

PRINCIPAL PARTICULARS

SURFACE ROUGHNESS (Ra) (ISO 1302)		
μm	KS (JIS) SYMBOL	GRADE NO
50	~	N12
25	▽	N11
12.5	▽	N10
6.3	▽	N9
3.2	▽	N8
1.6	▽	N7
0.8	▽	N6
0.4	▽	N5
0.2	▽	N4
0.1	▽	N3
0.05	▽	N2
0.025	▽	N1

GEOMETRIC CHARACTERISTICS		SYMBOL
FORM TOLERANCES	FLATNESS	▧
	STRAIGHTNESS	—
	CIRCULARITY	○
	CYLINDRICITY	⊘
ORIENTATION TOLERANCES	PERPENDICULARITY	⊥
	ANGULARITY	∠
	PARALLELISM	∥
PROFILE TOLERANCES	PROFILE OF A SURFACE	△
	PROFILE OF A LINE	∩
RUNOUT TOLERANCES	CIRCULAR RUNOUT	⌢
	TOTAL RUNOUT	⌢
LOCATION TOLERANCES	POSITION	○
	CONCENTRICITY	◎
	SYMMETRY	≡



LENGTH	(O. A)	approx. 180.00 M
LENGTH	(B. P)	172.00 M
BREADTH	(M.L.D.)	30.00 M
DEPTH	(M.L.D.) UPPER DECK	14.70 M
DRAFT	(DESIGNED)	9.50 M
	(SCANTLING)	approx. 9.80 M
DEADWEIGHT	(at D L W L)	approx. 32,000 MT
	(at SCANTLING DRAFT)	approx. 33,500 MT
MAIN ENGINE		B&W 5550MC-CZ
	(at MCR)	7,900 kW x 127.0 RPM
	(at NCR)	6,715 kW x 120.3 RPM
SERVICE SPEED	(at SCANTLING DRAFT)	
	(NCR with 15% S.M)	abt. 14.0 KTS
COMPLEMENT		25P+6
CLASSIFICATION		KR
	+KRS1-Bulk Carrier 'ESP', CSR, BC-A (HOLD Nos.2 & 4 may be empty), GRAB [20]	
	L, IWS, +KRM1-UMA, STGM	

图纸 分发

分发处		分发数	
汉字	ENGLISH	FW	FC
综合设计	Integrated Design Division	1	1
船体设计 1	Hull Design 1 Division		
船体设计 2	Hull Design 2 Division	3	3
船装设计	Hull Outfitting Design		
船室设计	Accommodation Design		
机装详细设计	Machinery Detail Design	2	2
机装生产设计	Machinery Production Design	3	3
电装设计	Electrical Design	1	1
先行舾装	Preoutfitting Division		2
E/R 舾装	E/R Outfitting		2
船室生产	Accommodation Production		
试航部	Trial Cruise Division		2
品质经营	Quality Assurance		2
品质物流(镇海)	Logistics Team (Jinhae)		1
轴舵设计(保管)	Shaft & Rudder Design	1	1
合计 (Total)		11	20
<input type="checkbox"/>	For Working		
<input type="checkbox"/>	For Construction		
<input checked="" type="checkbox"/>	For Revision		

THIS DRAWING OR DOCUMENT IS THE PROPERTY OF THE SAMJIN SHIPBUILDING INDUSTRIES CO., LTD. AND MUST NOT BE PARTIALLY OR WHOLLY COPIED OR USED FOR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF SAMJIN SHIPBUILDING INDUSTRIES CO., LTD

HULL NO. 1009-1012, 1031-1032	PROJECT TPC KOREA 33,500 DWT LOG/BULK CARRIER		
APPD BY M. V. Park	TITLE <h1>SHAFTING PLAN</h1>		
CHKD BY J. S. Lee			
DWN BY J. H. Park (Ext. : 0226)	TEL +86) 0631-538-0204	TOTAL 11 SHEET(S) WITH COVER	
 Samjin Shipbuilding Industries Co., Ltd.	DEPT RUDDER & SHAFT DESIGN TEAM	DWG NO. DA500M104	SCALE EACH
		DATE APRIL. 22. 2008	REV. NO. 8

