



ORDEM
DOS
ENGENHEIROS



ANO OE
ENERGIA E
CLIMA

Jornada de Segurança Industrial

Tratamento de energias perigosas

Desafios para a segurança na indústria

João Cezília [Tutorial, Lda.]



CEES - Comissão de Especialização em Engenharia de Segurança

Coimbra, 13 de Abril de 2023

Agenda

- **Aplicabilidade e responsabilidade**
- **Classificação**
 - para os utilizadores
 - para o transporte
 - de resíduos
- **Formas de acondicionamento**
- **Marcação e etiquetagem**
- **Expedição**

Aplicabilidade e responsabilidade

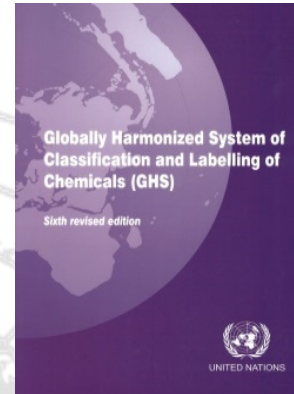


Aplicabilidade e responsabilidade



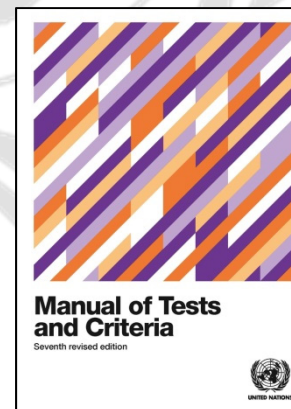
**Recommendations on
the Transport of
Dangerous Goods**

22st Revised Edition



**Globally Harmonized
System of
Classification and
Labelling of Chemicals**

9th revised edition

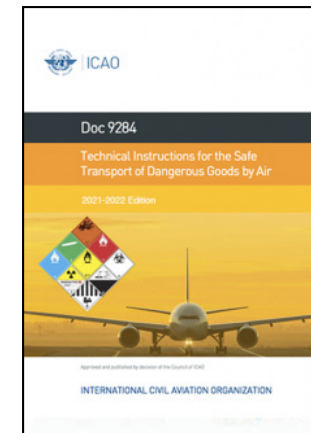
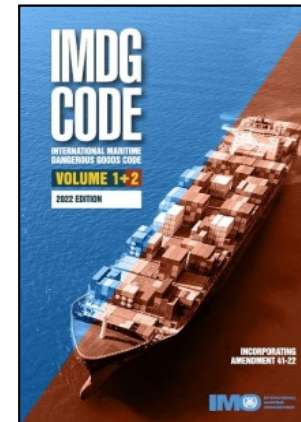
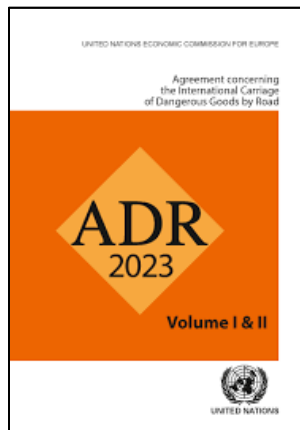


**UN Manual of Tests
and Criteria**

7th Revised Edition
Amend.1

Aplicabilidade e responsabilidade

- Regulamentos modais aplicáveis (ADR, RID, Código IMDG, IT-OACI)



A classificação para transporte...

Classe 1

Matérias e objetos explosivos



Classe 2

Gases



Classe 3

Líquidos inflamáveis



Classe 4

Matérias “sólidas” inflamáveis; m. sujeitas a inflamação espontânea; MQEC c/H₂O LGI



