

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

A16NM
Revision 6
Gulfstream Aerospace LP
1125 Westwind Astra
Astra SPX
Gulfstream 100
August 9, 2002

TYPE CERTIFICATE DATA SHEET No. A16NM

This data sheet which is a part of Type Certificate No. A16NM prescribes conditions and limitations under which the aircraft for which the Type Certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder. Gulfstream Aerospace LP
C/o Israel Aircraft Industries, LTD., Department 4199
Ben Gurion International Airport
70100, Israel

Type Certificate Holder Record. Israel Aircraft Industries, LTD. transferred ownership of Type Certificate A16NM to Gulfstream Aerospace LP on March 26, 2002

I. Model 1125 Westwind Astra (Transport Category), Approved August 29, 1985.

Engines. Two Honeywell (formerly AlliedSignal and Garrett) TFE 731-3A-200G or TFE 731-3C-200G per FAA Type Certificate Data Sheet E6WE

Fuel. Conforming to Honeywell Specifications EMS 53111 (Jet A type), EMS 53112 (Jet A-1 & JP-8 types), EMS 53113 (Jet B & JP-4 types), and EMS 53116 (JP-5 type) as per LIMITATIONS SECTION of approved Airplane Flight Manual.

Oil. Conforming to Honeywell Specification EMS 53110 type 2.

Engine Limits.

Static thrust at sea level, LBS

- Maximum continuous		3,700
- Take-off (5 minutes)		3,700

Maximum continuous permissible engine operating speeds for the engine rotors, % RPM (RPM)

- Low Pressure Rotor (N1)		101.5 (21000)
- High Pressure Rotor (N2)		100.0 (29692)

Maximum Interstage Turbine Temperature (ITT), °C		<u>-3A</u>	<u>-3C</u>
- Maximum Continuous		885	910
- Take-Off (5 minutes)		907	910
- During Starting		907	910

Maximum Oil Inlet Temperature, °C		<u>Up to 30,000 ft</u>	<u>Above 30,000 ft.</u>
- Fan Gearbox		127	140
- Fan Gearbox Transient (2 minutes)		149	149
- Accessory Gearbox		149	157

Oil Pressure, PSIG			
- Normal Operating		38 to 46	
- At Idle, Minimum		25	
- Maximum		55	

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Maximum bleed and power extraction:

- See Honeywell Installation Manual IM-8001

Airspeed Limits:

	<u>1125 BASIC</u>	<u>*1125 IW</u>
- V_{mo} (Max Operating) S.L. to 25000 ft.	360 KCAS	
- M_{mo} Above 25000 ft.	0.85 M	
- M_{mo} with Autopilot disengaged above 22500 ft.	0.81 M	
- V_{mo} (Max Operating) S.L. to 26360 ft.		350 KCAS
- M_{mo} Above 26360 ft.		0.85 M
- M_{mo} with Autopilot disengaged above 24130 ft.		0.81 M
- V_a (Maneuvering)		
- At 23500 LBS:		
- SL to 10000 ft	233 KCAS	
- At 37000 ft	280 KCAS	
- V_a varies linearly from 233 KCAS at 10000 ft to 280 KCAS at 37000 ft.		
- At 24650 LBS:		
- SL to 10000 ft		233 KCAS
- At 37000 ft		280 KCAS
- V_a varies linearly from 233 KCAS at 10000 ft. to 280 KCAS at 37000 ft.		
- At 18000 LBS:		
- SL to 20000 ft	204 KCAS	204 KCAS
- At 41000 ft	250 KCAS	250 KCAS
- V_a varies linearly from 204 KCAS at 20000 ft to 250 KCAS at 41000 ft.		
- Above 41000 ft	0.85M	0.85 M
- V_{fe} (Flaps 12° and slats 25°)	250 KCAS	250 KCAS
- V_{fe} (Flaps 20° and slats 25°)	225 KCAS	225 KCAS
- V_{fe} (Flaps Landing 40° and slats 25°)	180 KCAS	180 KCAS
- V_{sb} (Airbrakes Operation) No speed Limitation		
- V_{le} and V_{lo} (L/G Extension and Operating Speed)	180 KCAS	180 KCAS
- V_{mca} (Flaps 12° and 20°)	92 KCAS	92 KCAS
- V_{mcg} (Flaps 12° and 20°)	89 KCAS	89 KCAS
- Tire Limit Ground Speed: KTS (MPH)	182 (210)	182 (210)

