

June 01, 1995

CRITICAL ITEMS LIST

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1) CIL ITEM : B400-22
2) FMEA CODE : B400
3) COMPONENT : NPDP
4) PART NUMBER : R5007701
5) SYSTEM/SUBSYSTEM : PUMPS/BKX
6) FAILURE MODE : PUMP PIECE PART STRUCTURAL FAILURE

7) PREPARED : SSHE RELIABILITY
8) APPROVED :
9) DATE : 06-01-95
10) REVISION/CHANGE : -002/0
11) EFFECTIVITY : -761
12) HAZARD REFERENCE : SEE LISTINGS BELOW
13) COBO #: mes-01-3275

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
SMC	FIRE FROM LOCK IMPACT OR RUBBING. LOSS OF VEHICLE. REDUNDANCY SCREENS: SINGLE POINT FAILURE: N/A	1 HAZARD REF: NE-C1S,M, NE-C1A,C

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CIL ITEM: 8400-22	DESIGN	DOCUMENT REF.
FAILURE CAUSE A: INTERNAL STRUCTURAL FAILURE OF:		
(1) MAIN IMPELLER		(1) RS007718
(2) PREBURNER IMPELLER		(2) RS007723
(3) MAIN HOUSING		(3) RS007729
(4) PREBURNER PUMP HOUSING		(4) RS007739
(5) BALANCE PISTON SHIM		(5) RS007788
(6) LEFT TURNING VANE RETAINER NUT		(6) RS007790
(7) KEL-F SEAL RETAINER RING		(7) RS007918
(8) KEL-F SEAL RETAINER		(8) RS007920
(9) ISOLATOR		(9) RS007933
(10) PUMP END BEARING SUPPORT		(10) RS007937
(11) MATING RING		(11) RS007940
(12) ANTI-VORTEX RING		(12) RS007973
(13) CARTRIDGE		(13) RS007974
(14) TURBINE END BEARING SUPPORT		(14) RS007975
(15) ISOLATOR SHIELD		(15) R0017242
(16) MAIN IMPELLER RETAINER NUT		(16) R0017249
(17) PUMP BEARING RETAINER NUT		(17) R0017254
<p>THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING INCONEL 718, WHICH WAS SELECTED FOR ITS STRENGTH AND DUCTILITY AT ROOM AND CRYOGENIC TEMPERATURES, AND IS RESISTANT TO CORROSION AND STRESS CORROSION CRACKING (18). ALL THE PARTS ARE SOLUTION HEAT TREATED AND AGE-HARDENED. THE MAIN HOUSING COMPONENTS ARE ELECTRON BEAM WELDED TO MINIMIZE THE HEAT AFFECTED ZONE AND DISTORTION. WELDS ARE GROUND FLUSH. THE INLET OF THE MAIN HOUSING AND THE PREBURNER PUMP HOUSING ARE CASTINGS WHICH ARE NOT ISOSTATICALLY PRESSED FOR IMPROVED MECHANICAL PROPERTIES AND DENSIFICATION. CONTINUED USE WITH ALLOWABLE DISCREPANCIES RESULTING FROM OPERATION FOR THE MAIN IMPELLER AND MAIN HOUSING ARE EVALUATED AND CONTROLLED PER THE REQUIREMENTS OF THE MAINTENANCE CONTROL DOCUMENT (19). THE CARTRIDGE (13) IS HIGH CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (20).</p>		
		(18) RSS-8578-11
		(19) RSS-8793
		(20) DAR 2293

CIL ITEM: B400-22	DESIGN	DOCUMENT REF.
B - 336	<p>(1) DIVERTER (2) PUMP END BEARING PRELOAD SPRING (3) TURBINE END BEARING PRELOAD SPRING</p> <p>THE PARTS LISTED ABOVE ARE MANUFACTURED USING INCOLOY 903, WHICH WAS SELECTED FOR ITS CRYOGENIC MECHANICAL PROPERTIES, THERMAL EXPANSION COEFFICIENT, THERMAL CONDUCTIVITY, ELASTIC MODULUS, AND STRESS CORROSION CRACKING RESISTANCE (4). THE PARTS ARE SOLUTION HEAT TREATED AND AGE-HARDENED. THE PUMP AND TURBINE SPRINGS MEET CEI REQUIREMENTS FOR HIGH CYCLE AND LOW CYCLE FATIGUE LIFE (5), WITH THE EXCEPTION OF THE TURBINE END SPRING WHICH IS HIGH CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (6).</p>	<p>(1) RS007953 (2) R0012220 (3) R0012230 (4) RSS-8570-11 (5) RL00532, CP320R0003B (6) DAR 2033</p>
	<p>(1) SHAFT</p> <p>THE SHAFT IS MANUFACTURED UTILIZING WAFSPALOY, WHICH WAS SELECTED FOR ITS STRENGTH AND DUCTILITY AT CRYOGENIC TEMPERATURES (2). THE ALLOY IS VACUUM MELTED TO MINIMIZE IMPURITY FORMATION AND THERMO-MECHANICALLY PROCESSED. IT IS SOLUTION HEAT TREATED, STABILIZED, AND AGE-HARDENED. FORGING GRAIN FLOW IS SPECIFIED TO MAXIMIZE MATERIAL PROPERTIES IN THE DIRECTION OF STRESS INTENSITY (1). DRY-FILM LUBRICANT IS APPLIED AND BAKED ONTO ALL MATING COMPONENT SURFACES TO MINIMIZE FRETTING WHILE ALLEVIATING FRICTION. THE SHAFT IS LOW CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (3) (4).</p>	<p>(2) RSS-8570-11 (3) DAR 2024 (4) DAR 2432</p>
	<p>(1) TURBINE END BEARING (2) PUMP END BEARING</p> <p>THE BALLS AND RACES ARE MANUFACTURED UTILIZING 440C CRES, WHICH WAS SELECTED FOR ITS HARDNESS AND LOAD CARRYING ABILITY (3). THE ALLOY IS SINGLE VACUUM MELTED TO MINIMIZE IMPURITY FORMATION. IT IS AUSTENIZED, QUENCHED, AND DOUBLE COLD STABILIZED AND TEMPERED FOR ADDITIONAL HARDNESS AND MATERIAL DIMENSIONAL STABILITY. THE INCREASED INNER RACE SHOULDERS PERMIT HIGH CONTACT ANGLE LOADING FOR IMPROVED AXIAL THRUST CAPABILITY. STRUCTURAL INTEGRITY OF A SPALLED BEARING WAS DEMONSTRATED DURING TEST 901-301, IN WHICH A SPALLED NO. 3 BEARING WAS SUBJECTED TO 823 SECONDS OF OPERATION WITHOUT INCURRING A STRUCTURAL FAILURE. THE BEARING CAGES ARE MANUFACTURED UTILIZING MANDREL WRAPPED GLASS FABRIC/TEFLON (TFE) RESIN IMPREGNATED, WHICH WAS SELECTED FOR ITS HIGH LUBRICITY, WEAR RESISTANCE, AND REQUIRED MECHANICAL PROPERTIES (3). THE GLASS SUPPORTED FABRIC IS WRAPPED TO FORM A TUBE FROM WHICH CAGES ARE FABRICATED. SAMPLES FROM EACH TUBE ARE BATCH TESTED FOR LCM COMPATIBILITY (3). DRY-FILM LUBRICATION IS APPLIED TO THE BALLS, RACEWAYS, AND CAGE TO MINIMIZE FRICTION. CONTINUED USE WITH ALLOWABLE DISCREPANCIES RESULTING FROM OPERATION IS EVALUATED AND CONTROLLED PER THE REQUIREMENTS OF THE MAINTENANCE CONTROL DOCUMENT (4). THE BEARINGS ARE WEAR LIFE LIMITED BY MAJOR WAIVER (5).</p>	<p>(1) RS007955 (2) RS007958 (3) RSS-8570-11 (4) RSS-8793 (5) DAR 2054 DAR 2082</p>