	PLAN HISTORY		HULL NO.	1009-1012 1031-1032	2 11
			DWG. NO.	DA500M104	
DATE	REV. NO.	DESCRIPTION	DWN	CHKD	APPD
FEB.13,2008	A	SUBMITTED TO CLASS AND OWNER FOR APPROVAL	J. H PARK		
APRIL.10,2008	B	APPROVED BY OWNER WITHOUT COMMENT.	J. H PARK		
APRIL.22,2008		APPROVED BY OWNER WITHOUT COMMENT.	J. H PARK		
MAY.10,2008	C	MODIFIED ACCORDING TO DESIGN DEVELOPMENT.	J. H PARK		
MAY.13,2008	0	ISSUED FOR WORKING.	J. H PARK		
SEPT.24,2008	1	SUBMITTED TO OWNER THAT REQUEST FOR CANCEL OF SPARE BOLT SETS.	J. H PARK		
OCT.13,2008	2	a) MODIFIED ACCORDING TO DESIGN DEVELOPMENT.	J. H PARK		
		b) CHANGED FOR REAMER BOLT T.S 748 TO 840N/mm2	J. H PARK		
		c) MODIFIED ACCORDING TO T/V CALCULATION.	J. H PARK		
		ISSUED FOR REVISION.	J. H PARK		
OCT.14,2008	3	MODIFIED ACCORDING TO DESIGN DEVELOPMENT.	J. H PARK		
		ISSUED FOR REVISION.	J. H PARK		
OCT.23,2008	4	a) MODIFIED THE SAME THING WITH DIFFERENT NAMES INTO THE SAME NAME.	J. H PARK		
NOV.14,2008		b) CHANGED FOR SURFACE ROUGHNESS $\sqrt{N7}$ TO $\sqrt{N6}$.	J. H PARK		
ISSUED FOR REVISION.		J. H PARK			
NOV.19,2008	5	a) TOLERANCE OF REAMER BOLT HOLES MODIFY ± 0.1 TO $+0.5/-0.1$.	J. H PARK		
		b) MAKER CAN NOT PROCESSING WHEN CHANGED SURFACE ROUGHNESS $\sqrt{N7}$ TO $\sqrt{N6}$. SO CHANGE $\sqrt{N6}$ TO $\sqrt{N7}$ AGAIN.	J. H PARK		
		ISSUED FOR REVISION.	J. H PARK		
JAN.05,2009	6	a) CHANGED FOR SPARE REAMER BOLT & NUT SETS OF PROPELLER SHAFT SIDE 0 TO 3 SETS.	J. H PARK		
		b) DELETED TO SPLIT PIN OF ENGINE SIDE COUPLING.	J. H PARK		
		c) CHANGED FOR SURFACE ROUGHNESS OF PRO. SHAFT & INTER. SHAFT BEARING PART $\sqrt{N7}$ TO $\sqrt{N6}$.	J. H PARK		
		ISSUED FOR REVISION (ONLY ISSUED TO MAKER)	J. H PARK		
JAN.23,2009	7	CHANGED FOR MULTI-RADIUS LENGTH OF INTER. SHAFT 195.16 TO 190.8 AND HEIGHT 58.2 TO 59.12 ON 9 PAGE.	J. H PARK		
		ISSUED FOR REVISION (ONLY ISSUED TO MAKER)	J. H PARK		
JULY.09,2009	8	CHANGED FOR COUPLING HOLE DIAMETER OF INTERMEDIATE SHAFT WITH ENGINE SIDE $\phi 64$ TO $\phi 65$ ON 7, 9/11 PAGES.	J. H PARK		
JULY.10,2009		SUBMITTED TO CLASS AND OWNER FOR CONFIRMATION.	J. H PARK		
SEPT.19,2009		ISSUED FOR REVISION.	J. H PARK		

