

U.S. DEPARTMENT OF TRANSPORTATION  FEDERAL AVIATION ADMINISTRATION  TYPE CERTIFICATE DATA SHEET E-244	TCDS NUMBER E-244  REVISION: 21* DATE: March 23, 2007  WYTWORNIA SPRZETU KOMUNIKACYJNEGO "PZL-RZESZOW" - SPOLKA AKCYJN  MODELS  FRANKLI 6V4-178-B3 (0-335-1 6V4-178-B31 6V4-178-B32 (0-335-3) 6V4-178-B33 (0-335-4) 6V4-200-C32 (0-335-2)(0-335-5) 6V4-200-C33 (0-335-6) 6A-335-A, -B, -B1A, -D 6V-335-A, -B
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number 244) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER Wytwornia Sprzetu Komunikacyjnego (WSK) "PZL-RZESZOW" - Spolka Akcyjna (SA)

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 35-078 Rzeszow  
 Poland

I. MODELS	6V4-178-B31	6V4-178-B3,-B32,-B33	6V4-200-C32,-C33
TYPE	60A Vertically-Mounted Direct Drive		
RATINGS			
Maximum Continuous hp, r.p.m., at: Sea level pressure altitude	178-3000-S.L.	--	200-3100-S.L.
Takeoff hp, r.p.m., full throttle	178-3000	--	200-3100
FUEL			
Minimum grade aviation gasoline	80/87	--	91/96
OIL GRADE			
above 40øF ambient air temp.	SAE 50	--	--
below 40øF ambient air temp.	SAE 40	--	--

<b>I. MODELS (Continued)</b>	<b>6V4-178-B31</b>	<b>6V4-178-B3,-B32,-B33</b>	<b>6V4-200-C32,-C33</b>
COMPRESSION			
Bore and stroke, in.	4.5 X 3.5	--	--
Displacement, cu. in.	335	--	--
Compression ratio	7:1	--	8.5:1
WEIGHT (DRY) (lb)	274	293	298
CENTER OF GRAVITY (in) (with all accessories)			
Forward from rear face of crankcase	---	---	---
Above rear face of crankcase	---	---	4.6
Below top face of crankcase	15.0	--	---
Above C.L. of crankshaft	---	---	---
From crankshaft C.L. toward carb. side	1.2	--	1.9
DRIVE SHAFT END	Integral flange, with 8- 5/16 in. threaded holes on 3-5/16 in. circle	--	--
PROPELLER SHAFT	---	---	---
CARBURETION	Marvel Schebler MA4-5 or Bendix Stromberg PS5 Marvel Schebler MA4-5 or MA4-5A Marvel Schebler MA4-5, MA4-5AA or Bendix Stromberg PS-5B		
IGNITION (dual)	Eisemann LA-6 magneto	Scintilla S6RN-21	Scintilla S6RN-21, -23
TIMING, øBTC	32	--	36
SPARK PLUGS	Champion AJ-66, REJ-38, J43; Auto-Lite A4, A4S	--	Champion AJ-10 (See NOTE 6) REL37B; AC A47LY, LA47, SE47P; Jet Ignition 14-17-450S; Auto-Lite PE26-X3
OIL SUMP CAPACITY, QT.	8	9.6	10
USEABLE OIL, QT. (See NOTE 3) (starting with full tank)			
15ø nose down	a.4	a.5.6	a.6
20ø nose up	a.6	b.7.6	b.8
NOTES	1-6, 8, 12, 13	1-8, 12, 13	1-13