Classe 5

Matérias comburentes ou peróxidos orgânicos



Classe 6

Matérias tóxicas ou infecciosas



Classe 7

Matérias radioativas



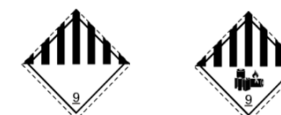
Classe 8

Matérias corrosivas



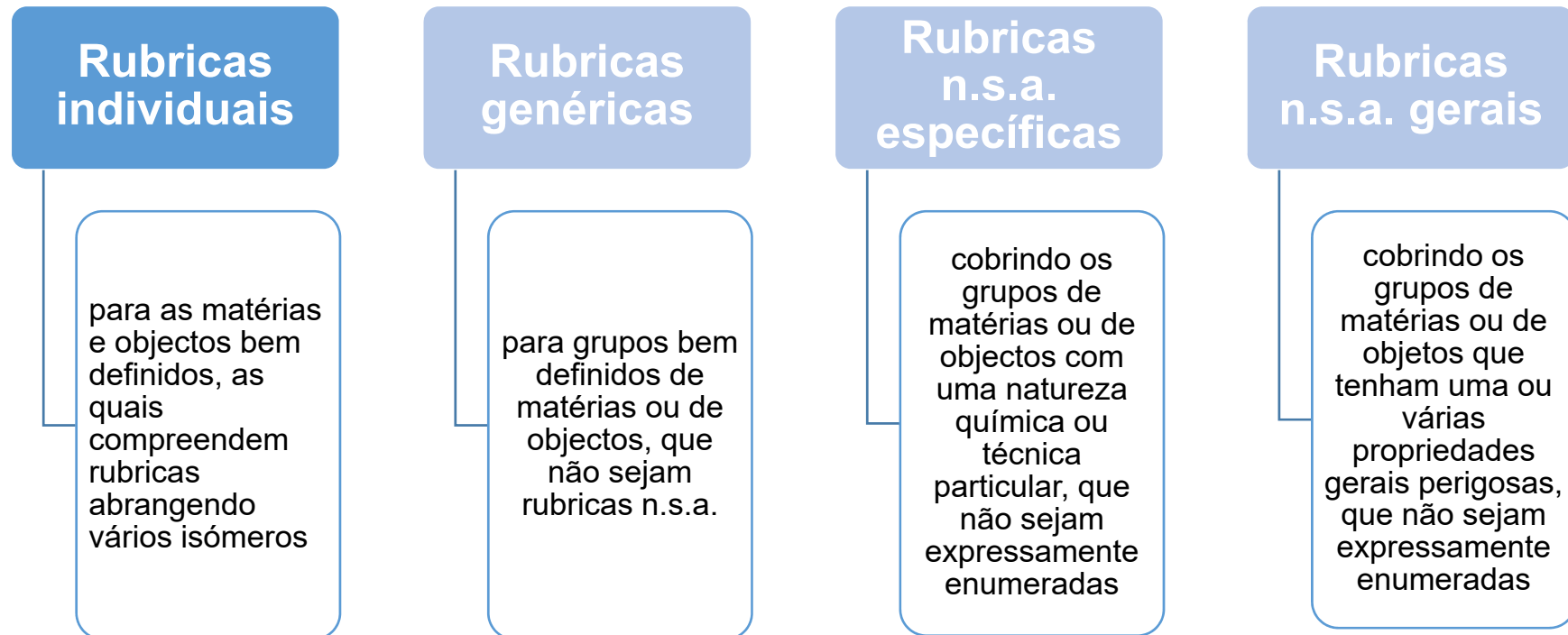
Classe 9

Matérias e objetos perigosos diversos



A classificação para transporte...

Os n^os ONU



Grupo de Embalagem/*Packing Group*:

- I Matérias muito perigosas
- II Matérias medianamente perigosas
- III Matérias levemente perigosas

Exemplo: UN 1993 líquido inflamável, n.s.a. (contendo acetona) 3 III

Ficha da Dados de Segurança (FDS)



SECÇÃO 1: Identificação da matéria/empresa

SECÇÃO 2: Identificação dos perigos

SECÇÃO 3: Composição/informação sobre os componentes

SECÇÃO 4: Medidas de primeiros socorros

SECÇÃO 5: Medidas de combate a incêndios

SECÇÃO 6: Medidas em caso de fuga accidental

SECÇÃO 7: Manuseamento e armazenagem

SECÇÃO 8: Controlo da exposição/Proteção individual

SECÇÃO 9: Propriedades físico-químicas

SECÇÃO 10: Estabilidade e reatividade

SECÇÃO 11: Informação toxicológica

SECÇÃO 12: Informação ecológica

SECÇÃO 13: Considerações relativas à eliminação

SECÇÃO 14: Informações relativas ao transporte

SECÇÃO 15: Informação sobre regulamentação

SECÇÃO 16: Outras informações

A classificação de resíduos...



