

SECTION 15 A3

HINGE COLUMN BEARINGS AND HOUSINGS

---GENERAL REQUIREMENTS---

---GENERAL

UNLESS OTHERWISE INDICATED, THE SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION SHALL GOVERN THE WORK. WELDING SHALL BE IN ACCORDANCE WITH SECTION 17K OF THESE SPECIFICATIONS. HIGH-STRENGTH BOLTING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS, AS MODIFIED BY THE BONDING AND GROUNDING REQUIREMENTS HEREIN.

DESIGN OF MEMBERS AND CONNECTIONS FOR ANY PORTION OF THE STRUCTURE NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE COMPLETED BY THE FABRICATOR AND INDICATED ON THE SHOP DRAWINGS.

SUBSTITUTIONS OF SECTIONS OR MODIFICATIONS OF DETAILS, OR BOTH, AND THE REASONS THEREFOR SHALL BE SUBMITTED WITH THE SHOP DRAWINGS FOR APPROVAL. APPROVED SUBSTITUTIONS, MODIFICATIONS, AND THE NECESSARY CHANGES IN RELATED PORTIONS OF THE WORK SHALL BE COORDINATED BY THE CONTRACTOR WITH THE CONTRACTING OFFICER OR HIS DESIGNATED REPRESENTATIVE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ERRORS OF DETAILING, FABRICATION, AND FOR THE CORRECT FITTINGS OF THE MEMBERS AND PARTS.

---SCOPE

THIS SECTION COVERS THE FABRICATION, SHOP ASSEMBLY, SHOP ERECTION, SHOP OPERATIONAL TESTING, ERECTION AT SITE, FIELD OPERATIONAL TESTING AND THE PERFORMANCE OF ALL OPERATIONS IN CONNECTION WITH THE FABRICATION, ASSEMBLY AND INSTALLATION OF THE HINGE COLUMN BEARING ASSEMBLIES.

HINGED COLUMN BEARING ASSEMBLIES SHALL BE OF TWO TYPES:

THE LOWER BEARING ASSEMBLY SHALL BE OF THE SPHERICAL, SELF-ALIGNING, RADIAL TYPE.

THE UPPER BEARING ASSEMBLY SHALL BE A COMBINATION RADIAL AND THRUST BEARING ASSEMBLY. THE TOTAL VERTICAL LOAD OF THE PCR WILL BE TAKEN BY A SPHERICAL-SEATED, SELF-ALIGNING THRUST BEARING POSITIONED ABOVE THE RADIAL BEARING WITHIN THE SAME HOUSING.

EACH BEARING ASSEMBLY SHALL HAVE ACCESS POINTS AS SHOWN ON THE DRAWINGS.

REFERENCES

THE FOLLOWING PUBLICATIONS OF THE ISSUES IN EFFECT ON THE DATE OF INVITATION FOR BIDS FORM A PART OF THIS SPECIFICATION AND, WHERE REFERRED TO THEREAFTER BY BASIC DESIGNATION ONLY, ARE APPLICABLE TO THE EXTENT INDICATED BY THE REFERENCES THERE TO.

AMERICAN SOCIETY FOR TESTING AND MATERIALS:

A 36	STRUCTURAL STEEL
A 441	HIGH STRENGTH LOW ALLOY STRUCTURAL MANGANESE - VANADIUM STEEL
A 325	HIGH STRENGTH STEEL BOLTS AND STUDS FOR STRUCTURAL STEEL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS
A 308	GLUED AND TEMPERED ALLOY STEEL BOLTS AND STUDS WITH SUITABLE NUTS
A 305	ULTRASONIC TESTING AND INSPECTION OF HEAVY STEEL FORGINGS
E 71	INDUSTRIAL RADIOGRAPHIC STANDARDS FOR STEEL CASTINGS
A 247	ALLOY STEEL FORGINGS FOR GENERAL INDUSTRIAL USE
A 274	ALLOY STEEL BROOMS, BULLETS AND SLABS FOR FORGINGS
A 175	ELECTRODEPOSITED COATINGS OF CADMIUM ON STEEL
E 109	DRY POWDER MAGNETIC PARTICLE INSPECTION
E 184	METHOD OF ULTRASONIC CONTACT INSPECTION OF WELDMENTS
A 572	HIGH STRENGTH LOW-ALLOY COLUMBIUM VANADIUM STEEL OF STRUCTURAL QUALITY

AMERICAN STANDARDS ASSOCIATION SPECIFICATIONS

B1.1	UNIFIED SCREW THREADS
B1.5	ACME SCREW THREADS
B4.1	PREFERRED LIMIT AND FITS FOR CYLINDRICAL PARTS
B46.1	SURFACE ROUGHNESS, WAVINESS AND LAY

AMERICAN WELDING SOCIETY SPECIFICATIONS

D1.1	STRUCTURAL WELDING CODE
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AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BOILER AND PRESSURE VESSEL CODE, SECTIONS VIII AND IX

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---FABRICATION---

---GENERAL

THE CONTRACTOR SHALL PERFORM ALL WORK REQUIRED TO PROVIDE AND COMPLETE THE INSTALLATION OF THE HINGED COLUMN BEARING ASSEMBLIES. CONCRETE FOUNDATIONS WILL BE PROVIDED UNDER ANOTHER SECTION OF THESE SPECIFICATIONS. IN ALL CASES WHERE A DEVICE OR PART OF THE EQUIPMENT IS HEREIN REFERRED TO IN THE SINGULAR, IT IS INTENDED THAT SUCH REFERENCE SHALL APPLY TO AS MANY SUCH DEVICES AS ARE REQUIRED TO COMPLETE THE INSTALLATION.

MATERIALS AND WORKMANSHIP SHALL CONFORM TO ALL APPLICATIONS AND REGULATIONS HAVING JURISDICTION OVER THE ITEMS HEREIN SPECIFIED, AND SHALL COMPLY WITH THE STANDARD PRACTICE OF THE TRADES INVOLVED, SUBJECT TO THE APPROVAL OF THE CONTRACTING OFFICER. SUPPLEMENTARY PARTS NECESSARY TO COMPLETE THE WORK OF THIS SECTION, WHETHER OR NOT DEFINITELY SHOWN OR SPECIFIED, SHALL BE FURNISHED AND INSTALLED.

SHOP DRAWINGS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIAL PROVISIONS AND SHALL INCLUDE DETAILS OF ASSEMBLY SEQUENCE FOR FIELD ERECTION.