II. MODELS	6V-335-A, -B(1) 6V-335-A (2)	6A-335-D	6A-335-B,-B1,-B1A
TYPE	For models 6V-335-A, -B(1) : 60A Vertically-Mounted Direct Drive For models 6A-335-A(2), 6A-335-D, 6A-335-B, -B1, -B1A: 60A Horizontally-Mounted Direct Drive		
RATINGS			
Maximum Continuous hp, r.p.m., at: Sea level pressure altitude	210-3100-S.L.	200-3100-S.L.	180-2800-S.L.
Takeoff hp, r.p.m., full throttle	210-3100	200-3100	180-2800
FUEL			
Minimum grade aviation gasoline	91/96	100/130	80/87
OIL GRADE			
above 40øF ambient air temp.	SAE 50	--	--
below 40øF ambient air temp.	SAE 40	--	--
COMPRESSION			
Bore and stroke, in.	4.5 x 3.5	--	--
Displacement, cu. in.	335	--	--
Compression ratio	8.5:1	--	7:1
WEIGHT (DRY) (lb)	303(1) 305(2)	292	328 (B, B1) 324 (B1A)
CENTER OF GRAVITY (in) (with all accessories)			
Forward from rear face of crankcase	8.1 (2)	9.1	7.2
Above rear face of crankcase	4.6 (1)	---	---
Below top face of crankcase	---	---	---
Above C.L. of crankshaft	0.7 (2)	--	0.3
From crankshaft C.L. toward carb. side	1.9 (1)	---	---
DRIVE SHAFT END	Integral flange, with 8- 5/16 in. threaded holes on 3-5/16 in. circle	---	---
PROPELLER SHAFT	---	Integral flange 6-1/2 in. holes on 4 in. circle	--
CARBURETION	Marvel Schebler MA4-5 or MA4-5A --	Marvel Schebler MA-5	
IGNITION (dual)	Scintilla S6RN-21, -23	--	--
TIMING, øBTC	36 (1) 32 (2)	32	28
SPARK PLUGS	Champion REL37B; AC A47LY, LA47, SD47 Champion REG-32W, -36W, RHB-33E, -32N, -36W, -36P		

<b>II. MODELS (Continued)</b>	<b>6V-335-A, -B(1) 6A-335-A (2)</b>	<b>6A-335-D</b>	<b>6A-335-B,-B1,-B1A</b>
OIL SUMP CAPACITY, QT.	10 (1) 8.8 (2)	---	8.8
USEABLE OIL, QT. (See NOTE 3) (starting with full tank)	a.6 (1) b.8 (2)	c.8 d.7	c.6.8 d.5.8
NOTES	1-13	1-5, 8, 13	1-5, 13

## CERTIFICATION BASIS

Type Certificate 244 issued/revised:

<u>Model</u>	<u>Date of Application</u>	<u>Date TC Issued/Revised</u>
CAR 13, effective August 1, 1941		
6V4-178-B31	09/09/46 and	03/19/46*
6V4-178-B3	10/01/46 (letters)	10/14/46*
0-335-1		
6V4-178-B32	03/12/46	04/29/47
0-335-3		
6V4-165-B32F	10/10/47	12/22/47*
6V4-178-B33	09/13/48	11/05/48
0-335-4		
6V4-200-C32	08/09/48	11/26/48
0-335-2		
0-335-5		
YO-335-5		

CAR 13 effective August 1, 1949, as amended by 13-1 and 13-2

6V4-200-C33	10/04/51	11/02/51
0-335-6		
YO-335-6		

CAR 13 effective June 15, 1956

6V-335-A	11/15/56	11/27/56
6V-335-B		11/27/56
6A-335-A	11/28/56	12/11/56

CAR 13 effective June 15, 1956, as amended by 13-1 to 13-4, inclusive.

6A-335-B	05/31/62	03/28/63
6A-335-D	10/17/62	03/28/63
6A-335-B1	09/18/63	10/10/63
6A-335-B1A	04/07/70	04/20/70
Reissued to WSK "PZL-RZESZOW"		11/05/81
Reissued to WSK "PZL-RZESZOW" SA		12/8/94

\*Engine models 6V4-178-B3, 6V4-178-B31, and 6V4-165-B32F were deleted from Type Certificate 244 on December 05, 1950. These models are no longer eligible for installation on certificated aircraft.

This note reflects the issuance of two Type Certificates for administrative purposes; one under 21.21 for engines produced in the United States, and one under 21.29 for engines produced in Poland. Both type certificates have identical numbers.

The General Inspectorate of Civil Aviation of Poland originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number **E-244**. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of Poland.

