## HIGHLIGHTS

**Revision No. 25 - Feb 01/19**

<table>
<thead>
<tr>
<th>LOCATIONS</th>
<th>CHG CODE</th>
<th>DESCRIPTIONS OF CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAPTER 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 4-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 4-5-3</td>
<td></td>
<td>MODIFIED ILLUSTRATIONS TO IMPROVE LAYOUT FOR A321-100, A321-200 AND A321NEO. ILLUSTRATION REVISED PART EFFECTIVITY ADDED/REVISED/DELETED</td>
</tr>
<tr>
<td>180° Turn on a Runway</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>FIGURE 180° Turn on a Runway - Edge of Runway Method</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>
### LIST OF EFFECTIVE CONTENT

**Revision No. 25 - Feb 01/19**

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAPTER 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 1-1-0</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>Purpose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 1-2-0</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>Glossary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHAPTER 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 2-1-1</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>General Aircraft Characteristics Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 2-2-0</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>General Aircraft Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIGURE General Aircraft Dimensions - Wing Tip Fence</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE General Aircraft Dimensions</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE General Aircraft Dimensions for A321NEO-ACF</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>Subject 2-3-0</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>Ground Clearances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Wing Tip Fence</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Sharklet</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Trailing Edge Flaps - Extended</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Flap Tracks - Extended</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Flap Tracks - Retracted</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Flap Tracks - 1 + F</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Aileron Down</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Aileron Up</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Spoilers - Extended</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Clearances - Leading Edge Slats - Extended</td>
<td></td>
<td>May 01/15</td>
</tr>
</tbody>
</table>
## CONTENT

<table>
<thead>
<tr>
<th>Subject 2-4-1</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Arrangements - Plan View</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Interior Arrangements - Plan View - Typical Configuration - Single-Class, High Density</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Interior Arrangements - Plan View - Typical Configuration - Two-Class</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Interior Arrangements - Plan View for A321NEO-ACF - Typical Configuration - Single-Class, Standard</td>
<td></td>
<td>Feb 01/18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject 2-5-0</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Arrangements - Cross Section</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Interior Arrangements - Cross Section - Economy Class, 6 Abreast - Wider Aisle</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Interior Arrangements - Cross Section - First-Class</td>
<td></td>
<td>May 01/15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject 2-6-0</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo Compartments</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Cargo Compartments - Locations and Dimensions</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Cargo Compartments - Loading Combinations</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Cargo Compartments for A321NEO-ACF - Locations and Dimensions for A321NEO-ACF</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Cargo Compartments for A321NEO-ACF - Loading Combinations for A321NEO-ACF</td>
<td></td>
<td>Dec 01/17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject 2-7-0</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door Clearances</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Door Identification and Location - Door Identification</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Door Identification and Location for A321NEO-ACF - Door Identification for A321NEO-ACF</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Forward Passenger/Crew Doors</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Doors Clearances for A321NEO-ACF - Forward Passenger/Crew Doors for A321NEO-ACF</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Emergency Exits</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Doors Clearances for A321NEO-ACF - Emergency Exits for A321NEO-ACF</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Aft Passenger/Crew Doors</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances for A321NEO-ACF - Aft Passenger/Crew</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>Doors for A321NEO-ACF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIGURE Door Clearances - Forward Cargo Compartment Door</td>
<td>May 01/15</td>
<td></td>
</tr>
<tr>
<td>FIGURE Door Clearances - Forward Cargo Compartment Door</td>
<td>May 01/15</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Aft Cargo Compartment Door</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Bulk Cargo Compartment Door</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Main Landing Gear Doors</td>
<td>May 01/15</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances - Radome</td>
<td>May 01/15</td>
<td></td>
</tr>
<tr>
<td>FIGURE Doors Clearances - APU and Nose Landing Gear Doors</td>
<td>May 01/15</td>
<td></td>
</tr>
</tbody>
</table>

Subject 2-8-0

Escape Slides

FIGURE Escape Slides - Location

FIGURE Escape Slides - Dimensions

FIGURE Escape Slides for A321NEO-ACF - Location for A321NEO-ACF

FIGURE Escape Slides for A321NEO-ACF - Dimensions for A321NEO-ACF

Subject 2-9-0

Landing Gear

FIGURE Landing Gear - Main Landing Gear - Twin-Wheel

FIGURE Landing Gear - Main Landing Gear Dimensions - Twin-Wheel

FIGURE Landing Gear - Nose Landing Gear

FIGURE Landing Gear - Nose Landing Gear Dimensions

Landing Gear Maintenance Pits

FIGURE Landing Gear Maintenance Pits - Maintenance Pit Envelopes

FIGURE Landing Gear Maintenance Pits - Maintenance Pit Envelopes

Subject 2-10-0

Exterior Lighting

FIGURE Exterior Lighting
<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIGURE Exterior Lighting</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Exterior Lighting</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Exterior Lighting</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 2-11-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antennas and Probes Location</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Antennas and Probes - Location</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 2-12-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Power Unit</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Auxiliary Power Unit - Access Doors</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Auxiliary Power Unit - General Layout</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Engine and Nacelle</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Fan Cowls - CFM56 Series Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Thrust Reverser Cowls - CFM56 Series</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>Engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - IAE V2500 Series</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - IAE V2500 Series</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Fan Cowls - IAE V2500 Series Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Thrust Reverser Halves - IAE V2500 Series</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>Engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - PW 1100G Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Fan Cowls - PW 1100G Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Thrust Reverser Halves - PW 1100G Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - CFM LEAP-1A Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Power Plant Handling - Major Dimensions - CFM LEAP-1A Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>Subject 2-13-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leveling, Symmetry and Alignment</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Location of the Leveling Points</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 2-14-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jacking for Maintenance</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Jacking Point Locations</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Forward Jacking Point</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Wing Jacking Points</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Safety Stay</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Jacking Design</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Loads at the Aircraft Jacking Points - Wing Jacking Point</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>and Forward Fuselage Jacking Point</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking for Maintenance - Location of Shoring Cradles</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Jacking of the Landing Gear</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Jacking of the Landing Gear - MLG Jacking Point Location - Twin Wheels</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking of the Landing Gear - MLG Jacking with Cantilever Jack - Twin Wheels</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking of the Landing Gear - NLG Jacking - Point Location</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Jacking of the Landing Gear - Maximum Load Capacity to Lift Each Jacking Point</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>FIGURE Jacking of the Landing Gear - Maximum Load Capacity to Lift Each Jacking Point</td>
<td></td>
<td>May 01/17</td>
</tr>
</tbody>
</table>

