



GOVERNMENT OF INDIA

AERB SAFETY GUIDE

COMPLIANCE ASSURANCE PROGRAMME FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL



ATOMIC ENERGY REGULATORY BOARD

AERB Guide No. SG/TR-1

**COMPLIANCE ASSURANCE PROGRAMME
FOR THE SAFE TRANSPORT OF
RADIOACTIVE MATERIAL**

Approved by the Board on December 24, 1991

Atomic Energy Regulatory Board
Vikram Sarabhai Bhavan
Anushaktinagar
Bombay 400 094

Price :

Orders of this guide should be addressed to:

The Administrative Officer
Atomic Energy Regulatory Board
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FOREWORD

The wide-spread utilisation of ionising radiations in multifarious applications - in industry, medicine, agriculture and research - has brought in its wake the need for exercising regulatory control to ensure safety both of the user and of the general public. The Atomic Energy Regulatory Board (AERB) is entrusted with the responsibility of developing and implementing appropriate regulatory measures aimed at ensuring radiation safety in all applications involving ionising radiations. One of the major objectives of AERB is to develop and publish specific codes, guides, standards and manuals which deal with radiation safety aspects of various applications of ionising radiations including transportation of radioactive materials in the public domain. Such codes and guides cover the entire spectrum of operations starting from planning, design and installation of radiation equipment to their ultimate decommissioning/disposal and associated transportation activity.

Accordingly, AERB has constituted Advisory Committees and Task Groups which will review the codes and guides developed by AERB. A Task Group has been constituted to prepare documents which would elaborate on certain specific provisions in the AERB Safety Code on Transport of Radioactive Materials. The membership of the Task Group is as under:

Dr. D. Singh, Convener.	-	Atomic Energy Regulatory Board, Bombay.
Shri J.S. Bisht, Member.	-	Division of Radiological Protection, Bhabha Atomic Research Centre, Bombay.

Experience has shown that compliance with the safety requirements stipulated in the surveillance procedures, codes and guides provides a high degree of safety in radioactive material transportation. A systematic programme of measures is being applied by AERB to assure that the transport safety requirements are adequately met. The safety guide entitled "Compliance Assurance Programme for the Safe Transport of Radioactive Material" outlines the procedures for review and assessment of package designs, special form radioactive materials, shipments and inspection activities. It is hoped that the document will be useful to all those concerned with the radioactive material transportation activity in the country.

S.D. Soman
31/12/91

(S.D. Soman)
Chairman
Atomic Energy Regulatory Board.

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1. INTRODUCTION

1.1 Purpose and Scope

The purpose of this guide is to provide information to the persons/organisations involved in radioactive material transportation on systematic programme of measures, under compliance assurance programme, applied by the Competent Authority for ensuring compliance with the safety procedures stipulated in the AERB Safety Code SC-TR-1, henceforth referred to as the Code. The document outlines the procedures for review and assessment of package designs, special form radioactive materials and certain shipments, requiring Competent Authority approval, and inspection and enforcement activities.

- 1.2 Words and expressions used in this document have the meanings assigned to them in the AERB Safety Code SC-TR-1(1986) and Radiation Surveillance Procedures for Safe Transport of Radioactive Material, 1987.

2. REVIEW OF PACKAGE DESIGN

- 2.1 Packages not requiring Competent Authority approval certificates, such as excepted, industrial and Type A, are also included under compliance assurance programme. This includes review of design, manufacture and maintenance of packagings as per provisions in the Code. Only standardised packages which are authorised by Head, Division of Radiological Protection (DRP), BARC, should be used for transportation. The following safety aspects are considered: quality assurance programme, design and authorisation, manufacturing control and maintenance programme.
- 2.2 Application for approval of excepted, industrial and type A packages should be furnished to Head, Division of Radiological Protection, BARC in the application form given in Appendix-1. It should be borne in mind that the consignor need not seek approval for the package design prior to each shipment. The consignor should have in his possession a copy of the certificate of approval/authorisation for the package design issued by the AERB/DRP. Application for approval of the design of special form radioactive material should include details of methods of compliance demonstration with the test requirements specified in the code. (Appendix - 2A)
- 2.3 For packages, such as Type B and Fissile, requiring Competent Authority approval as provided in para 3.22 of the Code, the following procedures are applied:
- 2.3.1 The applicant to submit a safety report on the design of the package alongwith the application form as given in Appendix-2.

