TYPE-CERTIFICATE DATA SHEET

No. E.079

for Engine
DIESELJET TDA CR

Type Certificate Holder
DieselJet s.r.l.

Via Marabini, 11
40013 Castel Maggiore (BO)
Italy

For Models:

TDA CR 1.9 8V
TDA CR 2.0 16V

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I. General

1. Type / Models
TDA CR 1.9 8V
TDA CR 2.0 16V
(see Note 1)

2. Type Certificate Holder

Design Organisation Approval No.: EASA.21J.283

3. Manufacturer
DieselJet s.r.l.

4. Date of Application
TDA CR 1.9 8V: 19 May 2005
TDA CR 2.0 16V: 31 October 2012

5. EASA Type Certification Date
TDA CR 1.9 8V: 11 June 2010
TDA CR 2.0 16V: 08 March2016

II. Certification Basis

1. Reference Date for determining the applicable airworthiness requirements
TDA CR 1.9 8V: 19 May 2005
TDA CR 2.0 16V: 31 October 2012

2. EASA Certification Basis

2.1. Airworthiness Standards
TDA CR 1.9 8V: CS-E, dated 24 October 2003
TDA CR 2.0 16V: CS-E, Amendment 3, dated 23 December 2010

2.2. Special Conditions (SC)
TDA CR 1.9 8V: None
TDA CR 2.0 16V: Fuel System – Fuel Approval – restart in flight

2.3. Equivalent Safety Findings (ESF)
TDA CR 1.9 8V: CS-E 130.h
TDA CR 2.0 16V: CS-E 130.g

2.4. Deviations
None

2.5. Environmental Protection
None (not required for piston engines)

III. Technical Characteristics

1. Type Design Definition

TDA CR 1.9 8V:
DJ-TC01-CAST-001 Configuration Approval Sheet Type issue 1 revision 1 dated 18 December 2009 or later approved revisions
TDA CR 2.0 16V:
DJ-CAS-T-T400001 Configuration Approval Sheet Type issue 1 dated 3 February 2016 or later approved revisions.

2. Description

TDA CR 1.9 8V:
The TDA CR 1.9 8V is a liquid cooled, Diesel cycle, 4 cylinder, 4 stroke, 8 valves engine, equipped with turbocharger and Common Rail high pressure injection system. The displacement is 1.9 l, the gearbox with reduction ratio is 1:0.644 . It is equipped with a dual FADEC.
TDA CR 2.0 16V:
The TDA CR 2.0 16V is a liquid cooled, Diesel cycle, 4 cylinder, 4 stroke, 16 valves engine, equipped with turbocharger and Common Rail high pressure injection system. The displacement is 2.0 l, the gearbox with reduction ratio is 1:0.607 . It is equipped with a dual FADEC.

3. Equipment

TDA CR 1.9 8V:
See Engine Technical Specification DJ-TC01-SP-001.
TDA CR 2.0 16V:
See Engine Technical Specification DJ-SP-A-T400001.

4. Dimensions

Model	**TDA CR 1.9 8V**
Overall Length	861 mm
Overall Height	655 mm
Width	585 mm

Model	**TDA CR 2.0 16V**
Overall Length	859 mm
Overall Height	659 mm
Width	650 mm

5. Dry Weight

TDA CR 1.9 8V: 205 kg
TDA CR 2.0 16V: 219 kg

6. Ratings

At propeller flange (see Note 4 and Note 5)

Rating		TDA CR 1.9 8V	TDA CR 2.0 16V
Power	Take-off (5 min.)	118 kW (160 hp) at 3800 RPM (2450 prop. RPM)	160 kW (217.5 hp) at 3800 RPM (2306 prop. RPM)

	Maximum Continuous	107 kW (146 hp) at 3800 RPM (2450 prop. RPM)	142 kW (193 hp) at 3800 RPM (2306 prop. RPM)
	Recommended Cruising	80 kW (109 hp) at 3000 RPM (1932 prop. RPM)	100 kW (137 hp) at 3000 RPM (1820 prop. RPM)

The performance values specified above correspond to minimum values defined under the conditions of ICAO or ARDC standard atmosphere.