AGÊNCIA
PORTUGUESA
DO AMBIENTE

ESTADO Emitida

DATA



CÓDIGO DOCUMENTO
CÓDIGO VERIFICAÇÃO

Para realizar a validação do documento e comprovar que o documento apresentado corresponde à GAR vigente, aceda a '<https://siliamb.apambiente.pt>' e no link 'Consultar Documentos', indique o código do documento e de verificação apresentados.

e-GAR

GUIA ELETRÓNICA DE ACOMPANHAMENTO DE RESÍDUOS



INFORMAÇÃO RELATIVA AO TRANSPORTE DE MERCADORIAS PERIGOSAS

Nº ONU

UN 1790

DESIGNAÇÃO OFICIAL

ÁCIDO FLUORÍDRICO contendo mais de 60% mas não mais de 85% de fluoreto de hidrogénio

OBSERVAÇÕES

Nº DE MODELOS ETIQUETAS

8/6.1

GRUPO DE EMBALAGEM

I

CÓDIGO DE RESTRIÇÃO EM TÚNEIS

(C/D)

OBSERVAÇÕES II

Nº E DESCRIÇÃO DOS VOLUMES

1 tambor

CATEGORIA DO TRANSPORTE

1



Formas de acondicionamento

Regra geral, as embalagens aprovadas para o transporte de mercadorias perigosas reconhecem-se pela marca de aprovação UN...



As embalagens plásticas têm cinco anos de validade

Formas de acondicionamento

As cisternas têm que ser fabricadas com base em projetos previamente aprovados e testadas antes de colocadas ao serviço e também periodicamente



Número de homologación		Volumen litros compartimentos		Presión prueba compartimentos		Inspección y control del depósito	
A-3447/176							
Nº de fabricación	A8/10-17	Nº. 1	10.012	2,6	11-10	P	
Año de construcción	2010	Nº. 2	5.060	2,6			
Presión de prueba	4,00 bar	Nº. 3	8.117	2,6			
Presión exterior	-0,21 bar	Nº. 4	8.158	2,6			
Temperatura de servicio	2,00 bar	Nº. 5					
Temperatura de cálculo	20+150°C	Nº. 6					
Temperatura mínima de carga	-20 °C	Nº. 7					
		Nº. 8					

Materia del depósito: AISI 316-L
Revestimiento protector

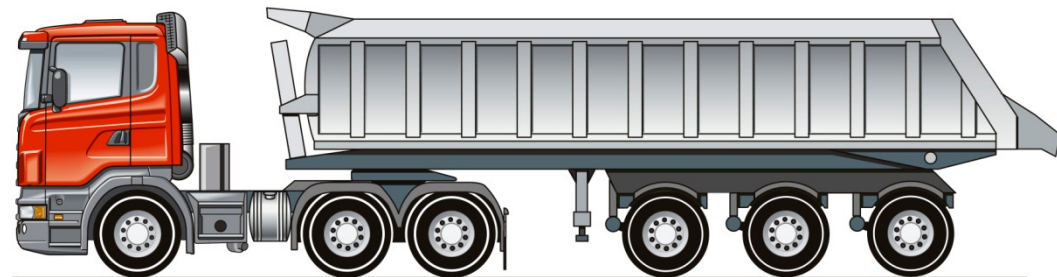


Formas de acondicionamento

Em alguns casos, o transporte a granel é permitido, nas condições previstas nos regulamentos aplicáveis



C.S.C. SAFETY APPROVAL			
COUNTRY OF APPROVAL AND REFERENCE	GB-LR 8570-5/96		
DATE MANUFACTURED	09 96		
IDENTIFICATION No.	C2260/271		
MAXIMUM GROSS WEIGHT	35000 kg	77160 lb	
ALLOWABLE STACKING WEIGHT FOR 1.8g	100500 kg	221600 lb	
RACKING TEST LOAD VALUE	15240 kg	33600 lb	
END WALL STRENGTH	0.35P		
SIDE WALL STRENGTH	0.52P		
INITIAL SURVEY (MONTH AND YEAR)			
ACEP GB-129 UBC LTD			