CIL ITEM: B400-22	DESIGN	DOCUMENT REF.
(1) TURBINE END BEARING RETAINER NUT (2) TURNING VANE - RIGHT (3) TURNING VANE - LEFT (4) FRONT DAMPING SEAL RETAINING RING (5) REAR DAMPING SEAL RETAINING RING (6) BALANCE PISTON RING - LEFT (7) BALANCE PISTON RING - RIGHT (8) LABYRINTH SEAL	THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING K-MONEL, WHICH WAS SELECTED FOR ITS REQUIRED TENSILE STRENGTH WITH HIGH DUCTILITY AND TOUGHNESS AT CRYOGENIC TEMPERATURES, AND CORROSION RESISTANCE (9). THE PARTS ARE SOLUTION HEAT TREATED AND AGE-HARDENED. THE RETAINER NUT AND TURNING VANES ARE DRY-FILM LUBRICATED TO MINIMIZE FRETTING AND FRICTION. THE LABYRINTH SEAL IS SILVER PLATED TO PREVENT BYPASS LEAKAGE OF BEARING COOLANT. CONTINUED USE WITH ALLOWABLE DISCREPANCIES RESULTING FROM OPERATION FOR THE TURNING VANES IS EVALUATED AND CONTROLLED PER THE REQUIREMENTS OF THE MAINTENANCE CONTROL DOCUMENT (10).	(1) RS007715 (2) RS007741 (3) RS007743 (4) RS007758 (5) RS007761 (6) RS007765 (7) RS007780 (8) RS007939 (9) RSS-8578-11 (10) RSS-8795
(1) BALANCE PISTON SEAL - RIGHT (2) FRONT DAMPING SEAL (3) REAR DAMPING SEAL (4) BALANCE PISTON SEAL - LEFT	THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING SILVER, WHICH WAS SELECTED FOR ITS HIGH IGNITION TEMPERATURE, THERMAL CONDUCTIVITY, FRICTIONAL WEAR RESISTANCE, ANTI-GALLING CHARACTERISTICS, AND ACCEPTABLE DESIGN STRENGTH (5).	(1) RS007727 (2) RS007764 (3) RS007766 (4) RS007773 (5) RSS-8578-11

CCL ITEM: B400-22	DESIGN	DOCUMENT REF.
	<ul style="list-style-type: none"> (1) PREBURNER IMPELLER BOLT (2) PUMP END BEARING SPACER (3) TURBINE END BEARING SPACER (4) BOLT (5) PUMP END BEARING SUPPORT BOLT (6) BOLT WASHER (7) INTERMEDIATE SEAL BOLT WASHER (8) PUMP END BEARING SUPPORT BOLT WASHER (9) INTERMEDIATE SEAL BOLT (10) TURBINE END BEARING SUPPORT BOLT (11) ISOLATOR BOLT (12) PUMP END BEARING SPACER 	<ul style="list-style-type: none"> (1) RS007726 (2) RS007744 (3) RS007765 (4) RS007792 (5) RS007793 (6) RS007794 (7) RS007874 (8) RS007878 (9) RS007895 (10) RS007945 (11) R0011320 (12) R0016038 (13) RSS-8578-11
	<p>THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING A-286 CRES, WHICH WAS SELECTED FOR ITS STRENGTH, DUCTILITY, ELASTIC MODULUS, AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (13). THE BEARING SPACERS ARE SOLUTION HEAT TREATED AND AGE-HARDENED. THE WASHERS ARE SOLUTION HEAT TREATED, AGE-HARDENED, AND ANNEALED. THE BOLTS ARE SOLUTION HEAT TREATED AND DRY-FILM LUBRICATED. IN ADDITION, THE PREBURNER IMPELLER, INTERMEDIATE SEAL, AND TURBINE SUPPORT BOLTS ARE COLD WORKED, AGE-HARDENED, AND COLD WORKED AGAIN FOR INCREASED STRENGTH.</p>	
	<ul style="list-style-type: none"> (1) TURBINE END BEARING RETAINER NUT LOCK (2) PUMP END BEARING RETAINER NUT LOCK (3) MAIN IMPELLER RETAINER NUT LOCK (4) LEFT TURNING VANE RETAINER NUT LOCK 	<ul style="list-style-type: none"> (1) RS007716 (2) RS007722 (3) RS007789 (4) RS007791 (5) RSS-8578-11
	<p>THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING 302 CRES, WHICH WAS SELECTED FOR ITS REQUIRED STRENGTH, DUCTILITY, AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (5). DRY-FILM LUBRICATION IS UTILIZED TO MINIMIZE FRETTING AND FRICTION. THE ALLOY IS ANNEALED FOR THIS BENDING APPLICATION.</p>	
	<ul style="list-style-type: none"> (1) PRIMARY OXIDIZER GASKET (2) ISOLATOR BOLT WASHER (3) TURBINE END BEARING SUPPORT BOLT WASHER 	<ul style="list-style-type: none"> (1) RS007784 (2) R0017251 (3) R0017647 (4) RSS-8578-11
	<p>THE PARTS LISTED ABOVE ARE MANUFACTURED UTILIZING 321 CRES, WHICH WAS SELECTED FOR ITS REQUIRED STRENGTH, DUCTILITY, AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (4). DRY-FILM LUBRICATION IS UTILIZED ON THE ISOLATOR BOLT WASHER TO MINIMIZE FRETTING AND ALLEVIATE FRICTION. THE WASHERS ARE SOLUTION HEAT TREATED. THE GASKET IS ANNEALED AND SILVER PLATED FOR THIS SEALING APPLICATION.</p>	

