

EU Recreational Craft Directive 94/25/EC
Amended Directive 2003/44/EC

TECHNICAL CONSTRUCTION FILE

Craft Reference	Ithaca
Craft Type	Steel Narrowboat
Model/Class type	Traditional Style
Craft Identification Number (CIN)	GB-GTB00204J110
Completion Date	October 2010
RCD Design Category	'D'
Conformity Assessment Model	A
Notified Body	None Required
Notified Body Certificate & date	-

Outfitter & Supplier	Carl Goulding 7 New Street Blaby LE8 4GT
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Steelwork Fabricator	GT Boatbuilders Stafford
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Signatory of Declaration (Responsible Person)	Carl Goulding
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The Recreational Craft Directive stipulates that the builder/supplier of the craft must retain the Technical Construction File for a minimum 10-year period after manufacture

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Diagram 1 - Safety

COPY
DECLARATION OF CONFORMITY
RECREATIONAL CRAFT
 Directive 94/25/EC
 Amended Directive 2003/44/EC

Supplier & Outfitter (Responsible person)	Carl Goulding 7 New Street Blaby LE8 4GT
Steel Shell Manufacturer	GT Boatbuilders Stafford

Craft Identification Number (CIN) <small>(In accordance with ISO 10087)</small>	GB-GTB00204J110
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Design Category	'D'
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Conformity Module Applied	A
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Craft Description	
Type	Narrowboat
Construction/Material	Welded Steel
Model/Style	Traditional
Propulsion Type & Power	Isuzu diesel engine rated @ 31.3kW
Principle Dimensions <small>(In accordance with ISO 8666)</small>	Length (L_H): 17.4m Beam (B_H): 2.1m Draught (T_{MAX}): .6m

I declare that at my own and sole responsibly the above craft is compliant with the applicable Essential Requirements stipulated overleaf.

Signature..... Date.....

Responsible Person: Carl Goulding

Standard or Documentation Reference

REF	ESSENTIAL REQUIREMENT	STANDARD OR DOCUMENTATION REFERENCE (Noted within the Technical Construction File)
2	General Requirements	
2.1	Craft Identification Number	ISO 10087:2006 - Small craft - craft identification- coding system
2.2	Builder's Plate	ISO 14945: 2004/AC:2005 - Small craft - builders plate
2.3	Protection from falling overboard	ISO 15085:2003 - Man overboard prevention & recovery
2.4	Visibility from main steering position	ISO 11591:2001 - Field of vision from helm position (Relevant parts and best practice)
2.5	Owners manual	ISO 10240:2004: - Small craft - Owners manual
3	Integrity and Structural Requirements	
3.1	Structure	Canal Boatbuilding Association - Code of Practice for steel inland waterways craft and narrowboat construction. Structural assessment (CBA-CoP ²⁰⁰¹) Spreadsheet
3.2	Stability and freeboard	Canal Boatbuilding Association - Code of Practice for steel inland waterways craft and narrowboat construction (Incorporating relevant parts ISO 12217:2002)
3.3	Buoyancy and flotation	ISO 12217:2002 (relevant parts) - Non-sailing boats over 6 metres in length.
3.4	Openings in hull deck and superstructure	ISO 12216:2002 - Small craft - Strength & tightness for Doors, windows, & hatches.
3.5	Flooding	ISO 15083:2003 - Bilge pumping systems ISO 11812:2001 - Cockpits & quick-draining cockpits
3.6	Manufacturers recommended load	ISO 14946:2001/AC:2005 - Maximum load capacity
3.7	Life raft stowage	Not mandatory. (But if carried feasible position noted in Owners Manual)
3.8	Escape	ISO 9094:2002 part 2 - Fire protection (Craft over 15 metres)
3.9	Anchoring, mooring and towing	ISO 15084:2003 - Strong points
4	Handling Characteristics	Applicable to high speed craft only
5	Installation Requirements	
5.1	Engines and Engine spaces	Relevant parts of:-
5.1.1	Inboard engine	ISO 10088:2001 (Fuel systems) ISO 7840:2004 (Fire resistant fuel hoses) ISO 10133 (DC electrical systems) ISO 9094 (Fire protection)
5.1.2	Ventilation	Engine manufacturer recommendation – see calculation within Technical Construction File.
5.1.3	Exposed parts	Industry custom & practice. See provision noted within Technical Construction File.
5.1.4	Outboard Engine starting	Not applicable
5.2	Fuel System	Relevant parts of:-
5.2.1	General	ISO 10088:2001 (Fuel systems) ISO 7840:2004 (Fire resistant fuel hoses) ISO 10133:2000 (DC electrical systems) ISO 9094 (Fire protection)
5.2.2	Fuel Tanks	ISO 21487:2006 - permanently installed petrol & diesel tanks (Best Practice)
5.3	Electrical Systems	ISO 10133:2000 (low voltage) ISO 13297:2000(AC)
5.4	Steering System	Proven Rudder Gear Construction – Inland waterway craft
5.4.1	General	ISO 10692:1996/A1:2000 – Small craft – Hydraulic steering gear
5.4.2	Emergency arrangements	Provision required. Noted in the Technical Construction File & Owners Manual.
5.5	Gas System	PD BS 5482 Part 3 (LPG systems)
5.6	Fire Protection	
5.6.1	General	ISO 9094:2002 part 2 - Fire protection (Craft over 15 metres)
5.6.2	Fire-fighting Equipment	ISO 9094:2002 part 2 - Fire protection (Craft over 15 metres)
5.7	Navigation Lights	UK Inland Navigation Authority bylaws
5.8	Discharge Prevention	ISO 8099:2000 - Small Craft - Toilet waste retention
B	Exhaust emissions	Certified by engine manufacturer. Attached to Technical Construction File
C	Noise emissions	Froude calculation noted in Technical Construction File

Essential Requirements (ER's)

1. Boat Design Categories

SECTION	ESSENTIAL REQUIREMENT	SEE BELOW
1 Design Category	Designated Design Category	X

Design Category	Wind force (Beaufort scale)	Significant wave height (H 1/3m)	
A- 'Ocean'	exceeding 8	exceeding 4	
B- 'Offshore'	up to, and including, 8	up to, and including, 4	
C- 'Inshore'	up to, and including, 6	up to, and including, 2	
D- 'Sheltered waters'	up to, and including, 4	up to, and including, 0.3	X

Definitions:

A. OCEAN: Designed for extended voyages where conditions may exceed wind force 8 (Beaufort scale) and significant wave heights of 4m and above but excluding abnormal conditions. Vessels are largely self-sufficient.

B. OFFSHORE: Designed for offshore voyages where conditions up to, and including, wind force 8 and significant wave heights up to, and including, 4m may be experienced.

C. INSHORE: Designed for voyages in coastal waters, large bays, estuaries, lakes and rivers where conditions up to, and including, wind force 6 and significant wave heights up to, and including, 2 m maybe experienced.

D. SHELTERED WATERS: Designed for voyages on sheltered coastal waters, small bays, small lakes, rivers and canals when conditions up to and including wind force 4 and significant wave heights up to and including 0.3m may be experienced, with occasional waves of 0.5m maximum height, for example from passing vessels.

Craft in each category must be designed and constructed to withstand these parameters in respect of stability, buoyancy, and other essential requirements listed in Annex 1 (of the Directive) and to have good handling characteristics.

2. General Requirements

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
2.1 Craft Identification	<p>Each craft shall be marked with a craft identification number including the following information:</p> <ul style="list-style-type: none"> - Country of manufacture - Manufacturer's code - Unique serial number - Month & Year of production - Model year 	ISO10087

Country of manufacture	GB-
Manufacturer's code	GTB
Unique serial number	00204J110
Month & Year of production	October 2010 (Shell construed by GT Boatbuilders 2004)
Model year	2010

CIN located on stern deck starboard side	GB-GTB00204J110
Duplicate (hidden) CIN located	Underside starboard engine bed

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
2.2 Builders Plate	<p>Each craft shall carry a permanently affixed plate mounted separately from the boat hull identification number, containing the following information:</p> <ul style="list-style-type: none"> • Manufacturer's name • CE marking • Boat design category • Manufacturer's maximum recommended load derived from section 3.6 <u>excluding</u> the weight of the contents of the fixed tanks when full • Number of persons recommended by the manufacturer for which the boat was designed to carry when under way. 	ISO 14945

Manufactures Name (Inscription on CE Plate)	GT Boatbuilders/C Goulding
CE Marking	Reference [RCD Annex IV]
Boat Design Category (RCD Annex 1-1)	'D'
Manufactures recommended load. Excluding Tankage. (RCD Annex 1-3.6)	1500kg
Number of persons recommend by the manufacturer for which the boat was designed to carry when underway.	6

LOADING FACTORS	
Hull profile	Conventional Narrowboat
Principle Dimensions	17.4m(L _H) x 2.1m(B _H) x .6m(T _{max})
Accommodation	2 + 2 berths

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
2.3 Protection from falling overboard and Means of reboarding	Depending on the design category, craft shall be designed to minimize the risks of falling overboard and to facilitate reboarding.	ISO 15085

Requirements for Non-Sailing Craft					
	1	3	4	5	6
Design Category	A	B	B	C	D
Slip-resistant surface	✓	✓	✓	✓	✓
Foot Stop	✓	✓	✓		
Handholds	✓	✓	✓	✓	✓
Low guard rail/line		✓			
High guard rail/line	✓				
Hooking points	✓		✓		
High speed body support	✓	✓	✓	✓	
Means of re-boarding	✓	✓	✓	✓	✓

Requirement	Application
Slip-resistant surface	All 'Working Decks' applied with slip-resistant surface. Coachroof mostly coated with slip-resistant paint and caution noted in OM
Handholds	Grab rails fitted to coachroof with maximum gap between hand-holds 1.5m
High speed body support	Not applicable
Means of re-boarding	Deployable rope ladder in pouch Noted in OM – to be in place at stern when craft occupied.

