P U B L I C A T I O N T R A N S M I T T A L

RR-DERBY

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DATER Jul. 9/01

V2500-A1 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 2 to Service Bulletin EV2500-72-0340

Document History

Service Bulletin Revision Status		Supplement Revision Status
Initial Issue	Nov.11/98	
Revision 1	Feb.15/99	

Bulletin Revision 2

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 17 of the Service Bulletin	To add concurrency statement, add note to Accomplishment Instructions and revise Family tree Fig 4

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Publication Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 2 are as follows:

	Page	Revision Number	Revision Date
	Bulletin		
R	1	2	Jul.9/01
R	2	2	Jul.9/01
R	3	2	Jul.9/01
R	4	2	Jul.9/01
R	5	2	Jul.9/01
R	6	2	Jul.9/01
R	7	2	Jul.9/01
R	8	2	Jul.9/01
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R	11	2	Jul.9/01
R	12	2	Jul.9/01
R	13	2	Jul.9/01
R	14	2	Jul.9/01
R	15	2	Jul.9/01
R	16	2	Jul.9/01
R	17	2	Jul.9/01

MODIFICATION SERVICE BULLETIN - ENGINE - HP TURBINE ROTOR AND STATOR ASSEMBLY - PROVIDE A NEW SINGLE FULLY CERAMIC COATED VANE AND A NEW STAGE 1 HIGH PRESSURE TURBINE COOLING DUCT ASSEMBLY

1. Planning Information

A. Effectivity

(1) Airbus A320, A321

R V2500-A1 Engines prior to Serial No.V0362

(2) ATA Location

72-44-00

R B. Concurrent Requirements

R This Service Bulletin must be done at the same time as Reference (1)(d),
R Service Bulletin No.V2500-ENG-72-0341.

R This Service Bulletin must be done before or at the same time as Reference
R (1)(a), Service Bulletin No. V2500-ENG-70-0182.

C. Reason

(1) Problem

The current Stage 1 High Pressure (HP) Turbine Vane has experienced severe burning distress in service. The distress, in some cases, has progressed to the point that other hardware located in the vicinity has also been affected. Repair of the current vane is complicated by their being configured as welded clusters. One vane in a cluster scrapped with distress complicates the repair process in that a matching, repairable vane must be located to complete the cluster.

(2) Background

The severe operating environment and suspected vane internal cooling feature contamination from upstream material has resulted in a high rate of vane distress in engines disassembled for HP turbine refurbishment.

(3) Objective

Provide a new V2500-A1 HP Turbine Stage 1 Vane incorporating the successfully demonstrated features found in the V2500-A5 and V2500-D5 Vane. This new vane will be configured as a single fully ceramic coated vane, which is more tolerant of contamination from upstream material and incorporates many of the internal cooling features found in the V2500-A5 and V2500-D5 Vane.

(4) Substantiation

One hundred and sixty six hours of testing on a test engine was successfully completed, which included 150 hours and 43 minutes and 500 cycles of endurance testing. The first 150 hours of endurance testing represent 25 hours at takeoff thrust and 108.33 hours at maximum continuous thrust. The study of features of this change indicate that there is no detrimental impact on engine operation and operability.

(5) Effects of Bulletin on Workshop Procedures:

(a) Removal/Installation

Not affected

(b) Disassembly/Assembly

Not affected

(c) Cleaning

Not affected

(d) Inspection/Check

Not affected

(e) Repair

Not affected

(f) Testing

Not affected

(6) Supplemental Information

None.

D. Description

Replace stage 1 HPT duct and blade assemblies

E. Compliance

Category Code 7

Accomplish when supply of superseded parts has been depleted.

F. Approval

The Part Number Changes and/or part modifications described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Model listed.

The compliance statement and the procedures described in this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-Approved for the Engine Model listed.

G. Manpower

Estimated manhours to incorporate the full intent of this Bulletin:

(1) In Service

Not applicable

(2) At Overhaul

Not applicable

H. Material - Price and Availability

(1) Modification kit is not required. Parts are supplied as single line items.

(2) Refer to 2. Material Information for the prices and availability of future spares.

I. Tooling - Price and Availability

Special tools are not required.

J. Weight and Balance

(1) Weight change

None

(2) Moment Arm

No effect

(3) Datum

Engine front mount centerline (Power Plant Station PPS 100)

K. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

R L. Software Accomplishment Summary

R Not applicable

R See vendor supplier Service Bulletin

M. References

(1) IAE V2500 Service Bulletins:

(a) V2500-ENG-70-0182

Engine - Turbine nozzle assembly - New stage 1 HPT duct segment retaining bolts

(b) V2500-ENG-70-0188

Engine - To announce New Stage 1 Turbine Vane Assemblies

(c) V2500-ENG-72-0046

Engine - HP Turbine Rotor and Stator Assembly - Provide a New First Stage HPT Blade and First Stage HPT Cooling Duct Assembly

(d) V2500-ENG-72-0341

Engine - HP Turbine Rotor and Stator Assembly - Provide a New Stage 1 High Pressure Turbine Support Assembly which contains a New Seal

(2) V2500 Engine Illustrated Parts Catalog (S-V2500-1IA), Chapter/Section 72-44-10, 72-44-20 and 72-44-50 to add the new parts.