CIL ITEM: B400-22	DESIGN	DOCUMENT REF.
<p>(1) PREBURNER IMPELLER BOLT LOCK</p> <p>THE LOCK IS MANUFACTURED UTILIZING HASTELLOY B-2, WHICH WAS SELECTED FOR ITS REQUIRED TENSILE STRENGTH AND TENSILE YIELD PROPERTIES AT CRYOGENIC TEMPERATURES (2). THE ALLOY IS RESISTANT TO CORROSION AND STRESS CORROSION CRACKING, AND HAS GOOD FABRICABILITY (2). IT IS ANNEALED FOR THIS BENDING APPLICATION. THE LOCK IS DRY-FILM LUBRICATED TO MINIMIZE FRETTING WHILE ALLEVIATING FRICTION.</p>	<p>(1) INTERMEDIATE SEAL ASSEMBLY</p> <p>THE SEAL HOUSING IS MANUFACTURED UTILIZING INCONEL 718 AND IS FABRICATED IN TWO HALVES WHICH LOCK TOGETHER WITH INTERLOCKING TANGS. THE SEAL ELEMENTS ARE RADIALLY FREE FLOATING TO ACCOMMODATE SHAFT DYNAMIC DEFLECTIONS AND UTILIZES A DUAL NOSE PAD DESIGN WITH A MICROFINISH SURFACE ON THE DOWNSTREAM FACE FOR BYPASS LEAKAGE PREVENTION. THE SEALS ARE AXIALLY PRELOADED AGAINST THE HOUSING BY A SPRING BETWEEN THE SEALS FOR PROPER POSITIONING DURING NON-OPERATIONAL PHASES. PRESSURE LOADING DURING OPERATION ENHANCES THE NOSE PAD SEALING. THE HOUSING IS SOLUTION HEAT TREATED AND AGE-HARDENED. SILVER PLATING IS UTILIZED AT THE OUTER FLANGE RIM TO PREVENT HELIUM LEAKAGE. THE SEAL ELEMENTS CONTAIN AN OUTER ADAPTER RING MADE FROM INCONEL K-750 AND AN INNER RING OF CARBON G84. THE ADAPTER RING PROVIDES AN INTERFERENCE FIT TO COMPRESS THE CARBON RING AND HAS ANTI-ROTATION TANGS ON THE OUTER DIAMETER TO LIMIT TANGENTIAL MOVEMENT. INCONEL K-750 WAS SELECTED FOR ITS HIGH TEMPERATURE STRENGTH PROPERTIES AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (2). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED. THE CARBON RINGS ARE MANUFACTURED UTILIZING CARBON G84 WHICH IS SINTERED IN A PREFORM SHAPE. G84 WAS SELECTED FOR ITS RESISTANCE TO DETERIORATION IN A HIGH TEMPERATURE EXHAUST GAS ENVIRONMENT, WEAR RESISTANCE, COEFFICIENT OF FRICTION, AND LIGHTWEIGHT RESPONSE ABILITY TO SHAFT DEFLECTIONS (2). THE SPRING IS MANUFACTURED UTILIZING INCONEL X-750 AND IS ANNEALED FOR THIS DUCTILE APPLICATION.</p>	<p>(1) RS00772B (2) RSS-8578-11</p>
<p>(1) PRIMARY OXIDIZER SEAL</p> <p>THE SEAL IS MANUFACTURED UTILIZING KEL-F, WHICH WAS SELECTED FOR ITS CHEMICAL AND ELECTRICAL PROPERTIES, COLD FLOW RESISTANCE, AND RELATIVE SOFTNESS TO THE LABYRINTH SEAL (2). THE SEAL IS ANNEALED AND MACHINED TO ACHIEVE CRYOGENIC DIMENSIONAL REQUIREMENTS WHILE INSTALLED IN A RETAINER CONFIGURATION.</p>		<p>(1) RS007921 (2) RSS-8578-11</p>

CIL ITEM: B400-22	DESIGN	DOCUMENT REF.
<p>INCONEL 718, INCOLOY 903, WASTALOY, HASTELLOY B-2, A-286 CRES, 302 CRES, 321 CRES, 440C CRES, K-NIOBEL, SILVER, TEFLON (TFE), KEL-F, INCONEL X-750, CARBON Q84, AND DRY-FILM LUBRICATION MEET LOX COMPATIBILITY REQUIREMENTS (1). THE HARDWARE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/WDE FLAW GROWTH SINCE THEY ARE NOT FRACTURE CRITICAL PARTS, EXCEPT FOR THE MAIN IMPELLER, PREBURNER PUMP BEARING SUPPORT AND ISOLATOR, ROTOR SHAFT, AND THE RIGHT AND LEFT TURNING VANES WHICH WERE CLEARED BY CRITICAL INITIAL FLAW SIZE DETECTABILITY, THE MAIN HOUSING, PREBURNER PUMP HOUSING, AND PREBURNER PUMP IMPELLER WERE CLEARED BY RISK ASSESSMENT (2). THE FMEA/CIL WELDS ARE CLEARED FOR FRACTURE MECHANICS/WDE FLAW GROWTH BY THE WELD ASSESSMENT (3). TABLE B400 LISTS ALL FMEA/CIL WELDS AND IDENTIFIES THOSE WELDS IN WHICH THE CRITICAL INITIAL FLAW SIZE IS NOT DETECTABLE AND THOSE WELDS IN WHICH THE ROOT SIDE IS NOT ACCESSIBLE FOR INSPECTION. THOSE WELDS IN WHICH THE CRITICAL INITIAL FLAW SIZE IS NOT DETECTABLE ARE ACCEPTABLE FOR FLIGHT BY RISK ASSESSMENT (3). THE REFERENCED PARTS MEET CEI REQUIREMENTS FOR HIGH CYCLE AND LOW CYCLE FATIGUE LIFE (4) WITH THE EXCEPTION OF THE SHAFT WHICH IS LOW CYCLE FATIGUE LIFE LIMITED (5), THE TURBINE AND PRELOAD SPRING WHICH IS HIGH CYCLE FATIGUE LIMITED (6), THE BEARINGS WHICH ARE WEAR LIMITED (7), THE MAIN HOUSING WHICH IS LIFE LIMITED DUE TO MICROFISURES (8), AND THE CARTRIDGE WHICH IS HIGH CYCLE FATIGUE LIFE LIMITED BY MAJOR WAIVER (12). THE MINIMUM FACTORS OF SAFETY FOR THE REFERENCED PARTS MEET CEI REQUIREMENTS (9). ASSEMBLY PROCEDURES FOR LOCKING DEVICES ENSURE DEFECT-FREE INSTALLATION (10). REUSE OF PARTS DURING OVERHAUL IS CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (11).</p>	<p>(1) RSS-8578-11 (2) NASA TASK 117 (3) RSS-8756 (4) H100532, CP320R00038 (5) DAR 2024 (6) DAR 2033 (7) DAR 2054 DAR 2082 (8) DAR 2044 (9) RSS-8546-16, CP320R00038 (10) RL00814 (11) RL00874 (12) DAR 2293</p>	