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
2.4 Visibility from the main steering position	For motorboats, the main steering position shall give the operator, under normal conditions of use (speed and load), good all-round visibility.	ISO 11591

Uncovered stern deck (traditional) fitted with conventional tiller steering enabling all-round visibility

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
2.5 Owner's Manual (OM)	Each craft shall be provided with an owner's manual in the official Community language or languages which may be determined by the Member State in which it is marketed in accordance with the Treaty. This manual should draw particular attention to risks of fire and flooding and shall contain the information listed in RCD Sections 2.2, 3.6 and 4 as well as the unladen weight of the craft in kilograms.	ISO 10240:1995

1) For additional information and equipment specification see copy of relevant Owners Manual accompanying this Technical Construction File. 2) Electronic copies of the Technical Construction File (TCF) and Owners Manual (OM) are retained by Morse Marine	DATE
	20.2.2015

3. Integrity and Structural Requirements

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
3.1 Structure	The choice and combination of materials and its construction shall ensure that the craft is strong enough in all respects. Special attention shall be paid to the design category according to section 1, and the manufacturer's maximum recommended load in accordance with section 3.6.	See option below X

OPTION		
1	Canal Boatbuilding Association (CBA) – Code of Practice for steel inland waterways craft and narrowboat construction. [CBA-CoP ²⁰⁰⁷] Spreadsheet applied	X
2	ISO 12215-5 ISO 12215-6	
3	Lloyds' Register Special Service Craft Rules (SSC)	

Mild steel plate specification	BS EN 10025	
Principle stock sizes	Baseplate:	10mm
	Hull sides:	6mm
	Cabin:	4mm
Principle Scantlings	Floors:	75mm x 50mm x 6mm RSA @ 600mm centres
	Hull sides:	50mm x 50mm x 6mm RSA @ 1200mm centres
	Longitudinals:	50mm x 50mm x 6mm RSA (Two either side)
	See photographic album accompanying the manual	

Summary	
Structural assessment [CBA-CoP ²⁰⁰⁷] Spreadsheet	Pass

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
3.2 & 3.3 Stability, Freeboard and flotation	<p>The craft shall have sufficient stability and freeboard considering its design category according to section 1 and the manufacturer's maximum recommended load according to section 3.6.</p> <p>The craft shall be constructed to ensure that it has buoyancy characteristics appropriate to its design category according to section 1.1, and the manufacturer's maximum recommended load according to section 3.6. All habitable multihull craft shall be so designed as to have sufficient buoyancy to remain afloat in the inverted position. Boats of less than six metres in length that are susceptible to swamping when used in their design category shall be provided with appropriate means of flotation in the swamped condition.</p>	See option below X

Methodology applied for establishing Inclination and Freeboard

OPTION	REFERENCE	APPLIED
1	ISO 12217 Part 1 (Physical Loading)	
2	'Type Tested' based on proven industry standard	✓
3	Canal Boat Builders (CBA) Code of Practice - Simplified	

OPTION 1

ISO 12217 Harmonised Standard

- Non-sailing boats of hull length greater than or equal to 6 metres.
- Assumption – Minimum down-flooding height for open shell penetrations on Category D craft shall be a minimum of 400mm and 700mm for Category C craft.
- *The residual freeboard height for down-flooding height when heeled during the test shall be at least $0.07 \sqrt{LH}$
- Calculation formulae for maximum heel angle for offset load test: -

$$\text{degree}^{\circ} = 10 + \frac{(24-L_H)^2}{600}$$

e.g. 17.4m craft:	10+5	=	10.5 ^o
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Ready Reckoner

Hull Length (L _H) metres	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Degree Angle (°)	29'6	32'10	36'	39'4	42'7	45'11	49'3	52'6	55'9	59'	62'4	65'7	68'11	72'2
* Residual Minimum Freeboard permitted (mm)	310	321	332	342	352	362	371	380	389	397	305	313	321	328

2.1m (6'10") Beam Batten Variation (mm)	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
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Craft reference	Ithaca
CIN	GB-GTB00204J110
Examination date	10.2.2015
Location	Pillings Lock Marina, R Soar
Craft Type	Steel Narrowboat
Design category	D
Mass of Craft (Light loaded)	1500kg estimated
Design maximum load	1500kg
Total fluid mass	1168kg
Design maximum persons underway	6
Length (L_H)	17.4m
Beam (B_H)	2.1m
Draft (T_{MAX})	.6m
Max. angle offset permitted	10.5°
Max. 'batten' distance permitted	194mm
Max. 'batten' distance measured	mm
Method used for simulating loading	
Location of simulated loading	
Load mass (75kg assumed for each person)	kg

Summary	Physical test not carried out and assumed tested type approved.
Stability	Pass
Residual Freeboard	Pass

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED STANDARD
3.4 Openings in hull, deck and superstructure	<p>Openings in hull, deck(s) and superstructure shall not impair the structural integrity of the craft or its weathertight integrity when closed.</p> <p>Windows, port lights, doors and hatch-covers shall withstand the water pressure likely to be encountered in their specific position, as well as point loads applied by the weight of persons moving on deck.</p> <p>Through-hull fittings designed to allow water passage into the hull or out of the hull, below the waterline corresponding to the manufacturer's maximum recommended load according to RCD Section 3.6, shall be fitted with shutoff means which shall be readily accessible.</p>	ISO 12216

Shell Penetrations			
Fitting	Type	Location	Actual
Skin fittings above water line	Patent bronze/ Welded sockets	Side shell	Watertight integrity provided
Engine Compartment Ventilation	6" x 6" Grill	Stern door	Compliant
Skin fittings below water line			Non fitted

Weed hatch	Fitted with quick-release mechanism & internal baffle plate	Conventional	Recommended min. 150mm freeboard (Loaded)
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Windows, Ports, Doors & Hatches	
Marine windows & ports	1) Declaration of Conformity supplied by window manufacturer 2) Cabin windows incorporate 4mm toughed glass to BS6202 for category D craft
Doors/hatches manufactured from steel and timber	Adequate for category D craft

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
3.5 Flooding	All craft shall be designed so as to minimize the risk of sinking. Particular attention should be paid where appropriate to: <ul style="list-style-type: none"> • Cockpits and wells, which should be self-draining or have other means of keeping water out of the boat interior. • Ventilation fittings • Removal of water by pumps or other means 	ISO 12217

Bilge Pumping Arrangements			
DC Bilge Pump (12v) Manufacturer/Model	Location	Auto Switch?	Rating (L/min)
Rulemate 500	Beneath Stern tube	✓	32 approx.

Deck Draining Arrangements & Apertures
Min. freeboard for down-flooding points Cat. D craft = 400mm Min. freeboard for down-flooding points Cat. C craft = 700mm

Foredeck/cockpit	Bow cockpit fitted with overboard drains located 100mm above (loaded) water line and cockpit floor supplemented by 70mm sill beneath bow doors. Cambered well deck 'Caution' noted in OM
Aft/Stern Deck	Tradition stern deck designed to enable self-draining overboard
Engine Compartment Ventilation fittings	6" x 6" Grill - located in stern door, above main deck

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
3.6 Manufacturer's maximum recommended load	The manufacturer's maximum recommended load (fuel, water, provisions, miscellaneous equipment and people (in kilograms)) for which the boat was designed shall be determined according to the design category (section 1), stability and freeboard (section 3.2) and buoyancy and flotation (section 3.3).	ISO 12217-1 ISO 14946

Maximum load

The term "maximum load" is to be understood as the "manufacturer's recommended maximum load". This shall not exceed the total load that may be added to the light craft mass in accordance with ISO 8666 without exceeding the requirements for stability, freeboard, flotation in accordance with ISO 12217-1, ISO 12217-2 and ISO 12217-3, and seating requirements and shall take into account the boat design category. As a minimum it shall take account of the mass of the following:

- a) The number of persons at 75kg each according to clause 4. Where children are carried as part of the crew the maximum number of persons may be exceeded provided that each child's mass does not surpass a limit of 37.5kg and the total persons mass is not exceeded;
- b) Basic equipment of $(L_{01} - 2.5)^2$, but not less than 10kg;
- c) Stores and cargo (if any), dry provisions, consumable liquids [not covered by d) or e)], and miscellaneous equipment not included in the light craft mass or in b);
- d) Consumable liquids (fresh water, fuel) in portable tanks filled to the maximum capacity;
- e) Consumable liquids (fresh water, fuel) in permanently installed tanks filled to the maximum capacity;
- f) A liferaft or dinghy when intended to be carried.