Marcação e etiquetagem



Transporte marítimo

Marcas	Etiqueta	Placas-etiqueta	Painel-laranja
<p>100 mm X 100 mm (embalagens) 250 mm X 250 mm (contentores e cisternas)</p>	<p>12,5 mm</p> <p>100 mm X 100 mm</p>	<p>65 mm</p> <p>25 mm</p> <p>250 mm X 250 mm</p>	<p>300 mm</p> <p>120 mm</p> <p>10 mm</p> <p>65 mm</p>

Transporte terrestre



Expedição

Apesar das tentativas de harmonização, existem regras, isenções e disposições especiais aplicadas de forma diferente, em função do modo de transporte.

LETRE DE VOYAGE INTERNATIONAL (GMR) INTERNATIONAL CONSIGNMENT NOTE

1. **Shipper's name and address** (Nom du chargeur, adresse, pays) / **Shipper's name, address, city, state/province, postal code, country**

2. **Consignee's name and address** (Nom du destinataire, adresse, pays) / **Consignee's name, address, city, state/province, postal code, country**

3. **Date of issue** (Date de délivrance) / **Date of issue**

4. **Mode of transport** (Mode de transport) / **Mode of transport**

5. **Number of packages** (Nombre de colis) / **Number of packages**

6. **Weight of packages** (Poids des colis) / **Weight of packages**

7. **Volume of packages** (Volume des colis) / **Volume of packages**

8. **Number of packages** (Nombre de colis) / **Number of packages**

9. **Weight of packages** (Poids des colis) / **Weight of packages**

10. **Volume of packages** (Volume des colis) / **Volume of packages**

11. **Number of packages** (Nombre de colis) / **Number of packages**

12. **Weight of packages** (Poids des colis) / **Weight of packages**

13. **Volume of packages** (Volume des colis) / **Volume of packages**

14. **Number of packages** (Nombre de colis) / **Number of packages**

15. **Weight of packages** (Poids des colis) / **Weight of packages**

16. **Volume of packages** (Volume des colis) / **Volume of packages**

17. **Number of packages** (Nombre de colis) / **Number of packages**

18. **Weight of packages** (Poids des colis) / **Weight of packages**

19. **Volume of packages** (Volume des colis) / **Volume of packages**

20. **Number of packages** (Nombre de colis) / **Number of packages**

21. **Weight of packages** (Poids des colis) / **Weight of packages**

22. **Volume of packages** (Volume des colis) / **Volume of packages**

23. **Number of packages** (Nombre de colis) / **Number of packages**

24. **Weight of packages** (Poids des colis) / **Weight of packages**

25. **Volume of packages** (Volume des colis) / **Volume of packages**

26. **Number of packages** (Nombre de colis) / **Number of packages**

27. **Weight of packages** (Poids des colis) / **Weight of packages**

28. **Volume of packages** (Volume des colis) / **Volume of packages**

29. **Number of packages** (Nombre de colis) / **Number of packages**

30. **Weight of packages** (Poids des colis) / **Weight of packages**

31. **Volume of packages** (Volume des colis) / **Volume of packages**

32. **Number of packages** (Nombre de colis) / **Number of packages**

33. **Weight of packages** (Poids des colis) / **Weight of packages**

34. **Volume of packages** (Volume des colis) / **Volume of packages**

35. **Number of packages** (Nombre de colis) / **Number of packages**

36. **Weight of packages** (Poids des colis) / **Weight of packages**

37. **Volume of packages** (Volume des colis) / **Volume of packages**

38. **Number of packages** (Nombre de colis) / **Number of packages**

39. **Weight of packages** (Poids des colis) / **Weight of packages**

40. **Volume of packages** (Volume des colis) / **Volume of packages**

41. **Number of packages** (Nombre de colis) / **Number of packages**

42. **Weight of packages** (Poids des colis) / **Weight of packages**

43. **Volume of packages** (Volume des colis) / **Volume of packages**

44. **Number of packages** (Nombre de colis) / **Number of packages**

45. **Weight of packages** (Poids des colis) / **Weight of packages**

46. **Volume of packages** (Volume des colis) / **Volume of packages**

47. **Number of packages** (Nombre de colis) / **Number of packages**

48. **Weight of packages** (Poids des colis) / **Weight of packages**

