

1) CIL ITEM : B400-18
 2) FMEA CODE : B400
 3) COMPONENT : HP01P
 4) PART NUMBER : R5007701
 5) SYSTEM/SUBSYSTEM : PUMPS/BKXK
 6) FAILURE MODE : LOSS OF COOLANT TO BEARINGS

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) CC80 # : ME3-DI-3275

PHASE	FAILURE DESCRIPTION/EFFECT	CRITICALITY
SNC	BEARINGS DEGRADE CAUSING RUBBING AND DISINTEGRATION OF ROTATING COMPONENTS. LOSS OF VEHICLE. REDUNDANCY SCREENS: SINGLE POINT FAILURE: N/A	HAZARD REF: ME-C15,M ME-C1A,C

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CEL ITEM: B400-18	DESIGN	DOCUMENT REF.
B-308	<p>FAILURE CAUSE A: BLOCKAGE OF TURBINE END BEARING COOLANT CIRCUITS</p> <p>THE TURBINE BEARINGS (1) ARE COOLED BY LIQUID OXYGEN WHICH ORIGINATES AT THE PREBURNER IMPELLER BOLT (2). COOLANT IS METERED ACROSS THE HOLLOW CORE OF THE BOLT TO THE SHAFT (3), WHERE IT IS TRANSFERRED INTERNALLY TO FOUR RADIAL PASSAGES WHICH DISCHARGE TO A MANIFOLD FORMED BY THE SHAFT, BEARINGS, LABYRINTH SEAL (4), AND COOLANT DIVERTER RING (5). THE PREBURNER IMPELLER BOLT PROVIDES AXIAL RETENTION OF THE PREBURNER IMPELLER (6) AGAINST THE MAIN IMPELLER RETENTION NUT. AXIAL SEALING IS PROVIDED BY THE PRESSURE LOADING OF THE IMPELLER TO THE NUT, WHILE THREE SHAFT-TO-IMPELLER INTERFERENCE PILOTS PROVIDE RADIAL SEALING. THE PREBURNER IMPELLER IS MANUFACTURED UTILIZING CAST INCONEL 718, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (7). THE CASTING IS NOT ISOSTATICALLY PRESSED FOR IMPROVED MECHANICAL PROPERTIES AND DENSIFICATION (6). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (6). THE PREBURNER IMPELLER BOLT IS MANUFACTURED UTILIZING A-286 CRES, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AND RESISTANCE TO CORROSION AND STRESS CORROSION CRACKING (7). THE ALLOY IS SOLUTION HEAT TREATED, COLD WORKED, AGED, AND COLD WORKED AGAIN TO ACHIEVE ADDITIONAL STRENGTH (2). THE SHAFT IS MANUFACTURED UTILIZING FORGED HASPALLOY, WHICH WAS SELECTED FOR ITS STRENGTH AND CORROSION RESISTANCE (7). THE ALLOY IS VACUUM MELTED TO MINIMIZE IMPURITY FORMATION, SOLUTION HEAT TREATED, STABILIZED, AND AGE-HARDENED TO PRODUCE THE DESIRED STRENGTH AND DUCTILITY OVER A WIDE TEMPERATURE RANGE (3). DRY-FILM LUBRICATION IS USED AT ALL MATING SURFACES TO MINIMIZE FRETTING AND FRICTION (3). BYPASS LEAKAGE AT THE DIVERTER MANIFOLD IS PREVENTED RADIALY BY THE USE OF INTERFERENCE PILOTS BETWEEN THE SHAFT/BEARING, SHAFT/LABYRINTH SEAL, AND DIVERTER/LABYRINTH SEAL. AXIAL SEALING IS PROVIDED BY THE COMPRESSION LOADS AT THE INTERFACES SUPPLIED BY THE BEARING RETENTION NUT (8). THE SHAFT AND NUT THREADS ARE ROLLED PER DRAWING REQUIREMENTS FOR INCREASED INSTALLATION CLAMPING FORCE (3) (8). THE COOLANT IS DISCHARGED FROM THE DIVERTER RING THROUGH 30 EQUALLY SPACED ORIFICE HOLES TOWARDS THE TURBINE BEARINGS. THE LABYRINTH SEAL INCORPORATES A SLINGER DESIGN WHICH MINIMIZES BEARING COOLANT LEAKAGE THROUGH THE SEAL (4). THE LABYRINTH SEAL IS MANUFACTURED UTILIZING K-MONEL, WHICH WAS SELECTED FOR ITS TENSILE STRENGTH, DUCTILITY AND TOUGHNESS AT CRYOGENIC TEMPERATURES (7). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (6). THE DIVERTER RING IS MANUFACTURED UTILIZING INCOLOY 903. INCOLOY 903 IS AN IRON BASE ALLOY WHICH WAS SELECTED FOR ITS TENSILE STRENGTH AND RESISTANCE TO STRESS CORROSION CRACKING (7). THE ALLOY IS SOLUTION HEAT TREATED AND AGE-HARDENED (5). THE BEARING RETENTION NUT IS MANUFACTURED UTILIZING SOLUTION HEAT TREATED AND AGE-HARDENED K-MONEL (8). CLEANLINESS REQUIREMENTS DURING HANDLING AND ASSEMBLY (9) AND AT THE VEHICLE PROPELLANT CLEANLINESS (10) LEVEL MINIMIZES THE POTENTIAL OF CONTAMINATION BLOCKAGE OF THE COOLANT NETWORK. ENGINE DRYING AND PURGING REQUIREMENTS PRECLUDES THE FORMATION OF ICE CONTAMINATION. PREBURNER IMPELLER BOLT, DIVERTER RING, AND BEARING RETENTION NUT ARE ASSESSED TO HAVE INFINITE LIFE (11) AND ARE NOT TRACKED BY SERIALIZATION.</p>	<p>(1) RS007955 (2) RS007726 (3) RS007703 (4) RS007939 (5) RS007953 (6) RS007723 (7) RSS-8578-11 (8) RS007715 (9) RL10001 (10) TCD 13415000 (11) RL00532, CP320R0003B</p>