## PRODUCTION BASIS

1. Production Certificate No. 9 for U.S. production. There will be no further production of engines or replacement parts under this production certificate.
2. FAR 21.500 for production of engines or replacement parts under this type certificate by WSK "PZL-RZESZOW" SA under control of the Republic of Poland General Inspectorate of Civil Aviation (GICA).

Parts produced under either production basis are eligible to be used interchangeably.

## IMPORT REQUIREMENTS

To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with the General Inspectorate of Civil Aviation of Poland or EASA airworthiness approval shall have a Joint Aviation Authorities (JAA) or EASA Form 1, Authorized Release Certificate. The JAA or EASA Form 1 should state that the engine conforms to the type design approved under the U.S. Type Certificate **E-244**, is in a condition for safe operation and has undergone a final operational check.

Additional guidance is contained in FAA Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products, imported into the United States.

<b>NOTES</b>
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## NOTE 1.

Maximum permissible temperatures (øF):

	<u>6V4-178-B31</u>	<u>6V4-178-B3 -B32, -B33</u>	<u>6V4-200-C32, -C33</u>
Cylinder head (spark plug gasket)	520	530	530
Cylinder head (well type thermocouple)	435	445	435
Cylinder base	310	310	310
Oil inlet	230	230	230
	<u>6V-335-A 6V-335-A, -B</u>	<u>6A-335-B, -B1, -B1A, -D</u>	
Cylinder head (spark plug gasket)	---	---	
Cylinder head (well type thermocouple)	435	390	
Cylinder base	315	315	
Oil inlet	235	235	

## NOTE 2.

Carburetor fuel pressure limits:

Marvel Schebler MA4-5, MA4-5AA and MA-5	0.5 to 9 p.s.i.
Bendix PS-5C and PS-5BD	9 to 14 p.s.i.

Lubricating oil pressure limits:

Normal operation	40 - 65 p.s.i. (55 - 80 p.s.i., 6A-335-B, -B1)
Idle	25 p.s.i.

NOTE 3.

6V Model Engines (Vertical)

- a. With crankshaft flange tilted 15° from vertical, in the direction of the oil pan.
- b. With crankshaft flange tilted 15° from vertical, in the direction of the crankcase cover.

6A-335-A, -B, -B1, -B1A, -D Engines (Horizontal)

- c. 15° Nose down
- d. 20° Nose up

NOTE 4.

The following accessory drives are provided:

ACCESSORY	Type of Drive Pad	Rotation Facing Drive Pad	Speed Ratio to Crankshaft	Max. Torqu (in. lb.		Maximum Overhang in. lb.
				Cont.	Static	
<b>Starter</b> 6V4-178-B3, B31 Except B3, B31	None	CC	11.444:1	70	240	30
	None	CC	11.444:1	140	300	90
<b>Generator</b> 6V4-178-B31 Except B31, B, B1, A, D 6A-335-B, B1 B1A 6A-335-A, D	None	CC	1.500:1	8	15	45
	None	CC	1.500:1	12	35	55
	None	CC	1.500:1	18	50	75
	None	CC	1.500:1	25	70	75
<b>Tachometer</b> All	AND10005 Type 1 or AND 20005 Type XV-B	CC	0.500:1	2	6	3
<b>Propeller Governor</b> 6A-335-B, B1, B1A	AND 20010	CC	0.847:1	125	825	25
	AND 20000	CC	0.847:1	125	825	25
<b>Fuel Pump**</b> All except B31, A, D	AND 10000	CC	1.500:1	5	600	7
<b>Fuel Pump</b> 6A-335-A, D	AND 10000	CC	1.500:1	5	600	7
<b>Vacuum Pump</b> 6A-335-B, B1, B1A	AND 20000	C	0.847:1	100	825	25

\* "C" - clockwise viewing drive pad, "CC" - counter clockwise  
 \*\* (Optional on right or left magneto drive housing)

NOTE 5. The above engines incorporate the following detailed differences:

<u>Model</u>	<u>Characteristics</u>
6V4-178-B3	Similar to -B32 except has direct drive starter.
6V4-178-B31	Similar to -B32 except has old type accessory section, small oil sump and direct drive starter.
6V4-178-B32	Basic engine, incorporates a geared starter.
6V4-178-B33	Similar to -B32 except for revised intake manifold to relocate carburetor.
6V4-200-C32	Similar to -B32 except for improved crankcase, modified cylinders and cylinder hold-down stud base circle, optional cylinder tie plate, increased cross-sectional area inlet manifold and zone pipe, 8.5:1 compression ratio pistons.
6V4-200-C33	Similar to -C32 except for revised intake manifold to relocate carburetor.