(3) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-44-00 and 72-44-10, Assembly.

(4) V2500 Standard Practices/Processes Manual (SPP-V2500-1IA), Chapter/Section 70-09-00, Marking of Parts

(5) Internal Reference No.

R IAE Engineering Change Number 96VA024, 96VA024N

N. Other Publications Affected

(1) V2500 Engine Illustrated Parts Catalog, Chapter/Section 72-44-10, 72-44-20 and 72-44-50 to add the new parts.

(2) V2500 Engine Manual (E-V2500-1IA), 72-44-10, 72-44-20 and 72-44-50, Cleaning, Inspection and Repair to add the new parts.

O. Interchangeability of Parts

Old and new parts are directly interchangeable in complete sets.

R This Service Bulletin must be done at the same time as Reference (1)(d), Service Bulletin V2500-ENG-72-0341.

R This Service Bulletin must be done before or at the same time as Reference (1)(a), Service Bulletin V2500-ENG-70-0182.

R P. Information in the Appendix

Alternative Accomplishment Instructions (No)

Progression charts (Yes)

Added data (Yes)

Revision to Table of Limits (No)

Inspection procedures (No)

2. Material Information

A. Kit associated with this Bulletin:

None

B. New production parts:

PART NO.	QTY	UNIT PRICE
2A5591	40	5670.00
2A2765	1	6.21
2A0534-01	1	349.00
2A0536	1	92.90
2A0537	1	106.00
2A2676	40	23.30
2A3359	40	9.00
2A2677	40	23.30

C. Parts affected by this Bulletin:

Applicability: For each V2500-A1 Engine to incorporate this Bulletin:

72-44-20

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	OLD PART NO.	INSTR DISP
01-240	2A5591	40	Vane assembly, Stage 1 HPT	-	(S1)(A)
01-240	-	20	Vane cluster, Stage 1 HPT	2A2591	(B)
			OR		
01-240	2A5591	40	Vane assembly, Stage 1 HPT	-	(S1)(A)
01-240	-	20	Vane cluster, Stage 1	2A0091	(B)
01-250	-	20	Vane cluster, Stage 1	2A2591CL21	(B)
01-250	-	20	Vane cluster, Stage 1	2A0091CL21	(B)
01-251	-	20	Vane cluster, Stage 1	2A2591CL22	(B)
01-251	-	20	Vane cluster, Stage 1	2A0091CL22	(B)
01-252	-	20	Vane cluster, Stage 1	2A2591CL23	(B)
01-252	-	20	Vane cluster, Stage 1	2A0091CL23	(B)
01-253	-	20	Vane cluster, Stage 1	2A2591CL24	(B)
01-253	-	20	Vane cluster, Stage 1	2A0091CL24	(B)
01-254	-	20	Vane cluster, Stage 1	2A2591CL25	(B)
01-254	-	20	Vane cluster, Stage 1	2A0091CL25	(B)
01-255	-	20	Vane cluster, Stage 1	2A2591CL26	(B)
01-255	-	20	Vane cluster, Stage 1	2A0091CL26	(B)
01-256	-	20	Vane cluster, Stage 1	2A2591CL27	(B)
01-256	-	20	Vane cluster, Stage 1	2A0091CL27	(B)
01-257	-	20	Vane cluster, Stage 1	2A2591CL28	(B)
01-257	-	20	Vane cluster, Stage 1	2A0091CL28	(B)

