AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

TYPE CERTIFICATE DATA SHEET Nº ER-9204

Type Certificate Holder:

MD HELICOPTERS, INC. (MDHI)
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USA

ER-9204-02
Sheet 01

MDHI

500N
600N

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This data sheet, which is part of Type Certificate No. 9204, prescribes conditions and limitations under which the product, for which the Type Certificate was issued, meets the airworthiness requirements of the Brazilian Aeronautical Regulations.

I - Model 500N, (Normal Category Helicopter), approved 24 April 1992.

ENGINE Allison 250-C20R/2

FUEL MIL-T-5624 grades JP-4 or JP-5; ASTM-1655 JET A, A-1 or B.

ENGINE LIMITS

	Takeoff (5min.)	Maximum Continuous
Shaft: Watts (horsepower)	570 (425)	503 (375)
Torque: kg.m (ft.lb)	51.3 (371)	45.3 (327.4)
Gas producer rpm, N_1 (%)	53 519 (105)	53 519 (105)
Output shaft rpm, N_2 (%)	6 016 (100)	6 016 (100)
Measured Gas Temp.: ºC (ºF)	810 (1 490)	752 (1 385)
Transient limits:		
- Measured Gas Temp.: ºC (ºF) (6 sec. limit) (10 sec. limit during start)	 810 (1 490) to 899 (1 650) 810 (1 490) to 927 (1 700)*	
- Gas Producer rpm, N_1 (%) (15 sec. Limit)	 55 028 (106%)	
- Output shaft rpm, N_2 (%) (15 sec. Limit)	6 798 (113) at idle to 6 316 (105) at takeoff power	

* 1 sec. at 927ºC (1 700ºF)

ROTOR LIMITS

	Power off (rotor tach.)	Power on (eng. Tach.)
Maximum rpm:	508	477 (100% N_2)
Minimum rpm:	410	473 (99% N_2)

OIL

See RFM for engine and transmission approved oils

AIRSPEED LIMITS (CAS)

Never exceed (V_{NE}) (at sea level): * 152 kt
Autorotation V_{NE} (at sea level): 130 kt
* For reduction of V_{NE} with altitude and temperature see approved RFM.

CG RANGE

Longitudinal

Forward mm (in)	Rear mm (in)	Gross Weight mm (lb)
2 515 (99)	2 642 (104)	1 746 (3 850)
2 515 (99)	2 680 (105.5)	1 520 (3 350)
2 515 (99)	2 738 (107.8)	1 179 (2 600)
2 560 (100.8)	2 784 (109.6)	907 (2 000)
2 576 (101.4)	2 802 (110.3)	815 (1 796)

The aft longitudinal CG limit varies linearly from a gross weight of 1 746 kg at station 2 642 mm to 815 kg (minimum flying weight) at station 2 802 mm.
Note: Weights between 1 520 kg and 1 746 kg must be external and jettisonable.

Lateral
±76.2mm (±3.0 in) for weights between 907 kg and 1 746kg.
±56 mm (±2.2 in), 815 kg
Straight line variation between 815kg and 907 kg

LEVELING MEANS

Plumb bob at station 2353 mm (92.64 in)

MAXIMUM WEIGHT

1 520 kg (3 350 lb)

MINIMUM CREW

1 (pilot)

MAXIMUM OCCUPANTS

5 (includes crew)

MAXIMUM CARGO

590 kg (1 300 lb) not exceeding 561 kg/m^2 (115 lb/ft^2) from fuselage station 1 994 mm (78.5 in) to fuselage station 3 150 mm (124.0 in).

FUEL CAPACITY

Total capacity:	189 kg	(416 lb)
Total unusable:	5.7 kg	12.5 lb)
Usable:	183.3 kg	(403.5 lb)

OIL CAPACITY

Engine:	2.72 kg	(6 lb)
Transmission	5.26 kg	(11.6 lb)

MAXIMUM OPERATING ALTITUDE

6 096 m (20 000 ft) density altitude.

ROTOR BLADE AND CONTROL MOVEMENTS

For rigging information refer to the Maintenance Manual.