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
<p>FAILURE CAUSE A:</p>	<p>RS007718 - MAIN IMPELLER RS007723 - PREBURNER IMPELLER</p> <p>MATERIAL INTEGRITY</p> <p>HEAT TREAT</p>	<p>MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.</p> <p>MAIN IMPELLER IS PENETRANT AND ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.</p> <p>PREBURNER IMPELLER IS PENETRANT AND RADIOGRAPHICALLY INSPECTED PER SPECIFICATION REQUIREMENTS.</p> <p>PREBURNER IMPELLER IS NOT ISOSTATIC PRESSED PER SPECIFICATION REQUIREMENTS.</p> <p>MAXIMUM GROWTH IS VERIFIED BY THE MAIN IMPELLER SPIN AT HIGH SPEED PER DRAWING REQUIREMENTS.</p> <p>HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS FOR THE MAIN AND PREBURNER IMPELLERS.</p>	<p>RS007718 RS007723</p> <p>RBD170-153 RBD170-155</p> <p>RA0115-116 RA0115-012</p> <p>RA0115-116 RA0115-006</p> <p>RL08368</p> <p>RS007718</p> <p>RA0611-020 RB0170-155</p>

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CIL ITEM: 8400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	SURFACE FINISH	THE PREBURNER IMPELLER DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	ROTATING DETAILS ARE BALANCED AS A LIMIT PER SPECIFICATION REQUIREMENTS.	RL00816
	RS007729 - MAIN HOUSING RS007731 - HOUSING INLET		RS007729 RS007731
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007729 RB0170-153 RB0170-154 RB0170-155
		HOUSING CASTINGS ARE NOT ISOSTATIC PRESSED PER SPECIFICATION REQUIREMENTS.	RL00368
		HOUSING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020 RB0170-153 RB0170-154 RB0170-155
	ASSEMBLY INTEGRITY	A PENETRANT INSPECTION IS PERFORMED ON THE HOUSING BEFORE AND AFTER PROOF PRESSURE TESTING PER DRAWING AND SPECIFICATION REQUIREMENTS.	RA0115-116 RS007729 RL00387
		HOUSING IS PROOF PRESSURE TESTED PER DRAWING REQUIREMENTS.	RS007729
		HOUSING IS HIDDEN SURFACE INSPECTED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RS007729 RL00314
		MAIN HOUSING WELDS 22 & 24 ARE MASS SPECTROMETER LEAK CHECKED PER SPECIFICATION REQUIREMENTS.	RA0115-116
		DIMENSIONAL DEVIATIONS FOR THE VANE CASTING OF THE HOUSING ARE VERIFIED ACCEPTABLE PER SPECIFICATION REQUIREMENTS.	RL00447

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	SURFACE FINISH	CASTING SURFACE FINISHES ARE INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-007
	RS007729 - MAIN HOUSING RS007732 - HOUSING VOLUTE		RS007729 RS007732
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153 RB0170-154
		VOLUTE FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153 RB0170-154 RB0170-155 RA0611-020 RS007729
	ASSEMBLY INTEGRITY	A PENETRANT INSPECTION IS PERFORMED ON THE HOUSING BEFORE AND AFTER PROOF PRESSURE TESTING PER DRAWING AND SPECIFICATION REQUIREMENTS.	RA0115-116 RS007729 RL00387
		A PROOF PRESSURE TEST IS PERFORMED PER DRAWING REQUIREMENTS.	RS007729
		HOUSING IS HIDDEN SURFACE INSPECTED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RL00514 RS007729
		ALL FILLET RADII AT THE ROOT AND BETWEEN THE VANES OF THE VOLUTE ARE CONTROLLED AND INSPECTED TO DRAWING REQUIREMENTS.	RS007732
		MAIN HOUSING WELDS 22 & 24 ARE MASS SPECTROMETER LEAK CHECKED PER SPECIFICATION REQUIREMENTS.	RA0115-116

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RS007729 - MAIN HOUSING RS007736 - FLANGE		RS007729 RS007736
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153 RA0611-020
	ASSEMBLY INTEGRITY	FLANGE IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING.	RA0115-116
		FLANGE IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	BA0115-012 RA0115-116
		MAIN HOUSING WELDS 22 & 24 ARE MASS SPECTROMETER LEAK CHECKED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	SURFACE FINISH	THE FLANGES HOT HYDROGEN EXPOSED SURFACES COPPER-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007729 RA1109-002
	WELD INTEGRITY	ALL WELDS ARE INSPECTED TO DRAWING AND SPECIFICATION REQUIREMENTS PER WELD CLASS. INSPECTIONS INCLUDE: VISUAL, DIMENSIONAL, PENETRANT, RADIOGRAPHIC, ULTRASONIC, AND FILLER MATERIAL, AS APPLICABLE.	RL10011 RAD607-094 RA0115-116 RA0115-006 RA0115-127 RA1115-001
		AFTER COMPLETION OF WELDING, THE INSIDE DIAMETER AND OUTSIDE DIAMETER OF WELDS 3, 11, AND 12; INSIDE DIAMETER OF WELDS 1 AND 2; AND THE CONVEX CURVATURE OF WELD 13, ARE GROUND FLUSH PER DRAWING REQUIREMENTS.	RS007729 RS007729
		WELD AND ADJACENT PARENT MATERIAL WALL THICKNESS ARE INSPECTED FOR THINNING AND STEPS AFTER FLUSHING OPERATION.	RS007729
		ALL WELDS GROUND FLUSH ARE ETCHED AND PENETRANT INSPECTED PER DRAWING REQUIREMENTS.	RS007729 RS007729