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	OLD PART NO.	INSTR DISP
01-258	-	20	Vane cluster, Stage 1	2A2591CL29	(B)
01-258	-	20	Vane cluster, Stage 1	2A0091CL29	(B)
01-259	-	20	Vane cluster, Stage 1	2A2591CL30	(B)
01-259	-	20	Vane cluster, Stage 1	2A0091CL30	(B)
01-260	-	20	Vane cluster, Stage 1	2A2591CL31	(B)
01-260	-	20	Vane cluster, Stage 1	2A0091CL31	(B)
01-261	-	20	Vane cluster, Stage 1	2A2591CL32	(B)
01-261	-	20	Vane cluster, Stage 1	2A0091CL32	(B)
01-262	-	20	Vane cluster, Stage 1	2A2591CL33	(B)
01-262	-	20	Vane cluster, Stage 1	2A0091CL33	(B)
01-263	-	20	Vane cluster, Stage 1	2A2591CL34	(B)
01-263	-	20	Vane cluster, Stage 1	2A0091CL34	(B)
01-264	-	20	Vane cluster, Stage 1	2A2591CL35	(B)
01-264	-	20	Vane cluster, Stage 1 HPT	2A0091CL35	(B)
01-265	-	20	Vane cluster, Stage 1	2A2591CL36	(B)
01-265	-	20	Vane cluster, Stage 1	2A0091CL36	(B)
01-266	-	20	Vane cluster, Stage 1	2A2591CL37	(B)
01-266	-	20	Vane cluster, Stage 1	2A0091CL37	(B)
01-267	-	20	Vane cluster, Stage 1	2A2591CL38	(B)
01-267	-	20	Vane cluster, Stage 1	2A0091CL38	(B)
01-268	-	20	Vane cluster, Stage 1	2A2591CL39	(B)
01-268	-	20	Vane cluster, Stage 1	2A0091CL39	(B)
01-269	-	20	Vane cluster, Stage 1	2A2591CL40	(B)
01-269	-	20	Vane cluster, Stage 1	2A0091CL40	(B)
01-270	-	20	Vane cluster, Stage 1	2A2591CL41	(B)
01-270	-	20	Vane cluster, Stage 1	2A0091CL41	(B)
01-271	-	20	Vane cluster, Stage 1	2A2591CL42	(B)
01-271	-	20	Vane cluster, Stage 1	2A0091CL42	(B)
01-272	-	20	Vane cluster, Stage 1	2A2591CL43	(B)
01-272	-	20	Vane cluster, Stage 1	2A0091CL43	(B)
01-273	-	20	Vane cluster, Stage 1	2A2591CL44	(B)
01-273	-	20	Vane cluster, Stage 1	2A0091CL44	(B)
01-274	-	20	Vane cluster, Stage 1	2A2591CL45	(B)
01-274	-	20	Vane cluster, Stage 1	2A0091CL45	(B)
01-275	-	20	Vane cluster, Stage 1	2A2591CL46	(B)
01-275	-	20	Vane cluster, Stage 1	2A0091CL46	(B)
01-276	-	20	Vane cluster, Stage 1	2A2591CL47	(B)
01-276	-	20	Vane cluster, Stage 1	2A0091CL47	(B)
01-277	-	20	Vane cluster, Stage 1	2A2591CL48	(B)
01-277	-	20	Vane cluster, Stage 1	2A0091CL48	(B)
01-278	-	20	Vane cluster, Stage 1	2A2591 CL48-5	(C)
01-278	-	20	Vane cluster, Stage 1	2A0091 CL48-5	(B)
01-279	-	20	Vane cluster, Stage 1	2A2591CL49	(C)
01-279	-	20	Vane cluster, Stage 1	2A0091CL49	(B)

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	OLD PART NO.	INSTR DISP
01-280	-	20	Vane cluster, Stage 1	2A2591 CL49-5	(B)
01-280	-	20	Vane cluster, Stage 1	2A0091 CL49-5	(B)
01-282	-	20	Vane cluster, Stage 1	2A2591 CL47-5	(B)
01-284	-	20	Vane cluster, Stage 1	2A2591 CL50	(B)
01-285	-	20	Vane cluster, Stage 1	2A2591 CL50-5	(B)
01-286	-	20	Vane cluster, Stage 1	2A2591CL51	(C)
01-300	-	2	Seal, Stage 1 HPT	2A0034	(B)
-	-	2	Cover, HPT vane Stage 1	2A0033	(B)
01-360	-	1	Baffle assembly	2A0024-01	(B)
01-363	-	1	Baffle assembly	2A0027-01	(B)
01-366	-	1	Cover	2A0030	(B)
01-367	-	1	Cover	2A0031	(B)
01-368	-	1	Cover	2A0032	(B)
01-415	-	1	Baffle assembly	2A0024-01	(B)
01-430	-	1	Baffle assembly	2A0027-01	(B)
01-445	-	1	Cover	2A0030	(B)
01-450	-	1	Cover	2A0031	(B)
01-455	2A2765	1	Cover	2A0032	(A)(B)
01-456	2A0534-01	1	Baffle assembly vane, Stage 1	-	(S1)(A)
01-459	2A0536	1	Cover, HPT vane, Stage 1	-	(S1)(A)
01-460	2A0537	1	Cover, HPT vane, Stage 1	-	(S1)(A)
01-480	2A2676	40	Seal, HPT vane, Stage 1	-	(S1)(A)
01-480	-	20	Seal	2A0037	(B)
01-490	2A3359	40	Seal, HPT vane, Stage 1	-	(S1)(A)
01-490	-	20	Seal	2A0037	(B)
01-500	-	20	Seal	2A0036	(B)
01-510	2A2677	40	Seal, HPT vane, Stage 1	-	(S1)(A)
01-510	-	20	Seal	2A0034	(B)

72-44-50

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	OLD PART NO.	INSTR DISP
01-010	2A1997-001	1	Duct CLG HPT, Stage 1 AS	2A1997-01	(S1)(1D)(A)(B)
01-010	2A3329-01	1	Duct, Assy of CLG, HPT Stage 1	2A1997-01	(S1)(1D)(A)(B)

D. Instruction Disposition Codes

(S1) Old parts must replace new parts in complete sets per Engine.