FABRICATION FROM UNAPPROVED SHOP DETAILS SHALL BE AT THE CONTRACTORS RISK. STORAGE FOR BEARING ASSEMBLIES DELIVERED TO THE SITE PRIOR TO THE AVAILABILITY FOR ERECTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

---DESIGN

THE CONTRACTOR SHALL COORDINATE THE SHOP DETAILS FOR THE SPECIFIED WORK WITH THE CONTRACT DRAWINGS TO SEE THAT ALL WORK IS CORRECTLY EXECUTED. SHOULD THE CONTRACTOR DESIRE TO SUBMIT CHANGES FOR APPROVAL OF THE CONTRACTING OFFICER, SUCH CHANGES, IF APPROVED AND INCORPORATED INTO THE WORK, SHALL NOT BE RECOGNIZED AS REASON FOR ADDITIONAL FABRICATION AND ERECTION CHARGES AND SHALL BE AT NO ADDITIONAL COST TO THE GOVERNMENT.

---PART NUMBERS

THE VARIOUS PARTS OF THE MECHANISMS ARE IDENTIFIED BELOW, AND LISTED ON THE CONTRACT DRAWINGS. THESE NUMBERS AND NAMES SHALL BE USED ON SHOP DETAIL DRAWINGS FOR EASE OF REFERENCE TO CONTRACT DRAWINGS.

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---MATERIALS

THE VARIOUS PARTS OF THE HINGED COLUMN BEARING ASSEMBLIES SHALL CONFORM TO THE MATERIAL SPECIFICATIONS NOTED BELOW:

UPPER BEARING ASSEMBLY

PART	DESCRIPTION	MATERIAL	NUMBER REQUIRED
1	UPPER BEARING HOUSING	A441 GRADE 40	1
2	HOUSING COVER	A-36	1
3	TAPERED COVER BACKING RING	A-36	1
4	SHEAR KEY RING	A-36	1
5	TOP THRUST BEARING FACE	BFARJUM (8-10)	1
6	TOP THRUST BEARING BALL	A-274-60T	1
7	SIDE THRUST BEARING FACE	A-274-60T	1
8	SIDE THRUST BEARING BALL	BEARJUM (8-10)	1
9	HYDRAULIC CYLINDER, HORIZONTAL	SEE DWG.	3
10	LOCKING BOLT	A-325	3
11	HYDRAULIC CYLINDER, VERTICAL	SEE DWG.	3
12	HYDRAULIC CYLINDER MATING LUG, TOP	A441 GRADE 40	3 SETS
13	HYDRAULIC CYLINDER MATING LUG, BOTTOM	A441 GRADE 40	3 SETS
14	HYDRAULIC PUMP	SEE DWG.	1
15	SERVICE PLATFORM	A-36	1
16	BEARING CHANGEOUT SHIM PACK	A-36	3 SETS
17	RAIN COVER	GC-5-692-B	1
18	LUBRICATION FITTINGS	SEE DWG.	1
19	BEARING INSTALLATION/CHANGEOUT FIXTURES	A-36	3
20	OBSERVATION/LUBRICATION PORT COVERS	BRASS	3
21	MISCELLANEOUS PARTS		
--	MAIN PIVOT COLUMN	A441 OR A571 GR. 42	1

LOWER BEARING ASSEMBLY

PART	DESCRIPTION	MATERIAL	NUMBER REQUIRED
27	LOWER BEARING HOUSING	A441 GRADE 40	1
23	SEGMENTED RADIAL THRUST BEARING FACE	A-274-EST	1
24	SEGMENTED RADIAL THRUST BEARING BALL	BEARLUM (B-10)	1
25	SEGMENTED BEARING RETAINER RING	A-26	1
26	HYDRAULIC CYLINDER, HORIZONTAL	SEE DWG.	3
27	LOCKING BOLTS	A-325	3
28	HYDRAULIC CYLINDER, VERTICAL	SEE DWG.	3
29	HYDRAULIC PUMP	SEE DWG.	3
30	HYDRAULIC CYLINDER MOUNTING LUGS	A441 GRADE 40	3 SETS
31	RAIN COVER	CG-S-6923	1
32	SERVICE PLATFORM	A-36	1
33	LUBRICATION FITTINGS	SEE DWG.	1 SET
34	BEARING INSTALLATION/CHANGEOUT FIXTURES	A-36	1 SET
35	MISCELLANEOUS PARTS		

- NOTE 1. HYDRAULIC CYLINDERS AND HYDRAULIC PUMPS SHALL BE EQUIVALENT TO THAT MANUFACTURED BY ENERPAC DIVISION OF APPLIED POWER INCORPORATED, BUTLER, WISCONSIN.
- NOTE 2. MISCELLANEOUS PARTS NOT INCLUDED ABOVE SHALL BE A-36 STRUCTURAL STEEL, OR EQUIVALENT, UNLESS OTHERWISE NOTED ON THE DESIGN DRAWINGS OR APPROVED ON REQUEST BY THE CONTRACTOR.
- NOTE 3. WHERE THE SIZE OF THE MATERIAL REQUIRED BY THE CONTRACT DRAWINGS EXCEEDS THE SCOPE OF THE MATERIAL SPECIFICATION NOTED OR MODIFIED ABOVE, IT IS INTENDED THAT THE REFERENCED SPECIFICATION SHALL GOVERN FOR THIS PART AND THE PROPERTIES OF THE LARGEST SIZE INCLUDED IN THAT SPECIFICATION ARE TO BE REQUIRED. SPECIFICATIONS REFERENCED ARE TO GOVERN QUALITY OF MATERIAL AND NOT METHOD OF FABRICATION.
- NOTE 4. ATTENTION OF THE CONTRACTOR IS DIRECTED TO THE FACT THAT WELDING IS TO BE PERFORMED ON VARIOUS PARTS SPECIFIED HEREIN AND THAT CHEMICAL PROPERTIES INCLUDING CARBON, SULPHUR, AND PHOSPHORUS SHALL BE SPECIFIED IN THE PURCHASE ORDERS TO PROVIDE SUITABLE WELDABILITY OF THESE PARTS.

