

# TECHNICAL FILE

EU Recreational Craft Directive 2003/44/EC (94/25/EC a)

**cruiser style narrowboat**

***Slim Jim***

compiled by:

A Boatfitter  
1 The Wharf  
Canaltown  
CA12 3DE

0123 456789

using

***CE-craft***

RCD compliance software

## Project progress monitor

Sheet number & title		Non-conformities to be rectified	Comments
1.1.1	Project details		fill in completion date
1.4	NoBo certificate		
2.0	Principal dimensions		fill in freeboard, draft etc. Size of propeller
2.0.1	Onboard systems		check if drain on fuel tank location of water tank filler details of battery and electrical installations location of
2.1	CIN	no CIN	send application form
2.2	Builder's plate		
2.3	Man Overboard	no anti-slip on decks	
2.4	Vision from helm		photos required
2.5	Owner's Manual		side view photo required
3.1	Structure		
3.2	Stability		
3.4	Openings list		check window thicknesses
3.5	Cockpits		method of securing forward doors forward bulkhead vents height of above deck
3.5	Bilge pumps		
3.6	Load		
3.7	Liferaft		
3.8	Escape		
3.9	Strong points	no anchor point	
4.0	Handling		
5.1	Engine installation	no ventilation	
5.2	Fuel system	no tank data plate	
5.3	DC electrical system		
5.3	AC electrical system		
5.4	Steering system		
5.5	LPG system		check appliances have ffd on all burners
5.5.1	LPG certificate		
5.6	Fire protection		Discharge point to be provided
5.7	Navigation lights		

5.8	Discharge prevention		check pipe installation for vent and pump-out
	Noise emission		
	Exhaust emission		



# Declaration of Conformity

## Recreational Craft Directive 2003/44/EC (94/25/EC a)

### DETAILS OF MANUFACTURER

Name of manufacturer: **A Boatfitter**  
Address: **1 The Wharf**  
**Canaltown**  
**CA12 3DE**

Assessment module used: **A**

### DETAILS IF DECLARATION MADE BY AN AUTHORISED REPRESENTATIVE

Authorised representative: **N/A**  
(established in the EU)  
Address:

### DETAILS IF INTERVENTION BY NOTIFIED BODY REQUIRED

Notified Body: **Not required**

EC type-examination certificate number (if issued): **N/A**

### DESCRIPTION OF THE CRAFT

Craft Identification Number: **GB-ABF12345D808**  
Model/class of craft: **cruiser style narrowboat**  
Design category: **D**  
Type of craft: **3**  
Type of hull: **1**  
Deck: **1**  
Construction material: **3**  
Propulsion: **3**  
Type of engine: **2**  
Max. recommended power: **31.33 kW**  
Hull length: **18.29 m**  
Hull beam: **2.08 m**  
Draught: **0.67 m**

**I declare that the above craft complies with the applicable essential requirements shown overleaf**

**Signed:** **Name:** **A Boatfitter**

**Position:** **Date:**

## 1.2 Declaration of Conformity for craft CIN:

**GB-ABF12345D808**

**Type of craft:**

1 sailboat
2 inflatable
3 other

**Propulsion:**

1 sails
2 petrol engine
3 diesel engine
4 electrical motor
5 oars
6 other

**Type of hull:**

1 monohull
2 multihull
3 other

**Engine type:**

1 outboard
2 inboard
3 z or sterndrive
4 other

**Construction material:**

1 alumin & al alloys
2 plastic, frp
3 steel & its alloys
4 wood
5 other

**Deck:**

1 decked
2 partly decked
3 open

Essential requirements - refer to the relevant article in Annex 1 of the the Directive	Harmonised standard used	ISO standard used	Other normative document used	See technical file
<b>General requirements (2)</b>				
Craft Identification Number CIN (2.1)	x			
Builder's plate (2.2)	x			
Protection from falling overboard & means of reboarding (2.3)	x			
Visibility from the helm position (2.4)				x
Owner's Manual (2.5)	x			
<b>Integrity and structural requirements (3)</b>				
Structure (3.1)				x
Stability and freeboard (3.2)	x			
Buoyancy and flotation (3.3)	N/A			
Openings in hull, deck and superstructure (3.4)	x			
Flooding (3.5)	x			
Manufacturer's maximum recommended load (3.6)	x			
Liferaft stowage (3.7)				x
Escape (3.8)	x			
Anchoring, mooring and towing (3.9)	x			
<b>Handling characteristics (4)</b>	N/A			x
<b>Systems (5)</b>				
<b>Engines and engine spaces (5.1)</b>				
Inboard engine (5.1.1)	///	///	///	x
Ventilation (5.1.2)	///	///	///	x
Exposed parts (5.1.3)	///	///	///	x
Outboard engine starting (5.1.4)	N/A			
<b>Fuel system (5.2)</b>				
General - fuel system (5.2.1)	x			
Fuel tanks (5.2.2)	x			
Electrical systems (5.3)	x			
<b>Steering systems (5.4)</b>				
General - steering system (5.4.1)				x
Emergency steering systems (5.4.2)	N/A			
Gas systems (5.5)	x			
<b>Fire protection (5.6)</b>				
General - fire protection (5.6.1)	x			
Fire fighting equipment (5.6.2)	x			
Navigation lights (5.7)			x	
Discharge prevention (5.8)	x			

/// = no standard available

## Standards applied

Essential Requirement		Standard applied
Design category	2.0	EN ISO 8666:2002 Principal data
Craft Identification Number	2.1	EN ISO 10087:1996/A1: Hull Identification Coding Systems
Builder's plate	2.2	EN ISO 14945:2004 Builder's plate
Protection from falling overboard and reboarding	2.3	EN ISO 15085:2003 - Man overboard prevention and recovery
Visibility from the main steering position	2.4	Standard not applicable - craft speed < 10 kts and is tiller steered
Owner's Manual	2.5	EN ISO 10240:1996 - Owner's manual
Structure	3.1	Annex IIIa Declaration from shell builder
Stability, freeboard, buoyancy and flotation	3.2 & 3.3	EN ISO 12217-1:2002 Part 1: - Non-sailing boats of hull length greater than or equal to 6m
Openings in hull, deck and superstructure	3.4	EN ISO 12216:2002 - Windows, portlights, hatches, deadlights and doors - strength requirements
		EN ISO 9093-1:2002 - Seacocks and through hull fittings - Part 1: Metallic
		N/A - no plastic skin fittings
Flooding	3.5	EN ISO 15083:2003 - Bilge pumping systems
		EN ISO 11812:2002 - Watertight cockpits and quick draining cockpits
Manufacturer's maximum recommended load	3.6	Mass breakdown following EN ISO 12217 EN ISO 14946:2001 - Maximum load capacity
Liferaft	3.7	Location nominated
Escape	3.8	EN ISO 9094-2:2002 - Fire protection part 2: Craft with a hull length over 15m and up to 24m
Anchoring, mooring and towing	3.9	EN ISO 15084:2003 - Small Craft -anchoring, mooring and towing - strong points
Handling characteristics	4.0	N/A - not a high speed craft
Inboard engine	5.1	No applicable standard - see Technical File
Ventilation		No applicable standard - see Technical File
Exposed parts of engine		No applicable standard - see Technical File
Outboard engines		N/A - inboard engine fitted
Fuel system - general	5.2	EN ISO 10088:2001 - Permanently installed fuel systems and fixed fuel tanks
Fuel system -tanks		
Electrical system	5.3	EN ISO 10133:2001 Electrical systems - extra low voltage d.c. EN ISO 13297:2001 Electrical systems - alternating current
Steering system	5.4.1	No applicable standard - tiller connected directly to stock
Emergency steering arrangements	5.4.2	Tiller connected directly to stock - emergency steering not required
Gas system	5.5	EN ISO 10239:2000 -Small craft LPG systems
Fire protection - general	5.6	EN ISO 9094-2:2002 - Fire protection part 2: Craft with a hull length over 15m and up to 24m
Fire protection - fire fighting equipment	5.6.2	
Navigation lights	5.7	1972 Colreg rules
Discharge prevention	5.8	EN ISO 8099:2001 - Toilet waste retention

## 1.3 Contents

### Recreational Craft Directive Technical File

ER	Description	Section	Standard applied
		1.1	Cover page
		1.1.1	Project details
		1.2	Declaration of Conformity
		1.3	Contents
		1.4	N/A - no Notified Body involvement

#### General requirements

1	Design category	2.0	EN ISO 8666:2002 Principal data
2	Craft Identification	2.1	EN ISO 10087:1996/A1: Hull Identification Coding Systems
2.2	Builder's plate	2.2	EN ISO 14945:2004 Builder's plate
2.3	Protection from falling overboard and means of reboarding	2.3	EN ISO 15085:2003 - Man overboard prevention and recovery
2.4	Visibility from the main steering position	2.4	Standard not applicable - craft speed < 10 kts and is tiller steered
2.5	Owner's Manual	2.5	EN ISO 10240:1996 - Owner's manual

#### Integrity and structural requirements

3.1	Structure	3.1	Annex IIIa Declaration from shell builder
3.2	List of openings	3.2.1	See standards applied in sections 3.2 and 3.4
3.2 & 3.3	Stability, freeboard, buoyancy and flotation	3.2	EN ISO 12217-1:2002 Part 1: - Non-sailing boats of hull length greater than or equal to 6m
3.4	Openings in hull and deck structure	3.4	EN ISO 12216:2002 - Windows, portlights, hatches, deadlights and doors - strength requirements
			EN ISO 9093-1:2002 - Seacocks and through hull fittings - Part 1: Metallic
			N/A - no plastic skin fittings
3.5	Flooding	3.5	EN ISO 15083:2003 - Bilge pumping systems
			EN ISO 11812:2002 - Watertight cockpits and quick draining cockpits
3.6	Manufacturer's maximum recommended load	3.6	Mass breakdown following EN ISO 12217 EN ISO 14946:2001 - Maximum load capacity
3.7	Liferaft	3.7	Location nominated
3.8	Escape	3.8	EN ISO 9094-2:2002 - Fire protection part 2: Craft with a hull length over 15m and up to 24m
3.9	Anchoring, mooring and towing	3.9	EN ISO 15084:2003 - Small Craft -anchoring, mooring and towing - strong points

## 1.3 Contents

### Recreational Craft Directive Technical File

#### Handling characteristics

4.0	Handling characteristics	4.0	N/A - not a high speed craft
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#### Installation requirements

5.1.1	Inboard engine	5.1	No applicable standard - see Technical File
5.1.2	Ventilation		No applicable standard - see Technical File
5.1.3	Exposed parts of engine		No applicable standard - see Technical File
5.1.4	Outboard engines		N/A - inboard engine fitted
5.2.1	Fuel system - general	5.2	EN ISO 10088:2001 - Permanently installed fuel systems and fixed fuel tanks
5.2.2	Fuel system - tanks		
5.3	Electrical system	5.3	EN ISO 10133:2001 Electrical systems - extra low voltage d.c.
			EN ISO 13297:2001 Electrical systems - alternating current
5.4.1	Steering system	5.4.1	No applicable standard - tiller connected directly to stock
5.4.2	Emergency steering arrangements	5.4.2	Tiller connected directly to stock - emergency steering not required
5.5	Gas system	5.5	EN ISO 10239:2000 -Small craft LPG systems
5.6.1	Fire protection - general	5.6	EN ISO 9094-2:2002 - Fire protection part 2: Craft with a hull length over 15m and up to 24m
5.6.2	Fire protection - fire fighting equipment	5.6.2	
5.7	Navigation lights	5.7	1972 Colreg rules
5.8	Discharge prevention	5.8	EN ISO 8099:2001 - Toilet waste retention

## 2.0 Principal dimensions and data

### EN ISO 8666 - Principal Dimensions and Description

#### Description of craft

construction material	MS42 mild steel
deck arrangement	decked
lightship weight including ballast (kg)	15000
crew limit	6
maximum speed (knots)	7

Craft dimensions @:		minimum operating load
Length -max overall (m)	$L_{MAX}$	18.64
Length of hull (m)	$L_H$	18.29
Length of waterline (m)	$L_{WL}$	17.99
Beam - maximum (m)	$B_{MAX}$	2.08
Beam of hull (m)	$B_H$	2.06
Beam at waterline (m)	$B_{WL}$	
Beam of chines (m)	$B_C$	
Deadrise angle (deg)	$\beta$	
Freeboard - forward (m)	$F_F$	1.09
Freeboard - amidships (m)	$F_M$	0.65
Freeboard - aft (m)	$F_A$	0.50
Draught - maximum (m)	$T_{MAX}$	0.67
Draught amidships (m)	$T_M$	N/A
Air draught (m)	$H_A$	1.77

#### Engine

System	Evidence			
number of engines:	one permanently installed			
engine arrangement:	inboard conventional shaft			
type of engine:	diesel			
make of engine:	Isuzu 42			
max. recommended power:	31.33	kW	42	hp
engine serial number:	223883			
exhaust type:	dry			
exhaust ducting:	non-integral			
make of gearbox:	PRM 150D2			
gearbox serial number:	C924332 R01573			
propeller shaft size:	38mm			
propeller size:	19" x 13" 3 blade RH			
engine space arrangement	enclosure			

## 2.0.1 Onboard systems

### Onboard systems

#### Description of craft systems

System or fittings	
Plastic skin fittings/seacocks	<input type="checkbox"/>
Metal fittings/seacocks	<input checked="" type="checkbox"/>
Watertight or quick draining cockpit, recess or bulwark which can retain water	<input checked="" type="checkbox"/>
AC electrical system	<input checked="" type="checkbox"/>
Tiller steering	<input checked="" type="checkbox"/>
Wheel hydraulic steering system	<input type="checkbox"/>
LPG system	<input checked="" type="checkbox"/>
Navigation lights	<input checked="" type="checkbox"/>
Permanent toilet system	<input checked="" type="checkbox"/>
Grey water tank	<input type="checkbox"/>

#### Details of fixed tanks

fuel tanks	location	tank capacity (L)	filler location	drain location
engine tank	across stern	245	aft deck to port	port side of tank
heater tank	N/A			

freshwater tanks	location	tank capacity (L)	filler location	stopcock location
main tank	under well deck	450	aft deck	at forward steps
auxiliary tank	N/A			

holding tanks	location	tank capacity (L)	pump out location	diverter valve
black water tank	under forward berth	160	starb'd side deck	N/A
grey water tank	N/A			

#### Electrical systems

Voltage of electrical systems installed	12v dc	<input checked="" type="checkbox"/>
	24v dc	<input type="checkbox"/>
	110v ac	<input type="checkbox"/>
	230v ac	<input checked="" type="checkbox"/>

DC systems	battery location	isolator location	system voltage	battery ratings
engine	starboard of engine	on battery locker	12	1 x 95AH
service	starboard of engine	on battery locker	12	4 x 110AH
inverter	service battery bank	as service bank	12	as service bank
bow thruster	under well deck	under well deck	12	1 x 95AH

AC systems	quantity	system voltage	location
shore line	2	230	aft bulkh'd to port, forward bulkh'd to port
inverter	1	230	in locker to starboard of aft doors
generator	N/A		
ac power source selector switch			ac panel board to port of aft doors

## 2.0.1 Onboard systems

### Onboard systems

#### Electrical systems (cont.)

location of DC panel board	to port of aft doors
location of AC panel board	to port of aft doors

#### Diesel fuel systems

appliance	location	fuel shut-off valve location
engine	under aft deck	on fuel tank to starboard
diesel boiler	engine space bulkhead	on fuel tank to starboard
diesel stove	saloon area to starboard	on fuel tank to starboard

#### Fuel burning appliances

LPG appliances	rating (kW)	location	appliance shut-off location
hob	10.1	galley to starboard	in adjacent cupboard
oven/grill	1.7	galley to starboard	in adjacent cupboard

#### Heating systems

water heating	location	description
boiler	engine space bulkhead	heats water in the calorifier
calorifier	port side of engine space	uses engine cooling system to heat water
immersion heater	in calorifier	a.c. electrical heating element

cabin heating equipment	rating (kW)	location	description
boiler	5.0	engine space bulkhead	programmable, heats cabin via radiators
diesel stove	4.0	saloon area to starboard	can be used as alternative to boiler
solid fuel stove	4.0	forward cabin to port	can be used as alternative to boiler

#### Assessment of ventilation provision

Appliance description	room sealed	flued	vented & flued in separate	input (kW)	vent requirement (mm <sup>2</sup> )
hob	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10.1	22110
oven/grill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.7	3740
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
boiler	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5.0	0
diesel stove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.0	1760
solid fuel stove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.0	1760
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Ventilation required for people on board					3900
<b>Total ventilation requirement:</b>					<b>33270</b>

## 2.0.1 Onboard systems

### Onboard systems

#### Fixed ventilation provision

high level vent	location of vent	area of fixed ventilation (mm <sup>2</sup> )
mushroom vent	on forward cabin roof	5000
mushroom vent	on bathroom cabin roof	5000
mushroom vent	on saloon cabin roof	5000
mushroom vent	on saloon/galley cabin roof	5000
mushroom vent	on saloon/galley cabin roof	5000
<b>Total airflow area of high level ventilation (mm<sup>2</sup>)</b>		<b>25000</b>

low level vent	location of vent	area of fixed ventilation (mm <sup>2</sup> )
grille	port forward door	5750
grille	starboard forward door	5750
grille	starboard aft bulkhead	2500
<b>Total airflow of low level ventilation (mm<sup>2</sup>)</b>		<b>14000</b>
<b>Combined area of high level and low level ventilation:</b>		<b>39000</b>

Is high level ventilation at least 50% of the minimum total required?	<b>YES</b>
Is low level ventilation at least 50% of the minimum total required?	<b>NO</b>

the minimum fixed ventilation requirement should be divided equally between high and low vents

Is the area of ventilation adequate for the appliances installed and the permitted number of people?	<b>NO</b>
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**NOTE: ADDITIONAL VENTILATION REQUIRED**

#### Fire fighting equipment

Location of fire fighting equipment	Type of equipment A minimum of three extinguishers to be fitted, but see requirements in section 5.6	Fire extinguisher ratings	
		A rating	B rating
aft bulkhead	ABC rated fire extinguisher	5	34
galley	ABC rated fire extinguisher	5	34
passageway	ABC rated fire extinguisher	5	34
forward cabin	ABC rated fire extinguisher	5	34
	fire blanket	BS EN 1869	

Does the total rating of the extinguishers meet the requirements? (pass or fail)	<b>FAIL</b>
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#### Bilge pumps

See section 3.5 Bilge pumps for details of requirements

Description of pumps	Location of pumps	Capacity litres/min
electric submersible	under stern gear	50
electric submersible	aft cabin bilge	35

## 2.1 CIN

### EN ISO 10087 - Small Craft - Hull Identification Coding System

**GB-ABF12345D808**

Country code (letters)

(assigned by National Federation)

Manufacturer's Identification Code (3 letters)

(registered with National Federation)

Serial number (5 letters or numbers)

(alpha-numeric - manufacturer to define)

Month when vessel was manufactured (1 letter)

(alphabetic)

Year when vessel was manufactured (1 number)

(numeric - last digit of year)

Model year (2 numbers)

(numeric - last two digits. Must be within 12 months of year of manufacture)

The external CIN is located:

**on the stern to starboard**





The second, hidden CIN is located:

**on the port engine bearer**

The CIN is made up of letters at least 6mm high

## 2.2 Builder's plate

### EN ISO 14945 - Small Craft - Builder's plate

cruiser style narrowboat			
A Boatfitter			
Category	D		
Max		=	6
Max	 + 	=	700 kg
A Boatfitter	tel:	0123 456789	

material of plate	brass
text height	6mm
pictogram heights	10mm
location of plate	below engine panel

## 2.3 MOB

EN ISO 15085:2003

## Small Craft - Man overboard prevention & recovery

### Selection of options

For non-sailing craft:

Design category	A	B	B	B	C	D
Options applicable	1	2	3	4	5	6
Safety device		$L_H > 8.5m$	$L_H < 8.5m$			
Slip resistant surface on working deck	X	X	X	X	X	X
Foot stop around edge of working deck	X	X	X	X		
Handholds around perimeter of working deck	X	X	X	X	X	X
Low guard rail or low guard line			X			
High guard rail or high guard line	X	X				
Hooking points	X			X		
Body support on high speed craft	X	X	X	X	X	X
Means of reboarding	X	X	X	X	X	X

Option applied:

6

### Definition of working deck area:

the aft deck and the forward well deck. The side decks and cabin roof are not part of the working deck and should not be used when the vessel is underway.

