DOCUMENT RESUME

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ABSTRACT

This outline, for the course numbered B-28, is designed for use in teaching apprentice pipehangers who are working with submarines how to interpret piping and hanger blueprints accurately and to visualize complete hanger assemblies, piping symbols, and the locations of the items discussed on the blueprints. Addressed in the individual lessons of the course are the following topics: understanding and using the 688 Standard Cross-Referencing System, reading configuration drawings, locating various hanger assemblies on blueprints, understanding and using piping symbols and references, and using the TRIDENT Class Cross-Referencing System. Each lesson contains some or all of the following: lesson objectives, a list of materials required, questions and answers, definitions, technical drawings, and instructional text. (MN)

B-28

PIPEHANGER BLUEPRINT READING

DIVISION OF VOCATIONAL-TECHNICAL SCHOOLS

CONNECTICUT DEPARTMENT OF EDUCATION

1983-1984

COURSE TITLE: PIPEHANGER BLUEPRINT READING

COURSE NUMBER: B-28

PERFORMANCE OBJECTIVES: The student will be able to accurately interpret piping and hanger blueprints and readily visualize complete hanger assemblies, piping symbols, and the locations of items discussed.

PREREQUISITES: PH-1

TEXTBOOKS: B-28 PIPEHANGER BLUEPRINT READING

DRAWINGS:

688 CLASS

256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F
2355-202 R/H, 6353-591 R/Z, 2285-213 R/F,
2744-51 R/J, 2744-33 R/H, 2740-377 R/K, 2285-237 R/C
2285-238 R/C, 2300-543 R/N, 2300-544 R/P,
2300-547X1,

TRIDENT CLASS

2620-286-10 R/N, 2620-286-11 R/K, 2620-286-12 R/M,
2620-286-13 R/H, 2620-286-14 R/G, 87524-9071 R/K
87524-4006 R/D, 87742-1702 R/G, 87742-1701 R/G
87522-2122 R/D, 87522-2123 R/D, 87522-2124 R/D
87744-3002 R/G, 87744-3004 R/G, 87742-1302 R/E
87742-3104 R/F, 87742-3103 R/P, 87742-3101 R/E

B-28 Pipehanger Blueprint Reading

Lesson 1

Materials Req.

Handout - 688 Class Cross Referencing System

Dwgs. 2355-202 R/H, 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F

Student Material List Answer Sheet

Part 1 of 3

Instructions:

Discuss Cross Referencing Using H/O only

Part 2 of 3

Instructions:

Issue plans listed on lead sheet of H/O. Follow the format shown on H/O using standard plans.

Part 3 of 3

Instructions:

Completely identify hanger H-5 using cross-referencing system without use of H/O. Student Material Answer Sheet will be used for answers.

688 STANDARD CROSS REFERENCING SYSTEM

PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAIN THE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS.

FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF 688 HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

688 HANGER DETAIL

2355-202

688 HANGER STANDARD DRAWINGS:

216357	255454
256373	256372

TO BE TURNED IN AFTER CLASS !!!!

NOTE: Index is a good time saver.

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15	ASSEMBLY-HANGER H9
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46	ASSEMBLY-HANGER 1135 & 1136

NOTES

1. Starting with hanger detail plan 2355-202
2. Go to index and locate the hanger in question and sheet No.

NOTE: Always look in the index hangers are not always listed in order.

NOTE: Ref. Block shows you all related drawings to this plan.

START WITH H-5

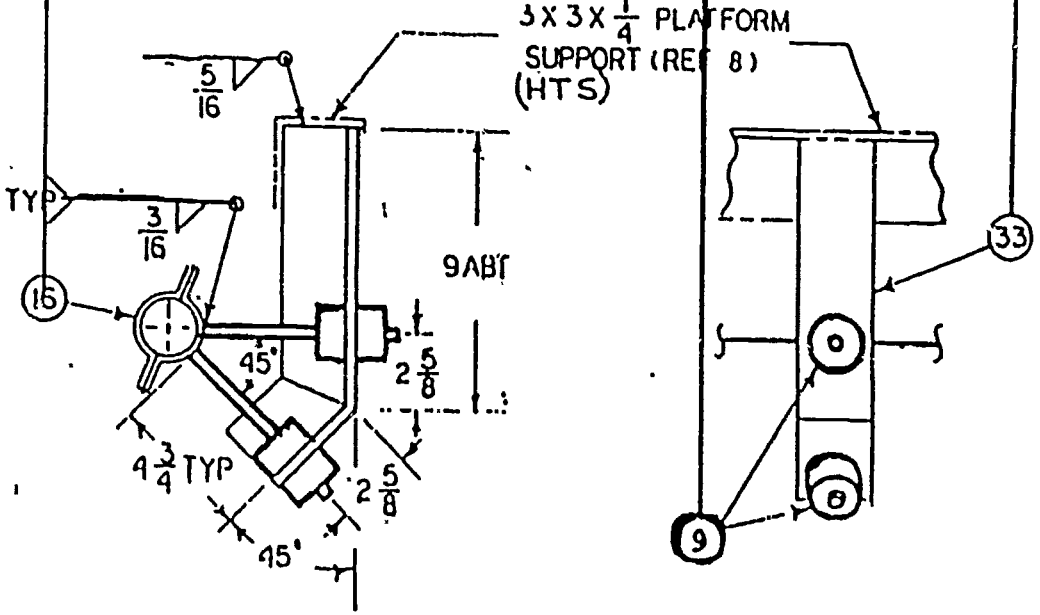
REFERENCES

NO.	TITLE	NAVSHIPS NO	DWG NO
1	PP ARR ELEC & AUX FW COOL TO & FROM AIR CPRSR ER PLAN	516-4457831	2355-101
2	MOI NOTES FOR WELDS & MAT'L SUB STRUCTURE (NON-NUC)	805-4454178	8180-348
3	PAINTING SCHEDULE	805-4483198	8389-1
4	PIPE HANGER DETAIL & DESIGN INSTRUCTIONS		355454
5	SPI STRUCTURES-SPOOL MID RESILIENT PIPE HANGERS		356377
6	PLATFORM DK STRUCTURE 76-82 UL ER	103-4458614	1888-481
7	RESILIENT MOUNTS FOR PIPE HANGERS-ASST & DET		216357
8	ARR PLATING UL FR 76-82	803-4455839	1888-58
9	FDN-LP AIR SYSTEM ER	113-4498117	1220-1498
10	NEO PLATE MP AIR COMPRESSOR	516-4553198	6351-14
11	TANK BILGE COLLECTING SYS ER FR 78-82 &	113-4455033	1218-581
12	SOUND DAMPING INT PRESS HULL AFT FRAME 65	601-45555414	2020-36
13	HP AIR COMPRESSOR		6351-61 67
14	FDN - H.P. AIR DRAIN SEPARATOR E.R.	113-4557052	1220-2215
15	REPLACE H.P. AIR FILTER, COOLER & MOIS. SEPR.	516-4553589	2260-658

1. [illegible]
2. The description of [illegible]
3. For further information [illegible] to locate all the parts

HANGERS H5

HANGER H5 CONSISTING OF:			
ITEM NO	QTY	L/M SHNO	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6



ELEV LKG PORT

SECT LKG AFT

FWD

NOTES

1. Remember your theory.
2. Item 9 consists of (Mount) (Rod) (Nuts)
3. For further information go to Ref. Block in the upper right hand corner of this page.

   Item 9
   QTY 2
   L/M Sh 6
4. Go to Sh 6 find Item 9

PRIME COAT: ZINC CHROMATE
SEE NOTE 16

HULL NO.	DWG. NO. 355-202	REV F
NAVSHIPS 516-455 1955	SHEET 2 OF	

NOTES

1. L/M gives you description and Ref. Drawings.
2. The description of item 9 is 50# unbonded MTS
3. For further information go to Ref. Block for plan numbers to locate all the parts to MTS.
4. Ref. Dwg. 216357 SH 19 Assy 97A.
5. Procede to proper drawing and Assy.

NOTE: Always read into the Remarks Column.

LIST OF MATERIAL — QUANTITIES ARE FOR ONE

HIT SEE DET	ASSY NO ITEM NO	MTG SYM	ZONE	DESCRIPTION	MAT'L	MATL SPEC	REF DWG	NH STK OR STOCK NO	REMARKS	WPSSE CONT (SEE NOTE)	REV
	1	NA		TYPE 5 RUBBER BLOCK 3/4 THK	STK RUBBER	MIL-S-6855 CL II	255454 SH 29, PC 2		SEE DETAIL SH 32		A
	2	NA		100# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 19 ASSY "96A"				A
	3	NA		TYPE 4 HANGER SUPPORT (MOD)	STEEL	MIL-S-20166 TY U, GR N	256372 SH 10 ASSY 4A100 (MOD)		SEE HGR DET SH 16 & 17		A
	4	NA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 19 ASSY "97D"				A
	5	NA		TYPE 1 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 118 ASSY "1A50"				A
	6	NA		TYPE 1 STRAP HANGER	VARIOUS	———	255454 SH 14 ASSY "AE"				A
	7	NA		TYPE 3 HANGER SUPPORT	STEEL	VARIOUS	256372 SH 131 ASSY "3H50"				A
	8	NA		TYPE 3 HANGER SUPPORT	STEEL	MIL-S-20166 TY U, GR N	256372 SH 8 ASSY "3B50"		SEE HGR DET SH 14 & 28		A
	9	NA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 19 ASSY "91A"				A
	10	NA		TYPE 1 STRAP HANGER	VARIOUS	———	255454 SH 14 ASSY "F"				A
	11	NA		TYPE 3 HANGER SUPPORT	STEEL	———	256372 SH131 ASSY "3C50"				A
	12	NA		TYPE 3 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 8 ASSY "3A50"		SEE HGR DET SH 10, 18 & 19		A
	13	NA		TYPE 12 HANGER ASSY	VARIOUS	———	255454 SH 34 ASSY "EJ"				A
	14	NA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	255454 SH 55 ASSY "FB"				A
	15	NA		TYPE 3 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 10 ASSY "4A50"		SEE HGR DET SH 25		A
	16	NA		TYPE 1 STRAP HANGER	VARIOUS	———	255454 SH 14 ASSY "E"				A
	17	NA		TYPE 4 HANGER SUPPORT (MOD)	STEEL	QQ-S-741	256372 SH 10 ASSY "4A50"(MOD)		SEE HGR DET SH 11		A
	18	NA		TYPE 4 HANGER SUPPORT	STEEL	MIL-S-20166 TY U, GR N	256372 SH 10 ASSY "4A50"		SEE HGR DET SH 13		A

216357

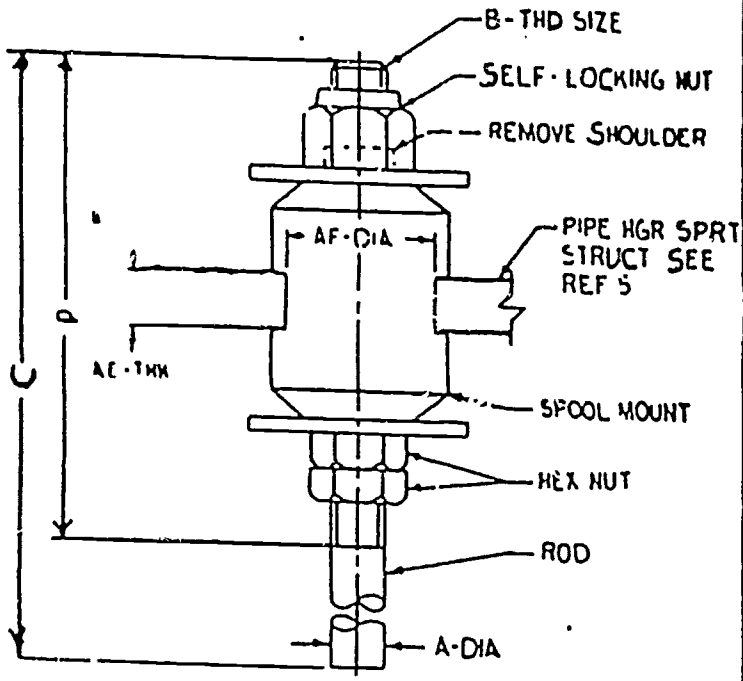
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
A COMPANY

RESILIENT MOUNTS FOR PIPE HANGERS ASSEMBLY AND DETAILS

RESILIENT PIPE HGR ASSY & DET

NOTES

1. Find assy. No. 97A, and read across.
2. Size 50 lb. spool MT, Pc no. 76 in L/M.
3. Self LKG nut Pc. No. 3 in L/M.
4. Hex Nut Pc. No. 12 in L/M.
5. Rod says see sheet 28 procede to that page.



DETAIL-A
UNBONDED SPOOL MOUNTS

TABLE I UNBONDED SPOOL MOUNTS DETAIL-A

REV	ASSY NO	SPOOL MOUNT SIZE	SPOOL MOUNT PC NO	SPOOL MOUNT QTY	ROD SEE SHT 28 PC NO	ROD SEE SHT 28 QTY	SELF-LOCKING NUT PC NO	SELF-LOCKING NUT QTY	HEX NUT PC NO	HEX NUT QTY	DESIGN DIMENSIONS AE	DESIGN DIMENSIONS M	REMARKS	NNPN/ SYM NO
H	95A	50#	76	1	37	1	1	1	12	1	1/8	3/8		1740815
	95B				46		35		34				SEE NOTE 7	1740816
	96A	150#	75		34		2		11		3/16	1/8		1740783
	96B				47		36		35				SEE NOTE 7	1740818
	97A	50#	76		39		3		12		3/16	1-1/16		2406011
	97B				48		37		36				SEE NOTE 7	2406010
	98A	100#	77		46		4		13		1/16	1-7/16		2406009
	98B				49		38		37				SEE NOTE 7	2406008
	99A	200#	78		41		5		14		5/16	1-5/16		1740714
	99B				50		39		38				SEE NOTE7	1740757
J	96C	100#	77	1	—	—	4	1	—	—	7/16	1 7/16		2407648

NOTES
1. Pc No. 39 on rod table.
2. All dimensions are located to the left of table.
3. Example A = 3/8 Dia.
4. All items found in list of material Pc No's 3, 12, 39, and 76.

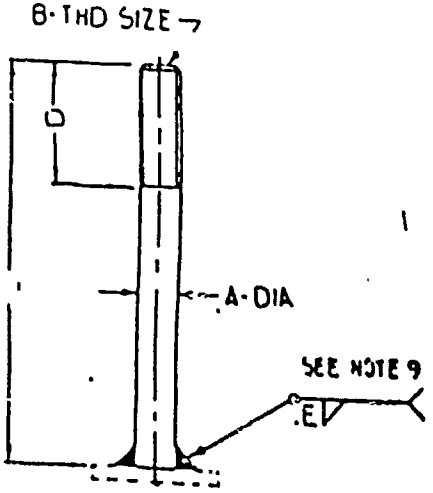


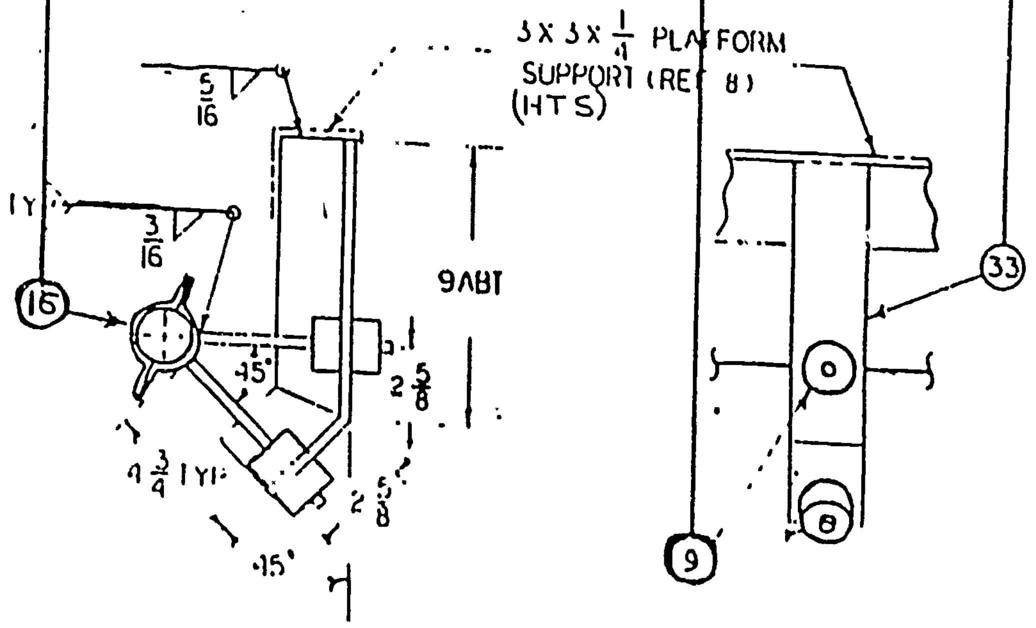
TABLE 6 RODS

PC NO	DIMENSIONS A	B	C	D	E	NNPN/ SYM Nº	REV
37/46	1/4	1/4-28 UNC-2A	18	6	3/16	1740311	H
38/47	5/16	5/16-18 UNC-2A		6	3/16	1740320	
39/48	3/8	3/8-16UNC-2A		12	3/16	1740312	
40/49	1/2	1/2-13 UNC-2A		11	1/4	1740573	
41/50	5/8	5/8-11 UNC-2A		12½	5/16	1740313	
42/51	3/4	3/4-10 UNC-2A		17	5/16	1740321	
43/52	1	1-8 UNC-2A		17	3/8	1740314	
44/53	1-1/4	1-1/4-7 UNC-2A		17	1/2	1740322	
45/54	1-1/2	1-1/2-6 UNC-2A		17	1/2	1740315	
						1740323	
						1740316	
						1740324	
						1740317	
						1740325	
						1740318	
						1740326	
						1740319	
						1740327	

LIST OF MATERIAL

PC NO	QTY	DESCRIPTION	MATL	MATL SPEC	EQPT SPEC OR DEC NO	REMARKS	NNPN/SYM Nº	REV
3	-	3/8 - 16 UNC -3B	STEEL CD-PLD	-	-	-	-	
12	-	3/8 - 16 UNC - 2B	STEEL ZINC PLD	-	-	-	-	
39	-	3/8 -	STEEL	-	SEE SH 28	-	-	
76	-	UNBONDED SPOOL 50# RESILIENT MOUNT	VARIOUS	-	-	-	-	

HANGERS H5



ELEV LKG PORT

FWD

SECT LKG AFT

HANGER H5 CONSISTING OF:			
ITEM NO	QTY	L/M SHNO	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6

NOTES

1. Remember your theory.
2. Item 16 consists of (clamp halves) (liner) and (nut and bolt)
3. For further information go to Ref. block in upper right hand corner of this page.
4. Go to sheet 6 find item 16.