49. **Volume of packages** (Volume des colis) / **Volume of packages**

50. **Number of packages** (Nombre de colis) / **Number of packages**

51. **Weight of packages** (Poids des colis) / **Weight of packages**

52. **Volume of packages** (Volume des colis) / **Volume of packages**

53. **Number of packages** (Nombre de colis) / **Number of packages**

54. **Weight of packages** (Poids des colis) / **Weight of packages**

55. **Volume of packages** (Volume des colis) / **Volume of packages**

56. **Number of packages** (Nombre de colis) / **Number of packages**

57. **Weight of packages** (Poids des colis) / **Weight of packages**

58. **Volume of packages** (Volume des colis) / **Volume of packages**

59. **Number of packages** (Nombre de colis) / **Number of packages**

60. **Weight of packages** (Poids des colis) / **Weight of packages**

61. **Volume of packages** (Volume des colis) / **Volume of packages**

62. **Number of packages** (Nombre de colis) / **Number of packages**

63. **Weight of packages** (Poids des colis) / **Weight of packages**

64. **Volume of packages** (Volume des colis) / **Volume of packages**

65. **Number of packages** (Nombre de colis) / **Number of packages**

66. **Weight of packages** (Poids des colis) / **Weight of packages**

67. **Volume of packages** (Volume des colis) / **Volume of packages**

68. **Number of packages** (Nombre de colis) / **Number of packages**

69. **Weight of packages** (Poids des colis) / **Weight of packages**

70. **Volume of packages** (Volume des colis) / **Volume of packages**

71. **Number of packages** (Nombre de colis) / **Number of packages**

72. **Weight of packages** (Poids des colis) / **Weight of packages**

73. **Volume of packages** (Volume des colis) / **Volume of packages**

74. **Number of packages** (Nombre de colis) / **Number of packages**

75. **Weight of packages** (Poids des colis) / **Weight of packages**

76. **Volume of packages** (Volume des colis) / **Volume of packages**

77. **Number of packages** (Nombre de colis) / **Number of packages**

78. **Weight of packages** (Poids des colis) / **Weight of packages**

79. **Volume of packages** (Volume des colis) / **Volume of packages**

80. **Number of packages** (Nombre de colis) / **Number of packages**

81. **Weight of packages** (Poids des colis) / **Weight of packages**

82. **Volume of packages** (Volume des colis) / **Volume of packages**

83. **Number of packages** (Nombre de colis) / **Number of packages**

84. **Weight of packages** (Poids des colis) / **Weight of packages**

85. **Volume of packages** (Volume des colis) / **Volume of packages**

86. **Number of packages** (Nombre de colis) / **Number of packages**

87. **Weight of packages** (Poids des colis) / **Weight of packages**

88. **Volume of packages** (Volume des colis) / **Volume of packages**

89. **Number of packages** (Nombre de colis) / **Number of packages**

90. **Weight of packages** (Poids des colis) / **Weight of packages**

91. **Volume of packages** (Volume des colis) / **Volume of packages**

92. **Number of packages** (Nombre de colis) / **Number of packages**

93. **Weight of packages** (Poids des colis) / **Weight of packages**

94. **Volume of packages** (Volume des colis) / **Volume of packages**

95. **Number of packages** (Nombre de colis) / **Number of packages**

96. **Weight of packages** (Poids des colis) / **Weight of packages**

97. **Volume of packages** (Volume des colis) / **Volume of packages**

98. **Number of packages** (Nombre de colis) / **Number of packages**

99. **Weight of packages** (Poids des colis) / **Weight of packages**

100. **Volume of packages** (Volume des colis) / **Volume of packages**

IMO DANGEROUS GOODS DECLARATION

This form meets the requirements of SOLAS 74 chapter VI, regulation 15, MARPOL 73/78 Annex II, regulation 1 and the IMDG Code, General introduction, section 9

1. **Shipper** / **Reference number(s)**

2. **Consignee** / **Carrier**

3. **Container packing certificate/vehicle declaration** / **Name/status, company/organization of signatory**