Clause	Requirements for non-slip decks	Details of craft
7.1	Non-slip surface on all working deck area	sanded paint finish on aft deck and well deck
	Maximum gaps in non-glazed areas 75mm	maximum gap 25mm
	Maximum gaps in glazed areas 500mm	N/A - there are no glazed areas in the working deck

Clause	Requirements for handholds	Details of craft
9	On the route along the outer edge of the working deck, the spacing between two adjacent handholds is not to exceed 1500mm	integral handrails have been provided at the top of the cabin sides and are accessible from all areas of the aft deck. The side decks should be used as handholds in the the well deck area.
	Handholds within 300mm of the deck edge shall be higher than 350mm above the deck, but shall not be higher than the adjacent structure	the cabin handrails are 900mm above the aft deck and the side decks are 550mm above the well deck
	Handholds shall be able to withstand 1500N	the handholds are integral welded parts of the steel structure and are more than adequately strong

## 2.3 MOB

<b>EN ISO 15085:2003</b>	<b>Small Craft - Man overboard prevention &amp; recovery</b>
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Clause	Requirements for passenger support	Details of craft
15	Passenger support for high speed craft	N/A - not a high speed craft

Clause	Requirements for reboarding	Details of craft
16	The vessel to be provided with a means of reboarding from the water	rope ladder stowed in the port side locker on the aft deck. To be rigged over stern dollies when required.
	If the means of recovery is a ladder, the lowest step to be at least 300mm below waterline, with boat in the minimum sailing condition.	the bottom rung of the ladder extends
	Means of reboarding to be readily accessible and useable when in place without assistance of anyone on board	the ladder is stored in the locker on the aft deck. Once in position on the stern dollies, the MOB can climb back on board unaided.

### Assessment of guard rail strength

The guard rail is a rigid rail modelled as a built-in beam with fixings at each stanchion. The load is applied at the the mid-span of the rail. The rail is welded at each joint and must support a horizontal force of 280N with a deflection < 50mm.

construction material:	mild steel MS42A		
outer diameter of rail:	40	mm	UTS of material:
wall thickness of rail tube:	1	mm	400
distance between stanchions:	0.8	m	Young's Modulus:
			140000
			2nd moment of area:
			23310
			Section modulus:
			1165

#### Load case 1: destruction

Load:	560	N	
Bending moment:	56	Nm	
Actual stress:	48	N/mm <sup>2</sup>	
Allowable stress:	400	N/mm <sup>2</sup>	
<b>Verdict:</b>	<b>PASS</b>		

#### Load case 2: deflection

Load:	280	N	
Bending moment:	815844	Nm	
Actual deflection:	0.2	mm	
Allowable deflection:	50	mm	
<b>Verdict:</b>	<b>PASS</b>		

### Assessment of stanchion supporting guard rail

An individual stanchion is modelled as a cantilever and is assumed to be unsupported by rails or wires

construction material:	mild steel MS42A		
outer diameter of stanchion:	30	mm	UTS of material:
wall thickness of stanchion tube:	1	mm	400
unsupported height of stanchion:	0.6	m	Young's Modulus:
			140000
			2nd moment of area:
			9589

#### Load case 1: destruction

Load:	560	N	
Bending moment:	336	Nm	
Actual stress:	526	N/mm <sup>2</sup>	
Allowable stress:	400	N/mm <sup>2</sup>	
<b>Verdict:</b>	<b>FAIL</b>		

#### Load case 2: deflection

Load:	280	N	
Actual deflection:	15.0	mm	
Allowable deflection	50	mm	
<b>Verdict:</b>	<b>PASS</b>		

## 2.3 MOB

<b>EN ISO 15085:2003</b>	<b>Small Craft - Man overboard prevention &amp; recovery</b>
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### Assessment of coachroof handrail strength

The handrail is a rigid rail modelled as a built-in beam with fixings at each stanchion. The load is applied at the mid-span. The rail is welded at each joint.

construction material:	mild steel MS42A		
outer diameter of rail:	30 mm	UTS of material:	400 N/mm <sup>2</sup>
wall thickness of rail tube:	1 mm	Young's Modulus:	140000 N/mm <sup>2</sup>
distance between stanchions:	0.6 m	2nd moment of area:	9589 mm <sup>4</sup>
		Section modulus:	639 mm <sup>3</sup>

#### Assessment of rail

Load:	1500 N	
Bending moment:	113 Nm	
Actual stress:	176 N/mm <sup>2</sup>	
Allowable stress:	400 N/mm <sup>2</sup>	
<b>Verdict</b>	<b>PASS</b>	

#### Assessment of welding

Load:	1500 N	
Shear area:	283 mm <sup>2</sup>	
Actual stress:	5 N/mm <sup>2</sup>	
Allowable stress:	400 N/mm <sup>2</sup>	
<b>Verdict</b>	<b>PASS</b>	

## 2.4 Vision from helm

### EN ISO 11591:2001 Field of vision from helm position

Photos showing the field of vision from the helm position(s)



View from helm looking forward



View from helm looking aft



View from helm looking to port



View from helm looking to starboard

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LOGO (if applicable)

# **Owner's and Operator's Manual for cruiser style narrowboat *Slim Jim***

This manual has been compiled to help you operate your boat with safety and pleasure. It contains details of the craft, typical equipment supplied or fitted and information on its operation and maintenance. Please read it carefully and familiarise yourself with the boat before using it for the first time.

If this is your first boat, or you are changing to a different type, please ensure that you obtain handling and operating experience before taking command of your boat for the first time. The British Marine Federation will be pleased to advise you of suitable training providers

Keep this manual in a safe place on board your boat and hand it over to the new owner when you sell your boat.

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## DECLARATION OF CONFORMITY

## ***Welcome aboard***

Congratulations on purchasing an A Boatfitter narrowboat. This manual contains useful data and information concerning the operation of your boat along with maintenance and safety related issues. Please read it carefully and familiarise yourself with your new boat before using it for the first time.

## ***About this manual***

The advice in this manual does not cover every situation which you are likely to encounter. There are many detailed guides available dedicated to handling this type of craft which are far more comprehensive, Or better still, enrol on a helmsmanship course and take advantage of a qualified instructor's knowledge and experience. Remember that for your boating trip to be a happy one, it must first be a safe one.

Similarly, the maintenance recommendations in the manual do not cover every eventuality. If in doubt, consult the builder of your boat for advice. The systems installed on modern vessels are increasingly complex, always use a properly trained professional for repairs or modifications.

In the back of the manual, you will find the instruction booklets from the suppliers of the major equipment installed on your boat. Examples of these manuals include the engine, pumps, heating and cooking equipment. A list of the manuals contained in this folder are listed below. If any equipment is added to the list, you should keep the list up to date. The manufacturer's of these products maintain their own repair and service facilities. The warranty card for each piece of equipment should be filled out and returned to the manufacturer to validate the warranty.

## ***Original Equipment Manufacturer (OEM) Manuals***

Item of equipment	Item of equipment
engine	water pump
gearbox	shower drain pump
inverter	water filter
battery charger	bilge pump
d.c. panel board	bilge pump
a.c. panel board	
immersion heater	
microwave oven	
diesel boiler	
diesel heater	
solid fuel stove	
cooker hob	
oven/grill	
refrigerator	

## ***Responsibilities of the Boat Owner***

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As the boat owner, your responsibilities include the following:

- 1 Read this manual as well as the Original Equipment Manufacturer manuals and other information included in this folder.
- 2 Inspect the boat at the time of delivery and ensure that all systems and components are operating correctly. Refer to the engine warranty for initial inspection and service requirements.
- 3 Operate all equipment in accordance with the manufacturer's instructions.
- 4 Know the limitations of your boat.
- 5 Follow the *rules of the road* and keep a sharp lookout for people and objects in the water.
- 6 Keep an eye on the weather. Be aware of possible changing conditions by checking local weather forecasts before departure
- 7 Do not overload or improperly load your boat
- 8 Never use the boat when the operator is under the influence of drugs or alcohol
- 9 Be aware of crew and passenger safety at all times
- 10 Do not allow passengers or crew to ride on parts of the boat other than the working decks which are defined in this manual.
- 11 Ensure that all crew receive suitable training, particularly with regard to the whereabouts and operation of safety equipment.
- 12 Reduce speed when visibility is limited, if there are people in the water. For the comfort of others, reduce speed when passing other boats whether they are moored or underway.
- 13 Ensure that the craft is well maintained at all times, especially the safety equipment
- 14 Have the craft inspected at regular intervals by qualified personnel and whenever a cause for concern is raised.
- 15 Ensure that you comply with all legislation which applies in the area of operation. This may include requirements for the carriage of life saving equipment, licensing of the helmsman and respect for the environment.

## *Hazard communication*


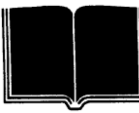




As you read this manual, please note the hazard warnings which alert you to safety precautions relating to unsafe conditions or operating procedures.

Three signal words: **DANGER**, **WARNING** and **CAUTION** convey the meaning of the statement as follows:

	<b>DANGER</b>	Calls attention to immediate hazards that <b>WILL</b> result in severe personal injury or death if proper precautions are not taken
	<b>WARNING</b>	Identifies hazards or unsafe practices that <b>COULD</b> result in severe personal injury or death if proper precautions are not taken
	<b>CAUTION</b>	Denotes a reminder of safety practices or alerts the user to hazards or unsafe practices that <b>COULD</b> result in minor personal injury or equipment damage or property damage

## *Safety labels*

Your boat and this manual display symbols which advise the operator and crew of vital safety precautions to follow when operating and/or servicing equipment. The following symbols may be found on your craft. They should be respected at all times.

	Electrical hazard		Read Owner's Manual
	Fire hazard		Escape
	Location of fire extinguisher		Dedicated opening for fire extinguisher

Do not remove or obstruct any label

Replace any label which becomes illegible

## ***Owner Advisory Statements***

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Advisory statements alert you to conditions affecting equipment operation, maintenance and servicing practices.

### **Important:**

This is an advisory statement or procedure intended to prevent damage to the equipment or associated components.

### **Note:**

This is a general advisory statement relating to equipment operation and maintenance procedures. Its intent is to call attention to information more than important than is contained in the normal text.

## ***Boat Licensing***

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To be able to operate your boat on British Waterways (BW) or Environment Agency (EA) waters you must license it with the relevant authority.

Your new boat has been CE marked by the builder to show that it complies with the Recreational Craft Directive (RCD) standards. The RCD Declaration of Conformity contained at the back of this manual will enable you to license your boat for the first four years after its completion. A registration number will be issued for your boat and the number along with a valid license should be displayed at all times.

At the end of that four year period, you will need to submit the boat for a Boat Safety Scheme examination. Once the boat has been shown to meet the BSS standards, a BSS certificate will be issued which shows that it meets the requirements of the navigation authorities. The certificate will be valid for four years and will enable you to license your boat each year for that period.

Further details of the BSS examination can be downloaded from the Boat Safety Scheme website.

## General arrangement



## Principal Boat Data

shell builder:	Steelright
fitted out by:	A Boatfitter
boat type:	cruising boat - displacement
boat model:	cruiser style narrowboat
boat name:	<i>Slim Jim</i>

Craft Identification Number:	GB-ABF12345D808	
RCD design category:	D	
Max. recommended number of people:	6	

length of hull:	18.29 m	60.01 ft
length overall:	18.64 m	61.15 ft
beam of hull:	2.06 m	6.76 ft
beam overall:	2.08 m	6.82 ft
maximum draught (laden):	0.67 m	2.20 ft
air draught:	1.77 m	5.81 ft

Recommended maximum engine power:	31.33 kW	42.00 hp
type of engine:	Isuzu 42	
engine serial number:	223883	
type of gearbox:	PRM 150D2	
gearbox serial number:	C924332 R01573	
propeller size:	19" x 13" 3 blade RH	

## *Recreational Craft Directive design category*

### **D - SHELTERED WATERS**

A boat given design category D is considered to be designed to operate in winds up to force 4 (Beaufort scale) and associated wave heights (significant wave heights up to 0.3m and occasional maximum heights up to 0.5m). Such conditions may be encountered on sheltered inland waters and on coastal waters in fine weather.

### ***Loading***

Maximum weight of people	450		
Baggage weight & other carry-on weight	250		
Maximum load as on builder's plate (kg)	700	700	
Weight of permanent stores & equipment	505		
Maximum weight of fixed fuel tanks	206		
Maximum weight of fixed water tanks	450		
Maximum weight of fixed holding tanks	160		
Weight of fluids & Permanent load (kg)	1321	1321	
Maximum recommended load (kg)		2021	2021
Unladen weight of boat (lightweight)			15000
Weight of craft fully laden (kg)			<u>17021</u>

### ***Fixed tanks***

diesel	tank location	volume (litres)	filler location	drain location
engine	across stern	245	aft deck to port	port side of tank
heater	no separate tank	-	-	-

water	tank location	volume (litres)	filler location	stopcock location
main	under well deck	450	aft deck	at forward steps
aux	not fitted	-	-	-

waste	tank location	volume (litres)	pump out location	diverter valve
black	under forward berth	160	starb'd side deck	N/A
grey	not fitted	-	-	-

## ***Electrical systems***

Your boat is equipped with the following electrical systems:

<b>12 volt dc</b>	-	-	<b>230 volt ac</b>
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The following simple rules should be observed at all times:

<b>ALWAYS</b>	keep protective covers in place, in place at all times except when servicing equipment e.g. rubber sleeves covering electrical connections dis-connect and remove the batteries when the craft is in winter storage or long term storage
<b>NEVER</b>	work on the electrical installation while the system is energised dis-connect the shore power connections while the system is in use modify the craft's electrical system or relevant drawings. Installation, alterations, and maintenance should be performed by a competent marine electrical technician. alter or modify the rated current amperage of overcurrent devices install or replace electrical appliances or devices with components exceeding the rate current amperage of the circuit. leave the craft unattended with the electrical system energised except for any fire protection equipment and alarm circuits which may be fitted.

**Note:**

Ensure that the batteries are kept in a good state of charge. They should be checked at regular intervals.

**Note:**

Dis-connect and remove the batteries when the craft is in winter storage (cold weather areas) or long term storage.

## ***DC systems***

There are three main DC electrical systems installed on board: the engine circuits, the domestic circuits and the bow thruster circuits. The systems are powered by separate battery banks each of which is provided with an isolation switch which should be turned off when the boat is left unattended or in the event of emergency.

While the engine is running, the battery banks are charged by two engine-mounted alternators. The smaller alternator charges only the engine battery so that the engine battery should normally be fully charged. This means that the engine can be started even if the service batteries are dead flat. The larger alternator charges the service and bow thruster battery banks.

When the shoreline is connected, the service batteries will be charged by the inverter/charger providing the domestic AC demand has been met.

circuit	battery location	isolator location	voltage	battery ratings
engine	starboard of engine	on battery locker	12	1 x 95AH
domestic	starboard of engine	on battery locker	12	4 x 110AH
inverter	service battery bank	as service bank	12	as service bank
bow thruster	under well deck	under well deck	12	1 x 95AH

The DC panel board is located  to port of aft doors

The layout of the DC panel board(s) are as shown below with overcurrent protection details:

Circuit description	Breaker rating (A)
extractor fan	6
galley/bed lights	6
downlights	6
dinette/bath lights	6
port wall lights	6
vanity lights	6
reading lights	3
saloon lights	6
starboard wall lights	6
dintette wall lights	6
tunnel light	6
hob/oven ignition	6

Circuit description	Breaker rating (A)
bilge pump	6
12V socket	6
led & nav. Lights	6
shower pump	6
central heating	25
amplifier	20
stereo	15
DVD	10
freezer	10
fridge	20
water pump	10
horn	10

The following auxiliary equipment is not protected at the panel board but is fitted with an individual fuse:


Circuit description	Fuse rating (A)	Location of fuse
inverter/charger	250	on bulkhead next to batteries
bow thruster	300	bow thruster locker
bilge pump	5	battery locker
bilge pump	5	battery locker

## ***Battery disconnection***

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### **Important:**

When the boat is left unattended, the battery banks should be isolated by turning off the isolator switches. This is especially important when leaving the boat unattended for a long period.

	<b>CAUTION</b>	<p>Do not turn off the battery isolator switches while the engine is running. This could damage the alternator and wiring.</p> <p>Before using any welding equipment on the boat, ensure that all battery terminals are disconnected. Damage to electrical components will not be covered by the warranty if they are damaged in this manner.</p>
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## ***Removal of batteries***

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To remove the battery terminals:

- 1 turn off all equipment drawing power from the battery
- 2 turn the battery isolator to the OFF position
- 3 remove the negative terminal first then the positive terminal. To replace the terminals, re-fit the positive terminal first, then the negative terminal.

