



UN – testing of containers

Geir Morten Johansen
Nordisk Emballasje Testing AS



What to talk about!

- Present NET and what we do!
- UN – approvals for dangerous goods packaging

The Team – People behind NET



- Rune Fink, managing director, Engineer in chemistry
- Geir Morten Johansen, quality manager, Master of Science, materials and engineering
- Tom Haugan, Laboratory manager, Technician
- Susanne Dahlberg, Dangerous Goods Expert, Master of Science, chemistry



History

- 2006
 - Borealis reduce focus on products for dangerous goods packaging
- January 2007
 - Contract for renting lab facility and buying of equipment signed
 - Contract for authority to make approvals signed
- January 2009
 - Three full time employees, 150 certificates
 - Probably the fastest growing UN certification institute!

Business concept

- Focus on UN – testing and approvals
- Use our plastic competence to increase leverage at plastic converters
- Flexibility without sacrificing on safety
- Close dialogue with authorities
- Valuable feedback and advice to customers
- International focus, harmonisation of practice

What NET can offer!

- UN approvals according to ADR, RID, IMDG and ICAO-TI
- Chemical compatibility testing using standard liquids or original liquid
- Drop test
- Leak and pressure test
- Stacking and compression test
- Permeability test

- Failure analysis
- Transportation logging and simulation
- Packaging Design

What is dangerous goods?

- Common international regulations: UN, ADR, RID, IMDG, ICAO-TI
- Most countries have signed agreements for adapting the regulations nationally.
- In “Materials Safety Data Sheets” you will find the relevant information about TRANSPORTATION of DANGEROUS GOODS. This includes classifying the chemical by an UN-number.

NFPA Classification	DOT / TDG Pictograms	WHMIS Classification	HMIS	PROTECTIVE CLOTHING				
Health: 2 Flammability: 0 Reactivity: 1 Specific Hazard: OX	Corrosive	Flammable Corrosive PVC	Health: 3 Flammability: 0 Reactivity: 1 PVC: H	W, R, C, P, F, Y				
Section I. Chemical Product and Company Identification								
PRODUCT NAME / TRADE NAME: Nitric Acid 42% B6		MSDS NUMBER: 14215						
SYNONYM: Hydrogen nitrate, Aqua fortis		REVISION NUMBER: 4.0						
CHEMICAL NAME: Nitric acid		MSDS prepared by: October 4, 2006						
CHEMICAL FAMILY: Inorganic acid.		the Environment, Health and Safety Department on:						
CHEMICAL FORMULA: HNO ₃		24 HR EMERGENCY TELEPHONE NUMBER: Transportation: 1-800-792-8311 Medical: 1-888-670-8123						
MATERIAL USES: Agricultural use: Manufacture of products. Industrial applications: Manufacture of chemicals, Manufacture of specially metal products.								
MANUFACTURER: Agrium, North American Wholesale, 13131 Lake Fraser Drive, S.E. Calgary, Alberta, Canada, T2J 7E8. Agrium U.S. Inc., Suite 1700, 4582 South Ulster St. Denver, Colorado, U.S.A., 80237		SUPPLIER: Agrium, North American Wholesale, 13131 Lake Fraser Drive, S.E. Calgary, Alberta, Canada, T2J 7E8. Agrium U.S. Inc., Suite 1700, 4582 South Ulster St. Denver, Colorado, U.S.A., 80237						
Section II. Hazardous Ingredients								
		Exposure Limits (ACGIH)						
NAME	CAS #	TLV-TWA mg/m ³	TLV-TWA ppm	STEL mg/m ³	STEL ppm	CEIL mg/m ³	CEIL ppm	% by Weight
Nitric acid	7697-37-2	2.2	2	10	4			67.2
ACGIH TLV definitions: (T) - Threshold Limit Value (C) - Ceiling: the concentration not to be exceeded at any time (S) - measured as the Thoracic fraction of the aerosol (T) - measured as the Thoracic fraction of the aerosol								
TOXICOLOGICAL DATA ON INGREDIENTS: Nitric acid OECD SIDS Information: Acute vapor LC ₅₀ : 244 ppm, Rat (1 hour). Ecotoxicity: Acute Fish LC ₅₀ (species unknown) pH 3.71 - 4.0; growth inhibition, daphnia at 0.3 mg/L. CHM/TADS - O6 and Hazardous Materials/Technical Assistance Data System Freshwater toxicity: Conc: (Expos) (Species) (Effect) (Test Environment) () PPM: (H ₂) () () () () 1.8 () (Trout) (TOX) () ()								
Continued on Next Page								