**CHAPTER 3**

Subject 3-1-0

- General Information

Subject 3-2-1

---

L.E.C.
Page 5
Feb 01/19
<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payload/Range - ISA Conditions</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Payload/Range - ISA Conditions</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Payload/Range - ISA Conditions - Sharklet</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Payload/Range - ISA Conditions</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 3-3-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take-Off Weight Limitation - ISA Conditions</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA Conditions - CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA Conditions - IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA Conditions - LEAP-1A Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 3-3-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take-Off Weight Limitation - ISA +15°C (+27°F) Conditions</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA +15°C (+27°F) Conditions - CFM56 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA +15°C (+27°F) Conditions - IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Take-Off Weight Limitation - ISA +15°C (+27°F) Conditions - LEAP-1A Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 3-3-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerodrome Reference Code</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 3-4-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landing Field Length - ISA Conditions</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Field Length - ISA Conditions - CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Field Length - ISA Conditions - IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 3-5-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Approach Speed</td>
<td></td>
<td>Feb 01/18</td>
</tr>
</tbody>
</table>

CHAPTER 4
<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 4-1-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Information</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 4-2-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turning Radii</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Turning Radii, No Slip Angle - (Sheet 1)</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Turning Radii, No Slip Angle - (Sheet 2)</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Subject 4-3-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Turning Radii</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Minimum Turning Radii</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 4-4-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visibility from Cockpit in Static Position</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Visibility from Cockpit in Static Position</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Binocular Visibility Through Windows from Captain Eye Position</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 4-5-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway and Taxiway Turn Paths</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 4-5-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>135° Turn - Runway to Taxiway</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE 135° Turn - Runway to Taxiway - Cockpit Over Centerline Method</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE 135° Turn - Runway to Taxiway - Judgemental Oversteering Method</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 4-5-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90° Turn - Runway to Taxiway</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE 90° Turn - Runway to Taxiway - Cockpit Over Centerline Method</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE 90° Turn - Runway to Taxiway - Judgemental Oversteering Method</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 4-5-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180° Turn on a Runway</td>
<td>R</td>
<td>Feb 01/19</td>
</tr>
<tr>
<td>FIGURE 180° Turn on a Runway - Edge of Runway Method</td>
<td>R</td>
<td>Feb 01/19</td>
</tr>
<tr>
<td>Subject 4-5-4</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>135° Turn - Taxiway to Taxiway</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE 135° Turn - Taxiway to Taxiway - Cockpit Over Centerline Method</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>Subject 4-5-5</td>
<td>Meter</td>
<td></td>
</tr>
<tr>
<td>90° Turn - Taxiway to Taxiway</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE 90° Turn - Taxiway to Taxiway - Cockpit Over Centerline Method</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>Subject 4-6-0</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>Runway Holding Bay (Apron)</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Runway Holding Bay (Apron)</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>Subject 4-7-0</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>Minimum Line-Up Distance Corrections</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Minimum Line-Up Distance Corrections - 90° Turn on Runway Entry</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Minimum Line-Up Distance Corrections - 180° Turn on Runway Turn Pad</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Minimum Line-Up Distance Corrections - 180° Turn on Runway Width</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>Subject 4-8-0</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>Aircraft Mooring</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Mooring</td>
<td>May 01/14</td>
<td></td>
</tr>
</tbody>
</table>

CHAPTER 5

Subject 5-1-1

Aircraft Servicing Arrangements | May 01/14 |

Subject 5-1-2

Typical Ramp Layout - Open Apron | May 01/14 |
| FIGURE Typical Ramp Layout - Open Apron - Bulk Loading | May 01/14 |
| FIGURE Typical Ramp Layout - Open Apron - ULD Loading | May 01/14 |

Subject 5-1-3

Typical Ramp Layout - Gate | May 01/14 |
<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIGURE Typical Ramp Layout - Gate</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-2-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal Operations - Full Servicing Turn Round Time</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Full Servicing Turn Round Time Chart</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Full Servicing Turn Round Time Chart for A321NEO-ACF</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 5-3-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal Operations - Transit Turn Round Time</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Outstation Turn Round Time Chart</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Outstation Turn Round Time Chart for A321NEO-ACF</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 5-4-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Service Connections Layout</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections Layout</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding (Earthing) Points</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Grounding (Earthing) Points - Landing Gear</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Grounding (Earthing) Points - Wing (If Installed)</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Grounding (Earthing) Point - Avionics Compartment Door-Frame</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Grounding (Earthing) Point - Engine Air Intake (If Installed)</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic Servicing</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Green System Ground Service Panel</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Blue System Ground Service Panel</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Yellow System Ground Service Panel</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - RAT</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Subject 5-4-4 Electrical System</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - External Power Receptacles</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-5 Oxygen System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Oxygen System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-6 Fuel System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Refuel/Defuel Control Panel</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Refuel/Defuel Couplings</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Overwing Gravity-Refuel Cap (If Installed)</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Overpressure Protectors and NACA Vent Intake</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-7 Pneumatic System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - LP and HP Ground Connectors</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-8 Oil System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Engine Oil Tank – CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - IDG Oil Tank – CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Starter Oil Tank – CFM56 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Engine Oil Tank – IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - IDG Oil Tank – IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Starter Oil Tank – IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - APU Oil Tank</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potable Water System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Potable Water Ground Service Panels</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Potable Water Tank Location</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-4-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum Toilet System</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Waste Water Ground Service Panel</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Service Connections - Waste Tank Location</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-5-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Starting Pneumatic Requirements</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Example for Use of the Charts</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Engine Starting Pneumatic Requirements - IAE V2500 Series Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Engine Starting Pneumatic Requirements - CFM56 Series and CFM LEAP-1A NEO Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Engine Starting Pneumatic Requirements - PW 1100G NEO Engine</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-6-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Pneumatic Power Requirements</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Ground Pneumatic Power Requirements - Heating</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Ground Pneumatic Power Requirements - Cooling</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>Subject 5-7-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preconditioned Airflow Requirements</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Preconditioned Airflow Requirements</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>Subject 5-8-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Towing Requirements</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Ground Towing Requirements</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Ground Towing Requirements - PW 1100G Engine</td>
<td></td>
<td>May 01/17</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Subject 5-9-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>De-Icing and External Cleaning</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>CHAPTER 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 6-1-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Exhaust Velocities and Temperatures</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Subject 6-1-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Exhaust Velocities Contours - Ground Idle Power</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Ground Idle Power – CFM56-5B Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Ground Idle Power – IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Ground Idle Power – CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Ground Idle Power – PW 1100G Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Subject 6-1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Exhaust Temperatures Contours - Ground Idle Power</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Ground Idle Power – CFM56-5B Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Ground Idle Power – IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Ground Idle Power – CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Ground Idle Power – PW 1100G Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Subject 6-1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Exhaust Velocities Contours - Breakaway Power</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power 12% MTO – CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power 12% MTO – PW 1100G Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power 24% MTO - CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power 24% MTO - PW 1100G Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power - CFM56 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Velocities - Breakaway Power - IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
</tbody>
</table>

