

Germanischer Lloyd



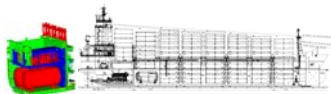
Current development of IMO IGF-Code – technical challenges and perspectives –

Dr Gerd Würsig, 2010-09-07



www.gl-group.com

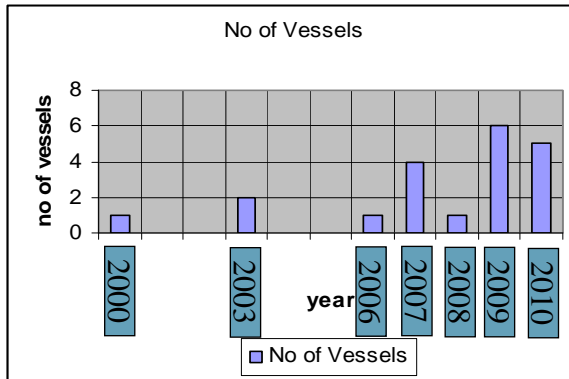
Gas as Fuel for Shipping



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Gas fuelled vessels



2000: car/passenger ferry
 2003: two offshore vessels
 2006: one car/passenger ferry
 2007: four car/passenger ferries
 2008: one offshore vessel
 2009: four car/passenger ferries, one patrol vessel, one offshore vessel
 2010: three car passenger ferries, two patrol vessels

car passenger vessels: two different owners
 offshore vessels: two different owners
 patro vessels: one owner

Source: DNV; Wärtsilä LNG Seminar, Waalvik, 2010-05-28

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Tarbit Shipping chemical tanker “Bit Viking” (GL 111552) will be converted to LNG as fuel

Particulars

Deadweight 24,783 MT
 Length over all 177,03 m
 Beam 26,30 m
 Cubic capacity 27,310 m³ 98%
 Main engines 2 x WÄRTSILÄ 6L46B
 5,850 kW

Classed GL* 100A5 E3 ESP IW
 NAV-OC Chemical Tanker Type-2



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IGF-Code IMO Rules for gas as ship fuel

	2009		2010		2011		2012		2013		2014		
Regulatory Track	BLG-13 MSC-86		BLG-14 MSC-87		BLG-15 MSC-88		BLG-16 MSC-89		BLG-17 MSC-90		BLG-18 MSC-91		
	SOLAS 2010								SOLAS 2014				
	IGF-Interim-Guideline (IMO) BMVBS												
	GL-IGF Guideline												
	GL IGF- Rule Notes												
IGF-Code (IMO) BMVBS										finalise before BLG-17			

MSC-86 (Mai 2009):
IGF Interim Guideline: MSC Resolution MSC-285-86



GL Guideline for the use of Gas as Fuel for Ships (VI-3-1)

The following Guidelines come into force on 1 May 2010.

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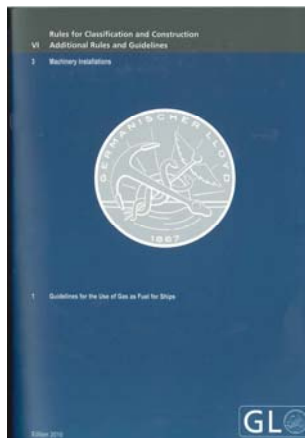
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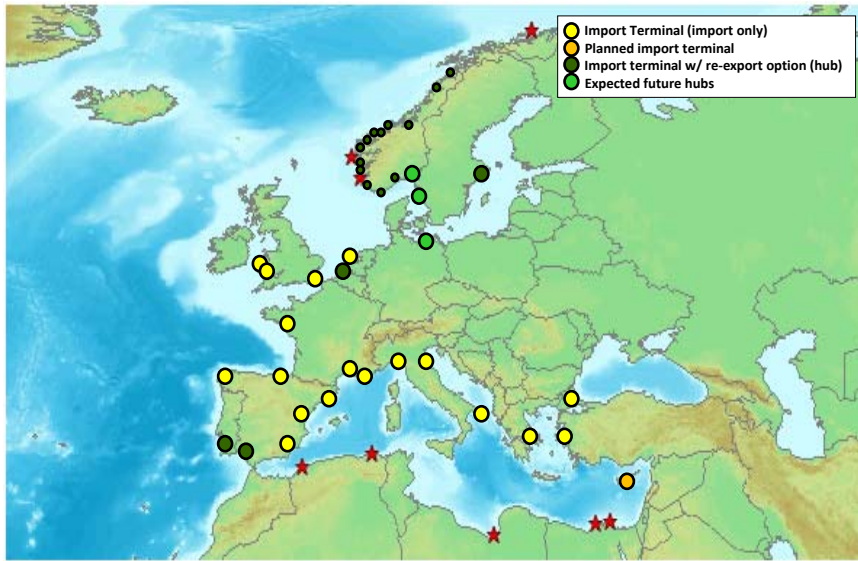
Published by: Germanischer Lloyd AG, Hamburg



