International Aero Engines

SERVICE BULLETIN

ENGINE - FUEL AND CONTROL - INTRODUCTION OF AN IMPROVED FUEL PUMP - CATEGORY CODE 6 - MOD.ENG-73-0068

1. Planning Information

A. Effectivity

(1) Aircraft: (a) Airbus A320
(b) Airbus A321
(c) McDonnell Douglas MD-90

(2) Engine: (a) V2500-A1 Engines prior to Serial No. V0362
(b) V2527-A5 Engines prior to Serial No. V10117*
(c) V2530-A5 Engines prior to Serial No. V10117*
(d) V2525-D5 Engines prior to Serial No. V20026*
(e) V2528-D5 Engines prior to Serial No. V20026*

*The Serial Number data shown is of a preliminary nature and is provided for advanced planning only.
A future revision to this Service Bulletin will confirm final serial number effectivity.

B. Concurrent Requirements

This Service Bulletin must be incorporated after or concurrently with the IAE Service Bulletin No. V2500-ENG-73-0067.

C. Reason

(1) Condition

Inspection of several LP/HP Fuel Pumps returned from operators revealed wear on the impeller/inducer pilot and threads connecting the impeller/inducer to the fuel pump drive shaft.

(2) Background

Wear to the impeller/inducer was found to be the result of thermal cycling. Thermal cycling caused expansion and contraction of the aluminum impeller/inducer resulting in localized yielding of the aluminum impeller/inducer at the attachment to the steel drive shaft. In some pumps the localized yielding allowed enough axial movement of the impeller/inducer to cause interference with the center plate housing. This interference caused a seizure of the impeller/inducer to the housing resulting in a sheared drive shaft during engine starting.

(3) Objective

To incorporate a spacer, steel sleeve and helical coil insert at the interface of the impeller/inducer with the steel drive shaft. Incorporation of the spacer has shown improvement in the stress level at the junction of the impeller/inducer with the drive shaft. The helical coil inserts improves the wear resistance of the threads. Together these improvements provide a significant improvement in the service life of the fuel pump.

(4) Substantiation

Substantiation testing has been successfully completed.

(5) Effect of Bulletin on Workshop Procedures;

Removal/Installation	Not affected
Disassembly/Assembly	Not affected
Cleaning	Not affected
Inspection/Check	Not affected
Repair	Not affected
Testing	Not affected

(6) Supplemental Information

None.

D. Description

(1) This Service Bulletin must be incorporated after or concurrently with the IAE Service Bulletin No. V2500-ENG-73-0067.

(2) This Service Bulletin covers the fitment to engines of Fuel Pump incorporating STS Corporation (STS) Service Bulletin No. STS-73-002.

(3) The accomplishment instruction for installation of inver washer, steel sleeve and helical coil insert is given in the STS Service Bulletin No. STS-73-002.

E. Approval

The part number changes described in this Bulletin have been shown to comply with the applicable Federal Aviation Regulation and are FAA-APPROVED for Engine Model listed.

F. Compliance

Category Code 6

Accomplishment when subassembly (i.e. Modules, Accessories, Components, Build Groups) is disassembled sufficiently to afford access to the affected part and to all affected spare subassemblies.

Retrofit will be recommended around 8000 hours (soft time).

G. Manpower

Estimated Manhours to incorporate the full intent of this Bulletin:

Venue	Estimated Manhours
(1) In Service	.. Not affected
(2) At Overhaul	.. Not affected

H. Weight and Balance

(1) Weight change.....	None
(2) Moment arm	No effect
(3) Datum	Engine front mount centerline (Power Plant Station - PPS 100)

I. Electrical Lode Data

Not affected

J. References

(1) Internal Reference No.

EC94VJ058

(2) Other References

IAE Engine Illustrated Parts Catalog.

STS Service Bulletin No. STS-73-002, "Engine Fuel Control - Modification of LP/HP Fuel Pumps Impeller/Inducer".

IAE Service Bulletin No. V2500-ENG-73-0067 "Engine - Fuel and Control - Replace the Fuel Pump Packings with Packings made from improved material".

A320 Engine Manual.

A321 Engine Manual.

MD-90 Engine Manual.

K. Other Publication Affected

(1) IAE Engine Illustrated Part Catalog, Chapter/Section 73-12-41.