**Subject 6-1-4**

| FIGURE Engine Exhaust Temperatures Contours - Breakaway Power | Dec 01/18 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power 12% MTO - CFM LEAP-1A Engine | Dec 01/15 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power 12% MTO - PW 1100G Engine | Dec 01/15 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power 24% MTO - CFM LEAP-1A Engine | Dec 01/15 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power 24% MTO - PW 1100G Engine | Dec 01/15 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power - CFM56 Series Engine | Dec 01/18 |
| FIGURE Engine Exhaust Temperatures - Breakaway Power - IAE V2500 Series Engine | Dec 01/18 |

**Subject 6-1-5**

| Engine Exhaust Velocities Contours - Takeoff Power | Dec 01/15 |
| FIGURE Engine Exhaust Velocities - Takeoff Power - CFM56-5B Series Engine | Dec 01/15 |
| FIGURE Engine Exhaust Velocities - Takeoff Power - IAE V2500 Series Engine | Dec 01/15 |
| FIGURE Engine Exhaust Velocities - Takeoff Power - CFM LEAP-1A Engine | Dec 01/15 |
| FIGURE Engine Exhaust Velocities - Takeoff Power - PW 1100G Engine | Dec 01/15 |

**Subject 6-1-6**
<table>
<thead>
<tr>
<th>CONTENT</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Exhaust Temperatures Contours - Takeoff Power</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Takeoff Power – CFM56-5B Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Takeoff Power – IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Takeoff Power - CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Engine Exhaust Temperatures - Takeoff Power - PW 1100G Engine</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Subject 6-3-0</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Danger Areas of Engines</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 6-3-1</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>Ground Idle Power</td>
<td></td>
<td>Dec 01/15</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - CFM56-5B Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - PW 1100G Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 6-3-2</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>Breakaway Power</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - CFM56-5B Series Engine</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - IAE V2500 Series Engine</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - CFM LEAP-1A Engine</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engines - PW 1100G Engine</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>Subject 6-3-3</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>Take Off Power</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engine - CFM56-5B Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engine - IAE V2500 Series Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engine - CFM LEAP-1A Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Danger Areas of the Engine - PW 1100G Engine</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 6-4-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>APU - APIC &amp; GARRETT</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Exhaust Velocities and Temperatures - APU – APIC &amp; GARRETT</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td><strong>CHAPTER 7</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject 7-1-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Information</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>Subject 7-2-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landing Gear Footprint</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Landing Gear Footprint</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Gear Footprint</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Landing Gear Footprint</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 7-3-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Pavement Loads</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Maximum Pavement Loads</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Maximum Pavement Loads</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Maximum Pavement Loads</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>Subject 7-4-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landing Gear Loading on Pavement</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV004, MRW 78 400 kg, CG 41%</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV008, MRW 89 400 kg, CG 38%</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV009, MRW 78 400 kg, CG 39.21%</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV011, MRW 93 900 kg, CG 36.88%</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV070, MRW 80 400 kg, CG 39.71%</td>
<td></td>
<td>Dec 01/18</td>
</tr>
<tr>
<td>FIGURE Landing Gear Loading on Pavement - WV071, MRW 97 400 kg, CG 36.07%</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>Subject 7-5-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Flexible Pavement Requirements - US Army Corps of Engineers Design Method</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV004, MRW 78 400 kg, CG 41 %</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV008, MRW 89 400 kg, CG 38 %</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV009, MRW 78 400 kg, CG 39.21%</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV011, MRW 93 900 kg, CG 36.88 %</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV070, MRW 80 900 kg, CG 39.71 %</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Flexible Pavement Requirements - WV071, MRW 97 400 kg, CG 36.07 %</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>Subject 7-6-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Pavement Requirements - LCN Conversion</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>Subject 7-7-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rigid Pavement Requirements - Portland Cement Association Design Method</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV004, MRW 78 400 kg, CG 41 %</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV008, MRW 89 400 kg, CG 38 %</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV009, MRW 78 400 kg, CG 39.21%</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV011, MRW 93 900 kg, CG 36.88 %</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV070, MRW 80 400 kg, CG 39.71 %</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>FIGURE Rigid Pavement Requirements - WV071, MRW 97 400 kg</td>
<td></td>
<td>Dec 01/17</td>
</tr>
<tr>
<td>Subject 7-8-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rigid Pavement Requirements - LCN Conversion</td>
<td></td>
<td>May 01/15</td>
</tr>
<tr>
<td>Subject 7-9-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aircraft Classification Number - Flexible and Rigid Pavements</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>CONTENT</td>
<td>CHG CODE</td>
<td>LAST REVISION DATE</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - ACN Table</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV004, MRW 78 400 kg, CG 41 %</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV008, MRW 89 400 kg, CG 38 %</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - ACN Table</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV009, MRW 78 400 kg, CG 39.21 %</td>
<td>Dec 01/17</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV011, MRW 93 900 kg, CG 36.88 %</td>
<td>May 01/14</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - ACN Table</td>
<td>Dec 01/18</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV070, MRW 80 400 kg, CG 39.71 %</td>
<td>May 01/15</td>
<td></td>
</tr>
<tr>
<td>FIGURE Aircraft Classification Number - Flexible Pavement - WV071, MRW 97 400 kg, CG 36.07 %</td>
<td>Dec 01/17</td>
<td></td>
</tr>
</tbody>
</table>

