

75T BP ASD HYBRID ESCORT TUG (for GORGON LNG project, Australia)

PRINCIPAL PARTICULARS

- Length Overall (excl fenders) 32.60 m
- Breadth Moulded 13.00 m
- Depth Amidship (mld) 6.60 m
- Design Draught (mld) 4.95 m
- Trial Speed 12.50 knots
- Total Complement 10 persons

CLASS NOTATION

- Class Notation : Lloyds : 100A1 Escort Tug, Fire Fighting Ship 1 (2400 m³/h) with water spray, IWS, ECO (A, GW,IHM,NOx2, OW, P, R Sox), WDL (5t/m² from AFT to Fr 21), LMC, UMS





Electrical Generating Plant for Hybrid Propulsion

- Two (2) units main generators each of 1800 kw x 1000 rpm (Wartsila)
- One (1) unit main generators each of 1600 kw x 1000 rpm (Wartsila)
- One (1) unit harbour generator of 150 kw x 1500 – 1800 rpm
- **One (1) set Lithium Batteries of type LiNMC for low speed propulsion duty for transit between deck and working area during which no diesel engine is allowed to run.**

Major Deck machinery

- Escort winch with split drum (Brake holding – 200 T)
- Vertical windlass
- Retractable towing guide pin on bow (100T SWL) & stern (SWL 200 T)
- Aft towing winch (Brake holding – 175 T) or tow hook (SWL 100 T)
- One (1) electro hydraulic telescopic foldable deck crane

Propeller and Shafting

Two (2) units Schottel Rudder propeller
SCD 4000 SRP 2300 kW & Propeller dia 2.8m

IMO NO.	TYPE OF TUG	NAME OF VESSEL
9673141	75T HYBRID ESCORT TUG	SVITZER EURO
9673953		SVITZER BOODIE
9673965		SVITZER DUGONG
9673977		SVITZER PERENTIE

