

MILITARY SPECIFICATION SHEETSTARTER, AIRCRAFT ENGINE, AIR TURBINE, MODEL A-24-1

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).

STARTER, AIRCRAFT ENGINE, AIR TURBINE MOL A-24-1APPLICABLE
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SPECIFICATION

3.8.1	<u>Envelope:</u> Figure 1
3.7	<u>Wt, Max (Lb):</u> 30
6.3.1	<u>Aircraft Model:</u> P-3
4.5.16	<u>Engine Model:</u> T56
3.8.2.1	<u>Quick-Attach-Detach Mounting:</u> Yes
3.8.2.2	<u>Engine Accessory Drive:</u> AND20002, Type XIIS
3.8.3	<u>Air Inlet and Exhaust Connections:</u> Figure 1
3.5.5	<u>Rotation Viewed from Anti-Drive End:</u> Clockwise
3.9.1	
3.3.2	<u>Exposure Temperature Range (°F):</u> -100 to +275
3.3.2	<u>Ambient Temperature Operating Range (°F):</u> -65 to +160
3.3.2.3	<u>Control Valve:</u>
4.5.1.1	Opening Rate, Max: 22 psig per sec for the first
4.5.6	.1 sec
	Closing Time Max: 0.5 sec
	Navy Model: ATSCV-1
3.5.1	<u>Rated Conditions:</u>
	Output Drive Speed (RPM): 6100
	Output Drive Torque, Min (Lb-Ft): 57
	Airflow, Max (Lb per Min): 110
	Air Inlet Total Pressure (In. Hg A): 100
	Air Inlet Total Temperature (°F): 350
3.5.1	Cutout Speed (RPM): 8500 ±250
3.5.7	
3.5.7	<u>Automatic Shutoff Control:</u> Either turbine wheel speed or output drive speed may be sensed for control operation.

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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 altitude 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, unless specified otherwise on this Specification Sheet.

4.5.4 Initial Calibration:

<u>Drive Torque (Lb-Ft)</u>	<u>Drive Speed (RPM)</u>	<u>Drive Speed Condition</u>
120 Min, 185 Max	0	*Stall
57 Min ----	6100	Rated
28 Min ----	8250 Min	Cutout

*If stall torque is below 158 lb-ft, starter must produce a minimum of 45 lb-ft at 8150 rpm.

<u>Airflow, Max (Lb per Min)</u>	<u>Drive Speed (RPM)</u>	<u>Drive Speed Condition</u>
110	0	Stall

4.5.5 No-Load Operation:
Time (Sec): 60
Minimum Drive Speed (RPM): 9500

3.3.5 Endurance Test: Number of cycles: 1200; no lubricant addition or change permitted. Each cycle shall consist of three consecutive phases as follows:

Test Stand Rotor Polar Moment of Inertia	Phase A - <u>Acceleration</u>		Phase B - <u>At Following Conditions</u>			Phase C - <u>Acceleration</u>	
	<u>Drive Speed</u>	<u>Time</u>	<u>Drive Speed</u>	<u>Drive Torque</u>	<u>Time</u>	<u>Drive Speed</u>	<u>Time</u>
Lb-Ft ²	RPM	Max Sec	RPM	Lb-Ft (Min)	Sec	Min RPM	Sec
72	2475	8	2475	115	10	6500	12
*72	2850	8	2850	---	10	6500	12

*Last 600 cycles only; run at 650°F air inlet temperature.

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NOTE: The above values do not allow for flywheel windage losses, test stand drag, or inertia of the starter. In order to determine compliance with this specification, 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 cutout shall not exceed 15 seconds.

4.5.8

Rated Torque Calibration:

Minimum Output Drive Speed (RPM): 6100
Airflow, Max (Lb per Min): 110

3.3.5

4.5.9

Overrunning: The starter output drive shall be driven for 10 cycles in a clockwise direction (viewed from the anti-output shaft end) in accordance with the following 100-hour cycle:

Position of Starter Anti-Drive
End Wrt. Respect to Starter
Horizontal Centerline $\pm 2^\circ$

Duration of
Running Hours

Output Shaft
Speed RPM ± 250

-15°	6	14,230
- 5°	42	14,230
0° (horizontal)	50	14,230
+10°	2	10,510

4.5.10

Extreme Temperature Operation:Inlet Air Conditions

<u>Total Press.</u> <u>In. of A ± 0.5</u>	<u>Total</u> <u>Temp ($^\circ$F)</u>	<u>Ambient</u> <u>Temp ($^\circ$F)</u>
140	260	-65
70	425	+160