**CHAPTER 8**
Subject 8-0-0
- Scaled Drawings | Dec 01/15
- FIGURE Scaled Drawing | Dec 01/15
- FIGURE Scaled Drawing | Dec 01/15

**CHAPTER 10**
Subject 10-0-0
- Aircraft Rescue and Fire Fighting | Feb 01/18
- FIGURE Front Page | May 01/16
- FIGURE Highly Flammable and Hazardous Materials and Components | May 01/15
- FIGURE Highly Flammable and Hazardous Materials and Components for A321NEO-ACF | Feb 01/18
- FIGURE Batteries Location and Access | May 01/15
- FIGURE Wheel/Brake Overheat - Wheel Safety Area | May 01/16
- FIGURE Composite Materials | May 01/14
## CONTENT

<table>
<thead>
<tr>
<th>FIGURE L/G Ground Lock Safety Devices</th>
<th>CHG CODE</th>
<th>LAST REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIGURE Emergency Evacuation Devices</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Emergency Evacuation Devices for A321NEO-ACF</td>
<td></td>
<td>Feb 01/18</td>
</tr>
<tr>
<td>FIGURE Pax/Crew Doors and Emergency Exits</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE FWD and AFT Lower Deck Cargo Doors</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Control Panels</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE APU Access Door</td>
<td></td>
<td>May 01/14</td>
</tr>
<tr>
<td>FIGURE Aircraft Ground Clearances</td>
<td></td>
<td>May 01/16</td>
</tr>
<tr>
<td>FIGURE Structural Break-in Points</td>
<td></td>
<td>May 01/14</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

1 SCOPE
1-1-0 Introduction
1-2-0 Glossary

2 AIRCRAFT DESCRIPTION
2-1-1 General Aircraft Characteristics Data
2-2-0 General Aircraft Dimensions
2-3-0 Ground Clearances
2-4-1 Interior Arrangements - Plan View
2-5-0 Interior Arrangements - Cross Section
2-6-0 Cargo Compartments
2-7-0 Door Clearances and Location
2-8-0 Escape Slides
2-9-0 Landing Gear
2-10-0 Exterior Lighting
2-11-0 Antennas and Probes Location
2-12-0 Power Plant
2-13-0 Leveling, Symmetry and Alignment
2-14-0 Jacking

3 AIRCRAFT PERFORMANCE
3-1-0 General Information
3-2-1 Payload / Range - ISA Conditions
3-3-1 Take-off Weight Limitation - ISA Conditions
3-3-2 Take-off Weight Limitation - ISA +15°C (+59°F) Conditions
3-3-3 Aerodrome Reference Code
3-4-1 Landing Field Length - ISA Conditions
3-5-0 Final Approach Speed

4 GROUND MANEUVERING
4-1-0 General Information
4-2-0 Turning Radii
4-3-0 Minimum Turning Radii
4-4-0 Visibility from Cockpit in Static Position
4-5-0 Runway and Taxiway Turn Paths
4-5-1  135° Turn - Runway to Taxiway
4-5-2  90° Turn - Runway to Taxiway
4-5-3  180° Turn on a Runway
4-5-4  135° Turn - Taxiway to Taxiway
4-5-5  90° Turn - Taxiway to Taxiway
4-6-0  Runway Holding Bay (Apron)
4-7-0  Minimum Line-Up Distance Corrections
4-8-0  Aircraft Mooring

5  TERMINAL SERVICING
5-1-1  Aircraft Servicing Arrangements
5-1-2  Typical Ramp Layout - Open Apron
5-1-3  Typical Ramp Layout - Gate
5-2-0  Terminal Operations - Full Servicing Turn Round Time Chart
5-3-0  Terminal Operation - Outstation Turn Round Time Chart
5-4-1  Ground Service Connections
5-4-2  Grounding Points
5-4-3  Hydraulic System
5-4-4  Electrical System
5-4-5  Oxygen System
5-4-6  Fuel System
5-4-7  Pneumatic System
5-4-8  Oil System
5-4-9  Potable Water System
5-4-10 Waste Water System
5-5-0  Engine Starting Pneumatic Requirements
5-6-0  Ground Pneumatic Power Requirements
5-7-0  Preconditioned Airflow Requirements
5-8-0  Ground Towing Requirements
5-9-0  De-Icing and External Cleaning

6  OPERATING CONDITIONS
6-1-0  Engine Exhaust Velocities and Temperatures
6-1-1  Engine Exhaust Velocities Contours - Ground Idle Power
6-1-2  Engine Exhaust Temperatures Contours - Ground Idle Power
6-1-3  Engine Exhaust Velocities Contours - Breakaway Power
6-1-4  Engine Exhaust Temperatures Contours - Breakaway Power
6-1-5  Engine Exhaust Velocities Contours - Takeoff Power
6-1-6 Engine Exhaust Temperatures Contours - Takeoff Power
6-3-0 Danger Areas of Engines
6-3-1 Ground Idle Power
6-3-2 Breakaway Power
6-3-3 Max Take Off Power
6-4-1 APU

7 PAVEMENT DATA
7-1-0 General Information
7-2-0 Landing Gear Footprint
7-3-0 Maximum Pavement Loads
7-4-0 Landing Gear Loading on Pavement
7-5-0 Flexible Pavement Requirements - U.S. Army Corps of Engineers Design Method
7-6-0 Flexible Pavement Requirements - LCN Conversion
7-7-0 Rigid Pavement Requirements - Portland Cement Association Design Method
7-8-0 Rigid Pavement Requirements - LCN Conversion
7-9-0 ACN/PCN Reporting System - Flexible and Rigid Pavements

8 SCALED DRAWINGS
8-0-0 SCALED DRAWINGS

10 AIRCRAFT RESCUE AND FIRE FIGHTING
10-0-0 AIRCRAFT RESCUE AND FIRE FIGHTING
Introduction

**ON A/C A321-100 A321-200 A321neo

Purpose

1. General

The A321 AIRCRAFT CHARACTERISTICS – AIRPORT AND MAINTENANCE PLANNING (AC) manual is issued for the A321-100 and A321-200 series aircraft equipped with wing-tip fences or sharklets, to provide necessary data to airport operators, airlines and Maintenance/Repair Organizations (MRO) for airport and maintenance facilities planning.