* SEE NOTE 4

II. Model Astra SPX (Transport Category) Approved January 8, 1996

The Model Astra SPX is a derivative of the Model 1125 Westwind Astra. The changes include: installation of Honeywell (formerly AlliedSignal) TFE 731-40R-200G engines; installation of winglets and minor structural modifications to the wing; installation of Collins pro-line 4 avionics; and a new Airplane Flight Manual to take credit for the aerodynamic and performance improvements.

III. Model Gulfstream 100 (Transport Category) Approved August 9, 2002

The Model Gulfstream 100 type design is identical to the Model Astra SPX type design except for the model designation. The only difference is the model designation (name) used on the data plate and associated manuals. The type design of the Model Gulfstream 100 includes all of the mandatory type design changes applied to the Astra SPX as of the date of approval.

Data Pertinent to Models Astra SPX and Gulfstream 100

Engines.

Two Honeywell Engines (formerly AlliedSignal) TFE 731-40R-200G per FAA Type Certificate Data Sheet E1NM

Fuel.

Conforming to Honeywell Specifications EMS 53111 (Jet A type), EMS 53112 (Jet A-1 & JP-8 types), EMS 53113 (Jet B & JP-4 types), and EMS 53116 (JP-5 type) as per LIMITATIONS SECTION of approved AFM.

Oil.

Conforming to Honeywell Specification EMS 53110 type 2.

Engine Limits.

Static thrust at sea level, LBS

- Maximum continuous 4,250
- Take-off (5 minutes) 4,250

Maximum continuous permissible engine operating speeds for the engine rotors, % RPM (RPM)

- Low Pressure Rotor (N1) 100.0 (21000)
- High Pressure Rotor (N2) 101.0 (31485)

Maximum Interstage Turbine Temperature (ITT), °C

- Maximum Continuous 991
- Take-Off (5 minutes) 991
- Take-Off (5 minutes) with APR On 1013
- During Starting 991

Maximum Oil Inlet Temperature, °C

- | | <u>Up to 30,000 ft</u> | <u>Above 30,000 ft.</u> |
|-------------------------------------|------------------------|-------------------------|
| - Fan Gearbox | 127 | 140 |
| - Fan Gearbox Transient (2 minutes) | 149 | 149 |
| - Accessory Gearbox | 149 | 157 |

Oil Pressure, PSIG

- Normal Operating 65 to 80
- At Idle, Minimum 50
- Maximum 100

Maximum bleed and power extraction:

- See Honeywell Installation Manual IM-8010

Airspeed Limits:

- V_{mo} (Max Operating) S.L. to 27600 ft. 350 KCAS
- M_{mo} Above 27600 ft. 0.87 M
- M_{mo} with Autopilot disengaged and Mach Trim inoperative above 23900 ft. 0.81 M
- V_a (Maneuvering)
 - At 24650 LBS:
 - S.L. to 10000 ft 233 KCAS
 - At 37000 ft 280 KCAS
 - V_a varies linearly from 233 KCAS at 10000 ft to 280 KCAS at 37000 ft.
 - At 18000 LBS:
 - S.L. to 20000 ft 204 KCAS
 - At 41000 ft 250 KCAS
 - V_a varies linearly from 204 KCAS at 20000 ft to 250 KCAS at 41000 ft.
 - Above 41000 ft 0.87M
- V_{fe} (Flaps 12° and slats 25°) 250 KCAS
- V_{fe} (Flaps 20° and slats 25°) 225 KCAS
- V_{fe} (Flaps Landing 40° and slats 25°) 180 KCAS
- V_{sb} (Airbrakes Operation) No speed Limitation
- V_{le} and V_{lo} (L/G Extension and Operating Speed) 180 KCAS
- V_{mca} (Flaps 12° and 20°) 100 KCAS
- V_{mcg} (Flaps 12° and 20°) 100 KCAS
- Tire Limit Ground Speed: KTS (MPH) 182 (210)

DATA PERTINENT TO ALL MODELS**C.G. Range.**

Approved center of gravity range is as shown in the following tables:
(Gear extension and retraction moment is negligible).