SHAFTING PLAN

HULL NO.	1009-1012
	1031-1032

3 /

DWG. NO.	DA500M104
----------	-----------

11

NO	PAGE	NAME	MATERIAL	Q'TY/SHIP		WEIGHT (KG)		REMARKS
				WORK.	SPARE	PIECE	TOTAL	
* 1	PAGE 7 (DIA. 5600MM)	F.P.PROPELLER	NI-AL-BRONZE	1		14,720	4-BLADE KEYLESS	
2	PAGE 7	PROPELLER CAP	Mn-BRONZE	1		260		
3	PAGE 7	PROPELLER NUT	FORGED STEEL	1		415	T.S: ≥ 590N/mm2	
4	PAGE 7	AFT STERN TUBE SEAL WITH UNNET	SEAL CASING :BRONZE, CLASS APPROVED TYPE	1		245	MAKER;JMT	
5	PAGE 7	FWD STERN TUBE SEAL	SEAL CASING : CAST IRON	1		157	MAKER;JMT	
6	PAGE 7	AFT STERN TUBE BUSH	CAST IRON LINED WHITE METAL	1		558	MAKER;JMT	
7	PAGE 7	FWD STERN TUBE BUSH	CAST IRON LINED WHITE METAL	1		202	MAKER;JMT	
* 8	PAGE 7,8 ø460x6225L	PROPELLER SHAFT	FORGED STEEL	1		7,838	T.S: ≥ 590N/mm2	
* 9	PAGE 7,9 ø390x7000L	INTERMEDI.SHAFT	FORGED STEEL	1		7,478	T.S: ≥ 590N/mm2	
10	PAGE 7	INTER' SHAFT BEARING	CAST IRON LINED WHITE METAL	1		645	MAKER;JMT	
11	PAGE 7	SHAFT EARTHING DEVICE	ASSEMBLY	1		51	MAKER; K.C.LTD.	
*12	PAGE 7,10 ø65x261L	NO.1 COUPLING REAMER BOLT	SCM435	10	3	88	T.S: ≥ 840N/mm2	
*13	PAGE 7,11 ø65x337L	NO.2 COUPLING REAMER BOLT	S25Cr1	12	4	104	T.S: ≥ 690~840N/mm2 STX SUPPLY	
*14	PAGE 7,10 M60x4	NO.1 COUPLING NUT	SCM435	10	3	16	T.S: ≥ 840N/mm2	
*15	PAGE 7,11 M60x4	NO.2 COUPLING NUT	S20B	12	4	32	T.S: ≥ 400~530N/mm2 STX SUPPLY	
16	PAGE 7,10 ø9.5x90L	SPLIT PIN	SWRM	10	3	1		
17	PAGE 7,11 ø9.5x90L	SPLIT PIN	SWRM	12	0	0		
18	PAGE 7	ROPE GUARD	MILD STEEL	1		78	EPOXY COATING	

(NOTE)

1.FOR * MARKED ITEM CLASS CERTIFICATE TO BE SUBMITTED.



SHAFTING PLAN

HULL NO.	1009-1012 1031-1032
DWG. NO.	DA500M104

4
11

A. SHAFT DIAMETERS (RULE 5-3-2030)

THE MINIMUM DIAMETER OF THE SHAFT IS TO BE DETERMINED BY THE FOLLOWING EQUATION.

$$D = 100 \times K \times \sqrt[3]{(P/n) \times 560 / (T + 160)}$$

WHERE :

D = REQUIRED SHAFT DIAMETER IN (mm)

K = SHAFT DESIGN FACTOR ----- 1.22 FOR PROPELLER SHAFT
1.00 FOR INTERMEDIATE SHAFT

P = POWER AT RATED SPEED (KW) ----- 7,900 kW

n = R.P.M AT RATED SPEED----- 127.0 RPM

T = ULTIMATE TENSILE STRENGTH OF SHAFT MATERIAL

* PROPELLER SHAFT : 590 N/mm²

* INTERMEDIATE SHAFT : 590N/mm²

(1) PROPELLR SHAFT

$$D_p = 100 \times 1.22 \times \sqrt[3]{(7,900/127) \times 560 / (590+160)}$$

= 438.54 mm ----- DESIGN : 460 mm

(2) INTERMEDIATE SHAFT

$$D_i = 100 \times 1.0 \times \sqrt[3]{(7,900/127) \times 560 / (590+160)}$$

= 359.46 mm ----- DESIGN : 390 mm

B. THE DIAMETERS OF COUPLING REAMER BOLT OF FLANGE COUPLING (RULE 5-3-207.1)

THE MINIMUM DIAMETER OF THE SHAFT IS TO BE DETERMINED BY THE FOLLOWING EQUATION.