Manufacturer's Recommended Load	1500Kg
Note: The "Manufacturers Recommended Load" on the builder's plate excludes the weight of the full tankage. See 'Tankage' and fluid weights within 'General Information'.	

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
3.7 Life Raft stowage	All craft of categories A and B, and craft of categories C and D longer than six metres shall be provided with one or more stowage points for a liferaft (liferafts) large enough to hold the number of persons the boat was designed to carry as recommended by the manufacturer. This (these) stowage point(s) shall be readily accessible at all times.	

The RCD does not stipulate that a liferaft be carried only that a suitable position for stowage be identified:
Coachroof.

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
3.8 Escape	All habitable multihull craft over 12 metres long shall be provided with viable means of escape in the event of inversion. All habitable craft shall be provided with viable means of escape in the event of fire.	ISO 9049

The distance to the nearest exit shall not exceed ($L_{ft} / 3$) m.	<ul style="list-style-type: none"> Accommodation exits provided fore & aft – cabin doors Side hatches - port & starboard (mirrored)
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<ul style="list-style-type: none"> Apertures for escape shall not be smaller than 450mm diameter (circular) or 380mm diameter (other). Where deck hatches are designated as exits, footholds, ladders, steps or other means shall be provided. The vertical distance between the upper foothold and the exit shall not exceed 1.2 m. 	<p>Complied</p> <p>Zoff Houdini roof hatches fitted but they do not constitute emergency escape exits</p>
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SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
3.9 Anchoring, Mooring and towing	All craft, taking into account their design category and their characteristics shall be fitted with one or more strong points or other means capable of safely accepting anchoring, mooring and towing loads.	ISO 15084

Strong points fitted:-	<ul style="list-style-type: none"> Two x Welded Dollies – stern deck One x Welded 'T' stud on fore deck
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4. Handling Characteristics

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
4 Handling Characteristics	The manufacturer shall ensure that the handling characteristics of the craft are satisfactory with the most powerful engine for which the boat is designed and constructed. For all recreational marine engines, the maximum rated engine power shall be declared in the owner's manual in accordance with the harmonised standard.	

Not Applicable

5. Installation Requirements

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.1.1 Inboard Engine	<p>All inboard mounted engines shall be placed within an enclosure separated from living quarters and installed so as to minimize the risk of fires or spread of fires as well as hazards from toxic fumes, heat, noise or vibrations in the living quarters.</p> <p>Engine parts and accessories that require frequent inspection and/or servicing shall be readily accessible.</p> <p>The insulating materials inside engine spaces shall be non-combustible.</p>	ISO 16147

Inboard engine enclosure	Beneath timber deckboards
Machinery accessibility	Beneath timber deckboards – Non fixed
Engine space insulating materials	None

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
5.1.2 Ventilation	The engine compartment shall be ventilated. The dangerous ingress of water into the engine compartment through all inlets must be prevented.	

Location (freeboard) for engine compartment ventilation	Stern door - above main deck
Ventilation size	6" x 6" Louvered grill
<p>In the absence of manufactures recommendations the following empirical formula shall be applied:-</p> <p>$A = \text{ventilation area (cm}^2\text{)}$</p> <p>$A = 4.4 \text{ engine power (Kw)}$</p> <p>eg. 145mm diameter duct for 50BHP engine</p>	Compliant

SECTION	ESSENTIAL REQUIREMENT	STANDARD APPLIED
5.1.3 Exposed engine parts	Unless the engine is protected by a cover or its own enclosure, exposed moving or hot parts of the engine that could cause personal injury shall be effectively shielded.	

Shielding for hot engine parts	Fully lagged exhaust system
Shielding for exposed moving parts	Engine coverboards

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.1.4 Outboard engine starting	All boats with outboard engines shall have a device to prevent starting the engine in gear, except: a) When the engine produces less than 500 newtons (N) of static thrust; b) When the engine has a throttle-limiting device to limit thrust to 500N at the time of starting the engine.	

Not Applicable

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.1.5 Personal Watercraft running without Driver	Personal watercraft shall be designed either with automatic engine cut-off or with an automatic device to provide reduced speed, circular, forward movement when the driver dismounts deliberately or falls overboard.	

Not Applicable

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.2 Fuel System 5.2.1 General	The filling, storage, venting and fuel-supply arrangements and installations shall be designed and installed so as to minimize the risk of fire and explosion.	ISO 10088 ISO 7840

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.2.2 Fuel Tanks	Fuel tanks, lines and hoses shall be secured and separated or protected from any source of significant heat. The material the tanks are made of and their method of construction shall be according to their capacity and the type of fuel. All tank spaces shall be ventilated. Petrol fuel shall be kept in tanks, which do not form part of the hull and are: a) Insulated from the engine compartment and from all other sources of ignition; b) Separated from living quarters. Diesel fuel may be kept in tanks that are integral with the hull.	ISO 10088 ISO 7840

Fuel Installation Check List	
Requirement	Actual
4.1 to 4.1.8 Materials & Design	Compliant
Materials designed for marine applications. Environmental conditions	Compliant
Component temperature range Operation: -10° C to +80° C	

Stored without operation: -30° C to +80° C	
Pipe connections to tanks – bending movements avoided.	Compliant
Ignition protected equipment in petrol compartments	Diesel equipment & machinery only
Approved plugs and drains fitted in system	Compliant
Approved grounding for tanks/fittings in petrol systems.	Diesel equipment & machinery only
Each tank shall be fitted with a means to determine fuel level	Reliable, steel dipstick
4.2. to 4.2.3 Testing	
System pressure tested to 20kPa (3 psi) minimum	Not done
4.3 to 4.3.8 Installation	
The installation shall be permanently installed and independently supported.	Filters, pipework and flexible hoses made secure
Valves and controls readily accessible. All other components must be accessible. Tanks need not be assessable for removal.	Compliant
Precautions for petrol installations	Diesel equipment & machinery only
Fuel system electrical components to be fitted in accordance wit ISO 10133 and ISO 13297	Compliant
5 to 5.3.8 Tanks	
Tanks should be marked to indicate that the prescribed pressure test has been carried out. Minimum 20kPa (3 psi)	Plate fixed to tank and marked pressure test at 0.25kgf/cm ²
The external surfaces of metal tanks shall not encourage water entrapment	Complied
Fuel tanks shall not be mounted on inboard engines	Integral stern tank
Fuel tank installed in a manner that allows inspection and maintenance of fittings, hoses, connections ect.	Complied
Tanks to be secure or appropriately chocked, supported or slung.	Integral stern tank
6 to 6.1 Fuel Filling lines	
Minimum ID filling pipe – 31.5mm Minimum ID filling hose – 38mm	Integral diesel tank incorporated in counter stern fitted with 38mm ID deck filler
Fuel filling hose in engine compartments shall be fire resistant	Not fitted
Fuel filling lines shall be self draining to the tank	Complied
Fuel filling lines shall run as directly as practicable	Complied
Deck filling arrangement to prevent fuel entering the craft	Overboard self draining decks fitted
Filling points to be marked with an approved label	'Diesel'
6.2 to 6.2.9 Vent Lines	
Each tank shall have a separate vent line.	Flame arrester mounted in stern deck
Fuel vent lines in engine compartments shall be fire resistant	-
Minimum vent size – 95mm ² (1/2" pipe = 122 mm ²)	Compliant
Vent lines shall be self draining	Compliant
Vent line termination shall be at least 400mm from any craft opening	Compliant
Vent lines should not enable water ingress or allow fuel to enter the craft	Compliant
Vent line terminations (or gooseneck) shall have sufficient height to prevent spillage into the craft during filling.	Flame arrester located higher than deck filler
Vent lines should terminate with approved flame arrester (prevent blow back whilst filling and not restrict opening less than 95mm ²)	Compliant
6.3 to 6.3.12 Fuel distribution lines and return lines	
Approved material for metal fuel lines	Seamless annealed copper fitted
Flexible hoses shall be used to connect to the engine. (Support in rigid pipe to be fitted within 100mm of the connection to the flexible.)	Two Flexible hoses fitted

