Farr 36

Sunsail 1

EXAMINED & APPROVED
FOR COMPLIANCE WITH THE
COMMERCIAL VESSELS ACT
1979 AND REGULATIONS

CLASS: 1E/2D 4E SERVICE

NAVAL ARCHITECT

WATERWAYS AUTHORITY
NEW SOUTH WALES
FOR CONDITIONS
SEE LETTER

DATE: ...

FOLIO NO: ...

STABILITY APPROVAL INFORMATION

Class ...

Number of Persons ...

Number of Passengers ...

Other Conditions ...

WW copy

Stability Booklet

Class 2D, 1E & Class 4E

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Summary

The practical stability test for this yacht was conducted at Heron Cove, Newport. A total of five (5) consecutive weight movements to the Starboard side of the yacht resulted in a maximum heel angle of 10.26 degrees - see Graph No.1 on page 8. The curve of Heeling moment Vs Heel angle was then extrapolated up to 16 degrees.
A total of 1063 kgs, made up of inclining weights (693 kg) and personnel (370 kg), was on board at the time of this test. This is equivalent to approximately 16 people @ 65 kgs each.

Class 4E

The interception of the Wind overturning moment, calculated using Section 18 of the USL code, and the curve of Heeling moment Vs Heel angle was found to be 12.4 degrees which is less than the allowed maximum of 25 degrees.

Class 1E

The interception of the Wind overturning moment, calculated using Cat T Stability criteria of the USL code, and the curve of Heeling moment Vs Heel angle was found to be 10.2 degrees which is less than the allowed maximum of 14 degrees.

The interception of the Passenger overturning moment, calculated using Cat T Stability criteria of the USL code, and the curve of Heeling moment Vs Heel angle was found to be 3.9 degrees which is less than the allowed maximum of 14 degrees.

Class 2D

The interception of the Wind overturning moment, calculated using Cat T Stability criteria of the USL code, and the curve of Heeling moment Vs Heel angle was found to be 12.1 degrees which is less than the allowed maximum of 14 degrees.

The interception of the Passenger overturning moment, calculated using Cat T Stability criteria of the USL code, and the curve of Heeling moment Vs Heel angle was found to be 3.9 degrees which is less than the allowed maximum of 14 degrees.

Practical Stability Test Report

Type of Vessel	:	Farr 36
Name of Vessel	:	Sunsail 1
Owners Particulars	:	Sunsail
Personnel Present	:	Grahame Parker - Grahame Parker Design Paul Hargrave - Sunsail Bill Bollard - Waterways
Location of Tests	:	Heron Cove, Newport Pittwater
Time and Date	:	0800 - 0930 hours 31st October 1995
Weather	:	Overcast & wet, wind 5-10 knots, smooth water
Mooring Arrangement	:	Berthed, lines kept slack and boat kept clear of piles
Vessel Condition	:	Complete, except for Lifesaving flotation devices to go on.
Tanks	:	Fuel Tank 20 litres (60 litres max) - 33% full No other tanks onboard
Bilges	:	Dry
Freeboards	:	Measured below the deck to the waterline (0 persons onboard and no inclining weights):- Upright: - At stern - Starboard 965mm - Port 950mm At Bow 1195mm

Practical Stability Test Results

Inclining Weights on Board : 693kg
Inclining Personnel on Board : 5 - total weight 370kg
Pendulum Length : 1618mm
Pendulum Location : Companionway

No.	Move	Wt. Moved (kg)	Dist (m)	Total Moment (kg-m)	Defl. (mm)	Pendulum Reading (mm)	Angle Heel (deg)
1	P to Stb	63.5	3.08	195.6	48	48	1.699
2	P to Stb	84.5	3.08	455.8	63	111	3.92
3	P to Stb	86.0	3.04	717.3	60	171	6.03
4	P to Stb	116.0	2.85	1047.9	81.5	252.5	8.87
5	P to Stb	67.0	2.31	1202.7	40.5	293	10.26

Heeled Freeboards : Measured below the deck to the waterline with 5 persons onboard and all inclining weights:-

