

June 01, 1995

CRITICAL ITEMS LIST

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1) CIL ITEM : B400-12  
2) FMEA CODE : B400  
3) COMPONENT : NPOTP  
4) PART NUMBER : R5007701  
5) SYSTEM/SUBSYSTEM : PUMPS/BXXX  
6) FAILURE MODE : LEAKAGE UNDER LABYRINTH SEAL, MATING RING, OR LEAKAGE OVER INTERMEDIATE SEAL HOUSING

7) PREPARED : SSME RELIABILITY  
8) APPROVED :  
9) DATE : 06-01-95  
10) REVISION/CHANGE : -002/0  
11) EFFECTIVITY : -761  
12) HAZARD REFERENCE : SEE LISTINGS BELOW  
13) CCB # : me3-01-3075

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
SMC	INTERNAL MIXING OF HOT GAS WITH OXYGEN RESULTS IN TURBOPUMP FIRE OR EXPLOSION. LOSS OF VEHICLE.  REUNDANCY SCREENS: SINGLE POINT FAILURE: N/A	1 HAZARD REF: ME-C18,H, ME-C1A,C.

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CIL ITEM: B400-12	DESIGN	DOCUMENT REF.
B-252	FAILURE CAUSE A: LOSS OF BEARING RETAINER NUT PRELOAD	
	<p>THE SHAFT JOURNAL IS PROTECTED FROM CONTACT WITH THE SHAFT SEALING ELEMENTS BY THE USE OF A MATING RING (1) FOR THE INTERMEDIATE SEAL AND A SHAFT SLEEVE (2) FOR THE TURBINE SEALS. THE MATING RING IS AXIALLY RETAINED, ALONG WITH THE INNER HEAT SHIELD (3), LABYRINTH SEAL (4), DIVERTER RING (5), TURBINE END BEARING INNER RACES (6), AND SPACER (7) BY THE RETAINER NUT (8). THE AXIAL MATING FACES OF THE MATING RING, THE INNER HEAT SHIELD AND THE SHAFT SHOULDER HAVE STRINGENT PERPENDICULARITY REQUIREMENTS TO PRODUCE A TIGHT AXIAL STACK. THE THREADS ON THE RETAINER NUT (8) AND SHAFT (2) ARE ROLLED TO DRAWING REQUIREMENTS FOR INCREASED CLAMPING FORCE. IN ADDITION TO THE COMPRESSION LOAD, SILVER PLATING IS UTILIZED ON THE MATING FACES OF THE INNER HEAT SHIELD (3) AND THE INNER SHOULDER FACE OF THE LABYRINTH SEAL (4) TO PREVENT LEAKAGE UNDER THE LABYRINTH SEAL AND MATING RING. RADIAL SEALING IS PROVIDED BY THE INTERFERENCE FIT BETWEEN THE MATING RING, LABYRINTH SEAL, AND BEARING INNER RACES AGAINST THE SHAFT PILOTS. DRY-FILM