(1D) You can obtain the new part by the modification specified in this Service Bulletin.

(A) The new part is currently available.

(B) The old part will no longer be supplied.

(C) The old part will continue to be supplied until stock is exhausted.

E. Other Material Information Data

Not applicable

F. Re-identified Parts

Not applicable

G. Re-identified Parts Data

New PN	Keyword	Old PN
2A1997-001	Duct, CLG HPT, Stage 1, AS	2A1997-01

3. Accomplishment Instructions

A. Rework Instructions

NOTE: This Service Bulletin must be accomplished at the same time as V2500-ENG-72-0341.

(1) Do a modification of the 2A1997-01 Stage 1 HPT Cooling Duct Assembly (1 off). See Reference (1), Chapter/Section 72-44-50, Fig./Item No.01-010. See Figures 1 and 3.

R NOTE: For Indexing Pin replacement refer to VRS3617

PROCEDURE	RELATED DATA
(a) Weld to build-up the surface as indicated in the referenced figure	Use the manual gas tungsten arc process given in Reference (4), Chapter/Section 70-31-13, Fusion Welding. Use AMS5832 filler material. Refer to Figure 3 (Sheet 2) for the weld build-up area
(b) Machine the build-up as shown in the referenced figures	Refer to Figure 3 (Sheet 1). NOTE: You can machine before or after heat treatment, but it must be done before fluorescent penetrant inspection.
(c) Fluorescent penetrant inspect by the procedure specified in TASK 70-23-01-230-501. No cracks are permitted	Refer to the procedure given in Reference (4), Chapter/Section 70-23-01, Fluorescent Penetrant Inspection. NOTE: The fluorescent penetrant inspection is optional.
(d) Do a heat treat by the procedure specified in Cycle 12 or 12A	Refer to the procedure given in Reference (4), Chapter/Section 70-37-01, Heat Treatment. Reference PWA SPOP 465-1 and 465-2
(e) Fluorescent penetrant inspect by the procedure specified in TASK 70-23-01-230-501. No cracks are permitted	Refer to the procedure given in Reference (4), Chapter/Section 70-23-01, Fluorescent Penetrant Inspection

(f)	Mark the new part number adjacent to the existing part number. Use the vibration peen method	Use the procedure specified in Reference (4), Chapter/Section 70-09-00, Marking of Parts. See Figure 3 (Sheet 1)

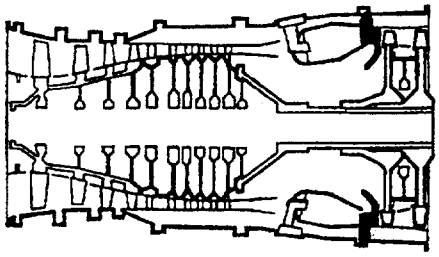
B. Installation Instructions

(1) Install the 2A5591 Stage 1 High Pressure Turbine Vane Assembly (40 off) when you assemble the Stage 1 Turbine Nozzle Assembly by the procedure specified in Reference (3) Engine Manual, Chapter/Section 72-44-00, Assembly. See Figure 2.