(2) IAE Power Plant Illustrated Parts Catalog, Chapter/Section 73-12-41 (V2500-A1 and V2500-A5) and 73-12-01 (V2500-D5).

(3) STS Component Maintenance Manual, Chapter/Section 73-12-41 (V2500-A1), 73-18-41 (V2500-A5) and 73-18-42 (V2500-D5).

2. Accomplishment Instruction

This Service Bulletin must be incorporated after or concurrently with the IAE Service Bulletin No. V2500-ENG-73-0067.

A. Rework Instructions

The rework instructions are given in STS Service Bulletin No. STS-73-002.

B. Record Instructions

A record of accomplishment is necessary.

3. Material Information

Applicability: For all V2500 engine to incorporate this Bulletin and this Service Bulletin must be incorporated after or concurrently with the IAE Service Bulletin No. V2500-73-0067.

A. Parts affected by this Bulletin:

New Part No. (ATA No.)	Qty	Est'd Unit Price ($)	Keyword	Old Part No. (IPC No.)	Instruction/ Disposition
For V2500-A1 Engines:					
5L0070 (73-12-41)	1		.Pump, Fuel LP/HP	5L0067 (01-100)	(A) (B) (C) (S1)
For V2527-A5 and V2530-A5 Engines:					
5L0071 (73-12-41)	1		.Pump, Fuel LP/HP	5L0068 (01-100)	(A) (B) (D) (S1)
For V2525-D5 and V2528-D5 Engines:					
5L0072 (73-12-41)	1		.Pump, Fuel LP/HP	5L0069 (01-100)	(A) (B) (E) (S1)

B. Instruction/Disposition Code Statements:

(A) New part is currently available.
(B) Old part will no longer be available.
(C) New Vendor P/N 5008735F (Old Vendor P/N 5008735E).
(D) New Vendor P/N 5009913D (Old Vendor P/N 5009913C).
(E) New Vendor P/N 5010216E (Old Vendor P/N 5010216D).
(S1) Old and new parts are freely and fully interchangeable both physically and functionally.

NOTE: Contact the "STS Product Support Manager" for information concerning firm prices. (Refer to STS Service Bulletin No. STS-73-002).

STS CORPORATION

SERVICE BULLETIN

NO. STS-73-002

ENGINE - FUEL AND CONTROL - MODIFICATION OF LP/HP FUEL PUMPS IMPELLER/INDUCER

1. PLANNING INFORMATION

A. EFFECTIVITY

(1) Aircrafts:

(a) Airbus A320

(b) Airbus A321

(c) McDonnell Douglas MD-90

(2) Engines:

(a) V2500-A1 Engine

(b) V2500-A5 Engine

(c) V2500-D5 Engine

(3) Pumps:

(a) For V2500-A1 Engine:
IAE Part Number: 5L0067
STS Part Number: 5008735E

(b) For V2500-A5 Engine:
IAE Part Number: 5L0068
STS Part Number: 5009913C

(c) For V2500-D5 Engine:
IAE Part Number: 5L0069
STS Part Number: 5010216D

NOTE: This Service Bulletin must be incorporated after or concurrently with the STS Service Bulletin No. STS-73-001 (Engine Fuel and Control - Replacement of LP/HP Fuel Pumps Face Seal Assembly and O-Rings).

B. REASON

(1) Condition:

Inspection of several LP/HP Fuel pumps from operators revealed wear on the impeller/inducer pilot and threads connecting the impeller/inducer to the fuel pump drive shaft.

(2) Background:

Wear to the impeller/inducer was found to be the result of thermal cycling. Thermal cycling caused expansion and contraction of the aluminum impeller/inducer resulting in localized yielding of the aluminum impeller/inducer at the attachment to the steel drive shaft. In some pumps the localized yielding allowed enough axial movement of the impeller/inducer to cause interference with the center

plate housing. This interference caused a seizure of the impeller/inducer to the housing resulting in a sheared drive shaft during engine starting.

(3) Objective:

To incorporate a spacer, steel sleeve and helicoil insert at the interface of the impeller/inducer with the steel drive shaft. Incorporation of the spacer has shown improvement in the stress level at the junction of the impeller/inducer with the drive shaft. The steel sleeve adds strength to the portion of the impeller/inducer in contact with the drive shaft. The helical coil inserts improves the wear resistance of the threads. Together these improvements provide a significant improvement in the service life of the fuel pump.

