

|                                                                                                                            |                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM<br>JAPAN CIVIL AVIATION BUREAU<br>TYPE APPROVAL DATA SHEET No. 778 | TADS NUMBER 778<br>REVISION : 2<br>DATE : September 25, 2023<br>CFM International S.A.<br>MODEL: LEAP-1A series engines<br>LEAP-1A23, LEAP-1A24, LEAP-1A26,<br>LEAP-1A29, LEAP-1A30, LEAP-1A32,<br>LEAP-1A33, LEAP-1A24E1, LEAP-<br>1A26E1, LEAP-1A26CJ, LEAP-<br>1A29CJ, LEAP-1A33B2 and LEAP-1A35A |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Engines of models described herein conforming with this data sheet, (which is part of Type Approval Number 778) and other approved data on file with the Japan Civil Aviation Bureau, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Japan Civil Aeronautics Law and Regulations, provided they are installed, operated, and maintained as prescribed by the manufacturer's manuals and other instructions.

Type Approval (TA) Holder      CFM International S.A.  
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| I .MODEL                                    | LEAP-1A35A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LEAP-1A33      | LEAP-1A33B2    | LEAP-1A32      |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|
| TYPE                                        | High bypass turbofan engine, with: coaxial front fan/booster driven by a multi-stage low pressure turbine; a multi-stage compressor; two-stage high pressure turbine; annular pre swirl combustor, and a full authority digital engine control (FADEC).                                                                                                                                                                                                                                                                                                              |                |                |                |
| RATINGS                                     | See NOTE 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |                |                |
| Static Thrust at Sea Level<br>lb (daN)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                |                |
| Takeoff (5 min.)                            | 32,160 (14,305)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | --             | --             | --             |
| Maximum continuous                          | 31,690 (14,096)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | --             | --             | --             |
| Flat Rating Ambient<br>Temperature ° F(° C) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                |                |
| Takeoff                                     | 86 (30)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | --             | --             | --             |
| Maximum continuous                          | 77 (25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | --             | --             | --             |
| COMPONENTS                                  | Part Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |                |                |
| Full Authority Digital<br>Control (FADEC)   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                |                |
| Electronic control unit<br>Software         | 2500M34<br>2590M00<br>and<br>2590M01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | --<br>--<br>-- | --<br>--<br>-- | --<br>--<br>-- |
| Identification plug                         | 2531M61P02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2531M61P22     | 2531M61P24     | 2531M61P14     |
| FUEL                                        | <ul style="list-style-type: none"> <li>Approved fuel conforming to GE Specification D50TF2, Classes A, C, D, and E. Primary fuel is D50TF2 Class-A (Jet A) with other fuels listed being acceptable alternates. No fuel control adjustment is required when changing from primary to alternate fuels. Use of aviation gasoline and D50TF2 Class-B, Wide-Cut Distillate (Jet B or JP-4) is not authorized.</li> <li>Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 73-0001 for a list of fuels specifically approved for LEAP-1A engine.</li> </ul> |                |                |                |
| OIL                                         | <ul style="list-style-type: none"> <li>Approved oils are synthetic type conforming to SAE AS5780 specification, grade SPC (Standard Performance Capability) or HPC (High performance Capability).</li> <li>Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 79-0001 for a list of oil specifically approved for the LEAP-1A engine.</li> </ul>                                                                                                                                                                                                       |                |                |                |
| I .MODEL                                    | LEAP-1A35A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LEAP-1A33      | LEAP-1A33B2    | LEAP-1A32      |

|      |   |     |     |     |     |     |     |   |   |    |     |     |    |    |    |
|------|---|-----|-----|-----|-----|-----|-----|---|---|----|-----|-----|----|----|----|
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| Rev. | 2 | Org | Org | Org | Org | Org | Org | 2 | 2 | 2  | Org | Org | 2  | 2  | 2  |

LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL", "---" NOT APPLICABLE

| PHYSICAL CHARACTERISTICS<br>LEAP-1A G01                                                                                                                        |                                                                                                                                      |    |    |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| PRINCIPLE<br>DIMENSIONS<br>Length<br>Fwd fan case flange to TRF aft<br>flange<br><br>Width<br>Maximum Envelope<br><br>Height<br>Maximum Envelope               | in (mm)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 131.0 (3,328)                                                                                                                        | -- | -- | -- |
|                                                                                                                                                                | 100.1 (2,543)                                                                                                                        | -- | -- | -- |
|                                                                                                                                                                | 93.2 (2,368)                                                                                                                         | -- | -- | -- |
| WEIGHT<br>Not to Exceed                                                                                                                                        | The engine weight is defined as the weight of the basic engine, Including basic engine accessories and fluids weight (oil and fuel). |    |    |    |
|                                                                                                                                                                | lb (kg)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 6,591 (2,990)                                                                                                                        | -- | -- | -- |
| CENTER OF GRAVITY<br>LOCATION<br>Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm)<br><br>Waterline<br><br>Buttline | in (mm)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 212.6 (5,400.0)                                                                                                                      | -- | -- | -- |
|                                                                                                                                                                | 99.0 (2,514.6)                                                                                                                       | -- | -- | -- |
|                                                                                                                                                                | 97.8 (2,484.1)                                                                                                                       | -- | -- | -- |
| PHYSICAL CHARACTERISTICS<br>LEAP-1A All other Gyy (see NOTE 5)                                                                                                 |                                                                                                                                      |    |    |    |
| PRINCIPLE<br>DIMENSIONS<br>Length<br>Fwd fan case flange to TRF aft<br>flange<br><br>Width<br>Maximum Envelope<br><br>Height<br>Maximum Envelope               | in (mm)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 131.0 (3,328)                                                                                                                        | -- | -- | -- |
|                                                                                                                                                                | 99.7 (2,533)                                                                                                                         | -- | -- | -- |
|                                                                                                                                                                | 93.0 (2,362)                                                                                                                         | -- | -- | -- |
| WEIGHT<br>Not to Exceed                                                                                                                                        | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel). |    |    |    |
|                                                                                                                                                                | lb (kg)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 6,632 (3,008)                                                                                                                        | -- | -- | -- |
| CENTER OF GRAVITY<br>LOCATION<br>Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm)<br><br>Waterline<br><br>Buttline | in (mm)                                                                                                                              |    |    |    |
|                                                                                                                                                                | 212.6 (5,400)                                                                                                                        | -- | -- | -- |
|                                                                                                                                                                | 99.0 (2,514.6)                                                                                                                       | -- | -- | -- |
|                                                                                                                                                                | 97.8 (2,484.1)                                                                                                                       | -- | -- | -- |

