MILITARY SPECIFICATION SHEET

STARTER, AIRCRAFT ENGINE, AIR TURBINE. MODEL A-28

The complete requirements for procuring the air turbine starter described herein shall consist of this document and the issue in effect of Specification MIL-S-19557C (AS).

APPLICABLE PARAGRAPH OF SPECIFICATION	
3.8.1	Envelope: Figure 1
3.7	Wt. Max (Lb): 23
6.3.1	Aircraft Model: F-14
4.5.16	Engine Model: TF30
3.8.2.1	Quick-Attach-Detach Mounting: In accordance with MS14117(AS) and MS14119(AS)
3.8.2.2	Engine Accessory Drive: AND 20002, Type XII[S]
3.8.3	Air Inlet and Exhaust Connections: Figure 1
3.5.5 3.9.1	Rotation Viewed from Anti-Drive End: Clockwise
3.3.2	Exposure Temperature Range (°F): -100 to +275
3.3.2	Ambient Temperature Operating Range (°F): -65 to +160
3.3.2.3 4.5.1.1 4.5.6	Control Valve: Opening Rate, Max: 22 psig per sec for the first .5 sec Closing Time, Max: 0.5 sec Navy Model: ATSCV-2
3.5.1	Rated Conditions: Output Drive Speed (RPM): 1$00 Output Drive Torque, Min (Lb-Ft): 255 Airflow, Max (Lb per rein): 120 Air Inlet Total Pressure (In. Hg A): 100 Air Inlet Total Temperature (°F): 500
3.5.1 3.5.7	Cutout Speed (RPM): 3450 ±250
3.5.7	Automatic Shutoff Control: Either turbine wheel speed or output drive speed may be sensed for control operation.

FSC-2995

APPLICABLE PARAGRAPH OF SPECIFICATION

3.5.8 Altitude: The starter shall be capable of meeting rated speed and output torque at 8000-ft altitude at rated inlet conditions. The starter shall not be damaged when subjected to 75,000-ft altutude in the overrunning mode of operation.

3.5.9 Attitude: The starter shall be capable of meeting the operational requirements of this specification when the starter centerline, taken through the output shaft, is in any position, within 10 degrees of the horizontal position, unless specified otherwise on this Specification Sheet.

4.5.4 Initial Calibration:

Drive Torque (Lb-Ft)	Drive Speed (RPM)	Drive Speed Condition
415 Min, 500 Max	0	stall
255 Min ------	1800	Rated
145 Min ------	3200 Min	cutout

Airflow, Max (Lb per Min)	Drive Speed (RPM)	Drive Speed Condition
120 .	0	stall

4.5.5 No-Load Operation:
Time (See): 60
Minimum Drive Speed (RPM): 4900

3.3.5 Endurance Test: Number of cycles: 1200. Each cycle shall consist of three consecutive phases as follows:

Test Stand Rotor Polar Moment of Inertia	Phase A- Acceleration		Phase B - At Following Conditions			Phase C - Acceleration	
	Drive Speed	Time	Drive Speed	Drive Torque	Time	Drive Speed	Time
Lb-Ft^2	RPM ±50	Max Sec	RPM ±50	Lb-Ft (Min)	Sec	Min RPM	Sec
300	2100	8	2100	230	10	3100	12
*300	2300	8	2300	---	10	3100	12

*Last 600 cycles only; run at 800°F air inlet temperature.

APPLICABLE
PARAGRAPH OF
SPECIFICATION

NOTE: The above values do not allow for flyheel windage losses, test stand drag, or inertia of the starter. In order to determine compliance with this specifi cation, the test equipment must be calibrated and specific test results corrected accordingly. If the acceleration specified for Phase C is not developed because of test stand drag torque, the test stand inertia load may be reduced or external power may be applied to assist acceleration to cutout speed. Time from end of Phase C to starter coutout shall. not exceed 15 seconds.

4.5.8 Rated Torque Calibration
Minimum Output Drive Speed (RPM): 1800
Airflow, Max (Lb per Min): 120

3.3.5
4.5.9 Overrunning: The starter output drive shall be driven for 1000 hours in a clockwise direction (viewed from the anti-output shaft end) in accordance with the following tabulation. The ambient -temperatures, starter output drive speeds, and attitudes shall vary in accordance with the following tabulation while the starter pad temperature is maintained at 350°F ±20°F. The attitude transitions are to be completed within 30 seconds.

Time Minutes	Attitude ±2° (See Note)	Ambient Temperature +10°F	Drive Speed RPM -0 +500
4	0°	130	7500
6	+45°	130	7500
4	0°	130	7500
1	+90°	130	7500
30	0°	370	7500
1	-90°	130	7500
4	0°	130	7500
6	-45°	130	7500
4	0°	130	7500

NOTE: Position of the starter anti-drive end with respect to the horizontal centerline.

After 300 hours of overrunning the starter shall be subjected to 300 endurance test cycles. Lubricant addition or change is permitted only after the 300 endurance test cycles.