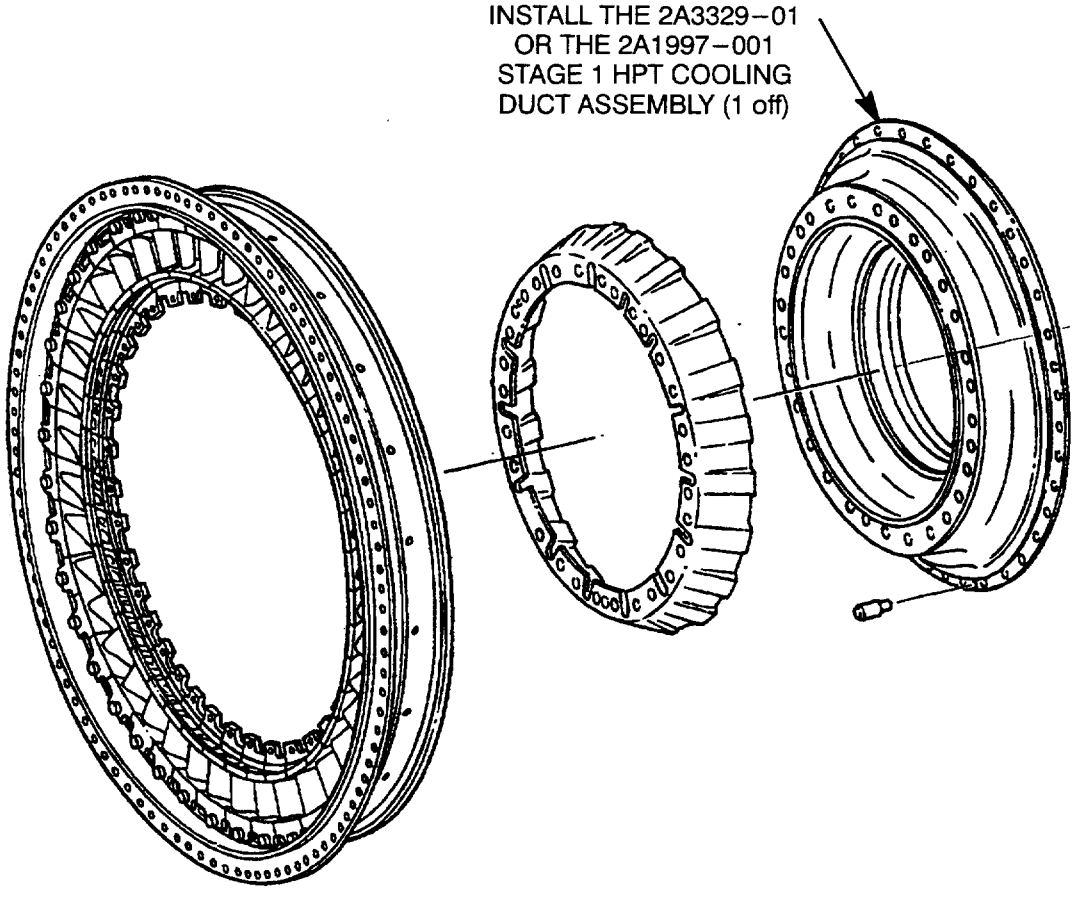
(2) Install either the 2A3329-01 or the 2A1997-001 Stage 1 High Pressure Turbine Cooling Duct Assembly (1 off) when you assemble the Stage 1 Turbine Nozzle Assembly by the procedure specified in Reference (3) Engine Manual, Chapter/Section 72-44-00, Assembly. See Figure 1.

C. Recording Instructions

(1) A record of accomplishment is necessary.