C. DESCRIPTION

(1) This Bulletin gives instructions necessary to remove the presently installed impeller/inducer, modify it and assemble the MFP with the modified impeller/inducer assembly.

(2) This Service Bulletin describes two options to accomplish the modification of the MFP.

(a) Option 1: Operators who wish to accomplish the modification in the shop by replacing impeller/inducer.

(b) Option 2: Operators who wish to have the modification accomplished by Sundstrand Aerospace.

D. COMPLIANCE

Category Code 6

Incorporation of this Bulletin is recommended at first shop visit after 8,000 total operating time (soft time).

E. APPROVAL

This Service Bulletin has been technically agreed by IAE.

F. MANPOWER

Approximately 18.0 man-hours will be required to perform this modification.

G. MATERIAL - PRICE AND AVAILABILITY

(1) Description of Product Improvement:

(a) Modified pump price:

STS/Sundstrand Aerospace will provide a special price for spare pumps as shown in the following:

50% off catalog price: For Jan. 1995 thru Dec. 1995
40% off catalog price: For Jan. 1996 thru Dec. 1996
25% off catalog price: For Jan. 1997 thru Dec. 1997

10% off catalog price: For Jan. 1998 thru May 1998

NOTE: All of the above are subject to escalation.

(b) Price for the modification:

1 For pump under warranty:

STS/Sundstrand Aerospace will provide free of charge replacement of any impeller/inducer which has been rendered inoperable because of damage as described in paragraph 1.B.(2) until May 31, 1998.

2 For pump out of warranty:

STS/Sundstrand Aerospace will provide a special price for the replacement of any impeller/inducer which has been rendered inoperable because of damage as described in paragraph 1.B.(2) until May 31, 1998 as follows:

To modify the pump impeller/inducer: $6,950
To overhaul and modify the pumps: $12,950

NOTE: All of the above are subject to escalation.

(2) Availability:

(a) Option 1:

Operators who wish to accomplish the modification in the shop by replacing impeller/inducer;

New parts required to accomplish this Service Bulletin are listed in Section 3. Material Information and are available at prices and lead time indicated. An order for spare parts should be addressed to:

Sundstrand Aerospace
Sundstrand Corporation
4747 Harrison Avenue, P.O. Box 7002
Rockford, Illinois 61125-7002
U. S. A.
(For the attention of Manager, Business Operations, Department No. 890-6)
Telephone: 1-800-622-3199 or 815-226-6481
Telex: 25-7440
Twx: 910-631-4255
SITA: RFDSUXD
Telecopy: 815-226-2624

(b) Option 2:

Operators who wish to have the modification accomplished by Sundstrand Aerospace;

Accomplishment of this Service Bulletin will be completed based on Sundstrand Aerospace standard terms, and prices of sale pertaining to commercial contract Sundstrand Aerospace Business Operations Manager which is mentioned in the above address for information concering firm quotation.

H. TOOLING - PRICE AND AVAILABILITY

No additional tooling other than that required for shop maintenance of the MFP is required to accomplish this Service Bulletin.

I. WEIGHT AND BALANCE

None.

J. ELECTRICAL LOAD DATA

Not affected.

K. REFERENCES

(1) STS Component Maintenance Manuals (CMM) 73-12-41 (for A1 pump), 73-18-41 (for A5 pump) and 73-18-42 (for D5 pump).

(2) IAE Engineering Change No. 94VJ058
IAE Service Bulletin No. V2500-ENG-73-0068

L. OTHER PUBLICATIONS AFFECTED

STS Component Maintenance Manuals (CMM) 73-12-41 (for A1 pump), 73-18-41 (for A5 pump) and 73-18-42 (for D5 pump) will be revised to incorporate this Service Bulletin.

2. ACCOMPLISHMENT INSTRUCTIONS

A. DISASSEMBLY

Disassemble the pump (refer to CMM 73-12-41, 73-18-41 and 73-18-42) to the extent necessary to get the impeller/inducer (320, IPL Figure 1, 73-12-41; 340, IPL Figure 1, 73-18-41; 370, IPL Figure 1, 73-18-42).