7. Control System

The engines are equipped with a dual FADEC.
Software verified to level C according to RTCA Document DO-178B.
TDA CR 1.9 8V:
FADEC P/N: DFD.1C0.14.P1 or later approved standard.
Basic Application Software P/N: DFADEC.10.00.00 or later approved standard.
TDA CR 2.0 16V:
FADEC P/N: EA001 or later approved standard.
Basic Application Software P/N: SY021 or later approved standard.

8. Fluids (Fuel, Oil, Coolant, Additives)

Fuels (see note 3) :
Diesel fuel (EN 590)
Aviation fuel JET A1 (ASTM 01655)

Coolant:
50% demineralised water and 50% glycol ethylene Selenia Paraflu

Lubrication Oils:
TDA CR 1.9 8V: the oils are defined in the Operating Manual DJ-TC01-MN-001
TDA CR 2.0 16V: the oils are defined in the Operating Manual DJ-MN-A-T400001

Fuel Additives:
TDA CR 1.9 8V: the fuel additives are defined in the Operating Manual DJ-TC01-MN-001
TDA CR 2.0 16V: Not Applicable

9. Aircraft Accessory Drives

- TDA CR 1.9 8V:

	Rotation (facing the drives)	Speed (RPM)	Max. Torque	Type of Drive
Governor	CW	2725	5.0 Nm	AND20010
Optional Device	CCW	3800	5.0 Nm	--------

- TDA CR 2.0 16V:

	Rotation (facing the drives)	Speed (RPM)	Max. Torque	Type of Drive
Governor	CW	2265	5.0 Nm	AND20010
Optional Device	CCW	3800	5.0 Nm	--------

CW / CCW = Clock-Wise l Counter-Clock-Wise
Speed is indicated for a reference engine speed of 3800 RPM.

10. Maximum Permissible Air Bleed Extraction
Not Applicable.

IV. Operating Limitations

1. Temperature Limits

	Temperature in °C / °F	Note
Oil Temperature (normal operation)	90 °C to 130 °C / 194 °F to 266 °F	
Max. Oil Temperature:	140 °C / 284 °F	Max 5 min.
Minimum Ambient Temperature for Starting for **TDA CR 1.9 8V**:	-30 °C / -22 °F	With Cetane N° ≥ 48 and oil 0W-40
Minimum Ambient Temperature for Starting for **TDA CR 2.0 16V**:	-30 °C / -22 °F	With Cetane N° ≥ 38 and oil 0W-40
	-25 °C / -13 °F	With Cetane N° ≥ 38 and oil 5W-40
	+ 5 °C / 41 °F	With 28 ≤ Cetane N° < 38
Minimum Fuel Temperature during operation	-40 °C / -40 °F	With Jet A1
	-10 °C /-14 °F	With Diesel Fuel (class D, E or F or higher)
	+ 5 °C / 41 °F	With Diesel Fuel, if class not known
Cooling Fluid temperature thermostat opening up	80 °C / 76 °F	
Max. coolinq fluid temperature	105 °C / 221 °F	Max 5 min.

2. Speed Limits

	Engine	Propeller **TDA CR 1.9 8V**	Propeller **TDA CR 2.0 16V**
Maximum Engine Over-speed (Crankshaft Speed)	4180 RPM	2692 RPM	2537 RPM
Take-off speed, maximum 5 minutes	3800 RPM	2450 RPM	2306 RPM
Max. continuous speed	3800 RPM	2450 RPM	2306 RPM

3. Torque Limits
Not Applicable.

4. Pressure Limits

4.1 Fuel Pressure

Minimum Fuel Pressure (at inlet of HP engine pump)	4.5 bar abs. (65.3 psi)
Maximum Fuel Pressure (at inlet of HP engine pump)	6.0 bar abs. (87 psi)

4.2 Oil Pressure

Minimum Oil Pressure	1.5 bar rel. (21.8 psi)
Oil Pressure (normaloperation)	3.5 - 6.0 bar rel. (51-87 psi)
Maximum Oil Pressure	7.0 bar rel. (101.5 psi)

5. Time Limited Dispatch (TLD)

The engine is not approved for Time Limited Dispatch. All engine systems and equipment must be functional prior to aircraft take-off. Any detected engine system or equipment failure must be corrected before next flight. For special instructions see the Operating Manual.