- NOTE 5. REPAIR WELDING AT ANY STAGE OF MANUFACTURE WHERE THE WELD OR HEAT AFFECTED ZONE WILL REMAIN IN THE FINISHED PART, SHALL NOT BE MADE WITHOUT PRIOR APPROVAL OF THE CONTRACTING OFFICER. SAID WELDS SHALL ONLY BE MADE WITH MATERIALS AND BY APPROVED PROCEDURES THAT WILL PRODUCE A DEPOSIT WHICH UPON SUBSEQUENT HEAT TREATMENT EXHIBITS PROPERTIES EQUAL TO THOSE OF THE PARENT MATERIAL.
- NOTE 6. SHOP DRAWINGS OF FORGINGS SHALL BE SUBMITTED FOR APPROVAL, INCLUDING PROVISIONS FOR TEST COUPONS AND ADDITIONAL MATERIAL AS REQUIRED FOR WELD QUALIFICATION TESTS IF WELDING IS TO BE PERFORMED ON THIS PART. CHEMICAL PROPERTIES INCLUDING MAXIMUM CARBON BY CHECK ANALYSIS SHALL BE SHOWN ON THE SHOP DRAWINGS FOR ALL PARTS TO BE WELDED.
- NOTE 7. ALSO SEE THE PROVISIONS OF PARAGRAPH TITLED NONDESTRUCTIVE TESTING. IN ADDITION TO TEST REQUIREMENTS OF THEIR RESPECTIVE ASTM SPECIFICATIONS, PARTS FABRICATED FROM A-237, FORGINGS, AND A-148, CASTINGS, SHALL BE INSPECTED 100 PERCENT BY ULTRASONIC AND/OR RADIOGRAPHIC INSPECTION AS PROVIDED THEREIN.

—SELF-ALIGNING BEARINGS

THE HINGED COLUMN BEARING SYSTEM IS COMPRISED OF THREE SELF-ALIGNING SPHERICAL BALL BEARING ASSEMBLIES. THE UPPER ASSEMBLY IS A COMBINATION VERTICAL THRUST AND RADIAL LOAD BEARING. THE LOWER ASSEMBLY IS A RADIAL LOAD BEARING ONLY. THE BEARING SURFACES ARE SPHERICALLY GROUND AND DESIGNED TO ACCOMMODATE MISALIGNMENT WHILE SUPPORTING HEAVY RADIAL AND THRUST LOADS. THE UPPER BEARING ASSEMBLY IS COMPRISED OF AN INNER BALL AND OUTER RACE, EACH PART BEING OF A SINGLE INTEGRAL CONSTRUCTION. THE LOWER BEARING ASSEMBLY SHALL BE A THREE PIECE SEGMENTED BEARING TO ALLOW INSTALLATION AROUND THE HINGED COLUMN.

MATERIAL FOR PARTS 5, 6 AND 24 SHALL BE B-10 GRADE BARIUM METAL AS MANUFACTURED BY THE BARIUM METAL CORPORATION, MILL AND COMMERCIAL STREET, ROCHESTER, NEW YORK 14614, HAVING A NORMAL CHEMICAL ANALYSIS OF 70 PERCENT VIRGIN COPPER, 10 PERCENT VIRGIN TIN AND 20 PERCENT BARIUM PROCESSED LEAD, AND A SURFACE HARDNESS OF BRINELL 55. MECHANICAL PROPERTIES SHALL BE AS LISTED ON THE FOLLOWING PAGE.

MECHANICAL PROPERTIES OF BARIUM METAL - AVERAGE VALUES

GRADE 5-10

YIELD STRENGTH $\#/IN^2$ (.2% PERM. SET)	14,750
TENSILE STRENGTH $\#/IN^2$	25,500
ELONGATION - % IN 2"	10
BRINELL HARDNESS	55
(10MM BALL-500 KG LOAD-30 SEC)	
COMPRESSION DEFORMATION LIMIT $\#/IN^2$	11,800
CHARPY IMPACT FT. - LBS.	2.2 TO 2.6
MODULUS OF ELASTICITY $\#/IN^2$	10,000,000
	12,000,000
MODULUS OF RIGIDITY $\#/IN^2$	3,700,000
ELECTRICAL CONDUCTIVITY (% COPPER AT ROOM TEMPERATURE)	9.1
COEFFICIENT OF FRICTION - DRY **	.16
THERMAL CONDUCTIVITY:	
CGS UNITS AT ROOM TEMPERATURE	.085
CAL/CM ² /CM/SEC/°C	
BRITISH UNITS AT ROOM TEMPERATURE	20.4
BTU/FT ² /FT/HR/°F	
SPECIFIC GRAVITY	9.2
WEIGHT PER CUBIC INCH	.320

- * LOAD PRODUCING A PERMANENT SET OF .001" IN SAMPLE 1" HIGH
- ** AS DETERMINED ON AMSLER WEAR TEST MACHINE

COEFFICIENT OF EXPANSION FOR ALL GRADES OF BARIUM METAL	.000011"
COEFFICIENT OF CONTRACTION (FOR RANGE FROM 70° F TO -115° F)	.000011"
(FOR RANGE FROM 70° F TO -350° F)	.000027"
(COEFFICIENT FIGURES SHOWN ARE PER INCH PER DEGREE FAHRENHEIT)	

MATERIAL FOR PARTS 6, 7 AND 23 SHALL BE NICKEL STEEL CONFORMING TO ASTM A274.65T, "ALLOY STEEL BLOOMS, BILLETS AND SLABS FOR FORGINGS", OR AISI NO. 4620.

NOTWITHSTANDING OTHER PROVISIONS OF THESE SPECIFICATIONS OR THE PROCESS BY WHICH THE BEARING IS TO BE PRODUCED, THE CONTRACTOR SHALL FURNISH COMPLETE WRITTEN CERTIFICATION AS TO CHEMICAL COMPOSITION, PHYSICAL PROPERTIES AND HEAT TREATMENT IN ADDITION TO ANY OTHER INFORMATION WHICH IS, IN THE OPINION OF THE CONTRACTING OFFICER, NECESSARY TO INSURE COMPLETE SUITABILITY OF THE FINISHED BEARING FOR ITS INTENDED SERVICE.

---TOLERANCES

ALL SPHERICAL BEARING SURFACES SHALL CONFORM TO THE DIMENSIONAL TOLERANCES SHOWN ON THE DRAWING DETAIL FOR THE SPECIFIC PART.

LARGE DIAMETER SCREW THREADS SHALL CONFORM TO ASA SPECIFICATION B1.1, CLASS 2 OR ASA B1.5 AS SPECIFIED ON DRAWINGS. THREAD ASSEMBLIES SHALL BE MATCH-MARKED AND CADMIUM PLATED PER ASTM A165.

BOLTS SHALL CONFORM TO THE TOLERANCES PROVIDED IN THEIR RESPECTIVE SPECIFICATIONS.