| II .MODEL                                                                                                                                                        | LEAP-1A30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LEAP-1A29                                               | LEAP-1A29CJ              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------|
| TYPE                                                                                                                                                             | High bypass turbofan engine, with: coaxial front fan/booster driven by a multi-stage low pressure turbine; a multi-stage compressor; two-stage high pressure turbine; twin annular pre swirl combustors; and a full authority digital engine control (FADEC).                                                                                                                                                                                                                                                    |                                                         |                          |
| RATINGS                                                                                                                                                          | See NOTE 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |                          |
| Static Thrust at Sea Level<br>lb (daN)<br>Takeoff (5 min.)<br>Maximum continuous<br>Flat Rating Ambient<br>Temperature ° F(° C)<br>Takeoff<br>Maximum continuous | 32,160 (14,305)<br>31,690 (14,096)<br><br>86 (30)<br>77 (25)                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 29,290 (13,029)<br>26,680 (11,868)<br><br>97 (36)<br>-- | --<br>--<br><br>--<br>-- |
| COMPONENTS                                                                                                                                                       | Part Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                         |                          |
| Full Authority Digital<br>Control (FADEC)                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |                          |
| Electronic control unit<br>Software                                                                                                                              | 2500M34<br>2590M00<br>and<br>2590M01                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | --<br>--<br>and<br>--                                   | --<br>--<br>and<br>--    |
| Identification plug                                                                                                                                              | 2531M61P06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2531M61P26                                              | 2531M61P42               |
| FUEL                                                                                                                                                             | • Approved fuel conforming to GE Specification D50TF2, Classes A, C, D, and E. Primary fuel is D50TF2 Class-A (Jet A) with other fuels listed being acceptable alternates. No fuel control adjustment is required when changing from primary to alternate fuels. Use of aviation gasoline and D50TF2 Class-B, Wide-Cut Distillate (Jet B or JP-4) is not authorized.<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 73-0001 for a list of fuels specifically approved for LEAP-1A engine. |                                                         |                          |
| OIL                                                                                                                                                              | • Approved oils are synthetic type conforming to SAE AS5780 specification, grade SPC (Standard Performance Capability) or HPC (High performance Capability).<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 79-0001 for a list of oil specifically approved for the LEAP-1A engine.                                                                                                                                                                                                       |                                                         |                          |
| PHYSICAL CHARACTERISTICS<br>LEAP-1A G01                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |                          |
| PRINCIPLE<br>DIMENSIONS                                                                                                                                          | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                         |                          |
| Length<br>Fwd fan case flange to TRF aft<br>flange                                                                                                               | 131.0 (3,328)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                                                      | --                       |
| Width<br>Maximum Envelope                                                                                                                                        | 100.1 (2,543)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                                                      | --                       |
| Height<br>Maximum Envelope                                                                                                                                       | 93.2 (2,368)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | --                                                      | --                       |
| WEIGHT<br>Not to Exceed                                                                                                                                          | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel).                                                                                                                                                                                                                                                                                                                                                                             |                                                         |                          |
|                                                                                                                                                                  | lb (kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                         |                          |
|                                                                                                                                                                  | 6,591 (2,990)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                                                      | --                       |
| CENTER OF GRAVITY<br>LOCATION                                                                                                                                    | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                         |                          |
| Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm)                                                                     | 212.6 (5,400)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                                                      | --                       |
| Waterline                                                                                                                                                        | 99.0 (2,514.6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | --                                                      | --                       |