CERTIFICATION BASIS

CAR 6, dated 20 December 1956, including Amendments 6-1 through 6-5, and Special Condition "Conditions Establishing Compensating Factors Providing an Equivalent Level of Safety Under Civil Air Regulations, Section 6-10, for light Turbine Powered Helicopters", dated 2 October 1962, as revised 8 February 1986.
In addition, height velocity testing is required to 7 000 feet, in accordance with paragraphs 6.111 and 6.116 as amended by Amendment 6-7, issued 8 October 1963.
RBHA 27 equivalent to FAR 27, section listed below are applicable to the NOTAR system:

Regulations	Amendment
27.143* (a), (b), (d), (e)	27-21
27.399	27-1
27.591	27-18
27.605 (b)	27-16
27.672**	27-21
27.927 (b)	27-12
27.1529	27-18

* Replaces CAR 6.121 (a), (b), (c), (e)
** Applicable to the Yaw Stability Augmentation System

Noise requirements: RBHA 36 corresponding to FAR 36 Amdt. 36-1 through 36-18 Appendix H for stage 2 helicopters.

SERIAL NUMBERS ELIGIBLE

LN0001 and up.

II - <u>Model 600N, (Normal Category Helicopter)</u>, approved 08 December 1998.

ENGINE

Allison 250-C47M

FUEL

MIL-T-5624 grades JP-4 or JP-5.
MIL-T-83133 Grade JP-8.
Aviation turbine fuels ASTM-D1655, Jet A or A-1 or Jet-B.
Fuels containing Tri-Cresyl-Phosphate additives shall not be used.
For fuel additives see note 4.

ENGINE LIMITS

	Takeoff (5min.)	Maximum Continuous
Shaft: Watts (horsepower)	570 (425)	503 (375)
Torque: kg.m (ft.lb)	51.3 (371)	45.3 (327.4)
Gas producer rpm, N_1 (%)	53 519 (105)	53 519 (105)
Output shaft and power turbine rpm, N_2 (%)	6 850 output shaft, 34 941 (114) power turbine ** varying linearly to 6 443 output shaft 32 826 (107.1) power turbine at 590 ft.lb *** torque.	
Turbine Outlet Temp.: ºC (ºF) - less than 3 048 m (10 000 ft) pressure altitude - 3 048 (10 000 ft) pressure altitude or greater.	1 435 (779) -	1 340 (727) 1 256 (680)
Transient limits:		
- Torque: ft.lb (10 sec. limit)	576 *	
- Turbine Outlet Temp.: ºC (ºF) (10 sec. limit start/shutdown) (1 sec. limit start/shutdown) (during power change in flight)	1 550 (843) to but not including 1 700 (927) 1 700 (927) 1 662ºF (905º)	
- Gas Producer rpm, N_1 (%) (10 sec. Limit)	54 060 (106%)	
- Output shaft and power turbine rpm, N_2 (%) (15 sec. Limit)	7159 output shaft, 36 474 (119) power turbine ** at autorotation torque, varying linearly to 6 557 output shaft, 33 409 (109) power turbine at 590 ft.lb torque*.	
Engine Cold Start Limits:	-40ºC (-40ºF)	

* Aircraft torque limit is 524 ft. lb.
** Aircraft rotor rpm limit is 106.4%.
*** Torque unit.

ROTOR LIMITS

	Power off (rotor tach.)	Power on (eng. Tach.)
Maximum rpm:	506 (106.4%)	480.1 (101% N_2)*
Minimum rpm:	428 (90%)	470.6 (99% N_2)*

(*) ECU governs Rotor rpm between 99.25% and 100.75%

AIRSPEED LIMITS (IAS)

Never exceed speed (V_{NE})

- Power on, sea level, internal gross weight:
  - 1 633 kg (3 600 lb) or less: 155 kt
  - 1 634 kg (3 601 lb) to 1 724 kg (3 800 lb): 145 kt
  - 1 725 kg (3 801 lb) or more: 135 kt
- Power off autorotation sea level 115 kt

For reduction of V_{NE} with altitude and temperature see approved RFM.

CG RANGE

See Brazilian Authority approved RFM for variation of CG limit with gross weight, nominal limits are 91.0 to 10.0 longitudinal, -5.0 to +5.0 lateral.