ALL MATERIAL NOT MACHINED SHALL CONFORM TO STANDARD MILL TOLERANCE OR TOLERANCES INDICATED IN THE RESPECTIVE ASTM MATERIAL SPECIFICATION. IF WITH STANDARD MILL TOLERANCE HEAVIER SECTIONS ARE REQUIRED TO PRODUCE FINISHED PARTS, CONTRACTOR SHALL FURNISH SUCH SECTIONS AS REQUIRED.

---WELDING

WELDING OF ALL PARTS SHALL CONFORM TO THE REFERENCED AWS AND ASME SPECIFICATIONS.

WELDERS AND WELDING OPERATORS EMPLOYED FOR WORK UNDER THIS SPECIFICATION SHALL BE PREVIOUSLY QUALIFIED BY TESTS AS PRESCRIBED IN SECTION 5, QUALIFICATIONS, OF THE REFERENCED AWS SPECIFICATION, OR ASME BOILER AND PRESSURE VESSEL CODE, SECTION IX, PRIOR TO ANY WORK ON THIS FABRICATION. CERTIFICATION OF THIS QUALIFICATION SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL.

LOW HYDROGEN ELECTRODES SHALL BE USED FOR ALL WELDING OF MATERIAL OTHER THAN A-36 STEEL. LOW HYDROGEN ELECTRODES MAY BE USED ON A-36 STEEL IF DESIRED.

MINIMUM PREHEAT AND INTERPASS TEMPERATURES SHALL CONFORM TO TABLE 4.2 OF THE REFERENCED AWS SPECIFICATION FOR A-36 AND A-441 STEELS, EXCEPT THAT FOR THICKNESSES 3 INCHES OR OVER THE PREHEAT

AND INTERPASS TEMPERATURE SHALL BE 300 DEGREES. PREHEAT AND INTERPASS TEMPERATURE FOR HIGHER STRENGTH STEELS SHALL BE AT LEAST 300 DEGREES FOR ALL THICKNESSES, BUT NOT HIGH ENOUGH TO AFFECT THE HEAT TREATMENT. KEEP AT, OR ABOVE, PREHEAT TEMPERATURE DURING WELDING, AND COOL SLOWLY AND UNIFORMLY TO ROOM TEMPERATURE AFTER WELDING. PRIOR TO WELDING, CONTRACTOR SHALL SUBMIT DETAILED WELDING PROCEDURES TO THE CONTRACTING OFFICER FOR APPROVAL AND WELDING SHALL NOT BE COMMENCED WITHOUT PRIOR APPROVAL OF PROCEDURES. THE WELD PROCEDURE SHALL REFLECT ANY SPECIAL REQUIREMENTS NECESSARY FOR WELDING PARTS OF HEAT-TREATED STEEL AND/OR SPECIAL CHEMICAL PROPERTIES. WHERE THE CHEMICAL PROPERTIES ARE NOT IN THIS SPECIFICATION, THEY SHALL BE INDICATED ON THE WELD PROCEDURE. WHERE WELD QUALIFICATION TESTS ARE TO BE MADE, THEY SHALL BE INDICATED.

WHERE AUTOMATIC SUBMERGED ARC WELDING PROCESSES ARE USED, THE CONTRACTOR SHALL SUBMIT EVIDENCE THAT THE FLUX AND WIRE TO BE USED WILL PROVIDE THE REQUIRED WELD PROPERTIES ON THE MATERIAL TO BE WELDED. SEE AWS D1.1-72, SECTION 4, PART III.

EXAMINATION OF WELDS-----WELDS SHALL BE SUBJECT TO EXAMINATION AS PROVIDED IN PARAGRAPH TITLED NONDESTRUCTIVE TESTING, IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

GROUP I - RADIOGRAPHIC EXAMINATION

CIRCUMFERENTIAL BUTT WELDS BETWEEN HOUSING AND PCR STRUCTURE.

BUTT WELDS ON HOUSINGS, COLUMN AND ALL BRACKET WELDS.

GROUP II - 100 PERCENT MAGNETIC PARTICLE INSPECTION

ALL LONGITUDINAL WELDS ON HOUSINGS AND COLUMN

ALL OTHER WELDS.

GROUP III - MAGNETIC PARTICLE INSPECTION OF ROOT PASS AND COMPLETED WELD

ALL WELDS NOT NOTED IN GROUPS I AND II.

STRESS RELIEF OF WELDS SHALL BE AS REQUIRED TO ASSURE DIMENSIONAL STABILITY DURING SUBSEQUENT MACHINING AND/OR FABRICATION. SEE SECTION 3, PARAGRAPH 3.9 OF AWS D1.1-72.

---INSPECTIONS AND TESTS---

---NONDESTRUCTIVE TESTING

FORGINGS SHALL, IN ADDITION TO THE TEST REQUIREMENTS OF THEIR RESPECTIVE ASTM SPECIFICATIONS, BE 100 PERCENT INSPECTED BY ULTRASONIC INSPECTION PRIOR TO MACHINING. THIS INSPECTION SHALL BE PERFORMED BY OR UNDER THE DIRECTION OF A RECOGNIZED INDEPENDENT TESTING LABORATORY APPROVED BY THE GOVERNMENT. THE CONTRACTOR SHALL SUBMIT FOR REVIEW BY THE GOVERNMENT THE NAMES AND QUALIFICATIONS OF ANY PARTICULAR INSPECTION AGENCIES WHICH HE DESIRES TO BE CONSIDERED. THE CONTRACTOR SHALL AFFORD SUCH INSPECTION AGENCY COMPLETE COOPERATION, ACCESS TO THE WORK, AND THE NECESSARY USE OF FACILITIES AS REQUIRED FOR THE SATISFACTORY PROGRESS OF THE INSPECTION. THE INSPECTION SHALL BE A BASIS FOR ACCEPTANCE OR REJECTION OF THE REFERENCED MATERIALS SUBJECT TO THE FOLLOWING CONDITIONS:

THE INDEPENDENT INSPECTION AGENCY SHALL SUBMIT FOR REVIEW AND COMMENT BY THE CONTRACTOR, AND APPROVAL BY THE CONTRACTING OFFICER, THE DETAILS TO BE FOLLOWED FOR THE INSPECTION AND REPORT, IN ACCORDANCE WITH ASTM A-585 INCLUDING BUT NOT LIMITED TO:

METHOD TO BE USED (REFLECTION OR RESISTANCE, OR BOTH), AND THE DIRECTIONS AND ANGULARITY TO INSURE PICKING UP ALL DISCONTINUITIES PRESENT.