PRIME COAT: ZINC CHROMATE
SEE NOTE 16

HULL NO.	DWG NO. [illegible]	REV F
NAVSHIPS 516-4554955	SHEET 12 OF	

NOTES

1. L/M gives you description and Ref. drawings.
2. The description of Item 16 is type 1 strap hanger.
3. For further Information go to Ref. block for plan numbers and assy. for detail of strap hanger.
4. Ref. Dwg. 255454 SH 14 Assy. E.
5. Proceed to proper drawing and assy.

LIST OF MATERIAL — QUANTITIES ARE FOR ONE

LEFT SIDE DET	ASSY NO ITEM NO	MTG LVL	ZONE	DESCRIPTION	MATL	MATL SPEC	REF DWG	NM SYM OR STOCK NO	REMARKS [1]	NOISE CONT (SEE NOTE)	REV
	1	MA		TYPE 6 RUBBER BLOCK 3/4 THK	SYN RUBBER	MIL-S-6855 CL II	255454 SH 29, PC 2		SEE DETAIL SH 32		A
	2	MA		100# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 18 ASSY "96A"				A
	3	MA		TYPE 4 HANGER SUPPORT (MOD)	STEEL	MIL-S-20166 TY U,GR N	256372 SH 18 ASSY 6A100 (MOD)		SEE HGR DET SH 16 & 17		A
	4	MA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 19 ASSY "92B"				A
	5	MA		TYPE 1 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 118 ASSY "1A50"				A
	6	MA		TYPE 1 STRAP HANGER	VARIOUS	———	255454 SH 14 ASSY "AE"				A
	7	MA		TYPE 7 HANGER SUPPORT	STEEL	VARIOUS	256372 SH 131 ASSY "7H50"		SEE HGR DET SH 14 & 28		A
	8	MA		TYPE 3 HANGER SUPPORT	STEEL	MIL-S-20166 TY U,GR N	256372 SH 8 ASSY "3B50"				A
	9	MA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	216357 SH 18 ASSY "91A"				A
	10	MA		TYPE 1 STRAP HANGER	VARIOUS	———	255454 SH 14 ASSY "F"				A
	11	MA		TYPE 7 HANGER SUPPORT	STEEL	———	256372 SH 131 ASSY "7G50"		SEE HGR DET SH 18, 18 & 19		A
	12	MA		TYPE 3 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 8 ASSY "3A50"				A
	13	MA		TYPE 12 HANGER ASSY	VARIOUS	———	255454 SH 34 ASSY "AJ"				A
	14	MA		50# UNBONDED SPOOL MOUNT ASSY	VARIOUS	———	255454 SH 55 ASSY "FB"				A
→	15	MA		TYPE 5 HANGER SUPPORT	STEEL	QQ-S-741	256372 SH 10 ASSY "4A50"		SEE HGR DET SH 25		A
	16	MA		TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "E"				A
	17	MA		TYPE 4 HANGER SUPPORT (MOD)	STEEL	QQ-S-741	256372 SH 18 ASSY "4A50" (MOD)		SEE HGR DET SH 11		A
	18	MA		TYPE 4 HANGER SUPPORT	STEEL	MIL-S-20188 TY U, GR N	256372 SH 18 ASSY "4A50"		SEE HGR DET SH 13		A

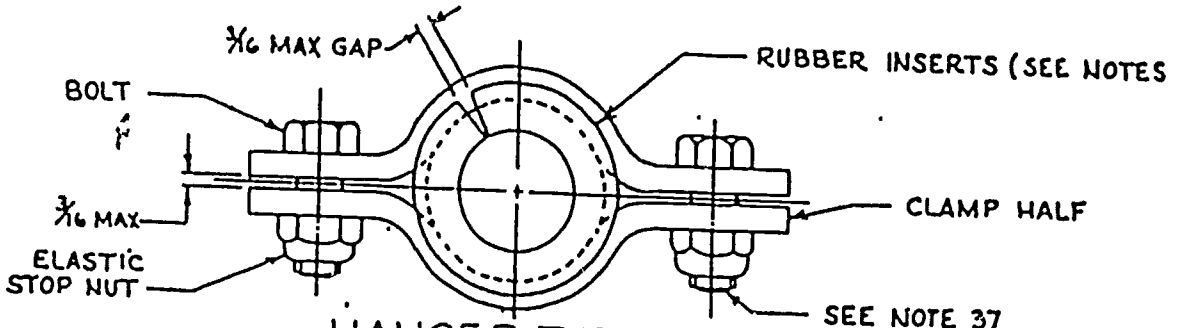
255454

ASSEMBLIES FOR STRAP HANGERS

TEMPERATURES 250°F AND LESS

NOMINAL PIPE SIZE	STEEL ASSY	STEEL NNPN FOR ASSY	STEEL PC NO. CLAMP HALF SH 15 (2 REQ'D)	STEEL PC NO. RUBBER INSERT SH 16 (1 REQ'D)	STEEL PC NO. BOLT SH 10 (2 REQ'D)	STEEL PC NO. NUT SH 9 (2 REQ'D)	STEEL (ZINC COATED) ASSY	STEEL (ZINC COATED) NNPN FOR ASSY	ZINC COATED PC NO. CLAMP HALF SH 15 (2 REQ'D)	ZINC COATED PC NO. RUBBER INSERT SH 16 (1 REQ'D)	ZINC COATED PC NO. BOLT SH 11 (2 REQ'D)	ZINC COATED PC NO. NUT SH 9 (2 REQ'D)	CRES ASSY	CRES NNPN FOR ASSY	CRES PC NO. CLAMP HALF SH 15 (2 REQ'D)	CRES PC NO. RUBBER INSERT SH 16 (1 REQ'D)	CRES PC NO. BOLT SH 11 (2 REQ'D)	CRES PC NO. NUT SH 9 (2 REQ'D)
1/4	A	2403243	151	451	51	28	AA	2403257	201	451	74	33	BA	2403268	301	451	74	33
3/8	B	244	152	452	51	28	AB	2409186	202	452	74	33	BB	2409197	302	452	74	33
1/2	C	245	153	453	52	29	AC	2403258	203	453	75	34	BC	2403269	303	453	75	34
3/4	D	246	154	454			AD	2409187	204	454			BD	2409198	304	454		
1	E	247	155	455			AE	2403259	205	455			BE	2403270	305	455		
1 1/4	F	248	156	456			AF	2409188	206	456			BF	2409199	306	456		
1 1/2	G	249	157	457	53 ●		AG	2403260	207	457	76 ●		BG	2403271	307	457	76 ●	
2	H	250	158	458	54		AH	261	208	458	77							
2 1/2	J	251	159	403	55	30	AJ	262	209	403	78	35						
3	K	252	160				AK	263	210									
3 1/2	L	253	161				AL	2409189	211									
4	M	254	162				AM	2403264	212									
5	N	255	163				AN	265	213									
6	P	2403330	164		56	31	AP	266	214		79	36						
8	R	2403256	165		56	31	AR	267	215		79	36						

● PC NO 52 & 75 MAY BE SUBSTITUTED FOR PC NO 53 & 76, RESPECTIVELY.



HANGER TYPE No 1

NOTES

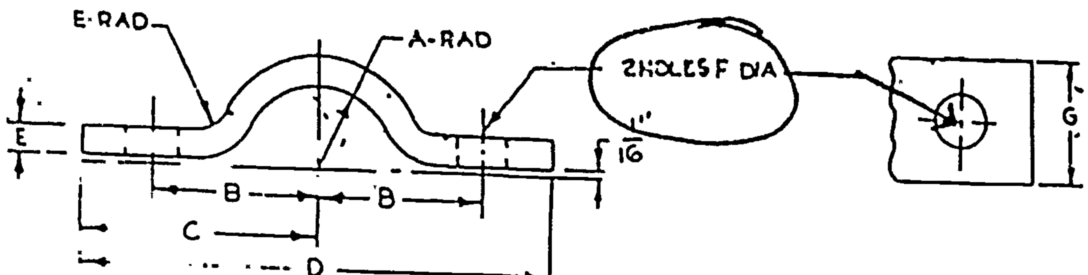
1. Find assy. E.
2. Assy. E IPS size is 1".
3. Clamp half (Pc No. 155) see sheet 15.
4. Rubber insert Pc. No 455 (liner) see sheet 16.
5. Bolt Pc. No 52 see sheet 10.
6. nut Pc. No. 29 see sheet 9.

NOTE: Remember the Pc. No. before going to another sheet.

SHEET 14

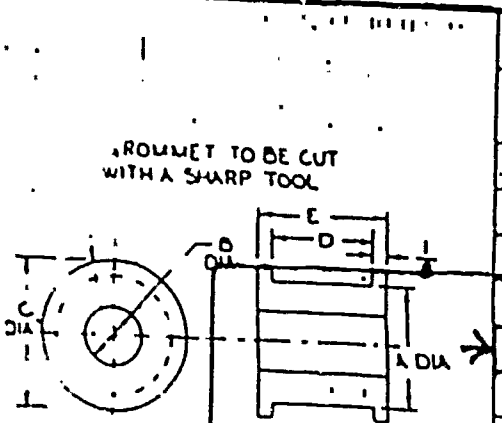
CLAMP HALF

NOM PIPE SIZE	MATERIAL: STEEL PC NO	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO	STEEL/ZINC COATED PC NO.	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO	CRES PC NO.	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO	MIN ORD QTY	DIMENSIONS A	B	C	D	E	F	G
1/4	151	QQ S-698	97-20-250		201	QQ-S-698	97-20-250		301	QQ S-766C CL 316 COND A	97-34-084		4 1/2	25/64	1 1/8	1 3/8	3 1/4	1/8	3/8	5/8
3/8	152				202				302				4 1/2	15/32	1 1/4	1 3/8	3 1/2	1/8	[illegible]	5/8
1/2	153		-251		203		-251		303	QQ-S-763 B CL 304, COND A	97-34-596		5 1/2	11/16	1 3/8	2	4	3/16	7/16	1
3/4	154				204				304				5 1/2	[illegible]	1 1/2	2 1/2	4 1/2	3/16	7/16	1
	155				~~205~~				~~305~~				6	29/32	1 5/8	2 1/4	4 1/2	3/16	7/16	1
1 1/4	156	QQ S 741	31-301		206	QQ-S-741	-31-301		306		-620		6 1/2	1 1/16	1 5/8	2 1/2	5	1/4	7/16	1
1 1/2	157				207				307				7	1 1/16	2	2 5/8	5 1/4	1/4	1/2	1
2	158				208				308				8	1 5/16	2 1/4	2 7/8	5 3/4	1/4	1/2	1
2 1/2	159		-304		209		-304		309		-622		9	1 11/16	2 5/8	3 1/8	6 3/8	1/4	9/16	1 1/4
3	160				210				310				10	2	2 7/8	3 3/8	7 1/4	1/4	5/8	1 1/4
3 1/2	161				211				311				10 1/2	2 1/4	3 1/8	3 7/8	7 3/4	1/4	5/8	1 1/4
4	162				212				312				11 1/2	2 1/2	3 3/8	4 1/8	8 1/4	1/4	11/16	1 1/4
5	163				213				313				13	3 1/16	4	4 7/8	9 1/4	1/4	3/4	1 1/4
6	164		-305		214		-305		314		-642		16	3 5/8	4 7/8	5 3/8	11 1/4	3/8	13/16	1 1/4
8	165				215				315				19	4 3/8	5 3/8	6 3/8	13 1/4	3/8	13/16	1 1/4



NOTES

1. Pc No. 155 1" IPS
2. Read to dimensions table
3. Dimensions are lettered to go with diagram below.
4. Example 2 holes F dia. F= 7/16
5. Go to Sheet 16 find item 455



RUBBER GROMMET INSERTS 180°F MAX.

PC NO	PIPE SIZE	MATERIAL	MATERIAL SPEC	RAW MATL SOURCE	NN SYM OR STOCK NO	DIMENSIONS A	B	C	D	E	REMARKS
451	1/8	RUBBER SYNTHETIC	MIL-S-6855 CL II 60DUR	—	97-79-070	25/32	1/2				401 MAY BE SUBSTITUTED 100FT LESS
452	3/8			—	97-79-071	15/16	11/16	5/16			
453	1/2			—	97-79-072	1 11/32	27/32	1 3/8	1	1 1/4	402 MAY BE SUBSTITUTED 100FT LESS
454	3/4			—	97-79-078	1 9/16	1 1/16	1 15/16			
455	1			—	97-79-079	1 15/16	1 5/16	2 7/16			
456	1 1/4			—	97-79-080	2 5/32	1 11/16	2 7/16			
457	1 1/2			—	97-79-076	2 7/16	1 29/32	2 11/16			
458	2			—	97-79-077	2 3/8	2 3/8	3 3/8			
459	1/4 OD			—	97-79-078	1/2	1/4	3/4	25/32	3/8	—
460	1/4			—	97-79-081	11/16	1/2	1 1/16	5/8	1/4	

DWG NO 255454 REV
SHEET 16

NOTES

1. PC. No. 455 is a 1" grommet.
2. Dimensions are lettered by size.
3. Example: B dia. = 1 5/16.
4. PC. No. 29 sheet 9.
5. Pc. No. 52 sheet 10.

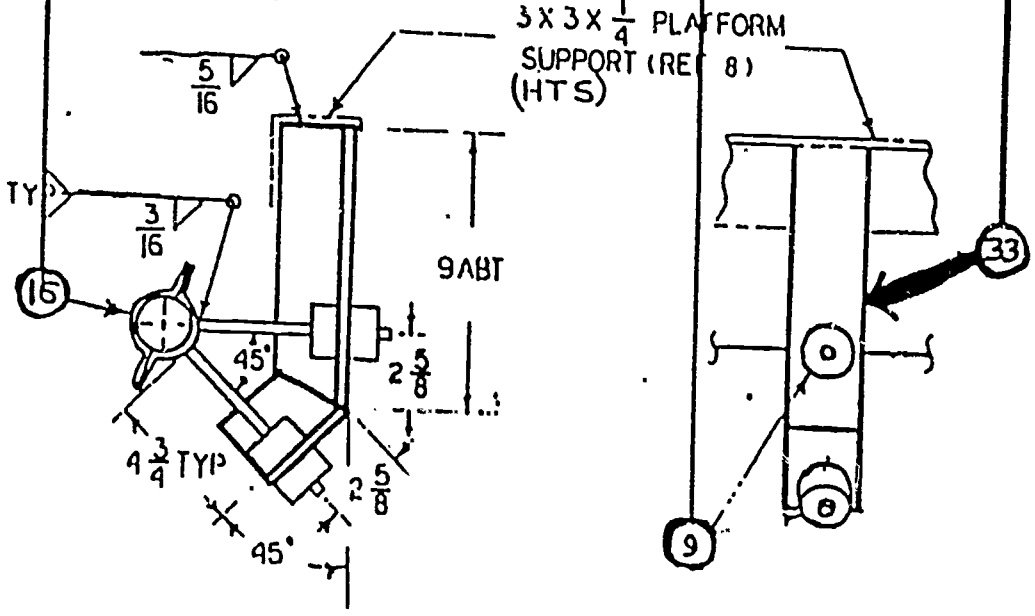
SHEET 9 LIST OF MATERIAL

PC NO	QUANTITY OF MATL	DESCRIPTION	MATERIAL	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO.	REMARKS
24	LG AS ORDERED	MULTIPLE STRAP HANGER 1 1/16	STEEL ZINC PLATED	QQ-S-645	97-20-251	—	FOR HGR TYPE SEE 5
25		1 1 1/4		QQ-S-741	97-31-301	—	
26		1 1/2 & 1/2			97-31-304	—	
27	—	HEX NUT SELF LOCKING 1/4 20 UNC-2B	STEEL CD PLD	MIL-N-25027	—	97 64 224	MS 178290 CLASS 3B SEE FIT MAY BE SUBSTITUTE NOTE 36
28	—	5/16 18 UNC-2B			—	97-64-225	
29	—	3/8 16 UNC-2B			—	97-64-226	

SHEET 10 LIST OF MATERIAL

PC NO	QUANTITY OF MATL	DESCRIPTION	MATERIAL	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO.	REMARKS
47	LG 2 7/8	HEX HEAD BOLT 1/4 20 UNC 2A	STEEL ZINC PLD	MIL-B-8879A GR 2 TY II	—	97-60-410	
48	2 3/4				SY'97-LC-411	—	CUT FROM LG 3"
49	3	3/8 16 UNC 2A			—	97-60 435	
50	2 1/2				—	97-60-436	
51	1	5/16 18 UNC 2A			—	-97-60-415	
52	1/2	3/8 16 UNC-2A			—	97-60-427	

HANGERS H5



HANGER H5 CONSISTING OF:

ITEM NO	QTY	L/M SYMBOL	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6

NOTES

1. Item 33 is a support.
2. For details of support go to SH 7 in list of material. Look up item 33.
3. Item 33 says look in plan 256"72 assy. 4A50 on sheet 10 for details.
4. Proceed to proper plan and sheet and assy.