Upright : -
At 0.75L - Starboard 885mm
Heeled: -
At 0.75L - Starboard 638mm

Maximum Loss of Freeboard, heeled = 247mm, or 27.9%

Stability Criteria - Section 8 C 1 . 3.4

Calculations of Heeling Moments for a Category T Class 1E Vessel for operation in Smooth Waters.

a) Passenger Heeling Moment

	Mp required	=	$\frac{W \times Bp}{6}$
Where -	W	=	Total passenger mass, tonnes
		=	12 passengers @ 0.065 kg each
		=	780 kg
	Bp	=	Maximum breadth of accessible deck space
		=	3.5 m
	Mp	=	$\frac{780 \times 3.5}{6}$
		=	455 kg - m

Intersection of the applied Wind Moment, Mw, with the Passenger Heeling Moment curve is 3.9° - see Graph No.1. This is less than the allowed 14 °.

a) Wind Heeling Moment

	Mw required	=	P A h
Where -	**A**	=	Projected Total Profile Area above the waterline m^2 under bare poles
	Mast & Boom	=	2.96 m^2
	Hull	=	13.7 m^2
	A	=	16.7 m^2
	P	=	0.0306 Pa
&	**h**	=	The vertical distance in m from the centre of the underwater lateral area to the above waterline lateral area
		=	1.79 m + 0.52 m
		=	2.31 m
	Mw	=	1178 kg-m

Intersection of the applied Wind Moment, Mw, with the vessel's Heeling Moment curve is 10.2° - see Graph No.1. This is less than the allowed 14 °.

Stability Criteria - Section 8 C 1 . 3.4

Calculations of Heeling Moments for a Category T Class 2D Vessel for operation in Partially Smooth Waters.

a) Passenger Heeling Moment

	Mp required	=	$\frac{W \times Bp}{6}$
Where -	W	=	Total passenger mass, tonnes
		=	12 passengers @ 0.065 kg each
		=	780 kg
	Bp	=	Maximum breadth of accessible deck space
		=	3.5 m
	Mp	=	$\frac{780 \times 3.5}{6}$
		=	455 kg - m

Intersection of the applied Wind Moment, Mw, with the Passenger Heeling Moment curve is 3.9° - see Graph No.1. This is less than the allowed 14 °.

a) Wind Heeling Moment

	Mw required	=	P A h
Where -	**A**	=	Projected Total Profile Area above the waterline m^2 under bare poles
	Mast & Boom	=	2.96 m^2
	Hull	=	13.7 m^2
	A	=	16.66
	P	=	0.0367 Pa
&	**h**	=	The vertical distance in m from the centre of the underwater lateral area to the above waterline lateral area
		=	1.79 m + 0.52 m
		=	2.31 m
	Mw	=	1416 kg-m

Intersection of the applied Wind Moment, Mw, with the vessel's Heeling Moment curve is 12.1° - see Graph No.1. This is less than the allowed 14 °.

Stability Criteria - Section 18 5 .4.2

Calculation of Wind Moment for Hire & Drive Vessels for operation in Smooth Waters.

Wind Moment	=	0.005 Ah		

Where -

A	=	Projected Total Profile Area above the waterline m^2		
Main Sail	=	32.0 m^2	@	6.80m above wl
Genoa	=	21.4 m^2	@	4.85m above wl
Mast	=	2.3 m^2	@	8.30m above wl
Boom	=	0.7 m^2	@	2.50m above wl
Hull	=	13.7 m^2	@	0.69m above wl
A, Total	=	70.1 m^2	@	3.65m above wl

& h = The vertical distance in m from the centre of the underwater lateral area to the above waterline lateral area