In Force – 2010-05-01



LNG Import Terminals & Hubs



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7

No Chicken Egg problem for Fuel Supply

<p>Large Scale LNG</p> <ul style="list-style-type: none"> • Intercontinental transport • Millions of tons • LNG plant to import terminal • Feeding into pipe grid • Providing a commodity 	<p>Small Scale LNG</p> <ul style="list-style-type: none"> • Regional supply • Hundred thousands of tons • Directly to end-users • Providing an energy solution previously not available 	<p>I.M. Skaugen - Norgas</p> <ul style="list-style-type: none"> • Ethylene – minus 103 • LNG – minus 163 <ul style="list-style-type: none"> – New cargo system – Known technologies • Fleet of Multigas Carriers: <ul style="list-style-type: none"> – LNG, LEG, LPG, VCM 	

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Knudsen, Coral Methane (1000 m³, 7.500 m³)



Source: TGE Marine Gas Engineering

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LNG/LPG Tanker Norgas Innovation GL-112578, in service since January 2010



Source: GL, I.M. Skaugen

I.M. Skaugen SE/Norgas: 6 Newbuildings 10.000 to 12.000 m³, 2009/2011

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BLG-15 CG on IGF-Code - Time Table

Initial draft prepared by Germany 2010-05-31
(includes the MSC.285(86))

What	Who	When
Round 1	Coordinator	2 June
Round 1 comments	Members	15 August
Round 2	Coordinator	22 August
Round 2 comments	Members	19 September
Round 3/Draft report	Coordinator	26 September
Round 3/Draft report comments	Members	13 October
Round 4 Draft report	Coordinator	17 October
Round 4 Draft report comments	Members	31 October
Submission IMO	Coordinator	5 November

Bulky Papers Deadline: 2010-11-12

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Scope of IGF-Code

- should provide safety measures for ships using various gases as fuel including liquefied gas tankers.
- is intended to address natural gas fuel and also other gas fuel types, such as butane, hydrogen, propane.
- will cover the energy conversion systems of relevance (low and high pressure ICE, gas turbines, boilers, fuel cells)
- should only address issues not already covered by SOLAS and serve as an addition to SOLAS.
- should revoke the interim guidelines and Chapter 16 of the IGC Code.
- should be set into force with SOLAS 2014

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Current structure of IGF-Code

- Preamble
- General
- Goal and Functional requirements
- Power Generation
- Fuel Storage
- Fuel Supply to Consumers
- Refueling
- Ship Structure
- Fire Safety
- Explosion Protection
- Ventilation
- Electrical installations
- Control, Monitoring and Safety Systems
- [Operational requirements (refuelling operations and/or other operations)]
- [Certification (to be further discussed)]

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Internal Structure of IGF-Code technical chapters

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4 Power Generation (related to Functional requirements 1, 11, 13, 16, 17)

4.1 Goal of Part

4.2 Functional requirements (from above and may further specified)

4.3 Regulations/requirements

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Fuels which will be covered by the IGF-Code (Status Round-01)

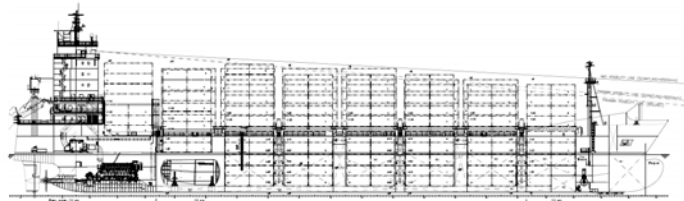
- Liquefied and compressed gases
 - natural gas, Propane, Butane (i and n), Propane/Butane mixtures
- Liquids
 - Ethanol, Methanol