<u>1125 BASIC</u>	<u>*1125 IW, Astra SPX & Gulfstream 100</u>
12,100 LBS – 39.00 % MAC	12,100 LBS – 39.00 % MAC
12,100 LBS – 36.40 % MAC	12,100 LBS – 36.40 % MAC
12,900 LBS – 19.60 % MAC	12,900 LBS – 19.60 % MAC
16,500 LBS – 19.60 % MAC	16,500 LBS – 19.60 % MAC
21,250 LBS – 25.00 % MAC	21,250 LBS – 25.00 % MAC
23,650 LBS – 30.39 % MAC	24,800 LBS – 32.97 % MAC
23,650 LBS – 39.00 % MAC	24,800 LBS – 39.00 % MAC

LINEAR VARIATION BETWEEN POINTS

* SEE NOTE 4

Datum.

Fuselage Station 0, is located 92.78 inches forward of airstairs opening aft frame.

Mean Aerodynamic Chord (MAC).

86.26 inches with leading edge at Fuselage Station 233.94.

Leveling Means.

Longitudinally: Place level on either seat rail at fuselage station 200 parallel to A/C centerline.

Laterally: Place level on seat rails at fuselage station 200 at 90° to A/C centerline.

Maximum Weight:

	<u>1125 BASIC</u>	<u>1125 IW, Astra SPX, & Gulfstream 100</u>
- Ramp Gross Weight	23650 lbs	24800 lbs
- Max Takeoff Weight	23500 lbs	24650 lbs
- Max Landing Weight	20700 lbs	20700 lbs
- Max Zero Fuel Weight	16000 lbs	17000 lbs

Minimum Crew.

Two (Pilot and Copilot)

Maximum Passengers.

Nine

Maximum Baggage.

Central Tank Extension (CTE) STATUS:	<u>LBS</u>	<u>ARM(INCHES)</u>
- CTE installed (full or empty)	370	358
- CTE not installed	1100	350

Fuel Capacity.

Fuel Tanks	<u>LH WING</u>	<u>CENTER</u>	<u>CENTER</u>	<u>RH WING</u>
		(w/o CTE)	(w/ CTE)	
Total/Usable Fuel (LBS)	1936/1920	4857/4852	5530/5525	1936/1920
Arm (INCHES)	256.1	278.5	285.3	256.1
Unusable Fuel (LBS)	16	5	5	16
Arm (INCHES)	236.5	228.5	228.5	236.5

Density: 6.7 LBS/U.S. Gallon

See Note 1 for data on Fuel System

Oil Capacity.

	<u>*TOTAL (LBS)</u>	<u>*USABLE(LBS)</u>	<u>ARM(INCHES)</u>
-3A & -3C Engines	36	8	394
-40R Engines	32	8	394

*For Both Engines Combined

Density: 8.2 LBS/U.S. Gallon

See Note 1 for Data on Oil System)

Maximum Operating Altitude. 45,000 ft.

Other Operating Limitations. Aircraft shall be operated according to operating limitations specified in approved airplane flight manual. (See notes 4 and 6.)

Control Surface Movements.

<u>Surface</u>	<u>Travel (at trailing edge)</u>		<u>Tolerance</u>
Aileron	Up	15°	+0°-30'
	Down	15°	+0°-45'
Aileron Trim	Up	5°	± 1°
	Down	5°	
Rudder	Left	22°	± 30'
	Right	22°	
Rudder Trim Tab	Left	11°30'	+ 2°-1°
	Right	11°30'	
Elevator	Up	22°	± 30'
	Down	12°	
Elevator Gear Tab	Up	4°30'	± 30'
	Down	9°30'	± 15'
Stabilizer Trim (Leading Edge)	Up	1°	± 15'
	Down	12°	± 30'
Airbrakes	Up	20°	± 1°
	Down	25°	+ 1°-2°
Flaps	Max Down	40°	+1°-1°30'

Manufacturer's Serial Numbers Eligible. Models 1125 Westwind Astra and 1125 IW - S/N 002, 004 thru 72, and 074 thru 078
Model Astra SPX - S/N 073, 079 thru 145.
Model Gulfstream 100 - S/N 146 and subsequent

Import Requirements. A U.S. Airworthiness Certificate may be issued on the basis of an Israeli Certificate of Airworthiness for Export signed by a representative of the Civil Aviation Administration of Israel (CAAI) containing the following statement: "The airplane covered by this certificate has been examined, tested and found to conform to the type design approved under FAA Type Certificate No. A16NM, and to be in condition for safe operation".