LEVELING MEANS

Plumb bob at station 81.54.

MAXIMUM WEIGHT

1 860 kg (4 100 lb) at sea level.
See RFM for variation of maximum weight with density altitude.

MINIMUM CREW

1 (pilot)

MAXIMUM OCCUPANTS

8 (includes crew)

MAXIMUM CARGO

612 kg (1 350 lb) at 561.5 kg/sq meter (115 lb/ sq ft) sta. 48.5 to 124.0.

FUEL CAPACITY

	Liters	Imp. Gal	US Gal
Usable:	433.8	95.5	114.6
Unusable:	6.1	1.3	1.6
Total:	439.9	96.8	116.2

OIL CAPACITY

	Liters	Imp. Gal	US Gal
Engine:	2.95	0.65	0.78
Transmission:	6.62	1.46	1.75

HYDRAULIC FLUID

	Liters	Imp. Gal	US Gal
Rotor brake:	0.118	0.026	0.031

MAX. OPERATING ALTITUDE

6 096 m (20 000 ft) density altitude, 5 791 m (19 000 ft) pressure altitude with JP.4 or Jet B or 6 096 m (20 000 ft) pressure altitude with Jet A, Jet A-1, JP-5 or JP-8, whichever is lower.

TEMPERATURE OPERATING LIMITS

-40ºC to +51.9ºC (-40ºF to +125ºF) OAT at sea level.
See RFM for variation at altitude..

FLIGHT CONTROL MOVEMENTS

Main Rotor Blade Movements:
- Collective pitch (relative to rigging position)
  Up to down: 17.1º to 21.6º
- Cyclic (relative to rigging position)
  Forward: 18.2º to 19.7º
  Aft: 11.5º to 13.5º
  Left: 7.6º to 9.6º
  Right: 5.2º to 7.2º
- Fan Blade Movements
  Minimum: 26º ± 1º
  Full right pedal: 54º ± 2º
  Full left pedal: 73º ± 2º

Horizontal stabilizer Incidence (with respect to waterline plane)
  Nose down: -1.9º

Vertical Stabilizer Movements
- Vertical stabilizers (relative to rigging position)

	Left	Right
Leading edge left	-10.5º ± .5º	-14.5º ± .5º
Leading edge right	+ 23.5º ± 1º	+ 19.5º ± 1º
Travel, minimum linear inches at trailing edge	180mm (7.1 in)	180mm (7.1 in)

CERTIFICATION BASIS

RBHA 27 which endorses the FAR 27 effective on 02 Oct. 1964 as amended by 27-1 thru 27-30 with the following deviations:
- RBHA/FAR 27.562 and 27-863 excluded;
- RBHA/FAR 27.561 at Amdt. 27-24;
- RBHA/FAR 27.607 at Amdt. 27-3;
- RBHA/FAR 27.785 at Amdt. 27-20; and
- RBHA/FAR 27.1325 at Amdt. 27-12.

Special Condition:
- High Intensity Radiation Fields (HIRF) Protection FAA special condition effective 29 January 1997, as published in the 66 FR 4134 as of 29 January 1997.

Equivalent Safety Finding:
- RBHA/FAR 27.1549 for the N1 gage.

Noise requirements:
- RBHA 36 corresponding to FAR 36 Amdt. 36-1 through Amdt. 36-21, Appendix J.

SERIAL NUMBERS ELIGIBLE

RN003 and subsequent.

DATA PERTINENT TO ALL MODELS:

DATUM

254.0 cm (100.0 in) forward of main rotor centerline.

IMPORT ELEGIBILITY

A Brazilian Certificate of Airworthiness may be issued on the basis of a FAA Export Certificate of Airworthiness (or a third country Export Certificate of Airworthiness, in case of used aircraft imported from such country), including the following statement:

"The aircraft covered by this certificate has been inspected, tested and found to be in conformity with the Brazilian approved type design as defined by the Brazilian Type Certificate no. 9204 and in condition of safe operation."

The Brazilian Authority Report H.10-1230-0, dated 21 Nov. 1991 or further revisions, contains the Brazilian requirements for the acceptance of the 500N model.