## ***Battery maintenance***

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- 1 if the batteries are not of the sealed type, the fluid levels in the cells should be checked every four weeks and weekly in hot weather
- 2 the fluid should be maintained between the upper and lower levels
- 3 replenish with distilled water only. Do not use a metal funnel.
- 4 keep the batteries dry and clean. Dirt and contamination can lead to *arcing*.
- 5 Battery life will be reduced if they are consistently discharged to dead flat. It is recommended that batteries are not discharged more than 50%. Batteries should not be left fully discharged
- 6 Running the engine to charge the batteries may not be effective at idling speed.
- 7 If you need to use a separate charger, use only a charger designed to marine batteries. Use the charger only when the batteries are disconnected from the boat's electrical system. Follow the charger instructions.

	<b>CAUTION</b>	<p>Batteries give off explosive gases when they are being charged. Ensure that battery ventilation ducts are kept free of obstruction at all times</p>
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## AC systems

There are three main AC circuits, one for the plug sockets and one for the immersion heater. They can be supplied by one of the following sources:

source	quantity	voltage	location
shore line	2	230	aft bulkh'd to port, forward bulkh'd to port
inverter	1	230	in locker to starboard of aft doors
generator	none fitted	-	-
AC power source selector switch			ac panel board to port of aft doors


### Important:


To avoid a power spike, turn OFF all main breakers before plugging in the shore power cable. Securely connect the power inlet of the boat and the shore line socket. If the connection is broken, the main breaker will trip. Connections must be secure for uninterrupted shore side service.


The AC panel board is located:	to port of aft doors
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The layout of the AC panel board is shown below with overcurrent details:

AC circuit	breaker rating (A)
sockets	16
immersion heater	10
-	-

	<b>DANGER</b>	Do not allow the end of the shore power cable to hang in the water. An electrical field can be generated which can cause injury or death to nearby swimmers
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	<b>CAUTION</b>	Use double insulated appliances or connect metallic housings of installed electrical appliances to the protective conductor system in the vessel (green or green with yellow stripe)
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	<b>WARNING</b>	<p>To minimise shock and fire hazards:</p> <p>Turn off the craft's shore power connection before connecting or disconnecting the shore power cable.</p> <p>Close the shore power inlet tightly</p> <p>Do not alter shore power cable connectors and use only compatible connectors</p>
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## ***Diesel fuel system***

The diesel fired equipment is supplied from the tank(s) as described on page 8. The components of the diesel system are as follows:

appliance	location	shut-off location
engine	under aft deck	on fuel tank to starboard
diesel boiler	engine space bulkhead	on fuel tank to starboard
diesel stove	saloon area to starboard	on fuel tank to starboard

Refer to the manufacturer's instructions for details of the above equipment before using for the first time.

	<b>WARNING</b>	<p>Inspect the fuel lines at least annually. Replace them if any deterioration or damage is found.</p> <p>If a leak is detected in the fuel system, close the shut-off valve and have repairs made before further use. System repairs should be made by a competent person.</p>
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**Note:**


Do not store equipment or extra ballast in the engine space which could move about and damage the fuel lines.


**Note:**

If the engine room is kept clean and tidy, fuel leaks can be spotted immediately. This will enable repairs to be made more promptly.

The LPG system is supplied from a locker which is located in the bows. An automatic changeover regulator is fitted on the locker bulkhead and both cylinder valves should be kept open so that the regulator can provide a continuous supply when the first cylinder contains no more gas.

The cylinder valves should be used as the main gas valve for isolating the cylinders from the system. Any gas which escapes into the cylinder locker is drained overboard by low-level vents.


	<p><b>DANGER</b></p>	<p>Do not smoke or use open-flame appliances when replacing LPG cylinders</p>
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	<p><b>CAUTION</b></p>	<p>Keep valves on empty cylinders closed and disconnected Keep protective covers, caps, or plugs in place. Cylinders whether full or empty should only be stored in the LPG locker. Do not use the LPG locker for the storage of any other equipment. Ensure that the low level vents are kept free of obstruction.</p>
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## ***LPG appliances***

The appliances supplied by the LPG system are as follows:


appliance	location	shut-off location
hob	galley to starboard	in adjacent cupboard
oven/grill	galley to starboard	in adjacent cupboard
-	-	-


	<p><b>DANGER</b></p>	<p>Fuel burning open flame appliances consume cabin oxygen and release products of combustion into the cabin. Open any designated vents when the appliances are in use. Do not use the stove for space heating Never obstruct ventilation openings</p>
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	<p><b>WARNING</b></p>	<p>Read the supplied appliance manufacturers' instructions before using any part of the system Never leave craft unattended when LPG consuming appliances are in use.</p>
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**Note:**

A test point for checking the tightness of the LPG system is located in the galley locker

	<b>CAUTION</b>	Close fuel supply line valves and cylinder valves when appliance are not in use. Close valves before replacing cylinders Do not use cleaning solutions containing ammonia Do not obstruct access to LPG components in any way
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	<b>CAUTION</b>	LPG leaks are especially dangerous on boats because the gas is heavier than air and can build up under the cabin sole creating a potential for a dangerous explosion. If a gas leak is suspected, carry out the following procedure immediately: <ol style="list-style-type: none"><li>1. Extinguish any naked flames or cigarettes</li><li>2. Turn off main gas isolation valves</li><li>3. Open all doors</li><li>4. Provide a through flow of air to remove the gas</li><li>5. Do not use the gas system until it has been serviced by a competent person.</li></ol>
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**Important:**

Hoses and connectors should be inspected regularly, at least annually. Any which appear to be damaged should be replaced immediately. Connections can be checked for leaks with soapy water.

**Important:**

Inspect flue pipes at least annually. Replace them if damage or deterioration is found.

## ***Ventilation***

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The ventilators have been fitted according to a calculation which takes into account the number of people the boat is designed to carry and the fuel burning appliances which are installed on board.

**Important:**

If any of the above parameters are changed, the ventilation requirement should be recalculated and the amount of fixed ventilation adjusted accordingly.

high level ventilators	location
mushroom vent	on forward cabin roof
mushroom vent	on bathroom cabin roof
mushroom vent	on saloon cabin roof
mushroom vent	on saloon/galley cabin roof
mushroom vent	on saloon/galley cabin roof
-	-

low level ventilators	location
grille	port forward door
grille	starboard forward door
grille	starboard aft bulkhead
-	-

	<b>WARNING</b>	<p>Inadequate ventilation can cause death by asphyxiation. On no account should ventilators be blocked or covered to prevent draughts.</p> <p>The condition of the ventilators should be checked regularly to ensure that they have not suffered any damage which may reduce the airflow through them.</p>
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## ***Heating systems***

The following methods are provided for heating:

water heat source	location	description
boiler	engine space bulkhead	heats water in the calorifier
calorifier	port side of engine space	uses engine cooling system to heat water
immersion heater	in calorifier	a.c. electrical heating element
-	-	-

cabin heat source	location	description
boiler	engine space bulkhead	programmable, heats cabin via radiators
diesel stove	saloon area to starboard	can be used as alternative to boiler
solid fuel stove	forward cabin to port	can be used as alternative to boiler
-	-	-


The following bilge pumps are installed:

description	location	capacity litres per min
electric submersible	under stern gear	50
electric submersible	aft cabin bilge	35
-	-	-

**Note:**

The function of the bilge pumps should be checked on a regular basis and any debris should be cleared from the inlets.

The engine and the cabin bilge should be checked on a regular basis. Large amounts of water or any signs of fuel or oil require immediate investigation.

	<b>DANGER</b>	Do not smoke or use open-flame appliances when replacing LPG cylinders
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## ***Fresh water system***

The fresh water system is supplied from a tank, the details of which appear on page 8. A stop cock is fitted in the pipework adjacent to the tank so that the components can be removed for servicing or winterising.

The system is pressurised by an automatic demand pump which activates when a tap is opened. The pump is located under the step in the forward cabin and is fitted with a grit filter which should be removed and cleaned periodically. An accumulator tank is located next to the pump and should be checked from time to time to ensure that it is at the correct pressure.

## ***Black water systems***

The toilet is connected to a holding tank which is detailed on page 8. A tank contents indicator is located on the panel above the toilet. There is no provision for pumping waste overboard and the holding tank should be emptied at a sanitary station. Read the manufacturer's instructions before using the toilet for the first time.

**Note:**

If the boat is not used for a long period, the holding tank should be pumped out otherwise blockage or settlement may occur.

**Note:**

Foreign bodies which fall into the toilet can damage seals and block the pipework

## ***Black water systems***

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### **Important:**

The chemicals used in toilets can be harmful and should be used carefully and kept out of the reach of children.

## ***Grey water systems***

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There is no provision for storing grey water on board. Grey water from the sinks is discharged directly overboard via through-hull fittings.

Grey water from the shower collects in the small tank beneath the adjacent vanity unit. The water is then pumped overboard from the tank by an automatic pump. The tank contains a filter to protect the pump and it should be cleaned out periodically to prevent blockage.

## ***Steering system***

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the flat plate rudder is mounted on a skeg bearing at its bottom end. The rudder is connected directly to the stock which passes through the fuel tank to a bearing on the aft deck. The tiller is an integral part of the stock and is fitted with a brass extension to provide the necessary

	<b>WARNING</b>	Failure of the steering system will cause loss of control of your boat. Any change in the steering system such as looseness, tightness, binding etc. should be checked immediately by qualified personnel.
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## ***Emergency steering***

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the tiller is connected directly to the rudder stock, so no emergency steering system is required

## ***Bow thruster***

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The bow thruster is located under the well deck and is accessible via a hatch in the the well deck sole. The hatch should be kept closed at all times unless access is required to the bow thruster for maintenance or repair. The bow thruster is operated by a rocker switch at the


Read the manufacturer's instructions before using for the first time.

## *Pre-departure and underway*


### *Risk of loss of stability*

The stability of the boat has been assessed on the basis of the load data detailed in the *General Specification* section.

	<b>WARNING</b>	The boat should never carry more than the manufacturer's recommended load. The load should be suitably distributed, bearing in mind that weight high up has the most detrimental effect on stability.
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	<b>WARNING</b>	Stability can be adversely affected by even relatively small amounts of sloshing liquid. Bilge water should be kept to a minimum.
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### *Risk of flooding*


	<b>WARNING</b>	The following openings are marked WATERTIGHT OPENING - KEEP SHUT WHEN UNDERWAY and care should be taken to observe this warning:
		Bow thruster weed hatch under well deck
		Propeller weed hatch in engine space

### *Through hull fittings*

The following through-hull fittings are equipped with seacocks. The seacocks should be closed when the vessel is left unattended.

Description	Location
no fittings with seacocks	-


## Risk of fire

	<b>WARNING</b>	<p><b>NEVER</b></p> <p>obstruct safety controls (shut-off valves, isolator switches etc.)</p> <p>leave the craft unattended whilst cooking/heating appliances are in use</p> <p>stow combustible materials in the engine space</p> <p>modify the craft's systems (especially fuel and gas)</p> <p>fill any tank whilst machinery is running</p> <p>smoke while handling fuel and gas</p> <p>fit curtains above cookers or open flame heating appliances</p>
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### Important:

Always keep the bilges clean and check them for escaped gas regularly

## Fire fighting equipment

	<b>WARNING</b>	<p>It is the responsibility of the boat/owner operator to:</p> <p>ensure that the fire fighting equipment is readily accessible when the boat is occupied</p> <p>inform members of the crew about the location and operation of fire fighting equipment.</p> <p>check the fire fighting equipment at intervals as stated on the equipment.</p> <p>replace any used fire extinguisher with one of the same rating</p>
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Location of fire fighting equipment	Type	A rating	B rating
aft bulkhead	ABC rated fire extinguisher	5	34
galley	ABC rated fire extinguisher	5	34
passageway	ABC rated fire extinguisher	5	34
forward cabin	ABC rated fire extinguisher	5	34
0	fire blanket	BS EN 1869	

### Note:

Fire extinguishers are fitted with a gauge to show that they are charged. Extinguishers containing a powder medium should be turned over regularly to prevent settlement in the cylinder.



## **Fire escapes**

The following fire escape are provided on board the boat:

description	location
door	forward end of cabin
door	starboard side of cabin
door	aft end of cabin
-	-
-	-

**Note:**

Exits which are not doors are labelled.

	<b>CAUTION</b>	It is the responsibility of the boat owner/operator to inform crew members of the location of escape routes and exits
	<b>WARNING</b>	NEVER obstruct exits

## **Risk of falling overboard**

**Note:**

The working deck area of the boat is the area of the deck which is safe for use at all times. The working has safety features that others of deck do not have. Areas outside the working deck should only be used when the boat is leaving or approaching a mooring or when the boat is **NOT** underway.



On this boat, the working deck area is defined as:

the aft deck and the forward well deck. The side decks and cabin roof are not part of the working deck and should not be used when the vessel is underway.

**Note:**

In the event of a crew member falling overboard they should be recovered using the:

rope ladder stowed in the port side locker on the aft deck. To be rigged over stern dollies when required.

	<b>WARNING</b>	When recovering man overboard, ensure that the gear lever is in neutral so that the propeller is no longer turning. If it is safe to do so, switch off the engine and remove key from ignition
	<b>CAUTION</b>	Most falls occur when board or disembarking. Be aware that wet decks can be slippery. Wear slip resistant foot wear at all times.

## ***Liferaft stowage***

**Note:**

Provision has been made for stowing a liferaft:

on the aft end of the cabin roof
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## ***Use of engine***

Before starting the engine:

check the bilge water level

check that the cooling system is in order


ensure that the ventilation openings are clear to prevent overheating

ensure that there is sufficient fuel for the anticipated journey including a margin for contingencies

give the stern greaser a couple of turns

ensure that the boat is securely moored with the gear selection lever in the neutral position.


ensure that all ropes and crew members are clear of the propeller

	<b>DANGER</b>	If a fuel leak or leak of fumes is detected , do not start the engine. Ensure that all crew members leave the boat and have a qualified person repair the fault as quickly as possible.
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**Important:**

take care not to damage fuel lines and check regularly that they are in good condition.

Avoid placing flammable materials on or near hot parts

	<b>CAUTION</b>	<p>The engine compartment contains rotating machinery. Before removing the engine covers, the engine should be stopped and the keys removed from the ignition.</p> <p>If the engine overheats, do not remove the cooling water filler until the sytem has cooled down.</p> <p>Clean up any spilt oil or grease in the engine space to reduc the risk of slipping.</p>
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**Important:**

Failure to carry out appropriate maintenance at the recommended intervals can lead to premature failure of components. This could invalidate the manufacturer's warranty.

## *Use of engine*

**Note:**

Engines should not be run for long periods on light loads. If the engine has to be run for a long period to charge the batteries, the boat should be well secured and the engine run in

Do not store items in the engine compartment which could move and damage the fuel lines.



## *Clearing the propeller*

**Note:**

The propeller can sometimes be cleared of fouling by engaging reverse gear, giving a short burst of power, then engaging forward gear and giving a short burst. If the fouling is not cleared after a couple of attempts, the propeller will have to be cleared through the weedhatch, if fitted. Depending on the nature of the fouling, a knife or wire cutters may be needed to remove it.

**Note:**



It is recommended that heavy duty rubber gloves are worn while doing work which involves immersing hands in the water.

	<b>WARNING</b>	Before removing the weedhatch cover, stop the engine and remove the engine start key. Isolate the electrical system.
	<b>CAUTION</b>	To avoid flooding the engine compartment and possibly sinking the boat, ensure that the weedhatch cover is replaced before starting the engine.

## *Handling characteristics*

Maximum engine power: 31.33 kW      Maximum speed: 7 kts

Periodic inspection of the propeller for excessive wear or damage is recommended to maintain the peak performance and to maximise longevity of the engine.

	<b>CAUTION</b>	It is strongly recommended that the helmsman receive adequate training in boat handling before using the craft for the first time.
	<b>WARNING</b>	To avoid injury to limbs and fingers, do not attempt to stop the vessel by using ropes. The vessel should be stopped by putting the engine into reverse gear.  No member of the crew should attempt to fend a moving boat off bridges, wharves or other obstructions.

## ***Visibility from the helm***

---

### **Important:**

the field of vision from the helm is generally unrestricted but the line of sight to the waterline when looking forward is restricted by the front of the cabin. Extra care should be taken when manouevering in the vicinity of wharves, lock gates etc.

### **Note:**

The helmsman's vision from the helm can be obstructed one or more of the following:

Loading and load distribtion which may affect the trim of the vessel.

Darkness, fog, rain and other adverse weather.

People or gear in the helsman's field of vision.

### **Important:**


A proper lookout should be kept at all times and rights of way should be observed. Make sure no other vessels are in the path before proceeding.

## ***Anchoring, mooring and towing***

---

### **Important:**

It is the owner's responsibility to ensure that the mooring lines, towing lines, anchor chains and anchors are adequate for the vessel's intended use.

	<b>CAUTION</b>	Breaking strain of forward strong point (kN): 174 Breaking strain of the aft strong point (kN): 189 The breaking strain of lines and chains shall in general not exceed 80% of the respective strong point breaking strain. A tow line shall be always be made fast in a way that it can be released when under load.
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## ***Filling with fuel***

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### **Note:**


when filling the tank:

splash water over the deck area around the fitting before filling. This will prevent any spilled fuel from adhering to the deck surface

open the deck fitting and start filling the tank.


don't fill the tank to the brim - allow for expansion

close the deck fitting tightly, but don't damage the seal

	<b>CAUTION</b>	Fuel is considered to be chemical waste. Keep an absorbent cloth to hand when filling the tank.
---	----------------	---

Regular inspection of the vessel and its systems is essential to ensure reliability and also the safety of the crew.

The table below details typical inspection and maintenance procedures. The intervals listed should be regarded as maximums. The table should be read in conjunction with the manufacturer's service recommendations contained in the equipment manuals.