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID

Hazard Class: 8

UN/NA: UN2031

Packing Group: II

Information reported for product/size: 6.5GL

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)

Hazard Class: 8

UN/NA: UN2031

Packing Group: II

Information reported for product/size: 6.5GL



What is dangerous goods?

- Class 1 Explosive substances and articles
- Class 2 Gases
- Class 3 Flammable liquids
- Class 4.1 Flammable solids, self-reactive substances and solid desensitized explosives
- Class 4.2 Substances liable to spontaneous combustion
- Class 4.3 Substances which, in contact with water, emit flammable gases
- Class 5.1 Oxidizing substances
- Class 5.2 Organic peroxides
- Class 6.1 Toxic substances
- Class 6.2 Infectious substances
- Class 7 Radioactive material
- Class 8 Corrosive substances
- Class 9 Miscellaneous dangerous substances and articles



What is dangerous goods?

- From the UN-number the relevant Packing Instruction can be found. The Packing Instruction tells which types of packaging that is approved to be used, and if there are special requirements.

4.1.4.1 *Packing instructions concerning the use of packagings (except IBCs and large packagings)*

P001		PACKING INSTRUCTION (LIQUIDS)			P001
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:					
Combination packagings:		Maximum capacity/Net mass (see 4.1.3.3)			
Inner packagings	Outer packagings	Packing group I	Packing group II	Packing group III	
	Drums				
Glass 10 l	steel (1A2)	250 kg	400 kg	400 kg	
Plastics 30 l	aluminium (1B2)	250 kg	400 kg	400 kg	
Metal 40 l	metal other than steel or aluminium (1N2)	250 kg	400 kg	400 kg	
	plastics (1H2)	250 kg	400 kg	400 kg	
	plywood (1D)	150 kg	400 kg	400 kg	
	fibre (1G)	75 kg	400 kg	400 kg	
	Boxes				
	steel (4A)	250 kg	400 kg	400 kg	
	aluminium (4B)	250 kg	400 kg	400 kg	
	natural wood (4C1, 4C2)	150 kg	400 kg	400 kg	
	plywood (4D)	150 kg	400 kg	400 kg	
	reconstituted wood (4F)	75 kg	400 kg	400 kg	
	fibreboard (4G)	75 kg	400 kg	400 kg	
	expanded plastics (4H1)	60 kg	60 kg	60 kg	
	solid plastics (4H2)	150 kg	400 kg	400 kg	
	Jerricans				
	steel (3A2)	120 kg	120 kg	120 kg	
	aluminium (3B2)	120 kg	120 kg	120 kg	
	plastics (3H2)	120 kg	120 kg	120 kg	

Tests and Type Approval needed!

- ADR 4.1.1.3 Unless provided elsewhere in ADR, each packaging, including IBCs and large packagings, except inner packagings, shall conform to a design type successfully tested in accordance with the requirements of 6.1.5, 6.3.2, 6.5.6 or 6.6.5, as applicable. The packagings for which the test is not required are mentioned under 6.1.1.3.
- ADR 6.1.1.4 Packagings shall be manufactured, reconditioned and tested under a quality assurance programme which satisfies the **competent authority** in order to ensure that each packaging meets the requirements of this Chapter.
- **ADR 6.1.3.14 Certification** By affixing marking in accordance with 6.1.3.1, it is certified that mass-produced packagings correspond to the approved design type and that the requirements referred to in the approval have been met.

Type approval – what is needed !