| II .MODEL                                                                                    | LEAP-1A30                                                                                                                               | LEAP-1A29 | LEAP-1A29CJ |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|
| Buttline                                                                                     | 97.8 (2,484.1)                                                                                                                          | --        | --          |
| PHYSICAL CHARACTERISTICS<br>LEAP-1A All other Gyy (see NOTE 5)                               |                                                                                                                                         |           |             |
| PRINCIPLE<br>DIMENSIONS                                                                      | in (mm)                                                                                                                                 |           |             |
| Length<br>Fwd fan case flange to TRF aft<br>flange                                           | 131.0 (3,328)                                                                                                                           | --        | --          |
| Width<br>Maximum Envelope                                                                    | 99.7 (2,533)                                                                                                                            | --        | --          |
| Height<br>Maximum Envelope                                                                   | 93.0 (2,362)                                                                                                                            | --        | --          |
| WEIGHT<br>Not to Exceed                                                                      | The engine weight is defined as the weight of the basic engine, including basic engine<br>accessories and fluids weight (oil and fuel). |           |             |
|                                                                                              | lb (kg)                                                                                                                                 |           |             |
|                                                                                              | 6,632 (3,008)                                                                                                                           | --        | --          |
| CENTER OF GRAVITY<br>LOCATION                                                                | in (mm)                                                                                                                                 |           |             |
| Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm) | 212.6 (5,400)                                                                                                                           | --        | --          |
| Waterline                                                                                    | 99.0 (2,514.6)                                                                                                                          | --        | --          |
| Buttline                                                                                     | 97.8 (2,484.1)                                                                                                                          | --        | --          |

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| II.MODEL                                                                                                                                                        | LEAP-1A26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LEAP-1A26CJ                  | LEAP-1A26E1                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------|
| TYPE                                                                                                                                                            | High bypass turbofan engine, with: coaxial front fan/booster driven by a multi-stage low pressure turbine; a multi-stage compressor; two-stage high pressure turbine; twin annular pre swirl combustors; and a full authority digital engine control (FADEC).                                                                                                                                                                                                                                                    |                              |                                    |
| RATINGS                                                                                                                                                         | See NOTE 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |                                    |
| Static Thrust at Sea Level<br>lb (daN)<br>Takeoff (5 min.)<br>Maximum continuous<br>Flat Rating Ambient<br>Temperatue ° F(° C)<br>Takeoff<br>Maximum continuous | 27,120 (12,064)<br>26,680 (11,868)<br><br><br>111 (44)<br>77 (25)                                                                                                                                                                                                                                                                                                                                                                                                                                                | --<br>--<br><br><br>--<br>-- | --<br>--<br><br><br>120 (49)<br>-- |
| COMPONENTS                                                                                                                                                      | Part Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |                                    |
| Full Authority Digital<br>Control (FADEC)                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                    |
| Electronic control unit<br>Software                                                                                                                             | 2500M34<br>2590M00<br>and<br>2590M01                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | --<br>--<br>and<br>--        | --<br>--<br>and<br>--              |
| Identification plug                                                                                                                                             | 2531M61P34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2531M61P46                   | 2531M61P30                         |
| FUEL                                                                                                                                                            | • Approved fuel conforming to GE Specification D50TF2, Classes A, C, D, and E. Primary fuel is D50TF2 Class-A (Jet A) with other fuels listed being acceptable alternates. No fuel control adjustment is required when changing from primary to alternate fuels. Use of aviation gasoline and D50TF2 Class-B, Wide-Cut Distillate (Jet B or JP-4) is not authorized.<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 73-0001 for a list of fuels specifically approved for LEAP-1A engine. |                              |                                    |
| OIL                                                                                                                                                             | • Approved oils are synthetic type conforming to SAE AS5780 specification, grade SPC (Standard Performance Capability) or HPC (High performance Capability).<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 79-0001 for a list of oil specifically approved for the LEAP-1A engine.                                                                                                                                                                                                       |                              |                                    |
| PHYSICAL CHARACTERISTICS<br>LEAP-1A G01                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                    |
| PRINCIPLE<br>DIMENSIONS                                                                                                                                         | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |                                    |
| Length<br>Fwd fan case flange to TRF aft<br>flange                                                                                                              | 131.0 (3,328)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                           | --                                 |
| Width<br>Maximum Envelope                                                                                                                                       | 100.1 (2,543)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                           | --                                 |
| Height<br>Maximum Envelope                                                                                                                                      | 93.2 (2,368)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | --                           | --                                 |
| WEIGHT<br>Not to Exceed                                                                                                                                         | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel).                                                                                                                                                                                                                                                                                                                                                                             |                              |                                    |
|                                                                                                                                                                 | lb (kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |                                    |
|                                                                                                                                                                 | 6,591 (2,990)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                           | --                                 |
| CENTER OF GRAVITY<br>LOCATION                                                                                                                                   | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |                                    |
| Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm)                                                                    | 212.6 (5,400)<br><br>99.0 (2,514.6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | --<br><br>--                 | --<br><br>--                       |
| Waterline                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                    |

| II .MODEL                                                                                                                                                         | LEAP-1A26                                                                                                                                       | LEAP-1A26CJ    | LEAP-1A26E1    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| Buttline                                                                                                                                                          | 97.8 (2,484.1)                                                                                                                                  | --             | --             |
| <b>PHYSICAL CHARACTERISTICS</b><br>LEAP-1A All other Gyy (see NOTE 5)                                                                                             |                                                                                                                                                 |                |                |
| <b>PRINCIPLE</b><br><b>DIMENSIONS</b><br>Length<br>Fwd fan case flange to TRF aft flange<br>Width<br>Maximum Envelope<br>Height<br>Maximum Envelope               | in (mm)<br>131.0 (3,328)<br>99.7 (2,533)<br>93.0 (2,362)                                                                                        | --<br>--<br>-- | --<br>--<br>-- |
| <b>WEIGHT</b><br>Not to Exceed                                                                                                                                    | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel).<br>lb (kg) |                |                |
|                                                                                                                                                                   | 6,632 (3,008)                                                                                                                                   | --             | --             |
| <b>CENTER OF GRAVITY</b><br><b>LOCATION</b><br>Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in (5,080 mm)<br>Waterline<br>Buttline | in (mm)<br>212.6 (5,400)<br>99.0 (2,514.6)<br>97.8 (2,484.1)                                                                                    | --<br>--<br>-- | --<br>--<br>-- |