All rigid fuel lines should incorporate approved connections (screwed, compression, cone, brazed or flanged joints)	Screwed nuts or brass compression joints used
All flexible fuel hoses shall be accessible for inspection and maintenance	Flexible hoses marked ISO 7840 A
Flexible fuel hoses shall comply with ISO 7840A	Compliant
All fuel lines shall be supported	Compliant
Excess joints in fuel lines not permitted	
Emergency shut off mechanism for the main control valve should be fitted outside the engine compartment. (Indicated accessible location required.) Note: Provision not required if all pipes are located above the tank.	Beneath deck hatch Risk assessment carried out
6.4 to 6.4.8 Hose fittings and hose clamping	Compliant
Hoses shall be connected using clamps or pre-made ends.	Compliant
Ridged connections to hoses (using clamps) should incorporate a bead, flare, series of annular rings or serrations.	Compliant
Hose connections to spuds (or other fittings) shall not be forced or too loose.	Compliant
Minimum length of spud permitted 25mm	Not Applicable
Hoses with a greater bore than 25mm shall have two clamps – filling and balance pipes.	Compliant
Approved hose clamps shall be used (stainless, minimum 8mm wide and worm screw). Clamps should be at least 10mm wide for hoses more than 25mm dia (OD).	Compliant
Clamps should be fitted correctly – behind the bead and at least one clamp-width from the end of the hose	Compliant
6.5 to 6.5.3 Valves	Indicated by valve - levers
Valves should clearly indicate their closed or open position	Compliant
The integrity and tightness of the valve shall not depend solely on spring tension	
6.6 to 6.6.4 Fuel filters	(i) Engine-mounted filter fitted (ii) Water separator fitted in supply line
At least one fuel filter and one water separator shall be fitted. Combined units can be installed	Complaint
Filters shall be securely mounted	Complaint
All fuel components should be fire resistant with approved markings (reference to ISO 10088, manufacturer and fuel type).	

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.3 Electrical system	<p>Electrical systems shall be designed and installed so as to ensure proper operation of the craft under normal conditions of use and shall be such as to minimize risk of fire and electric shock.</p> <p>Attention shall be paid to the provision of overload and short-circuit protection of all circuits, except engine starting circuits, supplied from batteries.</p> <p>Ventilation shall be provided to prevent the accumulation of gases which might be emitted from batteries. Batteries shall be firmly secured and protected from ingress of water.</p>	<p>ISO 10133 (DC)</p> <p>ISO 13297 (AC)</p>

DC CHECK LIST		
	GENERAL REQUIREMENTS (Section 4)	ACTUAL
4.1	Two wire system and hull not to be used as current-carrying conductor	✓ Compliant
4.1	Negative ground connected to hull NOTES (i) If an RCD or an isolation transformer is installed in the main supply circuit of the AC system, the negative ground terminal of the DC system need not be connected to the AC shore ground	✓ Compliant
4.3	Switches & controls marked	✓ Compliant
4.4	Protection required for circuits - to be fitted at the panel board.	Combined switch/breaker panel fitted within aft cabin
BATTERIES section 5)		
5.1	Installation in dry location	✓ Compliant
5.2	Restriction movement (10mm)	✓ Compliant
5.3	Containment of Electrolyte (capable up to inclinations of 30°)	Not applicable
5.4	Protection of terminals	✓ Compliant
5.6	Not installed directly above or below fuel tank or filter	✓ Compliant
5.7	Fuel system metallic components within 300mm above batteries to be electrically insulated	✓ Compliant
5.8	Terminals not dependent on spring tension	✓ Compliant
BATTERY MASTER SWITCHES (BMS) (SECTION 6)		
6.1	Installed in positive conductor, proximity, readily accessible and labelled	✓ Compliant
6.2	Capable of carrying maximum system current	✓ Compliant
6.3	Remote switch to have manual override	Not applicable
CONDUCTORS (CABLES) (Section 7)		
7.1	Multi-strand copper conductors	✓ Compliant
7.2	Single conductors supported max 300mm intervals (or trunking)	✓ Compliant
7.3	Conductors to BMS max support shall be 300mm. other sheathed conductors shall be max 450mm (or trunking)	✓ Compliant
7.4	Protection against damage – sleeving, grommets etc	✓ Compliant
7.5	Minimum size of conductor – see calculation formula	✓ Compliant
7.6	Minimum size of conductor – 0.75mm ² or 1mm ²	✓ Compliant
7.7	Unsheathed AC & DC conductors shall be separated by 100mm	✓ Compliant
7.8.1 7.8.2 7.8.3	Conductor identification:- (i) Equipotential – green or green/yellow – if fitted (ii) Negative DC – black or yellow (iii) Positive DC – colour code, tagging or diagram	✓ Compliant
7.8.4	Cables in engine space rated to 70°C minimum	✓ Compliant
7.8.6	Cables installed above bilge water level	✓ Compliant

7.8.7	Cables routed away from heat sources eg 250mm dry exhaust (barriers permitted)	✓ Compliant
	OVERCURRENT PROTECTION (Section 8)	
8.1	Circuit breaker or fuse within 200mm (or sheathed) of source of power – for each conductor	Breaker panel fitted ✓ Compliant
8.2	Current rating of each circuit breaker or fuse shall not exceed the conductor size	✓ Compliant
	PANEL BOARDS (Section 9)	
9.1	Front of panel board readily accessible (back of panel accessible)	✓ Compliant
9.2	Panel board and components enclosures to conform to IEC 60529 (i) IP 67 minimum – short term immersion (ii) IP 55 minimum – water splash (iii) IP 20 minimum – internal location	✓ Compliant
9.3	Panel board marked with supply voltage	Not done
9.4	Separate or partitioned panel boards needed when both DC and AC supplied	✓ Compliant
9.4	Wiring diagrams needed to identify circuits	✓ Compliant
	WIRING CONNECTIONS & TERMINALS (Section 10)	
10.1	Cable connections enclosures to IEC 60529 – see above	✓ Compliant
10.2	Terminal studs, nuts and washers to be corrosive-resistant	✓ Compliant
10.3	No bare wires or screw connections (eg use boot lace ferrules)	✓ Compliant
10.4	Captive spade or ring terminals to be used	✓ Compliant
10.5	No twist-on connectors to be used	✓ Compliant
10.6	Exposed shanks protected by barriers or sleeves	✓ Compliant
10.7	Terminals effectively connected – tensile values for connections	✓ Compliant
10.8	No more than 4 terminals connected to one stud	✓ Compliant
	RECEPTACLES (SOCKETS) (Section 11)	
11.1	DC & AC receptacles not interchangeable	✓ Compliant
11.2	Receptacles/sockets subject to rain, splash & spray – IP55 minimum	✓ Compliant
11.3	Receptacles/sockets subject to momentary submersion or flooding – IP67 minimum	✓ Compliant
	IGNITION PROTECTION (Section 12)	
12.1	Electrical components in compartments that may contain explosive gasses protection to ISO 8846	No electrical components fitted in gas locker
12.2	Craft with LPG systems to have ignition protected electrical components - in certain compartments	No electrical components fitted in gas locker

Voltage drop for DC 12 volt systems should not be greater than 10%

Extract ISO 10133

A.2 As a guideline, the voltage drop E at load, in volts, may be calculated by the following formula:

$$E = \frac{0.0164 \times I \times L}{S}$$

Where
 S is the cross-sectional area of the conductor, in square millimetres;

I is the load current, in amperes;

L is the length, in metres, of the conductor from the positive power source to the electrical device and back to the negative source connection.

AC CHECK LIST

GENERAL REQUIREMENTS (Section 4)	SUB-SECTION	CHECKED
The protective conductor coloured green or green/yellow	4.1	✓
The protective conductor connected to craft's d.c. negative ground as close as possible to the battery (dc) negative terminal.	4.2	✓
For craft with fully insulated d.c. systems (see ISO 10133), the a.c. protective conductor shall be connected to the hull of a metallic hull craft, the craft external ground (earth) or the craft lightning-protection ground plate, if fitted	4.3	✓ N/A
The hulls of metal craft not used as a conductor	4.4	✓
The protective conductor shall be connected to metallic hulls at a location above any anticipated water accumulation.	4.5	✓
Can only be energised from one source at a time	4.6	✓
Protection of live parts to IEC 60529	4.7	✓
The neutral conductor shall be grounded (earthed) only at the source of power, i.e. at the onboard generator, the secondary of the isolation or polarization transformer, or the shore-power connection. The shore-power neutral shall be grounded through the shore-power cable and shall not be grounded on board the craft.	4.8	✓
If a galvanic isolator is fitted it must be compliant with the standard.	4.9	Not fitted
MARKINGS (5)		
Shore power inlet marked with voltage and appropriate warning symbols	5.1	Not done
Warning signs fitted for shore power on panel-board	5.2	✓
Switches and controls marked with their function (unless the switch function is obvious)	5.3	✓
Electrical equipment marked with details	5.4	✓
IGNITION SOURCES (Section 6)		
Electrical components in compartments subject to ingress of explosive gasses protected to ISO 8846	6.	✓

