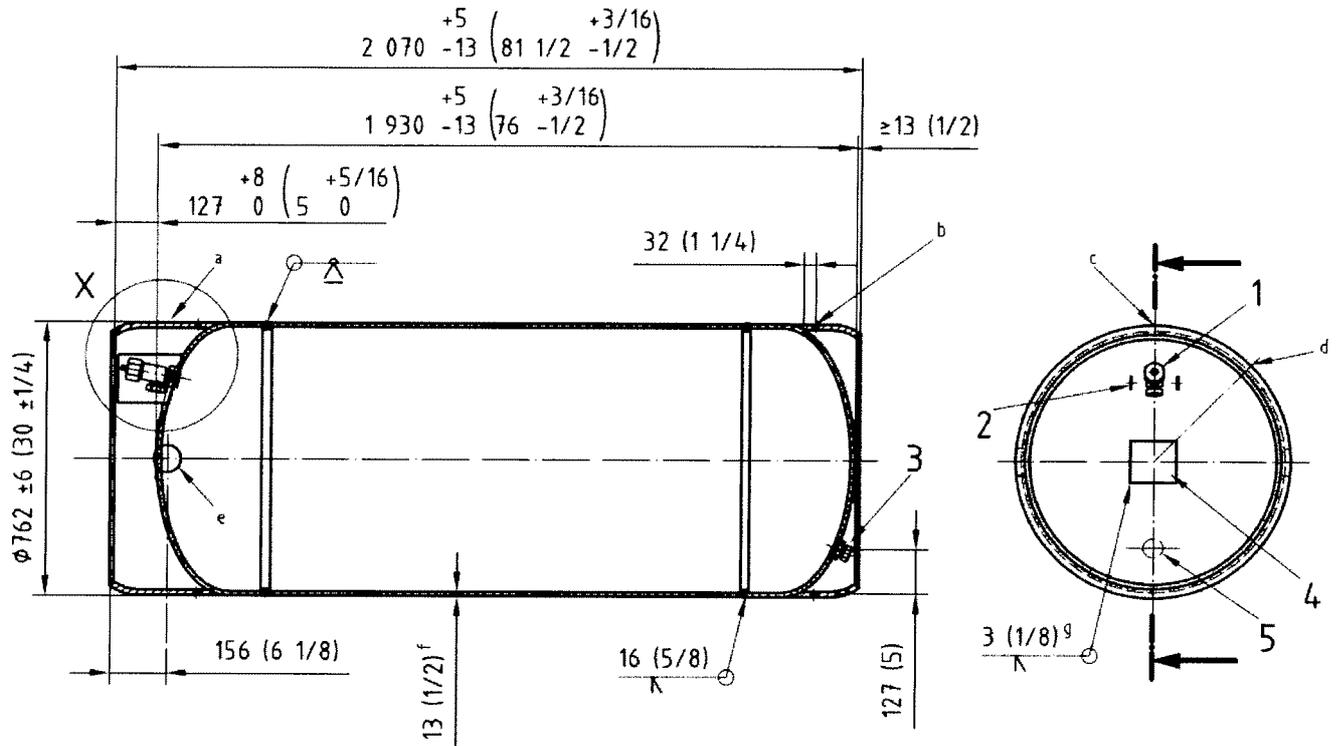


**OPTION 1**



**OPTION 2**

**FIGURE 0.3**  
**SKETCH OF 30B CYLINDER**



This figure is from the International standard ISO 7195: 2005. It is presented here for information.

## APPENDIX 5

### URANIUM HEXAFLUORIDE (UF<sub>6</sub>) ENRICHED TO A MAXIMUM OF 5 % IN URANIUM 235

#### 1. DESCRIPTION OF THE RADIOACTIVE CONTENT

The radioactive content of the 30B cylinder consists of uranium hexafluoride (UF<sub>6</sub>) from natural uranium, with a maximum enrichment in <sup>235</sup>U of 5%.

The UF<sub>6</sub> in the cylinder must conform to the definition of Enriched Commercial Grade UF<sub>6</sub> from the Standard ASTM C 996.