$$D_b = 0.65 \sqrt{(D_i^3 (T + 127) / n \times D \times T_b)}$$

$$T = 0.2 \times d_{pi}$$

WHERE :

D_b = DIAMETER OF BOLT AT JOINT IN (mm)

D_i = REQUIRED DIAMETER OF INTMEDIATE SHAFT IN mm----- DESIGN : 359.46 mm

n = NUMBER OF COUPLING REAMER BOLT FITTED IN ONE COUPLING

* INTERMEDIATE SHAFT / PROPELLER SHAFT-----10 EA

* INTERMEDIATE SHAFT / THRUST SHAFT OF ENGINE-----12 EA

D = BOLT PITCH CIRCLE DIAMETER IN (mm)

* INTERMEDIATE SHAFT / PROPELLER SHAFT----- 625 mm

* INTERMEDIATE SHAFT / THRUST SHAFT OF ENGINE----- 780 mm

T_b = MINIMUM TENSILE STRENGTH OF BOLT MATERIAL IN N/mm² ----- 923N/mm²

T = MINIMUM TENSILE STRENGTH OF BOLT MATERIAL IN N/mm² ----- 590N/mm²

(1) INTERMEDIATE SHAFT/PROPELLR SHAFT

$$D_{b1} = 0.65 \sqrt{359.46^3 (590+160) / (10 \times 625 \times 932)}$$

= 50.26 mm ----- DESIGN : 65 mm

(2) INTERMEDIATE SHAFT/ THRUST SHAFT OF MAIN ENGINE

$$D_{b2} = 0.65 \sqrt{359.46^3 (590 +160) / (12 \times 780 \times 932)}$$

= 41.07 mm ----- DESIGN : 64 mm



SHAFTING PLAN

HULL NO.	1009-1012 1031-1032
DWG. NO.	DA500M104

5
11

C. THICKNESS OF FLANGE COUPLING (RULE 5-3-207.2)

(1) PROPELLER SHAFT FLANGE

$$T_p \geq D_{b1}, \quad T_p \geq 0.2D_{p-fwd}$$

$$T_p \geq 50.67 \text{ mm}, \quad T_p \geq 0.2 \times 359.46 = 71.89 \text{ mm} \text{ ----- DESIGN : 80 mm}$$

(2) INTERMEDIATE SHAFT FLANGE

$$T_i \geq D_{b2}, \quad T_i \geq 0.2D_i$$

$$T_i \geq 41.07 \text{ mm}, \quad T_i \geq 0.2 \times 359.46 = 71.89 \text{ mm} \text{ ----- DESIGN : 80 mm}$$

WHERE :

T_p & T_i = MIN. REQ. THICKNESS OF PROP. SHAFT FLANGE & INTER. SHAFT FLANGE

D_{p-fwd} & D_i = MIN. REQ. OF PROP. SHAFT (COUPLING FLANGE SIDE) & INTERMEDIATE SHAFT

D_{b1} & D_{b2} = MIN. REQ. OF AFT & FWD COUPLING HOLE

D. FILLET RADIUS (RULE 5-3-207.2)

(1) PROPELLER SHAFT FLANGE

$$R_p \geq 0.8D_{p-fwd}$$

$$R_p \geq 0.08 \times 390 = 31.2 \text{ mm} \text{ ----- DESIGN : 40 mm}$$

(2) INTERMEDIATE SHAFT FLANGE

$$R_i \geq 0.8D_i$$

$$R_i \geq 0.08 \times 390 = 31.2 \text{ mm} \text{ ----- DESIGN : 40 mm}$$

WHERE :