LUBRICATION IS UTILIZED ON THE SHAFT (2) AND MATING RING (1) TO MINIMIZE FRETTING AND REDUCE FRICTION DURING INSTALLATION AND REMOVAL OF SHAFT COMPONENTS. THE RETAINER NUT FINAL TORQUE IS SPECIFIED BY DRAWING REQUIREMENTS (9). LOCKS (10) ARE UTILIZED TO PREVENT THE RETAINER NUT FROM THREAD DISENGAGEMENT AND ARE DEFORMED PER ASSEMBLY PROCEDURES TO ENSURE DEFECT-FREE INSTALLATION (11). THE MATING RING AND INNER HEAT SHIELD ARE MANUFACTURED UTILIZING INCONEL 718 AND ARE SOLUTION HEAT TREATED AND AGE-HARDENED (1) (3). THEY ARE EXPOSED TO A HYDROGEN ENVIRONMENT DURING OPERATION BUT DO NOT REQUIRE PROTECTION FROM BRITTLENESS DUE TO THEIR LOW STRAIN APPLICATION. THE DIVERTER IS MANUFACTURED UTILIZING INCOLOY 903 AND IS SOLUTION HEAT TREATED AND AGE-HARDENED (5). THE SHAFT IS MANUFACTURED UTILIZING WASPALLOY AND IS SOLUTION HEAT TREATED, STABILIZED, AND AGE-HARDENED (2). THE ALLOY IS VACUUM MELTED TO MINIMIZE IMPURITY FORMATION AND THERMO-MECHANICALLY PROCESSED FOR IMPROVED STRESS RUPTURE DUCTILITY (12). THE BEARING RACES ARE MANUFACTURED UTILIZING 440C CRES AND ARE AUSTENITIZED, QUERCHED, AND DOUBLE COLD STABILIZED AND TEMPERED FOR ADDITIONAL HARDNESS AND DIMENSIONAL STABILITY. THE ALLOY IS VACUUM MELTED (12). THE RETAINER NUT AND LABYRINTH SEAL ARE MANUFACTURED UTILIZING K-MONEL AND ARE SOLUTION HEAT TREATED AND AGE-HARDENED (B) (6). THE SPACER IS MANUFACTURED UTILIZING A-206 CRES AND IS SOLUTION HEAT TREATED AND AGE-HARDENED (7). THE LOCKS ARE MANUFACTURED UTILIZING 302 CRES AND IS ANNEALED FOR THIS BENDING APPLICATION (10). LEAKAGE PREVENTION IS SUPPLIED BY THE NUT COMPRESSION WHICH PRODUCES A SEAL BETWEEN THE MATING COMPONENTS AND IS FURTHER ENHANCED BY THE SILVER PLATING, INTERFERENCE PILOT FITS, AND DIMENSIONAL CONTROL AT THE MATING SURFACES.</p>	<p>(1) RS007940  (2) RS007703  (3) RS007941  (4) RS007939  (5) RS007953  (6) RS007955  (7) RS007745  (8) RS007715  (9) RS007701  (10) RS007716  (11) RLO0814  (12) ASS-8578-11</p>

