



SEE LETTER E-125687-180925

NOTED FOR INFORMATION



13-SEP-2021

PLAN ENDORSED FOR IN-PRINCIPLE APPROVAL

**COCHIN SHIPYARD - CT3360
60 T BOLLARD PULL ASD TUG -
ELECTRICAL LOAD CALCULATION
(Preliminary)**

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Revision	Date	Description	Prepared	Checked	Approved
Rev.I	01-Sep-21	For Publishing on IPA website	ANJ	NFC	NFC

COCHIN SHIPYARD LTD
 ASTDS
 PROJECT NO: - CT3360
 ELECTRICAL LOAD CALCULATION



Drawing no.: CT3360-850-001
 Revision: Rev-I/01-09-2021

SFI.NO	CONSUMERS	LOAD DETAILS				L.F	D.F	SAILING		TUG OPERATION		FIRE FIGHTING MODE		HARBOUR (SHORE SUPPLY)	
		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
	PUMP(WATER)														
803.101.01	Fire/Bilge Pump	1	415	8.0	8.0	0.8	0.2	1.3	0.2	1.3	0.2	1.3	0.2	1.3	
813.101.01	Fire pump	1	415	10.0	10.0	0.8	0.2	1.6	0.2	1.6	0.2	1.6	0.2	1.6	
581.103.01	F.W Hydrophore Pump - Working	1	415	2.0	2.0	0.8	0.5	0.8	0.3	0.5	0.3	0.5	0.3	0.5	
581.103.02	F.W Hydrophore Pump - Stand by	1	415	2.0	2.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
581.101.01	S.W Hydrophore Pump - Working	1	415	2.0	2.0	0.8	0.5	0.8	0.3	0.5	0.3	0.5	0.5	0.8	
581.101.02	S.W Hydrophore Pump - Stand by	1	415	2.0	2.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
581.101.01	Hot Water Circulation Pump	1	415	1.5	1.5	0.8	0.6	0.7	0.2	0.2	0.2	0.2	0.4	0.5	
TBD	S.W Cooling Pump 1 - Working	1	415	5.0	5.0	0.8	1.0	4.0	1.0	4.0	1.0	4.0	1.0	4.0	
TBD	S.W Cooling Pump 1 - Stand by	1	415	5.0	5.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	PUMPS (OIL)														
585.101.01	Sewage Transfer Pump	1	415	2.2	2.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	
489.101.01	Oil Dispersant Pump	1	415	4.0	4.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
701.101.01	FO Transfer Pump	1	415	2.5	2.5	0.8	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.4	
701.102.01	Sludge Pump	1	415	2.2	2.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	
	AUXILIARY EQUIPMENT														
571.01	Air Conditioning System for Accom	1	415	15.0	15.0	0.8	0.7	8.4	0.7	8.4	0.7	8.4	0.5	6.0	
571.02	Air Conditioning System for W/H(Air Cooled)	1	230	2.7	2.7	0.9	0.6	1.5	0.6	1.5	0.6	1.5	0.6	1.5	
571.03	Air Conditioning System for MSB(water Cooled)	1	415	3.0	3.0	0.9	0.7	1.9	0.7	1.9	0.7	1.9	0.7	1.9	
581	Fresh Water Calorifier	1	415	3.0	3.0	0.8	0.4	1.0	0.4	1.0	0.4	1.0	0.4	1.0	
803.101.01	Oily Bilge Separator	1	415	2.5	2.5	0.8	0.2	0.4	0.2	0.4	0.2	0.4	0.0	0.0	
585.101.01	Sewage Treatment Plant	1	415	2.0	2.0	0.8	0.5	0.8	0.5	0.8	0.4	0.6	0.4	0.6	
	COMPRESSORS & RESERVOIRS														
73.101.01	Air Compressor - 1	1	415	8.0	8.0	0.8	0.3	1.9	0.3	1.9	0.0	0.0	0.2	1.3	
73.101.02	Air Compressor - 2	1	415	8.0	8.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	VENTILATION FANS														
574.101.01	Engine Room Ventilation Fan - 1	1	415	15.0	15.0	0.9	1.0	13.5	1.0	13.5	1.0	13.5	0.6	8.1	
574.101.02	Engine Room Ventilation Fan - 2	1	415	15.0	15.0	0.9	1.0	13.5	1.0	13.5	1.0	13.5	0.0	0.0	