R_p = MIN. REQ. FILET RADIUS AT THE BASE OF PROPELLER. SHAFT COUPLING FLANGE

R_i = MIN. REQ. FILET RADIUS AT THE BASE OF INTERMEDIATE SHAFT COUPLING FLANGE

D_{p-fwd} = DESIGNED PROPELLER SHAFT DIAMETER (COUPLING FLANGE SIDE)

D_i = DESIGNED INTERMEDIATE SHAFT DIAMETER

E. STERN TUBE AFTER BUSH LENGTH (RULE 5-3-206)

$$L \geq 2 \times D_p$$

$$L \geq 2 \times 438.54 = 877.08 \text{ mm} \text{ ----- DESIGN : 950 mm}$$

WHERE :

L = THE LENGTH OF STERN TUBE BUSH

D_p = REQUIRED DIAMETER OF PROPELLER SHAFT

F. STERN TUBE FWD BUSH LENGTH

DESIGN : 350 mm

#. ALL ABOVE CALCULATED VALUE CAN BE CHANGED LATER ACCORDING TO THE RESULT OF TORSIONAL VIBRATION CALCULATION.



SHAFTING PLAN

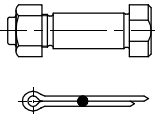
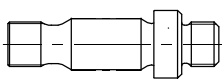
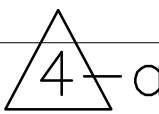
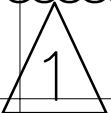
HULL NO. 1009-1012
1031-1032

DWG. NO. DA500M104

6

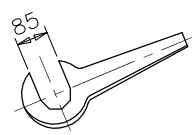
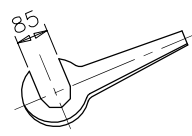
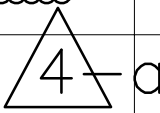
11

LIST OF SPARES

NO	PART NAME	MATERIALS	Q'TY	SKETCH DRAWING	REMARKS
1	NO.1 COUPLING REAMER BOLT, NUT & SPLIT PIN FOR PROP' SHAFT	SCM435 SWRM	3		BOLT DIA. : FINAL + 3mm
2	NO.2 COUPLING REAMER BOLT, NUT & SPLIT PIN FOR INTER' SHAFT	SCM435 SWRM	4		BOLT DIA. : FINAL + 3mm
					