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CIL ITEM: B400-18	DESIGN		DOCUMENT REF.
FAILURE CAUSE B:	LEAKAGE PAST AFT PREBURNER PUMP PRESSURE-ASSISTED SEAL		
	<p>A PRESSURE-ASSISTED SEAL (1) IS USED TO PREVENT INTERNAL LEAKAGE FROM THE PREBURNER PUMP DISCHARGE CAVITY TO THE MAIN PUMP INLET STATION. THE SEAL IS RETAINED IN A CIRCUMFERENTIAL CHANNEL ENCLOSED BY THE PREBURNER PUMP VOLUTE (2), THE REAR DAMPING SEAL (3), AND THE SEAL RETAINER RING (4). THE SEAL IS MANUFACTURED UTILIZING INCONEL K-750, WHICH WAS SELECTED FOR ITS CLOSE MATCH OF EXPANSION COEFFICIENT TO THE K-MONEL RETAINER RING AND FOR ITS REQUIRED STRENGTH PROPERTIES (5). THE ALLOY IS RESISTANT TO CORROSION AND STRESS CORROSION CRACKING. THE SEAL IS SILVER PLATED FOR ENHANCED SEALING EFFECTIVENESS (1). THE INTERFERENCE PILOT FIT BETWEEN THE SUPPORT (6) AND THE VOLUTE BECOMES THE CONTROLLING RESISTANCE TO LIMIT FLOW IF SEAL LEAKAGE OCCURS. VENT PASSAGES ARE FURTHER INCORPORATED INTO THE SUPPORT PILOT TO THE MAIN HOUSING TO MINIMIZE PRESSURE BUILDUP DUE TO LEAKAGE (6). THE SEAL HAS BEEN ASSESSED TO HAVE INFINITE LIFE (7) AND IS NOT TRACKED BY SERIALIZATION.</p>		<p>(1) RES1265 (2) RS007739 (3) RS007766 (4) RS007761 (5) RSS-8578-11 (6) RS007937 (7) RL00532, CP32DR00038</p>
ALL CAUSES:	<p>INCONEL 718, INCONEL X-750, INCOLOY 903, UNSPALOY, K-MONEL, AND A-286 CRES SATISFY LOK COMPATIBILITY REQUIREMENTS (1). THE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE OF THE PREBURNER IMPELLER, BOLT, SHAFT, LABYRINTH SEAL, DIVERter RING, BEARING RETENTION NUT, AND SEAL MEET CEI REQUIREMENTS (2). THE MINIMUM FACTORS OF SAFETY FOR THESE PARTS MEET CEI REQUIREMENTS (3). THE HARDWARE PARENT MATERIALS WERE CLEARED FOR FRACTURE MECHANICS/NDE FLAW GROWTH SINCE THEY ARE NOT FRACTURE CRITICAL PARTS, EXCEPT FOR THE PREBURNER PUMP IMPELLER AND VOLUTE WHICH WERE CLEARED BY RISK ASSESSMENT (4). REUSE OF PARTS DURING OVERHAUL ARE CONTROLLED BY THE REQUIREMENTS OF THE OVERHAUL SPECIFICATION (5).</p>		<p>(1) RSS-8578-11 (2) RL00532, CP32DR00038 (3) RSS-8546-16, CP32DR00038 (4) NASA TASK 117 (5) RL00874</p>
CIL ITEM: B400-18	INSPECTION AND TEST		DOCUMENT REF.
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
FAILURE CAUSE A:	<p>RS007703 - SHAFT RS007726 - PREBURNER TIE-BOLT RS007953 - DIVERter RS007723 - PREBURNER IMPELLER RS007766 - AFT PREBURNER SILVER SEAL</p>	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION AND DRAWING REQUIREMENTS.	<p>RS007703 RS007726 RS007953 RS007723 RS007766 RB0170-182 RB0170-186 RS007726</p>
	MATERIAL INTEGRITY		