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
571.101.01	Galley Supply fan	1	415	0.4	0.4	0.9	1.0	0.4	1.0	0.4	1.0	0.4	0.6	0.2	
571.101.02	Galley Exhaust fan	1	415	0.4	0.4	0.9	1.0	0.4	1.0	0.4	1.0	0.4	0.6	0.2	
571.101.03	Sanitary space Exhaust fan - Main Deck	1	415	0.2	0.2	0.8	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1	
574.101.03	Battery room fan	1	415	0.7	0.7	0.9	1.0	0.6	1.0	0.6	1.0	0.6	0.0	0.0	
574.101.04	Thruster Room Vent Fan	1	415	0.8	0.8	0.9	0.8	0.5	0.8	0.5	0.2	0.1	0.2	0.1	
574.101.05	Workshop Vent Fan	1	415	0.8	0.8	0.9	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	
574.102.06	CO2 Room Supply Fan	1	230	0.2	0.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
574.102.06	Bosun Store Supply Fan	1	230	0.4	0.4	0.9	0.0	0.0	0.5	0.2	0.5	0.2	0.3	0.1	
574.101.04	Sanitary space Exhaust fan-Lower Accom.	1	230	0.2	0.2	0.8	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1	
NAVIGATION EQUIPMENT															
411.01	X - Band ARPA radar - Main Supply	1	230	1.6	1.6	0.8	0.7	0.9	0.7	0.9	0.7	0.9	0.0	0.0	
414.02	Echo Sounder - Main Supply	1	230	0.2	0.2	0.8	0.8	0.1	0.8	0.1	0.8	0.1	0.0	0.0	
412	GPS - Main Supply	1	230	0.0	0.0	1.0	0.7	0.0	0.7	0.0	0.7	0.0	0.7	0.0	
414.01	Speed Log - Main Supply	1	230	0.1	0.1	1.0	0.7	0.0	0.7	0.0	0.7	0.0	0.0	0.0	
METEOROLOGICAL INSTRUMENTS															

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
417.101.01	AIS - Main Supply	1	230	0.2	0.2	0.6	1.0	0.1	1.0	0.1	0.2	0.0	0.0	0.0	
254	Window Wipers	1	230	2.0	2.0	0.8	0.3	0.5	0.3	0.5	0.3	0.5	0.0	0.0	
	MOORING AND ANCHORING FITTINGS														
434	Anchor & Mooring capstain	1	415	80.0	80.0	0.8	0.0	0.0	0.6	38.4	0.0	0.0	0.0	0.0	
	CRANE & DAVITS														
	Boat Davit Winch	1	415	15.0	15.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
331	Crane Power Unit	1	415	48.0	48.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
42	COMMUNICATION														
	GMDSS Equipment														
42.101.01	VHF Radio telephone with built - DSC - Main Supply	1	230	0.1	0.1	1.0	0.8	0.1	0.8	0.1	0.8	0.1	0.0	0.0	
42.101.02	NAVTEX Receiver - Main Supply	1	230	0.0	0.0	1.0	0.8	0.0	0.8	0.0	0.8	0.0	0.8	0.0	
42.101.03	MF/HF Radio Equipment with DSC - Main Supply	1	415	0.1	0.1	1.0	0.8	0.1	0.8	0.1	0.8	0.1	0.0	0.0	
42.101.04	Handheld VHF Radio - Charging Station	3	415	0.2	0.6	1.0	0.8	0.5	0.8	0.5	0.8	0.5	0.4	0.2	
42.101.05	Other Nav & Communication equipments	1	230	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.6	0.6	0.5	0.5	