TIME OF TEST.

DEGREE OF SURFACE PREPARATION.

COUPLANTS.

FREQUENCY.

METHOD OF SCANNING TO INSURE 100 PERCENT COVERAGE.

METHOD OF REPORTING ALL INDICATIONS, INCLUDING SIZE, TYPE, LOCATION, ETC.

COPIES OF ALL TEST REPORTS SHALL BE FURNISHED TO THE CONTRACTING OFFICER AND TO THE CONTRACTOR AND SHALL INCLUDE:

ALL DEFECTS IN EXCESS OF 10 PERCENT OF THE BACK REFLECTION.

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SKETCHES OF LOCATION OF DEFECTS.

DESCRIPTIONS BOTH IN PERCENT OF BACK REFLECTION AND LOSS OF BACK REFLECTION.

THE MANUFACTURER SHALL ACCEPT THE RESPONSIBILITY FOR RECOGNIZED DEFECTS, SUCH AS FLAKES, CRACKS, OR RUPTURES, AS WELL AS SUCH CONDITIONS AS INCLUSIONS, SEGREGATION, VARIATION IN GRAIN SIZE, ETC., WHICH WILL NOT BE REMOVED BY SUBSEQUENT MACHINING AND WHICH ARE CONSIDERED INJURIOUS BY THE CONTRACTING OFFICER. DUE CONSIDERATION WILL BE MADE OF THE LOCATION OF ANY OBSERVED DEFECT.

TO EVALUATE ANY QUESTIONABLE DEFECTS LOCATED ABOVE, THE CONTRACTOR MAY ELECT TO MAKE RADIOGRAPHIC INSPECTION OF THE DEFECTS, THE COST OF WHICH SHALL BE PAID FOR BY THE CONTRACTOR, IN LIEU OF REPLACING THE PART. SUCH INSPECTION SHALL BE MADE BY OR TO THE SATISFACTION OF AND UNDER THE SUPERVISION OF THE GOVERNMENT'S TESTING AGENCY, SELECTED AS NOTED ABOVE. ASTM E-71, INDUSTRIAL RADIOGRAPHIC STANDARDS FOR STEEL CASTINGS, CLASS B, WILL BE USED TO DETERMINE THE ACCEPTABILITY OF THESE DEFECTS EXCEPT THAT THE REQUIREMENTS OF CLASS 1 SHALL APPLY FOR SHRINKAGE ALLOWED. THE CONTRACTING OFFICER SHALL BE THE SOLE JUDGE AS TO THE ACCEPTANCE OF ANY SUCH DEFECT AND HIS DECISION SHALL BE FINAL.

ACCEPTANCE BY THE CONTRACTING OFFICER MAY BE CONDITIONAL UPON REMOVAL OF CERTAIN DEFECTS BY SUBSEQUENT MACHINING. IN THIS CASE, IF THE MANUFACTURER ELECTS TO PROCEED WITH ANY MACHINING WORK, SUCH WORK SHALL BE AT HIS OWN RISK AND IF SUBSEQUENTLY REJECTED BY THE CONTRACTING OFFICER, THE CONTRACTOR WILL REPLACE THE PART AT HIS OWN EXPENSE.

ACCEPTANCE BY THE CONTRACTING OFFICER OF ANY PART SO INSPECTED DOES NOT JEOPARDIZE HIS RIGHT TO REJECT SAID PART IF UPON SUBSEQUENT FABRICATION AND INSPECTION DEFECTS ARE FOUND TO EXIST THAT ARE CONSIDERED INJURIOUS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT COST AND TIME DELAY RESULTING FROM THE REJECTION OF ANY PART FOUND TO BE DEFECTIVE BY ANY OF THE REQUIRED INSPECTION PROCEDURES OR ADDITIONAL INSPECTION BY THE GOVERNMENT.

WELDS SHALL BE INSPECTED AS REQUIRED BY THEIR RESPECTIVE TYPE UNDER THE PARAGRAPH TITLED WELDING.

RADIOGRAPHIC INSPECTION SHALL BE FOR THE ENTIRE LENGTH OF THE SPECIFIED WELD. RADIOGRAPHY SHALL CONFORM TO THE REQUIREMENTS OF THE REFERENCED ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, PARAGRAPH UW-51.

THE RADIOGRAPHY SHALL BE PERFORMED OR WITNESSED BY A RECOGNIZED INDEPENDENT TESTING LABORATORY. THE INSPECTION AGENCY SHALL RECOMMEND THE TECHNIQUE AND PROCEDURE FOR PERFORMANCE OF THE RADIOGRAPHY AND REPORT OF DEFECTS FOR REVIEW AND COMMENT BY THE CONTRACTOR AND APPROVAL BY THE CONTRACTING OFFICER.

THE INSPECTION AGENCY WILL RETAIN A COPY OF THE FILM FOR REVIEW BY THE CONTRACTOR AND/OR THE CONTRACTING OFFICER UNTIL COMPLETION OF THE CONTRACT AND FOR FIVE YEARS THEREAFTER. THE INSPECTION AGENCY SHALL MAKE A WRITTEN REPORT TO THE CONTRACTING OFFICER REPORTING EACH INSPECTION AND DEFECT NOTED, IF ANY, WITH COPY TO THE CONTRACTOR.

ACCEPTANCE AND REJECTION OF WELD DEFECTS WILL BE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, PARAGRAPH UW-51.

MAGNETIC PARTICLE INSPECTION SHALL BE PERFORMED ON THE SPECIFIED WELDS IN ACCORDANCE WITH ASTM E-107, DRY MAGNETIC PARTICLE INSPECTION.

FOR 100 PERCENT MAGNETIC PARTICLE INSPECTION (GROUP II WELDS), THE SEQUENCE OF INSPECTION SHALL BE:

100 PERCENT OF ROOT PASS.

100 PERCENT AFTER EACH 1/2 INCH WELD DEPOSIT.

100 PERCENT OF FINAL WELD.

THE WELDED SURFACE AT INSPECTION SHALL BE FREE OF SCALE, SLAG, ETC., WHICH MIGHT INTERFERE WITH THE INSPECTION AND SHALL HAVE A TEMPERATURE NOT EXCEEDING 150 DEGREES FAHRENHEIT.