APPLICABLE PARAGRAPH OF SPECIFICATION

4.5.10 Extreme Temperature Operation:

Inlet Air Conditions		
Total Press. In. Hg A ±0.5	Total Temp (°F)	Ambient Temp (°F)
100	400	-65
100	800	+160

4.5.11 Consecutive Cyclical Operation: Number of Cycles: 5

4.5.12 Sustained Motoring: Time (Minutes): 5 on
30 off
5 on
30 off
start

4.5.13 Vibration: MIL-STD-810, Method 514, Procedure I, Curve F (Parts 1, 2 and 3)

4.5.15.1 Slip Clutch Torque, Max (Lb-Ft): 1000

4.5.15.2 Shear Section Strength, (Lb-Ft): 950 ±50

4.5.18 Containment Tests: Applicable

4.5.18.1 HUB Containment Test: 1
Inlet Air Pressure (PSIA): 49
Inlet Air Temperature(°F): 345

4.5.18.2 Failure at No-Load:
Inlet Air Pressure (PSIA): 110
Inlet Air Temperature (°F): 680

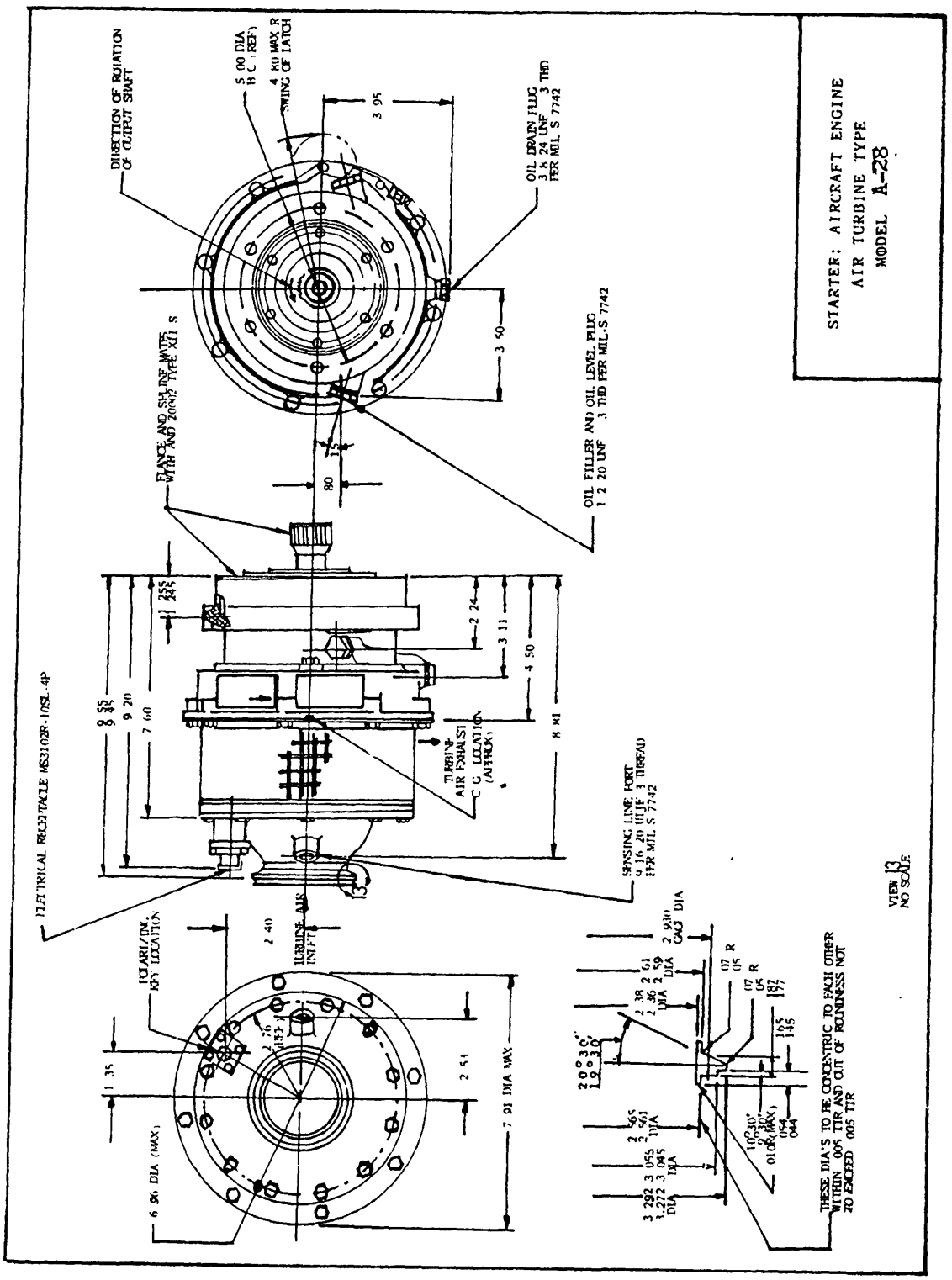

Figure 1

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION

MIL-S-19557/8(AS) STARTER, AIRCRAFT ENGINE, AIR TURBINE, MODEL A-28

ORGANIZATION

CITY AND STATE

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO *(If "yes", in what way?)*

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity - Optional)*

DATE

DD FORM 1 JAN 66 1426

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

S/N-0102-014-1801 C-25254

FOLD

DEPARTMENT OF THE NAVY
Naval Air Systems Command
Washington, D.C. 20360

POSTAGE AND FEES PAID

OFFICIAL BUSINESS

Naval Air Systems Command (AIR-52021)
Department of the Navy
Washington, D.C. 20360

FOLD