= 3.65 m above + 0.52 m below

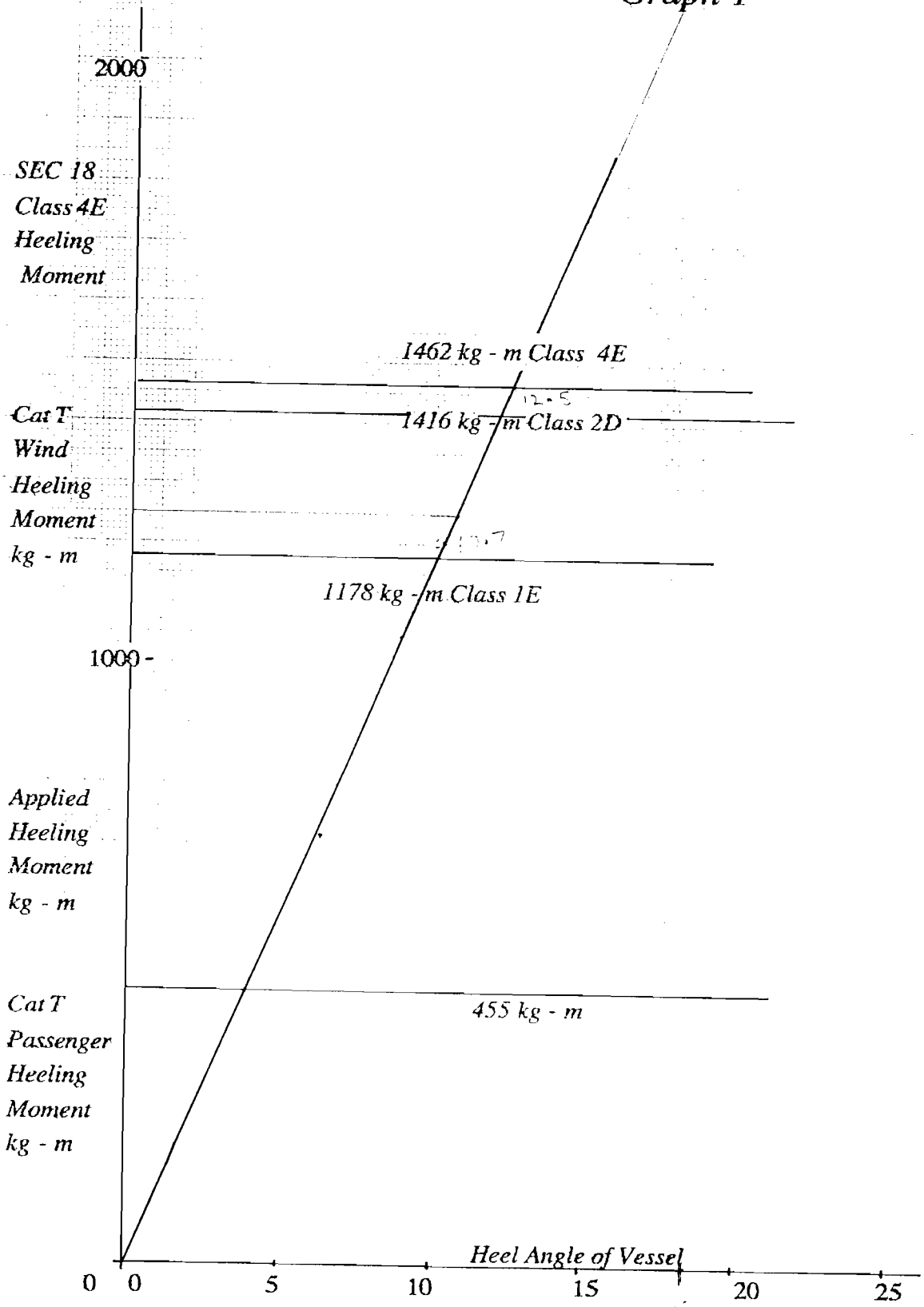
= 4.17 m

Mw = 1462 kg-m

Intersection of the applied Wind Moment, Mw, with the vessel's Heeling Moment curve is 12.5^{o} - see Graph No.1