- 2.3.2 Review of the safety report by AERB for compliance with the design and test requirements stipulated in schedules II and III of the Code.
- 2.3.3/ Approval of the design accorded on the basis of evaluation of the design. It may be noted that for radiation equipments such as radiography exposure devices, gamma chambers etc., apart from the certificate of approval for package design, type approval for the units is also required.
- 2.4 The applicant should provide to AERB the details with respect to testing of the package or its scale model, stating clearly the model scale, requirements and specifications of the model, the number of mechanical tests conducted, drop attitudes, essential measuring and recording equipment used and the nature of the target.
- 2.5 In case of scale-model specimen testing, AERB ensures that all relevant safety features are adequately represented, including materials, contents and internal structures. The adequacy of the means proposed to establish compliance with the acceptance limits is reviewed. Account is taken of instrumentation for measurement of local accelerations, strains, internal pressure transients etc.
- 2.6 The AERB may inspect the testing arrangements before testing, especially the specimen, the target and the measuring system. The AERB may also witness the tests.
- 2.7 It should be ensured that the prototype, specimen or scale-model are tested in the facilities recognised and approved by AERB. All the tests should be done in the presence of representatives of AERB/DRP.
- 2.8 The final application for the package design should be sent to AERB for approval. The application should include, among other subjects given in Appendix-2, the final tests along with photographs and testing results, which need to be evaluated by the applicant. The application should specify in particular the requirements for the individual packages to be manufactured and their proper maintenance and use. Specifically the applicant should demonstrate that the requirements for the package type in question are met. The following aspects should be required, as appropriate, to be covered by analysis (normal and accident conditions):
- criticality safety
 - heat transfer
 - radiation safety, and
 - structural integrity

The structural analysis should also take into account the brittle fracture of the packaging materials, where relevant.

2.9 According to the Code, compliance with the specific test requirements may also be demonstrated by analyses. The analyses should be based on validated computer codes which have been verified by experiments. The Atomic Energy Regulatory Board may be contacted for guidance on availability of such validated computer codes or expertise with Department of Atomic Energy (DAE) for doing such analyses.

2.10 Application for approval of design of type B and fissile packagings should be accompanied by a comprehensive safety analysis report detailing, among other things, demonstration of compliance with the design and test requirements as per para 2.8 and 2.9.

Note: The application form along with the required attachments and safety analysis report on the package design should be submitted in neatly bound book form.

2.11 The AERB evaluates the safety report on the package design in order to assure that all the relevant safety requirements specified in the Code are fulfilled. Independent assessments are carried out to verify the results presented in the safety report. The AERB ensures that proper engineering codes and models have been used, that they have been adequately verified by appropriate experiments and that all input data have been defined conservatively.

2.12 An approval certificate is issued by the Competent Authority for the package design accepted by AERB on the basis of evaluation.

2.13 All the packagings of approved design manufactured should have serial numbers and the list of such numbers for a model of approved design should be made available to AERB.

3. CONTROL OF MANUFACTURE

3.1 The packagings should be manufactured in a controlled manner and in accordance with the approval design, specifications and quality assurance programme.

3.2 All manufacturing facilities and subcontractors may be subject to inspections by AERB.

3.3 The packagings should be marked as per the procedures specified in the Code.

4. CONTROL OF MAINTENANCE

4.1 The AERB may make inspections to ensure that all packagings built to an approved design are maintained in good condition, the records on maintenance and repairs, if any, are available with the user, and they continue to comply with relevant requirements and specifications even after

repeated use.

- 4.2 The user is required to record and to inform AERB within 30 days all the safety related deviations from the specifications as well as other significant damage noted during the use of the packages. Corrective measures including the plan for repairs are subject to the approval of AERB.

5. TRANSPORT

Transport of excepted, industrial and Type A packages

- 5.1 It must be ensured that only packages of standardised design are deployed for transportation. Excepted, Industrial and Type A packages are authorised for use by the Division of Radiological Protection, BARC. Details of such packages should be available with AERB.
- 5.2 Prior to undertaking a shipment, the consignor must ensure that all the closures, nuts and bolts of the containment are properly fixed, and the lead pot or the device containing radioactive material is properly immobilised in the outer wooden box. The responsibility of proper preparation of package including labelling and marking prior to transportation rests with the consignor.
- 5.3 Each consignment of radioactive material must be accompanied by documents including a declaration by the consignor regarding proper preparation of the package, marking and labelling as specified in para 3.2.8 of the Code.
- 5.4 All transport operations including storage-in-transit must be carried out under quality assurance programme.