Preliminary information on neo (New Engine Option) given in this document can be subject to change, pending completion of the flight test phase.

This document is not customized and must not be used for training purposes. No information within may constitute a contractual commitment.

The A320 Family is the world’s best-selling single-aisle aircraft. An A320 takes off or lands somewhere in the world every 2.5 seconds of every day, the family has logged more than 50 million cycles since entry-into-service and records a best-in-class dispatch reliability of 99.7%.

To ensure this true market leadership, Airbus continues to invest in improvements in the A320 Family: enhancements to aerodynamics such as the sharklet wingtip devices, upgrades to the widest passenger cabin in its class, the A320 Family neo. The latter combines top-of-class engine efficiency offered by two new engine options: the PW1100G PurePower from Pratt&Whitney and the LEAP-1A from CFM International with superior aerodynamics offered by the new sharklet devices.

The neo will offer a minimum of 15% fuel savings and an additional flight range of about 500 nm (926 km). For the environment, the neo fuel savings will translate into some 3 600 t (7,936,639 lb) less CO2 per aircraft per year, together with a double-digit reduction in NOx emissions and reduced engine noise.
## Glossary

**ON A/C A321-100 A321-200 A321neo**

1. **List of Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>Aircraft</td>
</tr>
<tr>
<td>ACF</td>
<td>Aircraft Cabin Flex</td>
</tr>
<tr>
<td>ACN</td>
<td>Aircraft Classification Number</td>
</tr>
<tr>
<td>AMM</td>
<td>Aircraft Maintenance Manual</td>
</tr>
<tr>
<td>APU</td>
<td>Auxiliary Power Unit</td>
</tr>
<tr>
<td>B/C</td>
<td>Business Class</td>
</tr>
<tr>
<td>CBR</td>
<td>California Bearing Ratio</td>
</tr>
<tr>
<td>CC</td>
<td>Cargo Compartment</td>
</tr>
<tr>
<td>CG</td>
<td>Center of Gravity</td>
</tr>
<tr>
<td>CKPT</td>
<td>Cockpit</td>
</tr>
<tr>
<td>E</td>
<td>Young's Modulus</td>
</tr>
<tr>
<td>ELEC</td>
<td>Electric, Electrical, Electricity</td>
</tr>
<tr>
<td>ESWL</td>
<td>Equivalent Single Wheel Load</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>F/C</td>
<td>First Class</td>
</tr>
<tr>
<td>FDL</td>
<td>Fuselage Datum Line</td>
</tr>
<tr>
<td>FR</td>
<td>Frame</td>
</tr>
<tr>
<td>FSTE</td>
<td>Full Size Trolley Equivalent</td>
</tr>
<tr>
<td>FWD</td>
<td>Forward</td>
</tr>
<tr>
<td>GPU</td>
<td>Ground Power Unit</td>
</tr>
<tr>
<td>GSE</td>
<td>Ground Support Equipment</td>
</tr>
<tr>
<td>HYD</td>
<td>Hydraulic</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organisation</td>
</tr>
<tr>
<td>IDG</td>
<td>Integrated Drive Generator</td>
</tr>
<tr>
<td>ISA</td>
<td>International Standard Atmosphere</td>
</tr>
<tr>
<td>L</td>
<td>Left</td>
</tr>
<tr>
<td>L</td>
<td>Radius of relative stiffness</td>
</tr>
<tr>
<td>LCN</td>
<td>Load Classification Number</td>
</tr>
<tr>
<td>LD</td>
<td>Lower Deck</td>
</tr>
<tr>
<td>L/G</td>
<td>Landing Gear</td>
</tr>
<tr>
<td>LH</td>
<td>Left Hand</td>
</tr>
<tr>
<td>LPS</td>
<td>Last Pax Seating</td>
</tr>
<tr>
<td>MAC</td>
<td>Mean Aerodynamic Chord</td>
</tr>
</tbody>
</table>
2. Design Weight Terminology

- **Maximum Design Ramp Weight (MRW):**
  Maximum weight for ground maneuver (including weight of taxi and run-up fuel) as limited by aircraft strength and airworthiness requirements. It is also called Maximum Design Taxi Weight (MTW).

- **Maximum Design Landing Weight (MLW):**
  Maximum weight for landing as limited by aircraft strength and airworthiness requirements.

- **Maximum Design Takeoff Weight (MTOW):**
  Maximum weight for takeoff as limited by aircraft strength and airworthiness requirements. (This is the maximum weight at start of the take-off run).

- **Maximum Design Zero Fuel Weight (MZFW):**
  Maximum permissible weight of the aircraft without usable fuel.

- **Maximum Seating Capacity:**
  Maximum number of passengers specifically certified or anticipated for certification.

- **Usable Volume:**
  Usable volume available for cargo, pressurized fuselage, passenger compartment and cockpit.

- **Water Volume:**
  Maximum volume of cargo compartment.

- **Usable Fuel:**
  Fuel available for aircraft propulsion.
### AIRCRAFT DESCRIPTION