Heeling Moments Vs Yacht Heel Angle

Farr 36 SUNSAIL 1 Graph 1





Farr 36

Scale 1: 50

REPORT OF LIGHTSHIP MEASUREMENT CHECK

NAME OF VESSEL		= SUNSAIL 1.			
OWNER'S NAME AND ADDRESS		= SUNSAIL AUSTRALIA P/L. NEWPORT.			
BUILDER'S NAME AND ADDRESS		=			
LIGHTSHIP CHECK CONDUCTED BY		= GRAHAME PARKER.			
SURVEYOR ATTENDING		= BILL BOLLARD			
DATE AND PLACE OF EXPERIMENT		= 31-10-95 NEWPORT			
STATE OF WEATHER		= OVERCAST - SLIGHT WIND			
MOORING ARRANGEMENT		= SLACK LINES			
BILGES		= DRY.			
EQUIPMENT: ITEMS ON		= RAFT, LIFEBUOYS, JACKETS,			
ITEMS OFF		= +			
SPECIFIC GRAVITY OF WATER		= NOT TAKEN.			
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION		= FIXED KEEL.			
FUEL TANKS		= 20 LTS.			
FRESH WATER TANKS		= EMPTY			
DOMESTIC TANKS		= NIL.			
DRAUGHTS	FORWARD	P=		S=	
	AFT	P=		S=	
FREEBOARDS	FORWARD	P=	1195	S=	1195
	AFT	P=	950	S=	965
NO.OF PERSONS ON BOARD DURING DRAUGHT READINGS		= NIL.			

NOTE : INCLINING WTS ALSO REMOVED.

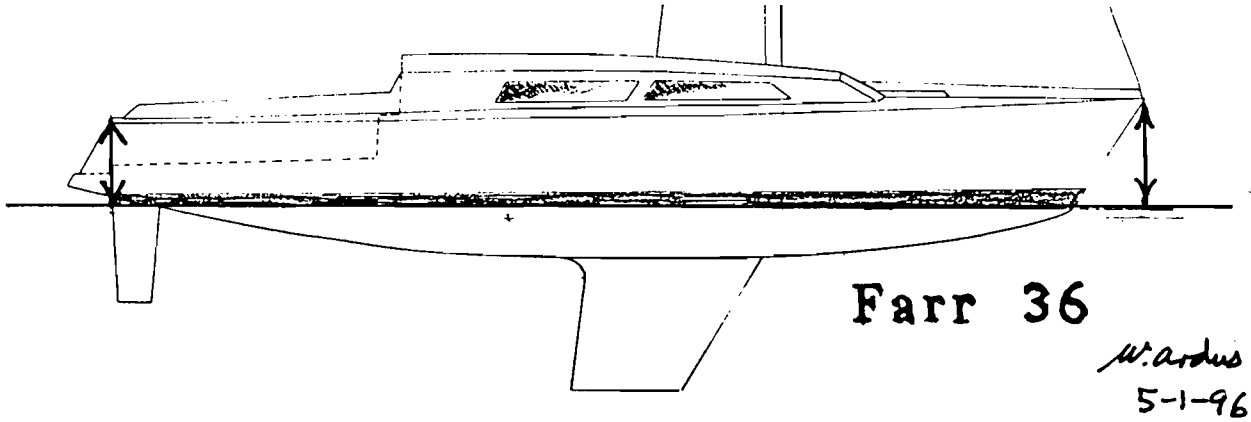
SISTER SHIP TO SUNSAIL 1

REPORT OF LIGHTSHIP MEASUREMENT CHECK

F 5391

NAME OF VESSEL		= SUNSAIL 2		
OWNER'S NAME AND ADDRESS		= SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET McMAHONS POINT NSW 2060		
BUILDER'S NAME AND ADDRESS		=		
LIGHTSHIP CHECK CONDUCTED BY SURVEYOR ATTENDING		= } W. ARDUS. =		
DATE AND PLACE OF EXPERIMENT		= 5-1-96 NEWPORT		
STATE OF WEATHER		= OVERCAST - SLIGHT WIND		
MOORING ARRANGEMENT		= SLACK LINES		
BILGES		= DRY		
EQUIPMENT: ITEMS ON ITEMS OFF		= = COMPLETE AND ON BOARD		
SPECIFIC GRAVITY OF WATER		= NOT TAKEN		
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION		= FIXED KEEL		
FUEL TANKS		= 30 LITRES.		
FRESH WATER TANKS		= NOT FITTED		
DOMESTIC TANKS	(SEWAGE)	= EMPTY		
DRAUGHTS	FORWARD	P= —	S= —	
	AFT	P= —	S= —	
FREEBOARDS	FORWARD	P= 1205	S= 1205	
	AFT	P= 945	S= 945	