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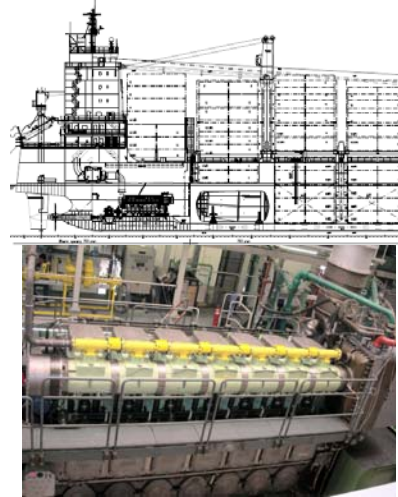
MAIN PARTICULARS		GL ✱ 100A5 E CONTAINER SHIP, IW, NAV-O, BWM, SOLAS II-2 Reg.19 ✱ MC E AUT	
Length, overall	166,15 m	Container capacity	Machinery MAN 9L51/60DF 9000
Length, tpp	155,08 m	Number of TEU (slot places)	ME: MAN B&W XX5604 XX900 kW
Breadth, moulded	25,00 m	In holds (5 tiers) / on deck (6 tiers)	AE: Wärtsilä 9L20 4 x 1665 kW
Depth, to main deck	14,20 m	Reefer sockets (on deck / in hold)	Emergency diesel 375 kVA
Draught, design	7,60 m	40' cell guides in holds	Controllable pitch propeller 5,50 m
Draught, freeboard	9,50 m	Number of TEU (nom. 14 t; T=9,00 m)	916
DWT at freeb. draught	18300 t	Stack loads for Containers:	(TEU/FEU)
Gross Tonnage	15375	On hatch no. 1A-4	60 / 105 t
Complement	21 pers.	In Holds	120 / 150 t
Speed, (at T=7,60m, 90%MCR,15%SM)	16 XX kn	Main deck above engine room	80 / 150 t
Ventilation cargo holds:		Hatch Cover, (pontoon)	Non-sequential
2 fold'h and acc. to SOLAS special ventilation for refrig. containers (4500m ³ /h / 40'-Cont.)		Bow Thruster	875 kW
		Rudder	Semi-balanced
			Cargo gear:
			Two cranes, SWL 45/40 t at 26,5/29,5 m
			2 combined anchors and mooring winches
			2 mooring winches

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Future container feeder - solution

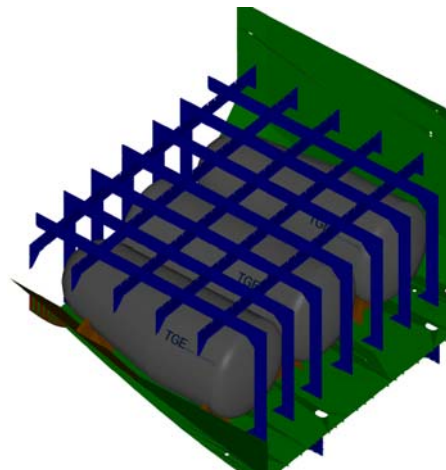
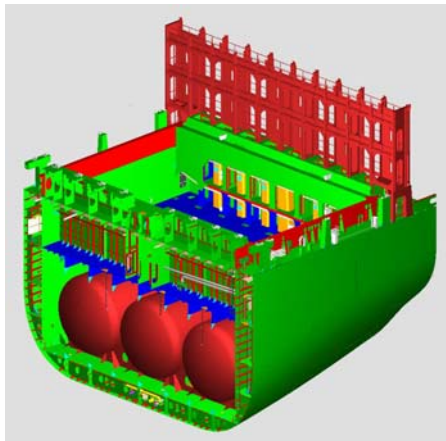
- A gas-fuelled container feeder has been developed to meet the outlined challenges.
- The vessel will use LNG as fuel in a dual-fuel MAN 51/60 engine.
- The range of the vessel is about 10 days of full operation.
- The LNG tanks are arranged in the aftmost cargo hold (which reduces TEU capacity by 3%).



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Future container feeder – tank arrangement



TGE-Marine Gas Engineering GmbH

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R&D project: Gaspax: - Cruise Ship -



Gross Tonnage: 63,000 GT
 LOA: 238 m
 Breadth: 32.2 m
 Passengers/ Crew: 2050 + 570 Crew
 Engines: Dual fuel (2 x 6 MW; 2 x 8 MW)
 Fuel: 2x1000 m3 LNG/ 800 m3 MGO

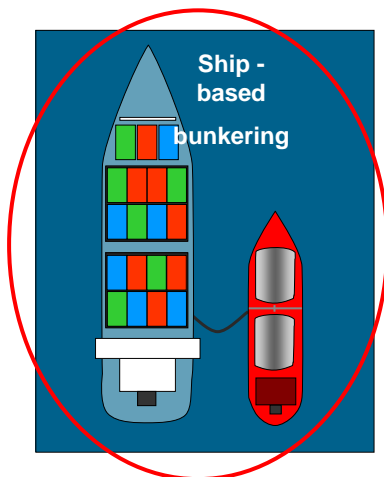
Hazard Identification carried out
 Next step: Failure Mode and Effects Analysis
 no showstoppers have been identified so far



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Project Proposal „BunGas“: Development of Bunker Boat and Bunker Requirements



- Meyer Werft
- MAN Diesel
- TGE-Marine Gas Engineering
- Germanischer Lloyd
- Det Norske Veritas
- AIDA Cruises
- Beluga Fleet Management
- Bernhard Schulte
- Port Feeder Barge

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Coordination Gas Technology

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