CIL ITEM: B400-12	DESIGN	DOCUMENT REF.
FAILURE CAUSE B: LOSS OF INTERMEDIATE SEAL BOLT PRELOAD	<p>THE INTERMEDIATE SEAL (1) HOUSING SEPARATES THE INTERNAL OXYGEN CAVITY FROM THE SECONDARY TURBINE SEAL HOT-GAS CAVITY AND PROVIDES GASEOUS HELIUM TO THE INTERMEDIATE SEAL RING ELEMENTS. THE HOUSING IS SECURED TO THE MAIN HOUSING (2), ALONG WITH AN OUTER HEAT SHIELD (3), BY 18 BOLTS (4) AND LOCKWASHERS (5). INTERNAL LEAKAGE IS PREVENTED BY THE BOLT COMPRESSION WHICH PRODUCES A SEAL BETWEEN THE OXYGEN AND HOT-GAS CAVITIES. THE BOLT THREADS ARE DRY-FILM LUBRICATED (4) TO ALLOW EQUAL LOAD DISTRIBUTION, AND FINAL INSTALLATION TORQUES ARE SPECIFIED (6). THE BOLTS ARE PREVENTED FROM DISENGAGEMENT BY THE USE OF LOCKWASHERS WHICH ARE STAKED PER ASSEMBLY PROCEDURES TO ENSURE DEFECT-FREE INSTALLATION (7). THE OUTER HEAT SHIELD IS POSITIONED BETWEEN THE MAIN HOUSING AND INTERMEDIATE SEAL HOUSING AND ACTS AS A GASKET TO SEAL AGAINST LEAKAGE. THE UPSTREAM AND DOWNSTREAM FACES OF THE SHIELD ARE SILVER PLATED TO CONFORM TO THE ADJACENT MATING SURFACE FINISHES (3). STRICT PARALLELISM, FLATNESS, AND WAVINESS REQUIREMENTS ARE SPECIFIED ON THE SEALING SURFACES TO ENHANCE THE SEALING FUNCTION (3). THE MATING SURFACE OF THE INTERMEDIATE SEAL IS GROUND TO A MICROFINISH SURFACE FINISH TO PREVENT LEAKAGE (1). THE SEAL HOUSING IS FABRICATED IN TWO HALVES WHICH LOCK TOGETHER WITH INTERLOCKING TANGS. SILVER PLATING IS UTILIZED AT THE LOCKING FACE TO PREVENT HELIUM LEAKAGE FROM THE HOUSING INTERNAL CAVITY (1). THE INTERMEDIATE SEAL HOUSING AND MAIN HOUSING ARE MANUFACTURED UTILIZING INCONEL 718 AND ARE SOLUTION HEAT TREATED AND AGE-HARDENED (1) (2). THE HOUSINGS HAVE LIMITED EXPOSURE TO A HYDROGEN ENVIRONMENT, BUT DO NOT REQUIRE PROTECTION FROM EMBRITTLEMENT DUE TO THEIR LOW STRAIN APPLICATION. THE OUTER HEAT SHIELD IS MANUFACTURED UTILIZING ANNEALED 321 CRES (3). THE BOLTS AND LOCKWASHERS ARE MANUFACTURED UTILIZING A-286 CRES. THE LOCKWASHERS ARE ANNEALED FOR THIS BENDING APPLICATION, WHILE THE BOLTS ARE SOLUTION HEAT TREATED, COLD WORKED, AGED, AND COLD WORKED AGAIN TO ACHIEVE ADDITIONAL STRENGTH (4) (5). LEAKAGE PREVENTION IS SUPPLIED BY THE BOLT COMPRESSION, SILVER PLATING, SURFACE FINISH, AND DIMENSIONAL CONTROL AT THE MATING SURFACES.</p>	<p>(1) RS007930  (2) RS007729  (3) RS007702  (4) RS007895  (5) RS007874  (6) RS007701  (7) RL00814</p>
ALL CAUSES:	<p>INCONEL 718, INCOLOY 903, WASPALLOY, K-MONEL, 440C CRES, A-286 CRES, 321 CRES, 302 CRES, AND SILVER PLATING SATISFY LOX COMPATIBILITY REQUIREMENTS (1). THE HARDWARE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/NOE FLAW GROWTH SINCE THEY ARE NOT FRACTURE CRITICAL PARTS, EXCEPT FOR THE SHAFT WHICH WAS CLEARED BY CRITICAL INITIAL FLAW SIZE DETECTABILITY, THE MAIN HOUSING WHICH WAS CLEARED BY RISK ASSESSMENT (2). THESE PARTS MEET CEI REQUIREMENTS FOR HIGH CYCLE AND LOW CYCLE FATIGUE LIFE FOR THESE FAILURE CAUSES (3). THE MINIMUM FACTORS OF SAFETY FOR THESE PARTS MEET CEI REQUIREMENTS (4). REUSE OF PARTS DURING OVERHAUL ARE CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (5).</p>	<p>(1) RSS-8578-11  (2) NASA TASK 117  (3) RL00532,  CP320R00038  (4) RSS-8546-16,  CP320R00038  (5) RL00874</p>