	<h2>CAUTION</h2>	<p>Modifications which may affect the safety characteristics of the craft should be assessed, executed and documented by competent people.</p> <p>Any change in the disposition of the masses on board may significantly affect the stability, trim and performance of the vessel.</p>
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MISCELLANEOUS EQUIPMENT		INTERVAL				
item	maintenance/service to be carried out	before every use	after first 20 hours	every 25 or 50 hours	every 50 or 100 hours	every 6 months/annually
bilge pumps	clean out strainer					x
water pump	clean out grit filter					x
water filter	change cartridge					x
accumulator	check pressure					x
shower drain	clean filter					x
calorifier	check for leaks					x
weedhatch	check condition of seal				x	
anodes	check depletion	<b>at each docking</b>				
hull	check for corrosion/damage					
steering	check for wear and damage					
propeller	check for damage					
ELECTRICAL EQUIPMENT		INTERVAL				
connections	check security				x	
RCD	check operation	x				x
batteries	check & clean terminals					x
ENGINE & GENERATOR (if fitted)		INTERVAL				
warning buzzer	check operation	x				
cooling system	check coolant level & for leaks with engine running	x				
crankcase vent	clean			x	x	
drive belts	check for wear	x				
exhaust	check for leaks			x	x	
flame trap	clean gauze				x	
fuel filter	change				x	x
engine mounts	check condition of mounts & security of fastenings			x		

ENGINE & GENERATOR (if fitted)		INTERVAL				
item	maintenance/service to be carried out	before every use	after first 20 hours	every 25 or 50 hours	every 50 or 100 hours	every 6 months/annually
oil & filter	change				x	x
oil level	check pressure	x				
service	change cartridge					x
fuel lines	check for wear and leaks	x				x
tanks	check for leaks & damage	x				x
water separator	replace or drain bowl				x	x
GEARBOX & STERNGEAR		INTERVAL				
oil/fluid	check level	x				
oil/fluid	change					x
greaser	two half turns	x				
stern gland	tighten or replace packing			x		
DIESEL HEATING SYSTEM (if fitted)		INTERVAL				
fuel system	check	maintain fuel system as for engine and generators				
appliance	service					x
LPG SYSTEM (if fitted)		INTERVAL				
appliance	service					x
hoses	check condition of appliance & cylinder hoses			x		
joints	check for leaks			x		
SOLID FUEL STOVE (if fitted)		INTERVAL				
firebricks	check for damage			x		
firedoor	check seals			x		
flue	check for corrosion, cracks, leaks, blockage			x		
stove casing	check for corrosion, cracks, leaks etc.			x		

### Important:

Failure to carry out appropriate maintenance at the recommended intervals can lead to premature failure of components. This could invalidate the manufacturer's warranty.

	<h2>CAUTION</h2>	<p>Always disconnect battery cables before doing any work on the electrical system.</p>
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## ***Environmental awareness***

The manual so far has covered the operation of the boat and the safety of the crew. This section describes how the crew can minimise its impact on the environment.

*Environment* should be taken to include other waterways users as well as the surrounding animal life, plant life and water.

Regulations covering the environment may vary according to where the boat is in use. It is the owner/operator's responsibility to be aware of applicable regulations and ensure compliance with them.

## ***Leakage of petrochemicals***

	<b>WARNING</b>	Any spillage of oil must be treated as chemical waste.
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**Note:**


Investigate the source of any oil leaks as soon as possible.


Dispose of any spilt oil in the correct manner.

Carry oil absorbent cloths on board.

Never dispose overboard of any oil, paint or other chemical which is potentially harmful to the environment. Action may be taken against those who disregard environmental regulations.

## ***Black and grey water***

	<b>WARNING</b>	The discharge of effluent into navigable waters is forbidden by law in many areas. If such discharge causes a film or sheen upon or discolouration of the water, the perpetrators may be subject to penalty. It is the responsibility of the boat user to ensure that they are aware of local legislation regarding discharge.
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	<b>CAUTION</b>	Keep bilges clean to avoid the discharge of illegal effluent by automatic bilge pumps
---	----------------	---

## ***Domestic waste***

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Always retain domestic waste on board for disposal at an appropriate facility.

## ***Noise***

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Most boaters take to the waterways for peace and relaxation:

Do not make excessive noise

Do not run engines or generators unnecessarily

## ***Wash/waves***

---

Adapt your speed to the waters in which you are cruising. Slow down when passing moored boats.

Consider the comfort and safety of other boats around you.

Be aware of the erosion caused to canal and river banks.



### 3.1 Structure

#### Description of structure

Primary framing arrangement:	transverse
Bottom arrangement:	single
Hull bottom plate thickness:	10mm
Topsides plate thickness:	6mm
Deck plate thickness:	6mm
Superstructure plate thickness:	5mm cabin sides and 4mm roof

#### Method of assessing structure:

Rule/standard applied:	Annex IIIa Declaration from shell builder
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RCD design category:	D
Survival waveheight:	0.5m

(Significant waveheight ( $H_{1/3m}$ ))

Paste in Declaration from shell builder

### 3.4 Openings

**EN ISO 12217 - notes regarding downflooding openings**

The table below contains text from the standard and is intended to determine which openings can be exempted from consideration as downflooding openings. The openings which can be exempted are shown on 3.4 *Openings List* which quotes the letter of the clause which has been used to show exemption.

clause	description of exemption.
a	watertight recesses with a combined volume of less than $L_H B_H F_M / 40$ , or quick draining recesses.
b	pipd drains from quick-draining recesses or from watertight recesses which, if filled, would not lead to down-flooding or capsize when the boat is upright.
c	non-opening appliances.
d1	openings located in the topsides which comply with ISO 12216 to watertightness degree 2 and which are referenced in the Owner's Manual and are clearly marked <i>WATERTIGHT CLOSURE - KEEP SHUT WHEN UNDERWAY</i> and which are emergency escape hatches or appliances fitted with screwed closures.
d2	openings located in the topsides which comply with ISO 12216 to watertightness degree 2 and which are referenced in the Owner's Manual and are clearly marked <i>WATERTIGHT CLOSURE - KEEP SHUT WHEN UNDERWAY</i> and which are in a compartment of such restricted volume that, even if flooded, the boat satisfies all the requirements.
d3	openings located in the topsides which comply with ISO 12216 to watertightness degree 2 and which are referenced in the Owner's Manual and are clearly marked <i>WATERTIGHT CLOSURE - KEEP SHUT WHEN UNDERWAY</i> and which are in a boat of design category C or D and which when at loaded displacement mass, would not sink if the affected compartment was flooded as a result of the appliance being left open.
e	openings located in the topsides which comply with ISO 12216 to watertightness degree 2 and which are referenced in the Owner's Manual and are clearly marked <i>WATERTIGHT CLOSURE - KEEP SHUT WHEN UNDERWAY</i> .
f	engine exhausts or other watertight systems which are only connected to watertight systems.
g1	openings in the sides of outboard wells which are of watertightness degree 2 and having the lowest point of downflooding more than 0.1m above the loaded waterline.
g2	openings in the sides of outboard wells which are of watertightness degree 3 and having the lowest point of downflooding more than 0.2m above the loaded waterline and also above the top of the transom in the way of the engine mounting, provided that well drain holes are fitted.
g3	openings in the sides of outboard wells which are of watertightness degree 4 and having the lowest point of downflooding more than 0.2m above the loaded waterline and also above the top of the transom in the way of the engine mounting, provided that well drain holes are fitted and that the part of the interior of non-quick draining spaces into which the water may be admitted has a length not less than $L_H / 6$ and from which water up to 0.2m above the loaded waterline cannot drain into other parts of the interior or non-quick draining parts of the boat.



### 3.4 Openings list

Area 1 is defined as the area of the topsides up to a height above the loaded waterline and is defined by  $h_s=$  1.08 m  
 Above that height, the topsides are considered to be area 2.

windows, portholes, hatches etc (appliances)												
CE marked appliance?	appliance make and model	degree of watertightness	glazing material	length of glazed panel (a) (mm)	breadth or diameter of panel (b) (mm)	curvature or camber of panel (c) (mm)	fixity SS or SF	fixing area	Aspect F/S/A	thickness of glazed pane (mm)	required thickness of glazing (mm)	verdict on thickness
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A
no	fabricated	3	8	605	570		SS	2a	A	6	3.4	Pass
no	fabricated	2	8	360	270		SS	2a	A	6	2.1	Pass
no	fabricated	3	8	1350	710		SS	2a	A	6	5.8	Pass
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A
no	fabricated	3	6	1210	570		SS	3	F	40	7.3	Pass
no	fabricated	3	3	660	180		SS	3	F	4	3.0	Pass
no	fabricated	3	8	750	730		SS	3	S	4	2.2	Pass
no	fabricated	3	3	1220	550		SS	3	S	4	4.5	Fail
no	fabricated	3	3		390		SS	3	S		3.0	Fail
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A
-----not a glazed appliance-----						-----not a glazed appliance-----						N/A

### 3.2 Stability

## EN ISO 12217 - 1:2002      Small - craft - Stability & buoyancy assessment & categorisation

### Selection of tests to be applied

For non-sailing craft if hull length greater than or equal to 6m:

Design category	A & B	C & D	B	C & D	C & D	C & D
Options applicable	1	2	3	4	5	6
<b>Requirements</b>						
deck or covering	full	full	any	any	partial	any
downflooding openings	6.1.1	6.1.1	6.1.1	6.1.	6.1.1	6.1.1
downflooding height test	6.1.2	6.1.2	6.1.2	6.1.2 <sup>a</sup>	6.1.2	6.1.2
downflooding angle	6.1.3	6.1.3	6.1.3	6.1.3 <sup>a</sup>		
offset load test	6.2	6.2	6.2	6.2	6.2	6.2
resistance to waves & wind	6.3		6.3			
heel due to wind action		6.4 <sup>b</sup>		6.4 <sup>b</sup>	6.4 <sup>b</sup>	6.4 <sup>b</sup>
flotation requirements			6.5	6.5		
flotation material			Annex F	Annex F		
<p><sup>a</sup> This test is not required for boats using option 4, if during the swamped load test in normative annex E, the boat has been shown to support an equivalent dry mass of 133% of the maximum total load.</p> <p><sup>b</sup> The application of 6.4 is only required for boats where <math>A_{LV}</math> is greater than or equal to <math>L_H B_H</math></p>						

Option applied: **6**

Ratio  $M_{LDC}/M_{MOC}$  **1.08**

### 6.1.1 & 6.1.2 assessment of downflooding openings

See assessment of downflooding openings in 3.4 *Openings list*

### 6.2 Offset load test

Using the "full" method, the results from the physical tests are shown in the table below:

Offset load test details				Required value	Verdict
mass applied during test	$M_{test}$	600	kg	510	OK
length of plumbob		1900	mm	Allowed value	
displacement of plumbob		120	mm		
heel angle during test	$\varnothing_0$	3.61	degrees	11.86	OK
lowest downflooding height when heeled	$h_D \varnothing_0$	0.32	m	0.30	OK

Does the vessel meet the requirements of the offset load test? **YES**

### 3.2 Stability

<b>EN ISO 12217 - 1:2002</b>	<b>Small - craft - Stability &amp; buoyancy assessment &amp; categorisation</b>
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#### 6.4 Heel due to wind action

Calculation of profile area	length of area (m)	height of area (m)	area (m <sup>2</sup> )
rectangular area of profile	18.29	1.77	32.37
<b>areas which can be subtracted from rectangular side profile of the boat</b>			
area above the aft deck			
area above the forward deck			
area above the fore cabin			
Windage area of vessel in profile $A_{LV}$			32.37

**N/A - the windage area is too small to require assessment**

#### SUMMARY

Vessel meets the requirements of category	<b>D</b>
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### 3.5 Cockpits

## EN ISO 11812:2002 - Watertight and quick-draining cockpits

### 5 General requirements

clause	loading and measurement conditions	details of craft
5.1	the loading conditions are "fully loaded ready for use" and the mass of water contained in specific volumes as clause 6.2.1 & 6.2.2 to be added to this loading	assessment made in fully loaded condition
clause	requirements for watertight cockpits and recesses	details of craft
5.2	watertight cockpit and recesses to have sills in accordance with clause 8 and show a degree of watertightness in accordance with clause 9.	see assessments below
clause	requirements for quick-draining cockpits and recesses	details of craft
5.3	quick draining recesses to have: a) to have its bottom height $H_B$ above the waterline in accordance with clause 6 b) have its draining devices in accordance with clause 7 c) have sills in accordance with clause 8 d) show a degree of watertightness in accordance with clause 9	see calculations below

### Calculation of cockpit or recess volume

cockpit or water retaining recess dimensions	L(m)	B(m)	D(m)	V(m <sup>3</sup> )
cockpit or recess dimensions	1.20	1.76	0.49	1.03
Total volume of cockpit:				1.03

dimensions of watertight voids within the cockpit	L(m)	B(m)	D(m)	V(m3)
well deck port locker	0.85	0.45	0.28	0.11
well deck starboard locker	0.85	0.45	0.28	0.11
Total volume of voids in cockpit:				0.21

Actual volume of cockpit $V_C$ :	0.82
----------------------------------	------

### Cockpit or recess volume is significant and requires drainage

#### Cockpit & drainage details

Minimum cockpit height bottom $H_B$ above the waterline (m):	0.2			
Are drains above or below the waterline?	above			
Cockpit retention height (m):	0.49			
Number of drains in cockpit:	circular	0	rectang'r	2
Diameter of drain if circular (mm):				
Dimensions of drain if rectangular (mm):	length:	140	height:	35

**Note: if the drains are piped, it is assumed that they contain no elbows.**

### 3.5 Cockpits

## EN ISO 11812:2002 - Watertight and quick-draining cockpits

### 6 Requirements for quick-draining cockpit or recess bottom

clause	requirements	details of craft		
6.1	minimum cockpit height bottom $H_{B,min}$ above the waterline	$H_{B,min}$	$H_B$ actual (m)	verdict
		0.05	0.2	Pass
6.2	surfaces up to 10% of the horizontal projection of the cockpit bottom are not required to comply with clause 6.1	the whole area of the cockpit bottom is considered		
	lockers in the cockpit bottom used for storing items such as liferafts, fish etc and which are watertight to the craft interior, but which the closing appliances do not meet all the requirements of 5.3 are not regarded as part of the cockpit and do not have to comply with clause 9	N/A - there are no lockers in the cockpit bottom		

### 7 Requirements for drainage of quick-draining cockpit or recesses

clause	requirements	details of craft		
7.1.1	drainage to be by gravity only	drainage by gravity only		
7.1.2	when the boat is upright at least 98% of the cockpit volume is to drain excluding any recesses as allowed by clause 6.2	the drains are fitted on either side at the lowest point of the cockpit to ensure the required drainage		
7.1.3.2	on non-sailing boats drainage to be provided for min. 90% of $V_C$ at $10^\circ$ of heel	the drains are fitted on either side at the lowest point of the cockpit to ensure the required drainage		

clause	draining time	details of craft		
7.2	if the draining section expressed in $m^2$ is $\geq 0.05V_C$ , it is considered adequate and no draining time assessment is required	is draining section greater than or equal to $0.05V_C$ ?		
	the maximum draining time is to be as shown in the table, but in any case should not be more than 5 minutes	max. drain time $t_{max}$ (min)	calculated drain time (min)	verdict
	the draining time is calculated with all appliances closed	27.12	0.45	Pass
		appliances are considered to be closed		

clause	number of drains	details of craft		
7.3	a quick draining cockpit to have at least two drains, one to port and one to starboard, unless one opening allows drainage as required by clause 7.1	number of drains in cockpit:	2	
		the drains are located to port and starboard in the cockpit		

clause	minimum drain dimensions	details of craft		
7.4.1	drains with a circular cross section to have a diameter of at least 25mm. Drains with other cross-section to have a cross-section area of at least 500mm <sup>2</sup> and a minimum dimension of 20mm	circular drains:	drains meet the minimum size requirement	
		rectangular drains		
7.4.2	where grids are fitted to the drains, the minimum passage dimension inside any part of these devices is to have a cross-section area of at least 125mm <sup>2</sup> and a total entry cross-section area of at least 1.5 times the cross-section area of the drain.	entry c.s.a. (mm <sup>2</sup> ) rectangle	drain c.s.a. (mm <sup>2</sup> ) rectangle	verdict
				N/A
		entry c.s.a. (mm <sup>2</sup> ) circular	drain c.s.a. (mm <sup>2</sup> ) circular	verdict
				N/A

### 3.5 Cockpits

EN ISO 11812:2002 - Watertight and quick-draining cockpits				
clause	drain fitting	details of craft		
7.6	the drain outlet is to be located above the waterline or, if below waterline, to be fitted with seacocks unless the drain outlet is an integral part of the hull extending from the outlet to at least $0.75H_{B,min}$ above the waterline	drains above or below waterline:		above
		$0.75H_{B,min}$	top of drain outlet height (m)	verdict
		N/A - drains above waterline		N/A
clause	drain pipe design & construction	details of craft		
7.7	a) scantlings & design of drains to bear all loads to which they may be subjected	N/A - the drains are apertures cut in the hull side		
	b) drain piping to be protected against physical damage from crew and gear	N/A - the drains are apertures cut in the hull side		
	c) drain pipes not to trap water and to be used only for cockpit drainage only	N/A - the drains are apertures cut in the hull side		
	d) seacocks and through-hull fittings to comply with ISO 9093 - 1/2	N/A - the drains are apertures cut in the hull side		
clause	requirements for sills	details of craft		
8.1	watertight cockpits are to have no opening below $h_C$	N/A - not a watertight cockpit		
clause	sill heights and requirements for quick-draining cockpits	details of craft		
8.2.1	when measuring the sill height, all closing appliances are considered to be closed with the exception of the companionway doors. The sill is the height of the lowest of the openings considered to be sills.	the only sill in the cockpit is that beneath the door into the cabin		
	any vertical bulkhead or partial bulkhead cut by a companionway or door leading to the interior and located to a cockpit to meet all the requirements for sill height and watertightness.	see assessment above and in section 3.4 <i>Openings list</i>		
	if the bottom of the cockpit is not level, the sill height to be measured from the closest point of the cockpit bottom	the sill is adjacent to the lowest point of the cockpit bottom		
clause	minimum values for fixed sills and semi-fixed sills	requirement (mm)	actual height (mm)	verdict
8.2.2	fixed sill, top of $h_{s,min}$	50	80	Pass
	semi-fixed sill, top of fixed part $h_{s,min}/2$	25	1210	Pass
	semi-fixed sill, top of mobile part $h_{s,min}/2$	50	N/A	N/A
8.2.3	above sill level, whether fixed or semi-fixed, appliances (doors etc.) complying with ISO 12216 to be used to close openings to at least $h_C$	see assessments in section 3.4 <i>Openings list</i>		
8.2.4	semi-fixed sills to have a device maintaining them in place which when in use is at least operable from inside	doors are secured by barrel bolts		
	semi-fixed sills to meet the requirements of ISO 12216 and to be detachable only with the use of tools	see assessments in section 3.4 <i>Openings list</i> . The doors are attached by hinges which require tools to remove		

### 3.5 Cockpits

#### EN ISO 11812:2002 - Watertight and quick-draining cockpits

clause	watertight cockpits	details of craft
9.1	all surfaces of watertight cockpits up to $h_c$ to have a watertightness of degree 1	N/A - not a watertight cockpit

clause	quick draining cockpit	details of craft
9.2.1	all surfaces of quick-draining cockpits up to $h_c$ to have a watertightness of degree 1	the surfaces are made of welded steel
	closing appliances on cockpit bottom and horizontal surfaces to have watertightness to degree 2.	see assessment in table below
	the above requirements only apply to appliances covering openings which give way to the interior part of the boat	only the cabin doors are assessed
	hatches & appliances located in the bottom or sides of the cockpit up to $h_{s,min}$ to be fitted with seals & sills to at least 12mm high or to be tested as installed to watertightness degree 2	N/A - there are no hatches or appliances in the cockpit bottom or sides
9.2.2	the lowest point of non-closeable ventilation openings leading to the interior to be at least $2h_{s,min}$ or 0.3m above the cockpit floor whichever is greatest	the vents in the forward doors are 240mm above the well deck sole

openings in the cockpit below $h_c$	height above sole (mm)	degree of watertightness	req'd degree of watertightness	verdict
forward access	80	3	3	Pass
low level vents	240	4	4	Pass