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



Farr 36

W. Ardus.
5-1-96

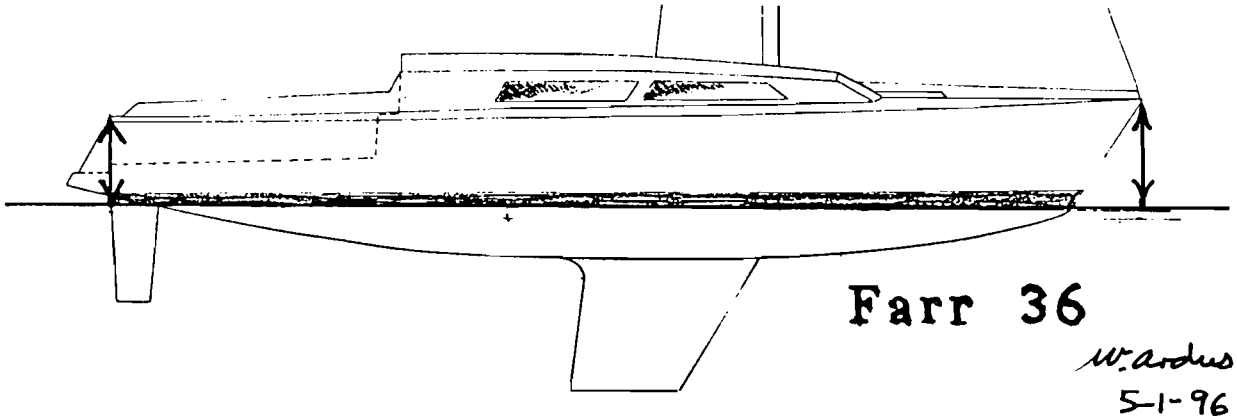
SISTER SHIP TO SUNSAIL 1

REPORT OF LIGHTSHIP MEASUREMENT CHECK

F5392

NAME OF VESSEL		= SUNSAIL 3		
OWNER'S NAME AND ADDRESS		= SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET McMAHONS POINT NSW 2060		
BUILDER'S NAME AND ADDRESS		=		
LIGHTSHIP CHECK CONDUCTED BY SURVEYOR ATTENDING		= } W. ARDUS =		
DATE AND PLACE OF EXPERIMENT		= 5-1-96 NEWPORT		
STATE OF WEATHER		= OVERCAST - SLIGHT WIND		
MOORING ARRANGEMENT		= SLACK LINES		
BILGES		= DRY		
EQUIPMENT: ITEMS ON ITEMS OFF		= = COMPLETE AND ON BOARD		
SPECIFIC GRAVITY OF WATER		= NOT TAKEN		
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION		= FIXED KEEL		
FUEL TANKS		= 30 LITRES		
FRESH WATER TANKS		= NOT FITTED		
DOMESTIC TANKS	(SEWAGE)	= EMPTY		
DRAUGHTS	FORWARD	P= —	S= —	
	AFT	P= —	S= —	
FREEBOARDS	FORWARD	P= 1210	S= 1210	
	AFT	P= 955	S= 945	