Transport of Type B, Fissile packages and shipments under Special Arrangement

- 5.5 Under para 3.4 of the Code, all the shipments must be carried under quality assurance programme. As specified in para 3.22 of the Code, certain shipments are subject to the approval of the competent authority. The approval of all such shipments are considered on the basis of the review of the application submitted to AERB.
- 5.6 The AERB evaluates the application for compliance with transport safety procedures specified in the Code. The application for shipment approval should contain the information as described in the Appendix-3.
- 5.7 Approval of shipments under Special Arrangement is issued by the competent authority after assuring that overall level of safety provided in the package design and the operational controls during transport is atleast equivalent to those which would be provided if all applicable requirements were

met. The applicant should provide to the AERB the set of operational controls which will be used during transport. The AERB may specify additional operational controls in certain cases.

- 5.8 AERB will ensure that shipments take place according to the transport safety procedures and the accepted plans.
- 5.9 Inspections may be carried out before shipment and during transport.
- 5.10 In certain cases AERB may require a notification before package is shipped and after it has been received. Such cases requiring notifications are specified in the shipment approval certificates issued by the competent authority.

6. PROVISIONS FOR ACCIDENTS

- 6.1 Competent authority issues shipment approvals after assuring that consignor has prepared an emergency plan for responding to transport accidents. The plans may include bases for planning, organizational responsibilities (including emergency teams), training, communication systems and procedures for response activities, as well as emergency equipment to be used and readily available.
- 6.2 AERB will review the emergency plans prepared by the consignors/organisations transporting large radioactive sources.

Appendix-1

Government of India
Atomic Energy Regulatory Board

Vikram Sarabhai Bhavan,
4th Floor, North wing,
Anushaktinagar,
Bombay - 400 094.

APPLICATION FOR AUTHORISATION OF EXCEPTED,
INDUSTRIAL PACKAGES (IP) AND TYPE A

The Code prescribes general design requirements for all packagings and packages (para 5-17 of the Schedule II), requirements for Industrial Packages (para 18-20 of Schedule II) and requirements for Type A packages (para 21-37 of the Schedule II). This application form should be filled in by the consignor of the Excepted, Industrial and Type A packages seeking authorisation for use of the packages. The application should be sent to the Head, Division of Radiological Protection, BARC, Bombay-400 085. A cut-away sketch of 21cm x 30cm showing make-up of the packaging must be provided.

1. Name and address and telephone number of the applicant :
2. Package model name :
3. The gross weight of the package :
4. Type of package : Excepted/IP-1/IP-2/IP-3/
Type A.
5. Mode of Transport : Road/Rail/Air/Sea/All
6. Proposed quantity of radioactive contents (see Table-I of the code) : $A_1/A_2/10^{-3}A_1/10^{-4}A_1$
7. Whether LSA or SCO : LSA/SCO/Not Applicable
8. Whether a cut-away sketch of dimensions 21cm x 30cm has been provided showing make-up of the package. : Yes/No
9. Whether specifications of packaging construction materials have been provided : Yes/No
10. Whether details of closures have been provided (e.g. details of nuts, bolts for lid closure, nature of welds, seals etc.) : Yes/No

11. Overall dimensions and mass of the package
12. Nature and thickness of shielding material, if applicable :
13. Whether details of inner containment system have been provided, if applicable : Yes/Not Applicable
14. Whether an evidence of quality assurance programme in design, manufacture, maintenance of packaging has been provided, if applicable. : Yes/Not applicable
15. Whether the packaging meets with the general requirements stipulated for all packagings. (Para 5-17 of Schedule II of the Code) : Yes/No
16. Whether the packaging meets with the specific requirements of design for which the authorisation is sought. (Para 18-20 or para 21-37 of Schedule II of the Code as applicable) : Yes/No
17. Indicate the Type of packaging for which the relevant requirements are met. : Excepted/IP-1/IP-2/IP-3/Type A.
18. Any other information :

I certify that I have furnished correct information above. I shall submit such additional information as may be required by the competent authority in connection with the authorisation for use of the packaging.