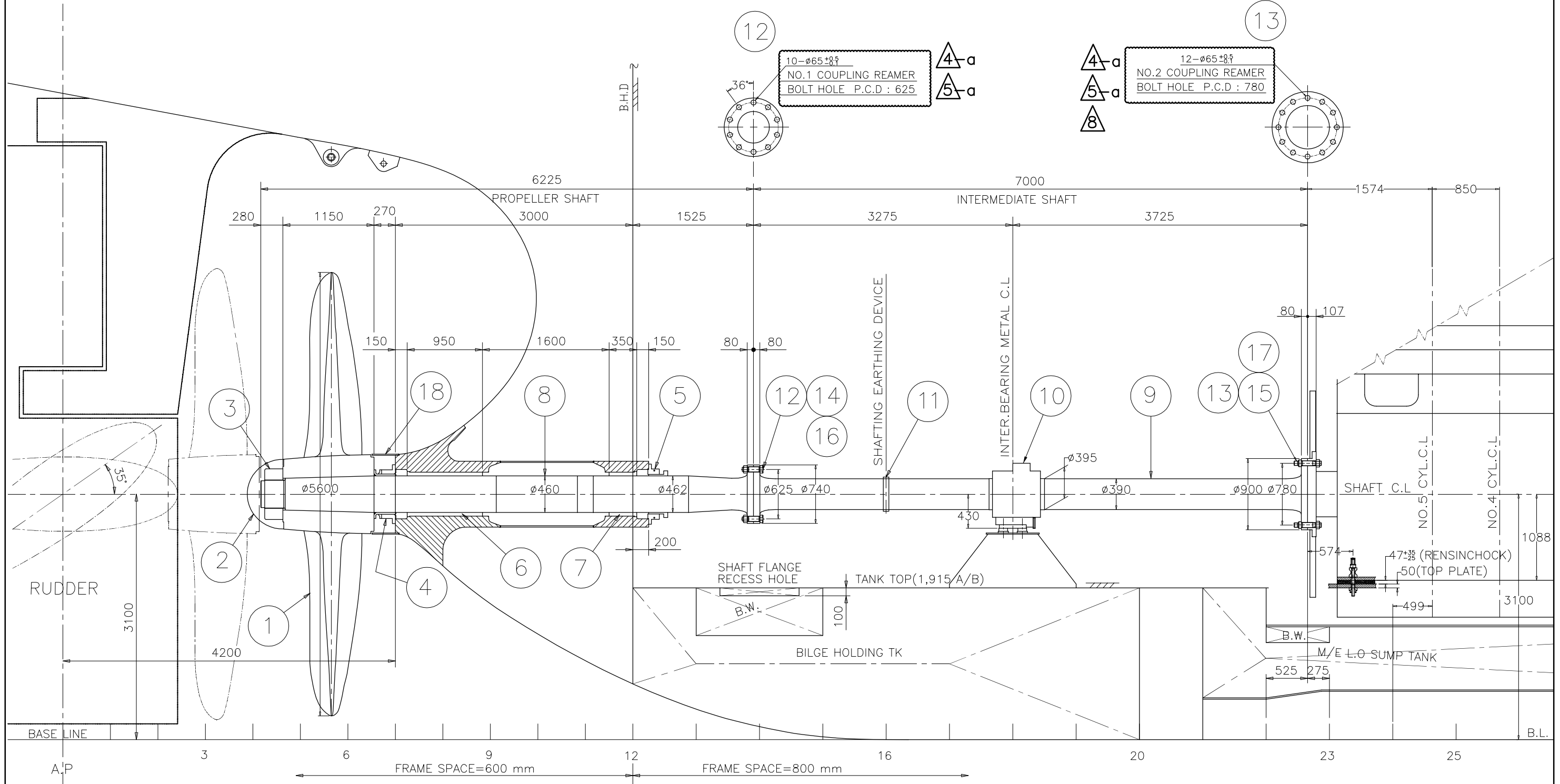
6-a

LIST OF TOOLS

NO	PART NAME	MATERIALS	Q'TY	SKETCH DRAWING	REMARKS
1	SPANNER FOR NO.1 COUPLING REAMER BOLT	S45C	1		
2	SPANNER FOR NO.2 COUPLING REAMER BOLT	S45C	1		
					

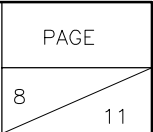


MAIN ENGINE		PROPELLER PARTICULARS	
TYPE	MAN B&W 5S50MC-C7	TYPE	FIXED PITCH PROPELLER
MCR	7,900kW at 127RPM	NO.OF BLADE	4
NCR	6,715kW at 120.3RPM	DIAMETER	abt.5,600 MM



HULL NO.	1009-1012 1031-1032
DWG. NO.	DA500M104
SCALE	1/50

SHAFTING PLAN



LEFT HAND THREADED
(Tr355xP12)

M48xP5
DP.75

N8/
N7/
N9/
N6/
N5/
N4/
N3/
N2/
N1/

"A"
"F"
VIEW "B"
TAPER=1/20
SMOOTHLY ROUND
"E"
"D"