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



Farr 36

W. Ardus.
5-1-96.

SISTER SHIP TO SUNSAIL 1

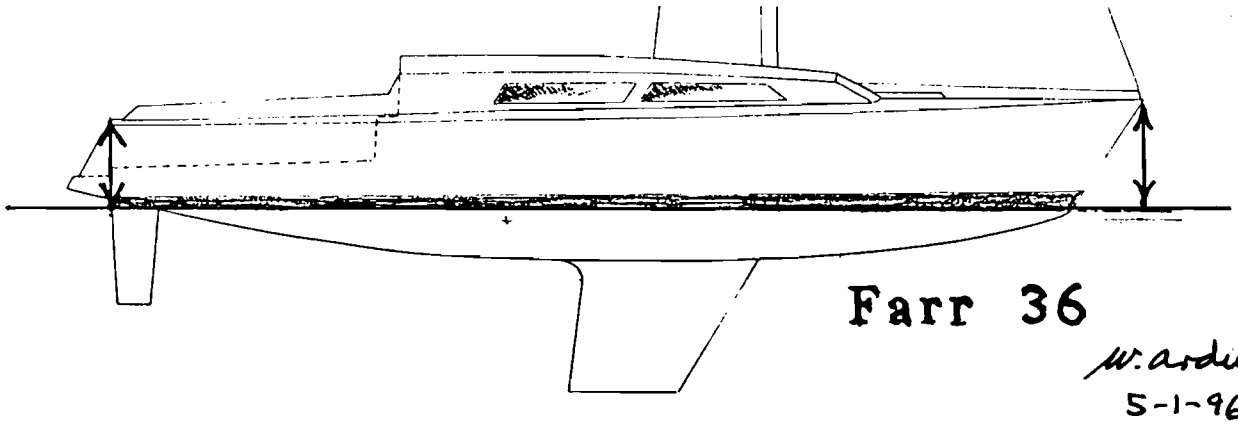
REPORT OF LIGHTSHIP MEASUREMENT CHECK

F5390

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OWNER'S NAME AND ADDRESS	=	SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET McMAHONS POINT NSW 2060
BUILDER'S NAME AND ADDRESS	=	
LIGHTSHIP CHECK CONDUCTED BY	=	W. ARDUS.
SURVEYOR ATTENDING	=	
DATE AND PLACE OF EXPERIMENT	=	5-1-96 NEWPORT
STATE OF WEATHER	=	OVERCAST - SLIGHT WIND
MOORING ARRANGEMENT	=	SLACK LINES
BILGES	=	DRY
EQUIPMENT: ITEMS ON	=	COMPLETE AND ON BOARD
ITEMS OFF	=	
SPECIFIC GRAVITY OF WATER	=	NOT TAKEN
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION	=	FIXED KEEL
FUEL TANKS	=	30 LITRES.
FRESH WATER TANKS	=	NOT FITTED
DOMESTIC TANKS (SEWAGE)	=	EMPTY