CELL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RS007739 - PREBURNER PUMP VOLUTE		RS007739
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-155
		VOLUTE IS RADIOGRAPHIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-006 RA0115-116
	HEAT TREAT	CASTING IS NOT ISOSTATIC PRESSED PER SPECIFICATION REQUIREMENTS.	RL00368
		HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-155
	ASSEMBLY INTEGRITY	VOLUTE IS PROOF PRESSURE TESTED PER SPECIFICATION REQUIREMENTS.	RL00018
		PENETRANT INSPECTION IS PERFORMED BEFORE AND AFTER PROOF PRESSURE TESTING PER DRAWING AND SPECIFICATION REQUIREMENTS.	RA0115-116 NDT RS007739
		VOLUTE INACCESSIBLE SURFACE INSPECTION IS PERFORMED PER SPECIFICATION REQUIREMENTS.	RL00314
		CAST SURFACE FINISH, FILLET RADIUS, AND CONTOURS BETWEEN MACHINED AND CAST SURFACES ARE INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007739 RA0115-007
		CONTOUR AND POSITIONING OF VANES IS INSPECTED PER DRAWING REQUIREMENTS.	RS007739
	RS007741 - VANE, R.N. TURNING RS007743 - VANE, L.N. TURNING		RS007741 RS007743
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-051
		VANE FORGINGS ARE ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	RS007790 - NUT		RS007790
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		NUT FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	NUT DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	RS00791B - RETAINER		RS00791B
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		RETAINER IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	RS007920 - RETAINER		RS007920
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		RETAINER IS PENETRANT INSPECTED PRIOR TO SILVER PLATING.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	RETAINER SILVER-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007920 RA1609-011
		RETAINER DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007920 RA0112-003
	RS007933 - ISOLATOR		RS007933
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		ISOLATOR FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		ISOLATOR IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING.	RA0115-116
	SURFACE FINISH	ISOLATOR CHROMIUM-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007933 RA1609-002
		ISOLATOR DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007933 RA0112-003
	RS007937 - SUPPORT		RS007937
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB017D-153
		SUPPORT FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
		SUPPORT IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	SUPPORT DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007937 RA0112-003
	RS007940 - MATING RING		RS007940
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB017D-153
		RING IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	RING CHROMIUM-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007940 RA1609-002
		RING DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007940 RA0112-003

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RS007973 - RING		RS007973
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		BAR STOCK IS ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
		RING IS PENETRANT INSPECTED PRIOR TO SILVER PLATING PER SPECIFICATION REQUIREMENTS.	RA0115-116
	SURFACE FINISH	RING SILVER-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007973 RA1609-011
		RING DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007973 RA0112-003
	RS007974 - CARTRIDGE		RS007974
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		FORGING IS PENETRANT AND ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116 RA0115-012
		A PENETRANT INSPECTION IS PERFORMED PRIOR TO PLATING PER DRAWING REQUIREMENTS.	RS007974
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	CARTRIDGE BORES CHROME-PLATING IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-002
		DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	RS007975 - SUPPORT		RS007975
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
B-348	HEAT TREAT	SUPPORT IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING.	RA0115-116
	SURFACE FINISH	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	RD017249 - NUT	SUPPORT DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007975 RD0140-016 RA0112-003
	MATERIAL INTEGRITY		RD017249
	HEAT TREAT	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RD0170-153
		HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
		A PENETRANT INSPECTION IS PERFORMED AFTER MACHINING ALTERATION OF THE NUT PER DRAWING REQUIREMENTS.	RD017249
	SURFACE FINISH	NUT DRY-FILM LUBRICATION IS VERIFIED PER DRAWING REQUIREMENTS.	RD017249
	RD017254 - NUT		RD017254
		MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RD0170-153
		NUT IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
SURFACE FINISH	NUT DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RD017254 RA0112-003	
RS00778B - SKIN		RS00778B	
MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RD0170-154	
HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020	

CEL ITEM: 8400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RO017242 - SHIELD		RO017242
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RO0170-154
		SHIELD IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	SHIELD DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RO017242 RA0112-003
	RS007703 - SHAFT		RS007703
	RS007703 - SHAFT (SLEEVE)		RS007703
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RO0170-182 RO0170-185
		SHAFT IS PENETRANT AND ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116 RA0115-012
		SLEEVE IS ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012
		HAZARD GROWTH IS VERIFIED BY THE SHAFT HIGH SPEED TEST PER DRAWING REQUIREMENTS.	RS007703
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS FOR THE SLEEVE.	RA0611-020
	SURFACE FINISH	SHAFT DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RA0112-003 RS007703
		GOLD PLATING ON HOT HYDROGEN EXPOSED SURFACES IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007703 RA1109-009
		SHAFT SLEEVE TUNGSTEN CARBIDE FLAKE-SPRAY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007703
	ASSEMBLY INTEGRITY	ROTATING DETAILS ARE BALANCED AS A UNIT PER SPECIFICATION REQUIREMENTS.	RL00016

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		ALL BLEED AND FLOW PASSAGES ARE INSPECTED TO BE FREE OF CONTAMINATION PER SPECIFICATION REQUIREMENTS.	RL00814
	RS007953 - DIVERTER		RS007953
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-186
		DIVERTER IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	ASSEMBLY INTEGRITY	ALL BLEED AND FLOW PASSAGES ARE INSPECTED TO BE FREE OF CONTAMINATION PER SPECIFICATION REQUIREMENTS.	RL00814
		ROTATING DETAILS ARE BALANCED AS A LIMIT PER SPECIFICATION REQUIREMENTS.	RL00814
	RO012228 - PUMP END SPRING		RO012228
	RO012230 - TURBINE END SPRING		RO012230
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-196
		SPRINGS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SPRING PRELOADS	SPRING CHARACTERISTICS ARE VERIFIED PER SPECIFICATION REQUIREMENTS.	RL00410 RL00814
	RS007955 - PUMP BEARING		RS007955
	RS00795B - TURBINE BEARING		RS00795B
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0160-064 RB0130-013