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
	MISCELLANEOUS														
816.101.02	Fire Monitor System	1	230	10.0	10.0	0.8	0.0	0.0	0.0	0.0	0.4	3.2	0.0	0.0	
816.101.03	Monitor	2	230	2.0	4.0	0.6	0.0	0.0	0.0	0.0	0.3	0.7	0.0	0.0	
793.101.01	ME 1 Control Supply - Main	1	230	0.2	0.2	0.9	0.8	0.1	0.8	0.1	0.8	0.1	0.0	0.0	
793.101.02	ME 2 Control Supply - Main	1	230	0.2	0.2	0.9	0.8	0.1	0.8	0.1	0.8	0.1	0.0	0.0	
793.101.03	Thruster Control - Main	2	230	0.1	0.7	0.9	0.8	0.5	0.8	0.5	0.8	0.5	0.0	0.0	
	Workshop Equipment	1	415	1.0	1.0	1.0	0.2	0.2	0.0	0.0	0.2	0.2	0.4	0.4	
	GALLEY , LAUNDRY& PANTRY														
551.101.01	Refrigerator	2	230	0.3	0.6	0.8	0.5	0.2	0.5	0.2	0.5	0.2	0.5	0.2	
551.101.02	Water Cooler	1	230	0.3	0.3	0.8	0.5	0.1	0.5	0.1	0.5	0.1	0.5	0.1	
551.101.03	microwave oven	1	230	0.8	0.8	0.8	0.2	0.1	0.2	0.1	0.2	0.1	0.4	0.3	
551.101.04	water purifier	1	230	0.1	0.1	0.8	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	

Refer IRS L

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW	
551.101.05	Garbage disposal units/ Plastic compactors	1	230	1.5	1.5	0.8	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	
551.101.06	Cooking Range	1	415	15.5	15.5	0.8	0.6	7.4	0.6	7.4	0.2	2.5	0.2	2.5	
551.101.07	Electric Kettle 1 Ltr	1	230	1.5	1.5	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	
554	Deep Freezer	1	230	0.5	0.5	0.8	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	
558	washing machine with Dryer	2	230	0.5	1.0	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	
	Misc Equipment	1	415	2.0	2.0	0.8	0.4	0.6	0.4	0.6	0.4	0.6	0.4	0.6	
	Misc Equipment	1	230	3.0	3.0	0.8	0.4	1.0	0.4	1.0	0.4	1.0	0.4	1.0	
427	LIGHTS & OTHER EQUIPMENTS														
427.101.01	General Lighting	1	230	12.0	12.0	1.0	0.6	7.2	0.6	7.2	0.5	6.0	0.2	2.4	
427.101.02	Flood Lights	4	230	0.5	2.0	1.0	0.8	1.6	0.8	1.6	1.0	2.0	0.4	0.8	
427.101.03	Fire and General Alarm System	1	230	0.1	0.1	1.0	0.8	0.1	0.8	0.1	0.8	0.1	0.8	0.1	
427.101.04	ICCP	1	230	2.2	2.2	1.0	0.8	1.8	0.8	1.8	0.8	1.8	0.8	1.8	
427.101.05	Search Light	2	230	2.0	4.0	1.0	0.2	0.8	0.2	0.8	0.2	0.8	0.0	0.0	
TBD	Trans-Rectifier cum Battery charger	1	230	1.0	1.0	0.9	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW		KW		KW		KW
							KW		KW		KW		KW	
	TOTAL LOAD:						(A) 81.2		(A) 118.0		(A) 75.2		(A) 43.4	
	DESIGN MARGIN 5%						(B) 4.1		(B) 5.9		(B) 3.8		(B) 2.2	
	GROWTH MARGIN-5%						(C) 4.1		(C) 5.9		(C) 3.8		(C) 2.2	
	TOTAL POWER CONSUMPTION=(A)+(B)+(C)						89		130		83		48	

BUS BAR LOADS														
	Load Connected To 415V Bus						KW	62.0		98.6		53.0		33.2
	Load Connected To 230V Bus						KW	18.9		19.1		21.9		10.2
	Design Margin 5%							4.1		5.9		3.8		2.2
	Growth Margin-5%							4.1		5.9		3.8		2.2
	Total Consumption							89		130		82		48

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		QUANTITY	VOLT	POWER (KW)	TOTAL POWER (KW)			KW	D.F	KW	D.F	KW	D.F	KW
	Main Generator No. 1 - 200kVA			160	KW			89.0	KW	129.5	KW	82.4	KW	
	Load Generator							55.6	%	80.9	%	51.5	%	
								OR		OR		OR		
	Main Generator No. 2 - 200kVA			160	KW			89.0	KW	129.5	KW	82.4	KW	
	Load Generator							55.6	%	80.9	%	51.5	%	
	415/230V Transformer. 1 - 40 kVA Delta/Delta			40/32	KVA/KW			18.9	KW	19.1	KW	21.9	KW	10.2
	Load on Transformer							59.0	%	59.6	%	68.5	%	31.8
	415/230V Transformer. 2 - 40 kVA Delta/Delta			40/32	KVA/KW			18.9	KW	19.1	KW	21.9	KW	10.2
	Load on Transformer							59.0	%	59.6	%	68.5	%	31.8