DRAUGHTS	FORWARD	P= —	S= —
	AFT	P= —	S= —
FREEBOARDS	FORWARD	P= 1185	S= 1185
	AFT	P= 935	S= 935

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



Farr 36

W. ardus.
5-1-96.

SISTER SHIP TO SUNSAIL 1

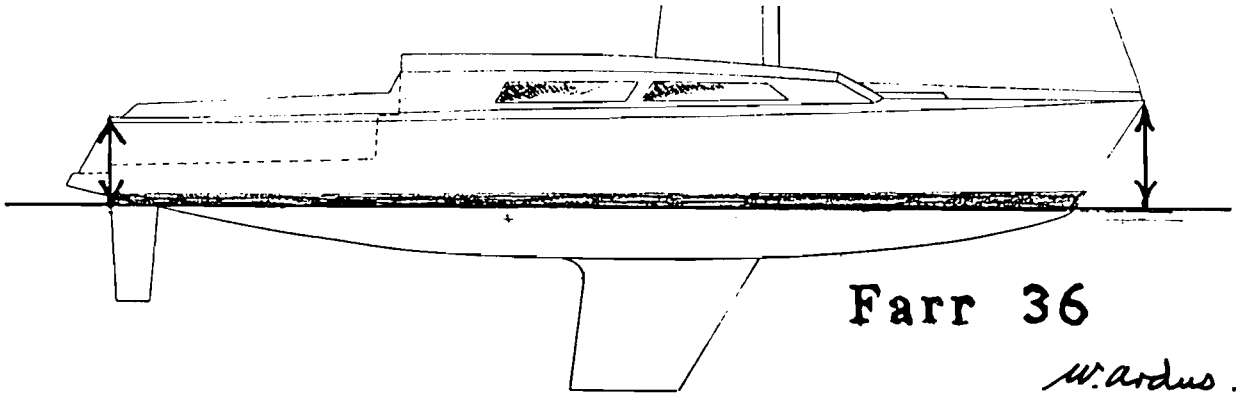
REPORT OF LIGHTSHIP MEASUREMENT CHECK

F5389

NAME OF VESSEL	=	SUNSAIL 5
OWNER'S NAME AND ADDRESS	=	SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET McMAHONS POINT NSW 2060
BUILDER'S NAME AND ADDRESS	=	
LIGHTSHIP CHECK CONDUCTED BY	=	W. ARDUS.
SURVEYOR ATTENDING	=	
DATE AND PLACE OF EXPERIMENT	=	5-1-96 NEWPORT
STATE OF WEATHER	=	OVERCAST - SLIGHT WIND
MOORING ARRANGEMENT	=	SLACK LINES
BILGES	=	DRY
EQUIPMENT: ITEMS ON	=	COMPLETE AND ON BOARD
ITEMS OFF	=	
SPECIFIC GRAVITY OF WATER	=	NOT TAKEN
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION	=	FIXED KEEL
FUEL TANKS	=	30 LITRES.
FRESH WATER TANKS	=	NOT FITTED
DOMESTIC TANKS (SEWAGE)	=	EMPTY

DRAUGHTS	FORWARD	P=	—	S=	—
	AFT	P=	—	S=	—
FREEBOARDS	FORWARD	P=	1190	S=	1190
	AFT	P=	945	S=	950

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



Farr 36

W. Ardus.
5-1-96.

SISTER SHIP TO SUNSAIL 1

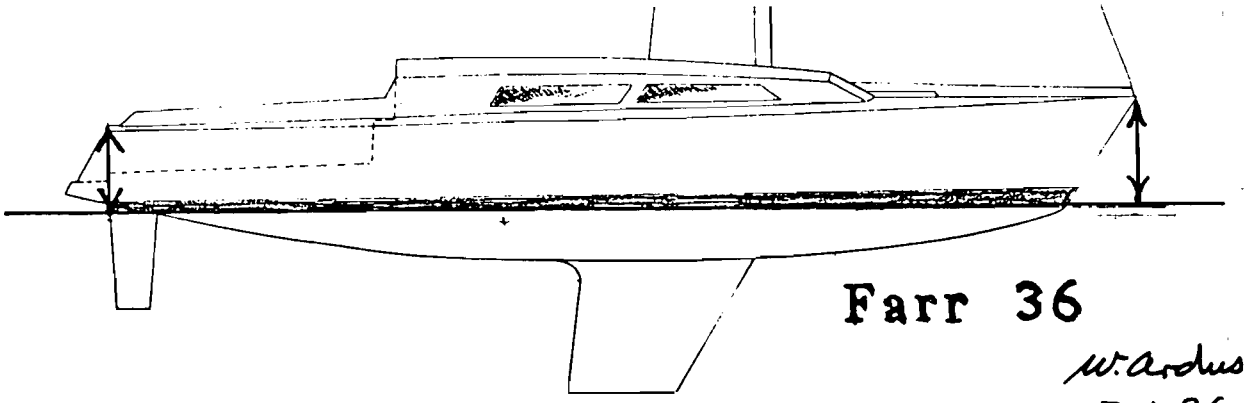
REPORT OF LIGHTSHIP MEASUREMENT CHECK

F5388

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OWNER'S NAME AND ADDRESS	=	SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET McMAHONS POINT NSW 2060
BUILDER'S NAME AND ADDRESS	=	
LIGHTSHIP CHECK CONDUCTED BY	=	W. ARDUS.
SURVEYOR ATTENDING	=	W. ARDUS.
DATE AND PLACE OF EXPERIMENT	=	5-1-96 NEWPORT
STATE OF WEATHER	=	OVERCAST - SLIGHT WIND
MOORING ARRANGEMENT	=	SLACK LINES
BILGES	=	DRY
EQUIPMENT: ITEMS ON	=	COMPLETE AND ON BOARD
ITEMS OFF	=	
SPECIFIC GRAVITY OF WATER	=	NOT TAKEN
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION	=	FIXED KEEL
FUEL TANKS	=	30 LITRES.
FRESH WATER TANKS	=	NOT FITTED
DOMESTIC TANKS (SEWAGE)	=	EMPTY