### 3.5 Bilge pumping

## EN ISO 15083 - Bilge pumping systems

### 5 General requirements

clause	requirements	details of craft
5.1	bilge pumps to be capable of removing water from all major compartments where water can accumulate.	pump fitted in engine space and in cabin bilge
	fore and aft peaks with a combined volume of less than 10% of the displacement of the craft in the fully loaded condition, need not be linked to the bilge pumping system if trapped water in these compartments can be emptied into the main bilge by a valve or other means.	N/A - no aft or fore peak

head from bilge to helm	head $\geq$ 1.5m
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bilge pump requirements	primary pump	secondary pump
type of pump	1 manual, mechanical or electric pump	secondary pump not required, but see clause 5.1
capacity of pump	30 litres per minute	if fitted, as primary pump

these volumes per minute to be achieved when the pump is subject to a back pressure of 10kPa. For manual pumps, the capacity is to be achieved at 45 strokes per minute

details of pumps fitted	
type of pump	capacity l/min
electric submersible	50
electric submersible	35

### 6 Design and construction

clause	general requirements	details of craft
6.1.1	the pumping system to be able to withstand the pressures, temperatures and stresses likely to be encountered in normal conditions. It should be able to withstand operating conditions of -40°C to +60°C.	all the bilge pump equipment is industry standard type and is designed to withstand these conditions.
6.1.2	spigots of pumps to be long enough to provide support for the hose and permit the use of clamps	the pumps are CE marked and have appropriate spigots
6.1.3	unless permanently mounted, pump handles to be permanently mounted to prevent loss	N/A - the pumps are all electric
6.1.4	no bilge pump to discharge into the cockpit unless cockpit opens aft to the sea. Pumps not to be connected to cockpit drains.	pumps have dedicated through-hull fittings

clause	electric pump requirements	details of craft
6.2.1	electric bilge pumps to comply with ISO 8849	all pumps are compliant
6.2.2	electrical connections to be water resistant to IP67 and to be above the maximum acceptable water level unless submersible	all pumps are submersible
6.2.3	where switch is subject to spray, it is to be water resistant to IP56	the switch is in the cabin so is protected from spray

### 3.5 Bilge pumping

#### EN ISO 15083 - Bilge pumping systems

##### 7 Installation

clause	electric pump requirements	details of craft
7.1	bilge to be sited in accessible location for servicing and clearing intake	pump is readily accessible by lifting the engine boards
7.2	bilge pump water inlets to be designed and installed to minimise the ingestion of debris and to be accessible for cleaning	submersible pump is fitted with integral strainer
7.3	intake hoses not to collapse under maximum pump suction	N/A - submersible pump with no intake hose
7.4	outlets to be installed to minimise restriction to flow	the pipe goes straight from the pump to the skin fitting with no tight bends
7.5	outlets to be installed above the 7 degree heeled water line unless an ISO 9093 compliant seacock is fitted with means to prevent backflow	as shown in 3.4 <i>Openings List</i> the fitting is well above the 7 degree heeled waterline
7.6	where several pumps discharge through one fitting, it is to be designed so that when one pump is operated there is no feedback through another pump and simultaneous operation of the pumps will not reduce the pumping capacity of the system.	N/A - one pump only
7.7	Hose connections to be secured with non-corrosive clamps or permanently attached end fittings	stainless steel hose clips used throughout
7.8	non-submersible pump motors to be located above critical bilge water level	N/A - submersible pump fitted
7.9	bilge pumps with automatic controls to be provided with readily accessible power supply switch to activate the pump	N/A - pump is manually switched
7.10	automatic controls to be provided with visual indication to show that power is supplied to the pump and that the pump is set and ready to operate in the automatic mode	N/A - pump is manually switched
7.11	Hand pumps to be installed so that they can operate at their rated capacity	N/A - pump is manually switched

### 3.6 Load

#### Breakdown of masses

Description of mass	mass (kg)	volume litres	density kg/m <sup>3</sup>
lightship including ballast	15000		
diesel	206	245	0.84
freshwater	450	450	1.00
holding tank contents	160	160	1.00
permanent stores & equipment	175		
essential safety kit	249		
liferaft	81		
carry-on load	250		
crew	450		

Permanent stores and equipment	mass (kg)
ropes, fenders, poles etc	50
LPG cylinders	50
toolkits	20
machinery spares	15
galley equipment	25
books, charts etc	15

Minimum Operating Condition mass ( $M_{MOC}$ )	mass (kg)
lightship including ballast	15000
permanent stores & equipment	175
essential safety kit	249
liferaft	81
minimum crew	225
<b><math>M_{MOC}(kg) =</math></b>	<b>15730</b>

Maximum Displacement Condition mass ( $M_{LDC}$ )	mass (kg)
lightship including ballast	15000
permanent stores & equipment	175
diesel	205.8
freshwater	450
holding tank	160
essential safety kit	249
liferaft	81
carry-on load	250
crew	450
<b><math>M_{LDC}(kg) =</math></b>	<b>17021</b>

<b>Maximum Recommended Load (<math>M_{MTL}</math>) (kg):</b>	<b>2021</b>
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<b>Maximum Load (as on builder's plate) (kg):</b>	<b>700</b>
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<b>Ratio <math>M_{LDC} / M_{MOC} =</math></b>	<b>1.08</b>
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### 3.7 Liferaft stowage

#### Liferaft stowage

Locations for stowage of the liferaft(s) should be nominated for the craft as shown below:

Design category	Length of vessel
A	all
B	all
C	$L_H > 6\text{m}$
D	$L_H > 6\text{m}$
inflatable	type VIII

The liferaft(s) should be big enough to accommodate all the crew.

The liferaft may be stowed: on the aft end of the cabin roof

### 3.8 Escape

<b>EN ISO 9094 - 2</b>	<b>Section 4.2 - escape routes for craft more than 15m in length</b>
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Clause	General requirements	Details of craft
4.2.1	where there are two escape routes, only one may pass through, over and beside an engine space	there are three escape routes, only one of which passes over the engine
	where the distance between a cooking or open flame appliance burner and the nearest side of an escape route < 750mm, a second escape route is to be provided. In an enclosed galley, this does not apply where the dead end beyond the cooker is <2m	two alternative escape routes are provided to the route via the aft doors which passes within 750mm of the cooker

Clause	Open accommodation arrangements	Details of craft
4.2.2	where living or sleeping accommodation is not separated from the nearest exit i.e. people can move around without passing through any door, the distance to the nearest exit not to exceed $L_H/3$ m.	both the living cabin and the forward sleeping cabin have direct access to the outside. There is a door at each end of the saloon/galley and a door at the forward end of the sleeping cabin so all the requirements can be met.
	<p>the distance to be measured in the horizontal plane as the shortest distance between the nearest part of the exit and:</p> <p>a) the farthest point between where a person can stand (min. height 1.60m)</p> <p>b) the midpoint of a berth</p> <p>whichever is the greater distance. (Doors of toilets or shower compartments can be disregarded).</p>	

Clause	Enclosed accommodation arrangements	Details of craft
4.2.3	where living accommodation is separated from the nearest exit by bulkheads and doors, escape routes are to be arranged to reduce the risk of people being trapped.	N/A - open accommodation
	a) each accommodation section to have more than one escape route leading to the open air, unless it is a single cabin or compartment and the exit leads directly to the open air without passing over cooking spaces or open flame heating appliances.	
	b) for individual cabins as described in a), escape routes may form shared escape ways for up to 2m from the door or entrance.	
	c) shower/toilet compartments are regarded as part of the compartment or passageway that gives access to their doors and do not require separate escape arrangements.	
	d) with multi-level arrangements, the exits to lead to a different accommodation or section as far as practicable.	

### 3.8 Escape

**EN ISO 9094 - 2                      Section 4.2 - escape routes for craft more than 15m in length**

Clause	Requirements for exits	Details of craft
9	exits to have a minimum clear opening of 380mm and min. area of 0.18m <sup>2</sup> . Exits to be large enough to have a 380mm diameter inscribed	see the table below showing an assessment of the exit dimensions
	circular exits to have a minimum clear diameter of 450mm	see the table below showing an assessment of the exit dimensions
	where deck hatches are designated as exits, footholds, ladders or steps to be provided. The maximum vertical distance from one of these aids to a hatch is not to exceed 1.2m. These aids are to be permanently located in the accommodation unless their use is self-evident	N/A - no deck hatches are used as escape routes
	escape facilities unless self-evident to be marked by ISO or national symbol.	all exits are doors

**Assessment of exits**

exit type	location	length (mm)	width (mm)	dia (mm)	area (m <sup>2</sup> )	verdict
door	forward end of cabin	1210	570		0.69	<b>PASS</b>
door	starboard side of cabin	750	750		0.56	<b>PASS</b>
door	aft end of cabin	960	640		0.61	<b>PASS</b>

### 3.9 Strong points

<b>EN ISO 15084:2003</b>	<b>Small Craft - Anchoring, mooring and towing - strong points</b>
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**Description of strong points**

**Forward strong point(s)**



<b>description:</b>	T cleat	
<b>material:</b>	mild steel MS42A	
<b>purpose:</b>	mooring, towing	
<b>location:</b>	foredeck	
<b>mounting:</b>	on steel deck	
<b>quantity:</b>	1	
<b>base diameter</b>	60	mm
<b>length of base:</b>		mm
<b>width of base:</b>		mm
<b>weld leg:</b>	4	mm

**Second forward strong point**



<b>description:</b>	eye	
<b>material:</b>	mild steel MS42A	
<b>purpose:</b>	anchor strong point	
<b>location:</b>	starboard well deck locker	
<b>mounting:</b>	welded to steel bulkhead	
<b>quantity:</b>	1	
<b>base diameter</b>	40	mm
<b>length of base:</b>		mm
<b>width of base:</b>		mm
<b>weld leg:</b>	4	mm

**Side strong points (if vessel longer than 18m)**



<b>description:</b>	mooring eye	
<b>material:</b>	mild steel MS42A	
<b>purpose:</b>	mooring in locks	
<b>location:</b>	cabin roof	
<b>mounting:</b>	on steel roof	
<b>quantity:</b>	1	
<b>base diameter</b>	15	mm
<b>length of base:</b>		mm
<b>width of base:</b>		mm

**Aft strong point**



<b>description:</b>	bollard	
<b>material:</b>	mild steel MS42A	
<b>purpose:</b>	mooring	
<b>location:</b>	aft deck	
<b>mounting:</b>	steel deck	
<b>quantity:</b>	2	
<b>base diameter</b>	65	mm
<b>length of base:</b>		mm
<b>width of base:</b>		mm
<b>weld leg:</b>	4	mm

### 3.9 Strong points

<b>EN ISO 15084:2003</b>	<b>Small Craft - Anchoring, mooring and towing - strong points</b>
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<b>Requirements for strong points</b>
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clause	type of strong point	number req'd	number fitted	verdict
5.2	forward towing/mooring/anchoring point	1	1	Pass
	forward mooring point	1	1	Pass
	side mooring points	1	1	Pass
	aft mooring point	2	2	Pass

The bollards and cleats are very strongly constructed and will bear very high loads before failing. The welded joints between the strong points and the decks can be assumed to be the point of failure. When calculating the maximum load which can be borne by the welded joints, the shear load is assessed as this allows the lowest stress. It can be assumed that if the joint meets the requirements in shear, it will also meet them when the stresses in tension and bearing are considered. The maximum allowable stress in shear is taken to be  $UTS/\sqrt{3}$  as used by Lloyds Register SSC Dept. The UTS of mild steel is taken to be 400N/mm<sup>2</sup> and aluminium alloy 275N/mm<sup>2</sup>.

The calculation determines the force required to induce the maximum allowable shear stress in the weld by multiplying the stress by the area of the weld. The maximum load is then compared with the minimum load as shown in the table below:

clause	loads on strong points	min. breaking load (kN)	maximum load (kN)	verdict
5.2	forward towing/mooring/anchoring point (P1)	54.45	174.12	Pass
	forward mooring point (P2)	44.39	116.08	Pass
	aft mooring point (P3)	37.97	188.64	Pass

## 4.0 Handling characteristics

The standard covering handling characteristics, EN ISO 11592, is only valid for craft with a hull length of less than 8m. As this vessel is longer than 8m, it does not apply in this case

As there is no other applicable standard, EN ISO 11592 has been used as the basis on which to assess the handling of this vessel. The parameters to be considered are:

Maximum speed	7	kts
$7\sqrt{L_H}$	29.94	
Max. speed / $7\sqrt{L_H}$	1.64	(the standard does not require the vessel to be tested if <7)
Engine type	inboard conventional shaft	

The craft is low speed so it does not require testing. Similar craft built to this design have been driven in a variety of conditions and throughout the speed range. The vessel has proved safe and manageable even when driven by a relatively inexperienced helmsman.

The handling characteristics and maximum rated power are considered to be appropriate for this vessel.

Observations and instructions regarding the safe handling of the vessel are included in the Owner's Manual.

## 5.1 Engine installation

### 5.1.1 Engine installation

<b>Propulsion engine:</b>	Isuzu 42
<b>Gearbox:</b>	PRM 150D2
<b>Engine space arrangement:</b>	enclosure
<b>Exhaust temperature sensor fitted:</b>	N/A
<b>Propeller:</b>	19" x 13" 3 blade RH

#### Details of installation:

Parts that require frequent inspection are easily accessible  
No sound insulation has been fitted in the engine space  
The noise within the living accommodation is not unreasonable  
See the photograph of the engine installation below:



### 5.1.2 Engine room ventilation

There is no standard covering the ventilation of diesel engine spaces, but adequate ventilation for the engine space is provided by:

vents let into the side of the hull in the engine space

### 5.1.3 Exposed parts

All machinery is contained in the engine space and is only accessible by lifting the steel deck board which is hinged over the engine. So, there is no chance of any crew member coming into contact with the machinery while in normal operation.

### 5.1.4 Outboard engine starting

N/A - no outboard engine

## 5.2 Fuel system

<b>EN ISO 10088:2001</b>	<b>Small craft - Permanently installed fuel systems and fixed tanks</b>
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clause	Design requirements	Details of craft
4.1.1 & 4.1.2	components of the fuel system to be designed to withstand the operating environment, to operated in temp. range from -10°C to 80°C & to be capable of being stored in temp. range -30°C to 80°C.	all components designed to operate in marine environment within the required temperature range.
4.1.3	all materials to be used in the system to resistant to deterioration by fuel and other compounds with which they may come into contact.	steel and copper are resistant to diesel, grease, oil, bilge solvents etc.
4.1.4	metal pipes welded to the tank should be fitted to minimise the bending moments at tank connection	all pipe connections to the tanks are short and the attached pipes are well supported
4.1.6	the only outlets for drawing fuel from the system to be plugs in filters, drain valves and other fittings in the tank	the only outlets are plugs in the fuel filters
4.1.7	each tank should be provided with a means of determining its contents	dipstick provided

clause	Installation requirements	Details of craft
4.3.1	fuel systems to be permanently installed apart from small components and short lengths of flexible hose	fuel system is permanently installed apart from flexible hoses on to the engine
4.3.2	all valves and other components which need to be seen or used during normal operation of the craft to be readily accessible. All other components to be accessible	all components of the fuel system are readily accessible by lifting the engine deck boards
4.3.7	fuel system electrical components to be installed to meet the requirements of ISOs 10133 & 13297	see section 5.3

### 5 Fuel tanks

clause	Tank materials	Details of craft
annex C.1	Minimum nominal thickness of sheet required: aluminium 2mm stainless steel 1mm mild steel 2mm mild steel externally galvanised 1.5mm mild steel externally and internally galvanised 1.5mm	6mm mild steel

clause	Testing requirements	Evidence
annex A	fuel system to be pressure tested to 20kPa (3 psi)	
annex B	non-metallic components and engine to be fire tested to annex B	the only non-metallic components are the fuel hoses which are made to ISO7840

clause	Testing requirements	Evidence
C.3	tank data plate to show: manufacturer's name and address year of manufacture design capacity in litres the word "diesel" max. allowable test presssure in kPa	

## 5.2 Fuel system

<b>EN ISO 10088:2001</b>	<b>Small craft - Permanently installed fuel systems and fixed tanks</b>
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clause	Tank design	Details of craft
C.2.2	all fittings and openings on diesel tanks to be on top of tank or at highest point of sides or to be fitted with shut-off valves	all tank connections are fitted with shut-off valves
C.2.3	valves shall be located to prevent physical damage to them or be at least 25mm nominal diameter	the valves are in a protected location under the aft deck
C.2.4	the tank drain, if fitted to have a metal plug on the outlet which can only be removed by using tools	the tank drain is fitted with a shut-off valve
C.2.5	rigid fuel pick-up pipes to have adequate clearance from the bottom of the tank	adequate clearance provided

clause	Tank installation	Details of craft
5.3.1	the tank is to be permanently installed and not to support any structure unless it is designed to	the tank is part of the steel hull structure and is designed to support the aft deck
5.3.3	Metallic tanks must not collect water on any surface and if installed above a horizontal surface must be at least 5mm above it when full	any water on the top of the tank would shed over the side
5.3.4	the tank is not to be mounted on an inboard engine	the tank is remote from the engine
5.3.5	tank fittings/connections/hoses to be accessible for inspection and maintenance	all readily accessible by lifting the engine deck boards
5.3.6	supports for metallic tanks to be separated from tank by non-metallic material unless welded	the tank is welded into the hull structure
5.3.7	metallic tanks other than diesel tanks integral with the hull to be no less than 25mm above the top of the bilge pump inlet or float switch	the tank is for diesel and is integral with the hull
5.3.8	foam not to be sole means of securing tank	tank is welded to the hull

### 6 Fuel pipes, hoses, connections and accessories

clause	Fuel filling lines	Details of craft
6.1.1	the minimum diameter of the fuel fill pipe to be 31.5mm and min. dia. of fuel hose to be 38mm	N/A - the filler is mounted on the top of the tank
6.1.2	fuel filling hoses in the engine compartment to be ISO7840A1/A2. Outside the engine space it can be ISO 7840 A1/A2 or ISO 8469 B1/B2	N/A - the filler is mounted on the top of the tank
6.1.4	fuel filling lines are to self-drain to the tank in the static position.	N/A - the filler is mounted on the top of the tank
6.1.5	fuel filling lines are to run as directly as possible from the the deck filler to the tank	N/A - the filler is mounted on the top of the tank
6.1.6	the fuel filling point to be arranged so that no overflowing fuel can enter craft in static position	the tank filler is set into a recess below the level of the top of the tank to shed spilt fuel
	the fuel filler can be inside the craft if they are in a sealed, self-draining area. See standard	N/A - the filler is mounted externally
6.1.7	the fuel system is to be installed so as to avoid blow-back when filling at 30litres/min with tank ½ to ¾ full	the filler is mounted on the tank, so there is no back pressure to cause blowback
6.1.8	the fuel filling point to be located to be not directly above or within 400mm radius of any vent or opening unless a coaming or structure creates a barrier to vapour entering craft	the filler is 640mm from the tank vent
6.1.9	the filling point to be marked with fuel type	filler is marked DIESEL