B. MODIFICATION

Modify the impeller/inducer (320, IPL Figure 1, 73-12-41; 340, IPL Figure 1, 73-18-41; 370, IPL Figure 1, 73-18-42). Refer to Figure 1 and 2 of this bulletin. If the impeller/inducer is damaged to the extent that modification is not possible, replace impeller/inducer with P/N 762726 (for pump assembly STS part number 5008735E, IAE P/N 5L0067) or 762725 (for pump assembly STS part numbers 5009913C, IAE P/N 5L0068 and STS part number 5010216D, IAE P/N 5L0069). Identify modified impeller/inducer according to paragraph 2.D.(1).

Modification of Impeller/Inducer

PROCEDURE

(a) Machine impeller/inducer. (Refer to the Figure 1 of Modification of Impeller/Inducer.)

(b) Perform local fluorescent penetrant inspection according to Sundstrand Standard Practices Manual, Bulletin 985, CHECK or Military Specification MIL-STD-6866.

(c) Install helical coil (P/N MS21209F9-10) and spacer (P/N 762724).

CAUTION: DO NOT HEAT IMPELLER/INDUCER TO MORE THAN 400 DEGREES FAHRENHEIT.

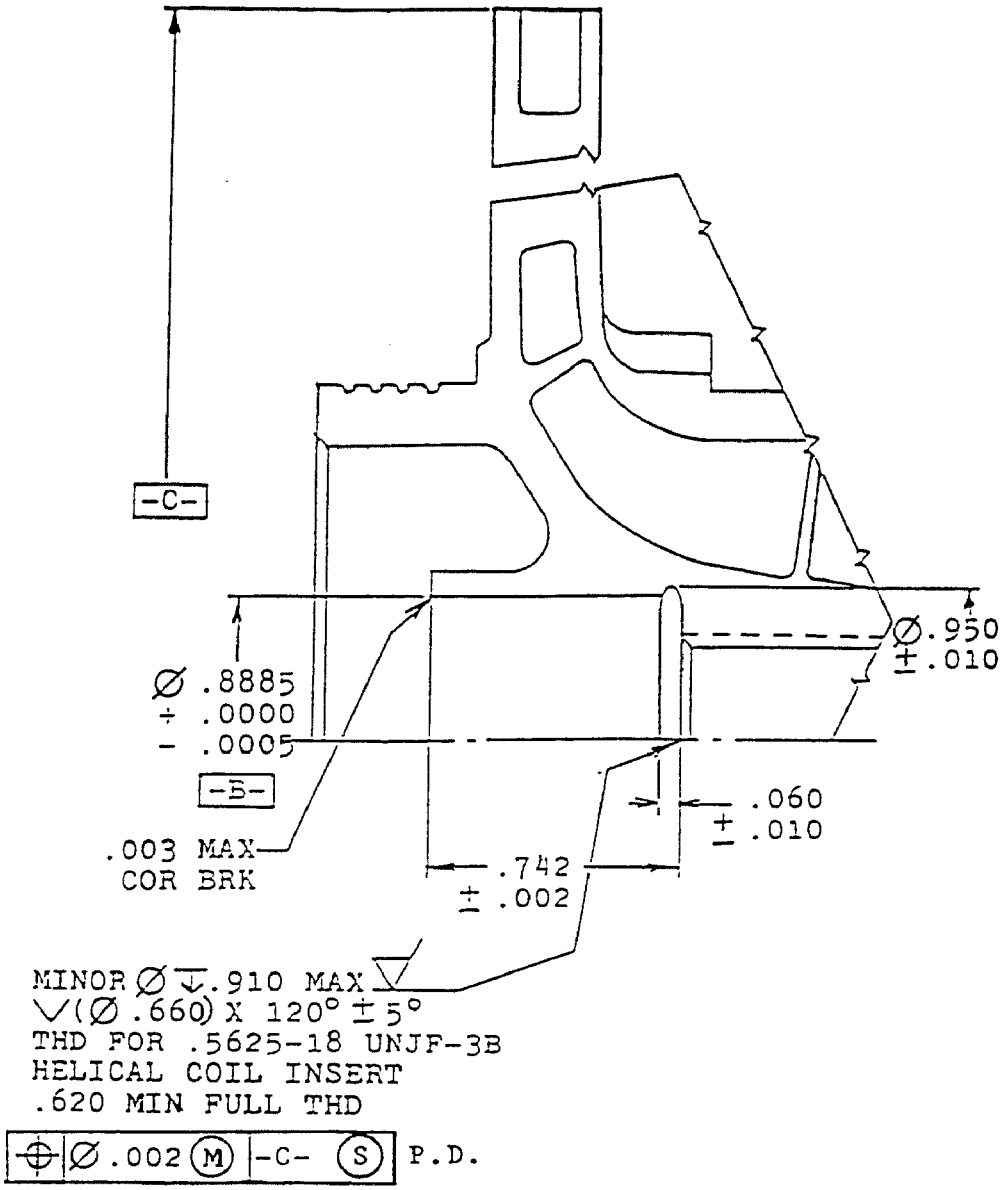
(d) Heat impeller/inducer and cool sleeve (P/N 762723) as required to obtain a temperature differential of at least 350 degrees Fahrenheit between the impeller and sleeve.