4. **DECLARATION** / **Place and date**

5. **Signature on behalf of packer**

6. **Ship's name and voyage No.** / **Port of loading** / **Instructions or other matter**

7. **Port of discharge**

8. **Tasks, Nos.** / **Number and kind of packages, proper shipping name** / **IMO hazard class/division, UN number, packaging group (where assigned)** / **Gross mass (kg), net quantity/litres** / **Goods declared as:**

9. **Additional information** / **Name/status, company/organization of signatory**

10. **DECLARATION** / **Place and Date**

11. **Signature on behalf of shipper**

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

1. **Shipper** / **Air Waybill No.**

2. **Consignee** / **Page 1 of 1 Pages**

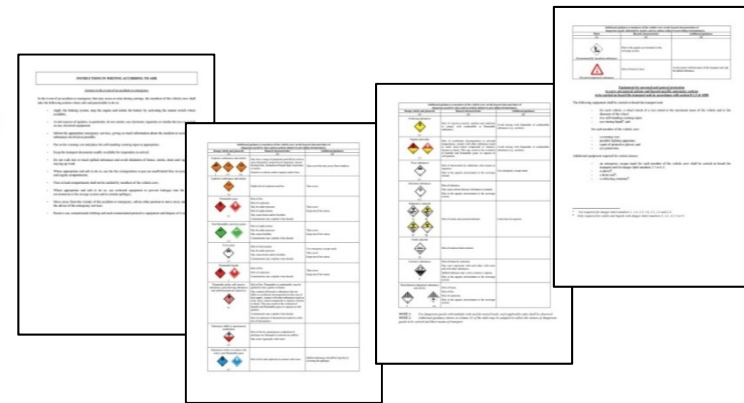
3. **TRANSPORT DETAILS** / **Airport of Departure (optional):**

4. **NATURE AND QUANTITY OF DANGEROUS GOODS** / **UN Number or Identification Number, Proper Shipping Name, Class or Division (subsidiary hazard), Packing Group (if required) and all other required information.**

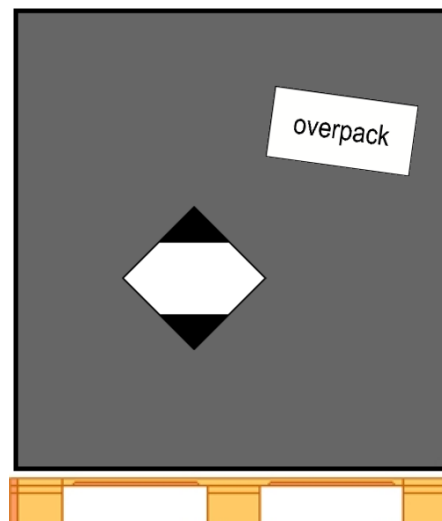
5. **Additional Handling Information** / **The packages containing UN3226 must be protected from direct sunlight and all sources of heat and be placed in adequately ventilated areas. 24-hour Number: +1 905 123 4567**

6. **Signature** / **Name of Signatory**

Expedição

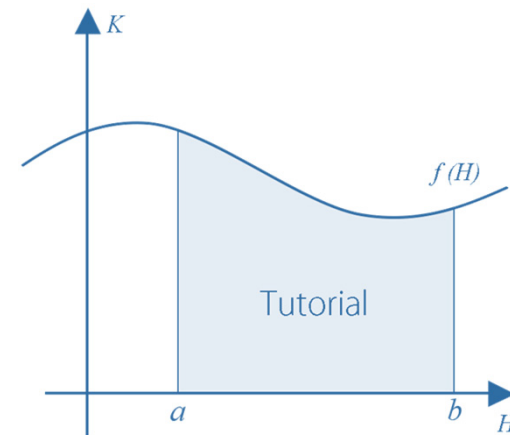


Expedição e armazenagem



Conclusão...

A segurança será,
cada vez mais,
um trabalho
interdisciplinar e de
integração





ORDEM
DOS
ENGENHEIROS



ANO OE
ENERGIA E
CLIMA

Jornada de Segurança Industrial

Obrigado!



jcezilia@gmail.com