6. ETOPS Capability

Not Applicable.

7. Operating Altitude

Maximum altitude 10670 m (35000 ft)

V. Operating and Service Instructions

	TDA CR 1.9 8V	TDA CR 2.0 16V
Installation Manual	DJ-TC01-MN-003	DJ-MN-A-T400003
Operating Manual	DJ-TC01-MN-001	DJ-MN-A-T400001
Maintenance Manual	DJ-TCO1-MN-002	DJ-MN-A-T400002
Overhaul Manual	Not yet issued	Not yet issued
Service Bulletins and Service Letters	As issued	As issued

The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the applicable "Engine Maintenance Manual" document, in the section "Airworthiness Limitations".

VI. Notes

Note 1: Engine model numbers may include suffixes V ( ).( ) to define engine changes related to installation specific configurations.

Note 2: The TDA CR engines are approved for the installation in Part 23 Normal and Utility category airplanes.

Note 3: For the model **TDA CR 1.9 8V** a minimum Cetane number of 48 is recommended, while for the model **TDA CR 2.0 16V** a minimum Cetane number 28 is recommended, and 38 for cold start.

Note 4: The TDA CR engines are approved for the operation with Jet fuels (see Operating & Maintenance Manual) and Diesel fuel according to EN 590. However, the cloud point (CFPP) of Diesel fuel is regulated by national appendices to the EN 590 Standard, and it varies between the countries and the time of the year. Therefore, the installation of a fuel tank thermometer is required as well as a minimum engine starting temperature is defined (refer to Operating Manual).

Note 5: Compliance with CS-E180 has only been demonstrated with a governing, non reversing, non feathering propeller.

Note 6: No overhaul permitted before publication of the Overhaul Manual.

Note 7: The Time Between Overhaul (TBO) is prescribed in the Maintenance Manual.

Note 8: The engine control system has been tested according to DO-160D for lightning protection and EMI. The demonstrated levels are declared in the Engine Technical Specifications.

Note 9: Containment has been demonstrated for max. turbocharger speed of 199644 RPM

SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
CCW	Counter Clock Wise
CFPP	Cold Filter Plugging Point
CR	Common Rail
CRI	Certification Review Item
CS-E	Certification Specification Engine
CV	Compliance Verification Engineering
CW	Clock Wise
DFADEC	Dual Full Authority Digital Electronic Control
CAS	Configuration Approval Sheet
EASA	European Aviation Safety Agency
EMI	Electro Magnetic Interference
ESF	Equivalent Safety Finding
ETOPS	Extended-range Twin-engine Operational Performance Standard
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Electronic Control
HP	High Pressure
ICAO	International Civil Aviation Organization
P/N	Part Number
RPM	Revolution Per Minute
RTCA	Radio Technical Commission for Aeronautics
SC	Special Condition
TBD	To Be Defined
TBO	Time Between Overhauls
TC	Type Certificate
TCDS	Type Certificate Data Sheet
TDA	Turbo Diesel Aviation
TLD	Time Limited Dispatch

II. Type Certificate Holder Record

DieselJet s.r.l

III. Change Record

TCDS Issue	Date	Changes	TC issue
Issue 01	10 June 2010	Initial Issue	Initial Issue, 10 June 2010
Issue 02	11 March 2013	Change of Manufacturer site	
Issue 03	08 March 2016	Derivative model TDA CR 2.0 16V added	08 March 2016

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