Certification Basis. Models 1125 Westwind Astra and 1125 IW

- 14 CFR Part 21.29
- 14 CFR Part 25, effective February 1, 1965, including Amendments 25-1 through 25-54.
- SFAR 27, effective February 1, 1974, including Amendments 27-1 through 27-5.
- 14 CFR Part 36, effective December 1, 1969, including Amendments 36-1 through 36-12.
- Special conditions for operation up to 45000 feet, per FAA S.C. No. 25-ANM-5.
- Special conditions for Automatic Takeoff Thrust Control System (ATTCS) installation, per FAA S.C. No. 25-ANM-5.
- Exemption No. 3692 from FAR 25.1305 (d) (3) Rotor Unbalance Indication.
- Compliance with ditching structural provisions of FAR 25.801(b) through (e) and 25.807(d) has been established.
- Equivalent safety: FAR 25.729 (e)(2) Landing Configuration Aural Warning.
- Equivalent safety: FAR 25.813(a) and 25.813(e) Emergency Exit Access, Lavatory Door (mod 6016).
- Equivalent safety: FAR 25.1305 Powerplant Instruments for APU Installation (mod 6043)

Models Astra SPX and Gulfstream 100

- 14 CFR Part 21.29
- 14 CFR Part 25, effective February 1, 1965, including Amendments 25-1 through 25-54, plus Subpart B, Flight, Sections 25.21 through 25.255, and Subpart E, Powerplant, Sections 25.901 through 25.945, and 25.1011 through 25.1207, including Amendments 25-1 through 25-80, which have been applied to the changes or the areas affected by the change per the FAA derivative aircraft policy. In addition, the following specific regulations including Amendments 25-1 through 25-80 have been applied to the changes or the areas affected by the change per the FAA derivative aircraft policy:

<u>Section</u>	<u>Title</u>
25.305	Strength and deformation
25.307	Proof of structure
25.571	Damage tolerance & fatigue evaluation of structure
25.625	Fitting factors
25.629	Aeroelastic stability requirements
25.961	Fuel system hot weather operation
25.994	Fuel system components
25.997	Fuel strainer or filter
25.1001	Fuel jettisoning system
25.1305	Powerplant Instruments
25.1307	Miscellaneous equipment
25.1316	System lightning protection
25.1521	Powerplant limitations
25.1551	Oil quantity indication

Further, Section 25.729 Amendment 25-75 has been applied in lieu of the equivalent safety finding made for this section on the IAI Model 1125 Westwind Astra.

- 14 CFR Part 34, effective September 10, 1990.
- 14 CFR Part 36, effective December 1, 1969, including Amendments 36-1 through 36-20.
- Special Condition No. 25-ANM-104 for High Intensity Radiated Fields (HIRF).
- Special Condition No. 25-ANM-5 for operation to 45,000 feet and for ATTCS. Note: Compliance with Section 25.904, as promulgated by Amendment 25-62, was required for the ATTCS system in lieu of the Special Condition 25-ANM-5.
- An equivalent safety finding exists with respect to Section 25.1203(a) Fire detection system within the turbine tailpipe zone. In addition, the following equivalent safety findings, previously made for the IAI Model 1125 Westwind Astra under the provisions of Section 21.21(b)(1), are also applicable to the IAI Model Astra SPX:

Section 25.813(a) and (e)	Emergency exit access, lavatory door
Section 25.1305	Powerplant instruments for APU installation

- Compliance with the following optional requirements has been established:

Section 25.801	Ditching
Section 25.1419	Ice Protection

Production Basis.

None

Equipment.

The basic required equipment as prescribed in the applicable airworthiness regulation (see certification basis) must be installed in the aircraft for certification.