The Brazilian Authority Report H.10-1230-01, dated 08 Dec. 1998 or further revisions, contains the Brazilian requirements for the acceptance of the 600N model.

REQUIRED EQUIPMENT

The basic required equipment, as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the helicopter. A Brazilian approved RFM should also be carried in the helicopter.

NOTES:

NOTE 1 Weight and balance. A current weight and balance report, including a list of equipment included in certificated empty weight and loading instructions, must be provided for each helicopter at the time of original airworthiness certification and at all times thereafter.

NOTE 2 Markings and placards. The following placard must be installed in clear view of the pilot: "This Helicopter must be operated in compliance with the operating limitations specified in the Rotorcraft Flight Manual."

For additional placards, see Rotorcraft Flight Manual.

Markings and placards for passenger information under normal and emergency conditions, as well as placards for servicing and loading must be in Portuguese or bilingual.

NOTE 3 Continuing Airworthiness. Information essential to the proper maintenance of these helicopters is contained in the Manufacturer's Handbook of Maintenance Instructions (HMI) which is provided with each helicopter. These handbooks specify that Service Life Limited parts be retired according to an ANAC approved schedule. These values of retirement or service life cannot be increased without approval by ANAC engineering.

For Model 500N and 600N aircraft see the Airworthiness Limitations Section of the HMI for the Limited Life Schedule.

NOTE 4 The differences of the Brazilian airplanes in relation to the basic FAA type design are summarized below:

1 The Brazilian Rotorcraft Flight Manual; and
2 Markings and placards in English and Portuguese as listed in the applicable report H.10-1230-0.

NOTE 5 For all operations below 40ºF ambient temperature all fuel, except MIL-G-5572 (Aviation Gasoline), must contain anti-additive conforming to MIL-1-27686 in concentrations of 0.035 percent by volume minimum 0.15 percent by volume maximum. See Rotorcraft Flight Manual for checking concentrations and blending.

NOTE 6 Model 500N aircraft, Serial Nr. LN0001 and up, with Cargo Hook installed, meet the

structural design requirement of the certification basis, provided the weight in excess of the normal category gross weight is not imposed on the landing gear when the Model 500N is operated at 3850 pounds gross weight in accordance with the limits of the approved Rotorcraft Flight Manual. The retirement times listed in the Airworthiness Limitations Section of the HMI are not changed.

NOTE 7 For Model 600N, a current Weight and Balance Report (MDHS' Basic Weight Balance Record) listing the helicopter certificated empty (basic) weight and loading instructions including a List of Equipment (MDHS' MD-600N Required/Optional Equipment List is provided as a separate document) must be provided for each helicopter at the time the helicopter's original airworthiness certification is issued. This Basic Weight and Balance Record shall be kept current as the configuration, affecting the helicopter's weight and balance, is changed. The MDHS Basic Weights Checklist Record (Chart A) and Basic Weight Checklist Supplement for the Model 600N contains needed reference data for the Weight and Balance Record. A copy of the current MDHS Basic Weight and Balance Record shall be kept in the helicopter. The certificated basic weight and corresponding center of gravity locations includes all transmission, hydraulic and engine oil/fluids as well as trapped/unusable fuel.

NOTE 8 The Model 600N rotorcraft employs electronic engine controls, commonly named Full Authority Digital Engine Controls (FADEC) and is recognized to be more susceptible to Electromagnetic Interference (EMI) than rotorcraft that have only manual (non-electronic) controls. (EMI may be the result of radiated or conducted interference.) For this reason modifications that add or change systems that have the potencial for EMI, must either be qualified to a ANAC acceptable standard or tested at the time of installation for interference to the FADEC. This type of testing must employ the particular FADEC's diagnostic techniques and external diagnostic techniques. The test procedure must be ANAC approved.

NOTE 9 Extension of the basic fuel capacity (over 114.6 US gal.) for the Model 600N may require reevaluation of the FADEC control system reliability due to time limited exposure determinations made during certification.

NOTE 10 The Model 600N is prohibited flying in falling or blowing snow with the standard engine inlet screen installed.

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