PRIME COAT: ZINC CHROMATE SEE NOTE 16

HULL NO.	DWG. NO. 7355-202	REV F
NAVSHIPS 516-4554955	SHEET 12 OF	

QTY	ASSY NO / ITEM NO	MIC LVL	ZONE	DESCRIPTION	MATL	MATL SPEC	REF DWG	MN STK OR STOCK NO.	REMARKS	NOISE CONT (SEE NOTE)	REV
	33	M4		TYPE 4 HANGER SUPPORT (MOD)	STEEL	QQ-S-741	256372 SH 18 ASSY 4A50 (MOD)		SEE HGR DET SH 12		A

LIST OF MATERIAL

QUANTITIES ARE FOR ONE

TYPE 4 SUPPORT

ANGLE TOTAL LG	ASSY NO.	ANGLE BAR SIZE	ANGLE BAR PC NO. SH 5	A ANGLE	B DIM	C DIM	REMARKS
B•C•3/4	4A15	2X2X1/4	5	TO BE DETERMINED BY ARR PLAN	TO BE DETERMINED BY ARR PLAN	TO BE DETERMINED BY ARR PLAN	THE SUM OF B & C DIM NOT TO EXCEED 14
B•C•3/4	4B15	2"X2"X1/4	6				THE SUM OF B & C DIM NOT TO EXCEED
B•C•3/4	4C15	3X3X1/4	7				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1	4A50	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{8}$	8				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1	4B50	3X3X3/8	9				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1	4C50	3½X3½X3/8	10				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1 1/4	4A100	$3\frac{1}{2}$ x $3\frac{1}{2}$ x $\frac{1}{2}$	12				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1 1/4	4B100	4 x 4 x $\frac{1}{2}$	13				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1 1/2	4A200	4 x 4 x $\frac{5}{8}$	14				THE SUM OF B & C DIM NOT TO EXCEED
B•C•1 1/2	4B200	5 x 5 x $\frac{5}{8}$	16				THE SUM OF B & C DIM NOT TO EXCEED

DIMENSION PROVIDED BY HGR DET WHEN REQUIRED

FOR HOLE DIA SEE SH 8.

FOR DRILLING SEE SHEET #8

FOR WELD SIZE SEE SHEET 116

<B2(S) V.2

DIM PROVIDED BY HGR DETAIL WHEN REQUIRED

A

B

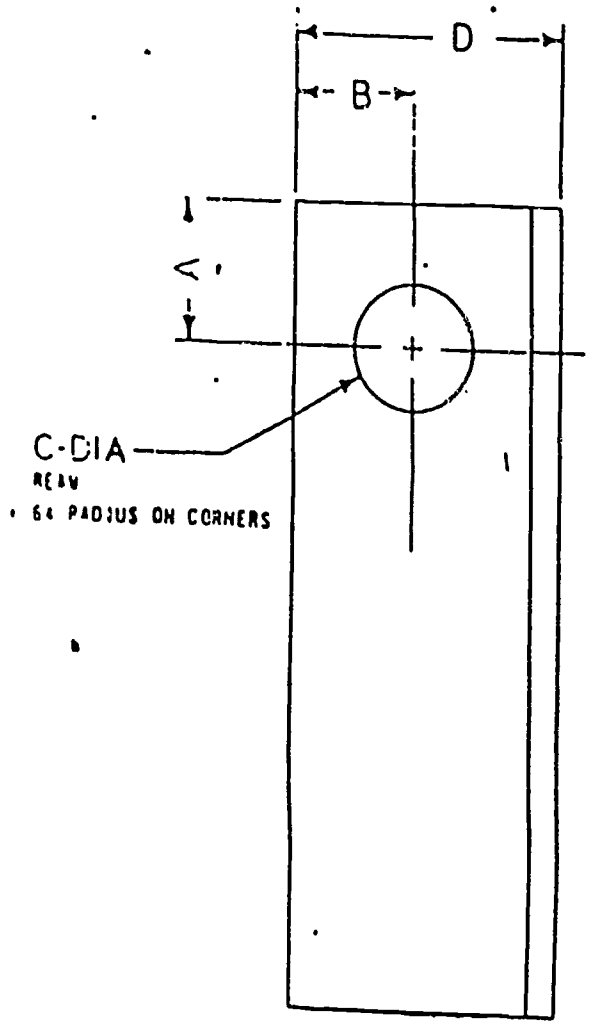
C

NOTE: TYPE 4 SUPPORT STRUCTURE MAY BE MODIFIED BY DRILLING HOLE WHEN REQUIRED BY HANGER DETAIL.

NOTES

1. Go to Sheet 8 for drilling instructions.

NOTE: Always read information around the diagrams given.



SUPPORT DRILLING

MOUNT SIZE	PC NO. SH 5	SUPPORT	DIMENSIONS A-DIM	B-DIM	C-DIA	D-DIM
15M	5	2 X 2 X 1/4	3/4	7/8	1.0	2
15M	6	2½ X 2½ X 1/4	3/4	1 1/8	1.3	2 1/2
15M	7	3 X 3 X 1/4	3/4	1 3/8	1 3	
50M	8	2½ X 2½ X 3/8	1	1 1/8	1 1/4	2½
50M	9	3 X 3 X 3/8	1	1 5/16	1 1-4	3
50M	10	3½ X 3½ X 3/8	1	1 9/16	1 1 3	
100M	11	3 X 3 X 1/2	1 1/4	1 1-4	1 7 16	
100M	12	3½ X 3½ X 1/2	1 1/4	1 1-2	1 7 16	
100M	13	4 X 4 X 1/2	1 1/4	1 3/4	1 7 16	
200M	14	4 X 4 X 5/8	1 1/2	1 11 16	1 5-8	
~~200M~~	~~15~~	~~5 X 3½ X 5/8~~	~~1 1/2~~	~~1 13/16~~	~~1 5-8~~	
200M	16	5 X 5 X 5/8	1 1/2	2 3 16	1 5 8	1

NOTES

1. Always check your item No. in list of material.
2. Pc. No. 8 Sheet 5
3. Proceed to proper sheet and Pc. No.

SH 5 PC NO 8

8	ANGLE BAR 2½X2½X 3/8	STL

HULL NO. DW6 256372
REV: B SH 8

STUDENT MATERIAL LIST

ITEM	QTY	MATL	TYPE SIZE	REMARKS
			CLAMP OR BLOCK ASSEMBLY	
			RESILIENT MOUNT ASSEMBLY (IF REQUIRED)	
			SUPPORT ASSEMBLY	

B-28 Pipehanger Blueprint Reading

Lesson 2

Materials Req.

Dwgs. 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F, 2285-213 R/F

Student Material List Answer Sheet

Question 1

Using Cross-Referencing System identify all parts of Hanger H-1. List answers in order on answer sheet.

Question 2

Using Cross-Referencing System identify all parts of Hanger H-19. List answers in order on answer sheet.

1. What type and size weld is required to attach pc.80 of hanger CF-H-504 to the ship's structure?

   ANS: 9/16" fillet weld, far side - single bevel fillet near side TZV.1 backgrind required.

2. How far above the main axis would hanger CF-H-252 be located?

   ANS: 6' 3" above the main axis

3. What is the piece number and what type of piping is being supported by hanger CF-H-173?

   ANS: F-18D, Flex-hose assy

4. How far off vertical must the rod for hanger CF-H-513 be rolled?

   ANS: 30^{o}

5. What is the minimum lug length for hanger CF-H-549?

   ANS: 4"

6. What type and size weld is required to attach pc.100 to pc.62 on hanger CF-H-177?

   ANS: 3/8" fillet all around

7. How far aft of fr. 96 is hanger CF-H-205 located?

   ANS: 15" aft fr. 96

8. What pipes are being supported by hanger CF-H-205?

   ANS: P57-3, P55-3, and P219-1

9. What is the angle between the rods on hanger CF-H-616?

   ANS: 60° ($40^{\circ} + 20^{\circ}$)

10. What is the length of item 97 on hanger CF-H-548?

    ANS: 10"

11. What type and size weld would be required to attach item 38 to item 126 on hanger CF-H-205?

    ANS: 3/8" fillet all around

12. How far off the vertical centerline would P58-3 on CF-H-206 be located?

    ANS: 54½"

13. Hanger CF-H-260 supports what pipe?

    ANS: P227-5

14. What is the tolerance for angles given on this hanger plan?

    ANS: $\pm 5^{\circ}$

15. What is the dimension given for the mount from the clamp on the aft leg of hanger CF-H-153?

    ANS: 6½"

16. On hanger CF-H-411 what type and size weld is required to attach pc 15-2 to pc 15-1?

    ANS: 5/16" weld near side only, fillet

17. How far below the main axis would hanger CF-H-295 be located?

    ANS: 1" BMA

18. What is the pipe number and size of the pipe supported by hanger CF-H-569?

ANS: P13-3, 1½" I.P.S.

19. How many degrees will the clamp half be rolled off vertical on hanger CF-H-663?

ANS: 70°

20. What is the overhang allowed for pc 77 to the Bilge Collecting Sump Structure on hanger CF-H-165?

ANS: 1"

21. What type of weld inspection is required to sell the ship's attachment weld on hanger CF-H-191?

ANS: MT required

22. How far below the main axis would hanger CF-H-260 be located?

ANS: 8' 9"

23. Hanger CF-H-354 supports what type of piping?

ANS: Capillary tubing

24. What is the angle required for item 32 on hanger CF-H-174?

ANS: 30°

25. What is the length of item 85 on the inboard leg of CF-H-167?

ANS: 8¼"

Lesson 4 (cont.)

11. H-154
    Ans.

12. H-35
    Ans.

13. H-3
    Ans.

14. H-17
    Ans.

15. H-186
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 4

Materials Required:
Dwgs. 2744-51 R/J, 2744-33 R/H

Instructions:
Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axus or ABL

1. H-106
Ans. 9-3/4"fwd. Fr.115, 27½"Port, 59"BMA

2. H-85
Ans. 64"port, 14"Aft Fr.115, 46½"AMA

3. H-139
Ans. 3"fwd. Fr.114, 6'9"Stbd., 11'6" AMA

4. H-183
Ans. 25½"Port, 8½"Aft Fr.106, 8'11½"BMA

5. H-5
Ans. 6'10"Port, 9"Aft Fr.99, 6'10½"BMA

6. H-111
Ans. 3"Aft Fr.114, 22"Stbd, 60"BMA

7. H-7
Ans. 12'5"Port, 7'0½"BMA, 17"Aft Fr.99

8. H-30
Ans. 56"Port, 13½"Fwd Fr. 112, 62-3/4"BMA

9. H-149
Ans. 8'3"AMA, 13'1½"Stbd, 11"Fwd. Fr.103

10. H-88
Ans. $\mathbb{C}_L$ Fr.117, 10'7"Port, 44"AMA

Lesson 4 (cont.)

11. H-154
Ans. 7"Port, 15'6"AMA, 6"Fwd Fr.101

12. H-33
Ans. 26½"AMA, 4"Fwd Fr.112, 13'9"Port

13. H-3
Ans. 11½"Aft Fr.99, 28"Port, 8'10"BMA

14. H-17
Ans. 9"Fwd Fr.107, 22"Port, 13'13½"BMA

15. H-186
Ans. 5"Stbd, 14'1-3/4"AMA, 13-3/4"Fwd Fr.109

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:
Dwgs. 2740-377 R/K

Instructions:
Give all locations for the following hangers. (Port/Stbd. of Centerline, Fwd./Aft of Frame Abv./Blw Main Axis or ABL)

1. H-3
Ans.

2. H-6
Ans.

3. H-40 (No Height Dim)
Ans.

4. H-18
Ans.

5. H-32
Ans.

6. H-29
Ans.

7. H-13
Ans.

8. H-49
Ans.

9. H-4
Ans.

10. H-30
Ans.

11. H-39
Ans.

12. H-14
Ans.

13. H-5 (No Height Dim)
Ans.

14. H-20
Ans.

15. H-25

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:
Dwgs. 2740-377 R/K

Instructions:
Give all locations for the following hangers. (Port/Stbd. of Centerline, Fwd./Aft of Frame Abv./Blw Main Axis or ABL)

1. H-3
Ans. 12'8-1/8"Port, 8½"Fwd. Fr. 53, 12'11-3/4"ABL

2. H-6
Ans. 16"Fwd Fr. 59, 42"Port, 79"ABL

3. H-40 (No Height Dim)
Ans. 6'6"Port, 10-3/4"Aft Fr.51

4. H-18
Ans. 17"Fwd Fr.62, 7'1"Stbd, 15'2"ABL

5. H-32
Ans. 17"Aft Fr.57, 11'8"Stbd, 15'0-1/4"ABL

6. H-29
Ans. 41-3/4"Aft Fr.51, 11'10"Stbd.,15'0-1/4"ABL

7. H-13
Ans. 22"Aft Fr. 59, 10'2"Stbd, 83"ABL

8. H-49
Ans. 22'1"ABL, 8'9"Stbd,4"Fwd Fr.62

9. H-4
Ans. 3½"Fwd Fr.52, 12'5-1/8"Port, 9'8½"ABL

10. H-30
Ans. 6"Aft Fr.54, 11'10"Stbd, 15'½"ABL

11. H-39
Ans. 10-3/4"Aft Fr.51, 44½"Port, 31'10"ABL

12. H-14
Ans. 22"Fwd.Fr.62, 10'2"Stbd, 7'5½"ABL

13. H-5 (No Height Dim)
Ans. 10½"Fwd Fr.58, 55-5/16"Port

14. H-20
Ans. 9"Fwd Fr.59, 10'9-3/4"Stbd, 8'2"ABL

15. H-25
18"Aft Fr.56, 10'3-3/4"Stbd, 8'2"ABL

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers: (Port/Stbd, of Centerline, Fwd./Aft of Frame Abv./Blw Main Axis or ABL)

1. H-13
   Ans.

2. H-6
   Ans.

3. H-19
   Ans.

4. H-66
   Ans.

5. H-26
   Ans.

6. H-27
   Ans.

7. H-33
   Ans.

8. H-25
   Ans.

9. H-28
   Ans.

10. H-3
    Ans.

11. H-41
    Ans.

12. H-2
    Ans.

13. H-10
    Ans.

14. H-44
    Ans.

15. H-53
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers: (Port/Stbd, of Centerline, Fwd./Aft of Frame Abv./Blw Main Axis or ABL)

1. H-13 Ans. 10"Aft Fr.91, 11'6"BMA 9'8"Port

2. H-6 Ans. 6"Aft Fr.88, 13'7"BMA, 21½"Stbd

3. H-19 Ans. 6"Aft Fr.108, 14'10"BMA, 18½"Stbd

4. H-66 Ans. 6"Aft Fr.108, 11'6"BMA, 8'0-3/4"Port

5. H-26 Ans. 6"Aft Fr.95, 15'BMA, 17"Port

6. H-27 Ans. 6" Aft Fr.97, 17"Port, 15"BMA

7. H-33 Ans. 9"Aft Fr.99,13'2-3/4"BMA, 7'5"Port

8. H-25 Ans. 6"Fwd Fr.95, 18½"Stbd, 14'10"BMA

9. H-28 Ans. 9"Fwd Fr.97, 14'3"BMA, 18½"Stbd

10. H-3 Ans. 6"Aft Fr.88, 69½"Stbd, 13'7"BMA

11. H-41 Ans. 10"Fwd Fr.102, 7'5"Port, 12'8"BMA

12. H-2 Ans. 47"STBD, 18½"AFT Fr.87, 13'7"BMA

13. H-10 Ans. 7½"AFT Fr.87, 8'5-3/4"BMA, 10'1"PORT

14. H-44 Ans. ℄ Fr.105, 6'7-3/4"PORT, 11'6"BMA

15. H-53 Ans. ℄ Fr.111, ℄ of ship 13'3½"BMA

B-28 PIPEHANGER BLUEPRINT READING

LESSON NUMBER #7

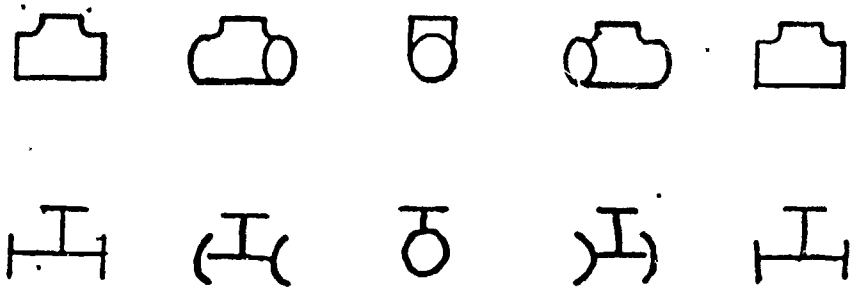
Materials Required:

Handout Pipefitter Symbols for Fittings
Handout Pipefitter Blueprint Reference
Dwgs. 2285-237 R/C, 2285-238 R/C

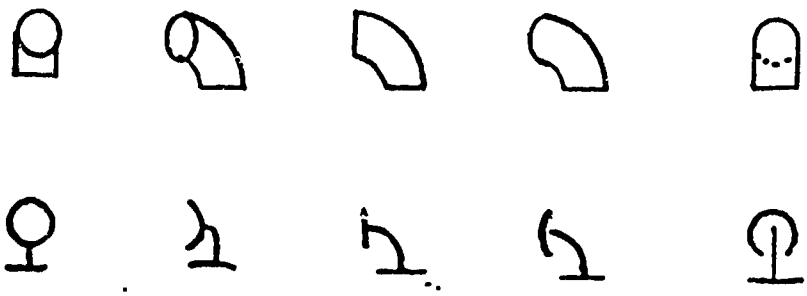
1. Using handouts and blueprints provided, discuss use of piping symbols and references.