Ø335
Ø460±_{0.05}
Ø460±_{0.05}
Ø462±_{0.05}
Ø400
PCD:625
Ø740±_{0.1}

AFT S/T BUSH
FWD S/T BUSH

50 260 1120 1545 1030 200 1200 740 80

6225
PROPELLER SHAFT LENGTH

TOP
36°
ST'BD
PORT
BOTTOM

10-Ø65±_{0.1}
NO.1 COUPLING REAMER
BOLT HOLES

DETAIL "A"
SCALE : NONE

VIEW "F"
SCALE : 1/2

VIEW "B"
SCALE : 1/2

VIEW "C"
SCALE : 1/2

DETAIL "E"
SCALE : 1/10

HOLE FOR LOCKING PLATE

NO CHAMFER
10-Ø65±_{0.1} NO.1 COUPLING
REAMER BOLT HOLES

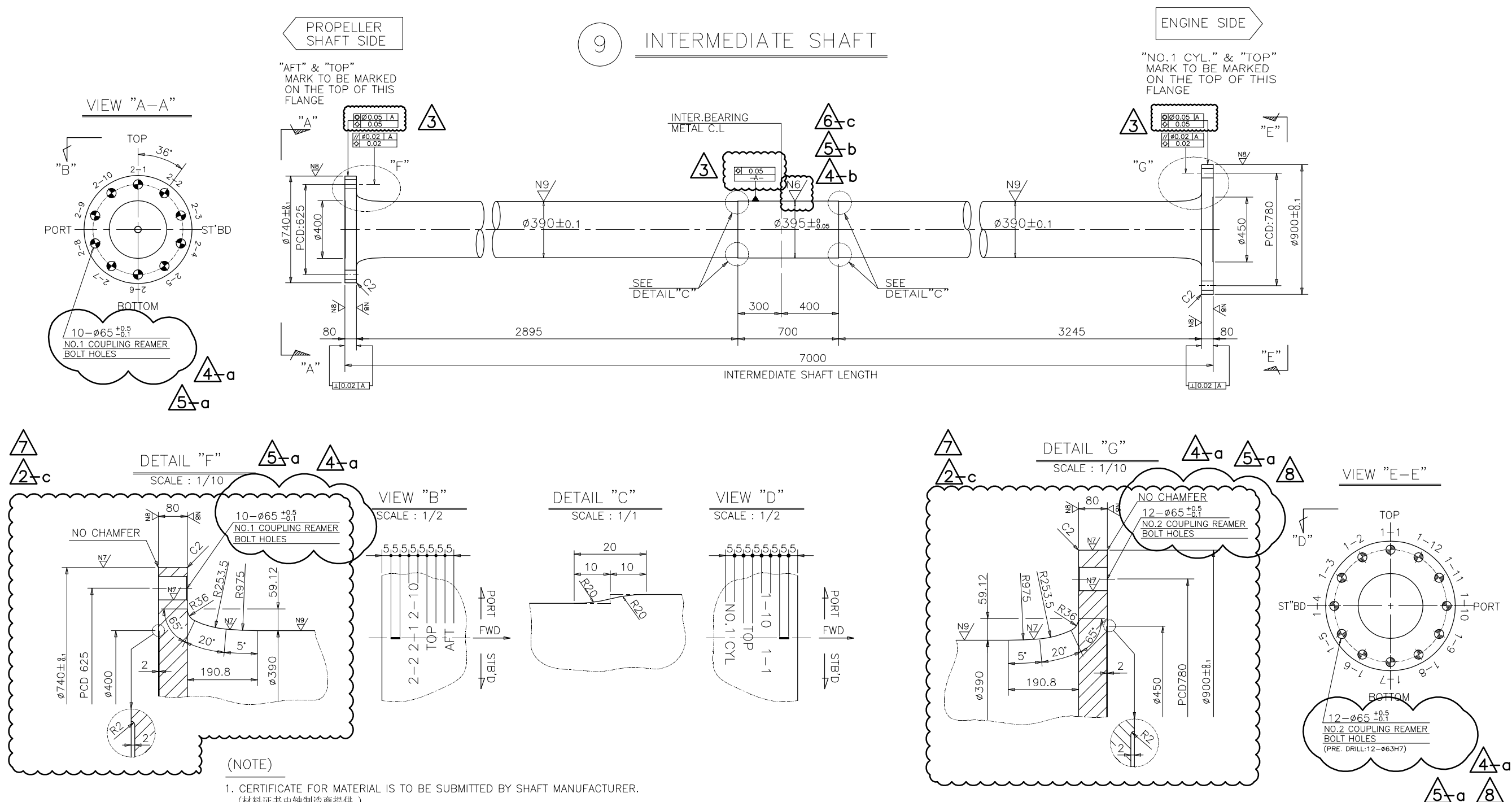
8.65
R1000
R260
R350
5°
20°
195.16
Ø400
PDC: 625
Ø740±_{0.1}