Models 1125 Westwind Astra and 1125 IW - Master Equipment List Report No. 25W100/841717.

Model Astra SPX and Gulfstream 100 - Master Equipment List Report No. 25W000/950560

Service Information.

Service bulletins, structural repair manuals, vendor manuals, aircraft flight manuals, and overhaul and maintenance manuals, which contain a statement that the document is Civil Aviation Administration of Israel (CAAI) approved, are accepted by the FAA and are considered FAA approved. These approvals pertain to the type design only.

NOTES:

- NOTE 1. (a) Current weight and balance report including list of equipment included in certificated empty weight and loading instructions must be provided for each aircraft at the time of original certification.
- (b) The airplane must be loaded so that the C.G. is within the specified limits at all times.
- (c) The weight of fuel and oil systems fluid as defined below must be included in the empty weight of the airplane.

<u>FUEL SYSTEM</u>		<u>LBS (Gallons)</u>	<u>ARM</u>
- Unusable (drainable from tanks, drain and lines)		37 (5.5)	235.4
- Undrainable (trapped in tanks and lines)		24 (3.6)	235.4
<u>OIL SYSTEM</u>		<u>Total (LBS)</u>	<u>ARM</u>
	<u>-3A & -3C engines</u>	<u>Total (LBS)</u>	
- Unusable Drainable (systems)	20	16	394
- Undrainable (systems)	8	8	394

- NOTE 2. All required placards listed in the Limitations Section of the Airplane Flight Manual must be installed in their proper locations.
- NOTE 3. Information essential to the proper servicing and maintenance of the aircraft is contained in the Maintenance Manual Section of the Instructions for Continued Airworthiness Manual marked 25W-1001-11-1 or G100-1001-11-1 for Model 1125 Westwind Astra, 1125 IW, and Astra SPX airplanes, and marked G100-1001-11-1 for Model Gulfstream 100 airplanes. Mandatory replacement times, structural inspection intervals and related structural inspection procedures, and Certification Maintenance Requirements are presented in the approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness Manual marked 25-1001-11-2 for Model 1125 Westwind Astra and 1125 IW, marked 25X-1001-11-2 or G100-1001-1-2 for Model Astra SPX, and marked G100-1001-1-2 for Gulfstream 100 airplanes.
- NOTE 4. Airplane Model 1125 Westwind Astra incorporating MOD 5812 are eligible for maximum take off weight of 24650 LBS and must be operated per Approved Airplane Flight Manual marked 25W-1001-1-IW (Increased Weight).
- NOTE 5. Airplane Model 1125 Westwind Astra must be operated per Approved Airplane Flight Manual marked 25W-1001-1. Airplane Model 1125 Westwind Astra with Honeywell TFE 731-3C engines installed (MOD 6333), must be operated per Approved Airplane Flight Manual marked 25W-1001-1 Revision 18 or subsequent. Airplane Model Astra SPX (MOD 6340) must be operated per Approved Airplane Flight Manual marked SPX-1001-1 or G100-1001-1. Airplane Model Gulfstream 100 (MOD 6680) must be operated per Approved Airplane Flight Manual marked G100-1001-1.
- NOTE 6. Airplane Model Astra SPX incorporating MOD 6541 or MOD 6546 may be operated without external paint, subject to the limitations and inspections defined in the Airworthiness Limitations Section Temporary Revision ALS-1 dated October 1998 or later approved revision.
- NOTE 7. Carriage of passengers in aircraft incorporating MOD 6546 or MOD 6582 is prohibited unless an approved interior and seating arrangement is installed. The Aircraft is eligible for carriage of up to 9 passengers provided approved seating arrangement and related required passenger provisions are incorporated in accordance with the Basis of Certification.
- NOTE 8. Israel Aircraft Industries LTD. (IAI), located at Ben Gurion International Airport 70100, Israel, is licensed by Gulfstream Aerospace LP to manufacture and obtain Airworthiness Certificates for the Model aircraft listed in this Type Certificate Data Sheet for serial number 146 and subsequent.
- NOTE 9. MOD 6680 introduces the "Gulfstream 100" Model designation and makes the requisite changes to identification plates and manuals. The "Gulfstream 100" is only a name change from former "Astra SPX".

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