CIL ITEM: B400-12		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE A:	RS007703 - SHAFT RS007715 - NUT RS007716 - LOCK RS007745 - SPACER RS007939 - LABYRINTH SEAL RS007940 - MATING RING RS007941 - INNER HEAT SHIELD RS007953 - DIVERTER RS007955 - TURBINE END BEARING		RS007703 RS007715 RS007716 RS007745 RS007939 RS007940 RS007941 RS007953 RS007955
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	NBD130-013 RBD160-064 NBD170-051 NBD170-153 NBD170-154 RBD170-162 RBD170-166 RS007715 RS007716 RS007745
		SHAFT IS SPIN TESTED PER DRAWING REQUIREMENTS.	RS007703
		THE SHAFT, NUT, MATING RING, INNER HEAT SHIELD, BEARING RACES, AND DIVERTER DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
		SHAFT IS ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012
		LABYRINTH SEAL IS ULTRASONIC INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-012
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RA0611-020 RA1611-003 RS007745

CIL ITEM: B400-12		INSPECTION AND TEST		
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.	
FAILURE CAUSE B:	SURFACE FINISH	LOCK ANNEALING IS VERIFIED PER DRAWING REQUIREMENTS.	RS007716	
		THE LABYRINTH SEAL AND INNER HEAT SHIELD SILVER PLATING IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007939 RS007941 RR1609-011	
		NUT, LOCK, MATING RING, AND SHAFT DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003	
	ASSEMBLY INTEGRITY	THE BEARING INNER RACE, LABYRINTH SEAL, AND MATING RING INTERFERENCE FIT TO THE SHAFT IS VERIFIED PER DRAWING REQUIREMENTS.	RS007955 RS007939 RS007940 RS007703	
		THE LABYRINTH SEAL, MATING RING, INNER HEAT SHIELD, AND SHAFT SEALING SURFACE PERPENDICULARITY IS VERIFIED PER DRAWING REQUIREMENTS.	RS007939 RS007940 RS007941 RS007703	
		MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	RS007729 RS007782 RS007874 RS007895 RS007930
			HOUSING IS ULTRASONIC AND PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RB0170-153 RS007874 RS007895 RS007782
			RA0115-012 RA0115-116	

CIT ITEM: B400-12		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
B - 256          ALL CAUSES:	HEAT TREAT	INTERMEDIATE SEAL HOUSING AND BOLTS ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
		HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020 RB0160-014 RB0170-153 RB0170-154 RB0170-155
		OUTER HEAT SHIELD AND LOCKWASHER ANNEALING IS VERIFIED PER DRAWING REQUIREMENTS.	RS007782 RS007874
	SURFACE FINISH	THE INTERMEDIATE SEAL HOUSING MATING SURFACE AND THE OUTER HEAT SHIELD SILVER PLATING IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-011
		BOLT AND LOCKWASHER DRY-FILM LUBRICATION IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0112-003
	ASSEMBLY INTEGRITY	SEALING SURFACE FINISH, FLATNESS, AND WAVINESS ARE INSPECTED PER DRAWING REQUIREMENTS.	RS007729 RS007782 RS007930
		MAIN HOUSING WELDS 22 & 24 ARE MASS SPECTROMETER LEAK CHECKED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	RS007701 - NP07P		RS007701
	ASSEMBLY INTEGRITY	BOLT AND NUT INSTALLATION AND TORQUE ARE VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
		LOCKWASHER AND LOCK DEFORMATION IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RS007701 RL00814
	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	

CEL ITEM: W400-12	DESIGN	DOCUMENT REF.
	THE COMPONENTS ARE VERIFIED CLEANED PER SPECIFICATION REQUIREMENTS.	RL0001
	OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & M INSPECTION.	RL00050-04 RL00056-06 RL00056-07 RL00461
	MPOTP MICROSHAFT TRAVEL IS PERFORMED PRIOR TO EACH FLIGHT PER SPECIFICATION REQUIREMENTS.	RL40050-D4 OMRSD V41BSQ.065 RL01034
	DATA FROM THE PREVIOUS FLIGHT OR HOT FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/ PERFORMANCE. (LAST TEST)	HSFC PLN 1226
FAILURE HISTORY: COMPREHENSIVE FAILURE HISTORY DATA IS MAINTAINED IN THE PROBLEM REPORTING DATABASE (PRMS/PRAEA). REFERENCE: NASA LETTER SA21/80/308 AND ROCKETDYNE LETTER 08RC09761.		

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"> <li>1. LIFE LIMIT ON NON HOT ISOSTATIC PRESSED 2ND STAGE NOZZLES REDUCES PROBABILITY OF LOW CYCLE FATIGUE CRACKING RESULTING FROM EXCESSIVE MICROPOROSITY. (DAR 2147)</li> <li>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)</li> </ol>	<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"> <li>1. WEAR LIFE LIMIT ON BEARINGS PREVENTS WEAR FROM EXCEEDING ALLOWABLE LIMITS. (DAR 2054, DAR 2082)</li> <li>2. CONTINUED USE WITH ALLOWABLE DISCREPANCIES IS CONTROLLED PER THE MAINTENANCE CONTROL DOCUMENT REQUIREMENTS (RSS-8793).</li> </ol>	<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"> <li>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.</li> </ol>	-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"> <li>FITTINGS ARE LEAK CHECKED FOLLOWING PROOF PRESSURE TEST PER RL00387.</li> <li>LOADS INDUCED BY FABRICATION (WELDING AND PROOF PRESSURE TESTING) ARE HIGHER THAN OPERATIONAL LOADS AND SUFFICIENT TO SCREEN -059 FITTINGS FOR LEAKAGE.</li> </ol>	-171, -181

R-412.01

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