## 5.2 Fuel system

<b>EN ISO 10088:2001</b>	<b>Small craft - Permanently installed fuel systems and fixed tanks</b>
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clause	Vent lines	Details of craft
6.2.1	each tank is to have a separate vent line	one tank - one vent
6.2.2	vent hoses in/out of the engine space to have same fire resistance as the filling lines	N/A - the tank vent is mounted on one of the stern dollies so there is no vent hose
6.2.3	the cross-sectional area of any component of the vent system is not to be less than 95sq mm	the csa of the vent is 121mm <sup>2</sup>
6.2.4	no valves to be fitted in the vent lines which restrict the free flow of air/liquid in and out of tank	there are no valves in the vent
6.2.5	vent lines to self-drain to tank in static position	the vent is mounted directly above the tank
6.2.6	the vent terminal is not to be located within 400mm of any vent or opening allowing vapour into the craft	the aft doors are approximately 900 from the tank vent
6.2.7	the vent line is to minimise intake of water without restricting release of vapour and is not to allow fuel vapour to enter the craft	the vent is mounted at the aft end of the boat so minimising vapour ingress to the boat and water ingress to the tank
6.2.8	the vent terminal is to be at sufficient height to avoid spillage of fuel from the vent during normal operation.	the vent is approximately 150mm above the level of the top of the tank
6.2.9	vent lines are to include a flame arrester	vent terminal is fitted with a gauze

clause	Fuel distribution and return lines	Details of craft
6.3.1	metallic fuel lines to be made of copper, copper nickel or equivalent material	the fuel lines are made of copper
6.3.2	rigid fuel lines to connect to engine with flexible hoses supported within 100mm of the connection on the rigid side of the connection	the rigid fuel lines meet the flexible hoses at the sedimenter which is secured to the swim.
6.3.3	connections between rigid fuel lines to be compression, screwed, cone or flanged joints	compression fittings used
6.3.4	flexible fuel lines to be used where relative movement of the structure is anticipated	N/A - no relative movement of the structure is anticipated
6.3.5	flexible fuel lines to be accessible for inspection and maintenance	flexible fuel lines are readily accessible by lifting the engine boards
6.3.7	diesel flexible hose to be to ISO 7840 A1/A2	flexible fuel lines are to ISO7840 A1
6.3.8	fuel distribution and return lines to be secured to structure above bilge water level unless protected against immersion	fuel lines are secured to the counter well above the bilge water level
6.3.9	there are to be no surplus joints in the system	no surplus joints
6.3.8	the fuel distribution system is to prevent fuel syphoning out of the tank by any one of: a) engine and fuel system is above the tank b) fitting anti-syphon valve at tank connections c) fitting a manual shut-off valve which can be closed from outside the engine space d) fitting an electrical valve which is only activated when the engine is running. To be fitted with a manual by-pass.	the shut-off valves are accessible from outside the engine space
6.3.12	any divert valves fitted in return lines must not restrict the return line flow	N/A - no divert valves are fitted in the fuel lines

## 5.2 Fuel system

<b>EN ISO 10088:2001</b>	<b>Small craft - Permanently installed fuel systems and fixed tanks</b>
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clause	Hose fittings and clamps	Details of craft
6.4.1	fuel hoses to be attached to spuds by swaging or hose clamps	fuel hoses have swaged connections
<b>for hose clamp connections:</b>		
6.4.2	spuds to have bead/flare/annular grooves	N/A - fuel lines have swaged connections
6.4.3	spuds to have the same i.d. and o.d.	N/A - fuel lines have swaged connections
6.4.4	spuds to be at least 25mm long	N/A - fuel lines have swaged connections
6.4.5	hose connections with a diameter more than 25mm to have two hose clips	N/A - fuel lines have swaged connections
6.4.7	hose clamps to be made of stainless steel or equivalent and to be re-useable. Spring tension clamps are not to be used.	N/A - fuel lines have swaged connections
6.4.8	hose clamps to be fitted directly on to the hose and not to overlap each other	N/A - fuel lines have swaged connections

clause	Valves	Details of craft
6.5.1	manually operated valves to have positive stops in open/closed positions or indicate the positions	ball valves have stops at the open and closed positions which are obvious from valve design
6.5.2	the integrity of the valves is not to depend entirely on spring tension	there are no springs in the valves
6.5.3	any threaded valve housing covering liable to an opening torque when the valve is operated are to be fitted with re-useable protection devices	there are no threaded valve housing coverings

clause	Fuel filters	Details of craft
6.6.2	diesel systems to be fitted with at least one filter and one water separator (they may be combined in to one unit)	a sedimenter and a filter are fitted
6.6.3	each unit to be supported independently on the engine or the craft structure	the sedimenter is mounted on the engine and the filter on the engine
6.6.4	all components to be marked with ref to ISO10088, manufacturer's name or mark and the fuel for which it is suitable	components are marked as required

## 5.3 DC electrical system

### EN ISO 10133:2001 Small Craft - Electrical systems - extra low voltage d.c. systems

#### 4 General requirements

clause	General requirements	Details of craft
4.1	system to be fully insulated two wire dc system or two wire dc system with -ve ground	
4.2	an equipotential bonding conductor if fitted, to be connected to the craft's earth to minimise stray current corrosion	
4.3	switches and controls to be marked unless use is obvious and non-hazardous	
4.4	fuses or circuit breakers to be provided at the source of power	
4.5	All DC equipment to function over the following voltage ranges: 10.5V to 15.5V (12V), 21V to 31V (24V)	
4.6	the voltage drop for any appliance is not to exceed 10% at full load	

#### 5 Batteries

clause	Installation requirements	Details of craft
5.1	batteries to be installed in a dry, vented location above the bilge water level	
5.2	batteries to have no more than 10mm freedom of movement when twice the battery weight is applied to them	
5.3	batteries to be able to sustain an angle of heel up to 30° without the leakage of electrolyte and for mono hull sailing craft up to 45° with means of electrolyte containment	
5.4	batteries to be installed to avoid accidental contact of metallic objects with the terminals	
5.5	batteries to be protected against damage	
5.6	batteries not to be installed directly above or below the fuel tank or filter	
5.7	any metallic component within 300mm above the battery top to be electrically insulated	
5.8	battery terminal cables not to rely on spring tension for mechanical connection to them	

#### 6 Battery dis-connect switch

clause	Requirements	Details of craft
6.1	a battery dis-connect switch to be installed in the positive conductor from the battery in a readily accessible location as close to the batteries as possible. The following are exceptions:	
	<ul style="list-style-type: none"> <li>a) outboard powered craft with circuits for engine starting and navigation lights only</li> <li>b) electronic devices with protected memory, such as radio, bilge pump etc if protected by a fuse as close to the battery as possible.</li> </ul>	

## 5.3 DC electrical system

### EN ISO 10133:2001 Small Craft - Electrical systems - extra low voltage d.c. systems

clause	Requirements	Details of craft
6.1 (cont)	c) ventilation of exhaust or engine room if protected by a fuse or breaker as above d) charging devices which are used when the craft is unattended (solar panels etc) if protected by a fuse or breaker as above	
6.2	the minimum continuous rating of battery isolators to be at least equal to the rating of the main circuit breaker	
6.3	remote control battery switches, if used, must also permit safe manual operation	

#### 7 Conductors

clause	Requirements	Details of craft
7.1	electrical distribution to use insulated stranded copper conductors with flame retardant insulation	
7.2	unsheathed conductors to be supported throughout their length in conduits/trunking/trays or individual supports at max intervals of 450mm.	
7.3	sheathed conductors and battery conductors to disconnect switches to be supported at max. intervals of 300mm. Other sheathed conductors to be supported at max. intervals of 450mm.	
7.4	conductors exposed to damage to be protected by sheaths, conduits etc. Insulation on conductors passing through bulkheads etc. to be protected against damage from chafing	
7.5	conductors to have minimum dimensions based on the circuit load, voltage drop and manufacturer's requirements	see conductor table
7.6	each conductor > 200mm long to have a minimum conductor area of 1mm <sup>2</sup> . Conductors in a multi-conductor sheath to have min area of 0.75mm <sup>2</sup>	
7.7	DC circuits not to be used in the same wiring as AC circuits unless one of the following methods of separation is used: a) for multi-core cable, dc circuits are separated from ac circuits by an earthed metal screen b) cables are insulated from system voltage & are installed in separate compartment or duct c) cables are installed on tray or ladder where physical separation is provided by a partition d) a separate conduit/sheathing system is used e) dc & ac conductors are fixed directly to a surface & are separated by at least 100mm.	
7.8	each conductor which is part of an electrical system (except for engine wiring looms) to have a means to identify its function in the system	
7.8.1	equipotential bonding conductors to have green or green with yellow stripe insulation, or uninsulated. These colours not to be used for current carrying conductors	

## 5.3 DC electrical system

### EN ISO 10133:2001 Small Craft - Electrical systems - extra low voltage d.c. systems

clause	Requirements	Details of craft
7.8.2	means of identification other than colour for positive conductors permitted if they are properly identified on the wiring diagram	
7.8.3	DC negative conductors to be identified by black or yellow insulation. If AC system uses black insulation for live conductors, yellow insulation must be used for DC negative conductors. If brown or light blue is used in the DC system, they must be separated from the AC system & be clearly identified	
7.8.4	insulation of conductors in the engine space to be at least 70°C rating and the insulation is to be oil-resistant unless protected by a sleeve or conduit and it is de-rated	
7.8.6	current carrying conductors to be routed above the anticipated bilge water level in areas where water may accumulate or 25mm above actuation height of bilge switch.	
7.8.7	conductors to be routed away from exhausts & other heat sources. Minimum distance of 50mm from wet exhausts & 250mm from dry exhausts unless thermal barrier is provided.	

### 8 Overcurrent protection

clause	Requirements	Details of craft
8.1	a manually reset trip-free circuit breaker or fuse to be installed within 200mm of each power source, or conductor to be run in sheathing/conduit from power source to breaker. The following exceptions are permitted: a) the main power feed to the engine cranking motor if sheathed or supported to protect against damage & contact with conductive surfaces b) the main power feed to engine panel board if sheathed or supported to protect against damage & contact with conductive surfaces if the fuse or circuit breaker is sized to protect the smallest conductor in the circuit, only the fuse or circuit breaker at the source is required.	
8.2	the current rating of each fuse/cb not to be more than the value for the smallest conductor in the circuit	
8.3	output circuits of self-limiting generators & battery chargers do not need fuses or circuit breakers	

### 9 Panel boards

clause	Requirements	Details of craft
9.1	panel boards to have control elements, indicators, fuses/cbs readily accessible. The terminal side to be accessible.	

## 5.3 DC electrical system

### EN ISO 10133:2001 Small Craft - Electrical systems - extra low voltage d.c. systems

clause	Requirements	Details of craft
9.2	panel boards and connections to be in locations which are protected from expected conditions.	
9.3	panel boards to be marked with nominal voltage	
9.4	if AC and DC systems are installed, separate panel boards to be fitted or positive means of separation provided.	

#### 10 Wiring connections and terminals

clause	Requirements	Details of craft
10.1	conductor connections are to be in locations protected from weather or in IP55 enclosures. Connections above deck exposed to intermittent immersion are to be in IP67 enclosures.	
10.2	metals used as terminal studs, nuts etc. to be corrosion resistant & galvanically compatible with conductor & terminal. Aluminium and unplated steel is not to be used.	
10.3	all conductors to have suitable terminals fitted, no bare wires attached to studs/screws	
10.4	screw clamp/screwless terminal blocks to be to IEC 60947-7-1. Other terminals to be of ring or self-locking spade type and not dependent on screw tightness.	
10.5	twist-on (wire nut) connectors not to be used	
10.6	exposed shanks of terminals to be protected against shorting by use of insulating sleeves etc except those in the earth system.	
10.7	solderless crimp-on terminals to be attached using correct crimping tool & to be able to withstand forces as in table 1	the terminals have been randomly tested
10.8	no more than 4 conductors per stud terminal	the terminals have been randomly tested

#### 11 Receptacles / sockets

clause	Requirements	Details of craft
11.1	sockets used on DC systems not to be interchangeable with those used on AC system	
11.2	sockets subject to spray/immersion to have minimum protection of IP55 when not in use, eg protected by a cover with weatherproof seal	
11.3	sockets in areas subject to temporary immersion to have minimum protection of IP67, including when they are in use with connecting plugs	

#### 12 Ignition protection

clause	Requirements	Details of craft
12.1	electrical components installed in compartments which may contain explosive gases or vapours to be ignition protected to ISO 8846	
12.2	electrical components in LPG compartments to be ignition protected to ISO 8846	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

#### 4 General requirements

clause	General requirements	Details of craft
4.1	the protective current conductor insulation to be green or green with yellow stripe. Neither to be used for current carrying conductor	
4.2	the protective current conductor to be connected to the DC -ve ground as close as practicable to the battery -ve terminal. If a whole craft RCD or isolation transformer is fitted the DC -ve does not need to be connected to the AC shore ground.	
4.3	for craft with fully insulated DC systems, the AC protective conductor to be connected to the hull of metal craft, the craft external earth or lightning protection plate.	
4.4	metallic hull craft not to be used as conductors	
4.5	the protective conductor to be connected to the hull above the anticipated level of any water accumulation	
4.6	individual circuits not to be capable of being energised by more than one source of electrical power at a time. Any changeover switch must open all live and neutral conductors simultaneously	
4.7	energised parts of electrical system to be guarded against accidental contact by enclosures or other means not used for electrical for non-electrical equipment. Access to energised parts to require handtools & suitable warning signs to be fitted.	
4.8	the neutral conductor to be grounded only at source of power, eg at onboard generator. The shore power neutral to be grounded through the shore power cable and not on board the craft	
4.9	ref. standard for testing galvanic isolator	

#### 5 Marking

clause	Requirements	Details of craft
5.1	shore power inlets to be marked to indicate voltage, current & Read Owner's manual symbols	
5.2	a waterproof permanent sign to be mounted on the panel board to include: warning, electric shock hazard and read owner's manual symbols	
5.3	switches & controls to be marked unless use is obvious and non-hazardous	
5.4	electrical equipment to be marked to indicate: a) manufacturer's identification b) model number or designation c) electrical rating in V & A or V & W d) phase and frequency if applicable e) ignition protected if applicable to ISO 8846	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

#### 6 Ignition sources

clause	Requirements	Details of craft
6	electrical components installed in compartments which may contain explosive gases or vapour to be ignition protected to ISO 8846. (Compartments containing spark ignition engines or fuel tanks or LPG lockers)	

#### 7 Overcurrent protection

clause	General requirements	Details of craft
7.1.1	in unpolarised systems, double pole circuit breakers that open both live & neutral conductors are required	
7.1.2	fuses not to be used in unpolarised systems	
7.1.3	overcurrent protection devices for motor loads to have pre-determined value of current flow consistent with the demand-load characteristics of the circuit.	
7.1.4	all motor installations & each motor of a motor operated device to be individually protected as in 7.1.3 by integral current or thermal protection device. Exception can be made for motors that will not overheat under continuous locked rotor conditions.	
7.1.5	the rating of the overcurrent protection not to exceed the maximum current carrying capacity of the protected conductor	

clause	Main supply circuits	Details of craft
7.2.1	double pole circuit breakers to be installed in conductors to shore line power circuits	
7.2.2	a manually reset trip-free circuit breaker to be installed within 0.5m of the power source, or if impractical, the conductor from power source to the panel board to be contained within protective covering. If the location of the shower power circuit breaker exceeds 3m from the shore power inlet, additional fuses or circuit breakers should be provided within 3m of the inlet measuring along the conductor.	
7.2.3	overcurrent protection to be provided for isolation & polarisation transformers, including a bank of transformers operating as a unit. Each transformer to be protected by an overcurrent device on the primary side not rated at more than 125% of the rated current of the primary transformer.	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

clause	Branch circuits	Details of craft
7.3.1	the live conductor of each branch circuit in a polarised system to be provided with overcurrent protection at the point of connection to the main panel board bus	
7.3.2	the live conductor of each branch circuit in unpolarised systems to be provided with overcurrent protection by double pole circuit breakers & switches if used at the point of connection to the main panel board bus	

#### 8 Ground fault protection/earth leakage protection

clause	Requirements	Details of craft
8.1	RCDs (GFCIs) to be of trip-free type	
8.2	the craft to be provided with earth leakage protection in the main supply circuit by one of: a) a double pole RCD with a maximum nominal trip sensitivity of 30mA & 100ms max. trip time b) each socket in the galley, toilet compartment, machinery space or weather deck to be protected by an RCD having a maximum sensitivity of 10mA	

#### 9 Appliances and equipment

clause	Requirements	Details of craft
9	appliances and fixed AC equipment to have exposed conductive parts connected to the protective conductor, unless double insulated	

#### 10 System wiring

clause	Requirements	Details of craft
10.1	conductors to have a min. rating of 300/350V. Flexible cords to have a min rating of 300V	
10.2	conductors /cords to be of multi-strand copper	
10.3	insulation temperature rating of conductors outside engine space to at least 60°C	
10.4	conductors to be at least 1mm <sup>2</sup> in area except for internal wiring panel boards (at least 0.75mm <sup>2</sup> )	
10.5	insulation temperature rating of conductors in engine spaces to at least 70°C and the insulation should be oil-resistant, unless protected by sleeve or conduit and is de-rated	
10.6	the protective conductor not to have cross section area less than live conductor in supply circuit	
10.7	live, neutral & protective conductors of the AC system to be identified. Identification may be made by colour of insulation, by numbers or other means if shown on wiring diagram insulation colours are: live conductors: black or brown neutral conductors: white or light blue earth conductors: green or green/yellow	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

#### 11 Installation

clause	Requirements	Details of craft
11.1	conductor connections to be protected from weather or to be in IP55 enclosures. Connections above the weather deck, exposed to occasional immersion to be in IP67 enclosures	
11.2	conductor to be supported along their length by conduits, trunking, etc or individual supports at max intervals of 450mm	
11.3	DC circuits not to be used in the same wiring as AC a) for multi-core cable, dc circuits are separated from ac circuits by an earthed metal screen b) cables are insulated from system voltage & are installed in separate compartment or duct c) cables are installed on tray or ladder where physical separation is provided by a partition d) a separate conduit/sheathing system is used e) dc & ac conductors are fixed directly to a surface & are separated by at least 100mm.	
11.4	current carrying conductors to be routed above the anticipated bilge water level in areas where water may accumulate or 25mm above actuation height of bilge switch. If conductors must be in the bilge, the wiring and connections must be in IP67 enclosures such as continuous conduit with no connections below the foreseeable water level.	
11.5	metals used as terminal studs, nuts etc. to be corrosion resistant & galvanically compatible with conductor & terminal. Aluminium and unplated steel is not to be used.	
11.6	solderless crimp-on terminals to be attached using correct crimping tool & to be able to withstand forces as in table 1	the terminals have been randomly tested
11.7	all conductors to have suitable terminals fitted, no bare wires attached to studs/screws	
11.8	screw clamp/screwless terminal blocks to be to IEC 60947-7-1. Other terminals to be of ring or self-locking spade type and not dependent on screw tightness.	
11.9	twist-on (wire nut) connectors not to be used	
11.10	exposed shanks of terminals to be protected against shorting by use of insulating sleeves etc except those in the earth system.	
11.11	conductors to be routed away from exhausts & other heat sources. Minimum distance of 50mm from wet exhausts & 250mm from dry exhausts unless thermal barrier is provided.	
11.12	conductors exposed to damage to be protected by sheaths, conduits etc. Insulation on conductors passing through bulkheads etc. to be protected against damage from chafing	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

clause	Requirements	Details of craft
11.13	solderless crimp-on terminals to be attached using correct crimping tool & to be able to withstand forces as in table 1	the terminals have been randomly tested
11.14	no more than 4 conductors per stud terminal	

#### 12 Panel boards

clause	Requirements	Details of craft
12.1	an AC panel board with a lamp indicating the on-off function to be installed	
12.2	a system voltmeter to be installed at the panel board if system has generator or motors	
12.3	panel boards to be marked with nominal voltage	
12.4	panel boards to have control elements, indicators, fuses/cbs readily accessible. The terminal side to be accessible:	
12.5	panel boards and connections to be in locations which are protected from expected conditions: min IP67 for short term immersion min IP56 for exposure to splashing water min IP20 if in protected location inside craft	
12.6	if AC and DC systems are installed, separate panel boards to be fitted or positive means of separation provided.	