- Test and packaging information documented in accredited test report. (Confidential information)
- Product approval of packaging for transportation of Dangerous goods. (Public information)

REPORT

Report no.: NET1901A-01 File no.: 2.0.19.1 11 of 4 0

Manufacturer: Hannells Industrier AS Test work is performed by:
 DK-7400 Herring NET AS
 DENMARK Bledakkevejen 45
 3950 BREVIN, NORWAY
 # Knud Engedal
 ☎ (+45) 96 27 21 00
 # knud.engedal@hannells.dk
 ☎ (+45) 96 27 21 01

Test specimens arrival date: 23.05.08 / 23.11.08
 Date of starting: 23.05.08 Date of completing: 16.12.08

TYPE APPROVAL ON PLASTICS JERRICANS, 20 l. (300 G), 3H1, NON-REMOVABLE HEAD

Internal distribution: 1. Geir M. Johansen
 External distribution: 1. Knud Engedal

Lab. Manager: Date: Test responsible: Date:

Rune M. Fink Tom W. Haugen

Tested item(s): Plastic cans, drawing number: 4480 016. Date: 24.11.2008

Tests are ordered by: Knud Engedal.

Material(s):	Part of the Packaging	Grade	Item #
	Can	Borealis BLD511	2
	Screw cap	Borealis B1481	2
	Gasket	EPE 300	3

Testing specifications: The transport conventions ADR (by road), RID (by railway), IMDG (at sea), ICAO & IATA (by air) and UN recommendations on "Transport of dangerous goods".

Test goal: Packaging group II.

Test medium: Water, White Spirit and Wetting agent.

Conclusion: The cans fulfil the requirements for transport of dangerous goods: packing group II for water, 1.5 kg, white spirit, 1.0 kg, n-butyl acetate 1.0 kg, acetic acid 1.0 kg and wetting solution, 1.2 kg. (AUNDO, net 6, 2007 min).
 Maximum vapour pressure for the cans at 50 °C is 171 kPa.
 Production weight: 878 - 922 gram.
 The test results relate only to the items tested.

Hannells Industrier Testing AS
 Herringvej 45
 DK-7400 Herring
 ☎ (+45) 96 27 21 00
 # knud.engedal@hannells.dk
 # 96272101

NET 17025
 165 m. 190 703 040
 Bank account: 6260 09 2295
 www.net17025.com

INTERNATIONAL CERTIFICATE

PRODUCT APPROVAL OF PACKAGING FOR TRANSPORTATION OF DANGEROUS GOODS

CERTIFICATE NO.: NET1901A

Holder of certificate: Hannells Industrier AS
 Manufacturer: Hannells Industrier AS
 Herringvej 45
 DK-7400 Herring
 DENMARK

Product:	Packaging code	Description	Drawings	Material
	3H1	Plastics jerricans with non-removable head	Denmark_20 litre, Drawing 4480 016	HDPE

Closing mechanism:	Closure type	Material in cap	Gasket	Closing torque
	Plastic screw cap	HDPE	EPE 300	30 Nm

Photo:



Dimensions:	Packaging weight, g	Volume, litre	Height, mm	Width, mm	Length, mm
878 - 922 g	20	376	260	225	

Marking on packaging: 3H1/Y1.0/200/YR/N/NET1901A - 3D
 *To be replaced with the two last digits of the year.
 *To be replaced by any identification as decided by the manufacturer.
 The packaging shall also be appropriately marked with the month of the manufacture.


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 Hannells Industrier Testing AS
 Herringvej 45
 DK-7400 Herring
 ☎ (+45) 96 27 21 00
 # knud.engedal@hannells.dk
 # 96272101


Follow up of approvals

Agreement for control of production

- Assure that produced packaging are as good as the ones originally tested.
- Verify that the UN-approved packaging are produced under a quality assurance program.

Certification – marking

Solids:  4G / Y9 / S / 08 / N / NET1002A – ID

Liquid:  3H1 / Y1.9 / 250 / 08 / N / NET1901A - ID



- X for packing groups I, II and III;
- Y for packing groups II and III;
- Z for packing group III only;

- Packing group I: Substances presenting high danger;
- Packing group II: Substances presenting medium danger;
- Packing group III: Substances presenting low danger.



Questions ?