**ON A/C A321-100 A321-200 A321neo**

General Aircraft Characteristics Data

**ON A/C A321-100**

1. The following table provides characteristics of A321-100 models, these data are specific to each weight variant:

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV000</th>
<th>WV002</th>
<th>WV003</th>
<th>WV004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>83 400 kg</td>
<td>83 400 kg</td>
<td>85 400 kg</td>
<td>78 400 kg</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>(183 865 lb)</td>
<td>(183 865 lb)</td>
<td>(188 275 lb)</td>
<td>(172 842 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>83 000 kg</td>
<td>83 000 kg</td>
<td>85 000 kg</td>
<td>78 000 kg</td>
</tr>
<tr>
<td></td>
<td>(182 984 lb)</td>
<td>(182 984 lb)</td>
<td>(187 393 lb)</td>
<td>(171 961 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>73 500 kg</td>
<td>74 500 kg</td>
<td>74 500 kg</td>
<td>73 500 kg</td>
</tr>
<tr>
<td></td>
<td>(162 040 lb)</td>
<td>(164 244 lb)</td>
<td>(164 244 lb)</td>
<td>(162 040 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>69 500 kg</td>
<td>70 500 kg</td>
<td>70 500 kg</td>
<td>69 500 kg</td>
</tr>
<tr>
<td></td>
<td>(153 221 lb)</td>
<td>(155 426 lb)</td>
<td>(155 426 lb)</td>
<td>(153 221 lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV005</th>
<th>WV006</th>
<th>WV007</th>
<th>WV008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>83 400 kg</td>
<td>78 400 kg</td>
<td>80 400 kg</td>
<td>89 400 kg</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>(183 865 lb)</td>
<td>(172 842 lb)</td>
<td>(177 252 lb)</td>
<td>(197 093 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>83 000 kg</td>
<td>78 000 kg</td>
<td>80 000 kg</td>
<td>89 000 kg</td>
</tr>
<tr>
<td></td>
<td>(182 984 lb)</td>
<td>(171 961 lb)</td>
<td>(176 370 lb)</td>
<td>(196 211 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>75 000 kg</td>
<td>74 500 kg</td>
<td>73 500 kg</td>
<td>75 500 kg</td>
</tr>
<tr>
<td></td>
<td>(165 347 lb)</td>
<td>(164 244 lb)</td>
<td>(162 040 lb)</td>
<td>(166 449 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>71 000 kg</td>
<td>70 500 kg</td>
<td>69 500 kg</td>
<td>71 500 kg</td>
</tr>
<tr>
<td></td>
<td>(156 528 lb)</td>
<td>(155 426 lb)</td>
<td>(153 221 lb)</td>
<td>(157 630 lb)</td>
</tr>
</tbody>
</table>
2. The following table provides characteristics of A321-200 models, these data are specific to each weight variant:

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV000</th>
<th>WV001</th>
<th>WV002</th>
<th>WV003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>89 400 kg (197 093 lb)</td>
<td>93 400 kg (205 912 lb)</td>
<td>89 400 kg (197 093 lb)</td>
<td>91 400 kg (201 502 lb)</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>89 000 kg (196 211 lb)</td>
<td>93 000 kg (205 030 lb)</td>
<td>89 000 kg (196 211 lb)</td>
<td>91 000 kg (200 621 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>87 000 kg (191 802 lb)</td>
<td>85 000 kg (187 393 lb)</td>
<td>83 000 kg (182 984 lb)</td>
<td>83 000 kg (182 984 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>75 500 kg (166 449 lb)</td>
<td>75 500 kg (166 449 lb)</td>
<td>75 500 kg (166 449 lb)</td>
<td>77 800 kg (171 520 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>71 500 kg (157 630 lb)</td>
<td>73 800 kg (162 701 lb)</td>
<td>73 800 kg (162 701 lb)</td>
<td>73 800 kg (162 701 lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV004</th>
<th>WV005</th>
<th>WV006</th>
<th>WV007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>87 400 kg (192 684 lb)</td>
<td>85 400 kg (188 275 lb)</td>
<td>83 400 kg (183 865 lb)</td>
<td>83 400 kg (183 865 lb)</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>87 000 kg (191 802 lb)</td>
<td>85 000 kg (187 393 lb)</td>
<td>83 000 kg (182 984 lb)</td>
<td>83 000 kg (182 984 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>80 000 kg (176 370 lb)</td>
<td>78 000 kg (171 961 lb)</td>
<td>85 000 kg (187 393 lb)</td>
<td>93 500 kg (206 132 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>73 500 kg (162 040 lb)</td>
<td>73 500 kg (162 040 lb)</td>
<td>77 800 kg (171 520 lb)</td>
<td>77 800 kg (171 520 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>69 500 kg (153 221 lb)</td>
<td>69 500 kg (153 221 lb)</td>
<td>73 800 kg (162 701 lb)</td>
<td>73 800 kg (162 701 lb)</td>
</tr>
</tbody>
</table>
3. The following table provides characteristics of A321NEO models, these data are specific to each weight variant:

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV050</th>
<th>WV051</th>
<th>WV052</th>
<th>WV053</th>
<th>WV056</th>
<th>WV065</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>89 400 kg</td>
<td>89 400 kg</td>
<td>93 900 kg</td>
<td>93 900 kg</td>
<td>92 900 kg</td>
<td>90 900 kg</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>(197 093 lb)</td>
<td>(197 093 lb)</td>
<td>(207 014 lb)</td>
<td>(207 014 lb)</td>
<td>(204 809 lb)</td>
<td>(200 400 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>89 000 kg</td>
<td>89 000 kg</td>
<td>93 500 kg</td>
<td>93 500 kg</td>
<td>92 500 kg</td>
<td>90 500 kg</td>
</tr>
<tr>
<td></td>
<td>(196 211 lb)</td>
<td>(196 211 lb)</td>
<td>(206 132 lb)</td>
<td>(206 132 lb)</td>
<td>(203 928 lb)</td>
<td>(199 518 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>77 300 kg</td>
<td>79 200 kg</td>
<td>77 300 kg</td>
<td>79 200 kg</td>
<td>77 300 kg</td>
<td>79 200 kg</td>
</tr>
<tr>
<td></td>
<td>(170 417 lb)</td>
<td>(174 606 lb)</td>
<td>(170 417 lb)</td>
<td>(174 606 lb)</td>
<td>(170 417 lb)</td>
<td>(174 606 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>73 300 kg</td>
<td>75 600 kg</td>
<td>73 300 kg</td>
<td>75 600 kg</td>
<td>73 300 kg</td>
<td>75 600 kg</td>
</tr>
<tr>
<td></td>
<td>(161 599 lb)</td>
<td>(166 669 lb)</td>
<td>(161 599 lb)</td>
<td>(166 669 lb)</td>
<td>(161 599 lb)</td>
<td>(166 669 lb)</td>
</tr>
</tbody>
</table>

4. The following table provides characteristics of A321-100, A321-200 and A321NEO models, these data are common to each weight variant:

<table>
<thead>
<tr>
<th>Aircraft Characteristics</th>
<th>WV070</th>
<th>WV071 (ACF)</th>
<th>WV072 (ACF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ramp Weight (MRW)</td>
<td>80 400 kg</td>
<td>80 400 kg</td>
<td>97 400 kg</td>
</tr>
<tr>
<td>Maximum Taxi Weight (MTW)</td>
<td>(177 252 lb)</td>
<td>(177 252 lb)</td>
<td>(214 730 lb)</td>
</tr>
<tr>
<td>Maximum Take-Off Weight (MTOW)</td>
<td>80 000 kg</td>
<td>80 000 kg</td>
<td>97 000 kg</td>
</tr>
<tr>
<td></td>
<td>(176 370 lb)</td>
<td>(176 370 lb)</td>
<td>(213 848 lb)</td>
</tr>
<tr>
<td>Maximum Landing Weight (MLW)</td>
<td>71 500 kg</td>
<td>71 500 kg</td>
<td>79 200 kg</td>
</tr>
<tr>
<td></td>
<td>(157 630 lb)</td>
<td>(157 630 lb)</td>
<td>(174 606 lb)</td>
</tr>
<tr>
<td>Maximum Zero Fuel Weight (MZFW)</td>
<td>67 000 kg</td>
<td>73 300 kg</td>
<td>75 600 kg</td>
</tr>
<tr>
<td></td>
<td>(147 710 lb)</td>
<td>(161 599 lb)</td>
<td>(166 669 lb)</td>
</tr>
</tbody>
</table>

**ON A/C A321-100 A321-200 A321neo**
## Aircraft Characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>A321CEO CFMI</th>
<th>A321CEO IAE</th>
<th>A321NEO</th>
<th>A321NX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usable Fuel Capacity (density = 0.785 kg/l)</td>
<td>23 700 l - 26 692 l * - 29 684 l ** (6 261 US gal - 7 051 US gal * - 7 842 US gal **)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td>2992 l (790 US gal)</td>
<td>2992 l (790 US gal)</td>
<td>3121 l (824 US gal)</td>
<td></td>
</tr>
<tr>
<td>Basic Aircraft</td>
<td>24050 l (6353 US gal)</td>
<td>23700 l (6261 US gal)</td>
<td>23490 l (6205 US gal)</td>
<td></td>
</tr>
<tr>
<td>With 1 ACT</td>
<td>27042 l (7144 US gal)</td>
<td>26692 l (7051 US gal)</td>
<td>26482 l (6996 US gal)</td>
<td>26611 l (7030 US gal)</td>
</tr>
<tr>
<td>With 2 ACTs</td>
<td>30034 l (7934 US gal)</td>
<td>29684 l (7842 US gal)</td>
<td>29474 l (7786 US gal)</td>
<td>29782 l (7868 US gal)</td>
</tr>
<tr>
<td>With 3 ACTs (applicable only for ACF)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>32853 l *** (8679 US gal ***)</td>
</tr>
<tr>
<td>Pressurized Fuselage Volume (A/C non equipped)</td>
<td>418 m³ (14 762 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger Compartment Volume</td>
<td>155 m³ (5 474 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cockpit Volume</td>
<td>9 m³ (318 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usable Volume, FWD CC</td>
<td>22.81 m³ (806 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usable Volume, AFT CC</td>
<td>23.03 m³ (813 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usable Volume, Bulk CC</td>
<td>5.88 m³ (208 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Volume, FWD CC</td>
<td>25.42 m³ (898 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Volume, AFT CC</td>
<td>25.69 m³ (907 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Volume, Bulk CC</td>
<td>7.76 m³ (274 ft³)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* OPTION: 1 ACT  
** OPTION: 2 ACT  
*** OPTION: 3 ACT
General Aircraft Dimensions

**ON A/C A321-100 A321-200 A321neo**

General Aircraft Dimensions
1. This section provides general aircraft dimensions.
**ON A/C A321-100 A321-200**

NOTE: RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions
Wing Tip Fence (Sheet 1 of 4)
FIGURE-2-2-0-991-005-A01
**ON A/C A321-100 A321-200**

---

**NOTE:**

RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions

Wing Tip Fence (Sheet 2 of 4)

FIGURE-2-2-0-991-005-A01

Page 3

Feb 01/19
**ON A/C A321-100 A321-200**

NOTE: RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions
Sharklet (Sheet 3 of 4)
FIGURE-2-2-0-991-005-A01
**ON A/C A321-100 A321-200**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.51 m</td>
<td>146.03 ft</td>
</tr>
<tr>
<td>5.75 m</td>
<td>18.86 ft</td>
</tr>
<tr>
<td>6.07 m</td>
<td>19.91 ft</td>
</tr>
<tr>
<td>3.95 m</td>
<td>12.96 ft</td>
</tr>
<tr>
<td>3.31 m</td>
<td>10.86 ft</td>
</tr>
<tr>
<td>1.24 m</td>
<td>4.07 ft</td>
</tr>
<tr>
<td>1.64 m</td>
<td>5.38 ft</td>
</tr>
<tr>
<td>3.22 m</td>
<td>10.56 ft</td>
</tr>
<tr>
<td>27.72 m</td>
<td>90.94 ft</td>
</tr>
<tr>
<td>15.46 m</td>
<td>50.72 ft</td>
</tr>
<tr>
<td>15.39 m</td>
<td>50.49 ft</td>
</tr>
<tr>
<td>4.87 m</td>
<td>15.98 ft</td>
</tr>
<tr>
<td>8.30 m</td>
<td>27.23 ft</td>
</tr>
<tr>
<td>11.91 m</td>
<td>39.07 ft</td>
</tr>
<tr>
<td>16.29 m</td>
<td>53.44 ft</td>
</tr>
</tbody>
</table>

**NOTE:**
RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions
Sharklet (Sheet 4 of 4)
FIGURE-2-2-0-991-005-A01

N_AC_020200_1_0050105_01_02
**ON A/C A321neo

NOTE:
RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions
(Sheet 1 of 2)
FIGURE-2-2-0-991-010-A01
**ON A/C A321neo**

NOTE:
RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions
(Sheet 2 of 2)
FIGURE-2-2-0-991-010-A01
**ON A/C A321neo

NOTE:
RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.