HANDOUT: PIPING SYMBOLS FOR FITTINGS

TEE



90° ELL



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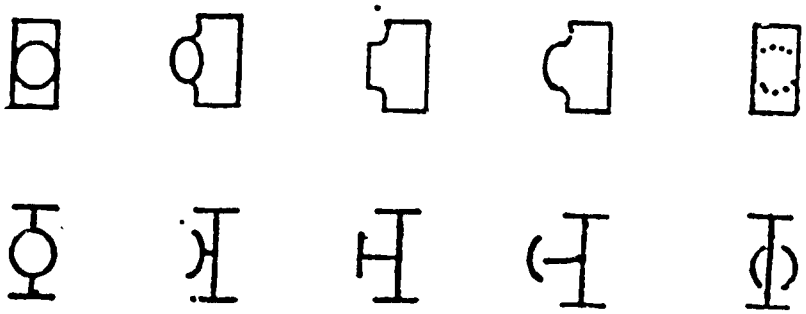
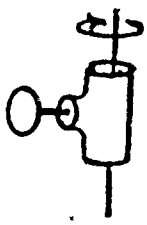
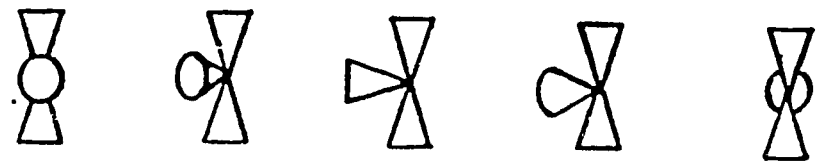
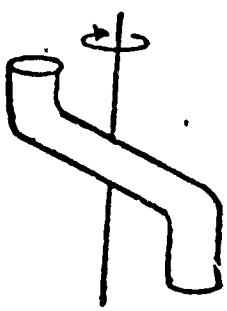


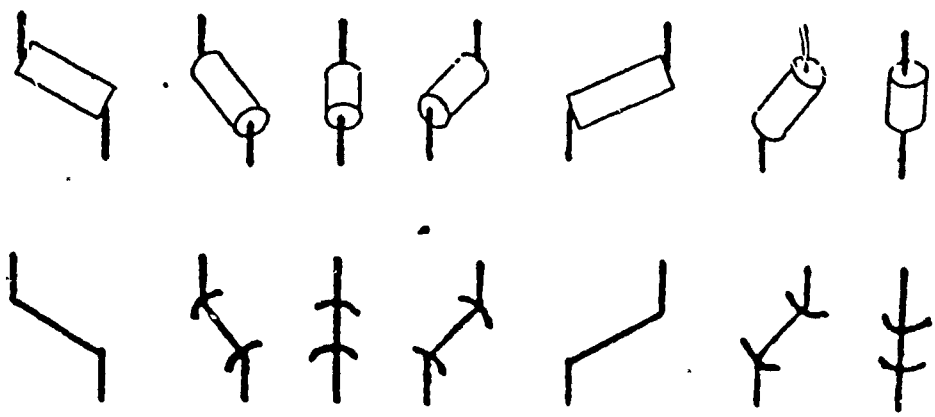
VALVE





OFFSET





TRUE SCALE - means the scale shown the face of the blueprint is 1/2 of the actual scale used.

NON-DETAIL - means that the pipefitter will have to make a template from the plan and the ship.

DATUM LINE-- means it is a reference line; e. g., at a point marked 0' 0", from that point or line.

NEAR & FAR - near would be the pipe on a plan that is the closest to you and far is just the opposite.

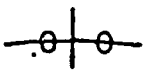
DIA. FORM - is to what diameter the pipe will be bent to.

TR & IPS - is the formula used to compute the diameter form of a pipe bent from the detail plan.

--- - three dashes on a detail plan at the end of the pipe indicates, allowance of three inches at the end of the pipe for tolerences, also at the start of the pipe

-)- -(- - on a plan indicates a bend in the pipe and which direction it is bent in.

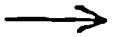
 - symbol indicates that there is a hidden bend in the pipe on the plan.

 - indicates two holes up for alignment of a flange.

 - indicates one hole up for alignment on a flange.

 - indicates a pipe bend on a plan that is bending directly towards you from the plan.

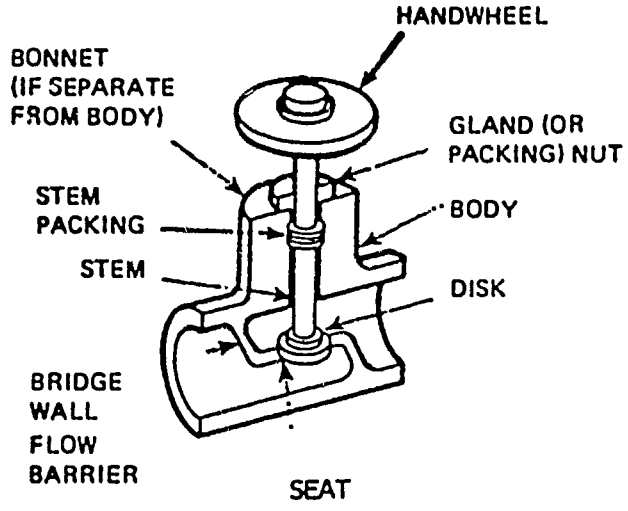
 - indicates a pipe bend on a plan that is bending directly away from on the plan.

 - indicates direction of flow of fluid on a plan.

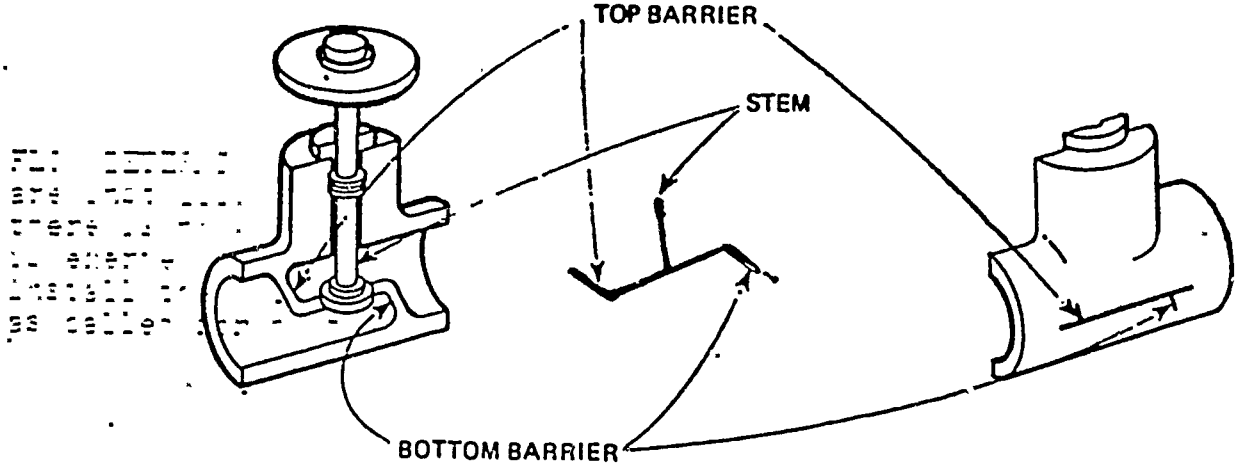
 - indicates flow may go in either direction.

This symbol is commonly called a BRIDGE MARK and is found on the blueprint and the Globe Valve body. It is this symbol that is used for orientation of the Globe Valve for installation.

GLOBE VALVE

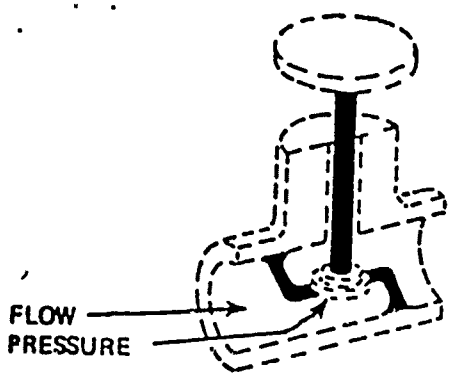


The BRIDGE MARK is nothing more than the internal construction of the Globe Valve - it consists of the Flow Barrier and the Stem.

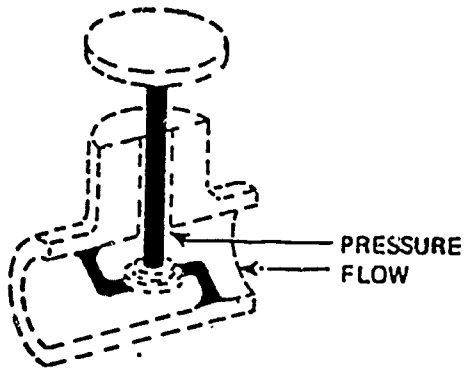


Because the BRIDGE MARK represents the internal construction of the valve, it can be used to orient the valve for installation.

TYPICAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the seat of the valve.

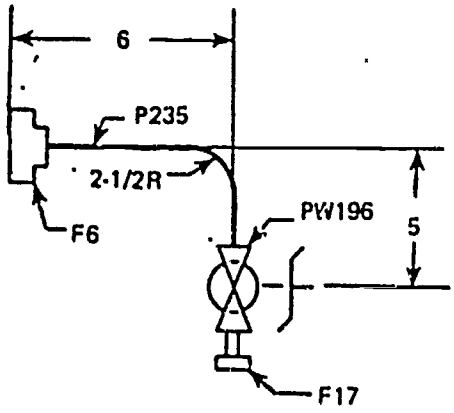


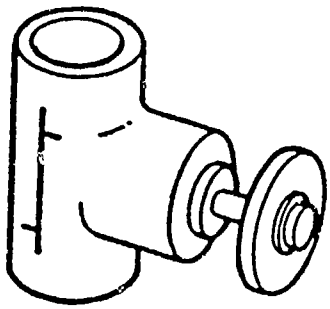
SPECIAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the packing rather than the seat.



FLOW DETERMINATION - There is no way of knowing if the valve you are installing is a Typical or a Special valve installation, therefore there is no way to know which way the fluid flows or where the pressure is exerted. The only way to ensure proper valve installation is to install the valve with its BRIDGE MARK oriented in the same direction as called for by the blueprint.

The Globe Valve must be installed with its BRIDGE MARK oriented in the same direction as the BRIDGE MARK on the blueprint - REGARDLESS of flow direction or pressure.





NOTE - BRIDGE MARKS are not used to orient the valve handle during installation - the valve symbol is used for this purpose.

If the BRIDGE MARK is missing or incomplete on the:

Valve - stop work and see your supervisor. A BRIDGE MARK MUST be placed on the valve before installation - Lack of a BRIDGE MARK is cause for rejection.

Plan - stop work and see your supervisor. Do not interpret it yourself.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 8

Materials: Drawing Numbers- 2300-543 R/N, 2300-544 R/P

1. What type and size fitting is F-23 ?

   Ans.

2. How many F-2 fittings are required on this drawing ?

   Ans.

3. What service does HP-368 perform ?

   Ans.

4. What plan would be used to locate the foundation to which HP-362 is attached ?

   Ans.

5. How many ½" flanges are used on these drawings ?

   Ans.

6. What pipes are used to service the Port Torpedo Hoist Cylinder ?

   Ans.

7. What pipes are used to service F-26 ?

   Ans.

8. In what revision was fitting F-8 added ?

   Ans.

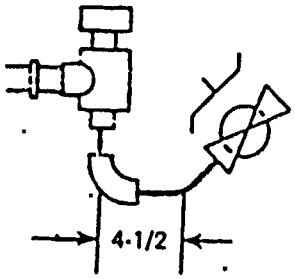
9. F-26 is shown in zone 4 B + C on drawing 2300-544 plan view, what section view also shows F-26 ?

   Ans.

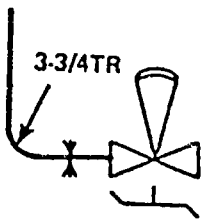
10. In what revision was H-49 added ?

    Ans.

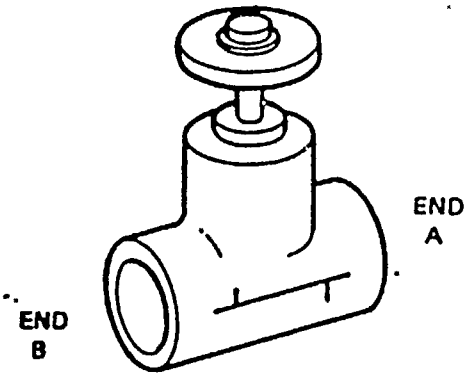
Compare the valve drawing with the four piping details and indicate which end of the valve is fitted to the pipe - End A or End B.

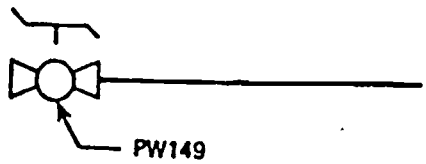
1. 

1.____

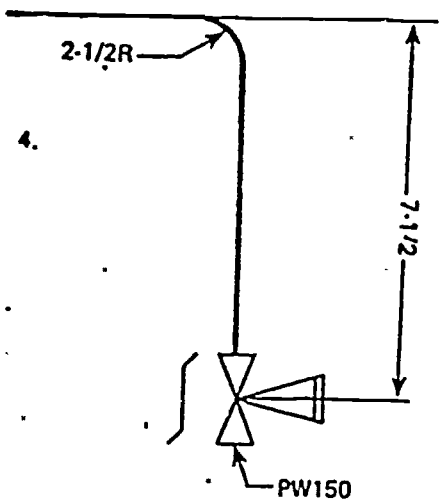
2. 

2.____



3. 

3.____

4. 

4.____

Lesson Number 8 cont.

11. In what revisions were the locations for H-35 + H-36 changed ?
Ans.

12. On what plan would you find the hanger details ?
Ans.

13. What does the symbol (G2) next to H-38 in the hanger table signify ?
Ans.

14. Where would you find a complete list of notes for drawing 2300-543 ?
Ans.

15. What valve connects to shuttle cylinder No. 2 ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?
   Ans.

2. Does P2538T-½" service HS-41 or HS-42 ?
   Ans.

3. F-6 is a reducing tee, what pipe or pipes does it service ?
   Ans.

4. In what direction is the flow for HS-64 ? (Port or Stdb)
   Ans.

5. Why was hanger H-17 revised ?
   Ans.

6. In the valve list, HS-64 has a + symbol to the left, why ?
   Ans.

7. To what block valve is FL-2 attached ?
   Ans.

8. What is the pipe length required for P-2877 ?
   Ans.

9. What pipe or pipes are supported by hanger H-18 ?
   Ans.

10. In what direction is the flow of HS-38 ? (Up or Down)
    Ans.

11. HS-37 has two lines connected to the top, what are the pipe numbers ?
    Ans.

12. How far off the baseline is the bottom of HS-36 located ?
Ans.

13. In section view 14A what is the distance between centers of pipes P2539U-$\frac{1}{2}$" and P2538T-$\frac{1}{2}$" ?
Ans.

14. What type of material is used for HS-35 ?
Ans.

15. How many F-4 fittings are used on this drawing and to what pipes are thet attached ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?
   Ans. LOCKED SHUT

2. Does P2538T-½" service HS-41 or HS-42 ?
   Ans. HS-42

3. F-6 is a reducing tee, what pipe or pipes does it service ?
   Ans. P2598-3/8", P2832-½", and HS-33

4. In what direction is the flow for HS-64 ? (Port or Stdb)
   Ans. PORT

5. Why was hanger H-17 revised ?
   Ans. TO CLEAR ADJACENT HANGER

6. In the valve list, HS-64 has a + symbol to the left, why ?
   Ans. TO SPECIFY ITEM IS N.D.

7. To what block valve is FL-2 attached ?
   Ans. HS-35

8. What is the pipe length required for P-2877 ?
   Ans. 15' (Fifteen Feet)

9. What pipe or pipes are supported by hanger H-18 ?
   Ans. P2538R-½", P2539W-½"

10. In what direction is the flow of HS-38 ? (Up or Down)
    Ans. UP

11. HS-37 has two lines connected to the top, what are the pipe numbers ?
    Ans. P2540-¼", P2542-¼"

12. How far off the baseline is the bottom of HS-36 located ?
Ans. 21' 4"

13. In section view 14A what is the distance between centers of pipes P2539U-$\frac{1}{2}$" and P2538T-$\frac{1}{2}$" ?
Ans. 11/16"

14. What type of material is used for HS-35 ?
Ans. Aluminum Alloy

15. How many F-4 fittings are used on this drawing and to what pipes are thet attached ?
Ans. 2, P2544 and P2546

TRIDENT STANDARD CROSS REFERENCING SYSTEM

PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMBLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAIN THE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS.

FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF TRIDENT HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

TRIDENT HANGER DETAIL

8Z524-9071

TRIDENT HANGER STANDARD DRAWINGS:

2620-286-10
2620-286-11
2620-286-12
2620-286-13
2620-286-14

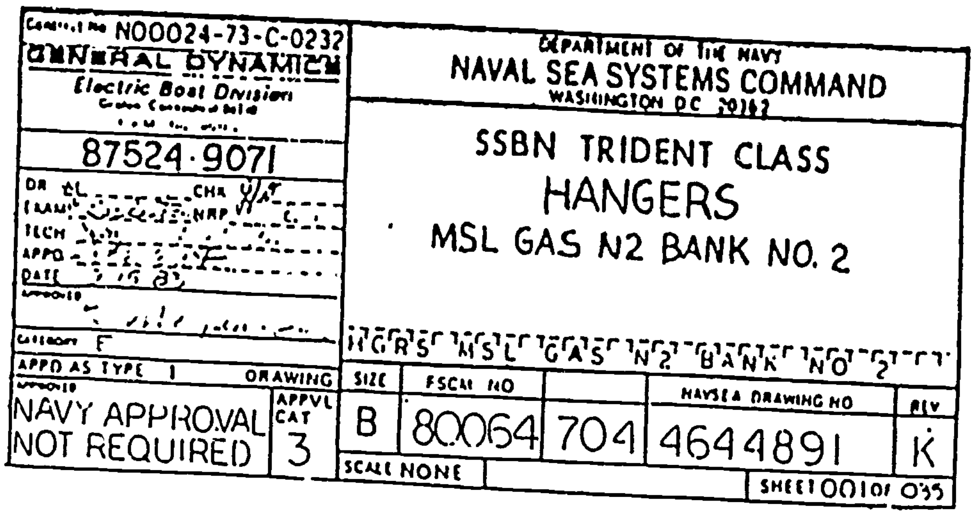
STEP I

A. STARTING WITH THE HANGER DETAIL PLAN. 87524-9071

NOTE. PLAN NUMBER IS FOUND IN THE TITLE BLOCK.