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CIL ITEM: 8400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
B - 351	HEAT TREAT ASSEMBLY INTEGRITY	BEARING RACES ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
		BEARING BALLS ARE EDDY CURRENT INSPECTED PER SPECIFICATION REQUIREMENTS.	RL00564
		HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS FOR THE BALLS AND RACES.	RA1611-005
		BEARINGS ARE EDDY CURRENT INSPECTED PER SPECIFICATION REQUIREMENTS.	RL00743
		BEARINGS ARE ASSEMBLED AND DISASSEMBLED PER SPECIFICATION REQUIREMENTS.	W100916
	RS007715 - NUT MATERIAL INTEGRITY	BEARING BALLS, RACES, AND CAGE DRY-FILM LUBRICATIONS ARE VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-039 RA1609-040 RA1612-002
		NO. 3 BEARING IS BORESCOPE INSPECTED AFTER EACH MDT FIRE AND PRIOR TO EACH FLIGHT.	RL00050-04 RL00814 QMSRSD Y41BU0.065
		BEARINGS ARE VISUALLY INSPECTED AT ASSEMBLY PER SPECIFICATION REQUIREMENTS.	RL00814
		MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007715
		NUT IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS AFTER FINAL MACHINING AND AFTER HEAT TREAT.	RA0115-116
HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020	
SURFACE FINISH	NUT DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003	

CPL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RS007758 - P/B FWD. SEAL RETAINING RING		RS007758
	RS007761 - P/B AFT SEAL RETAINING RING		RS007761
	RS007765 - LEFT-HAND SEAL RETAINING RING		RS007765
	RS007780 - RIGHT-HAND SEAL RETAINING RING		RS007780
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-051
		RINGS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS FOR ALL RINGS.	RA0611-020
		LEFT-HAND AND RIGHT-HAND RINGS FORGINGS ARE ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	SURFACE FINISH	PREBURNER AFT SEAL RING DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007761 RA0112-003
	RS007939 - LABYRINTH SEAL		RS007939
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-051
		SEAL FORGING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012 RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
		SEAL IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS PRIOR TO SILVER PLATING.	RA0115-116
	SURFACE FINISH	SEAL SILVER-PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007939 RA1609-011

CTL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	ASSEMBLY INTEGRITY	LABYRINTH SEAL IS DETAIL BALANCED PER DRAWING REQUIREMENTS AND BALANCED AS PART OF THE ROTATING ASSEMBLY PER SPECIFICATION REQUIREMENTS.	RS007939 RL00816
	RS007921 - PRIMARY OXIDIZER SEAL		RS007921
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0130-096
	HEAT TREAT	HEAT TREAT IS VERIFIED PER DRAWING REQUIREMENTS.	RS007921
	RS007727 - RIGHT-HAND SILVER SEAL		RS007727
	RS007764 - FORWARD PREBURNER SILVER SEAL		RS007764
	RS007766 - AFT PREBURNER SILVER SEAL		RS007766
	RS007773 - LEFT-HAND SILVER SEAL		RS007773
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-051
		SEALS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	RS007726 - PREBURNER TIE-BOLT		RS007726
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007726
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0160-014
	ASSEMBLY INTEGRITY	BOLT PILDING SHOULDER IS INSPECTED PER DRAWING REQUIREMENTS.	RS007726
	SURFACE FINISH	BOLT THREADS DRY-FILM LUBRICATION IS VERIFIED PER DRAWING REQUIREMENTS.	RS007726

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	ASSEMBLY INTEGRITY	BOLT TORQUE IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
	RS007792 - SCREW RS007794 - CUPWASHER		RS007792 RS007794
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	NO112-0001 RS007794
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	SCREW AND CUPWASHER DRY-FILM LUBRICATIONS ARE VERIFIED PER SPECIFICATION REQUIREMENTS.	RA112-003
	ASSEMBLY INTEGRITY	SCREW TORQUE IS VERIFIED PER DRAWING REQUIREMENTS.	RS007701
		CUPWASHERS DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
	RS007744 - SPACER RS007745 - SPACER R0016038 - SPACER		RS007744 RS007745 R0016038
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007744 RS007745 R0016038
	HEAT TREAT	HEAT TREAT IS VERIFIED PER DRAWING REQUIREMENTS.	RS007744 RS007745 R0016038

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTOR(S)/TEST(S)	DOCUMENT REF.
	R0011320 - BOLTS RS007945 - BOLTS RS007793 - BOLTS RS007895 - BOLTS MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	R0011320 RS007945 RS007793 RS007895 RS007793 RS007945 R0011320 RD111-4009
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RS007793 RS007945 RD160-014
		BOLTS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RS007793 RS007895 RA0115-116 R0011320 ANS2645
	SURFACE FINISHES	BOLTS DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	BOLTS TORQUE IS VERIFIED PER DRAWING REQUIREMENTS.	RS007701
	RS007874 - WASHER RS007878 - WASHER, SUPPORT		RS007874 RS007878
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007874 RS007878
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
	SURFACE FINISH	WASHERS DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	LOCKWASHERS DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RLO0514

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	RS007716 - T-LOCK RS007722 - LOCK, P/B BEARING NUT RS007789 - LOCK, IMPELLER NUT		RS007716 RS007722 RS007789
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007716 RS007722 RS007789
		PREBURNER BEARING NUT LOCK IS PENETRANT INSPECTED AFTER FLATNESS LOADING PER DRAWING AND SPECIFICATION REQUIREMENTS.	RA0115-116 RS007722
	SURFACE FINISH	LOCKS DRY-FILM LUBRICATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007716 RS007722 RS007789 RA0112-003
	ASSEMBLY INTEGRITY	LOCKWASHERS DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
	RS007791 - LOCK		RS007791
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007791
	SURFACE FINISH	LOCK DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	LOCKWASHERS DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
	RS007784 - PRIMARY OXIDIZER GASKET		RS007784
	RO017251 - CUPWASHER, PREBURNER SUPPORT		RO017251
	RO017647 - CUPWASHER, BEARING SUPPORT BOLT		RO017647
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007784 MS9880-10

CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
	HEAT TREAT	HEAT TREAT IS VERIFIED PER DRAWING REQUIREMENTS.	MS9600-10
		PUMP BEARING SUPPORT BOLT CUPWASHER IS PENETRANT INSPECTED AFTER FLATNESS LOADING PER DRAWING AND SPECIFICATION REQUIREMENTS.	ROD17647 RAD115-116
	SURFACE FINISH	PREBURNER SUPPORT CUPWASHER DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA112-003
		DISKET SILVER-PLATING IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-011
	ASSEMBLY INTEGRITY	CUPWASHERS DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RLO0816
	RS007728 - LOCK, P/B TIE-BOLT		RS007728
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007728
	ASSEMBLY INTEGRITY	LOCKWASHER IS DEFORMED PER DRAWING REQUIREMENTS.	RS007701
	RS007930 - INTERMEDIATE SEAL ASSEMBLY		RS007930
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007930 RBO170-153
		SEAL HOUSING, RETAINER, AND ADAPTER RING ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	SEAL HOUSING AND RETAINER HEAT TREATS ARE VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020
		SEAL SPRING AND ADAPTER RING HEAT TREATS ARE VERIFIED PER DRAWING REQUIREMENTS.	RS007930

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CIL ITEM: B400-22		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
B - 358	SURFACE FINISH	SEAL HOUSINGS RETAINER MATING SURFACE SILVER-PLATING IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-011
	R5007701 - HPOTP		R5007701
	ASSEMBLY INTEGRITY	THE PUMP SUBASSEMBLIES ARE INSPECTED DURING OVERHAUL PER SPECIFICATION REQUIREMENTS. (INSPECTIONS INCLUDE: VISUAL, DIMENSIONAL, PENETRANT, AND REPLACEMENT OF USAGE ITEMS AS APPLICABLE, PER OVERHAUL CLASSIFICATION.	RL00874 RA0115-116
		THE HPOTP AND SUBASSEMBLIES ARE VERIFIED CLEANED PER SPECIFICATION REQUIREMENTS.	RL10001
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & M INSPECTION.	RL0005D-04 RL00056-06 RL00056-07 RL00461
		TORQUE CHECKS ARE PERFORMED PRIOR TO EACH FLIGHT.	OMRSD V418SQ.060
		HPOTP MICROSHAFT TRAVEL MEASUREMENTS ARE PERFORMED PRIOR TO EACH FLIGHT PER SPECIFICATION REQUIREMENTS.	RL81034 RL0005-04 OMRSD V418SQ.065
	DATA FROM THE PREVIOUS FLIGHT OR HOT FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/PERFORMANCE. (LAST TEST)	MSFC PLN 1228	
FAILURE HISTORY: COMPREHENSIVE FAILURE HISTORY DATA IS MAINTAINED IN THE PROBLEM REPORTING DATABASE (PRAHS/PRACA). REFERENCE: NASA LETTER SA21/88/308 AND ROCKEIDYNE LETTER 88RC09761.			

OPERATIONAL USE: NOT APPLICABLE.

TABLE 8400. HIGH PRESSURE OXIDIZER TURBOPUMP
FREA/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL		COMMENTS
						FLAW SIZE NOT HCF	DETECTABLE LCF	
MAIN HOUSING	RS007729	1,2	EBW	I	X	X		
MAIN HOUSING	RS007729	3	EBW	I		X		
MAIN HOUSING	RS007729	9,10	GTAW	II	X	X	X	
MAIN HOUSING	RS007729	11,12	GTAW	I		X		
MAIN HOUSING	RS007729	13	EBW	I	X	X		
MAIN HOUSING	RS007729	14-17,16	GTAW	II	X			
MAIN HOUSING	RS007729	18,19	GTAW	II	X	I	X	
MAIN HOUSING	RS007729	21,23	GTAW	II	X			
MAIN HOUSING	RS007729	22,24	GTAW	II	X			
MAIN HOUSING	RS007729	44,53-59	GTAW	I	X			
MAIN HOUSING	RS007729	45	GTAW	I	X			
MAIN HOUSING	RS007729	48	GTAW	I	X	X		X
MAIN HOUSING	RS007729	49	GTAW	I	X			
MAIN HOUSING	RS007729	50	GTAW	I				
MAIN HOUSING	RS007729	51,52	GTAW	I	X			
MAIN HOUSING	RS007729	54	GTAW	I	X			
MAIN HOUSING	RS007729	55,56	GTAW	I	X			
MAIN HOUSING	RS007729	61	GTAW	I				
MAIN HOUSING	RS007729	62	GTAW	I	X			
MAIN HOUSING	RS007729	63	GTAW	I				
MAIN HOUSING	RS007729	64	GTAW	I	X	X		
MAIN HOUSING	RS007729	65	GTAW	I	X			
MAIN HOUSING	RS007729	66-70	GTAW	II	X			
INLET HOUSING	RS007732	4	GTAW	I			I	
INLET HOUSING	RS007732	8,9	GTAW	I			I	
VOLUTE	RS007732	10,15	GTAW	I	X	I		
VOLUTE	RS007732	20,21	GTAW	I				
VOLUTE	RS007732	22,23	GTAW	I				
VOLUTE	RS007732	24,27	GTAW	I		X		X
VOLUTE	RS007732	25,26	GTAW	I				
FLANGE	RS007736	1,2	GTAW	II	X			
FLANGE	RS007736	3,26	GTAW	II	X			

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TABLE 1400. HIGH PRESSURE OXIDIZER TURBOPUMP
FREA/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT	CRITICAL INITIAL		COMMENTS
					SIDE NOT ACCESS	FLAW SIZE NOT HCF	DETECTABLE LCF	
FLANGE	RS007736	6,7	GTAW	II	X			
FLANGE	RS007736	9-12,17	GTAW	II	X			
FLANGE	RS007736	13-16	GTAW	II	X			
FLANGE	RS007736	18,20	GTAW	I	X			
FLANGE	RS007736	19,21	GTAW	II	X			
FLANGE	RS007736	22	EBW	I	X			
FLANGE	RS007736	23	GTAW	II				
FLANGE	RS007736	24	GTAW	II	X			
FLANGE	RS007736	26	GTAW	II	X			
BELLOWS	RS007740	1,2,5,9	GTAW	I		X		
BELLOWS	RS007740	3,4	EBW	I				
HOUSING	RS007746	1,2	GTAW	I	X		X	
HOUSING	RS007746	3	GTAW	I	X			
HOUSING	RS007746	4	GTAW	II	X			
HOUSING	RS007746	5	GTAW	II	X		X	
HOUSING	RS007746	6-17	GTAW	II	X		X	
HOUSING	RS007746	18-29	GTAW	II	X		X	
HOUSING	RS007746	30-41	GTAW	II		X		X
BELLOWS	RS007748	1	EBW	I				
BELLOWS	RS007748	2	GTAW	I	X			
BELLOWS	RS007749	1-4	GTAW	I				
BELLOWS	RS007749	5,6	EBW	I				
BELLOWS	RS007749	11	EBW	I				
BELLOWS	RS007749	12	EBW	I				
BELLOWS	RS007751	3	EBW	I	X			
BELLOWS	RS007751	4	EBW	I	X	X		X
BELLOWS	RS007751	8	GTAW	I	X	X		
SECOND STAGE NOZZLE	RS007752	1,2	EBW	I	X			
SECOND STAGE NOZZLE	RS007752	1	GTAW	I	X	X		X
JET RING	RS007757	1	GTAW	I	X	X		X
FAIRING	RS007774	1-12	GTAW	I		X		
FAIRING	RS007774	13-24	GTAW	I		X		