CIL ITEM: B400-18		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
		DIVERTER IS PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116
	HEAT TREAT	HEAT TREAT IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA0611-020 RB0160-014
	CLEANLINESS OF COMPONENTS	BLEED AND FLOW PASSAGES ARE INSPECTED FOR CONTAMINATION PER SPECIFICATION REQUIREMENTS.	RLO0814
	ASSEMBLY INTEGRITY	DIVERTER POSITION IS VERIFIED PER ASSEMBLY SPECIFICATION REQUIREMENTS.	RLO0814
		SEAL AND IMPELLER SEALING DIAMETERS ARE VERIFIED PER DRAWING REQUIREMENTS.	RS007723 RS007764
		AFT PREBURNER SILVER SEAL-TO-IMPELLER CLEARANCE IS VERIFIED PER DRAWING REQUIREMENTS.	RS007723 RS007766
		INLET ORIFICE DIAMETER IS INSPECTED PER DRAWING REQUIREMENTS.	RS007726
		INTERFERENCE FITS ARE VERIFIED PER DRAWING REQUIREMENTS.	RS007703 RS007939 RS007953 RS007955
		OXIDIZER SYSTEM IS PURGED PER SPECIFICATION REQUIREMENTS.	OMRSD 50CFR0.300 OMRSD 50CFR0.250 OMRSD V41C80.000 OMRSD V41C80.081
FAILURE CAUSE B:	RS007739 - VOLUTE RS007761 - RING RES1265 - SEAL		RS007739 RS007761 RES1265
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER DRAWING AND SPECIFICATION REQUIREMENTS.	RES1265 R00170-155 R00170-051
		THE SEAL, RING, AND VOLUTE ARE PENETRANT INSPECTED PER SPECIFICATION REQUIREMENTS.	RA0115-116

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CII ITEM: B400-18		INSPECTION AND TEST	
POSSIBLE CAUSES	SIGNIFICANT CHARACTERISTICS	INSPECTION(S)/TEST(S)	DOCUMENT REF.
ALL CAUSES:	SURFACE FINISHES	SEALING SURFACES ARE INSPECTED PER SPECIFICATION REQUIREMENTS.	RL00814
		SILVER PLATING IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RA1609-001
	ASSEMBLY INTEGRITY	SEAL DIAMETERS ARE VERIFIED PER DRAWING REQUIREMENTS.	RES1265
	RS007701 - NPOTP		RS007701
	CLEANLINESS OF COMPONENTS	COMPONENTS ARE VERIFIED CLEANED PER SPECIFICATION REQUIREMENTS.	RL10001
	ASSEMBLY INTEGRITY	THE PUMP SUBASSEMBLIES ARE INSPECTED DURING OVERHAUL PER SPECIFICATION REQUIREMENTS. INSPECTION INCLUDE: VISUAL, DIMENSIONAL, PENETRANT, AND REPLACEMENT OF USAGE ITEMS AS APPLICABLE, PER OVERHAUL CLASSIFICATION.	RL00874 RA0115-116
		OPERATION/PERFORMANCE IS VERIFIED BY ENGINE HOT FIRE TESTING AND 2ND E & N INSPECTIONS.	RL00050-04 RL00056-06 RL00056-07 RL00461
		TORQUE CHECKS ARE PERFORMED PRIOR TO EACH FLIGHT.	OMRSD V41B50.040
		NPOTP MICROSHAFT TRAVEL MEASUREMENTS ARE PERFORMED PRIOR TO EACH FLIGHT PER SPECIFICATION REQUIREMENTS.	RL01034 RL00050-04 OMRSD V41B50.045
		DATA FROM PREVIOUS FLIGHT OR HOT FIRE IS REVIEWED FOR PROPER TURBOPUMP OPERATION/PERFORMANCE. (LAST TEST)	HSFC PLW 1228
FAILURE HISTORY: COMPREHENSIVE FAILURE HISTORY DATA IS MAINTAINED IN THE PROBLEM REPORTING DATABASE (PRMS/PRCA). REFERENCE: NASA LETTER SA21/88/308 AND ROCKETDYNE LETTER BBRCD9761.			

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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	FLAN 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-8793). 	<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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