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| III.MODEL                                                                                    | LEAP-1A24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LEAP-1A24E1     | LEAP-1A23       |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|
| TYPE                                                                                         | High bypass turbofan engine, with: coaxial front fan/booster driven by a multi-stage low pressure turbine; a multi-stage compressor; two-stage high pressure turbine; twin annular pre-swirl combustors; and a full authority digital engine control (FADEC).                                                                                                                                                                                                                                                    |                 |                 |
| RATINGS                                                                                      | See NOTE 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                 |
| Static Thrust at Sea Level<br>lb (daN)                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                 |
| Takeoff (5 min.)                                                                             | 24,010 (10,680)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | --              | --              |
| Maximum continuous                                                                           | 24,000 (10,676)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | --              | 23,510 (10,458) |
| Flat Rating Ambient<br>Temperatue ° F(° C)                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                 |
| Takeoff (5 min)                                                                              | 113 (45)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 130 (55)        | 113 (45)        |
| Maximum continuous                                                                           | 77 (25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | --              | --              |
| COMPONENTS                                                                                   | Part Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                 |
| Full Authority Digital<br>Control (FADEC)                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                 |
| Electronic control unit                                                                      | 2500M34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | --              | --              |
| Software                                                                                     | 2590M00<br>and<br>2590M01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | --<br>and<br>-- | --<br>and<br>-- |
| Identification plug                                                                          | 2531M61P62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2531M61P58      | 2531M61P54      |
| FUEL                                                                                         | • Approved fuel conforming to GE Specification D50TF2, Classes A, C, D, and E. Primary fuel is D50TF2 Class-A (Jet A) with other fuels listed being acceptable alternates. No fuel control adjustment is required when changing from primary to alternate fuels. Use of aviation gasoline and D50TF2 Class-B, Wide-Cut Distillate (Jet B or JP-4) is not authorized.<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 73-0001 for a list of fuels specifically approved for LEAP-1A engine. |                 |                 |
| OIL                                                                                          | • Approved oils are synthetic type conforming to SAE AS5780 specification, grade SPC (Standard Performance Capability) or HPC (High performance Capability).<br>• Refer to the latest revision of CFM Service Bulletin LEAP-1A S/B 79-0001 for a list of oil specifically approved for the LEAP-1A engine.                                                                                                                                                                                                       |                 |                 |
| PHYSICAL CHARACTERISTICS<br>LEAP-1A G01                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                 |
| PRINCIPLE<br>DIMENSIONS                                                                      | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                 |
| Length<br>Fwd fan case flange to TRF aft<br>flange                                           | 131.0 (3,328)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --              | --              |
| Width<br>Maximum Envelope                                                                    | 100.1 (2,543)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --              | --              |
| Height<br>Maximum Envelope                                                                   | 93.2 (2,368)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | --              | --              |
| WEIGHT<br>Not to Exceed                                                                      | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel).                                                                                                                                                                                                                                                                                                                                                                             |                 |                 |
|                                                                                              | lb (kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                 |
|                                                                                              | 6,591 (2,990)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --              | --              |
| CENTER OF GRAVITY<br>LOCATION                                                                | in (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                 |
| Engine Only, Nominal Weight<br>Station (axial)<br>HPC case fwd flange = 200 in<br>(5,080 mm) | 212.6 (5,400)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --              | --              |
| Waterline                                                                                    | 99.0 (2,514.6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | --              | --              |

| III.MODEL                                                                                                                                                      | LEAP-1A24                                                                                                                                       | LEAP-1A24E1    | LEAP-1A23      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| Buttline                                                                                                                                                       | 97.8 (2,484.1)                                                                                                                                  | --             | --             |
| <b>PHYSICAL CHARACTERISTICS</b><br>LEAP-1A All other Gyy (see NOTE 5)                                                                                          |                                                                                                                                                 |                |                |
| <b>PRINCIPLE</b><br><b>DIMENSIONS</b><br>Length<br>Fwd fan case flange to TRF aft flange<br>Width<br>Maximum Envelope<br>Height<br>Maximum Envelope            | in (mm)<br>131.0 (3,328)<br>99.7 (2,533)<br>93.0 (2,362)                                                                                        | --<br>--<br>-- | --<br>--<br>-- |
| <b>WEIGHT</b><br>Not to Exceed                                                                                                                                 | The engine weight is defined as the weight of the basic engine, including basic engine accessories and fluids weight (oil and fuel).<br>lb (kg) |                |                |
|                                                                                                                                                                | 6,632 (3,008)                                                                                                                                   | --             | --             |
| <b>CENTER OF GRAVITY</b><br><b>LOCATION</b><br>Engine Only, Nominal Weight Station (axial)<br>HPC case fwd flange = 200 in (5,080 mm)<br>Waterline<br>Buttline | in (mm)<br>212.6 (5,400)<br>99.0 (2,514.6)<br>97.8 (2,484.1)                                                                                    | --<br>--<br>-- | --<br>--<br>-- |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CERTIFICATION BASIS</b> | <p>1. Airworthiness Standards<br/>           The Civil Aeronautics Regulations Appendix 1: “Standards of Strength, Structure and Performance to Ensure the Safety of Aircraft and its Equipment”<br/>           Part 7, Engines of the TAIKUSEI-SHINSA-YORYO [(JCAB Airworthiness Inspection Manual) established October 20, 1966 by Ku-Ken No. 381], including amendments of Koku-Ku-Ki No.1167 dated March 25, 2014.<br/>           Note: Above standards to be applied are equivalent to 14 CFR Part 33, including Amendment 33-1 through Amendment 33-33</p> <p>2. Special Condition<br/>           Fan Blade Special Condition: 33-015-SC</p> <p>3. Equivalent Level of safety<br/>           High Pressure Shaft Loss-of-Load: LEAP1A1C-2014-TC-01-P-11 to 14 CFR33.27(c)</p> <p>4. Environmental requirement<br/>           The Civil Aeronautics Regulations Annex 3 Chapter 2 (equivalent to ICAO Annex 16, Volume II, Part III, Amendment 10, dated January 1, 2021)</p> |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