(e) Install sleeve to bottom on spacer. Allow impeller/inducer to cool to room temperature.

(f) Peen impeller/inducer on surface - D - of Figure 2 of Modification of Impeller/Inducer in four places to retain sleeve.

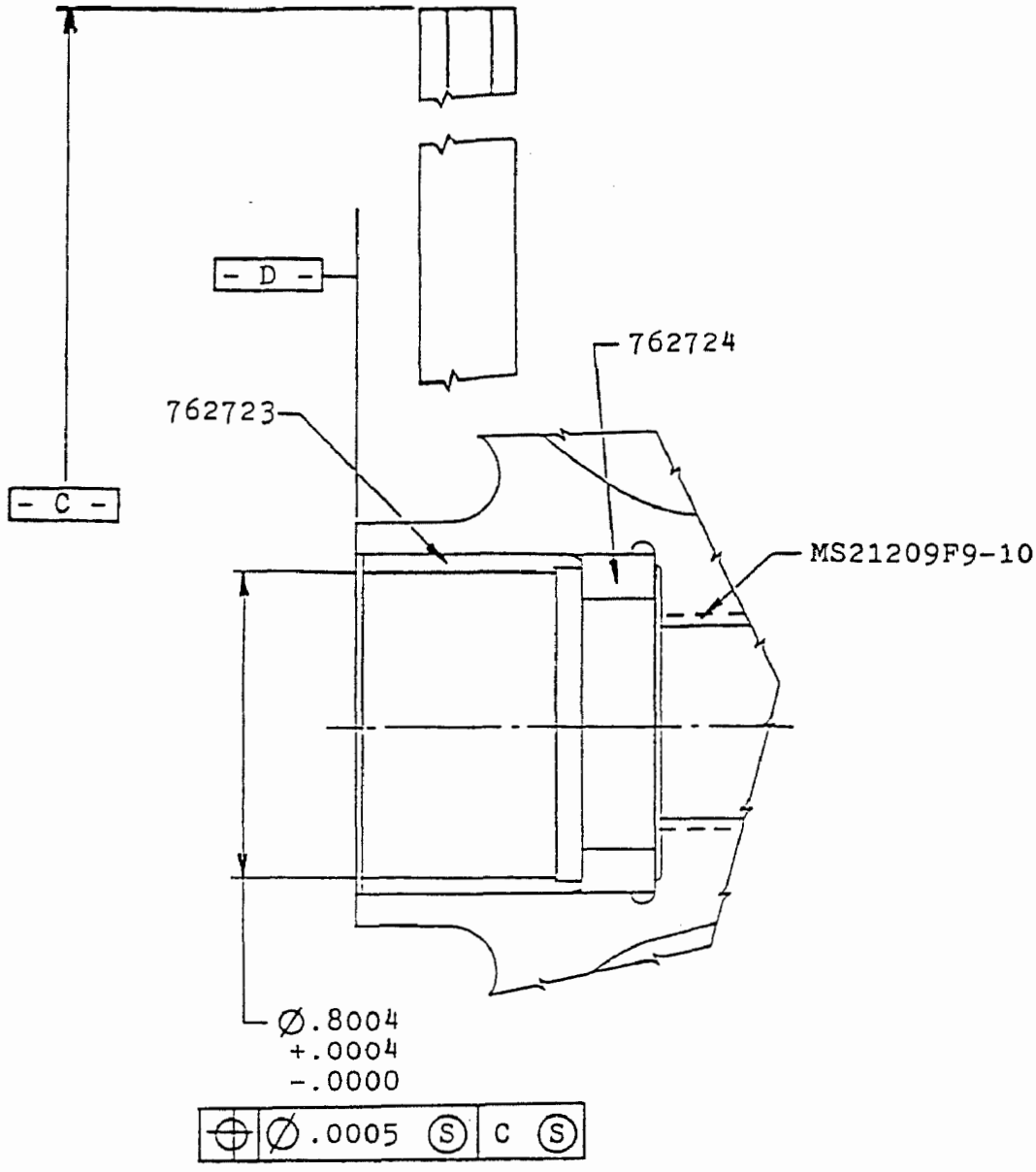
(g) Finish machine impeller/inducer according to Figure 2.