Signature of the Applicant

Encl:

Name :
 Designation :
 Address :

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Vikram Sarabhai Bhavan,
4th Floor, North wing,
Anushaktinagar,
Bombay - 400 094.

APPLICATION FOR PACKAGE DESIGN APPROVAL FOR
TYPE B AND PACKAGES CONTAINING FISSILE MATERIAL

As per para 3.22 of the AERB Code, and para 15 of the Surveillance Procedures for the Safe Transport of Radioactive Materials, prior approval of the Competent Authority is required for the design of Type B packagings and packagings containing fissile material. This application form should be filled in by the designer/applicant seeking approval of the package design. The form must be accompanied by a safety report on the design details of the packagings of Type B and fissile materials. A cut-away sketch of 21 cm x 30 cm showing make-up of the packaging must be provided. The safety report should contain detailed report on analysis/tests to demonstrate compliance with the design requirements stipulated in the schedules II and III of the AERB Code.

Part I: General Information

1. Name, address and telephone number of the
 - a) Applicant :
 - b) Designer :
 - c) Manufacturer :
2. Date of application :
3. Date by which approval is required. :
4. Package model name :
5. Whether approved earlier : Yes/No.
Ref No.

6. The gross weight of the package :
7. Type of approval required : Type B(U)/B(M)/B() AF/ B(U)F/ B()
8. Mode of Transport : Road/Rail/Air/Sea/All
9. Competent authority identification mark if previously allocated. (e.g. IND/-----/B(U)) or (USA/-----/B(U)) or (-----) :
10. Date of expiry of the Certificate issued by the competent authority, if applicable. :

Part II: Specification of Radioactive Contents

- Identity of radioactive material and its strength in TBq(Ci) :
- Physical state :
- Chemical state :
- Mass and volume of fissile material. (if applicable) :
- Percent enrichment (if applicable) :
- Fissile material composition in percent (if applicable) :

Part III: Packaging Details

11. Whether a cut-away sketch of dimensions 21cmx30cm has been provided showing make-up of the package : Yes/No
12. Whether specifications of packaging construction materials have been provided. : Yes/No

13. Whether details of closures have been provided.
(e.g. details of nuts and bolts for lid closure, nature of welds, seals, etc.) : Yes/No
14. Whether tests for leaktightness have been done, if applicable : Yes/Not applicable
15. Overall dimensions and mass of the package :
16. Whether handling facilities have been provided. : Yes/No
17. Whether tie-down system is adequate to withstand normal conditions of transport. : Yes/No
18. Nature and thickness of radiation shielding material. :
19. Estimated maximum radiation level on surface of the package and at 1 m from the surface of the package for maximum strength of the radioactive contents (mrem/h). :
20. Whether neutron absorbers have been provided, where applicable. : Yes/Not applicable
21. Whether details of the inner containment system has been provided : Yes/Not applicable
22. Whether an evidence of quality assurance programme in design, manufacture, maintenance of packaging has been provided : Yes/No
23. Whether emergency instructions (including TREMCARD) have been prepared. : Yes/No
24. Whether instructions have been prepared for preparation of the package prior to transport. : Yes/No

Part IV : Package Analyses and Tests

25. Whether behaviour of radioactive material under varying conditions of temperature and pressure have been taken into account. : Yes/No
26. Whether effect of radiolysis has been taken into account. : Yes/No
27. Whether structural evaluation has been done to demonstrate integrity of the packaging under normal and accident conditions of transport. (As per relevant requirements stipulated in the schedules II and III of the AERB Code) : Yes/No
28. Whether containment of the radioactive material is assured under normal and accident conditions (para 45 of the schedule II of the Code) : Yes/No
29. Whether adequacy of radiation shielding is demonstrated for normal and accident conditions (para 39 of the schedule II of the Code) : Yes/No
30. Whether thermal evaluation has been done to demonstrate integrity of package components for the maximum heat load and insolation conditions (para 40 of the schedule II of the Code) : Yes/Not applicable
31. Maximum surface heat flux in W/m^2 . :
32. Whether details of criticality evaluation assures criticality safety, where applicable : Yes/Not applicable
33. Whether details of actual tests on prototype have been provided. : Yes/Not applicable