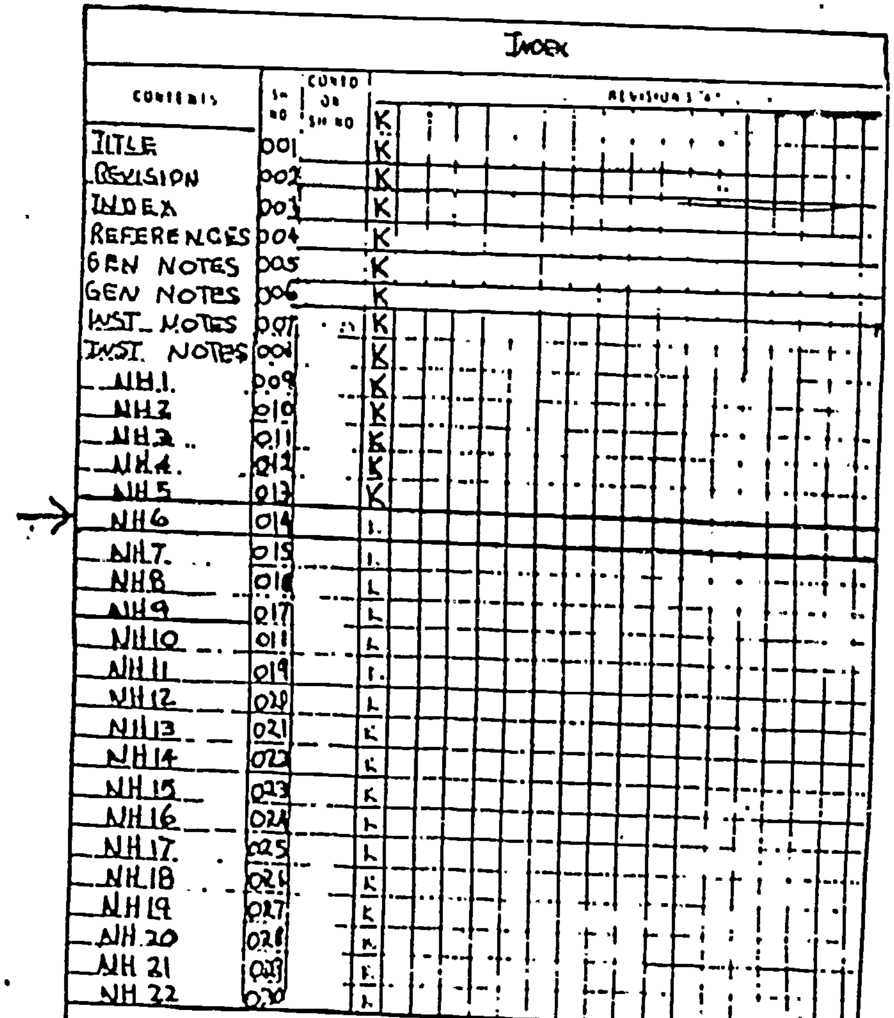
B. GO TO THE INDEX AND LOCATE THE HANGER IN QUESTION, AND THE SHEET NUMBER.

C. PROCEED TO SHEET NUMBER LISTED.



NOTE ALWAYS LOOK IN THE INDEX. HANGERS ARE NOT ALWAYS LISTED IN ORDER.

NOTE THE INDEX IS A GOOD TIME SAVER.



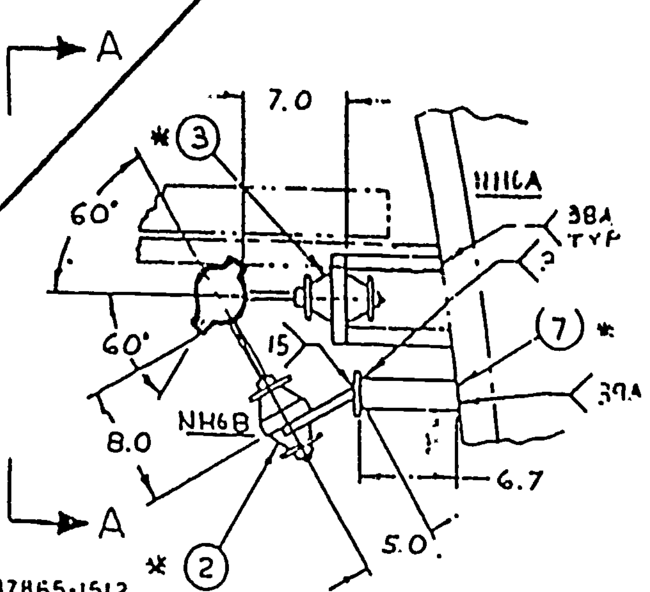
THE DETAIL DRAWING ALSO DESIGNATES THE ITEMS REQUIRED TO MAKE UP A COMPLETE ASSEMBLY. THESE ITEMS ARE DEPICTED AS ENCIRCLED NUMBERS. ①, ③, ②, ⑦ & ⑬ ARE THE ITEM NUMBERS ASSOCIATED WITH THIS HANGER ASSEMBLY.

PARTS LIST

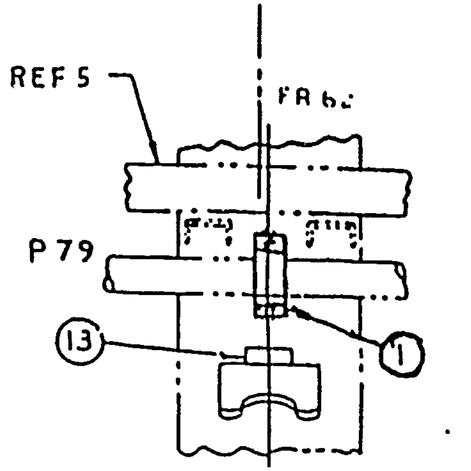
ITEM NO / SEQ NO	QTY CLASS	U/M LVL	NOUN NAME SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I U/M	PART NUMBER MF NATL STK NO	SERVICE OR REMARKS	F R	S H
6 6006	1	PC N	HANGER ASSY	PIPE	N/A	87624-5071 NH6	96169	4644891-0000NH6 MF			
IT ① 6006A	1	PC N	HANGER ASSY 2.000IPS	PIPE	CLAMP TY STL	2620-286-11 ASSY AG	96169	2445498-00A0			X
IT 2 6006B	1	PC N	HANGER ASSY 100 LBS	PIPE	MOUNT & SPRT N/A	2620-286-11 ASSY BCH	96169	2446496-0080N MF	NC		X
IT 3 6006C	1	PC N	HANGER ASSY 100 LBS	PIPE	MOUNT LUG SPRT N.A	2620-285-11 ASSY CON	96169	2445496-00E0N MF	NC		X
IT 7 6006F	1	FT N	TUBE 2.000 X 2.000 X 0.187NOM	SQUARE	STL	ASTM-A500 GRADE B	96169	10-00-1668 MF			X
IT 13 6008O	1	IN N	BAR 0.500 X 3.000	FL	HR STL	00-S-741	96169	30-11-0830 MF			X

NOTES

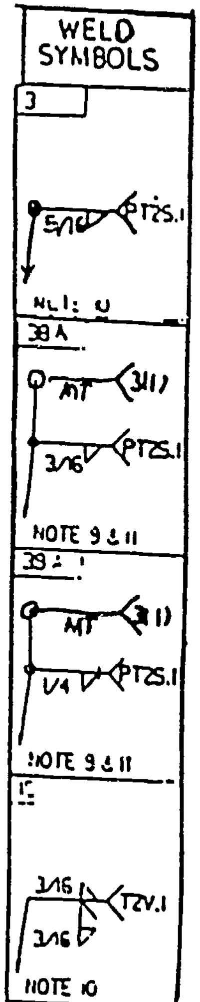
1. Remember your theory.
2. Item ① consists of clamp halves, liner and fasteners.
3. Plan No. and Assy found in drawing column of the list of material.
4. Proceed to proper Plan and Assy.



SECTION
LOOKING AFT



ELEVATION A-A
LOOKING TO PORT
FWD



NH6A
NH6B PORT

NOTE 21
HGR REF LOCATION: PANEL 8F ON 87865-1512

HGR. NO.	COLD LOAD	DEFLECTION
NH6A	——	—— TNSN
B	——	—— CPRSN

Contract No N00024-73-C-0232 HGRS MSL GAS N2 BANK NO 2

GENERAL DYNAMICS
Electric Boat Division

87524-9071

SIZE	FSCM NO.	DRAWING NO		REV
B	80064	704	4644891	K

SCALE 1/8 SHEET 014

GENERAL DYNAMICS
Electric Boat Division

2620-286-14

NAVY APPROVAL NOT REQUIRED

NAVAL SHIP SYSTEMS COMMAND

HANGER STANDARD CLAMPS & BLOCKS
ASSY & DET

H	80064	845	2445498	H

SCALE NONE

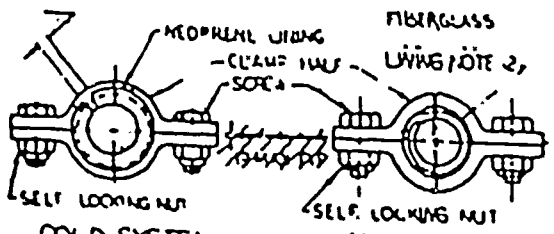
SHEET 1 OF 1

NOTES

1. Plan 2620-286-14, look up assembly AG
2. Find item numbers for hanger (Clamps) (Liner) (Screw) (Nut)
3. Description of item number will be found on Plan 2620-286-13

NOTE: Reference to list of material for item numbers is found in the reference block of the plan in which the item numbers were located.

REF #	DRAWING NUMBER	DESCRIPTION OF PLAN
1	2620-286-13	HANGER STANDARD MATERIAL LIST



COLD SYSTEM UNDER 180

HOT SYSTEM OVER 180

TABLE 2A CLAMP ASSEMBLIES

PLAIN (FOR HOT SYSTEM)

NOM IPS SIZE		1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10
ASSY		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R
CLAMP HALF	ITEM	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NEOPRENE LINING	ITEM	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
	QTY	1				1	1	1	1	1	1	1	1	1	1	1
SCREW	ITEM	42	42	42	42	42	42	42	42	200	200	200	200	200	200	200
	QTY	2	2	2	2			2	2	2			2	2	2	2
SELF LKG NUT	ITEM	219	219	219	219	219	219	219	219	220	220	220	220	220	220	220
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
SPACER	ITEM															
	QTY															

PLAIN (FOR COLD SYSTEM)

NOM IPS SIZE		1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10
ASSY		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	AN	AP	AR
CLAMP HALF	ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NEOPRENE LINING	ITEM	147	148	149	150	146	151	152	152	152	152	152	152	152	152	152
	QTY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SCREW	ITEM	42	42	42	42	42	42	42	42	200	200	200	200	200	200	200
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NUT	ITEM	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

ITEM-NO

GENERAL DYNAMICS
Electric Boat Division

2620-286-13

NAVY APPROVAL NOT REQUIRED

NAVAL SHIP SYSTEMS COMMAND

HANGER STANDARD CLAMPS & BLOCKS
MATERIAL

H	80064	845	2445497	H

SCALE NONE

SHEET 1 OF 1

ITEM #	noun size or weight	TYPE	modifier material
7	BAR 0.250 X 2.000	FLAT	HR STL
152	CHANNEL 2.250 W 2.000	CH 0.375 H	EXTD NPRN
328	NUT 0.375 - 16UNC - 3B	SLFLKG	HEX-GALV STL

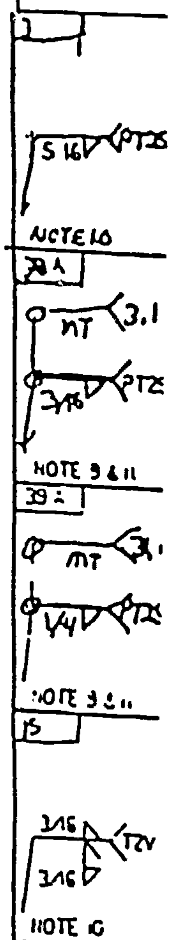
PARTS LIST

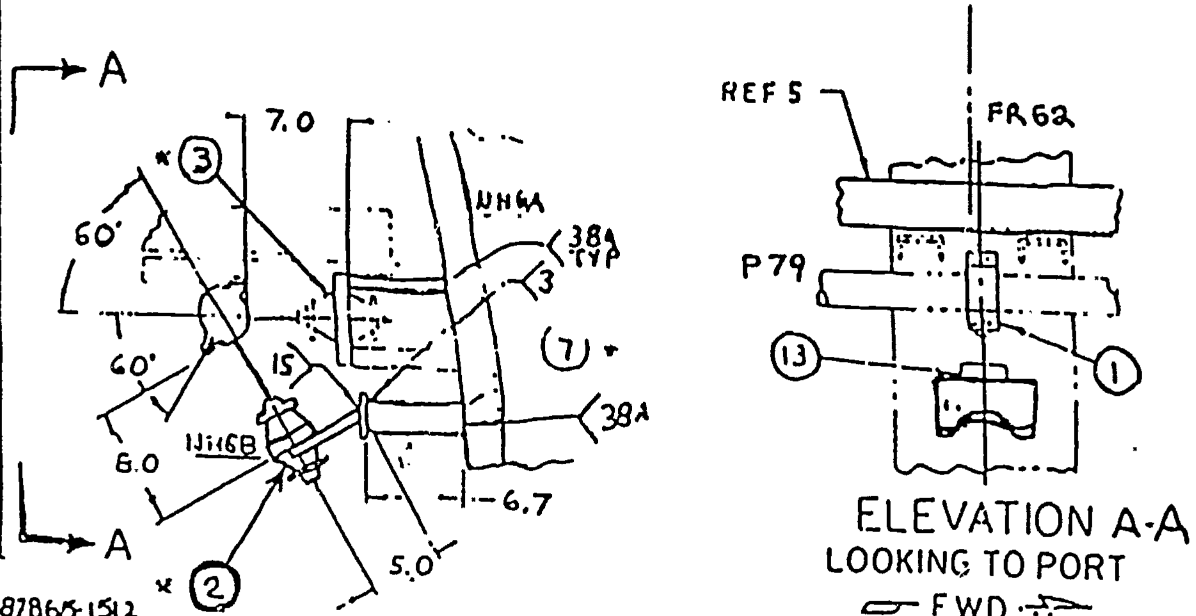
ITEM NO / SEQ NO	QTY CLASS	U/M LVC	NOUN NAME / SIZE	TYPE	MODIFIER / THICKNESS	DOCUMENT OR DRAWING NO	C/I U/M	PART NUMBER / MIL STK NO	SERVICE OR REMARKS	P K	S M
6 / 5005		PC	HANGER ASSY	PIPE	[illegible]	87624-9071 NH6	96169	4644891-0000NH / NF			
IT 1 / 6036A		PC	HANGER ASSY [illegible] 0001PS	PIPE	CLAMP TY / STL	2620-25[illegible] 11 / ASSY AG	96169	2445498-00A0			
IT 2	1	PC / N	HANGER ASSY / 100 LBS	PIPE	MOUNT & SPRT / N/A	2620-286-11 / ASSY BDN	96169	2446496-00BDN / NF	NC		
IT 5 / 5006C		PC / N	HANGER ASSY / 20 LBS	PIPE	MOUNT LUG SPRT / N/A	2620-285 11 / ASSY EDN	96169	2445495-00EDN / NF	NC		
IT 7 / 6006F	.	PC / N	TUBE [illegible] 000 [illegible] 0.187NOM	SQUARE	STL	ASTM [illegible] / GRADE [illegible]	[illegible]	[illegible] -1668 / NF			
IT 13 / 6008O	9	IN / N	BAR / 2 500 [illegible]	FL	HR / STL	00-S-[illegible]	96169	30-11-0830 / NF			

NOTES

1. REMEMBER YOUR THEORY.
2. ITEM 2 (MOUNT & SPRT)
3. ITEM 2 CONSISTS OF (ROD) (MOUNT) (HEX NUTS) (SLKG NUT) (SPRT NUT) (SPRT BOLT & (SUPPORT)
4. PROCEED TO PROPER PLAN & ASSY.