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TABLE B100. HIGH PRESSURE OXIDIZER TURBOPUMP
FMEAS/CIL WELD JOINTS

COMPONENT	BASIC PART NO.	WELD NO.	WELD TYPE	CLASS	ROOT SIDE NOT ACCESS	CRITICAL INITIAL		COMMENTS
						FLAW SIZE NOT DEFECTABLE REF	NOT DEFECTABLE LCF	
FAIRING	RS007774	25-36	BTAW	I				X
FAIRING	RS007774	74	BTAW	I				
FAIRING	RS007774	75,76	BTAW	II	X			
STRUT	RS007779	23-44, 143-164	BTAW	II	X			
STRUT	RS007779	45-66, 165-186	BTAW	II	X			
STRUT	RS007779	67	BTAW	II	X			
STRUT	RS007779	69,70	EDW	II	X			
STRUT	RS007779	71	EDW	II				
STRUT	RS007779	72	EDW	II				
STRUT	RS007779	73-94	EDW	II				
STRUT	RS007779	95,96	EDW	II	X			
SHIELD	RS007781	1,11	BTAW	II				
SHIELD	RS007781	2,3,4	BTAW	II				
SEAL	RS006848	1 PLC	BTAW	I				
SEAL	RS006857	1 PLC	BTAW	I		X		X

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FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: B400-XN	HPOIP		P/N RS007791
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
<p>1. B400-02, B400-03 SECOND STAGE NOZZLE CASTING IS NOT ISOSTATIC PRESSED PER DRAWING REQUIREMENTS. (ECP 1A-2949)</p>	<p>SECOND STAGE NOZZLE CASTINGS HAVE NOT BEEN HOT ISOSTATIC PRESSED</p>	<p>NOT ISOSTATIC PRESS INCREASES STRUCTURAL INTEGRITY BY REDUCING CASTING MICROPOROSITY.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> 1. LIFE LIMIT ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES REDUCES PROBABILITY OF LOW CYCLE FATIGUE CRACKING RESULTING FROM EXCESSIVE MICROPOROSITY. (DAR 2147) 2. A PENETRANT INSPECTION INTERVAL HAS BEEN IMPOSED ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES TO VERIFY NO CRACKING IN EXCESS OF ALLOWABLE LIMITS. (DAR 2147) 	<p>-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -351, -351, -371, -401</p>
<p>2. B400-13, B400-22 PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00916). (ECP 909)</p>	<p>BEARINGS ARE PROCESSED AND INSPECTED PER SPECIFICATION REQUIREMENTS (RL00558).</p>	<p>LONG TERM FATIGUE LIFE OF BEARING IS EXTENDED BY REDUCING THE ALLOWABLE SIZE AND QUANTITY OF ALLOWABLE DEFECTS.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> 1. WEAR LIFE LIMIT ON BEARINGS PREVENTS WEAR FROM EXCEEDING ALLOWABLE LIMITS. (DAR 2054, DAR 2082) 2. CONTINUED USE WITH ALLOWABLE DISCREPANCIES IS CONTROLLED PER THE MAINTENANCE CONTROL DOCUMENT REQUIREMENTS (RSS-8795). 	<p>-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -331, -351, -371, -401, -411, -421, -431, -441, -451, -461</p>

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FIELD CONFIGURATION VARIANCES FROM CIL RATIONALE

CIL ITEMS: B400-NK		HPOTP	P/W RS007701
BASE LINE RATIONALE	VARIANCE	CHANGE RATIONALE	VARIANT DASH NUMBER
3. B400-21 HOUSING DETAILS ARE ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS. (ECP 680)	HOUSING DETAILS HAVE NOT BEEN ULTRASONIC INSPECTED PER DRAWING AND SPECIFICATION REQUIREMENTS.	<p>THE ADDED NDI PROVIDES ADDED CONFIDENCE THAT THE CRITICAL FLAW SIZE IS DETECTED IN THE PARENT MATERIAL OF THE HOUSING DETAILS.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> HOUSING DETAILS ARE ACCEPTABLE WITHOUT ULTRASONIC INSPECTION DUE TO A PENETRANT INSPECTION OF THE HOUSING DETAILS. THE PENETRANT INSPECTION IS ADEQUATE TO DETECT CRITICAL INITIAL FLAWS WHICH ARE THROUGH CRACKS. 	-121, -131, -141, -151, -161, -171, -181, -191, -201, -211, -221, -231, -241, -251, -261, -271, -291, -301, -311, -331, -351, -371, -401, -411, -421, -431, -441, -451, -461, -471, -481, -491, -501
4. B400-21 FITTING MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS (INCONEL 718, 880170-153).	RS007729-059 TEE-FITTING IS MANUFACTURED FROM AIR MELT 321 CRES BAR (02-S-763 CL321 COND A).	<p>INCONEL 718 MATERIAL DOES NOT EXHIBIT INCLUSION STRINGERS WHICH ARE SUSCEPTABLE TO CHEMICAL ATTACK AND MAY RESULT IN LEAKAGE.</p> <p>USE AS IS RATIONALE:</p> <ol style="list-style-type: none"> FITTINGS ARE LEAK CHECKED FOLLOWING PROOF PRESSURE TEST PER RL00387. LOADS INDUCED BY FABRICATION (WELDING AND PROOF PRESSURE TESTING) ARE HIGHER THAN OPERATIONAL LOADS AND SUFFICIENT TO SCREEN -059 FITTINGS FOR LEAKAGE. 	-171, -181

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