| MODEL       | Application date to FAA | FAA Type Certificate Issued/Revised | Application date to JCAB                          | JCAB Type Approval Issued/Revised                   |
|-------------|-------------------------|-------------------------------------|---------------------------------------------------|-----------------------------------------------------|
| LEAP-1A33   | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A32   | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A26   | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A26E1 | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A24   | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A24E1 | May. 21, 2012           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A33B2 | Aug. 23, 2013           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A35A  | Jun. 23, 2014           | Nov. 20, 2015                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A30   | Jun. 23, 2014           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A23   | Jun. 23, 2014           | Mar. 11, 2016                       | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A29   | Feb. 16, 2018           | May 30, 2018                        | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A29CJ | Feb. 16, 2018           | May 30, 2018                        | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |
| LEAP-1A26CJ | Feb. 16, 2018           | May 30, 2018                        | Feb. 11, 2019<br>/Sep. 13, 2021<br>/Feb. 28, 2023 | Oct. 1, 2019<br>/Nov.29, 2021<br>September 25, 2023 |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IMPORT REQUIREMENT | <p>To be considered eligible for installation on Japan registered aircraft, each engine to be exported to the Japan shall be accompanied by certificate of airworthiness for export or certifying statement, endorsed by the exporting cognizant civil airworthiness authority, which contains the following language:</p> <p>(1) This engine conforms to its JCAB type design (Type Approval No. 778-3) and is in a condition for safe operation.</p> <p>(2) This engine has been subjected by the manufacturer to a final operational check and is in a proper state of airworthiness. (See NOTE 16)</p> |
| PRODUCTION BASIS   | <p>Production Certificate No. 108 for LEAP-1A engines produced in the United States by General Electric under license from CFM International, S.A. (See NOTE 16).</p> <p>Production Organization Approval No. FR.21G.0007 dated December 17th, 2009 for engines produced in France by SAFRAN Aircraft Engines under license from CFM International, S.A (See NOTE 16).</p>                                                                                                                                                                                                                                 |

**NOTES****NOTE 1.****ENGINE RATINGS**

Engine ratings are based on calibrated stand performance under the following conditions:

Takeoff thrust is nominally independent of ambient temperature (flat rated) up to ambient temperature of: Std. +15°C (30°C, 86 ° F) for all models, except as noted above.

Maximum continuous thrust is nominally independent of ambient temperature (flat rated ) up to ambient temperature of Std. +10°C (25°C, 77 ° F) for all models.

Assumptions:

1. Sea level static, standard day: 101.325kPA Pressure (14.696 psia); 15°C temperature (59 ° F)
2. Zero customer bleed or customer horsepower extraction
3. Ideal inlet, 100% ram recovery
4. Production aircraft flight cowling
5. Production instrumentation
6. Fuel lower heating value of 18,400 BTU/lb

Thrust Setting Parameter

Power setting, power checks and control of engine thrust output in all operations is to be based on CFM International engine charts referring to fan speed. Fan speed sensors are included in the engine assembly for this purpose.