#### 13 Receptacles/sockets

clause	Requirements	Details of craft
13.1	sockets used on DC systems not to be interchangeable with those used on AC system	
13.2	sockets subject to spray/immersion to have minimum protection of IP55 when not in use, eg protected by a cover with weatherproof seal. Sockets mated with an appropriate plug also to remain sealed	
13.3	sockets in areas subject to temporary immersion to have minimum protection of IP67, including when they are in use with connecting plugs	
13.4	sockets to be of earthing type with a terminal provided for the protective conductor	
13.5	sockets in galley to be positioned so that appliances may be plugged in without cords crossing the sink or cooker	
13.6	sockets to have a voltage rating consistent with voltage supplied by power source.	

## 5.3 AC electrical system

### EN ISO 13297:2001 Small Craft - Electrical systems - Alternating current installations

#### 14 Power source options

clause	Requirements	Details of craft
14.1	power for the AC system to be supplied by one of the following means: a) shore power cable(s) b) inverter c) generator d) combination of the above	
14.2	the shore power cable(s) capacity alone or with onboard generator capacity in addition, to be as large as the required system load	

## 5.3 DC electrical system

### EN ISO 10133 - Electrical systems - assessment of conductors

DC voltage	12 V
AC voltage	V

Insulator temp ratings:		
60	85-90	125
70	105	200

Circuit description		Wire & breaker ratings				Inputs				
Circuit Number or colour	Description	Actual Current $I_{actual}$ (A)	Breaker or fuse Rating $I_{max}$ (A)	Wire Rating $I_{wire}$ (A)	% Drop in V (%)	Cable in engine room? (ER or Accom.)	Wire Area (mm <sup>2</sup> )	Insulator Temp Rating (°C)	Separation battery & device (L/2) (m)	Voltage Drop (E) (V)
1	extractor fan	1	6	16.13	1.09	accomm	2	70	8	0.13
2	galley/bed lights	8	6	21.25	7.29	accomm	3	70	10	0.87
3	downlights	6	6	21.25	5.47	accomm	3	70	10	0.66
4	dinette/bath lights	8	6	21.25	8.75	accomm	3	70	12	1.05
5	port wall lights	5	6	16.13	6.15	accomm	2	70	9	0.74
6	vanity lights	4	6	16.13	3.28	accomm	2	70	6	0.39
7	reading lights		3							
8	saloon lights		6							
9	starboard wall lights		6							
10	dintette wall lights		6							
11	tunnel light		6							
12	hob/oven ignition		6							
13	bilge pump		6							
14	12V socket		6							
15	led & nav. Lights		6							
16	shower pump		6							
17	central heating		25							
18	amplifier		20							
19	stereo		15							
20	DVD		10							
21	freezer		10							
22	fridge		20							
23	water pump		10							
24	horn		10							

## 5.3 AC electrical system

### EN ISO 13297 - Electrical systems - assessment of conductors

DC voltage	V
AC voltage	230 V

Insulator temp ratings:		
60	85-90	125
70	105	200

Circuit description	
Circuit Number or colour	Description
1	sockets
2	immersion heater

Wire & breaker ratings		
Actual Current $I_{actual}$ (A)	Breaker or fuse Rating $I_{max}$ (A)	Wire Rating $I_{wire}$ (A)
	16	
	10	

Inputs			
No. in Bundle	Cable in ER ? (ER or Accom.)	Wire Area (mm <sup>2</sup> )	Insulator Temp Rating (°C)
1	accomm	2	70
1	ER	2	70

## 5.4 Steering system

### 5.4.1 Steering system

#### Description of system

the flat plate rudder is mounted on a skeg bearing at its bottom end. The rudder is connected directly to the stock which passes through the fuel tank to a bearing on the aft deck. The tiller is an integral part of the stock and is fitted with a brass extension to provide the necessary turning moment.

#### Details of components

Type of steering wheel:	N/A - tiller steering
Type of steering system:	N/A - tiller steering

### 5.4.2 Emergency steering arrangement

In the event of failure of the hydraulic system, the vessel should be capable of being steered at low speed by the emergency system.

Description of emergency steering system:	the tiller is connected directly to the rudder stock, so no emergency steering system is required
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## 5.5 LPG system

### EN ISO 10239:2000 Small Craft - Liquefied petroleum gas (LPG) systems

#### 4 General requirements

Clause	General requirements	Evidence
4.1	LPG system to be capable of withstanding storage at -30 deg C to + 60 deg C & vibration & exposure in marine environment	Industry standard equipment designed to work in these conditions
4.2	LPG systems to be of vapour withdrawal type	Vapour phase withdrawal only
4.3	All appliances to be installed for same working pressure	the hob and oven work are designed to operate at 37mb

#### 5 Pressure reduction system

Clause	General requirements	Evidence
5.1	Each LPG system to be equipped with or have provision for fitting of pressure reduction system to provide suitable pressure for working pressure but not more than 50mb. To be fixed within vicinity of the cylinders	a pressure regulator rated at 6kg/h at 37mb is located in the cylinder locker.
5.2	The LPG pressure reduction system to have an overpressure device to prevent uncontrolled pressure increase in the low pressure side. Any discharge to be inside the cylinder locker or vented separately to outside the craft.	the overpressure device is integral in the pressure regulator
5.3	Working pressure to be marked on regulator	marked 37mb
5.4	Regulators of external adjustment type not to be fitted.	Regulator not externally adjustable
5.5	Regulator to be located within the cylinder locker or housing	regulator is located in the cylinder housing
5.6	If not rigidly connected to and supported by the cylinder connection, the regulator to be secured to the cylinder locker to protect it from damage and exposure to dirt and water	the regulator is secured to the cylinder locker bulkhead
5.7	Regulators to be made of corrosion resistant material or have coating of paint or plastic. Fasteners to be corrosion resistant material.	the regulator has a powder coating for corrosion resistance and is secured with stainless steel screws

#### 6 LPG supply line system

Clause	General requirements	Evidence
6.1.1	LPG supply line system to be of solid piping or continuous hoses as para 6.3	supply line is made of copper
6.1.2	Hoses to be used to connect gimballed stoves to their LPG supply and supply piping to the regulator. The hose between supply pipe connection and regulator to be contained within the cylinder locker	the stove is not gimballed. The solid piping is connected directly to the regulator

## 5.5 LPG system

<b>EN ISO 10239:2000</b>	<b>Small Craft - Liquefied petroleum gas (LPG) systems</b>
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Clause	General requirements (continued)	Evidence
6.1.3	The piping and hose to be sized so that the pressure drop due to pipe resistance does not reduce the working pressure at any appliance below that required by the manufacturer when all the appliances are working simultaneously.	see the test certificate

Clause	Piping	Evidence
6.2.1	Only solid drawn copper or stainless steel piping to be used for rigid supply lines. Min wall thickness for piping of od <12mm to be 0.8mm and 1.5mm for piping of od >12mm.	copper pipe of the appropriate specification
6.2.2	Except for bulkhead fittings, there are to be no joints or fittings in pipe that passes through an engine space	N/A - there is no part of the LPG system in the engine space
6.2.3	Metallic LPG supply piping routed through engine spaces to be protected by conduit or trunking or by non-abrasive supports max spacing 300mm.	N/A - there is no part of the LPG system in the engine space
6.2.4	Fittings for connections in piping to be metallic and one of following types: a) hard soldered connections b) cutting ring fittings c) compression fittings of copper alloy with thick-walled copper rings on copper pipe d) stainless steel rings on stainless steel pipe	compression fittings of industry standard spec used throughout
6.2.5	Piping to be installed as high as practicable above bilge water level	piping runs along the underside of the side deck so is well clear of the bilge water level.
6.2.6	Supply piping to have as few fittings as practicable. Joints/fittings to be readily accessible	Number of joints is minimised and all are readily accessible

Clause	Hoses and hose lines	Evidence
6.3.1	Hose assemblies to meet requirements of EN1763-1 & EN1763, class 2 or 3 for low pressure side and class 3 or 4 for the supply pressure side	Hose assemblies are to BS3212 type 2
6.3.2	Hoses not to be routed through an engine compartment	N/A - there is no part of the LPG system in the engine space
6.3.2	Hoses to have permanently attached end fittings and to be accessible for inspection over their entire length	the hoses have swaged connections
6.3.4	Hoses to be stress free under any conditions of use.	the hoses are of sufficient length to avoid stress
6.3.5	Hose used for the supply line to be continuous & have no joints or fittings from cylinder locker to appliances or shut off valve near appliance.	N/A - copper pipe is used for supply lines

Clause	Materials	Evidence
6.4.1	Melting point of materials at brazed or welded connections not to be < 450 deg C	N/A - no brazed or welded joints used
6.4.2	Fittings to be galvanically compatible with pipe	brass fittings with copper pipes
6.4.3	Hose clamps if used on vent hoses to be of corrosion resistant material eg s/s & be reuseable	N/A - the vents are apertures cut in the side of the hull

## 5.5 LPG system

<b>EN ISO 10239:2000</b>	<b>Small Craft - Liquefied petroleum gas (LPG) systems</b>
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Clause	Materials (continued)	Evidence
6.4.4	End connecting fittings to be of corrosion resistant material eg brass not > 15% zinc	Industry standard fittings used
6.4.5	Where cutting rings fitted on copper pipe, brass insertion ring & brass cutting ring to be fitted	N/A - no cutting rings used

Clause	Installation	Evidence
6.5.1	Piping not to have direct contact with metallic parts of craft structure	piping runs on wooden panels
6.5.2	LPG supply lines to be routed at least 30mm from electrical conductors unless pipe passes through a conduit or conductors are sheathed or in conduit	supply lines are separated from electrical conductors by at least 30mm
6.5.3	LPG lines to be at least 100mm from components of exhaust system. Metallic lines to be <100mm away from exposed terminals of electrical devices	N/A - there is no part of the LPG system in the engine space
6.5.4	LPG lines to be supported by clips or other means eg inside vented non-metallic supported conduit or piping. For solid pipe fixings to be <500mm spacing for hose <1m. Fixings to be corrosion resistant, non-abrasive & designed to	pipes are supported at appropriate intervals
6.5.5	All joints in lines to be made to minimise stress at fitting	pipes are secured within 150mm of the joint to minimise the stress
6.5.6	Pipes passing through water tight bulkheads to be sealed at point of penetration.	N/A - there are no water tight bulkheads
6.5.7	Piping passing through bulkheads to be protected from abrasion or chafing	the pipe passes through bulkhead fittings at the LPG locker bulkhead and the cabin bulkhead
6.5.8	All threaded connections to be of taper thread using sealants conforming to EN 751-2/3	N/A - no threaded connections

Clause	Shut-off valves	Evidence
6.6.1	Each LPG system to be fitted with readily accessible manually operated shut-off valve in supply pressure side. It can be cylinder valve or be in the regulator so long as it isolates cylinder contents from regulator input & removal of the regulator closes cylinder valve.	the cylinder valves are used as the main shut-off valve
6.6.2	A dual cylinder system to be provided with automatic or manual change-over device.	automatic change-over regulator fitted
6.6.3	A shut-off valve to be installed in low pressure supply to each appliance. Valve to be readily accessible & operable from vicinity of appliance. If only one appliance & cylinder shut off is readily accessible from appliance, valve in low pressure side is not required	
6.6.4	Controls of shut-off valves to be readily accessible with means of identifying open & closed positions provided	
6.6.5	Shut-off valves not immediately adjacent to appliance they are serving to be labelled accordingly. If valve is not visible, its location to be labelled	
6.6.6	Taper valves to be spring loaded & only to be used in the low pressure side of the system	

## 5.5 LPG system

<b>EN ISO 10239:2000      Small Craft - Liquefied petroleum gas (LPG) systems</b>
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Clause	Shut-off valves (continued)	Evidence
6.6.7	Shut-off valves to be located to avoid accidental operation	
6.6.8	Needle valves & gate valves not to be used as shut off valves in low pressure system	no needle valves or gate valves fitted

### 7 Appliances

Clause	Requirements	Evidence
7.1	Appliances to be designed for use with LPG in marine environment & installed according to manufacturers instructions	appliances are suitable for use in leisure environment
7.2	Appliances to be securely fixed to craft to avoid stress on piping	hob and oven are set into the galley units
7.3	Each appliance to be equipped with flame supervision devices on all burners & pilots	
7.4	All unattended appliances to be of room sealed type with intake ducting and flues.	N/A - no unattended appliances are installed
7.5	Each appliance to be labelled with type of LPG to be used	marked for use with propane
7.6	Cooking appliances to have permanent legible label in characters min. 4mm high on or adjacent to appliance: DANGER - avoid asphyxiation provide ventilation when stove in use do not use for space heating	
7.7	Proximity and flammability of materials in relation to appliances to be in accordance with ISO 9094-1	
7.8	Space heaters & water heaters installed in exposed locations in small craft to be installed with regard to risk of injury	N/A - no space or water heater installed
7.9	A free area to be provided around appliances, sufficient to prevent overheating & allow servicing	appliances are installed in accordance with the manufacturer's instructions and adequate space is provided for servicing
7.10	Means to be provided to prevent deep & shallow cooking utensils sliding off or across stove at angles up to 15 deg for motor craft.	

### 8 Location and installation of LPG cylinders

Clause	Requirements	Evidence
8.1	LPG cylinders, regulators & safety devices to be secured against anticipated movement	cylinders are secured into the cylinder locker
8.2	LPG cylinders, regulators & safety devices to be installed in cylinder lockers or housings	all are installed in the cylinder locker
8.3	Cylinders, regulators & safety devices located below decks to be mounted in lockers which when closed are vapour tight to the craft interior, openable only from outside the craft interior, vented at the bottom of not less than 19mm inside dia. or equivalent area	
8.3.1	The locker drain to be run outboard without sumps which can retain water with outlet at bottom of locker & as high as possible but not less than 75mm above the loaded waterline.	the drains are apertures cut in the side of the hull and cannot retain water.

## 5.5 LPG system

<b>EN ISO 10239:2000</b>	<b>Small Craft - Liquefied petroleum gas (LPG) systems</b>
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Clause	Requirements (continued)	Evidence
8.3.2	All hoses or pipes penetrating the locker walls to be sealed so as to maintain vapour tightness to the interior of the craft	bulkhead fitting used at the LPG locker wall
8.4	Cylinder locker drains openings & vents to be located >500mm away from hull openings into interior of craft	the locker drains are approximately 1200mm away from any opening into the interior of the craft.
8.5	No provision for storage in locker of loose equipment which could damage LPG equipment	there is no provision for storage of equipment other than LPG equipment
8.6	Cylinders, valves & regulators to be installed to be readily accessible & secured rigidly in position so that only gas in vapour phase is withdrawn	all equipment is rigidly installed in the cylinder locker.
8.7	Provision for storage of unconnected gas cylinders whether full or empty to be the same as for cylinders connected to the system	there is no provision for the storage of unconnected cylinders

### 9 Ventilation

Clause	Requirements	Evidence
9	Ventilation to be provided in accommodation spaces where open flame appliances without flues are used or to which compartments containing such appliances are connected by open passageways. Ventilation to be supplied by at least 2 equally sized openings, one as high as practicable and one as low as practicable.	See assessment of ventilation in 2.0.1 <i>Onboard systems</i>

### 10 LPG installation system tests

Clause	Requirements	Evidence
10.1	The LPG system to be tested with shut valves open to an air pressure of at least 3 times working pressure, but not more than 150mb. The pressure to remain constant to +/- 5mb during following 5 mins	see test certificate
10.2	All burners including function of fsd & pilot lights to be subjected to a burner function test. A visual check for flame lift-off & adequate flame height to be made with all burners in the system operating.	see test certificate
10.3	Where a bubble leak detector is permanently fitted in the system, it is to be securely mounted in the low pressure side in the cylinder locker or housing	
	If fitted for leak detection purposes, a pressure gauge to be fitted in the high pressure side of the system.	