OVERCURRENT PROTECTION	7	
(7.1 General Requirements)		
In unpolarized systems, double-pole circuit-breakers that open both live and neutral conductors are required.	7.1.1	N/A
Fuses shall not be installed in unpolarized systems.	7.1.2	-
Overcurrent protection devices for motor loads shall have a predetermined value of current flow that is consistent with demand-load characteristics of the protected circuit.	7.1.3	N/A
a.c. motors to be individually protected	7.1.4	-
Current rating of each circuit breaker shall not exceed maximum current-carrying capacity of the conductor being protected	7.1.5	✓
(7.2 Main Supply Circuits)		
Double pole circuit breakers required for main power supply circuits	7.2.1	✓
Circuit breaker or fuse within 0.5m of source of power. (16amp double-pole breaker required)	7.2.2	✓
Protection needed for isolation and polarisation transformers	7.2.3	✓
(7.3 Branch Circuits)	7.3	
The live conductor of each branch-circuit in a polarized system shall be provided with overcurrent protection, i.e. a fuse or circuit-breaker, at the point of connection to the main panel-board bus	7.3.1	✓
The live and neutral conductors of unpolarised system needs double Pole breakers	7.3.2	N/A
EARTH LEAKAGE PROTECTION (Section 8)		
The RCD shall be trip-free type. Trip-free means that it cannot be reset (even by holding closed with tape or a prop for example) until the fault has been corrected.	8.1	✓
The craft shall be provided with earth-leakage protection in the main supply circuit by:- a) a double-pole RCD having a maximum nominal trip sensitivity of 30 mA and 100 ms maximum trip time located in accordance with 7.2.2, OR b) each receptacle located in the galley, toilet, machinery space or weather deck shall be protected by a GFCI (RCD) having a maximum sensitivity of 10 mA.	8.2	✓
Manual testing of the trip function required.	8.3	✓
APPLIANCES & EQUIPMENT (Section 9)		
Equipment with exposed conductive surfaces to have them connected to the protective conductor. Integral overcurrent protection shall be provided.	9.	✓
SYSTEM WIRING (Section 10)		
Minimum voltage rating of conductors	10.1	✓
Conductors & Flexible cords shall be multi-strand & cable sizing calculated	10.2	✓
Minimum size of conductors to Table A1	10.2	✓
Insulation temperature rating at least 60° C (Installed outside engine)	10.3	✓
Conductors shall be at least 1mm ² in area	10.4	✓

Insulation temperature rating in engine spaces shall be 70° C minimum Oil-resistant or sleeved/conduit.	10.5	✓
The protective conductor shall be the same or greater than the cross-section as live conductor in the supply circuit.	10.6	✓
Live, neutral and protective conductors of the a.c. system shall be identified. Identification may be made by the insulation colour, by numbering or other means, if a wiring diagram for the system indicating the means of identification is supplied with the craft. Insulation colours used, in conformance with IEC 60446: _ live conductors: black or brown; _ neutral conductors: white or light blue; _ protective conductors: green or green with a yellow stripe (see 4.1). NOTE A colour stripe may be added to live and neutral conductor insulation for identification in the system.	10.7	✓
INSTALLATION (Section 11)		
Conductor connections shall be protected from the weather. (IP55- IP 67)	11.1	✓
Conductors must be supported by conduit, trays or maximum 450 mm	11.2	✓
a.c. and d.c. to be separately sheathed in conduit or 100mm gap	11.3	✓
Conductors shall be routed above areas where water can accumulate	11.4	✓
Metals used for terminals shall be corrosive resistant	11.5	✓
All conductors shall have suitable terminations	11.6	✓
Terminal screws or nuts shall not bear directly on the conductor wires	11.7	✓
Terminations should be approved type and tight	11.8	✓
Twist on connectors shall not be used	11.9	✓
Exposed terminals shall be protected	11.10	✓
Conductors shall be routed away from heat sources (eg 50mm for water- cooled exhausts & 250mm from dry exhausts.)	11.11	✓
Conductors exposed to physical damage shall be protected by sheaths or grommets ect.	11.12	✓
Conductors connections shall be capable of withstanding tensile forces in Table 1	11.13	✓
No more than four conductors shall be secured to one terminal stud	11.14	✓
PANEL BOARDS (Section 12)		
A lamp indicating on/off function to be installed	12.1	✓
A system voltmeter shall be installed (If motors or generators installed)	12.2	N/A
Panel Boards shall be marked with the system voltage	12.3	✓
The back side of the board shall be accessible	12.4	✓
Connections and components on panel-boards shall be in locations protected from the weather, in conformity with IEC 60529: _ IP 67 as a minimum, if exposed to short-term immersion; _ IP 56 as a minimum, if exposed to splashing water; _ IP 20 as a minimum, if located in protected locations inside the craft.	12.5	✓

ac and dc sections be kept separate. Wiring diagrams required.	12.6	✓
RECEPTACLES/SOCKETS (Section 13)		
Sockets/plugs not interchangeable a.c./d.c.	13.1	✓
Sockets subject to IEC 60529 IP 55 when exposed	13.2	✓
Sockets when subject to submersion IEC 60529 IP 56	13.3	✓
All sockets to be provided with an earth terminal	13.4	✓
Receptacles/sockets provided for the galley area shall be located so that appliance cords may be plugged in without crossing above a galley stove or sink or across a traffic area.	13.5	✓
Sockets to be correctly voltage rated	13.6	✓
POWER SOURCE OPTIONS (Section 14)		
Power supplied from one source at a time	14.1	✓
Cables for ac shall be large enough to meet system load requirements	14.2	✓
Connections of a.c. generator to the distribution system shall be by changeover switch	14.3	✓
Power feeder conductor to be rated to accommodate maximum output of generator.	14.4	✓

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.4 Steering System 5.4.1 General	Steering systems shall be designed, constructed and installed in order to allow the transmission of steering loads under foreseeable operating conditions.	ISO 10592 Where appropriate

Conventional narrowboat rudder and tiller design	Rudder and steering system constructed in accordance with proven industry standards for narrowboat manufacture.
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SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.4.2 Emergency Arrangements	Sailboat and single-engined inboard powered motorboats with remote-controlled rudder steering systems shall be provided with emergency means of steering the craft at reduced speed.	

Conventional tiller steering fitted therefore emergency steering provision is not required
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SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.5 Gas System	<p>Gas systems for domestic use shall be of the vapour-withdrawal type and shall be designed and installed so as to avoid leaks and the risk of explosion and be capable of being tested for leaks. Materials and components shall be suitable for the specific gas used to withstand the stresses and exposures found in the marine environment.</p> <p>Each appliance shall be equipped with a flame failure device effective on all burners. Each gas-consuming appliance must be supplied by a separate branch of the distribution system, and each appliance must be controlled by a separate closing device. Adequate ventilation must be provided to prevent hazards from leaks and products of combustion.</p> <p>All craft with a permanently installed gas system shall be fitted with an enclosure to contain all gas cylinders. The enclosure shall be separated from the living quarters, accessible only from the outside and ventilated to the outside so that any escaping gas drains overboard. Any permanent gas system shall be tested after installation.</p>	PD 5582-3: 2005

Liquid Petroleum Gas (LPG) Installation Check List (PD 5482-3:2005)	
Requirement	Actual
4 Pipework Materials	
Approved materials installed	10mm seamless copper tube utilised
5 Selection of Materials	
5.1 General	
LPG Components suitable for use with marine environment	Compliant
5.2 Valves	
Approved valves shall be fitted (ball valves BS EN 331 and tapered plug cocks BS 1552) ect.	Approved LPG valves fitted
5.3 Joints	
Compression fittings should be manufactured from copper or copper alloy. Annealed olives should be used.	'Wade' brass joints and copper olives utilised.
5.4 Joint and thread sealing	
Suitable material for washers and gaskets. Fibre washers and hemp should not be used.	Compliant Not used
PTFE should conform to BS EN 751-3	Sealing tape not used
Jointing compound to be used on tapered threads only	Not used
6 Selection of Appliances	
6.1 General	
Appliances recommended for marine environment	Compliant - see OM
Appliances should be room-sealed – except cookers and replacement conventional instantaneous water heaters	Compliant
6.2 Flame Supervision Devices (FSD's)	
All burners should be fitted with FSD's	Compliant
7 Cylinder location considerations	
7.1 Layout of supply system	