The above engines incorporate the following detailed differences:

<u>Model</u>	<u>Characteristics</u>
6V-335-A	Similar to -C32 except for revised cylinder, camshaft and magneto timing.
6V-335-B	Similar to 6V-335-A except for relocated carburetor.
6A-335-A	Similar to 6V-335-A except mounts in horizontal position.
6A-335-B	Similar to 6A-335-A except intended for fixed wing installation and includes provision for propeller governor.
6A-335-B1	Similar to 6A-335-B except for carburetor zone, zone and equalizer pipes.
6A-335-B1A	Similar to 6A-335-B except for intake system and accessory case.
6A-335-D	Similar to 6A-335-A except carburetor located at front of engine instead of rear.

NOTE 6. The Champion AJ-10 spark plug must be inspected at 50 hour interval. The AJ-10 spark plug was previously designated LA-10. The Champion C-10S spark plug has been obsoleted.

NOTE 7. Military 0-335 engine models are identical to the corresponding 6V4 models as indicated. When installed in certificated aircraft the commercial equivalent designation and TC No. 244 should be added to the engine nameplate. YQ-335-5 engines are same as 6V4-200-C32 engines with serial numbers 26209 and under. 0-335-5 engines are same as 6V4-200-C33 engines with serial numbers 26210 and over. YO-335-6 and O-335-6 engines are military equivalents of 6V4-200-C33 engine model. YO-335-6 engines are serially numbered E-600001 and E-600002, 0-335-6 engines are serially numbered E-60003 and over. 0-335-5D engines are military equivalents of the 6V-335-B engine model.

NOTE 8. The following models have been approved specifically for helicopter installation:

6V4-200-C32 serially numbered 26210 and over  
 6V4-200-C33  
 0-335-5  
 0-335-6  
 6V-335-A, -B  
 6V-335-A, -D

Engines not covered by this note that are currently installed in helicopters should not be operated at speeds in excess of the MC rating. A note to this effect should be incorporated in the pertinent helicopter flight manual.

NOTE 9. Engine Serial Numbers 26677 and above incorporate revised intake manifold kit part number 19515 and 19516. When these parts are added to engines serially numbered 26676 and under, suffix letter "A" will be added to the pertinent engine serial number.

NOTE 10. Engine Serial Numbers 26721 and above incorporate sodium cooled exhaust valve part number 19518 or 19631. Engine Serial Numbers 26001 to 26720, and 600001 to 600733 were not originally equipped with the sodium cooled exhaust valve. When this part is installed in these engines, suffix letter "B" will be added to the pertinent engine serial number.

NOTE 11. Model 6V4-200-C33 and 6V-335-B engines equipped with Marvel Schebler MA4-5AA carburetor setting no. 10-3847 approved for following ratings:

	<u>6V4-200-C33</u>	<u>6V-335-B</u>
Maximum permissible carburetor air temperature	180øF	180øF
Maximum continuous and takeoff, hp., r.p.m., in Hg, at:		
Critical altitude, ft.	200-3100-31.2 -7000	210-3000-30.4-7000
Sea level pressure altitude	200-3100-32.5-S.L.	210-3000-31.8-S.L.

NOTE 12. External valve cover drain system optional on all 6V model (vertical) engines.

NOTE 13. SERVICE INFORMATION:

Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or, for approvals made before September 28, 2003 by the General Inspectorate of Civil Aviation of Poland. Any such documents including those approved under a delegated authority, are accepted by the FAA and are considered FAA approved.

- Service bulletins,
- Structural repair manuals,
- Vendor manuals,
- Aircraft flight manuals, and
- Overhaul and maintenance manuals.

These approvals pertain to the type design only.

---THE END---