MODULE 40



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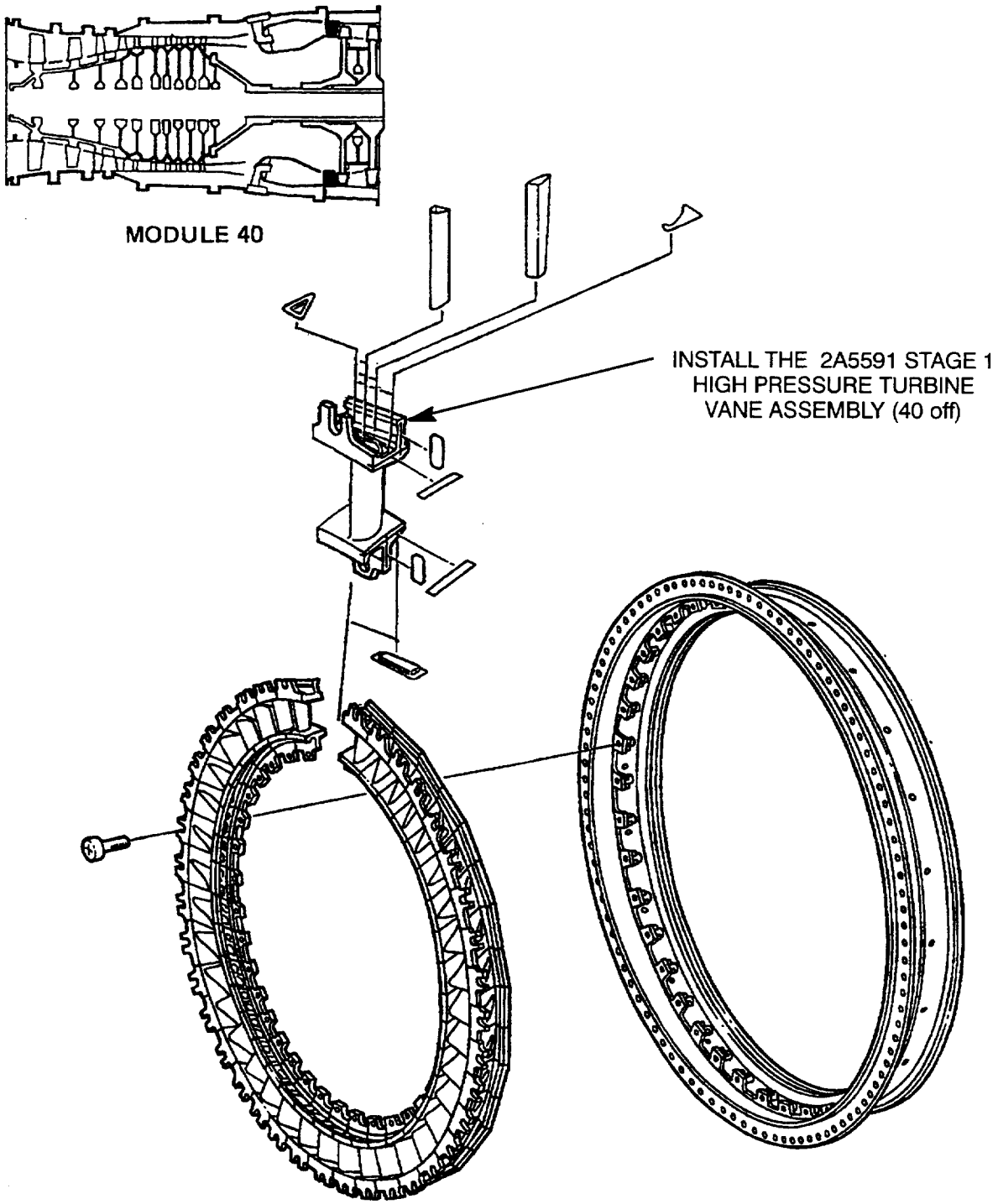
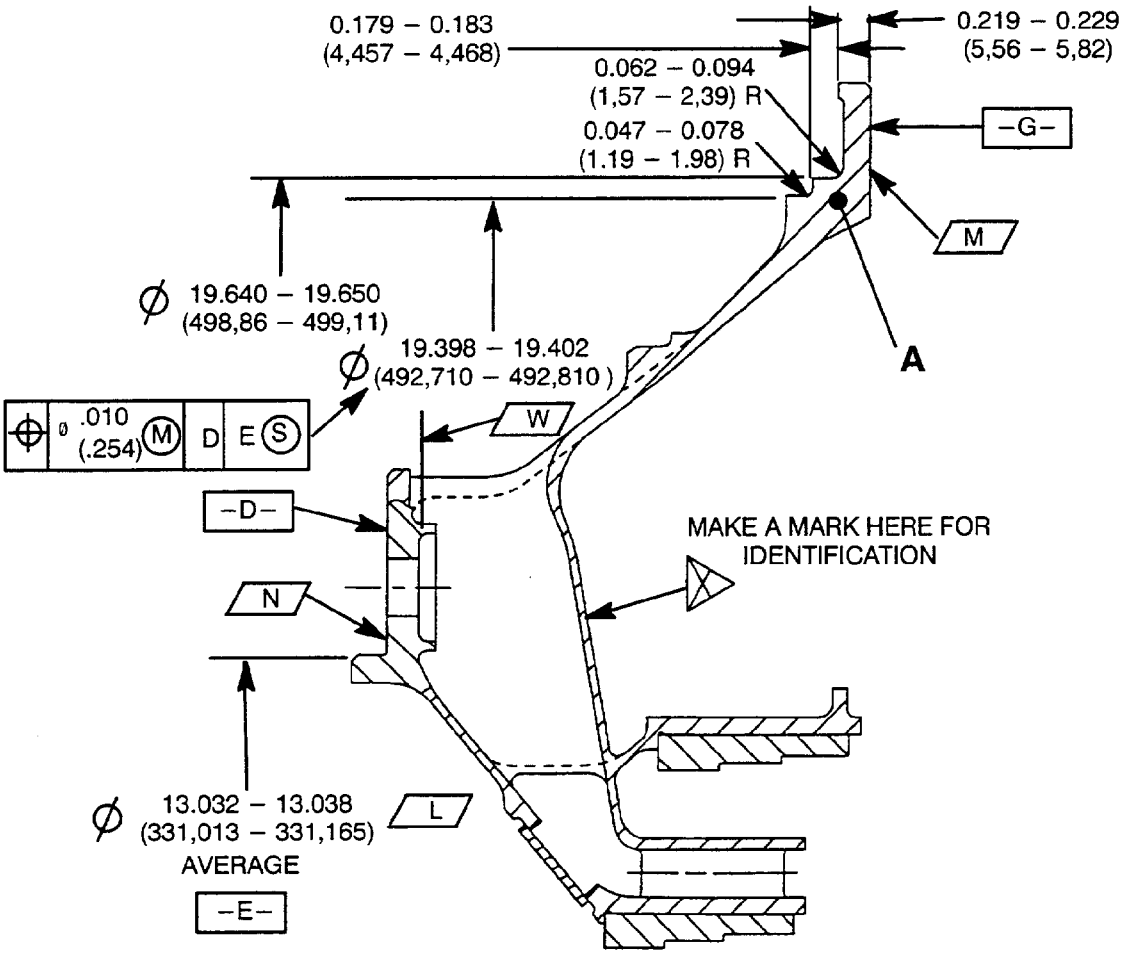
Location of the Stage 1 High Pressure Turbine Cooling Duct Assembly
Figure 1



Location of the Stage 1 High Pressure Turbine Vane Assembly
Figure 2



SECTION THROUGH STAGE 1 HIGH PRESSURE
TURBINE COOLING DUCT ASSEMBLY

UNLESS DIFFERENTLY SPECIFIED BREAK SHARP EDGES 0.003 – 0.015 (0,08 – 0,38)