**NOTE 2.****TEMPERATURE LIMITS**

| <b><u>INDCATED TURBINE EXHAUST GAS TEMPERATURE</u></b>                         |                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Takeoff; 5 min                                                                 | 1,060°C (1,940 ° F)                                                                                                                                                                                          |
| Maximum Continuous                                                             | 1,025°C (1,877 ° F)                                                                                                                                                                                          |
| Max Transient (30 sec.)                                                        | 1,065°C (1,949 ° F)                                                                                                                                                                                          |
| Ground Starts                                                                  | 750°C (1,382°F) (Measured 750°C (1382°F)<br>Pre LEAP-1A S/B 73-0034 and<br>Pre LEAP-1C S/B 73-0003)<br>750°C (1,382°F) (Measured 800°C (1472°F))<br>Post LEAP-1A S/B73-0034 and<br>Post LEAP-1C S/B 73-0003) |
| Inflight Starts                                                                | 875°C (1,607 ° F)                                                                                                                                                                                            |
| <b><u>FUEL PUMP INLET TEMPERATURE</u></b>                                      |                                                                                                                                                                                                              |
| Maximum                                                                        | 55°C (131 ° F)                                                                                                                                                                                               |
| Minimum (Cold Start)                                                           | -54°C (-65.2 ° F)<br>Or the relevant fuel freezing point, whichever is higher                                                                                                                                |
| <b><u>OIL TEMPERATURE</u></b>                                                  |                                                                                                                                                                                                              |
| Maximum                                                                        |                                                                                                                                                                                                              |
| ▪ Continuous operation                                                         | 140°C (284 ° F)                                                                                                                                                                                              |
| ▪ Transient(15 minutes)                                                        | 155°C (311 ° F)                                                                                                                                                                                              |
| Minimum(Cold Start)                                                            |                                                                                                                                                                                                              |
| ▪ Engine Not Compliant with LEAP-1A<br>S/B 72-0034, 72-0035, & 72-0036         | -29°C (-20 ° F)                                                                                                                                                                                              |
| ▪ Engine Compliant with LEAP-1A<br>S/B 72-0034, 72-0035, & 72-0036(see NOTE 5) | -40°C (-40 ° F)                                                                                                                                                                                              |
| Minimum for Acceleration to Take-Off Power                                     | 19°C (66 ° F)                                                                                                                                                                                                |

**NOTE 3.****FUEL AND OIL PRESSURE LIMITS****FUEL PRESSURE LIMITS AT THE ENGINE PUMP INLET**

- Aircraft Boost Pump Operative  
The minimum pressure at the engine fuel pump inlet with aircraft boost pumps operative is true vapor pressure plus 5 psia (32.4 kPa). The maximum vapor to liquid ratio at the engine fuel pump inlet with aircraft boost pumps operative is zero.
- Aircraft Boost Pump Inoperative  
The engine fuel system operation is restricted with the aircraft boost pumps inoperative as outlined in the LEAP-1A Installation Manuals.

**OIL PRESSURE LIMITS**

- The minimum pressure limit at idle is 17.4 psid (120.0 kPa) and varies up to 29 psid (200.0 kPa) at redline.
- The maximum pressure is limited during cold starts by a 420.5 psid (2,900 kPa differential) pressure-relief valve.

**NOTE 4.****ACCESSORY DRIVE CHARACTERISTICS (All LEAP-1A Models)**

| <b>ELECTRICAL (IDG)*</b>                      |                   |               |
|-----------------------------------------------|-------------------|---------------|
| Rotation Direction+                           |                   | CCW           |
| Speed ratio to core**                         |                   | 0.462         |
| Pad Rating                                    | HP (kW)           | 173 (129)     |
| Shear Torque                                  | in.lb (N.m)       | 9,400 (1,062) |
| Maximum overhung moment                       | in.lb (N.m) (wet) | 1,000 (113)   |
| <b>HYDRAULIC PUMP*</b>                        |                   |               |
| Rotation Direction+                           |                   | CCW           |
| Speed ratio to core**                         |                   | 0.211         |
| Pad Rating                                    | in.lb (N.m)       | 1,301 (147)   |
| Shear Torque                                  | in.lb (N.m)       | 4,249 (480)   |
| Maximum overhung moment                       | in.lb (N.m) (wet) | 204 (23)      |
| * Airframer Supplied Hardware                 |                   |               |
| + CCW = COUNTERCLOCKWISE (looking at the Pad) |                   |               |
| ** 100% core speed = 16,645 RPM               |                   |               |

**NOTE 5.****MODEL DESCRIPTION**

| The model shown on this TADS have the following general characteristics |                                                                                      |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| LEAP-1A                                                                 |                                                                                      |
| LEAP-1A35A                                                              | A321 neo optional model, with additional takeoff thrust at high altitude conditions. |
| LEAP-1A33                                                               | A321 neo optional model, with higher thrust rating.                                  |
| LEAP-1A33B2                                                             | Same as LEAP-1A33, with additional pilot-selected takeoff thrust capability.         |
| LEAP-1A32                                                               | A321 neo basic model.                                                                |
| LEAP-1A30                                                               | A321 neo optional model, with lower thrust rating.                                   |
| LEAP-1A29                                                               | A320 neo optional model.                                                             |
| LEAP-1A29CJ                                                             | A320 neo or A319 neo Airbus Corporate Jet (ACJ) optional model. Same as LEAP-1A29.   |
| LEAP-1A26                                                               | A320 neo basic model. A319 neo optional model.                                       |
| LEAP-1A26CJ                                                             | A320 neo or A319 neo Airbus Corporate Jet (ACJ) basic model. Same as LEAP-1A26.      |
| LEAP-1A26E1                                                             | Same as LEAP-1A26, with extended ambient temperature takeoff thrust capability.      |

|             |                                                                                 |
|-------------|---------------------------------------------------------------------------------|
| LEAP-1A24   | A319 neo basic model. A320 neo optional model.                                  |
| LEAP-1A24E1 | Same as LEAP-1A24, with extended ambient temperature takeoff thrust capability. |
| LEAP-1A23   | A319 neo optional model.                                                        |

LEAP-1A engine series includes: LEAP-1A35A, LEAP-1A33, LEAP-1A33B2, LEAP-1A32, LEAP-1A30, LEAP-1A26, LEAP-1A26E1, LEAP-1A24, LEAP-1A24E1, LEAP-1A23, LEAP-1A29, LEAP-1A29CJ and LEAP-1A26CJ

The parts list for each LEAP-1A engine model contains a configuration group number to identify the engine configuration. The engine model configuration is identified as LEAP-1AxxGyy where xx is the model and yy is the applicable configuration as described in LEAP-1A Service Bulletin 72-0220.