DRAUGHTS	FORWARD	P=	—	S=	—
	AFT	P=	—	S=	—
FREEBOARDS	FORWARD	P=	1200	S=	1200
	AFT	P=	920	S=	940

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



Farr 36

W. Ardus.
5-1-96

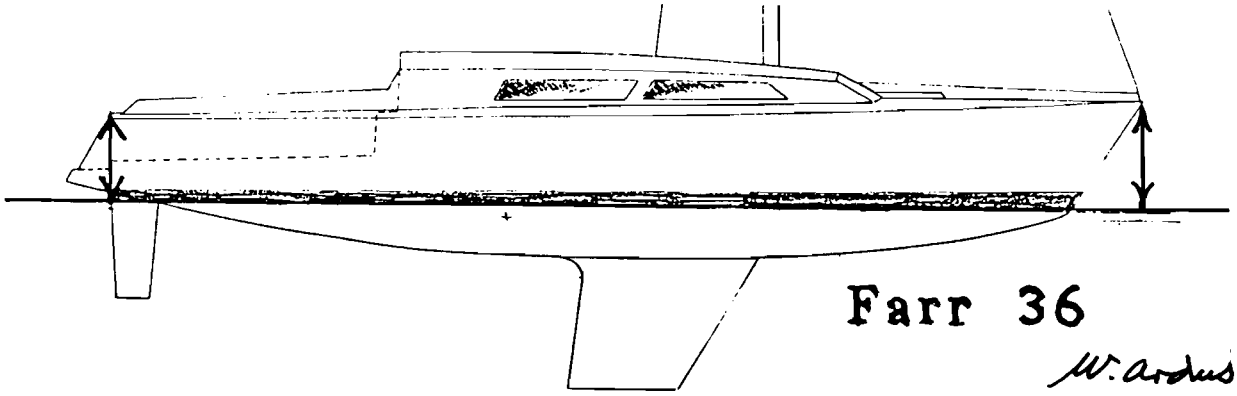
SISTER SHIP TO SUNSAIL 1

REPORT OF LIGHTSHIP MEASUREMENT CHECK

F5387

NAME OF VESSEL		= SUNSAIL 7		
OWNER'S NAME AND ADDRESS		= SUNSAIL AUSTRALIA PTY LTD 23A KING GEORGE STREET MCMAHONS POINT NSW 2060		
BUILDER'S NAME AND ADDRESS		=		
LIGHTSHIP CHECK CONDUCTED BY		= } W. ARDUS .		
SURVEYOR ATTENDING		= }		
DATE AND PLACE OF EXPERIMENT		= 5-1-96 NEWPORT		
STATE OF WEATHER		= OVERCAST - SLIGHT WIND		
MOORING ARRANGEMENT		= SLACK LINES		
BILGES		= DRY		
EQUIPMENT: ITEMS ON		=		
ITEMS OFF		= COMPLETE AND ON BOARD		
SPECIFIC GRAVITY OF WATER		= NOT TAKEN		
PERMANENT BALLAST; DETAILS WEIGHT AND LOCATION		= FIXED KEEL		
FUEL TANKS		= 30 LITRES .		
FRESH WATER TANKS		= NOT FITTED		
DOMESTIC TANKS	(SEWAGE)	= EMPTY		
DRAUGHTS	FORWARD	P= —	S= —	
	AFT	P= —	S= —	
FREEBOARDS	FORWARD	P= 1195	S= 1195	
	AFT	P= 940	S= 925	

NO. OF PERSONS ON BOARD DURING DRAUGHT READINGS = NIL



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W. Ardus .
5-1-96 .