UNLESS DIFFERENTLY SPECIFIED ALL SURFACE TEXTURES ARE TO BE 125 (3.2 µm)

UNLESS DIFFERENTLY SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE N IS
⏥ .002 (0,051) AND Ø L MAINTAINS A CLEARANCE ENVELOPE OF Ø13.040 (331,216)
IN A FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACE
N , M , W AND Ø L

IN A FREE STATE SURFACE N IS ⏥ .005 (0,127) AND Ø L IS Ø
13.008 – 13.059 (330,40 – 331,70)

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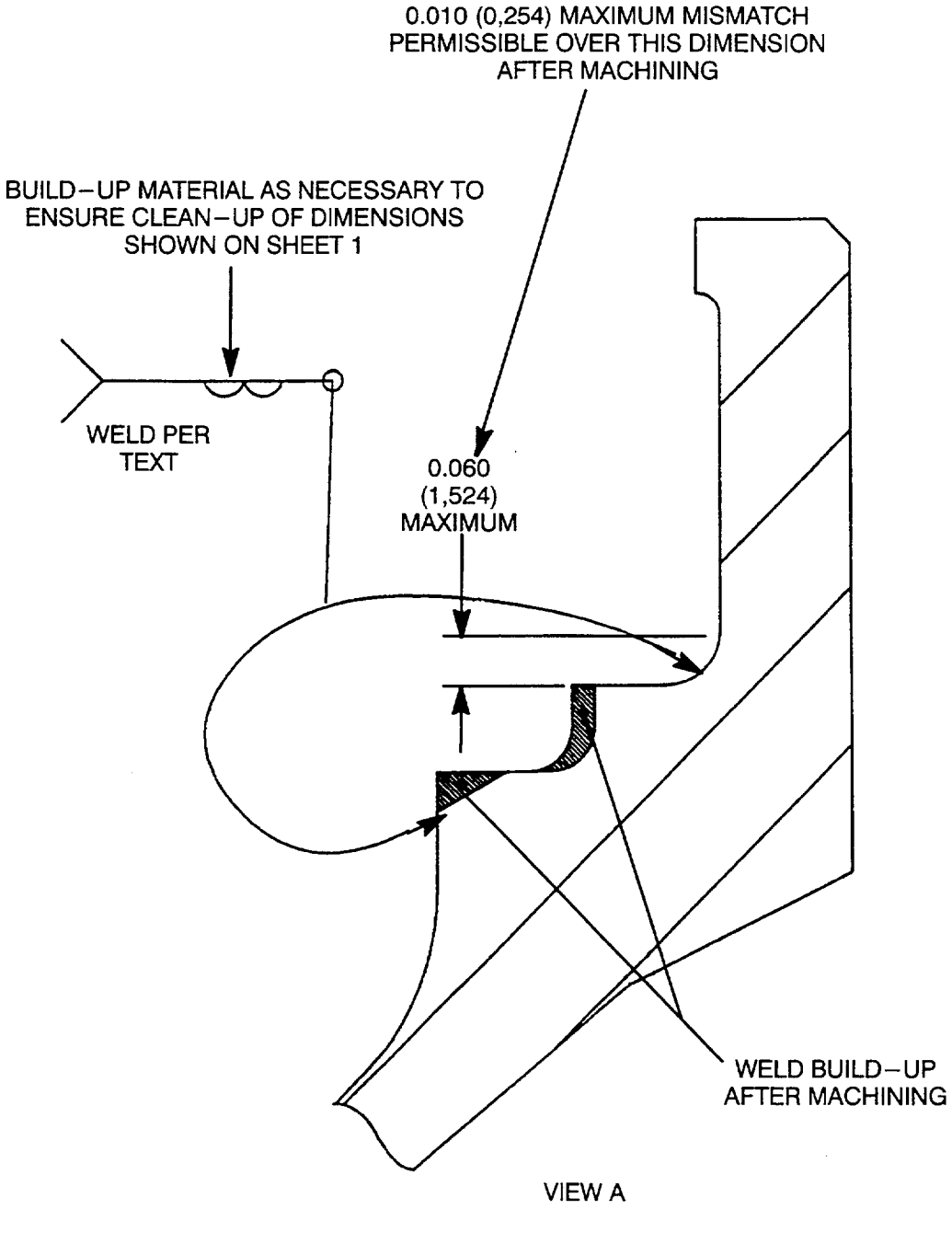
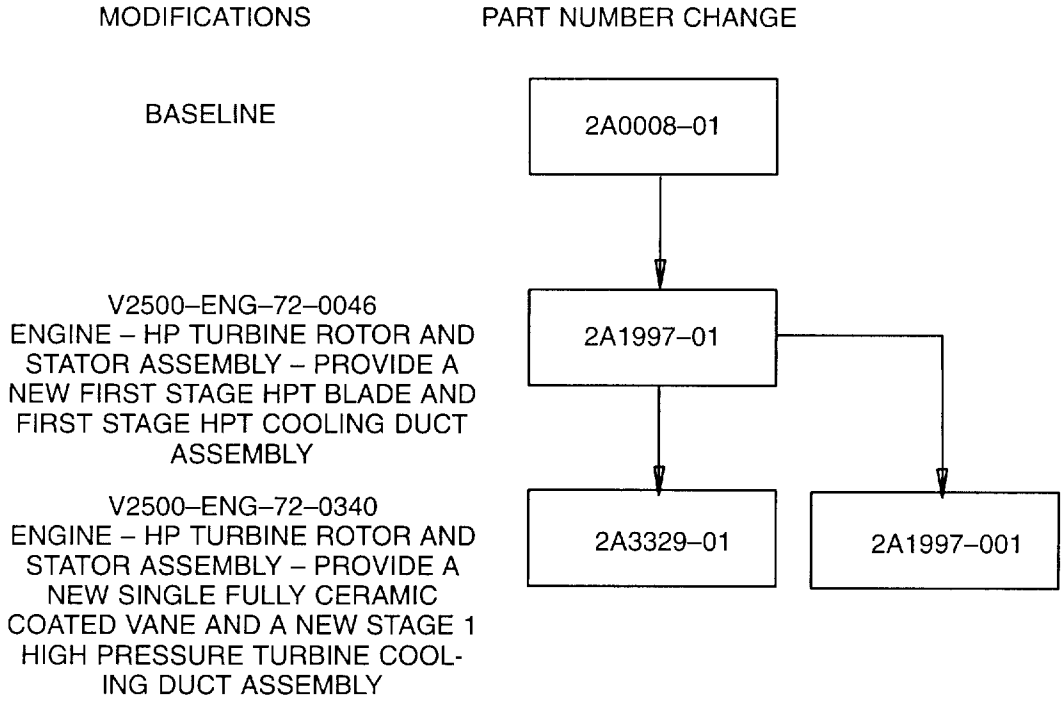
Modification of the Stage 1 High Pressure Turbine Cooling Duct Assembly
Figure 3 (Sheet 1)