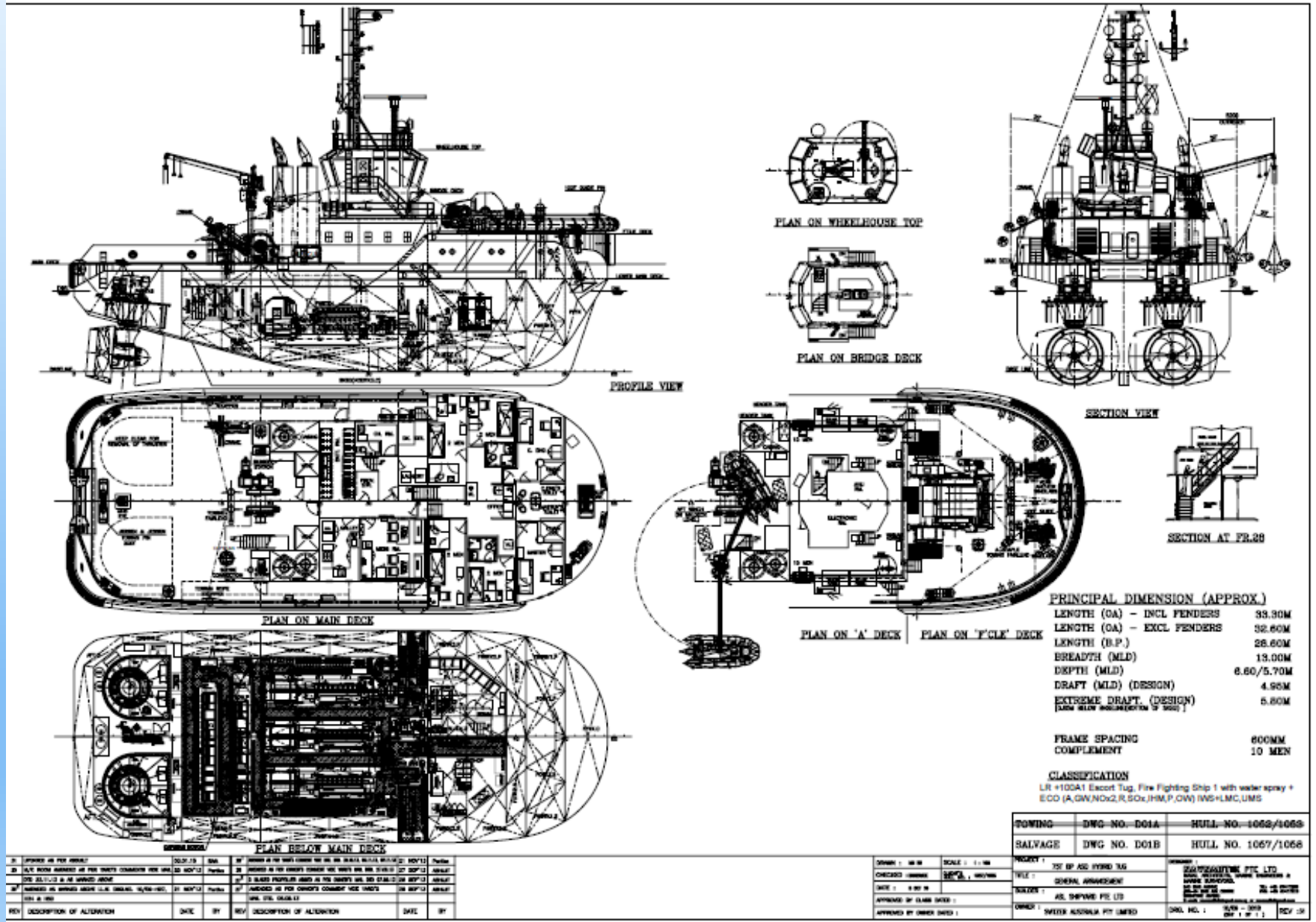


Special features of the Diesel Electric Hybrid ASD Tug

- Diesel electric Hybrid concept consisting of 3 DG sets and a battery bank.
- Siemens VSD (variable speed drive) technology utilizing a Siemens blue drive VSD switchboard
- Schottel combi-drive of 2.3 MW thruster units with FP 4-bladed propellers
- Fully integrated CORVUS battery system, utilizing Lithium NMC batteries and a fully integrated Battery Management Systems.
- Battery package size of 525 kWh corresponding to 1.5 hours free sailing at speed of 6 knots.
- Anticipated Performance Characteristics (as per Siemens) of battery pack

The vessels are expected to be able to transit from its docks to the working area under electric power only, a figure of 400kw of energy is anticipated to be able to support this at .8C discharge (to be finalized). Up to five times a day the vessel is expected to be able to perform sustained discharges of roughly 1Mw for periods of 5-10 minutes (2C or 4C discharge rates, based on either one or two banks being used at the same time). The vessel is expected to be able to perform a 4800kW discharge for 180 seconds, representing full bollard pull anticipated for these vessels in case of emergency. This will be anticipated to be at a discharge rate of approximately 12C.

- Entire drive unit installed in such a way that it can be repaired / removed without dry-docking vessel.
- Being an ECO tug, this vessel has additional Class notation of ECO (A,GW,NOx2,R,SOx,IHM,P,OW)
- Usage of SOLAR PANEL for heating water (water calorifier)
- Vessel can operate with reduced bollard pull and full maneuverability even if one genset fails.
- Self-rendering escort winch and retractable tow pins (aft and fwd)
- No FO tank is exposed to side shell
- GAS detection system (for operation in LNG terminals) installed.





PRELIMINARY EQUIPMENT LIST

Name	Qty	Project Specification
Propulsion Machineries		
Diesel Generator Sets No.1 & 2	2	1800kw @ 1000 rpm, 690V, 50 Hz, Air Starting
Diesel Generator Sets No.3	1	1600kw @ 1000 rpm, 690V, 50 Hz, Air Starting
Harbour Generator	1	150kw @ 1500~1800 rpm, 400V, 50 Hz, Electric Starting along with deadship starting arrangement.
Box Cooler for for Harbour Generator		
Box Cooler for Generator No. 1 & 2		
Box Cooler for Generator No.3		
SIEMENS ELECTRICAL PANELS		
Controller Cabinet for Propulsion (M06-A)	1	
VSD1 (M06-B)	1	
VSD2 (M06-C)	1	
440 VAC Switch Board (M06-E)	1	
230 VAC Switch Board (M06-F)	1	
Transformer 250KVA (690V~400V)	2	
Transformer (400V ~ 230V) (M06-H)	2	
Flexible Control Cabiner (M06-M)	2	
Alternator 1720 KVA	1	
Alternator 1940 KVA	2	
SCHOTTEL ELECTRICAL LIST		
Schottel Switchgear (M06-I)	2	
Schottel Local Control Box (M06-J)	2	
Break Resistor (M06-K)	2	
Leacon Vacuum Tank (M06-L)	2	
Lub Oil Pump (M06-N)	2	
Lub Oil Tank (M06-O)	2	
Liquid pump (M06-P)	4	
Swich Box (SCS)-1 (M06-Q)	1	
Swich Box (power)-2 (M06-R)	1	
Swich Box (power)-2 (M06-S)	1	