4.5.11

Consecutive Cyclical Operation: Number of cycles: 5

4.5.12

Sustained Motoring: Time (Minutes): 2

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): 400

4.5.15.2

Shear Section Strength, Max (Lb-Ft): 400

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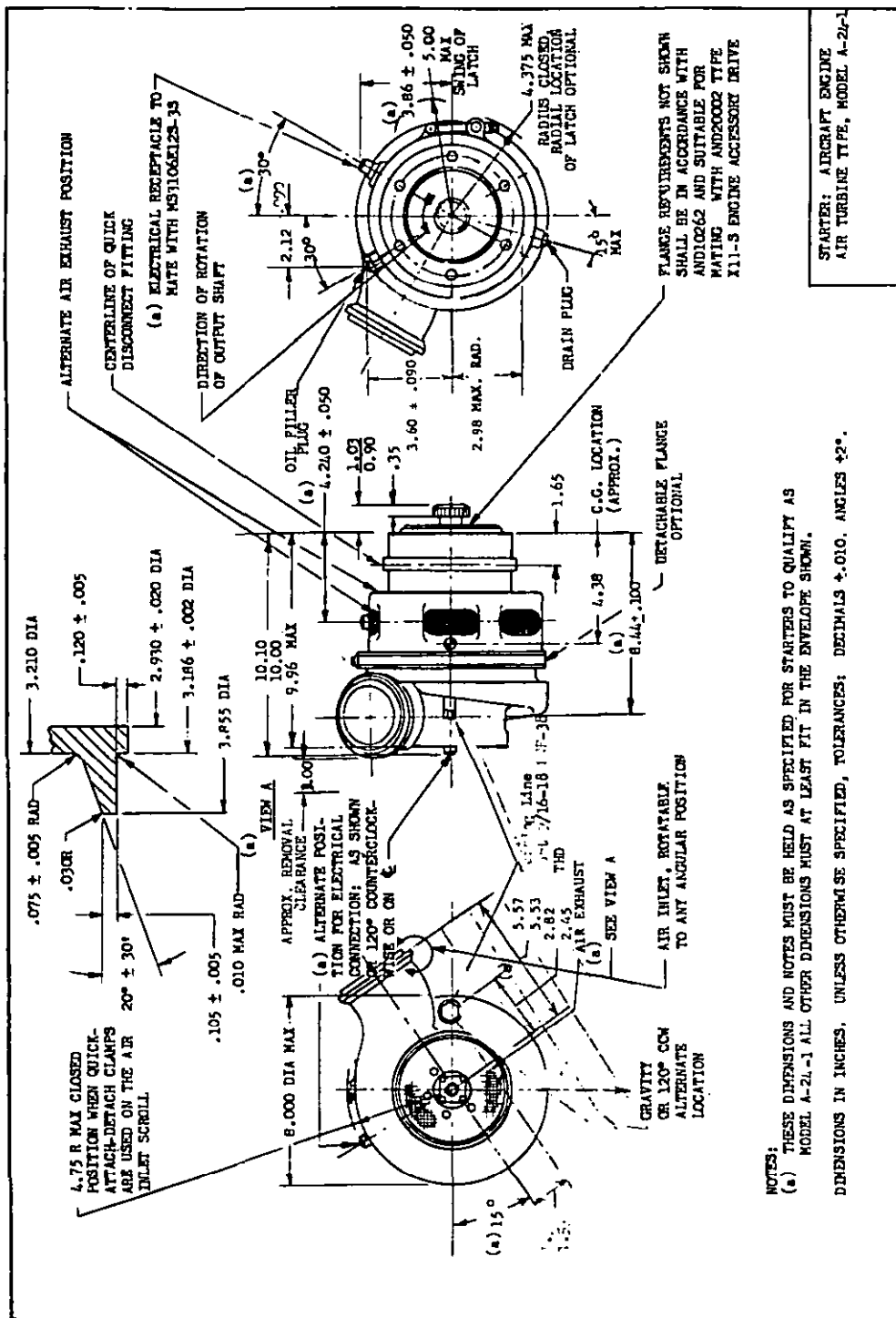
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4.5.18 Containment Tests: Applicable

4.5.18.1 HUB Containment Test:
 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

Project No. 2995-N028-7



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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
<p>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.</p>		
<p>SPECIFICATION MIL-S-19557/7(AS) STARTER: AIRCRAFT ENGINE, AIR TURBINE</p>		
<p>ORGANIZATION</p>		
<p>CITY AND STATE</p>		<p>CONTRACT NUMBER</p>
<p>MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT</p>		
<p>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.</p>		
<p>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</p>		
<p>2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID</p>		
<p>3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)</p>		
<p>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)</p>		
<p>SUBMITTED BY (Printed or typed name and activity - Optional)</p>		<p>DATE</p>

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REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

S/N-Q 102-014-1801

C-25254