Pipe runs as short as practicable	See schematic diagram annexed within file
7.2 Cylinder Supply	
Sufficient capacity for appliances during simultaneous use.	Compliant
7.3 Cylinder location	
a) On deck or in cockpits enabling leakage to flow overboard.	Cylinders stored within approved stern deck locker
b) Within approved locker	Compliant
Cylinders stored in locker correctly	
7.4 Stowage on open decks and cabin tops or outside cockpits	
a) Cylinder and associated equipment enables leakage to flow overboard.	Not applicable
b) Cylinder and associated equipment at least 1m openings and sources of ignition.	
7.5 Stowage below decks or in cockpits	
Lockers not to contain items that could block drains	Compliant
Lockers not located near heat sources	Compliant
Lockers (and side-opening lockers) to be vapour-tight	Approved stern locker
Installation pipework from the locker should be within a bulkhead fitting or above the cylinder and equipment. Note: No definition for bulkhead fitting within standard.	Compliant
Cylinder locker should have a lid	Compliant – steel
Drain from lowest point of the locker, fall continuously and exit above loaded waterline	Compliant
Drain pipes and hose should be suitable for purpose. Minimum 19mm hole.	Plain hole
Cylinder lockers should vent overboard above level of cylinder	Compliant
Material for cylinder locker – 30min fire resistance	Steel locker fitted
Locker opening should not restrict access to valves and equipment	Compliant
Locker opening should not be sited in accommodation, engine, fuel or battery spaces.	Compliant
Electrical joints (if any) in lockers or housing should comply with BS EN 28846 (Ignition protected devices)	None fitted
Electric cables not in gas locker unless contained in suitable conduit.	No electric cables in gas locker
8 High pressure stage design considerations	
More than one cylinder connected – each high pressure line to incorporate NRV.	Compliant
High pressure hoses should be pre-assembled, marked BS 3212/2 and no greater than 1m in length.	Compliant
High pressure components protected against potential damage	Compliant
Regulators sited level with or higher than the bottle valve	Compliant
Regulator vent holes oriented correctly	Compliant
Correct type of regulator fitted	Compliant
9 Low pressure stage design considerations	
Pipe size guideline – pressure drop no greater than 2.5 mbar	Not achieved
9.2 Inlet connection	
Assuming bottle-mounted regulator - Flexible hose should be used to connect between the low pressure regulator and the inlet gas connection. The inlet gas connection should be assessable for inspection.	Bottle-mounted regulator fitted Compliant

9.3 Installation pipework	
Approved material used for pipework	10mm - Seamless copper tube fitted
Appliances should be connected with rigid metal pipe. <i>However flexible hose can be used provided fitted in accordance with manufactures instructions.</i>	Compliant
9.4 Flexible hose	
Flexible hose should conform to type 2 of BS 5482 or the relevant requirements of BS EN 1763. <i>Flexible hose marked BS 669 can be used to connect cookers.</i>	Flexible hoses not used for appliances
Flexible hose should be no greater than 1m	Compliant
Flexible hose should be protected passing through bulkheads ect.	Not applicable
Flexible hose should be readily assessable	Compliant
Approved clamps can be used for low pressure hose connections	Not fitted
Flexible hose manufactured to BS 5482 should not be used where it could be subjected to temperatures exceeding 50° C.	Compliant
10 Flue design considerations	
Recommended by and installed to manufacturer's recommendations	Not fitted
Flue terminals greater than 300mm from openings. (500mm for fuel fillers & vents)	Not fitted
Flue terminals should be outside the vessel, <i>in a position that minimizes the risk of accidental damage</i> , and away from areas that could be enclosed by canopies	Not fitted
11 Ventilation design considerations	
Permanent, high and low-level ventilation	See table and calculations below
Assuming closable ventilators fitted (Cat 'C' craft)	Not applicable
12 Installation of pipework	
12.1 Pipework design considerations	
Between the highest rated appliance and the cylinder the pipe supply should be as short as practicable.	See schematic diagram annexed to this file
All pipework should be accessible and routed as high as practical	Compliant
Except for bulkhead fittings there should be no fittings in the engine compartment	No LPG fittings located in engine compartment
The installation should incorporate a fitting to enable tightness check	Gas test point located in galley
Excess joints not permitted	Compliant
12.2 Pipework	
Pipework to be secure – fixings at least every 500mm	Compliant
Suitable clips to be used	
At the point of connection between rigid pipework and flexible hose adequate support should be provided	Compliant
Pipework should be protected against mechanical damage	Compliant
Bulkhead penetrations should be protected by grommets etc.	Compliant
Pipework should not run below bilge level	Compliant
12.3 Pipe fittings and joints	
Joints should be secure	Compliant
Connections should be secure, within 150mm from each joint	Compliant
Immediate connections to appliances should be accessible	Compliant
Other joints should be readily accessible	
12.4 Connection and disconnection of pipes and fittings	
Redundant pipework should be properly sealed	No redundant pipework

12.5 Positioning of LPG pipework relative to other services	
LPG pipework should not:- <ul style="list-style-type: none"> • Pass through a ventilation or air conditioning duct • Be exposed from leakage from water services • Pass through electrical ducts • Be routed in proximity to electrical cables - at least 30mm gap. (Unless in conduit) • Should not be situated less than 75mm from exhaust pipes 	Compliant
13 Shut off valves	
13.1 Main shut off valve	
Readily accessible main shut off valve, situated outside accommodation spaces and as close to the LPG cylinder as practical.	Gas bottle valve utilised as Main isolator valve
The main cylinder valve can be used as the main shut off valve unless two or more cylinders are connected by an automatic changeover device – in that case a further isolator required after the changeover valve.	
Location for main shut off valve to be clearly marked	" Gas isolator valve beneath" marked on gas locker lid
13.2 Appliance isolation valve	
Dedicated isolator valve for each appliance. Valves should be readily accessible	Compliant
Valves not situated immediately adjacent appliances should clearly indicate which appliance they serve	Not fitted
Valves that close by rotation should be marked 'open' and 'closed'	Compliant
Tapered plug valves should be spring loaded. Needle valves not permitted	
14 Appliances	
Appliances should be suitable for marine applications	Compliant
Appliances should be fitted in accordance with manufacturers recommendations for installations in vessels	Compliant
Appliances not permitted in engine spaces unless location accords with manufacturers recommendations for installations in vessels	Appliances not fitted in engine space
Manufacturers instructions for appliances should be given to user	Provided with OM
Appliances should be separated from fabrics and upholstery determined by the appliance manufacturer	Compliant
No stress on pipework and fittings to appliance. Pipework should not be used to retain the appliance.	
Appliances should be secured against accidental movement	Compliant - hob & built-in oven fixed
Appliances should be fitted as instructed by the manufacturer to prevent over-heating of nearby surfaces	Compliant
Adjacent surface structures should withstand 65°C	Not required
Should temperature exceed 50°C, protection should be provided for adjacent combustible materials	
Room sealed appliances installed in closed compartments should have adequate ventilation to prevent over-heating	No room sealed appliances in closed compartments
14.2 Cooking appliances	
Cooking appliances to be secure	Compliant
Materials in the vicinity of cooking appliances should be non-combustible or protected with a finish of Class 1 surface spread of flame rating as specified in BS 476-7	Compliant
If manufactures instructions not available - minimum distance between burner centre and combustible material should be no less than 500mm	Compliant

15 Commissioning	
System and appliances commissioned in accordance with PD 5482-3 Annex C.	Compliant
16 Soundness	
Installation inspected and tightness checked in accordance with PD5482-3.	'Gas Safety Record' certificate annexed
17 Information and instructions for safe usage	Manufacturers handbooks supplied with Owner's Manual

Provision for tightness check	Gas test point located adjacent cooker
'Gas Safe Registered Installer' and certification See Gas Safety Certificate accompanying this file	Name: Chris Williams Registration No. 3371852 Certificate number: 2697068 Date: 19.2.2015

FUEL-BURNING APPLIANCES					
APPLIANCE	MAKE	FLUE	FUEL	KW	AREA sq''
Refrigerator	230v				-
Cooker					
Hotplate/Hob	CBA	U	G	4.55	15.47
Built-in Oven Unit	Pen-y-banc woods	U	G	4.5	15.3
Room Heater (Stove)					
Water Boiler	Webasto				-
Persons	2				4
TOTAL					<u>34.84sq''</u>

HIGH LEVEL VENTS						
LOCATION	TYPE	SIZE	AIR	QTY	SUB TOTAL	TOTAL sq''
Roof	M			3	35	<u>35sq''</u>
LOW LEVEL VENTS						
LOCATION	TYPE	SIZE	AIR	QTY	SUB TOTAL	TOTAL sq''
Stem door	G	6" x 6"		1	10	<u>34</u>
Front Bulkhead	G	9" x 6"		2	24	
TOTAL						<u>67sq''</u>

Ventilation formula: $A \text{ m}^2 = (650 \times P) + (2200 \times U) + (440 \times F)$	✓Ventilation compliant
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SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.6 Fire Protection	The type of equipment installed and the layout of the craft shall take account of the risk and spread of fire.	ISO 9094/1 (Up to 15m)