PLAN 2620-286-11, ASSY BDN





SECTION LOOKING AFT

ELEVATION A-A LOOKING TO PORT

FWD

NH6A NH6B PORT

NOTE 21
HGR REF LOCATION PANEL 8F ON 87865-1512

HGR NO.	COLD LOAD	DEFLECTION
NH6A	–	TNSN
6B		CPRSN

GENERAL DYNAMICS
Electric Boat Division

87524 9071

SIZE	FSCM NO.		DRAWING NO	
B	80064	704	4644891	K

SCALE 1/8 SHEET 2 of 4

GENERAL DYNAMICS
Electric Boat Division

2620-286-11

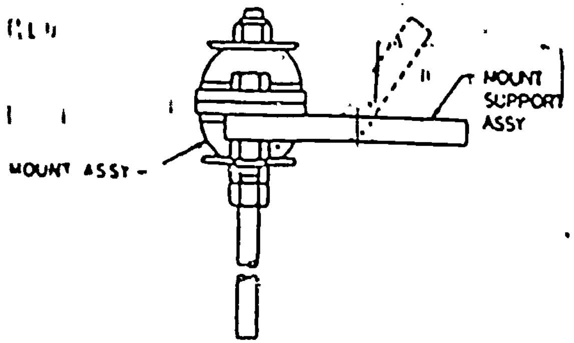
NAVAL SHIP SYSTEMS COMMAND

NOTES

HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES

80064 | 645 | 2[illegible]-549[illegible]

1. FIND ASSY BDN FOR MTS AND SPRT ASSY ON PLAN 2620-286-11
2. TABLE 16, 17, & 18 FIND ASSY SAN.
3. TABLE 16 LOOK UP ITEM NUMBERS FOR ASSY SAN.
4. START WITH ROD TABLE, GO TO NEXT PAGE



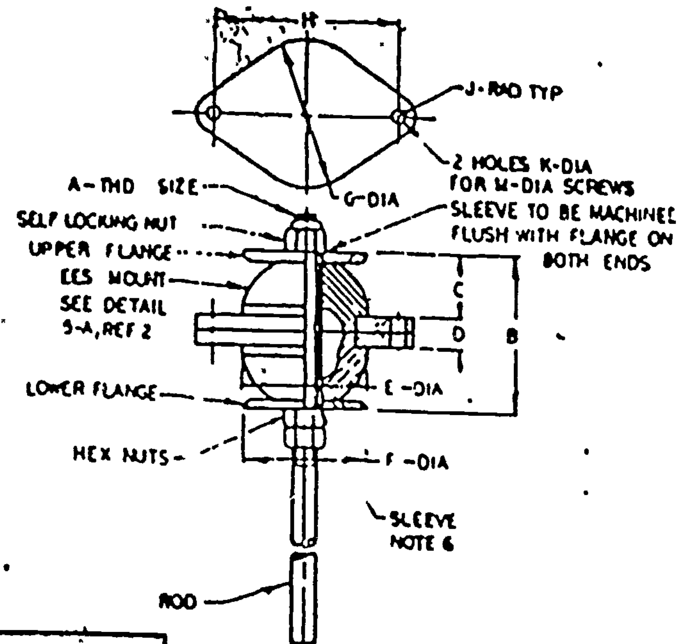


TABLE 2 MOUNT & SUPPORT ASSY

USE ABOVE BILGE LINE				USE BELOW BILGE LINE		
ASSY	MOUNT SIZE	MOUNT ASSY TABLE 16 17 & 19	SPRT ASSY TABLE 36 REF 2	ASSY	MOUNT ASSY TABLE 16 17 & 19	SPRT ASSY TABLE 36 REF 2
[illegible]	[illegible]	[illegible]	UE	BU	[illegible]	UF
[illegible]	[illegible]	VC	[illegible]	BN	VO	UH
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	UX
[illegible]	[illegible]	[illegible]	UL	[illegible]	[illegible]	UM
BG	150°	5F	UN	BS	5D	UP
[illegible]	[illegible]	[illegible]	UR	[illegible]	5O	US
BG	450°	1A	UT	BU	TB	UU
BH	900°	TC	UY	BV	TD	UW
B/Y	5°	VA[illegible]	[illegible]	BMN	VFN	UF
BKY	25°	V[illegible]N	L	BNN	VDN	UH
[illegible]	50°	VEN	UL	BPN	VFN	UK
BOW	100°	SAN	UL	BRN	SBN	UM
BCB	150°	SCW	UN	BSN	SDN	UP
BCC	150°	SCW	UR	BTN	SCN	US

TABLE 16 EES MOUNTS

ASSY	EES MOUNT			ROD TABLE 27 REF 2		SLEEVE DET 8-A REF 2		SELF LKG NUT		HEX NUT		TABLOCK WASHER	
	SIZE	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	QTY
SA	100	[illegible]	2	18	[illegible]	139	1	180	[illegible]	187	[illegible]	[illegible]	[illegible]
SB	100	[illegible]	[illegible]	26	[illegible]	139	[illegible]	211	[illegible]	197	[illegible]	[illegible]	[illegible]
SC	150	[illegible]	[illegible]	18	[illegible]	140	[illegible]	180	[illegible]	187	[illegible]	[illegible]	[illegible]
SD	150	[illegible]	[illegible]	26	[illegible]	140	[illegible]	211	[illegible]	197	[illegible]	[illegible]	[illegible]
SAN	100	[illegible]	[illegible]	18	1	139	1	293	1	187	2		
SBN	100	[illegible]	[illegible]	26	1	139	1	211	1	197	2		
SCN	150	[illegible]	[illegible]	18	1	140	1	293	1	187	2		
SDN	150	[illegible]	[illegible]	26	1	140	1	211	1	197	2		

DIMENSIONS FOR LAYOUT PURPOSES ONLY

SIZE	A	B	C	D	E	F	G	H	J	K	M
100	1/2-11UNC-2A	4.06	1.39	.88	3.00	3.00	3.38	4.75	.56	33/64	1/2
150	5/8-11UNC-2A	4.14	1.57	1.00	3.25	3.25	3.50	5.38	.62	41/64	5/8

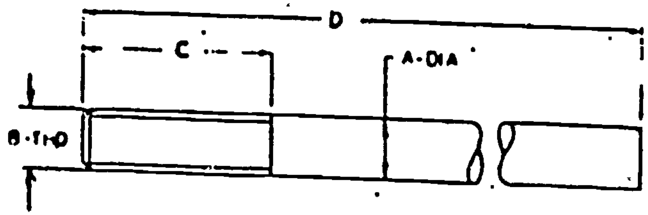
NOTES

1. ITEM'S ASSY SAN 18 293 187 TABLE 16
2. ITEM 18 SAY'S ROD TABLE 27 REF 2 ITEM 18
3. TO FIND REF 2 LOOK IN REF BLOCK OF THE PLAN IN WHICH YOUR ITEM NUMBER'S WERE FOUND

NOTE: ALL DIMENSION'S ARE LETTERED ABOVE TABLE 27

EXAMPLE: A-DIA is 5/8

NOTE: ALWAYS REMEMBER TO LOOK IN REF BLOCK BEFORE GOING TO ANOTHER PLAN.



REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2620-286-11	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL LIST

TABLE 27 MOUNT ROD

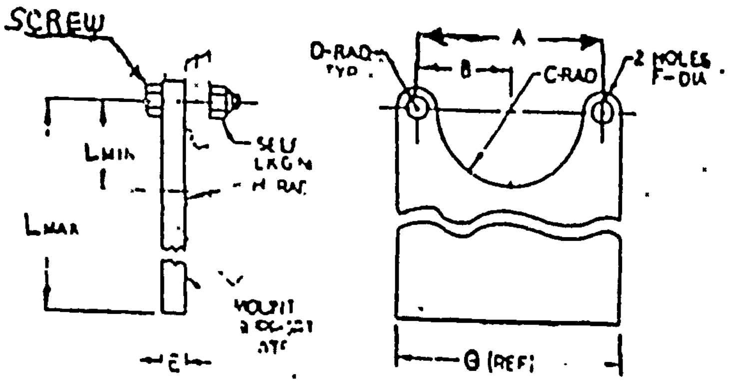
TYPE MOUNT	SIZE	ITEM	A	B	C	D
MI	15°	16 / 21	1/4	1/4-20UNC-2A	3 19	18 00
	25° 50°	13 / 23	3/8	3/8-16UNC-2A	4 25	18 00
EES	100° 150°	17	5/8	5/8-11UNC-2A	7 00	18 00
	100° / 150°	18 / 26	5/8	5/8-[illegible]UNC-2A	5.75	24 00
	450°	19 / 27	3/4	3/4-10UNC-2A	9 75	24 00
	900°	20 / 28	1	1-8[illegible]NC-2A	[illegible]	[illegible]
[illegible]	2000°	[illegible]	[illegible]	[illegible]UNC-2A	[illegible]	24 00
SPOOL	15°	12 / 22	[illegible]/16	[illegible]/16-18UNC-2A	3 00	[illegible]
	50°	13 / 23	3/8	3/8-16UNC-2A	4 25	[illegible]
	100°	[illegible]4 / [illegible]4	[illegible]	[illegible] 13UNC [illegible]	5 00	[illegible]
	[illegible]	15 / [illegible]5	[illegible]	[illegible]/8-11UNC-2A	[illegible]	[illegible]
[illegible] MI	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EES	[illegible]00°	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EES & MI	2000°	[illegible]82 / [illegible]83	1 1/4	1 1/4-[illegible]UNC-2A	11 00	[illegible]

GENERAL DYNAMICS Electric Boat Division 2620-286-11	[illegible] NAVAL SHIP SYSTEMS COMMAND HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES
NAVY APPROVAL [illegible]	80064 3451 2445495 L

NOTES
1. Sheet No. 6 look for assy for sprt plate
2. Assy UL Table 36 Ref 2
3. Ref 2 is standard 2620-286-12
4. All information under assy UL
5. All dimensions are lettered above table
6. Example: A = 4.75 under assy UL
7. Go to proper list of material for item numbers

REFERENCE DRAWING'S

REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2620-286-11	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL LIST



GENERAL DYNAMICS Electric Boat Division	DEPARTMENT OF THE NAVY NAVAL SHIP SYSTEMS COMMAND WASHINGTON D.C. 20360
2620-286-10	HANGER STANDARD MOUNTS WITH SUPPORT MATERIAL
[illegible]	HGR STD MT WITH SUPPORT MAT'L
NAVY APPROVAL NOT REQUIRED	SIZE H · CODE IDENT NO 80064 · 845 · NAVSHIPS DRAWING NO 2445494 · REV P
	SCALE NONE · SHEET 1 OF 1

TABLE 36		M I & EES MOUNT SUPPORT ASSY															
ASSY		UE	UF	UG	UH	UJ	UK	UL	UM	UN	UP	UR	US	UT	UU	UV	UW
SIZE		15	15	25	25	50	50	100	100	150	150	150	150	150	150	300	300
SCREW	ITEM	143	214	147	215	150	216	157	219	146	221	146	22	140	222	162	224
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
SELF LKG NUT	ITEM	209	207	290	208	291	209	292	210	293	211	293	211	293	211	294	212
	QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MOUNT SPRT PLATE	ITEM	74		75		76		77		78		79		80		81	
	QTY	1		1		1		1		1		1		1		1	
DIMENSIONS FOR MOUNT SUPPORT	A	2.00		3.50		3.50		4.75		5.38		5.38		5.38		8.25	
	B	1.00		1.75		1.75		2.38		2.69		2.69		2.69		4.12	
	C	.78		1.19		1.19		1.56		1.81		1.81		1.81		3.31	
	D	.22		.56		.56		.81		.88		.88		.88		.81	
	E	1/4		1/2		1/2		5/8		5/8		3/4		1		1	
	F	19/64		23/64		27/64		35/64		11/16		11/16		[illegible]		[illegible]	
	G	2.44		4.62		4.62		6.38		7.14		7.14		7.14		9.88	
	H	.25		.50		.50		.62		.62		.75		1.00		1.00	
	L MAX	3.25		10.50		7.50		8.00		6.00		8.75		5.25		4.50	
	L MIN	.00		1.45		1.45		2.00		2.10		2.10		2.50		0.00	

LIST OF MATERIAL

PARTS OF MOUNTS

ITEM	MIT CLASS	UNIT LVL	NOUN NAME SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I UIN	PART NUMBER
187	0	PC NA	NUT 0.625-11UNC 2B	FL	HEX STL	[illegible]	96169	80 08 [illegible]
293	0	PC NA	NUT 0.625 11UNC-3B	SLFLKG	HEX GALV STL	MS-17829 MIL-N-25027 QQ-Z-325 TY 2 CL 2 OR 3	96169	60-08-2264
18	0	PC NA	BAR 0.625	RD	NA STL	QQ-S-[illegible]	96169	3[illegible]-C1-7810 NF

PARTS OF SUPPORT

ITEM	MIT CLASS	UNIT LVL	NOUN NAME SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I UIN	PART NUMBER
292	0	PC NA	NUT 0.500 13UNC-3B	SLFLKG	HEX GALV STL	MS-17829 MIL-N-25027 QQ-Z-325 TY 2 CL 2 OR 3	96169	60-08-2262
77	0	PC NA	PLATE 0.625 INR		STL	MIL-S-2[illegible] CL [illegible]	96169	20-87-0626 NF
157	0	PC NA	SCREW 0.500-13UNC-2A[illegible].500	CRP	HEX HD STL	MIL-B-857 [illegible] TY 3 OR 6	96169	80-82-0261

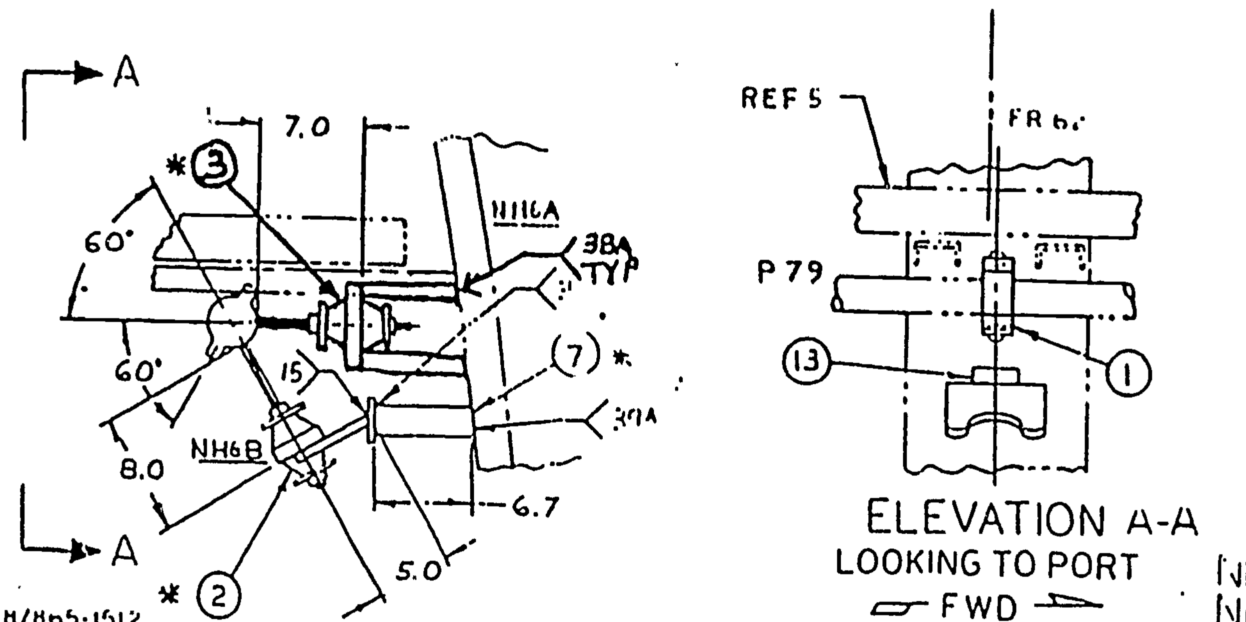
PARTS LIST

ITEM NO / SEC	QTY CLASS	U/M UVL	NOUN NAME / SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I U/M	PART NUMBER MF NAIL STK NO	SERVICE OR REMARKS	P R	S H
6 5006	1	PC N	HANGER ASSY	PIPE	N/A	87624-5071 NH6	96169	4644891-0000NH6 MF			
IT 1 5006A	1	PC N	HANGER ASSY 2.000IPS	PIPE	CLAMP TY STL	2620-286-11 ASSY AO	96169	2445498-00A0			X
IT 2 5006B	1	PC N	HANGER ASSY 100 LBS	PIPE	MOUNT & SPRT N/A	2620-286-11 ASSY BCN	96169	2446496-00BDN MF			X
IT 3 5006[illegible]	:	PC N	HANGER ASSY 100 LBS	PIPE	MOUNT LUG SPRT N/A	2620-285-11 ASSY EDN	96169	2445496-00EDN MF	NC		X
IT 7 6006[illegible]	:	IT N	TUBE 2.000 x 2.000 x 0.187NOM	SQUARE	STL	ASTM-A500	56169	46-[illegible]-1668 MF			X
IT 13 60060	9	IN IN	BAR 0.500 x 3.000	FL	HR STL	GRADE B QQ-S-[illegible]41	96169	30 11-0830 MF			X

NOTES

1. Remember your theory
2. Item 3 mount & lug, sprt
3. Item 3 consists of (mount) (rod) (slkg nut) (Hex headnuts) (sprt nut) (sprt bolt) and lugs
4. Proceed to proper plan and assy

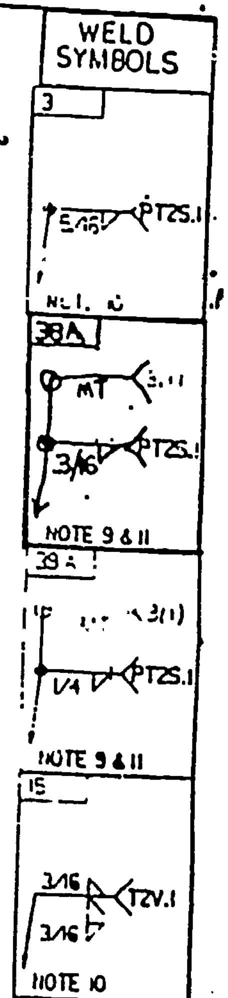
Plan 286-11 assy EDN



SECTION
LOOKING AFT

ELEVATION A-A
LOOKING TO PORT
FWD

NH6A PORT
NH6B



-HOME PANEL 8F ON 87865-1512

HR NO	COLD LOAD	DEFLECTION
NH6A	--	— TNSN
NH6B	--	— CPRSN

GENERAL DYNAMICS
Electric Boat Division

SIZE	FSCM NO		DRAWING NO	REV
B	80064	[illegible]	[illegible]448[illegible]	K

87[illegible]4 5071
SCALE 1/8
SHEET 014

NOTES

1. On assy EDN assy SAN is the same as Item 2 Go on to lug sprt.
2. Lug support Table 30 & 31 Ref 2, assy M, size 3
3. Ref 2 is found in the ref block of the drawing which the items were found.
4. Proceed to proper plan & assy.

   Ref 2 Table 30 & 31 assy M

NOTE: Remember size & type of MT.