MAGNETIC PARTICLE INSPECTION SHALL BE UNDER THE SUPERVISION OF THE GOVERNMENT'S INSPECTOR AND THE CONTRACTING OFFICER SHALL RECEIVE REPORTS OF ALL INSPECTIONS AND RESULTS.

DEFECTS FOUND UNDER EITHER THE RADIOGRAPHIC OR MAGNETIC PARTICLE INSPECTION THAT ARE REMOVED AND REWELDED SHALL BE REINSPECTED BY THE SAME PROCEDURES ORIGINALLY USED IN THE AREA OF THE REPAIR WELDING.

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ALL MACHINED PARTS SHALL BE INSPECTED 100 PERCENT BY MAGNETIC PARTICLE INSPECTION FOLLOWING FINISH MACHINING. INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH ASTM E-107, DRY MAGNETIC PARTICLE INSPECTION.

ALL FORGINGS THAT WILL RECEIVE WELDS REQUIRING RADIOGRAPHIC INSPECTION SHALL BE RADIOGRAPHED 100 PERCENT IN THE AREA WITHIN 1-1/2 INCHES OF THE FINISHED WELD JOINT. THIS RADIOGRAPHIC INSPECTION WILL BE PERFORMED BY THE INDEPENDENT TESTING LABORATORY. ANY DEFECTS NOTED THAT, IN THE OPINION OF THE INSPECTION AGENCY AND THE CONTRACTOR, WILL CREATE PROBLEMS OR INCREASE IN SCOPE DURING WELDING SHALL BE REMOVED AND REPAIRED OR THE PART SHALL BE REPLACED. THIS REPAIR AND/OR REPLACEMENT SHALL BE PAID FOR BY AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

ADDITIONAL INSPECTIONS AND/OR TESTS OTHER THAN ABOVE OUTLINED, MAY BE REQUIRED FOR ITEMS SPECIFIED HEREIN AS MAY BE LATER DETERMINED BY THE CONTRACTING OFFICER. THE COST OF SUCH ADDITIONAL INSPECTIONS AND TESTS REQUESTED SHALL BE PAID FOR BY THE GOVERNMENT; HOWEVER, THE COST OF REWORKING, AND/OR REPLACING OF MATERIAL THEREBY FOUND TO BE DEFECTIVE SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT COST TO THE GOVERNMENT. TIME DELAYS RESULTING FROM PARTS FOUND TO BE DEFECTIVE, SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

NOTHING IN THIS SECTION OF THE SPECIFICATIONS SHALL BE DEEMED IN ANY WAY TO LIMIT THE RIGHTS OF THE GOVERNMENT UNDER GENERAL PROVISIONS OF THIS CONTRACT TITLED "INSPECTION AND ACCEPTANCE".

---FINISHES---

MACHINED SURFACES SHALL HAVE AN AVERAGE ROUGHNESS HEIGHT AS DEFINED BY AMERICAN STANDARDS ASSOCIATION SPECIFICATION B46.1.

THE MATING SPHERICAL SURFACES SHALL HAVE A ROUGHNESS HEIGHT OF 32 MICROINCHES.

SURFACES OTHER THAN THE ABOVE ON WHICH MACHINING IS REQUIRED SHALL HAVE ROUGHNESS HEIGHT NOT GREATER THAN:

SURFACES WHICH MATE	63 MICROINCHES
OTHER SURFACES	125 MICROINCHES

OTHER THAN THE ABOVE, ALL OTHER SURFACES WHICH ARE VISIBLE AND ON THE EXTERIOR OF THE STRUCTURES SHALL HAVE A FINISHED SURFACE ROUGHNESS HEIGHT NOT GREATER THAN 250 MICROINCHES.

---PAINTING AND TEMPORARY CORROSION PROTECTION---

ALL EXPOSED SURFACES, EXCEPT METAL-TO-METAL SLIDING SURFACES AND PLATED THREADS, SHALL BE CLEANED AND PAINTED IN ACCORDANCE WITH THE SECTION TITLED "PAINTING". THE CONTRACTOR SHALL PROTECT ALL UNPAINTED MACHINED SURFACES FROM CORROSION FROM ANY CAUSE DURING SHIPMENT, STORAGE AT THE SITE AND CONSTRUCTION OPERATIONS SO THAT THESE SURFACES ARE IN A NEW CONDITION, FREE FROM RUST AND CORROSION AT THE TIME OF FINAL ACCEPTANCE. TEMPORARY PROTECTION SHALL GENERALLY BE A WAX OR GREASE TYPE MATERIAL SPECIFICALLY FORMULATED AS A TEMPORARY PROTECTIVE COATING FOR MACHINED SURFACES. THE TEMPORARY COATING SHALL BE COMPLETELY REMOVED AND THE SURFACES PROPERLY LUBRICATED PRIOR TO FINAL ACCEPTANCE. THE TEMPORARY COATINGS AND THE OPERATIONS OF APPLICATION OR REMOVAL SHALL NOT DAMAGE OR DETRACT FROM THE ULTIMATE PROPERTIES OF THE PERMANENT PROTECTIVE COATINGS. COATINGS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL IN CONJUNCTION WITH THE SUBMISSION OF SHOP DRAWINGS. CORROSION OF SPHERICAL BEARING SURFACES, MACHINED THREADS AND ALL PARTS HAVING FINISHES OF 75 MICROINCHES OR LESS SHALL BE CAUSE FOR REJECTION.

---DAMAGES TO EQUIPMENT, SURFACES AND FINISHES---

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EQUIPMENT, SURFACES AND FINISHES FROM ANY CAUSE PRIOR TO FINAL ACCEPTANCE OF THE TOTAL WORK COVERED BY THESE SPECIFICATIONS AND CONTRACT FOR THE TOTAL WORK. ALL DAMAGES SHALL BE REPAIRED AND/OR REFINISHED TO THE FULL SATISFACTION OF THE CONTRACTING OFFICER OR SHALL BE REPLACED WITH MATERIAL ACCEPTABLE TO AND APPROVED BY THE CONTRACTING OFFICER.