INDICATE FOR MATERIAL IS TO BE SUBMITTED BY SHAFT MANUFACTURER.
(书由轴制造商提供。)

MARKING SHALL BE ENGRAVED BY 0.2 mm DEPTH ON THE END OF TAPER
AND FLANGE (SEE VIEW "B", "C")

1. CERTIFICATE FOR MATERIAL IS TO BE SUBMITTED BY SHAFT MANUFACTURER.
(材料证书由轴制造商提供。)
2. TOP MARKING SHALL BE ENGRAVED BY 0.2 mm DEPTH ON THE END OF TAPER PART AND FLANGE (SEE VIEW "B", "C")
(在锥形部分和法兰末端将雕刻 0.2mm 深的上方标记。(请看视图 "B", "C"))
3. THE COUPLING BOLT HOLES OF PROPELLER SHAFT AND INTERMEDIATE SHAFT SHALL BE MACHINED TOGETHER.
(螺旋桨轴和中间轴的连接螺栓洞将一起加工。)
4. POSITIONS OF EACH COUPLING BOLT HOLE ARE TO BE MARKED WITH SERIAL NUMBER ON THE SURFACE OF FLANGE IN ORDER CLOCKWISE FROM AFT VIEW.
(从后面看顺时针方向在法兰表面每个连接螺栓洞的位置都制造有连续的系列号。)
5. ALL TESTS AND INSPECTIONS ARE TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT RULE REQUIREMENT OF CLASSIFICATION SOCIETY.
(所有测试和检验将按照船级社的相关规则和要求进行。)
6. SURFACE ROUGHNESS; " $\sqrt{12.5}$ " EXCEPT AS SHOWN.
(除了图纸上表示的以外其它的表面粗糙度为 " $\sqrt{12.5}$ ".)

HULL NO.	1009-1012 1031-1032	SHAFTING PLAN
DWG. NO.	DA500M104	
SCALE	1/30	

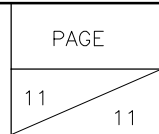


- (NOTE)
1. CERTIFICATE FOR MATERIAL IS TO BE SUBMITTED BY SHAFT MANUFACTURER.
(材料证书由轴制造商提供。)
 2. TOP MARKING SHALL BE ENGRAVED BY 0.2 mm DEPTH ON THE END OF TAPER PART AND FLANGE (SEE VIEW "B", "D")
(在锥形部分和法兰末端将雕刻0.2mm深的上方标记。(请看视图 "B", "D"))
 3. COUPLING BOLT HOLES OF INTERMEDIATE SHAFT AND THRUST SHAFT SHALL BE MACHINED TOGETHER.
(中间轴和推进轴的连接螺栓洞将一起加工。)
 4. POSITIONS OF EACH COUPLING BOLT HOLE ARE TO BE MARKED WITH SERIAL NUMBER ON THE SURFACE OF FLANGE IN ORDER CLOCKWISE FROM AFT VIEW.
(从后面看顺时针方向在法兰表面每个连接螺栓洞的位置都制造有连续的系列号。)
 5. ALL TESTS AND INSPECTIONS ARE TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT RULE REQUIREMENT OF CLASSIFICATION SOCIETY.
(所有测试和检验将按照船级社的相关规则和要求进行。)
 6. SURFACE ROUGHNESS; $R_{\sqrt{12.5}}$ EXCEPT AS SHOWN.
(除了图纸上表示的以外其它的表面粗糙度为 $R_{\sqrt{12.5}}$ 。)

HULL NO.	1009-1012 1031-1032
DWG. NO.	DA500M104
SCALE	1/30

SHAFTING PLAN

SHAFTING PLAN



NO.	DESCRIPTION	MATERIAL	Q'TY		(Kg) WEIGHT	REMARK
			W	S		
15	NO.2 COUPLING NUT	S20B	12	4	32	T.S: $\geq 400 \sim 530 \text{N/mm}^2$
13	NO.2 COUPLING REAMER BOLT	S25Cr1	12	4	104	T.S: $\geq 690 \sim 840 \text{N/mm}^2$