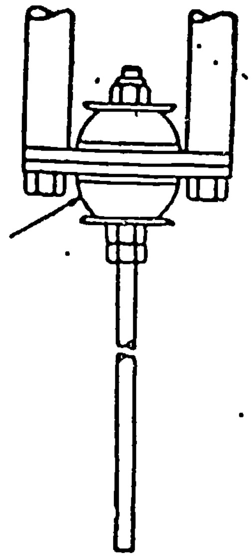


TABLE 5 MOUNT & LUG SUPPORT ASSY

USE ABOVE BILGE LINE						USE BELOW BILGE LINE				
ASSY	MOUNT SIZE	MOUNT ASSY TABLE 16, 17 & 19	LUG SUPPORT TABLE 30 & 31 REF 2 ASSY	SIZE	QTY	ASSY	MOUNT ASSY TABLE 16, 17 & 19	LUG SUPPORT TABLE 30 & 31 REF 2 ASSY	SIZE	QTY
[illegible]	15°	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	2	2
[illegible]	25°	[illegible]	K	1	2	[illegible]	[illegible]	[illegible]	[illegible]	2
[illegible]	50°	[illegible]	[illegible]	2	2	[illegible]	[illegible]	[illegible]	8	2
[illegible]	100°	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	U	[illegible]	2
[illegible]	150°	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	10	2
EF	450°	TA	N	4	2	ET	TB	V	10	2
EG	900°	TC	PV	5	2	EU	TD	W	11	2
EH	2000°	TE	R	6	2	EV	TF	Y	12	2
EW	2000°	TL	R	6	2	EY	TM	Y	12	2
EJ	2000°	TN	R	6	2	EL	TP	Y	12	2
EK	3000°	TU	R	6	2	EZ	TV	Y	12	2
EAN	15°	VAN	RJ	1	2	EMN	VBN	PK	2	2
EBN	25°	VCN	K	1	2	ENN	VDN	S	7	2
ECN	50°	VEN	L	2	2	EPN	VFN	T	8	2
EDN	100°	SAN	M	3	2	ERN	SBN	U	9	2
EEN	150°	SCN	LN	4	2	ESN	SDN	V	10	2
	2000°					ELN	TP	Z	12	2
	3000°					EZN	TV	Z	12	2
EHR	2000°	TER	R	6	2	EYR	TFR	Z	12	2
EYR	2000°	TLR	R	6	2	EYR	TGR	Z	13	2

GENERAL DYNAMICS Electric Boat Division	DEPARTMENT OF THE NAVY NAVAL SHIP SYSTEMS COMMAND
2620-286-11	HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES
	80064 645 24-5495 L
NOT REPRINTED	SHEET 1 OF 1

SEE#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2620-286-12	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL LIST

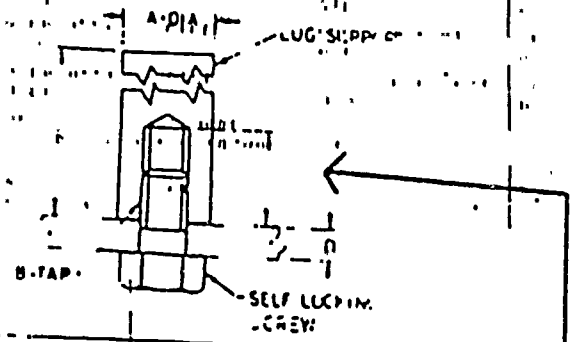


TABLE 30 LUG SUPPORT ASSY

USE ABOVE BILGE LINE					USE BELOW BILGE LINE				
ASSY	SIZE	MOUNT SIZE	LUG SPRT ITEM	SCREW ITEM	ASSY	SIZE	MOUNT SIZE	LUG SPRT ITEM	SCREW ITEM
		25 MI	48	163	S	7	25 MI	14	225
	2	30 MI	49	164	T	8	50 MI		226
M	3	100 FES	50	165	U	9	100 FES		227
N	4	150 FES 450 FES	51	166	V	10	150 FES 450 FES	51	228
P	5	300 FES	52	167	W	11	300 FES	52	229
R	6	2000	223	163	Z	12	2000		265

DIMENSIONS FOR LUG SUPPORTS

SIZE	A	B	C	D	E
1 & 7	3/4	5/16 - 18UNC - 2B	1.12	.38	2.00
2 & 8	1	3/8 - 16UNC - 2B	1.00	.50	.00
3 & 9	1	1/2 - 13UNC - 2B	1.00	.88	20.00
4 & 10	1 1/2	5/8 - 11UNC - 2B	1.50	1.00	.00
5 & 11	2	3/4 - 10UNC - 2B	2.00	1.00	.00
6 & 12	1 3/4	7/8 - 9UNC - 2B	1.75	1.25	.00

NOTES

1. Ref II 2620-286-12
2. Table 30 Assy M, Size 3
3. Dimensions for lugs are below Table 30 by size.
4. Dimensions are lettered and found above the table.

NOTE: Description of each Item No. is found in proper list of material.

GENERAL DYNAMICS
Electric Boat Division

DEPARTMENT OF THE NAVY
NAVAL SHIP SYSTEMS COMMAND
WASHINGTON, D.C. 20360

2620-286-10

HANGER STANDARD
MOUNTS WITH SUPPORT
MATERIAL

NAVY APPROVAL NOT REQUIRED

MFR	CODE IDENT NO	SHIPBUILDING DRAWING NO	REV
H	80064	845 2445494	P

SCALE NONE SHEET 1 OF 1

48 0048	0	PC NR	BAR 1.000	RD	NR STL	86-8-741	98189	30-06-7818 RF
49 0049	0	PC NR	BAR 1.000	RD	NR STL	86-8-741	98189	30-06-7818 RF
61 0061	0	PC NR	BAR 1.250	RD	NR STL	86-8-741	98189	30-01-7829 RF
62 0062	0	PC NR	BAR 1.500	RD	NR STL	86-8-741	98189	30-01-7824 RF
183 0203	0	PC NR	SCREW 0.312-18UNC-2AX1.250	CAP SLOTTED	HEX HD STL	MIL-B - 857 (MOD) TY 3 GR 5	98189	60-02-2106
184 0204	0	PC NR	SCREW 0.375-16UNC-2AX1.250	CAP SLOTTED	HEX HD STL	MIL-B - 857 (MOD) TY 3 GR 5	98189	60-02-2122
186 0205	0	PC NR	SCREW 0.500-13UNC-2AX1.500	CAP SLOTTED	HEX HD STL	MIL-B-857 (MOD) TY 3 GR 5	98189	60-02-2155
188 0206	0	PC NR	SCREW 0.626-11UNC-2AX2.000	CAP SLOTTED	HEX HD STL	MIL-B-857 (MOD) TY 3 GR 5	98189	60-02-2212
187 0207	0	PC NR	SCREW 0.750-10UNC-2AX2.500	CAP SLOTTED	HEX HD STL	MIL-B-857 (MOD) TY 3 GR 5	98189	60-02-2240

PARTS LIST

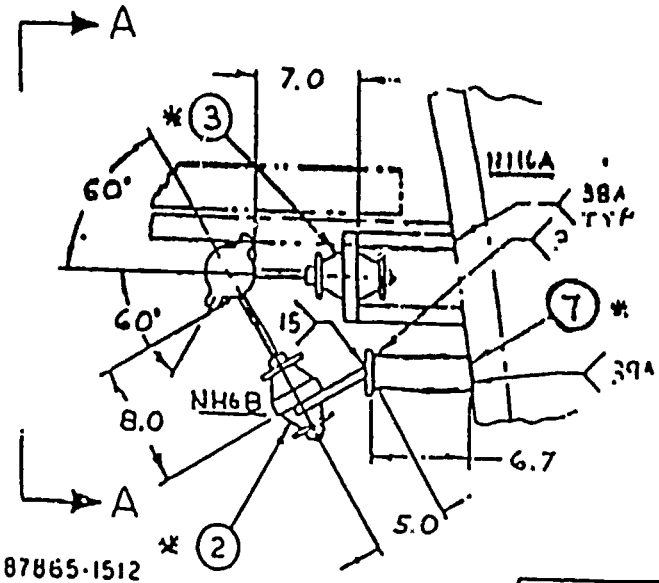
ITEM NO / SEQ NO	QTY / CLASS	U/M / LVL	NOUN NAME / SIZE OR WEIGHT	TYPE	MODIFIER / MATERIAL	DOCUMENT OR DRAWING NO	C/I / U/M	PART NUMBER / NF NAIL STK NO	SERVICE OR REMARKS	PR	S/ML
0 6006	1	PC IN	HANGER ASSY	PIPE	N/R	87624-5071 NH6	96169	4644891-0000NH6 NF			
11 1 6006A	1	PC IN	HANGER ASSY 2.000IPS	PIPE	CLAMP FT STL	2620-286-14 ASSY AD	96169	2445498-00A0			X
11 2 6006B	1	PC IN	HANGER ASSY 100 LBS	PIPE	MOUNT & SPRI N/A	2620-286-11 ASSY BOH	96169	2446496-006DH NF	[4C]		Y
11 3 6006C	1	PC IN	HANGER ASSY 100 LBS	PIPE	MOUNT LUG SPRI N.A	2620-285-11 ASSY EOH	96169	2445496-00EOH NF	[4C]		W
11 7 6006F	1	FT IN	TUBE 2.000 x 2.000 x 0.187NOM	SQUARE	STL	ASTM-A500 GRADE B	96169	40-00-1668 NF			X
11 13 6006G	8	IN IN	BAR 0.600 x 3.000	FL	HR STL	00-S-741	96169	30-11-0830 NF			X

NOTES

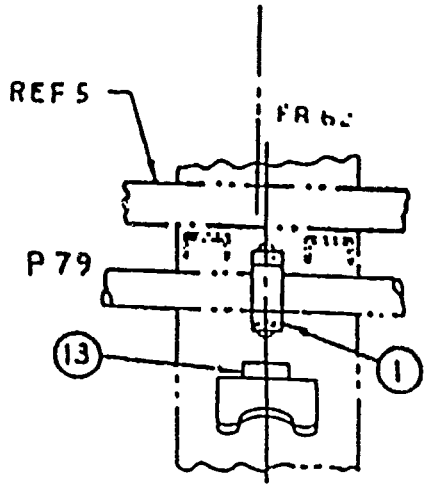
1. Item No. (7) in parts list gives all the information needed.

NOTE:

If any further information was needed the plan would supply a Ref drawing in the drawing number column.



SECTION
LOOKING AFT



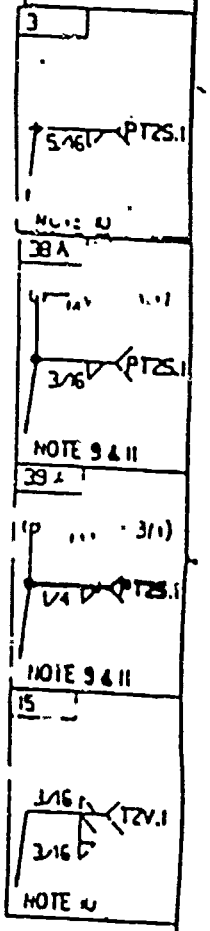
ELEVATION A-A
LOOKING TO PORT
FWD

NH6A
NH6B PORT

NOTE 21
HGR REF LOCATION: PANEL 8F ON 87865-1512

HGR. NO.	COLD LOAD	DEFLECTION
NH6A	——	—— TNSN
NH6B	——	—— CPRSN

WELD SYMBOLS



Contract No N00024-73-C-0232
GENERAL DYNAMICS
Electric Boat Division
87524-9071

HGR'S MSL GAS N2 BANK NO 2

SIZE	FSCM NO	DRAWING NO		REV
B	80064	704	4644891	K

SCALE 1/8 SHEET 014

PARTS LIST

ITEM NO / SEQ NO	QTY / CLASS	U/M / LVL	NOUN NAME / SIZE OR WEIGHT	TYPE	MODIFIER / MATERIAL	DOCUMENT OR DRAWING NO	(C/I) / CM	PART NUMBER / NF NAIL STK NO	SERVICE OR REMARKS	P R	S M
6 / 60006	1	PC / M	HANGER ASSY	PIPE	N/A	87624-9071 NH6	96169	4644891-0000NH6 NF			X
11 1 / 60068	1	PC / M	HANGER ASSY 2.000IPS	PIPE	CLAMP IT SIL	2620-286-14 ASSY A0	96169	2445498-00A0			X
11 2 / 60068	1	PC / M	HANGER ASSY 100 LBS	PIPE	MOUNT & SPRT N/A	2620-286-11 ASSY B0H	96169	2446496-008DN NF	[illegible]		X
11 3 / 60068	1	PC / M	HANGER ASSY 100 LBS	PIPE	MOUNT LUG SPRT N/A	2620-286-11 ASSY E0H	96169	2445496-00E0N NF	[illegible]		X
11 7 / 60068	1	FT / M	TUBE 2.000 x 2.000 x 0.187NOM	SQUARE	SIL	ASTM-A500 GRADE B	96169	40-00-1668 NF			X
11 13 / 60060	3	IN / M	BAR 0.500 x 3.000	FL	HR SIL	00-5-741	96169	30-11-0830 NF			X

NOTES

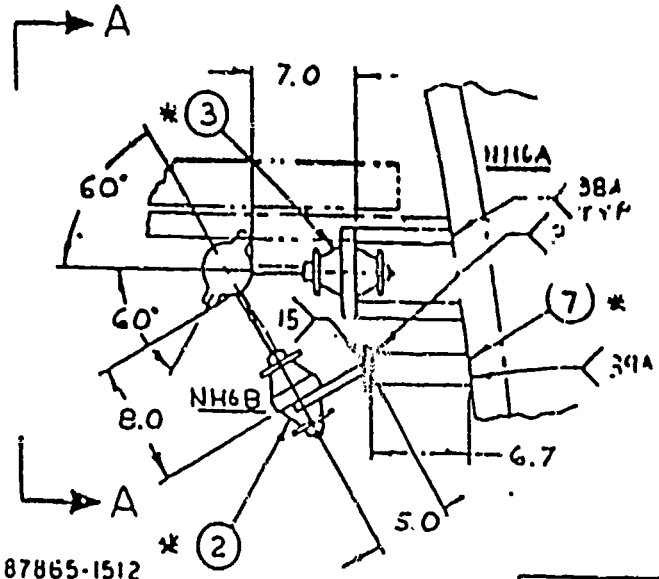
1. Item No. (13) in parts list gives all the information needed.

NOTE:

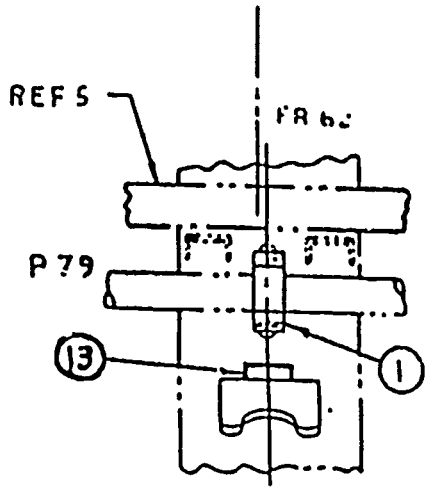
If any further information was needed the plan would supply a Ref drawing in the drawing number column.

NOTE 21
HGR REF LOCATION: PANEL 8F ON 87865-1512

HGR. NO.	COLD LOAD	DEFLECTION
NH6A	———	——— TNSN
NH6B	———	——— CPRSN

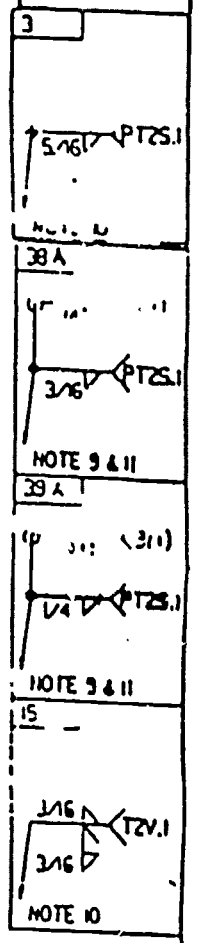


SECTION
LOOKING AFT



ELEVATION A-A
LOOKING TO PORT
FWD

NH6A PORT
NH6B



CONTRACT NO N00024-73-C-0232	HGRS MSL GAS N2 BANK NO 2			
GENERAL DYNAMICS Electric Boat Division	SHT	FSCM NO	DRAWING NO	REV
87524-9071	B	80064	704 4644891	K
	SCALE 1/8		SHEET 014	

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

HANDOUT: TRIDENT Class Cross-Referencing System
Dwgs. 87524-9071 R/K, 2620-286-10 R/N, 2620-286-11 R/K
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G,
Student Material List Answer Sheet

Part One of Three:

Instructions:

Discuss Cross-Referencing System using H/O only.

Part Two of Three:

Instructions:

Issue plans listed on lead sheet of handout. Follow the format shown on handout using standard plans.

Part Three of Three:

Instructions:

Completely identify hanger H-5 using cross-referencing system without the use of the handout. Student Material List Answer Sheet will be used for all answers.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Dwgs. 87524-4006 R/D, 2620-286-10 R/N, 2620-286-11 R/K,
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G
Student Material List Answer Sheet

Question 1

Using cross-referencing system identify all parts of hanger H5-2.
List all answers in order on answer sheet

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87524-4006 R/D

Instructions:

Give complete answers to all questions.

1. What does hanger H35-2 support ?
   Ans.

2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
   Ans.

3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
   Ans.

4. What is the angle of the outboard leg of hanger H23-1 ?
   Ans.

5. What is the ship's attachment weld for hanger H6-2 ?
   Ans.

6. What does hanger H26-2 support ?
   Ans.

7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
   Ans.

8. How many degrees off the center of the flex should the U-Bolt welded on hanger H27-1 ?
   Ans.

9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
   Ans.