**NOTE 6. ACCESSORIES, COMPONENTS, OR SYSTEM ASSEMBLIES PROVIDED AS PART OF ENGINE TYPE DESIGN:**

Not Applicable

**NOTE 7. ACCESSORIES, COMPONENTS, OR SYSTEM ASSEMBLIES NOT PROVIDED AS PART OF ENGINE TYPE DESIGN:  
COMPATIBLE SYSTEM ASSEMBLIES**

Thrust Reverser

The LEAP-1A engine is approved for use with the Aircelle thrust reverser system: P/N BDL0011-12-0 for the left hand thrust reverser half; and P/N BDL0051-12-0 for the right hand thrust reverser half.

**NOTE 8. SPECIAL ANTI-ICING OR DE-ICING REQUIREMENTS:**

Not applicable

**NOTE 9. ENGINE MOUNT SYSTEM PROVISIONS:  
For all models,**

For information regarding Engine Mount provisions refer to the Engine Installation Manuals of the respective models. See NOTE 15 for applicable Engine Installation Manuals.

**NOTE 10. POWER BOOST, INJECTION OR AUGMENTATION SYSTEMS:**

Not applicable

**NOTE 11. SPECIAL INSTALLATION REQUIREMENTS:**

ETOPS

The LEAP-1A series engines models comply with the requirements of §§ 33.4 (A33.3(c)), 33.71(c)(4) and 33.201, and are therefore eligible for installation on Extended Operations (ETOPS) and Early ETOPS approved airplanes. The demonstrated diversion time is 180 minutes at maximum continuous thrust plus 15 minutes at hold power. ETOPS eligibility does not constitute airplane or operational level approvals necessary to conduct ETOPS flights.

LEAP-1A S/B 71-0006 defines the requirements for conducting ETOPS operation.

Time Limited Dispatch Criteria

Criteria pertaining to the dispatch and maintenance requirements for the engine control systems are specified in the airworthiness limitation section of the Engine Shop Manual (05-17-01 LEAP-1A ESM.20), which defines the various configurations and maximum operating intervals.

A control system reliability monitoring program has been established with LEAP, as a contingency of the dispatch criteria approval, to ensure that overall engine control system

and specific component failure rates do not exceed the maximum values permitted by the reliability analysis.

#### Induction System Icing

Demonstration of compliance to 14 CFR Part 33.68, Induction System Icing, is installation specific:

Limited to the Airbus A319neo/A320neo/A321neo model aircraft for the LEAP-1A series engines. .

Installation of these engine models on different airplane models or types will require a separate evaluation and finding of compliance to 14 CFR Part 33.68.

#### Emissions Standards

The following emissions standards promulgated in 14 CFR Part 34, Amendment 6, effective March 6, 2018, and 40 CFR Part 87, effective October 31, 2012, have been complied with for the LEAP-1A35A, LEAP-1A33, LEAP-1A33B2, LEAP-1A32, LEAP-1A30, LEAP-1A26, LEAP-1A26E1, LEAP-1A24, LEAP-1A24E1, LEAP-1A23, LEAP-1A29, LEAP-1A29CJ, LEAP-1A26CJ engine models.

Fuel Venting Emission Standards: 14 CFR 34.10(a) and 34.11; in addition, 40 CFR 87.10(a) and 87.11.

Smoke Number (SN) Emission Standards: 14 CFR 34.21 (e) (2); in addition, 40 CFR 87.23(c) (l).

Carbon Monoxide (CO) Emission Standards: 14 CFR 34.21(d) (l) (ii); in addition, 40 CFR 87.23(c) (l).

Hydrocarbons (HC) Emission Standards: 14 CFR 34.21(d) (1) (i); in addition, 40 CFR 87.23(c) (l).

Oxides of Nitrogen (NO<sub>x</sub>) Emission Standards: 14 CFR 34.23(b) (l); in addition, 40 CFR 87.23(c) (3).

The LEAP-1A series engines model ratings have demonstrated compliance to the ICAO emissions standards identified in Annex 16, Volume II, Amendment 9, effective July 2017:

Part II, Chapter 2 for Fuel Venting

Part III, Chapter 2, Section 2.2.2 for Smoke number

Part III, Chapter 2, Section 2.3.2 for Carbon monoxide and Hydrocarbons,

Part III, Chapter 2, Section 2.3.2. e.2(i) for Oxides of Nitrogen (also known as CAEP/8),

Part III, Chapter 4, Section 4.2.2 for non-volatile Particulate Matter (nvPM) mass concentration (also known as CAEP/10)

#### NOTE 12.

#### **MANUFACTURER'S SERVICE BULLETINS OR OTHER INSTRUCTIONS COVERING MATTERS OF INTEREST:**

Not applicable

#### NOTE 13.

#### **SPECIAL OPERATING PROCEDURES**

##### Negative G Operation

During negative g operation only, it is permissible to operate below minimum oil pressure (17.4 psid) for a maximum of 14 seconds. See LEAP-1A Specific Operating Instruction Manual, GEK 131717.