34. If calculation/analytical methods have been used for demonstrating compliance with test requirements, please state whether the analysis is based on computer codes validated by experiments. : Yes/Not applicable
35. If scale model tests have been done, please state whether details such as scale factor used, law of similitude etc. have been provided. : Yes/Not applicable
36. Whether good quality photographs on tests conducted have been provided. : Yes/Not applicable
37. Whether the leakage radiation level and radioactivity leakage from the package, after tests, are within the acceptance limits stipulated in the AERB Code (paras 34, 39 and 45 of schedule II of the Code) : Yes/No
38. Whether the packaging meets the requirements of Type B(U) package (para 46-53 of the AERB Code) : Yes/No
39. Any other information :

I certify that I have furnished correct information above and technical details substantiating the claims made in the application are provided in a comprehensive safety report on the package design which is enclosed herewith. I shall furnish such additional information as may be required by the competent authority in connection with the design approval.

Signature of the Applicant

Name

Designation

Address

Government of India
Atomic Energy Regulatory Board

Appendix - 2A

Vikram Sarabhai Bhavan,
4th Floor, North wing,
Anushaktinagar
Bombay-400 094.

APPLICATION FOR APPROVAL OF THE DESIGN OF SPECIAL FORM
RADIOACTIVE MATERIAL
(Under para 3.22 of the AERB Code)

Sketch showing the design details of the special form radioactive material shall be provided along with this form.

1. Identity of radioactive material and its strength in TBq (Ci) :
2. Emitted radiation :
3. Chemical state of the radionuclide :
4. The overall dimensions of the special form of radioactive material :
5. Whether the radioactive material is in encapsulated form or in the form of a solid mass. :
6. State whether the design of the special form radioactive material complies with the performance standards stipulated in paras 2-4 of schedule II of the AERB Code. Submit details of methods employed for demonstration of compliance as per para 1 of schedule III of the AERB Code. :
7. Heat output (if the surface heat flux exceeds 15 W/m^2) :
8. Details regarding leakage tests and other quality control measures. :

Date :

Signature of the Applicant
Name
Designation
Address

Government of India
Atomic Energy Regulatory Board

Vikram Sarabhai Bhavan,
4 th Floor, North Wing,
Anushaktinagar,
Bombay - 400 094.

APPLICATION FOR SHIPMENT APPROVAL
(Under para 3.22 of the AERB Code)

1. Name and address of the consignor :
2. Name and address of the consignee :
3. Name of the carrier :
4. Date of application :
5. Date by which approval is required :
6. Details of consignment :
 - Identity of radioactive material and its strength in TBq (Ci) :
 - Physical state :
 - Chemical state :
 - Mass and volume of fissile material, if applicable :
 - Percent enrichment, if applicable :
 - Fissile material composition in percent if applicable :
7. If the radioactive material is proposed to be imported, whether the consignee is duly authorised by the Competent Authority for importing the above radioactive material of the specified strength : Yes/No
8. Whether the user is authorised to handle the above radioactive material: Yes/No
9. Maximum radiation level at the external surface of the package (mrem/h) :
10. Maximum radiation level at one meter from the external surface of the package (mrem/h) :
11. Maximum temperature on the

- external surface of the package :
12. Whether the design of the package has been approved by the Competent Authority. : Yes/No
13. If yes, give the identification mark issued by the Competent Authority of country of origin of design. :
14. Whether the shipment is proposed under exclusive use provisions, if applicable : Yes/No
15. Operational controls, if any :
16. Proposed mode of transport : Air/Rail/Road/Sea/All
17. Packaging details
Please provide a cut-away sketch of dimensions 21cmx30cm, showing components of the packaging, construction materials and closures :
18. If the radioactive material has any other hazardous properties, whether the requirements of the relevant international/national regulations have been duly fulfilled (please specify: e.g. explosive, inflammable, etc.)
19. Whether instructions to the carrier in respect of handling, lifting, tying down, storage in transit and stowage have been provided. : Yes/No
20. State whether emergency instructions (including TREMCARD) have been prepared for the shipment. : Yes/No
21. Any other information :

Signature of applicant

Name

Designation

Address

Government of India
Atomic Energy Regulatory Board

Vikram Sarabhai Bhavan,
4th Floor, North wing,
Anushaktinagar,
Bombay - 400 094.