Modification of the Stage 1 High Pressure Turbine Cooling Duct Assembly
Figure 3 (Sheet 2)

Appendix
Parts Progression To Show the Changed Part in Relation to Other Parts



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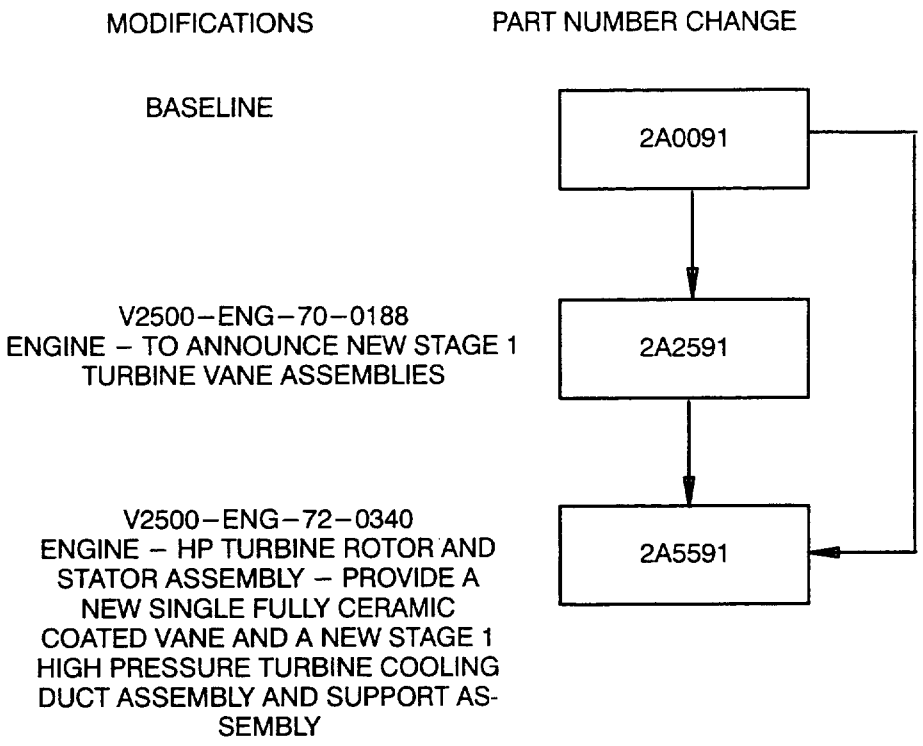
R Family Tree - Stage 1 High Pressure Turbine Cooling Duct Assembly
R Reference Catalog Sequence Number 72-44-50, Figure 1 Item 1
R Figure 4



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Family Tree – Stage 1 High Pressure Turbine Vane Assembly
Reference Catalog Sequence Number 72-44-20, Figure 1 Items 240 and 250 through 408
Figure 5