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 March 2016

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:

4. Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>TDA CR 1.9 8V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length</td>
<td>861 mm</td>
</tr>
<tr>
<td>Overall Height</td>
<td>655 mm</td>
</tr>
<tr>
<td>Width</td>
<td>585 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>TDA CR 2.0 16V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length</td>
<td>859 mm</td>
</tr>
<tr>
<td>Overall Height</td>
<td>659 mm</td>
</tr>
<tr>
<td>Width</td>
<td>650 mm</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Rating</th>
<th>TDA CR 1.9 8V</th>
<th>TDA CR 2.0 16V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Take-off (5 min.)</td>
<td>118 kW (160 hp) at 3800 RPM (2450 prop. RPM)</td>
</tr>
</tbody>
</table>
### 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: DF.D.1C0.14.P1 or later approved standard.
  - Basic Application Software P/N: DFADDEC.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:

<table>
<thead>
<tr>
<th>Rotation (facing the drives)</th>
<th>Speed (RPM)</th>
<th>Max. Torque</th>
<th>Type of Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor</td>
<td>CW</td>
<td>2725</td>
<td>5.0 Nm</td>
</tr>
<tr>
<td>Optional Device</td>
<td>CCW</td>
<td>3800</td>
<td>5.0 Nm</td>
</tr>
</tbody>
</table>

#### TDA CR 2.0 16V:

<table>
<thead>
<tr>
<th>Rotation (facing the drives)</th>
<th>Speed (RPM)</th>
<th>Max. Torque</th>
<th>Type of Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor</td>
<td>CW</td>
<td>2265</td>
<td>5.0 Nm</td>
</tr>
<tr>
<td>Optional Device</td>
<td>CCW</td>
<td>3800</td>
<td>5.0 Nm</td>
</tr>
</tbody>
</table>
CW / CCW = Clock-Wise / 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

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

2. Speed Limits

<table>
<thead>
<tr>
<th>Engine</th>
<th>Propeller TDA CR 1.9 8V</th>
<th>Propeller TDA CR 2.0 16V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Engine Over-speed (Crankshaft Speed)</td>
<td>4180 RPM</td>
<td>2692 RPM</td>
</tr>
<tr>
<td>Take-off speed, maximum 5 minutes</td>
<td>3800 RPM</td>
<td>2450 RPM</td>
</tr>
<tr>
<td>Max. continuous speed</td>
<td>3800 RPM</td>
<td>2450 RPM</td>
</tr>
</tbody>
</table>

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 (normal operation) | 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

<table>
<thead>
<tr>
<th></th>
<th>TDA CR 1.9 8V</th>
<th>TDA CR 2.0 16V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhaul Manual</td>
<td>Not yet issued</td>
<td>Not yet issued</td>
</tr>
<tr>
<td>Service Bulletins and Service Letters</td>
<td>As issued</td>
<td>As issued</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>TCDS Issue</th>
<th>Date</th>
<th>Changes</th>
<th>TC Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue 01</td>
<td>10 June 2010</td>
<td>Initial Issue</td>
<td>Initial Issue, 10 June 2010</td>
</tr>
<tr>
<td>Issue 02</td>
<td>11 March 2013</td>
<td>Change of Manufacturer site</td>
<td></td>
</tr>
<tr>
<td>Issue 03</td>
<td>08 March 2016</td>
<td>Derivative model TDA CR 2.0 16V added</td>
<td>08 March 2016</td>
</tr>
</tbody>
</table>

-END-