APPLICATION FOR SHIPMENT APPROVAL UNDER SPECIAL ARRANGEMENT
(Under para 3.22 of the AERB Code)

1. Name and address of the Consignor :
2. Name and address of the Consignee :
3. Name of the Carrier :
4. Date by which approval is required. :
5. Mode of Transport : Road/Rail/Air/Sea/All
6. Details of the Consignment :
 - Identity of radioactive material and its strength in TBq(Ci) :
 - Physical state :
 - Chemical state :
 - Mass and volume of fissile material. (if applicable) :
 - Percent enrichment (if applicable) :
 - Fissile material composition in percent (if applicable) :
7. Packaging details
Please provide a cut-away sketch of dimensions 21cmx30cm, showing components of the packaging, construction materials and closures :

8. Reasons for Special Arrangement : Design not approved/
leakage radiation
levels higher/-----
9. Proposed compensatory measures to maintain overall level of safety (Please tick mark (_/) against the items proposed for operational controls during transport. :
- a) shipment under exclusive use.
 - b) provision of escort in a separate vehicle
 - c) provision of a health physics escort.
 - d) provision of portable fire fighting equipment for the shipment.
 - e) provision for personnel monitoring of transport workers such as driver, cargo handlers etc.
 - f) others (please specify)
10. State whether the approval is required for a single shipment or multiple shipments during a specified period. :
11. State whether emergency instructions (including TREMCARD) have been prepared for the shipment :
12. Any other information :

Date:

Signature of the Applicant

Name

Designation

Address

EXAMPLES OF CERTIFICATES

Attached are examples of standard formats for approval certificates for

- design of special form radioactive material,
- package design,
- shipment, and
- special arrangement

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CERTIFICATE OF APPROVAL OF DESIGN FOR
SPECIAL FORM RADIOACTIVE MATERIAL

1. Certificate Issue Date Expiry Date	2. Competent Authority Identification Mark
--	---

3. This certificate is issued on the basis of the application submitted by
- | | |
|---------------------------------------|---|
| (Name and address of the applicant) | (Title and identification of the application) |
|---------------------------------------|---|

- | | |
|---|---------------------|
| 4. Radioactive Material
(Radionuclide, chemical and physical form) | 5. Maximum Activity |
|---|---------------------|

6. Specification and Drawing References

7. This is to certify that the design of the radioactive material identified in items 4, 5 and 6 above meets the requirements set for the Special Form Radioactive Material in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No.6, 1985 Edition and in the AERB Code No. SC/TR-1, 1986.

Date:

COMPETENT AUTHORITY

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CERTIFICATE OF APPROVAL OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

1. Certificate Issue Date	2. Competent Authority Identification Mark
Expiry Date	Package Identification Number

3. This certificate is issued on the basis of the application submitted by
- | | |
|--------------------------------------|---|
| (Name and address of the applicant) | (Title and identification of the application) |
|--------------------------------------|---|

4. This is to certify that the design of the package described in para 5 meets the applicable requirements set for the Type B() packages (the Type packages containing fissile material) in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No.6, 1973 Revised Edition (as amended) and in the AERB Code No.SC/TR-1, 1986, and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

Date:

COMPETENT AUTHORITY

contd.

CERTIFICATE OF APPROVAL OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

5. Package Identification

(a) Packaging

- (i) Model No. :
- (ii) Descriptions
(Use, dimensions, materials, closures, gross mass, etc.)
- (iii) Reference to Drawings and Specifications

(b) Radioactive Contents (non-fissile)

- (i) Type and Form
(including special form radioactive material, if applicable)
- (ii) Maximum Activity per Package
(including activities of the various isotopes)

(c) Packages for Fissile Material

- (i) Type and Form of Fissile Material
- (ii) Maximum Activity and Quantity per Package
- (iii) Transport Index for Nuclear Criticality Control
- (iv) Special Features
(On the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment)
- (v) Irradiated Fissile Material
(Any determination on which decreased neutron multiplication is assumed in the criticality assessment as a result of actual irradiation experience)

contd.

CERTIFICATE OF APPROVAL OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

6. Mode of Transport

7. Shipment Notification

8. Shipment Authorisation

9. Restrictions on the Modes of Transport
(Type of conveyance and/or freight container, and routing instructions.)

10. Operational Controls
(Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as use of the packaging and specific actions prior to shipment.)