Name	Qty	Project Specification
Marine Equipment		
Bilge Pump/GS	1	50 m ³ /hr @ 5 bar, Centrifugal, Horizontal
Bilge Handling Pump	1	1m ³ /hr
Ballast Pump/Fire Pump	1	50 m ³ /hr @ 5 bar, Centrifugal, Horizontal
Emergency Fire Pump (Diesel Driven)	1	30 m ³ /hr @ 5 bar, Centrifugal, Horizontal
Oily water separator	1	0.5m ³ /hr @ 15PPM
LO Transfer Pump		2m ³ /hr, Gear Type
FO Transfer Pump	1	10m ³ /hr @ 5 bar
FW Pressure Set c/w Tank	1	2m ³ /hr, 60L Tank
Hot Water Tank	1	200L
Hot water Circulation Pump		0.5 m ³ /hr @ 5 bar,Centrifugal, Vertical
Starting Air Compressor	2	25m ³ /hr
Starting Air Receiver	2	710L @ 30 Bar
FW Transfer Pump	1	10m ³ /hr @ 5 bar
Auxiliary Air Compressor		15.6m ³ /hr @ 8 bar
Auxiliary Air Receiver		
Sewage Treatment Plant	1	Capacity for 10 Pax
Dirty Oil/ Sludge Pump	1	2.5 m ³ /hr @ 3.5 bar
Sewage Pump/ Eductor	1	
Cooling Pump for HVAC		
Cooling Pump for Refrigeration System		
Cooling Pump for HPU		
Box Cooler for HVAC		
Box Cooler for Refrigeration System		
FO Purifier (deleted)	1	
FO Filter for Day Tanks	2	1000 L/hr (yard)
LO Filter for Main Engine	3	200 L/hr (yard)
LO Filter for Thruster	2	100 L/hr
FIFI Pump	2	
FIFI Pump Gear Box Coupling	2	
Ship's HVAC Unit	1	
Aft Thruster Compt HVAC Unit	1	
Deck Machineries:		
Escort Winch Fwd		
Towing Winch Aft or tow hook		
Deck machinery HPU		
Capstan		
Deck Crane & HPU		



Switzer's new ECO tug: the strong, silent type

Not your typical tug

To minimise the impact that the tug operations will have on sea life in the area, including dolphins, whales, dugongs and one of the world's seven species of sea turtles, the tugs are equipped with special features to minimise noise and light emissions.

As a hybrid diesel-electric, the ECO tugs combine a diesel engine with a giant, 5.5-tonne battery bank. The diesel-electric combination allows the tugs to switch power sources depending on operational needs and the sensitivity of the area.

With the diesel engine off, the battery bank can provide 525 kilowatts of power, enough to propel the tugs up to speeds of 6 knots – quietly – for 1.5 hours before recharging is needed. Combined with specially designed low-noise, low-wash propellers, the ECO tugs can move discreetly through the water when required.

Like noise, artificial light can be disorientating to sea life and, in the case of turtles, can prevent adults from laying eggs and hatchlings from reaching open water.

To keep light emission and reflection to a minimum, the outside of the tugs are painted with anti-reflective matt paint, and will be equipped on deck with low-spill, yellow sodium deck lights with low-water penetration and automatic shut-off cabin lighting.





Svitzer hybrid tugs for Gorgon LNG

19 Dec 2012

by Riviera Newsletters

With a range of custom-built tugs providing towage services at 18 LNG terminals worldwide, Svitzer has the largest portfolio of vessels amongst the escort tug operators active in the LNG sector. The latest LNG escort tug contract awarded to the company is that by Chevron Australia for the provision of marine services at the Gorgon export terminal under construction at Barrow Island in Western Australia.

Under the terms of the US\$600 million, 20 year contract, the operator will supply Barrow Island with four 33m, 80 tonne bollard-pull azimuthing stern drive (ASD) tugs and a pilot boat. Svitzer has designed the quartet specifically for the Gorgon terminal, which is in a Class A nature reserve, and they are the first of the company's LNG escort tugs to be provided with a new type of diesel-electric propulsion system.

Each of the diesel-electric 'hybrid' tugs will have a power management system which enables energy from its two diesel engines to be stored in batteries. The batteries can in turn be used to either supplement the diesel power or replace it, an arrangement which achieves significant reductions in carbon emissions and noise.

Unlike conventional tugs the Svitzer hybrid vessels for Gorgon LNG can operate on only one engine when lower levels of power are required or exclusively on battery power, while maintaining full steering and manoeuvrability.

Svitzer, a part of the AP Møller-Maersk group, points out that the tugs have a number of other environment-friendly features. These include electric deck equipment, obviating the risks of oil spillage associated with hydraulic machinery; surfaces finished in a low-sheen paint to reduce water reflection; low-spilling sodium deck lights to reduce water penetration and disturbance during night operations; fuel tanks protected by a double-skin arrangement; solar panels for water heating; and a water recycling plant for the water used on board.

Amongst other recent Svitzer LNG terminal newbuildings was a **quartet for Peru LNG and a quintet for Angola LNG.**

The nine escort tugs are part of a series of 10 such vessels built at the Qianjin shipyard in the Chinese port of Qingdao during 2009-2012.

The five S80/33 tugs constructed in 2011 to service Svitzer's 20-year contract with Angola LNG are Svitzer Angola, Svitzer Zaire, Svitzer Soyo, Svitzer Padrao and Svitzer Pinda. They have been built to work the new export terminal, which is in the port of Soyo at the mouth of the Congo River in north-western Angola.