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SI No	CONSUMERS	LOAD DETAILS					NORMAL CONDITION		EMERGENCY CONDITION
		QUANTITY	POWER (WATTS)	TOTAL POWER (WATTS)	L.F.	D.F	W	D.F	W
1	AIS-BACK UP SUPPLY	1	30	30	0.5	0.0	0.0	0.7	10.5
2	VHF WITH DSC BACK UP SUPPLY	1	80	80	0.5	0.0	0.0	0.7	28
3	MF/HF RADIO EQUIPMENT - BACK UP SUPPLY	1	80	80	0.5	0.0	0.0	0.7	28
4	NAVTEX RECEIVER - BACK UP SUPPLY	1	12	12	0.6	1.0	7.2	0.7	5.04
5	GPS - BACK UP SUPPLY	1	4	4	0.5	1.0	2.0	0.8	1.6
6	MAGNETIC COMPASS	1	30	30	0.7	0.6	12.6	1.0	21
7	RUDDER ANGLE INDICATOR	1	24	24	0.6	1.0	14.4	1.0	14.4
8	EMERGENCY LIGHT 24VDC: MACHINERY AREA	1	45	45	1.0	0.0	0.0	1.0	45
9	EMERGENCY LIGHT 24VDC:ACCOM AREA	1	72	72	1.0	0.0	0.0	1.0	72
10	ECHOSOUNDER-BACK UP SUPPLY	1	30	30	0.5	0.0	0.0	0.8	12
11	SPEED LOG - BACK UP SUPPLY	1	60	60	0.6	0.7	25.2	0.8	28.8
12	NAVIGATION LIGHTS (13Nosx25W) BACK UP SUPPLY	1	325	325	0.7	0.0	0.0	1.0	227.5
13	RADAR BACK UP SUPPLY	1	20	20	0.8	0.0	0.0	1.0	16
14	ME 1 CONTROL SUPPLY (BACK UP)	1	200	200	0.8	0.0	0.0	1.0	160
15	ME 2 CONTROL SUPPLY (BACK UP)	1	200	200	0.8	0.0	0.0	1.0	160
16	DG1 CONTROL SUPPLY	1	100	100	0.9	0.0	0.0	0.0	0
17	DG2 CONTROL SUPPLY	1	100	100	0.9	0.0	0.0	0.0	0
18	MAIN SWITCHBOARD CONTROL SUPPLY	1	80	80	0.8	1.0	64.0	0.8	51.2
19	THRUSTER CONTROL - BACK UP SUPPLY	2	100	200	0.8	0.0	0.0	1.0	160
20	ELECTRIC SIREN (BACK UP)	1	125	125	0.2	0.0	0.0	0.5	12.5
21	PA/COMMAND SYSTEM (BACK UP)	1	100	100	0.5	0.0	0.0	0.8	40
22	FIRE DETECTION AND ALARM SYSTEM	1	100	100	0.9	0.0	0.0	0.8	72
	LOAD CONNECTED TO EMERGENCY SWITCHBOARD (Watts)		WATTS	2017.0			125.4		1165.5

BATTERY CAPACITY CALCULATION	
LOAD CONNECTED TO EMERGENCY SWITCHBOARD (Watts)	1165.5
LOAD ON BATTERY(AMP)	48.56
TOTAL HOURS BACK UP REQUIRED	12
TOTAL AH REQUIRED	582.77
TIME RATE FACTOR	0.7
USAGE FACTOR	0.9
NEW CAPACITY (AH)	925
BATTERY CAPACITY SELECTED(AH),24V	1000

BATTERY CHARGER CALCULATION	
NORMAL POWER REQUIRED(WATTS)	125.4
CURRENT CONSUMPTION(AMP)	5.23
CHARGING CURRENT REQUIRED TO CHARGE THE BATTERY 80% OF CAPCITY IN 10 HRS	80
TOTAL CURRENT REQUIRED	85.23
BATTREY CHARGER RATING(AMP) SELECTED@24V DC	120

Note- Load indicated in the load calculation is preliminary. Load calculation and Battery and battery charger rating to be updated by ship yard/designer while constructing the vessel.

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