11. Emergency Arrangements

END

Government of India
Atomic Energy Regulatory Board

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SHIPMENT APPROVAL CERTIFICATE

1. Certificate Issue Date Expiry Date	2. Competent Authority Identification Mark
--	---

3. This certificate is issued on the basis of the application submitted by
- | | |
|--------------------------------------|---|
| (Name and address of the applicant) | (Title and identification of the application) |
|--------------------------------------|---|

4. This is to certify that the shipment of the radioactive material described in para 5(b) is designed to meet the requirements set for the shipment of radioactive material in question in the IAEA Regulations for the Safe Transport of Radioactive Material Safety Series No.6, 1985 Edition and in the AERB Code No.SC/TR-1, 1986 and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

Date:

COMPETENT AUTHORITY

contd.

SHIPMENT APPROVAL CERTIFICATE

5. Package Identification

(a) Packaging

- (i) Model No. :
- (ii) Descriptions
(Use, dimensions, materials, closures, gross mass, etc.)
- (iii) Reference to Drawings and Specifications

(b) Radioactive Contents (non-fissile)

- (i) Type and Form
(including special form radioactive material, if applicable)
- (ii) Maximum Activity per Package
(including activities of the various isotopes)
- (iii) Maximum Quantity of Fissile Material per Package

6. Restrictions on the Modes of Transport
(Type of conveyance and/or freight container, and routing instructions.)

7. Operational Controls
(Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as use of the packaging and specific actions prior to shipment.)

8. Emergency Arrangements

END

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Atomic Energy Regulatory Board

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SPECIAL ARRANGEMENT SHIPMENT
APPROVAL CERTIFICATE

1. Certificate Issue Date Expiry Date	2. Competent Authority Identification Mark
--	---

3. This certificate is issued on the basis of the application submitted by
- | | |
|---------------------------------------|---|
| (Name and address of the applicant) | (Title and identification of the application) |
|---------------------------------------|---|

4. This is to certify that the shipment of the radioactive material described in para. 5 (b) of this certificate is designed to meet the requirements set for the shipment of the radioactive material in question, under special arrangement, in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1985 Edition and in the AERB Code No. SC/TR-1, 1986 and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

Date:

COMPETENT AUTHORITY

contd.

SPECIAL ARRANGEMENT SHIPMENT
APPROVAL CERTIFICATE

5. Package Identification

(a) Packaging

(i) Model No. :

(ii) Descriptions
(Use, dimensions, materials, closures, gross mass, etc.)

(iii) Reference to Drawings and Specifications

(b) Radioactive Contents (non-fissile)

(i) Type and Form
(including special form radioactive material, if applicable)

(ii) Maximum Activity per Package
(including activities of the various isotopes)

(c) Packages for Fissile Material

(i) Type and Form of Fissile Material

(ii) Maximum Activity and Quantity per Package

(iii) Transport Index for Nuclear Criticality Control

(iv) Special Features
(On the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment)

(v) Irradiated Fissile Material
(Any determination on which decreased neutron multiplication is assumed in the criticality assessment as a result of actual irradiation experience)

SPECIAL ARRANGEMENT SHIPMENT
APPROVAL CERTIFICATE

6. Mode(s) of Transport
-
7. Restrictions on the Modes of Transport
(Type of conveyance and/or freight container, and routing instructions.)
-
8. Operational Controls
(Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as use of the packaging and specific actions prior to shipment.)
-
9. Reasons for Special Arrangement
-
10. Compensatory Measures as a Result of the Shipment under Special Arrangement
-
11. Emergency Arrangements
-

END

REFERENCES

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2. AERB Safety Code, SC/TR-1, 1986, Transport of Radioactive Materials, Atomic Energy Regulatory Board, Bombay.
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4. AERB Safety Guide, SG/TR-3 1991, Procedure for Forwarding, Transport, Handling and Storage of Radioactive Consignments, Atomic Energy Regulatory Board, Bombay.
5. AERB Safety Guide, SG/TR-2 (Under issuance), Standards of Safety in Transport of Radioactive Material, Atomic Energy Regulatory Board, Bombay.
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10. IAEA Safety Series No.87, Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material, 1988 edition, IAEA, Vienna, 1988.

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