---LUBRICATION---

ALL SURFACES WHERE METAL-TO-METAL SLIDING CONTACT OCCURS SHALL BE LUBRICATED BY HAND BRUSH APPLICATION DURING ASSEMBLY WITH AN ANTIGALLING, ANTIWELDING, EXTREME BEARING PRESSURE, SOLID TYPE LUBRICANT IN PASTE FORM EQUAL TO "MOLYKOTE C" AS MANUFACTURED BY THE ALPHA-MOLYKOTE CORPORATION OF STAMFORD, CONNECTICUT. THE LUBRICANT SHALL HAVE THE ABILITY TO MAINTAIN A FILM OVER EXPOSED METAL SURFACES TO PROVIDE PROTECTION FROM ATMOSPHERIC AND SEA WATER STRAY CORROSION CONDITIONS AS ENCOUNTERED ON THE ATLANTIC COAST OF FLORIDA. FINAL SELECTION OF LUBRICANT SHALL BE APPROVED BY THE CONTRACTING OFFICER. ALL SLIDING METAL SURFACES, EXCEPT THREADS OF SMALLER SIZED BOLTS, SHALL BE PROVIDED WITH DRILLED LUBRICANT PORTS EQUIPPED WITH HIGH PRESSURE GUN-TYPE LUBRICATION FITTINGS CONFORMING TO MIL-F-3541.

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---BONDING AND GROUNDING OF METALS---

INSOFAR AS IS APPLICABLE, THE WORK OF THIS SECTION SHALL BE CLOSELY COORDINATED WITH THE REQUIREMENTS FOR BONDING AND GROUNDING OF METALS AS OUTLINED IN THE SECTION TITLED "ELECTRICAL WORK".

---SHOP ASSEMBLY---

EACH BEARING ASSEMBLY SHALL BE COMPLETELY ASSEMBLED AND ERECTED IN THE SHOP, LUBRICATED IN ACCORDANCE WITH PARAGRAPH TITLED "LUBRICATION", AND OPERATED WITHOUT LOAD TO INSURE PROPER MATING AND FIT OF ALL PARTS. THE GOVERNMENT'S AUTHORIZED REPRESENTATIVES SHALL BE PRESENT TO WITNESS AND VERIFY ALL SHOP TESTS. THE CONTRACTOR MAY, AT HIS OPTION, ELECT TO HAVE THE BEARING ASSEMBLIES SHIPPED TO THE SITE ASSEMBLED OR DISASSEMBLED. HOWEVER, THE PARTS FOR EACH SHALL BE MATCH-MARKED WHILE SHOP ASSEMBLED TO INSURE PROPER REASSEMBLY IN THE EVENT OF ANY FUTURE DISASSEMBLY.

---FIELD ERECTION---

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THE BEARING ASSEMBLIES ARE TO BE ERECTED ON THE EXISTING LAUNCH PAD DURING THE CONSTRUCTION OF OTHER FACILITIES AND IN CONJUNCTION WITH THE CONTINUED WORK OF OTHER CONTRACTORS ENGAGED IN THIS CONSTRUCTION. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH WORK OF OTHER CONTRACTORS SO AS TO PROVIDE A MINIMUM OF INTERFERENCES. IN CASE OF DISPUTES OR DIFFICULTIES IN COORDINATION, THE DECISION OF THE CONTRACTING OFFICER SHALL BE FINAL.

THE HINGED COLUMN BEARING ASSEMBLIES ARE TO BE ERECTED ON A COLUMN WITH FOUNDATIONS AND ANCHOR BOLTS INSTALLED BY THE CONTRACTOR. THESE FOUNDATIONS WILL BE CHECKED BY THE CONTRACTING OFFICER TO INSURE THAT THEY ARE WITHIN THE TOLERANCES REQUIRED FOR ERECTION OF THE HINGED COLUMN BEARING ASSEMBLIES. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING THE SHIMS AS REQUIRED TO BRING ANCHOR BOLT SLEEVES TO PROPER ELEVATION AND FOR SETTING AND GROUTING THOROUGHLY BASE PLATES AND TORQUING ANCHOR BOLTS AS REQUIRED ON THE CONTRACT DRAWINGS.

GROUT SHALL CONSIST OF:

1 PART EMSECO	(160 POUND DRUM)
1 PART PORTLAND CEMENT	(1 SACK)
1 PART COARSE CLEAN SAND	(1 CUBIC FOOT)
* 1-1/2 PARTS OF 1/4" PEA GRAVEL	(1-1/2 CUBIC FEET)

* (FOR PRESSURE GROUTING, CONTRACTOR MAY ELECT TO OMIT PEA GRAVEL)

SUBSEQUENT TO ERECTION, ALL ASSEMBLIES SHALL BE OPERATED BY THE CONTRACTOR TO EXHIBIT EQUAL PERFORMANCE TO THE FACTORY TESTING, AND SHALL FINALLY BE ADJUSTED TO THE NOMINAL DIMENSIONS IN A NEUTRAL POSITION AS SHOWN ON THE CONTRACT DRAWINGS.

---POTENTIAL SUPPLIERS---

---GENERAL

POTENTIAL SUPPLIERS OF MATERIAL FOR HINGED COLUMN AND/OR BEARING HOUSINGS ARE LISTED BELOW:

CAMSON IRON WORKS
HOUSTON, TEXAS

ERIE FORGE
ERIE, PENN.

MICHAEL-HAPPENSTALL
PHILADELPHIA, PENN.

FOSTER AND WHEELER
MOUNTAIN TOP, PENN.

BADCOCK AND WILCOX
BARTON TOWN, OHIO

COMBUSTION ENGINEERING
CHATTANOOGA, TENN.

BETHLEHEM STEEL CORPORATION
BETHLEHEM, PENN.

UNITED STATES STEEL CORPORATION
PITTSBURGH, PENN.

---TESTS AND INSPECTION---

---FINAL TESTS AND INSPECTION

AFTER THE BEARING SYSTEM FURNISHED UNDER THIS SECTION HAS BEEN COMPLETELY INSTALLED, CONNECTED, LUBRICATED AND ADJUSTED AND OTHERWISE COMPLETELY PREPARED FOR OPERATION, THE FOLLOWING TESTS SHALL BE PERFORMED. THROUGHOUT THE CONDUCT OF THE TESTS ALL COMPONENTS SHALL BE CAREFULLY INSPECTED TO INSURE THAT ALL COMPONENTS OPERATE SMOOTHLY AND PROPERLY IN ACCORDANCE WITH THE SPECIFICATION REQUIREMENTS; THAT THERE IS NO EVIDENCE OF MALFUNCTIONING, THAT NONE OF THE COMPONENTS OVERHEAT; AND THAT THERE ARE NO VISUAL EVIDENCES OF IMPROPER FUNCTIONING. THE CHARACTERISTICS OBSERVED DURING THESE TESTS SHALL BE RECORDED FOR INCORPORATION IN THE MAINTENANCE MANUALS HEREINAFTER SPECIFIED.