## 5.5 LPG system

<b>EN ISO 10239:2000      Small Craft - Liquefied petroleum gas (LPG) systems</b>
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<b>11 Electrical devices for ignition protection</b>
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Clause	Requirements	Evidence
11	<p>There are to be no potential sources of ignition in LPG lockers or housings. Electrical devices located in cylinder lockers or compartments containing valves fittings or connections in the LPG system or compartments containing unattended appliances to be ignition protected in</p> <p>Exceptions are accommodation spaces &amp; compartments open to the atmosphere having an open area of at least 0.34 sq m per cubic metre of compartment volume.</p>	

<b>13 Ducts and flues for air intake and combustion product discharge</b>
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Clause	Requirements	Evidence
13	Flue components including ductwork & terminals to be installed according to manufacturer's instructions for small craft installations	
	Flues to be routed to ensure complete discharge to outside of craft, including areas under canopies and avoid water obstruction	
	The flue & air intake system to be continuous & sealed to be vapour tight from the appliance to its terminal outside the craft.	
	Dampers not to be used in flue systems	
	The entire flue system to be accessible for inspection	
	Flue terminals for exhaust-product discharge not to be positioned within 500mm of a ventilator opening port, hatch, window, fuel filler or tank vent	
	Flue terminals to be solidly constructed or provided with guards to prevent accidental damage. Such guards to prevent injury due to contact.	

## 5.5.1 LPG system certificate

Paste in LPG system certificate

## 5.6 Fire protection

### EN ISO 9094-2 Fire protection and fire fighting equipment for craft with a hull length greater than 15m

#### 4 Fire prevention

Clause	Boat layout and design	Details of craft
4.1.1	Bilges that may contain spillage of flammable liquids to be accessible for cleaning.	the engine bilge is readily accessible by lifting the aft deck boards
4.1.2	Compartments containing petrol engines and or petrol tanks to be separated from enclosed accommodation spaces.	N/A - there is no petrol on board
4.1.3	Petrol tanks within an engine room to be in accordance with ISO10088 and to be insulated from the engine or other heat source by appropriate physical barrier or air gap	N/A - there is no petrol on board
4.1.4	Where a non-metallic hose is part of water cooled exhaust system, an alarm at main helm position to be activated if there is loss of cooling water or if coolant temperature in the exhaust line exceeds a pre-set limit.	N/A - dry exhaust fitted
4.1.5	Passages through accommodation spaces not to be obstructed	there are no obstructions to passage through the accommodation spaces

Escape routes and exits are detailed in section 3.8

#### 4.4 Cooking and heating appliances

Clause	Materials near cooker or heaters	Details of craft
4.4.1	Free hanging curtains or fabric not to be fitted in zones 1 or 2	
	Exposed materials in zone 1 to be glass, ceramics, metals or other materials with fireproof characteristics.	
	Exposed materials in zone 2 to be glass, ceramics, metals or other materials with fireproof characteristics. To be thermally insulated from underlying substrates if surface temp. > 80°C	
Clause	General safety provisions	Details of craft
4.4.2.1	Flues are to be shielded to avoid overheating or damage to adjacent material or to the structure of craft	
Clause	For liquid fuel heating & cooking appliances:	Details of craft
4.4.2.2	Appliance to be securely fastened	
	Open-flame burners to be fitted with readily accessible drip pan.	
	Open-flame type water heaters to have adequate ventilation and flue protection	N/A - no open flame water heater installed
	Where pilot burner is installed the combustion chamber to be room sealed except for cookers	

## 5.6 Fire protection

<b>EN ISO 9094-2</b>	<b>Fire protection and fire fighting equipment for craft with a hull length greater than 15m</b>
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Clause	General safety provisions	Details of craft
4.4.2.2	<b>For non-integral tanks &amp; supply lines:</b> Non-integral tanks to be securely fastened and to be installed outside Zone II	Diesel equipment is supplied from the engine fuel tank which is outside Zone II for appliances
	A readily accessible shut-off valve to be fitted on the tank. If tank is outside galley a second valve to be in the fuel line to be fitted in the fuel line in the galley space, outside Zone II but not behind the cooker. This does not apply where the tank is located than the cooker/heater and there is no chance of back-syphoning	
	Filler openings for tanks to be visibly identified to indicate the type of fuel to be used with the system	
	The requirements of ISO 10088 to apply	see section 5.2

### 4.4 Engine and fuel spaces

Clause	Requirements	Details of craft
4.5.1	Engine and fuel spaces to be ventilated to prevent build-up of explosive gases.	vents let into hull side in way of engine space
	Materials used for the insulation of engine spaces to: a) to be fire retardant and to prevent a non-fuel absorbent surface to the engine. b) have an oxygen index of at least 21 in accordance with ISO 4589-3 at an ambient temp of 60° C	

Clause	Electrical installation requirements	Details of craft
4.6	DC electrical installations to comply with ISO 10133	See section 5.3
	AC electrical installations to comply with ISO 13297	See section 5.3

Clause	Fuel installation requirements	Details of craft
4.7	Installation of fuel systems and fixed fuel tanks to comply with ISO10088	See section 5.2

Clause	LPG system requirements	Details of craft
4.8	LPG systems to be in accordance with ISO 10239	See section 5.5

Clause	Ignition protection	Details of craft
4.9	Only ignition protected items to ISO8846 to be installed in compartments containing:	there is no petrol or CNG on board and there is no electrical equipment in any LPG compartment outside the accommodation.
	Petrol engines, petrol fuel tanks	
	LPG or CNG cylinders	
	LPG or CNG fittings except where they are in the accommodation close to the appliance.	
	Portable petrol tanks or outboards with integral tanks	

## 5.6 Fire protection

### EN ISO 9094-2 Fire protection and fire fighting equipment for craft with a hull length greater than 15m

#### 5 Fire extinguishing equipment

Clause	Suitability of medium	Details of craft
5.2	Suitability of specific fire extinguishing mediums to fight category of fires to be taken into account.	ABC rated extinguisher as required by the Boat Safety Scheme are suitable for most fire-types.

#### 5.3 Requirements

Clause	Requirements	Details of craft
5.3.2	The accommodation to be equipped with either portable fire extinguishers or fixed fire extinguishing system plus portable extinguishers	portable extinguishers fitted in accommodation
5.3.3	The galley to be equipped with one or more portable extinguishers according to clause 6 & fire blanket according to clause 7.	one fire blanket and one fire extinguishers
5.3.4.1	<b>Protection of engine spaces to be as follows:</b> diesel inboard engine(s) $\leq$ 120kW combined rating (main and auxiliaries) fixed fire fighting system as clause 7 or portable fire extinguisher	portable fitted at aft bulkhead
	diesel inboard engine(s) $>$ 120kW combined rating (main and auxiliaries) fixed fire fighting system as clause 7	N/A - combined rating $<$ 120kW
5.3.4.2	The extinguishing medium of portable extinguisher to be suitable for extinguishing an engine room fire & flooding entire engine space.	the Boat Safety Scheme requires ABC fire extinguishers to be carried. All the extinguishers on board can be used to tackle an engine fire
	Extinguisher capacity to be sufficient for volume of engine space.	All the extinguishers on board can be used to tackle an engine fire
	A discharge opening to be provided so that the extinguisher can be discharged without opening the primary access to engine space.	opening in aft cabin bulkhead
5.3.4.3	The fire port to be identified, sized to accept the discharge nozzle, open or openable to provide ready access and located to allow full discharge of appropriate size extinguisher.	port is labeled and is designed to fit extinguishers on board
5.3.5	Other enclosed spaces to be treated as accommodation spaces unless they are designated for storage of fuel or other inflammable goods when they should be treated as in 5.3.4 for engines $\leq$ 120kw.	other spaces are considered to be accommodation spaces

#### 6 Portable fire extinguisher

Clause	Requirements	Details of craft
6.2.1	Any portable extinguisher to be readily acc'ble.	all extinguishers are readily accessible
6.2.2	If the nozzle & trigger are exposed to spray or splashed water, they are to be shielded	all extinguishers are in the accommodation so are protected from spray and splashed water
6.2.3	Extinguishers in lockers etc. but door must be labelled with appropriate ISO symbol.	all extinguishers are on view
6.2.4	Portable CO <sub>2</sub> extinguishers may only be located in accommodation spaces where electrical equipment is located or flammable liquids are present.	N/A - no CO <sub>2</sub> extinguishers on board

## 5.6 Fire protection

<b>EN ISO 9094-2</b>	<b>Fire protection and fire fighting equipment for craft with a hull length greater than 15m</b>
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Clause	Type, capacity, number and location	Details of craft
6.3 & 6.4	No A/B rated individual extinguisher to be rated less than 5A/34B	minimum rating 5A 34B
	Any individual CO <sub>2</sub> extinguisher to have max. capacity of 2kg. To be only one such extinguisher in any hazard area.	N/A - no CO <sub>2</sub> extinguishers on board
	Where a CO <sub>2</sub> extinguisher is provided, except in open boats, an adjacent warning label to be provided.	N/A - no CO <sub>2</sub> extinguishers on board
	A portable extinguisher to be located:	
	a) within 2 m of the helm	
	b) within 2 m of any permanently installed cooker or open flame device.	
	c) within 2 m of a fire port if engine is protected by a portable extinguisher located outside engine space.	
	d) within L <sub>H</sub> /3 of any berth, measured in horizontal projection.	
e) at least one extinguisher to be located within each 20m <sup>2</sup> of accommodation area.		
	A single extinguisher may meet more than one of these requirements	all the extinguishers on board are ABC rated so can be used to tackle fires in any part of craft.

## 5.7 Navigation lights

### International COLREG (1972) Requirements

A recreational craft operating at night is required to show navigation lights between sunset and sunrise. The following requirements apply to this vessel:

#### When underway:

Port side light or combined bi-colour lights  
 Starboard side light or combined bi-colour lights  
 Stern light  
 Masthead light to be mounted at least 2.5m above side lights

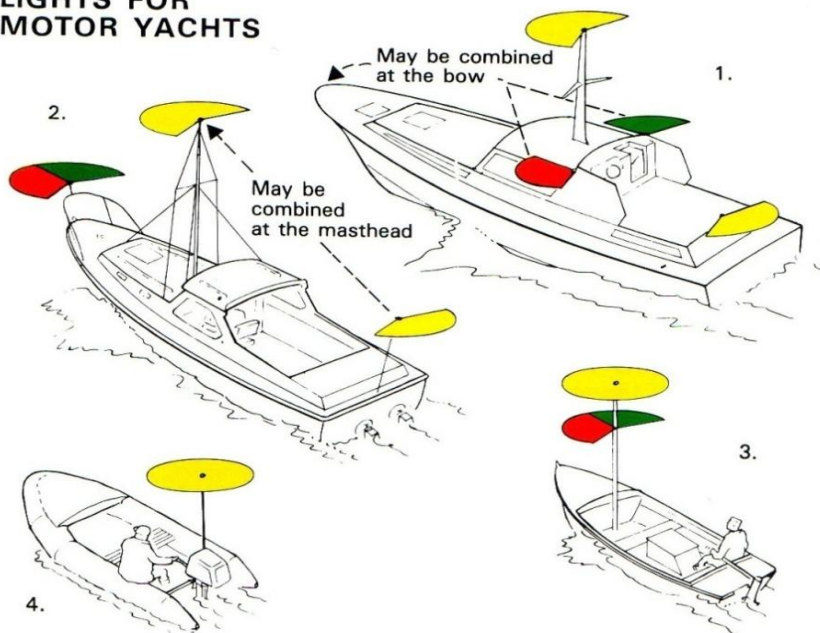
#### When at anchor:

Anchor light

#### Lights fitted to vessel:

Light	Mounting position	Horizontal arc	Vertical arc	Visibility (miles)	Wattage (W)
Port	cabin side	112.5° to port to midships	± 5°	2	10
Starboard	cabin side	112.5° to starboard to midships	± 5°	2	10
Bi-colour		112.5° to port to 112.5° to starboard	± 5°		
Stern	aft bulkhead	67.5° to port to 67.5° to starboard	± 5°	2	10
Masthead		112.5° to port to 112.5° to starboard	± 5°		
Anchor		360°	± 5°		

#### LIGHTS FOR MOTOR YACHTS



1. Vessel over 12 - 20m LOA
2. Vessel under 12m LOA
3. Vessel under 7m LOA, speed not exceeding 7 knots

## 5.8 Discharge prevention

### EN ISO 8099:2001 Toilet waste retention systems

Note: Only the sections of the standard are used which can be checked on board the vessel.

#### 6 Design and installation of system

Clause	Requirements	Details of craft
6.1.2	Systems to be able to operate when boat is heeled up to 20° & at 10° trim	effluent is pumped from the toilet to the tank so is not affected by these angles of heel
6.1.3	Back-syphoning from holding tanks to be prevented up to heel of 20° & 10° trim for engine driven craft.	the non-return valves in the toilet pump prevent backflow
6.1.4	Leaks from holding tanks when 90% full to be prevented as follows:	the non-return valves in the toilet pump prevent backflow and the emptying and vent pipes are well above the top of the tank
	a) from the exterior of the craft up to 20° heel for engine driven craft	
	b) from the interior of the craft up to 30° for engine driven craft	
6.1.5	Holding tanks to be securely fastened & located independent of any connecting pipe.	the holding tank is secured by the forward berth structure
6.1.6	Pump-out fittings to be readily accessible & located to reduce the possibility of contamination of fuel or water	the pump-out fitting is located in the side deck, well away from the water filler
6.1.7	The level of holding tank contents to be observable when the tank is ¾ full by volume, when the tank is viewed directly while installed in a readily accessible location or by another means.	
6.1.8	Holding tanks of capacity > 40 litres to have inspection opening min. dimension > 75mm.	
6.1.9	Holding tanks not to have common walls, tops or bottoms with fuel or potable water tanks.	the holding tank is a separate polythene tank
6.1.10	Connecting hoses and piping to be securely fastened to prevent abrasion/vibration damage	hoses are adequately secured
6.1.11	Holding tanks fittings & connections to be accessible for inspection and maintenance.	
6.2.1	The system to provide for venting of gases within the system to the exterior of the craft up to 20° at 90% tank capacity	
6.2.2.1	If rigid tank capacity < 400 litres:	
	Vent pipe to be 19mm id min. (or 16mm if tank has vacuum operated or manual relief valve with min. combined area of 1100mm <sup>2</sup> )	

## 5.8 Discharge prevention

### EN ISO 8099:2001 Toilet waste retention systems

Clause	Requirements	Details of craft
6.2.2.2	If rigid tank capacity $\geq 400$ litres:	
	Vent pipe to be 38mm id min. or if multiple pipe, min. id of 19mm and min. combined area of 1100mm <sup>2</sup> . Alternatively, vent pipe $\geq 16$ mm if tank has vacuum operated or manual relief valve with min. combined area of 1100mm <sup>2</sup>	N/A - tank is less than 400 litres capacity
	If manual relief valve is fitted, a sign in appropriate language to be located near the pump-out fitting stating that the valve must be opened before emptying tank.	N/A - no manual relief valve is fitted
6.2.3	Flexible tanks to have at least one vent of id min. 16mm	N/A - rigid tank fitted
6.2.4	The id of spigots on vent lines not to be less than 75% of the id of the piping with a length less than 6 times the id of the piping.	Spigots are of appropriate dimensions
6.2.5	The design & construction of the system to minimise clogging by contents of the tank or as a result of snow, ice etc. The vent to be capable of resisting without damage a -ve pressure of 50kPa.	Similar installations have proved to be effective in these conditions. The vent tube is heavy duty to resist pressure.
6.2.6	The min.flow area through vent screens & equivalent flow resistance of any filters installed in the vent system not to be less than the smallest flow area in either the vent pipe or its fittings.	N/A - no vent screens or filters fitted
6.3	Electrical systems to meet the electrical requirements of ISO 13297 & ISO 10133	see section 5.3
6.4	Piping or hose between the WC & holding tank & tank & deck fitting to be as short as practicable, the inner surface to smooth and free of convolutions to permit free flow of sewage.	the hose length is the minimum practical and is industry standard-type for sewage handling
6.5	Retention systems with facility for overboard discharge of sewage to sea to be fitted with seacock at hull fitting which can be sealed in the closed position.	N/A - there is no facility for overboard disposal
6.6	Fixed systems to be equipped with a pump-out deck fitting in accordance with clause 11	pump-out fitting is mounted on the starboard side deck

### 7 Fixed holding tanks only

Clause	Requirements	Details of craft
7.1	Tanks as designed to provide removal of at least 90% of the contents through the pump-out fitting	the tank is designed to optimise the removal of the contents
7.2	Baffles if fitted in holding tanks to have openings to allow sewage and vapour to flow across top and bottom	N/A - no baffles fitted in the tank
7.2.3	Fittings, including the covers of inspection openings to be designed & constructed to ensure gas & water tight closure.	Industry standard fittings which have proved to gas and water tight

## 5.8 Discharge prevention

### EN ISO 8099:2001 Toilet waste retention systems

#### 8 Portable holding tanks

Clause	Requirements	Details of craft
8.1	Portable holding tanks to be of capacity < 20 litres and not to be connected to any pump out fitting or toilet.	N/A - fixed tank installed
8.2	The id of the vent line for portable holding tanks if used, not to be less than 16mm and to have a quick-disconnect at the tank-vent opening, with a cap or closing device permanently attached to the tank which ensures a watertight seal for transportation.	N/A - fixed tank installed
8.3	All other holding tank openings to be sealed with water and gas tight closing devices.	N/A - fixed tank installed
8.4	Handles or recesses for carrying the tank to be provided on the tank in a location that will allow safe transportation and emptying.	N/A - fixed tank installed

## 2003-44-EC Noise emission

### Annex 1 Part C Essential requirements for noise emissions

#### 1.1 Maximum sound pressure

engine type	inboard conventional shaft	
exhaust arrangement	non-integral	
rated engine power ( $P_N$ )	31.33	kW
max. allowable sound pressure $L_{pASmax}$	72	dB

#### 1.2 & 1.3 Assessment by Power: Displacement Ratio & Froude no. method

rated engine power:	$P_N$	31.33	kW
maximum displacement:	$M_{LDC}$	17021	kg
waterline length:	$L_{WL}$	17.99	m
maximum speed:	$V_{MAX}$	3.60	m/s
Froude number:	$F_n$	0.271	
Power : Displacement Ratio:	$P_N/M_{LDC}$	1.84	kW/tonne
<b>Verdict:</b>	<b>Noise requirements satisfied - no testing required</b>		

## 2003-44-EC Exhaust emission

### Annex 1B Requirements for exhaust emissions from propulsion engines

CE marking	Engine CE marked and declared by supplier	<input type="checkbox"/>
	Engine covered by shell builder's Annex IIIa Dec.	<input checked="" type="checkbox"/>
Declaration of Conformity	Declares to directive 2033/44/EC	<input type="checkbox"/>
Certificate number		
Notified Body		

Engine installer's Annex IIIa Declaration shown below

#### Allowable limits

Engine type: compression ignition

Emission type	A	B	n	P <sub>N</sub>	Emission max. limit g/kWh
carbon monoxide (CO)	5.0	0.0	0.0	31.3	5.00
hydrocarbons (HC)	1.5	2.0	0.5	31.3	1.86
nitrous oxide (NO)					9.80
particulates (PT)					1.00

Paste in emission certificates and Declarations as detailed in the yellow cell above