The essential parameters of the content for safety are the following :

- UF<sub>6</sub> load allowed in the cylinder: from 455 kg to 2 277 kg ;
- Maximum <sup>235</sup>U enrichment: 5 % ;
- Minimum purity of UF<sub>6</sub> transported : 99,5 % ;

Maximum contents when filling the cylinder :

Radioactive elements	Maximum content for UF <sub>6</sub>
U <sub>232</sub>	1.10 <sup>-4</sup> µg/gU
U <sub>234</sub>	11.10 <sup>3</sup> µg/g <sup>235</sup> U
U <sub>235</sub>	5.10 <sup>4</sup> µg/gU (5%)
U <sub>236</sub>	500 µg/gU
Tc <sub>99</sub>	1.10 <sup>-2</sup> µg/gU

The consignor has to make sure that the total activity of the material being transport is less than 1 A<sub>2</sub> throughout the period of transport.

The consignor must own the analyses of the filling UF<sub>6</sub> of the cylinder.

#### 2. SAFETY ANALYSIS REPORT

The Safety Analysis Report justifying this content is the TN International DOS-08-00117711 Revision 2.

#### 3. CRITICALITY SAFETY STUDY

This is described in Section 5A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2.

The confinement system is described in section 5A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2.

Criticality Safety Index (CSI) : 0

## APPENDIX 7

### RESIDUES OF URANIUM HEXAFLUORIDE (UF<sub>6</sub>)

#### 1. DESCRIPTION RADIOACTIVE CONTENT

The radioactive content of the 30B cylinder comprises the heels of uranium hexafluoride UF<sub>6</sub> and its filiation products in various chemical forms as UO<sub>2</sub>F<sub>2</sub>, in any proportion after emptying, with a maximum enrichment in <sup>235</sup>U of 5%.

The UF<sub>6</sub> in the cylinder must conform to the definition of Enriched Commercial Grade UF<sub>6</sub> from the Standard ASTM C 996.

The essential parameters of the content for safety are the following :

- Authorised mass in the cylinder: less than or equal to 11,34 kg ;
- Maximum <sup>235</sup>U enrichment: 5 % ;
- Minimum purity of UF<sub>6</sub> transported : 99,5 % ;

Maximum contents when filling the cylinder:

Radioactive elements	Maximum content for UF <sub>6</sub>
U <sub>232</sub>	1.10 <sup>-4</sup> µg/gU
U <sub>234</sub>	11.10 <sup>3</sup> µg/g <sup>235</sup> U
U <sub>235</sub>	5.10 <sup>4</sup> µg/gU (5%)
U <sub>236</sub>	500 µg/gU
Tc <sub>99</sub>	1.10 <sup>-2</sup> µg/gU

The consignor has to make sure that the total activity of the material being transport is less than 1 A<sub>2</sub> throughout the period of transport.

The consignor must own the analyses of the filling UF<sub>6</sub> of the cylinder.

#### 2. SAFETY ANALYSIS REPORT

The Safety Analysis Report justifying this content is the TN International DOS-08-00117711 Revision 2.

#### 3. SAFETY CRITICALITY STUDY

This is described in Section 5A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2.

The confinement system is described in section 5A of the Safety Analysis Report TN International DOS-08-00117711 Revision 2.

Criticality Safety Index (CSI) : 0.



U.S. Department  
of Transportation

East Building, PHH-23  
1200 New Jersey Avenue SE  
Washington, D.C. 20590

**Pipeline and  
Hazardous Materials  
Safety Administration**

**CERTIFICATE NUMBER:** USA/0577/AF-96, Revision 4

**ORIGINAL REGISTRANT(S):**

François Marvaud  
Transport & Engineering Section  
Areva - TN International  
1 Rue Des Hérons  
Montigny Le Bretonneux, France  
France

Catherine Grandhomme  
Transport Engineering Manager - Transport Engineering Unity  
Areva - TN International  
1 Rue Des Hérons  
Montigny Le Bretonneux, France  
France

Mr. Nicholas Guibert  
Research Reactors Design and Licensing  
Areva - TN International  
Etablissement Saint Quentin en Yvelines  
1, rue des Herons  
Montigny-le-Bretonneux, Yvelines 78180  
France

Jean-François Malhaire  
Design Licensing Team Leader - Transport Engineering Unity  
Areva - TN International  
1 Rue Des Hérons  
Montigny Le Bretonneux, France  
France

Kevin Massif  
Design Engineer - Transport Engineering Unity  
Areva - TN International  
Etablissement Saint Quentin en Yvelines  
1, rue des Herons  
Montigny-le-Bretonneux, Yvelines 78180  
France