10. What does hanger H23-2 support ?
    Ans.

11. What is the total length of the angle bar used on hanger H42-2 ?
    Ans.

12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on on hanger H35-1 using the elevation view ?
    Ans.

B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans.

14. What does hanger H37-2 support ?
Ans.

15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans.

16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans.

17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans.

18. What is the minimum overall dimentions of the block after taking the maximum cut on Pc. 122-2 ?
Ans.

19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans.

20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
Drawing No. 87524-4006 R/D

Instructions:
Give complete answers to all questions.

1. What does hanger H35-2 support ?
   Ans. F-2 Flex Hose Assy.

2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
   Ans. P237

3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
   Ans. 3.0"

4. What is the angle of the outboard leg of hanger H23-1 ?
   Ans. 35 Degrees

5. What is the ship's attachment weld for hanger H6-2 ?
   Ans. 3/8" fillet weld all-around

6. What does hanger H26-2 support ?
   Ans. P295 & P336

7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
   Ans. 0.8"

8. How many degrees off the center of the flex should the U-Bolt rolled on hanger H27-1 ?
   Ans. 5 Degrees

9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
   Ans. 3/16" all-around

10. What does hanger H23-2 support ?
    Ans. P132

11. What is the total length of the angle bar used on hanger H42-2 ?
    Ans. 8.1"

12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on on hanger H35-1 using the elevation view ?
    Ans. 35 Degrees

B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans. TRIDENT Subbase

14. What does hanger H37-2 support ?
Ans. P328

15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans. 10.0"

16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans. 3 Degrees off horizontal

17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans. None (Items are bolted)

18. What is the minimum overall dimentions of the block after taking the maximum cut on Pc. 122-2 ?
Ans. 18.3L X 1.00thk x 3.87W

19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans. 55 Degrees

20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans. ½" weld

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required: 87742-1702 R/G

Instructions: Give Three Point Locations For The Following Hangers

1. H1-2
2. H4-2
3. H11-2
4. H10-2 (no heigh dimention)
5. H3-2
6. H2-2
7. H12-2
8. H6-2
9. H7-2
10. H9-2 (no height dimention)
11. H5-2
12. H8-2
13. How far above the main axis is SSTG Set No. 1 ?
14. How far apart are hangers H4-2 and H10-2 ? (fwd & aft)
    Ans.
15. What is the distance between hangers H11-2 and H12-2 ? (port to stbd)
    24'7.0"

8. H6-2
   Ans. 12'4.5" Fwd
   6'2" Above
   13'7" Port of

9. H7-2
   Ans. 27'9.0"
   33" Above
   12'11.5"

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number (Answer Sheet)

1. H1-2
   Ans. 18'7" Fwd. centerline 2nd reduction gear
   15'7" Stbd of centerline
   44" Above Main Axis

2. H4-2
   Ans. 10'7.8" Fwd. centerline 2nd reduction gear
   43.1" Above Main Axis
   13' Port of centerline

3. H11-2
   Ans. 12'4" Stbd of centerline
   72.1" Above Main Axis
   27'7.0" Fwd. centerline 2nd redudtion gear

4. H10-2 (no height dim)
   Ans. 23'0.2" Fwd. centerline 2nd reduction gear
   12'11.6" Port of centerline

5. H3-2
   Ans. 43.1" Above Main Axis
   10'7.8" Fwd 2nd reduction gear centerline
   13' Stbd of centerline

6. H2-2
   Ans. 18'7" Fwd 2nd reduction gear centerline
   15'7" Port of centerline
   44" Above Main Axis

7. H12-2
   Ans. 12'4" Port of centerline
   72.1" Above Main Axis
   24'7.0" Fwd 2nd reduction gear centerline

8. H6-2
   Ans. 12'4.5" Fwd 2nd reduction gear centerline
   6'2" Above Main Axis
   13'7" Port of centerline

9. H7-2
   Ans. 17'9.0" Fwd 2nd reduction gear centerline
   33" Above Main Axis
   12'11.6" Stbd of centerline

10. H9-2 (no height dim.)
Ans. 23'9.2" Fwd 2nd reduction gear centerline
12'11.6" Stbd of centerline

11. H5-2
Ans. 12'4.5" Ewd 2nd reduction gear centerline
13'7" Stbd of centerline
6'2" Above Main Axis

12. H8-2
Ans. 17'9.0" Fwd 2nd reduction gear centerline
33" Above Main Axis
12'11.6" Port of centerline

13. How far above the main axis is SSTG Set No.1 ?
Ans. 8'2.5" AMA

14. How far apart are hangers H4-2 and H10-2 ? (Fwd & Aft)
Ans. 12'4.4"

15. What is the distance between hangers H11-2 & H12-2 ? (Port & Stbd)
Ans. 24'8.0"

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
   Ans.

2. What type of fitting is used to connect P8-3 to P8-2?
   Ans.

3. How far off the vertical is GS-15 rolled?
   Ans.

4. In what direction is the flow for F-32?
   Ans.

5. What type of fitting is F-16?
   Ans.

6. In which direction is the flow for GS-5?
   Ans.

7. How far port or stbd of C_L is the F-22 that is attached to P8-1?
   Ans.

8. How far fwd or aft of the frame is GS-75-GA-03 located?
   Ans.

9. How far above main axis is hanger H15-1 located?
   Ans.

10. How far from the Ref to C_L is hanger H2-1 located?
    Ans.

11. What Reference and Plan number would give the details of GS-75-GA-03?
    Ans.

12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
    Ans.

13. What Reference and Plan number would give the hanger details?
    Ans.

14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
    Ans.

15. When reading a blueprint and a discrepancy is found, who must be notified?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
   Ans. 27.5"

2. What type of fitting is used to connect P8-3 to P8-2?
   Ans. F-2 90 Degree Elbow

3. How far off the vertical is GS-15 rolled?
   Ans. 15 Degrees

4. In what direction is the flow for F-32?
   Ans. Fwd.

5. What type of fitting is F-16?
   Ans. Concentric Reducer 3.00 X 2.00 IPS

6. In which direction is the flow for GS-5?
   Ans. Fwd.

7. How far port or stbd of C_L is the F-22 that is attached to P8-1?
   Ans. Right on the C_L

8. How far fwd or aft of the frame is GS-75-GA-03 located?
   Ans. 17' 3" Fwd of Ref to RFR

9. How far above main axis is hanger H15-1 located?
   Ans. 99.0" AMA

10. How far from the Ref to C_L is hanger H2-1 located?
    Ans. 101.0" Stbd

11. What Reference and Plan number would give the details of GS-75-GA-03?
    Ans. Ref. 18 87728-1502

12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
    Ans. GS-15

13. What Reference and Plan number would give the hanger details?
    Ans. Ref. 12 87524-4801

14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
    Ans. G.N. 48 (Installation of surrounding Equipment)

15. When reading a blueprint and a discrepancy is found, who must be notified?
    Ans. Your Supervisior

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off C_L would you install GS-10?
   Ans.

2. How far above or below main axis would you install hanger H4-3?
   Ans.

3. How far off C_L is MS-3 installed?
   Ans.

4. How far off the centerline would you install Ident hanger number 2?
   Ans.

5. How far off C_L would you install Ident hanger number 3?
   Ans.

6. How far stbd. of C_L would you install the F-28 that is attached to P79-3?
   Ans.

7. What size and type fitting is F-4?
   Ans.

8. Between what frames would the C_L of the steam chest be located?
   Ans.

9. How far above main axis would FL-5 be located?
   Ans.

10. How far above the main axis and on what pipe would H12-3 be located?
    Ans.

11. To what pipe does F-9 attach?
    Ans.

12. Give the three point location for GS-75-DP-05.
    Ans.

13. Where would the information be found to fabricate F-26?
    Ans.

14. What is the total length required for P71?
    Ans.

15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off C_L would you install GS-10?
   Ans. 2" Stbd

2. How far above or below main axis would you install hanger H4-3?
   Ans. 19" AMA

3. How far off C_L is MS-3 installed?
   Ans. 187" Stbd of Ref to C_L

4. How far off the centerline would you install Ident hanger number 2?
   Ans. 11' 4" Stbd

5. How far off C_L would you install Ident hanger number 3?
   Ans. 160.5" Stbd of Ref to C_L

6. How far stbd. of C_L would you install the F-28 that is attached to P79-3?
   Ans. 12' 9.5" Stbd of Ref to C_L

7. What size and type fitting is F-4?
   Ans. 1.500 Flex-Hose Assy

8. Between what frames would the C_L of the steam chest be located?
   Ans. Fr. 123 & Fr. 124

9. How far above main axis would FL-5 be located?
   Ans. 9' 2.1"

10. How far above the main axis and on what pipe would H12-3 be located?
    Ans. 61.2" AMA on P75-2

11. To what pipe does F-9 attach?
    Ans. P-79

12. Give the three point location for GS-75-DP-05.
    Ans. 185.5" Stbd, 121" AMA, 13" Ref to C_L 2nd Red Gear

13. Where would the information be found to fabricate F-26?
    Ans. 87201-0750 It. 3

14. What is the total length required for P71?
    Ans. 6 Feet

15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
    Ans. 30 Degrees

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
   Ans.

2. What is the material of the fasteners used for FL-3?
   Ans.

3. In which direction is the flow for GS-8, Port or Stbd?
   Ans.

4. How far off C_L is the F-21 that is attached P72-4?
   Ans.

5. How far of C_L and how far fwd or aft of the frame is H3-4 located?
   Ans.

6. Give all dimensions to locate GS-75-DP-06?
   Ans.

7. What is the distance between Ident Hgrs. 3 & 4?
   Ans.

8. What valve is used to feed GS-75-DP-06?
   Ans.

9. What type of Assy is F-22?
   Ans.

10. How far above the main axis would you install F-22?
    Ans.

11. How far above the main axis is hanger H-7?
    Ans.

12. What is the distance between Ident H2 from GS-75-DP-06?
    Ans.

13. What is the minimum bend radius for .250 OD tubing?
    Ans.

14. What will be the thickness of the insulation for P72?
    Ans.

15. How far from the C_L turbine is SSTG set turbine #2?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
   Ans. 2.2" Fwd RFR 124, 9'2.1" AMA

2. What is the material of the fasteners used for FL-3?
   Ans. Galvanized Steel

3. In which direction is the flow for GS-8, Port or Stbd?
   Ans. Port

4. How far off C_L is the F-21 that is attached P72-4?
   Ans. 15' 10.8" Port of Ref to C_L

5. How far of C_L and how far fwd or aft of the frame is H3-4 located?
   Ans. 8' 2.3" Port, 19.5" Aft RFR 124

6. Give all dimensions to locate GS-75-DP-06?
   Ans. 12'11.0" Port, 19.0" Aft 2nd Red Gear C_L, 92.0" AMA

7. What is the distance between Ident Hgrs. 3 & 4?
   Ans. 29.5"

8. What valve is used to feed GS-75-DP-06?
   Ans. GS-28

9. What type of Assy is F-22?
   Ans. Flex-Hose

10. How far above the main axis would you install F-22?
    Ans. 27.2" AMA

11. How far above the main axis is hanger H-7?
    Ans. 26" Abv Ref to MA

12. What is the distance between Ident H2 from GS-75-DP-06?
    Ans. 75"

13. What is the minimum bend radius for .250 OD tubing?
    Ans. G.N. 22 9/16" Radius

14. What will be the thickness of the insulation for P72?
    Ans. 1" G.N. 15

15. How far from the C_L turbine is SSTG set turbine #2?
    Ans. On C_L Turbine

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
   Ans.

2. What type of valve is GS-24?
   Ans.

3. How far off the horizontal is GS-16 rolled?
   Ans.

4. In what direction is the flow for F-32?
   Ans.

5. How far AMA would you locate GS-9?
   Ans.

6. How far AMA and how far off C_L would you locate GS-75-GA-04?
   Ans.

7. What two pipes service GS-12?
   Ans.

8. How far fwd or aft is FS-75-GA-04 located?
   Ans.

9. What turbine does P26-2 service?
   Ans.

10. How far Port or Stbd of C_L is P70-2 located?
    Ans.

11. What does the FL-2 attached to P24-2 connect to?
    Ans.

12. What type and size fitting is F-17?
    Ans.

13. Give all locations to attach F-10 to P14-2 and P14-3.
    Ans.

14. What is the distance between F-11 and GS-24?
    Ans.

15. What items are required to attach P14-1 to P18-3?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
   Ans. Fwd.

2. What type of valve is GS-24?
   Ans. Valve Angle Relief

3. How far off the horizontal is GS-16 rolled?
   Ans. 45 Degrees

4. In what direction is the flow for F-32?
   Ans. Fwd.

5. How far AMA would you locate GS-9?
   Ans. 100.25 Abv. Ref to MA

6. How far AMA and how far off C_L would you locate GS-75-GA-04?
   Ans. 93.5 Abv. Ref to MA- 114.9 Port of Ref to C_L

7. What two pipes service GS-12?
   Ans. P30-1 & P30-2

8. How far fwd or aft is FS-75-GA-04 located?
   Ans. 17' 3" Fwd of Ref toRFR

9. What turbine does P26-2 service?
   Ans. Propulsion Turbine No.2

10. How far Port or Stbd of C_L is P70-2 located?
    Ans. 107.5"

11. What does the FL-2 attached to P24-2 connect to?
    Ans. Ref. Piping Steam Connection Ref 30

12. What type and size fitting is F-17?
    Ans. Reducer Concentric 4.00 X 3.00 IPS Sch 80

13. Give all locations to attach F-10 to P14-2 and P14-3.
    Ans. 24.3"AMA, 1'2"Port, 21'7.6"Fwd Ref to RFR

14. What is the distance between F-11 and GS-24?
    Ans. 6.25"

15. What items are required to attach P14-1 to P18-3?
    Ans. F-17 & F-15

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87744-3004 R/G

1. What type of valve is CF-135?
Ans.

2. What pump does P352-1 connect to?
Ans.

3. What size pipe is P128-3?
Ans.

4. What pipes does H48-4 support?
Ans.

5. What is the distance between H13-4 and H1-4?
Ans.

6. Could partial section 18-A be used to facilitate installation?
Ans.

7. What type of Assy. is F-18?
Ans.

8. What type and size end fittings are used for F-18?
Ans.

9. On CF-130 what type and size fitting is FL-2?
Ans.

10. What pipe does Ident hanger No.1 support?
Ans.

11. What is the Reference and Plan no. for hangers on this system?
Ans.

12. To what two fittings does P140-1 attach?
Ans.

13. What valve is used to feed CF-73-GA-58 gageboard?
Ans.

14. In which direction is the flow for CF-138? (Fwd or Aft)
Ans.

15. What is the Reference and Plan number for gageboards on this system?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87744-3004 R/G

1. What type of valve is CF-135?
Ans. Gate Valve

2. What pump does P352-1 connect to?
Ans. Main Feed Pump No. 2

3. What size pipe is P128-3?
Ans. 1.900OD X 0.134 Min

4. What pipes does H48-4 support?
Ans. P189-1, P135-1

5. What is the distance between H13-4 and H1-4?
Ans. 118.5"

6. Could partial section 18-A be used to facilitate installation?
Ans. No

7. What type of Assy. is F-18?
Ans. 90 degree Flex-Hose Assy.

8. What type and size end fittings are used for F-18?
Ans. F-12 Union Assy. - 2" IPS

9. On CF-130 what type and size fitting is FL-2?
Ans. Flange - 1.500 IPS

10. What pipe does Ident hanger No.1 support?
Ans. P307

11. What is the Reference and Plan no. for hangers on this system?
Ans. Ref. 5 87524-7503

12. To what two fittings does P140-1 attach?
Ans. F-8 & F-4

13. What valve is used to feed CF-73-GA-58 gageboard?
Ans. CF-254

14. In which direction is the flow for CF-138? (Fwd or Aft)
Ans. Aft

15. What is the Reference and Plan number for gageboards on this system?
Ans. Ref. 13 Plan No. 87728-1502

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
   Ans.

2. What type of valve is CF-152 used on the 729 Boat?
   Ans.

3. How far port or stbd of C_L is F-14 located?
   Ans.

4. To what pipe does F-31 attach?
   Ans.

5. How far BMA would CF-331 be located?
   Ans.

6. In what direction is the flow for CF-203?
   Ans.

7. How far fwd of Fr. 113 would CF-331 be installed?
   Ans.

8. After installation will CF-154 be locked open or closed?
   Ans.

9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
   Ans.

10. What is F-20 and how much is required?
    Ans.

11. What size clamp half would be used on P157-2?
    Ans.

12. Why is piping on this drawing insulated?
    Ans.

13. What Reference and Plan would be used for the pipe details on this system?
    Ans.

14. What does P168-2 and P162-6 connect into?
    Ans.

15. What Reference and Plan numbers are used for the hangers on this system?
    Ans.

B-28, PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
   Ans. 16' 3" BMA
2. What type of valve is CF-152 used on the 729 Boat?
   Ans. Globe Stop Check
3. How far port or stbd of C_L is F-14 located?
   Ans. 2' 6"
4. To what pipe does F-31 attach?
   Ans. P158
5. How far BMA would CF-331 be located?
   Ans. 7' 9.2"
6. In what direction is the flow for CF-203?
   Ans. Up
7. How far fwd of Fr. 113 would CF-331 be installed?
   Ans. 18' 4.5"
8. After installation will CF-154 be locked open or closed?
   Ans. Closed
9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
   Ans. 19' 1.5"
10. What is F-20 and how much is required?
    Ans. Stave Damping - 22'
11. What size clamp half would be used on P157-2?
    Ans. 2" IPS
12. Why is piping on this drawing insulated?
    Ans. G.N. 37 Perssonnel Protection
13. What Reference and Plan would be used for the pipe details on this system?
    Ans. Ref. 2 87744-3032
14. What does P168-2 and P162-6 connect into?
    Ans. Feed Compound Tank
15. What Reference and Plan numbers are used for the hangers on this system?
    Ans. Ref 11 & 25 87524-7502 & 87524-7504