#### Minimum Flight Idle

The minimum permissible idle in flight is a non-adjustable limit, preset into the EEC Control schedule. Flight idle is engaged based on thrust lever position and operating conditions as specified in the LEAP-1A Specific Operating Instructions Manual, GEK 131717.

#### Takeoff Time Limit

The normal 5 minute takeoff rating may be extended to 10 minutes for engine out contingency, as specified in the LEAP-1A Specific Operating Instructions Manual, GEK 131717.

#### Icing Operation

For operation in icing conditions; requirements, limitations, and notes are specified in the LEAP-1A Specific Operating Instructions Manual, GEK 131717.

### NOTE 14.

#### **SPECIAL REPAIR OR OVERHAUL LIMITATIONS:**

Not applicable

### NOTE 15.

#### **APPLICABLE INSTALLATION, MAINTENANCE AND OVERHAUL MANUALS**

##### LEAP-1A:

The applicable installation and operating manuals are referenced in the latest revision of CFM Service Bulletin LEAP-1A 72-0220.

- 1) Turbofan Engine Installation Manual (EIM-IM.20):  
LEAP-1A G01 CRL 2106a  
LEAP-1A All other Gyy CRL 2106a\_3
- 2) Specific Operating Instructions (SOI): CRL 2105a (GEK 131717)

Instructions for Continued Airworthiness (ICA): Engine Shop Manuals, Service Bulletins, Overhaul and Maintenance Manuals, Repair Manuals, Vendor Manuals, and Design Changes which contain a statement that the document is EASA approved or approved under authority of DOA No. EASA.21J.086 are accepted by the FAA and considered FAA approved. Repair data and related instructions are considered FAA approved or accepted as applicable. These approvals pertain to the type design only. The LEAP-1A ICA includes:

- 1) Engine Shop Manual (ESM): SM.20
- 2) Standard Practices Manual (SPM): SPM.25
- 3) Consumable Product Manual (CPM): CPM.25
- 4) Non Destructive Test Manual (NDTM): NDTM.25
- 5) Components Maintenance Manuals (CMM): as published by CFM
- 6) Service Bulletins (SB): as published by CFM
- 7) Maintenance Manual: see Aircraft Maintenance Manual (AMM)
- 8) Troubleshooting Manual: see Aircraft Troubleshooting Manual (TSM)

### NOTE 16.

#### **IMPORT REQUIREMENTS**

The type certificate holder, CFM International, S.A., is a company established and jointly owned by SAFRAN Aircraft Engines of France and the General Electric Company for the certification, sale, and support of CFM56 & LEAP series engines. The LEAP-1A engine series is a product line designed to power the Airbus A319neo/320neo/321neo aircraft. With respect to the benefits of type certification for production, General Electric and SAFRAN Aircraft Engines function as licensees of CFM International, S.A.

The location of final assembly can be inferred from the engine manufacturer, which will be identified on the engine nameplate, along with the date of production. Engines produced in the United States by GE are identical to and fully interchangeable with engines produced in France by SAFRAN Aircraft Engines.

Modules, assemblies, or parts produced in France are eligible for use in engines produced

to this type certificate provided an airworthiness approval certificate (EASA Form 1 – Authorized Release Certificate or JAA Form 1) issued by SAFRAN Aircraft Engines under authority of European Aviation Safety Agency (EASA) Production Certificate No. FR.21G.0007 is attached to the item or invoice covering shipment of items (Ref. 14 CFR § 21.502).

**NOTE 17.****LIFE LIMITED PART INFORMATION:**

Life limits established for critical engine parts are published in the ALS section of Chapter 05 of the LEAP-1A Engine Shop Manual, ESM.20.

**NOTE 18.****MILITARY MODEL INFORMATION:**

Not Applicable

**NOTE 19.****MAXIMUM PERMISSIBLE ENGINE ROTOR SPEEDS**

| SPOOL                    | RPM    | %     |
|--------------------------|--------|-------|
| Low pressure rotor (N1)  | 3,894  | 101.0 |
| High pressure rotor (N2) | 19,391 | 116.5 |

**NOTE 20.****OUTPUT/PROPELLER SHAFT TORQUE LIMITS**

Not Applicable

**NOTE 21.****BLEED AIR EXTRACTION PROVISIONS:****MAXIMUM PERMISSIBLE BLEED AIR EXTRACTION**

| LOCATION    | TEMPERATURE CORRECTED FAN SPEED | FLOW LIMIT               |
|-------------|---------------------------------|--------------------------|
| HPC Stage 4 | All speeds above minimum idle.  | 9.97% core airflow*      |
| HPC Stage7  | Above 2,314 RPM                 | 2.45% core airflow       |
|             | Below 2,314 RPM                 | 2.9% core airflow        |
| HPC Stage10 | All speeds above minimum idle.  | 15.0% of core airflow.   |
| Bypass Duct | All speeds above minimum idle.  | 2 % of secondary airflow |

\* - Absolute maximum. Refer to the LEAP-1A Installation Manual, for detailed Stage 4 bleed schedule.

**NOTE 22.****ROTOR DISK INTEGRITY AND ROTOR BLADE CONTAINMENT (where special requirements apply):**

Not Applicable

**NOTE J1**

This Type Approval Data Sheet (TADS) is based on FAA TCDS No. E00089EN Rev.8 dated Jul 19, 2023.

...END...