5.6.1 General	Special attention shall be paid to the surroundings of open flame devices, hot areas or engines and auxiliary machines, oil and fuel overflows, uncovered oil and fuel pipes and avoiding electrical wiring above hot areas of machines.	ISO 9094/2 (15m - 24m)
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SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.6.2 Fire Fighting Equipment	<p>Craft shall be supplied with fire-fighting equipment appropriate to the fire hazard, or the position and capacity of fire-fighting equipment appropriate to the fire hazard shall be indicated. The craft shall not be put into service until the appropriate fire-fighting equipment is in place.</p> <p>Petrol engine enclosures shall be protected by a fire extinguishing system that avoids the need to open the enclosure in the event of fire. Where fitted, portable fire extinguishers shall be readily accessible and one shall be so positioned that it can easily be reached from the main steering position of the craft.</p>	<p>ISO 9094/1 (Up to 15m)</p> <p>ISO 9094/2 (15m - 24m)</p>

Fire protection check list ($L_{ft} > 15m$)	
Requirement	Actual
4 Fire Prevention	
4.1 to 4.1.2 Boat layout and design	
Bilges that may contain spillages of flammable liquids should be accessible	Unencumbered access to engine compartment bilges
4.1.3 to 4.1.5	
Compartments containing petrol engines or tanks should be separated from accommodation spaces	No petrol equipment onboard
Water-cooled exhaust alarm fitted	Dry exhaust system fitted
Passages through accommodation spaces shall not be obstructed	Complied
4.2 to 4.3 Escape routes and exits	
Means of Escape ($L_{ft}/3$)	<p>Exits Located:</p> <ul style="list-style-type: none"> • Fore & Aft cabin doors • Side Hatches – amidships mirrored
The furthest distance to an exit (of the min size) should not be more than 5m or 4m if the route passes beside an engine	Engine located beneath coverboards
If there is only one escape route it should not pass over a cooker	Complied
Minimum clear openings for exits:- Circular shape: 450mm diameter circle Any other shape: 350mm diameter circle	Complied
Exits must be at least 0.18m ² area	Complied
Securing devices on exits should be operable from inside	Complied
The maximum distance between a permanently attached step and any exit is 1.2m	Complied

4.4 to 4.4.2.2 Cooking and heating appliances									
Installation should comply with PD 5482-3	Complied See LPG Check List – ER 5.5								
4.5 to 4.5.2 Engine & fuel spaces									
Materials used for insulation of engine space should have non-absorbent surfaces	No insulation material fitted in engine compartment								
Materials used for insulation of the engine space should have an Oxygen Index of at least 21 at 60°C	No insulation material fitted in engine compartment								
Engine space ventilation	Ventilation provided for diesel engine space: Louvered grill – 6" x 6" Fitted in stern door								
4.6 Electrical systems									
DC systems should comply with ISO 10133 AC systems should comply with ISO 13297	Complied See checklist for electrical installations – ER 5.3								
4.7 Fuel systems									
Fuel Installation should comply with ISO 10088	Complied See checklist for fuel installations – ER 5.2								
4.9 LPG systems									
LPG systems should comply with PD 5482-3	Complied See LPG Check List – ER 5.5								
4.10 Ignition protection									
Electrical items installed in compartments that contain petrol engines should be ignition protected	No petrol equipment onboard								
Electrical items installed in compartments that contain LPG cylinders should be ignition protected	No electrical equipment installed within gas locker								
5 to 9 Fire-fighting equipment									
Readily accessible fire extinguishers installed	Dry powder extinguishers fitted: <table border="1" data-bbox="896 1318 1367 1444"> <thead> <tr> <th>Location</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Forward cabin</td> <td>8A/55B</td> </tr> <tr> <td>Cabin</td> <td>8A/55B</td> </tr> <tr> <td>Galley – in proximity to engine</td> <td>8A/55B</td> </tr> </tbody> </table>	Location	Rating	Forward cabin	8A/55B	Cabin	8A/55B	Galley – in proximity to engine	8A/55B
Location	Rating								
Forward cabin	8A/55B								
Cabin	8A/55B								
Galley – in proximity to engine	8A/55B								
Engine space protection (a) Diesel inboard less than 120kw - fire port in engine case. (b) Diesel engine greater than 120kw – fixed fire-fighting system.	Engine rating less than 120kw								
If any extinguishers is exposed to spray it should be suitable for external marine use	Complied								
Extinguishers located in lockers should have a label on the outside of the locker	No extinguishers located in lockers								
CO ₂ only to be installed adjacent to electrical systems	Complied								
No extinguisher should be less than 5A/34B	Complied								

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.7 Navigation Lights	Where navigation lights are fitted, they shall comply with the 1972 COLREG or CEVNI regulations, as appropriate.	

Navigation lights	None fitted
Tunnel/Search Light	2 x 12v Lights fitted at the bow and switched at main panel

SECTION	ESSENTIAL REQUIREMENT	APPLIED STANDARD
5.8 Discharge Prevention	<p>Craft shall be constructed so as to prevent the accidental discharge of pollutants (oil, fuel etc.) overboard. Craft fitted with toilets shall have either:</p> <p>a) holding tanks; or b) Provision to fit holding tanks.</p> <p>Craft with permanently installed holding tanks shall be fitted with a standard discharge connection to enable pipes of reception facilities to be connected with the craft discharge pipeline.</p> <p>In addition, any through-the-hull pipes for human waste shall be fitted with valves, which are capable of being secured in the closed position.</p>	ISO 6185

Requirement	Actual
Oil-tight compartment beneath machinery	Compliant
Holding tank construction & location	Welded steel beneath double berth
Holding tank pressure testing	In accordance with ISO 10088
If not fitted then provision for holding tank	-
Pump-out plumbing and deck fitting installed	Compliant
Seacock for blackwater discharge	Non fitted

8. Essential requirements for exhaust emissions	B. Propulsion engines shall comply with the following essential requirements for exhaust emissions.
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8.1 Engine Identification

8.1.1 Each engine shall be clearly marked with the following information:

- a) engine manufacturer's trademark or trade name,
- b) engine type, engine family, if applicable,
- c) a unique engine identification number,
- d) CE marking, if required under Article 10 of the Directive

8.1.2 These marks must be durable for the normal life of the engine and must be clearly legible and indelible. If labels or plates are used, they must be attached in such a manner that the fixing is durable for the normal life of the engine, and the labels/plates cannot be removed without destroying or defacing them.

8.1.3 These marks must be secured to an engine part necessary for normal engine operation and not normally requiring replacement during the engine life.

8.1.4 These marks must be located so as to be readily visible to the average person after the engine has been assembled with all the components necessary for engine operation.

8.2 Exhaust Emission Requirements

Propulsion engines shall be designed, constructed and assembled so that when correctly installed and in normal use, emissions shall not exceed the limit values obtained from the following table:

(g/kWh)

Table 1

Type	Carbon monoxide $CO = A + B/Pn_{80}$			Hydrocarbons $HC = A + B/Pn_{80}$			Nitrogen oxides NO_x	Particulates PT
	A	B	n	A	B	n		
Compression Engine	5.0	0	0	1.5	2.0	0.5	9.8	1.0

Where A, B and n are constants in accordance with the table, P_{80} is rated engine power (kW) and the exhaust emissions are measured in accordance with the harmonised standard EN ISO 8178-1:1996.

For engines above 130 kW either E3 (IMO) or E5 (recreational marine) duty cycles may be used. The reference fuels to be used for the emissions test for engines fuelled with petrol and diesel shall be as specified in Directive 98/69/EC (Annex IX, Tables 1 and 2), and for those engines fuelled with Liquefied Petroleum Gas as specified in Directive 98/77/EC.

8.3 Durability

The manufacturer of the engine shall supply engine installation and maintenance instructions, which if applied should mean that the engine in normal use will continue to comply with the above limits throughout the normal life of the engine and under normal conditions of use.

This information shall be obtained by the engine manufacturer by use of prior endurance testing, based on normal operating cycles, and by calculation of component fatigue so that the necessary maintenance instructions may be prepared by the manufacturer and issued with all new engines when first placed on the market.

The normal life of the engine is considered to mean:

- a) Inboard or stern drive engines with or without integral exhaust: 480 hours or 10 years, whichever occurs first;
- b) Personal watercraft engines: 350 hours or 5 years, whichever occurs first;
- c) Outboard engines: 350 hours or 10 years, whichever occurs first.