THE FINAL TESTS AND INSPECTION OF THE HINGED COLUMN BEARING INSTALLATION SHALL BE CONDUCTED CONCURRENT WITH THE FINAL TESTS AND INSPECTION OF THE DRIVE TRUCK SYSTEM SPECIFIED IN SECTION 14 N. DURING EACH TEST CONDUCTED UNDER SECTION 14 IN THE BEARING SYSTEM WILL ALSO BE SUBJECTED TO TEST AS A RESULT OF THE STRUCTURE BEING ROTATED. THEREFORE, SIMULTANEOUS WITH THE DRIVE TRUCK TESTING THE CONTRACTOR SHALL HAVE TWO QUALIFIED REPRESENTATIVES OF THE BEARING MANUFACTURER ON THE SITE AND ONE REPRESENTATIVE POSITIONED ON EACH HINGED COLUMN BEARING PLATFORM. THE FOLLOWING ACTIVITIES SHALL BE PERFORMED BY THE REPRESENTATIVES OF THE BEARING MANUFACTURER:

RECORD WIND VELOCITY AND DIRECTION.

RECORD TEMPERATURE OF BEARING BALL, BEARING RACE AND BEARING HOUSING.

CONFIRM AND RECORD THAT A VISUAL INSPECTION HAS BEEN MADE TO ASSURE THAT THE BEARINGS ARE COMPLETELY PREPARED FOR OPERATION AND READY FOR ROTATION.

DURING EACH AND EVERY STRUCTURE MOVEMENT OPERATION PERFORMED UNDER SECTION 14 N PARAGRAPH TITLED "TRUCK ASSEMBLY TESTS AFTER ERECTION" THE FOLLOWING ACTIVITIES SHALL BE PERFORMED BY THE BEARING REPRESENTATIVES:

STAY IN VOICE COMMUNICATION WITH THE DRIVE TRUCK OPERATOR SO THAT EACH CAN ADVISE THE OTHER OF HOW THE TEST IS PROCEEDING.

RECORD THE AMBIENT AIR TEMPERATURE.

RECORD THE BEARING TEMPERATURE BEFORE, DURING AND AFTER EACH ROTATION OF THE STRUCTURE.
VISUALLY OBSERVE AND RECORD THAT THE SPHERICAL BALL IS TRAINING ON THE SPHERICAL FACE.
RECORD ANY OTHER PERTINENT AND SIGNIFICANT OBSERVATIONS MADE DURING THE TESTS.
CORRELATE EACH DATA COMPILATION WITH SPEED OF ROTATION.

---OPERATIONS AND MAINTENANCE---

---OPERATIONS AND MAINTENANCE INSTRUCTION MANUALS

THE CONTRACTOR SHALL PREPARE AND DELIVER TO THE CONTRACTING OFFICER OPERATIONS AND MAINTENANCE MANUALS IN ACCORDANCE WITH THE PROVISIONS OF THE "CONTRACT SCHEDULE."

EACH MANUAL SHALL CONTAIN THE FOLLOWING INSTRUCTIONS CLEARLY STATED AND SHALL INCLUDE DIAGRAMS AND ILLUSTRATIONS WHERE NECESSARY TO CLARIFY THE TEXT:

COMPLETE OPERATING INSTRUCTIONS INCLUDING:

INSPECTION AND CHECKS TO BE PERFORMED PRIOR TO OPERATION.

SPECIAL PRECAUTIONS AND OBSERVATIONS REQUIRED BEFORE AND DURING OPERATION.

OPERATIONS REQUIRED IMMEDIATELY PRIOR TO SHUT-DOWN INCLUDING SPECIAL INSTRUCTIONS, IF ANY, TO BE FOLLOWED IF SYSTEM IS EXPECTED TO BE IDLE FOR 7 TO 30 DAYS, AND IF SYSTEM IS EXPECTED TO BE IDLE MORE THAN 30 DAYS.

SPECIAL PROCEDURES NECESSARY TO PREPARE THE SYSTEM FOR HURRICANE DUTY TOGETHER WITH SPECIAL PROVISIONS TO RESTORE TO NORMAL CONDITIONS AT TERMINATION OF HURRICANE ALERT INCLUDING SPECIAL INSPECTIONS AND/OR SERVICE.

DETAILED STEP-BY-STEP OPERATIONS FOR ROUTINE AND PERIODIC MAINTENANCE INSPECTIONS AND OPERATIONS INCLUDING FREQUENCY OF INSPECTIONS, FREQUENCY OF LUBRICATION AND FREQUENCY OF OPERATION FOR EXERCISE PURPOSES AND TESTING.

COMPLETE MAINTENANCE INSTRUCTIONS INCLUDING:

DETAILED SEQUENCE OF OPERATIONS FOR BEARING INSTALLATION AND REMOVAL.

DETAILED SEQUENCE OF HYDRAULIC CYLINDER INSTALLATION AND OPERATION.

DETAILED SEQUENCE OF LOCKING BOLT OPERATION.

DETAILED SEQUENCE OF OPERATIONS FOR PERFORMING ADJUSTMENTS.

COMPLETE DETAILED INSTRUCTIONS FOR REMOVAL, OVERHAUL AND RECONDITIONING, AND REINSTALLATION OF ALL COMPONENTS.

DETAILED PROCEDURES FOR CLEANING, INSPECTING, PREPARING THE SYSTEM FOR OPERATION FOLLOWING MAINTENANCE OPERATIONS.

CHARTS AND DIAGRAMS:

COMPLETE CHARTS AND DIAGRAMS SHALL BE INCLUDED SHOWING THE DETAILED SEQUENCE OF BEARING ASSEMBLY FOR BOTH REMOVAL AND INSTALLATION.

SPARE PARTS LISTS INCLUDING:

DETAILED LISTS OF SPARE PARTS FOR MAINTENANCE AND OVERHAUL OF EACH COMPONENT INCLUDING ILLUSTRATIONS AND EXPLODED VIEWS WHERE NECESSARY TO INSURE PROPER IDENTIFICATION OF INDIVIDUAL PARTS.

COMPLETE PROCUREMENT SPECIFICATIONS AND SOURCE OF SUPPLY FOR ALL EXPENDABLE MATERIALS INCLUDING LUBRICANTS.

COMPLETE AND DETAILED TABULATION SHOWING ALL VALUES OF TOLERANCES AND ALL OTHER ADJUSTMENTS AS RECORDED DURING FINAL TEST, ADJUSTMENT AND CALIBRATION OF THE SYSTEM.

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