(h) Clean according to Sundstrand Standard Practices Manual, Bulletin 985, CLEANING or Cleaning instruction of the appropriate STS CMM (73-12-41 or 73-18-41 or 73-18-42).



Modification of Impeller/Inducer

Figure 1



Modification of Impeller/Inducer
Figure 2

C. ASSEMBLY

Assemble the pump (refer to CMM 73-12-41, 73-18-41 or 73-18-42) with a modified or replacement impeller/inducer assembly.

NOTE: Torque to 156 ~ 172 in-lbs above run on torque.

D. IDENTIFICATION

(1) After modification of the impeller/inducer, using a vibro peen or routing, mark out the part number (5008741 for A1 type pump or 5009951-1 for A5/D5 type pumps) on the impeller/inducer.

(2) Using a vibro peen or routing, mark the new part number on the impeller/inducer according to below:

Existing part number	Change to	Application for
5008741	762726	A1 type pump
5009951-1	762725	A5/D5 type pumps

(4) Apply a small amount of vaseline (commercially available), when the O-Rings are installed on the pump.

(5) After re-assembly of the pump, using a vibro peen or routing, mark out the letter following the 7-digit part number and IAE part number marked in the STS P/N and IAE P/N block of the identification plate (570, IPL Figure 1, 73-12-41; 590, IPL Figure 1, 73-18-41; 620, IPL Figure 1,

73-18-42).

(6) Using a vibro peen or routing, change the letter following the 7-digit part number and IAE part number according to below:

Existing part number		Change to	
STS Part No.	IAE Part No.	STS Part No.	IAE Part No.
5008735E	5L0067	5008735F	5L0070
5009913C	5L0068	5009913D	5L0071
5010216D	5L0069	5010216E	5L0072

E. TEST

Test the MFP assembly according to the applicable CMM.

3. MATERIAL INFORMATION

A. APPLICABILITY

To be applied for each STS P/N 5008735E (IAE P/N 5L0067) pump, STS P/N 5009913C (IAE P/N 5L0068) pump and STS P/N 5010216D (IAE P/N 5L0069) pump, that is installed on V2500-A1, V2500-A5 or V2500-D5 engine respectively and the spare pumps.

B. PARTS AFFECTED BY THIS SERVICE BULLETIN

New P/N	Qty Per Unit	Unit List Price	Keyword	Old P/N	Disposition/ Instruction	
5008735F (5L0070)	RF	N/A	LP/HP Fuel Pump	5008735E (5L0067)	Modify	For A1 pump
5009913D (5L0071)	RF	N/A	LP/HP Fuel Pump	5009913C (5L0068)	Modify	For A5 pump
5010216E (5L0072)	RF	N/A	LP/HP Fuel Pump	5010216D (5L0069)	Modify	For D5 pump
762726	1	*	Impeller/ Inducer Assembly	5008741	Modify	For A1 pump (A)(B)(S1) (1D)

New P/N	Qty Per Unit	Unit List Price	Keyword	Old P/N	Disposition/ Instruction	
762725	1	*	Impeller/ Inducer Assembly	5009951-1	Modify	For A5/D5 pumps (A)(B)(S1) (1D)
MS21209 F9-10	1	*	Helical Coil	N/A	Install	For all pumps (S1)
762724	1	*	Spacer	N/A	Install	For all pumps (S1)
762723	1	*	Sleeve	N/A	Install	For all pumps (S1)

NOTE: * Contact the Sundstrand's Business Operations Manager for the information concerning prices and lead time.

C. DISPOSITION/INSTRUCTION CODE STATEMENT

(A) New part will be available for sale.

(B) Old part will no longer be available for sale.

(S1) New parts coded (S1) must replace old parts coded (S1)

in a COMPLETE SET per Unit.

(1D) If the impeller/inducer is damaged to the extent that modification is not possible, replace an old impeller/inducer to new configuration.