8.4 Owner's Manual

Each engine shall be provided with an owner's manual in the Community language or languages, which may be determined by the Member State in which the engine is to be marketed. This manual shall:

- a) Provide instructions for the installation and maintenance needed to assure the proper functioning of the engine to meet the requirements for durability (see clause 8.3)
- b) Specify the power of the engine when measured in accordance with the harmonised standard
- c) Contain a copy of the Declaration of Conformity for the engine

9. Essential requirements for Noise emissions	C. Recreational craft with inboard or stern drive engines without integral exhaust, personal watercraft and outboard engines and stern drive engines with integral exhaust shall comply with the following essential requirements for noise emissions.
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<p>9.1 Noise Emission Levels</p> <p>9.1.1 Recreational craft with inboard or stern drive engines without integral exhaust, personal watercraft and outboard engines and stern drive engines with integral exhaust shall be designed, constructed and assembled so that noise emissions measured in accordance with tests defined in the harmonised standard EN ISO 14509 shall not exceed the limit values in the following table:</p> <p style="text-align: center;">Table 2</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Single Engine Power In kW</th> <th style="text-align: center;">Maximum Sound Pressure Level = L_{pASmax} In dB</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\frac{P}{N} \leq 10$</td> <td style="text-align: center;">67</td> </tr> <tr> <td style="text-align: center;">$10 < \frac{P}{N} \leq 40$</td> <td style="text-align: center;">72</td> </tr> <tr> <td style="text-align: center;">$\frac{P}{N} > 40$</td> <td style="text-align: center;">78</td> </tr> </tbody> </table> <p>where PN = rated engine power in kW at rated speed and L_{pASmax} = maximum sound pressure level in dB.</p> <p>For twin-engine and multiple-engine units of all engine types an allowance of 3 dB may be applied.</p> <p>9.1.2 As an alternative to sound measurement tests, recreational craft with inboard engine configuration or stern drive engine configuration, without integral exhaust, shall be deemed to comply with these noise requirements if they have a Froude number of ≤ 1.1 and a power displacement ratio of ≤ 40 and where the engine and exhaust system are installed in accordance with the engine manufacturer's specifications.</p> <p>9.1.3 "Froude number" shall be calculated by dividing the maximum boat speed V (m/s) by the square root of the waterline length L_{wl} (m) multiplied by a given gravitational constant, (g = 9,8 m/s²)</p> $Fn = \frac{V}{\sqrt{(g \cdot L_{wl})}}$ <p>"Power displacement ratio" shall be calculated by dividing the engine power P (kW) by the boat's displacement D (t) = P/D</p> <p>9.1.4 As a further alternative to sound measurement tests, recreational craft with inboard or stern drive engine configurations without integral exhaust, shall be deemed to comply with these noise requirements if their key design parameters are the same as or compatible with those of a certified reference boat to tolerances specified in the harmonised standard.</p> <p>9.1.5 "Certified reference boat" shall mean a specific combination of hull/inboard engine or stern drive engine without integral exhaust that has been found to comply with the noise emission requirements, when measured in accordance with the standard harmonised (see section 7 clause 9.1.1) and for which all appropriate key design parameters and sound level measurements have been included subsequently in the published list of certified reference boats.</p> <p>9.2 Owner's Manual</p> <p>For recreational craft with inboard engine or stern drive engines with or without integral exhaust and personal watercraft, the Owner's Manual required under Directive Annex I.A (see Section 7 clause 2.5) shall include information necessary to maintain the craft and exhaust system in a condition that, insofar as is practicable, will ensure compliance with the specified noise limit values when in normal use.</p>	Single Engine Power In kW	Maximum Sound Pressure Level = L _{pASmax} In dB	$\frac{P}{N} \leq 10$	67	$10 < \frac{P}{N} \leq 40$	72	$\frac{P}{N} > 40$	78
Single Engine Power In kW	Maximum Sound Pressure Level = L _{pASmax} In dB							
$\frac{P}{N} \leq 10$	67							
$10 < \frac{P}{N} \leq 40$	72							
$\frac{P}{N} > 40$	78							

The 'Froude number' (Fn) is calculated as follows:

$$Fn = \frac{V}{\sqrt{(g \cdot L_{wl})}}$$

Whereas:

- v : maximum boat speed in metres per second
- L_{wl} : waterline length measured in accordance with EN ISO 8666
- g : gravitational constant g = 9,8 m/s²

The 'Power displacement ratio' (P/D) is calculated as follows

$$P/D = \frac{P}{D}$$

Whereas:

P : Declared Power in kW in accordance with ISO 8665

D : Displacement in tonnes at performance test mass conditions in accordance with EN ISO 8666

Boats with a power/displacement ratio greater than 40 kW/t and/or a Froude number greater than 1.1 must be sound tested.

PD Ratio	2.22
Froude Number	0.2

10

Components

The following components, listed in Annex II of the Directive, are subject to the conformity assessment B+C procedures (See Section 6) and must be CE marked or labeled.

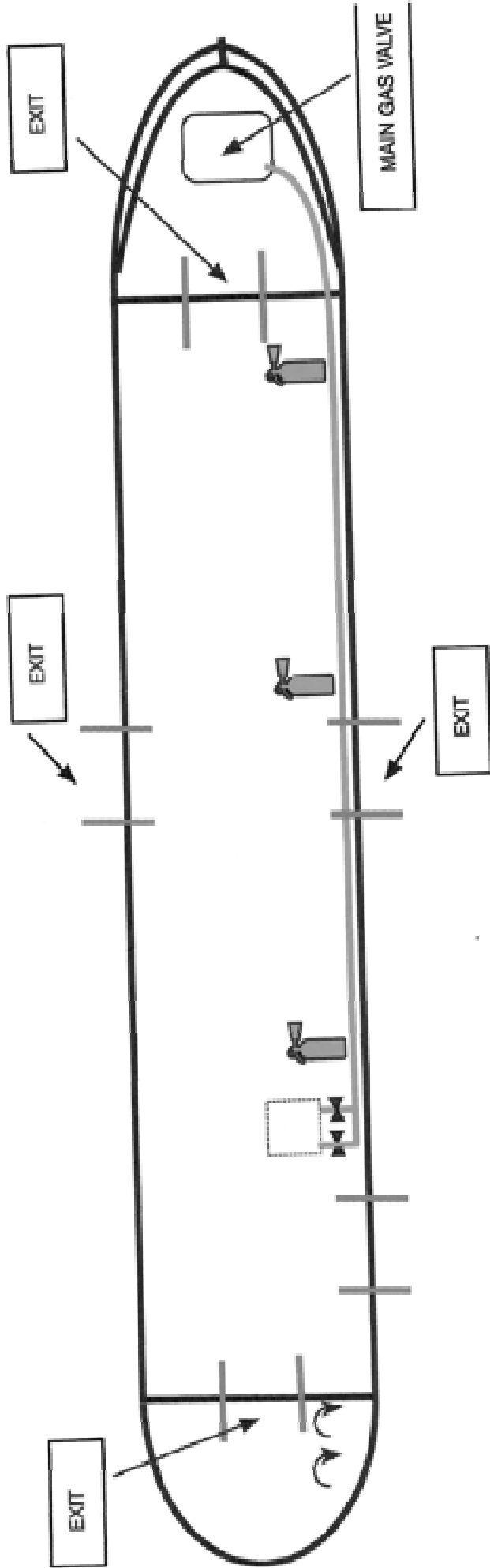
Components

1	Ignition-protected equipment for inboard and stern drive petrol engines and petrol fuel tank spacers
2	Start-in-gear protection devices for outboard motors
3	Steering wheels, steering mechanisms and cable assemblies
4	Non integral fuel tanks and fuel hoses (this does not include 27L outboard tanks covered by the Machinery Directive)
5	Prefabricated hatches and port lights

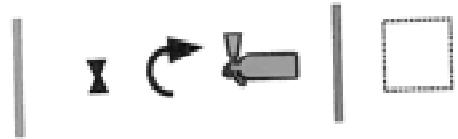
This means that a) anyone, other than the boatbuilder, who is manufacturing any of the above items has to ensure they comply with the appropriate standard and that they are CE marked and b) any boatbuilder purchasing any of the above items has to ensure that they are CE marked.

Where the boatbuilder makes these components for his production they are covered by the CE marking of the boat and do not need separate assessment.

SAFETY - Narrowboat 'Ithaca'



Gas Pipework
LPG Appliance Isolators x 2
Battery Isolators x 2
Fire Exstinguishers x 3
Exits x 5
LPG Appliances x 2



SCHEMATIC DIAGRAM
NOT TO SCALE

- Receipt for narrowboat 'Imaea'
2nd September 2020.

- Full payment of [REDACTED] 000 has been
received from [REDACTED]
on 02/09/2020.

- We confirm that narrowboat Imaea
Index number 519557 has been
sold to Paul + Bidget Kirk, who
are now responsible for the vessel.
Sold as seen.

Signed: [REDACTED]

Portland Basin Marina Ltd

Lower Alma Street

Dukinfield, Cheshire SK16 4SQ

Telephone / Fax: 0161 330 3133

VAT Registration No: 712706654

NAME	[REDACTED]	DATE	11	06	21
ADDRESS					
POSTCODE					

DESCRIPTION	QTY	UNIT PRICE		
DRY DOCK 4 Days			250	—
Silvery 9 Lit 6 Amps			300	—
Grand Present			2	—
Lubricant			12	—
2 x 2 Lit Propylant Mineral			52	—
13kg Camel			35	50
Pump out			14	—
6 D Sumpkins			6	60
RECEIVED BY	WESS POTROT	SUB-TOTAL	25	—
7247		VAT %		
		TOTAL	590	10

I declare that % of the fuel purchased will be used for propelling a private leisure craft.

Signed