General Aircraft Dimensions for A321NEO-ACF
(Sheet 1 of 2)
FIGURE-2-2-0-991-012-A01
**ON A/C A321neo

General Aircraft Dimensions for A321NEO-ACF
(Sheet 2 of 2)
FIGURE-2-2-0-991-012-A01

NOTE:
RELATED TO AIRCRAFT ATTITUDE AND WEIGHT.
2-3-0  Ground Clearances

**ON A/C A321-100 A321-200 A321neo**

Ground Clearances

1. This section provides the height of various points of the aircraft, above the ground, for different aircraft configurations.

   Dimensions in the tables are approximate and will vary with tire type, weight and balance and other special conditions.

   The dimensions are given for:
   - A light weight, for an A/C in maintenance configuration with a mid CG,
   - An aircraft at Maximum Ramp Weight with a FWD CG and an AFT CG,
   - Aircraft on jacks, FDL at 4.60 m (15.09 ft).

   **NOTE**: Passenger and cargo door ground clearances are measured from the center of the door sill and from floor level.
**ON A/C A321-100 A321-200**

A/C CONFIGURATION | MRW | 47 000 kg (103 617 lb) | A/C JACKED
|-------------------|-----|------------------------|-------------------
|                   | m   | ft                     | m                |
| FWD CG (19%)      |     |                        |                  |
| D1                | 3.39| 11.12                  | 3.47             |
| D2                | 3.45| 11.32                  | 3.48             |
| D3                | 3.89| 12.76                  | 3.90             |
| D4                | 3.61| 11.84                  | 3.53             |
| C1                | 1.99| 6.53                   | 2.05             |
| C2                | 2.14| 7.02                   | 2.09             |
| C3                | 2.20| 7.22                   | 2.14             |
| F1                | 1.73| 5.68                   | 1.78             |
| F2                | 1.87| 6.14                   | 1.82             |
| F3                | 5.87| 19.26                  | 5.92             |
| F4                | 6.01| 19.72                  | 5.96             |
| BF1               | 1.64| 5.36                   | 1.62             |
| CP1               | 4.19| 13.75                  | 4.29             |
| W1                | 4.76| 15.62                  | 4.73             |
| W2                | 3.79| 12.43                  | 3.76             |
| HT                | 5.45| 17.88                  | 5.34             |
| V1                | 11.97| 39.27                  | 11.85            |
| ENGINE/           |     |                        |                  |
| N1 (CFM)          | 0.59| 1.94                   | 0.60             |
| N1 (IAE)          | 0.77| 2.53                   | 0.78             |

**NOTE:**

PASSENGER AND CARGO DOOR GROUND CLEARANCES ARE MEASURED FROM THE CENTER OF THE DOOR SILL AND FROM FLOOR LEVEL.

Ground Clearances
Wing Tip Fence

FIGURE-2-3-0-991-005-A01

Page 2
Feb 01/19
**ON A/C A321-100 A321-200**

---

**A/C CONFIGURATION**

<table>
<thead>
<tr>
<th>A/C Configuration</th>
<th>MRW</th>
<th>47,000 kg (103,617 lb)</th>
<th>A/C Jacked FDL = 4.60 m (15.09 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FWD CG (19%)</td>
<td>AFT CG (36.9%)</td>
<td>CG (25%)</td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>DOORS</td>
<td>D1</td>
<td>3.39</td>
<td>11.12</td>
</tr>
<tr>
<td></td>
<td>D2</td>
<td>3.45</td>
<td>11.32</td>
</tr>
<tr>
<td></td>
<td>D3</td>
<td>3.89</td>
<td>12.76</td>
</tr>
<tr>
<td></td>
<td>D4</td>
<td>3.61</td>
<td>11.84</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>1.99</td>
<td>6.53</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>2.14</td>
<td>7.02</td>
</tr>
<tr>
<td></td>
<td>C3</td>
<td>2.20</td>
<td>7.22</td>
</tr>
<tr>
<td>FUSELAGE</td>
<td>F1</td>
<td>1.73</td>
<td>5.68</td>
</tr>
<tr>
<td></td>
<td>F2</td>
<td>1.87</td>
<td>6.14</td>
</tr>
<tr>
<td></td>
<td>F4</td>
<td>6.01</td>
<td>19.72</td>
</tr>
<tr>
<td></td>
<td>BF1</td>
<td>1.64</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td>CP1</td>
<td>4.19</td>
<td>13.75</td>
</tr>
<tr>
<td>WINGS</td>
<td>W1</td>
<td>6.70</td>
<td>21.98</td>
</tr>
<tr>
<td></td>
<td>W2</td>
<td>4.06</td>
<td>13.32</td>
</tr>
<tr>
<td>TAILPLANE</td>
<td>HT</td>
<td>5.45</td>
<td>17.88</td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>4.73</td>
<td>15.52</td>
</tr>
<tr>
<td></td>
<td>VT</td>
<td>11.97</td>
<td>39.27</td>
</tr>
<tr>
<td>ENGINE/ NACELLE</td>
<td>N1 (CFM)</td>
<td>0.59</td>
<td>1.94</td>
</tr>
<tr>
<td></td>
<td>N1 (IAE)</td>
<td>0.77</td>
<td>2.53</td>
</tr>
</tbody>
</table>

**NOTE:**

Passenger and cargo door ground clearances are measured from the center of the door sill and from floor level.

Ground Clearances

Sharklet

FIGURE-2-3-0-991-030-A01
**ON A/C A321neo

A/C JACKED

FDL = 4.60 m (15.09 ft)

<table>
<thead>
<tr>
<th>A/C CONFIGURATION</th>
<th>MRW</th>
<th>47 000 kg (103 617 lb)</th>
<th>FWD CG (19%)</th>
<th>AFT CG (36.9%)</th>
<th>CG (25%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m ft</td>
<td>m ft</td>
<td>m ft</td>
<td>m ft</td>
<td>m ft</td>
</tr>
<tr>
<td>DOORS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>3.39</td>
<td>11.12</td>
<td>3.47</td>
<td>11.38</td>
<td>3.50</td>
</tr>
<tr>
<td>D2</td>
<td>3.45</td>
<td>11.32</td>
<td>3.48</td>
<td>11.42</td>
<td>3.57</td>
</tr>
<tr>
<td>D3</td>
<td>3.89</td>
<td>12.76</td>
<td>3.90</td>
<td>12.80</td>
<td>4.01</td>
</tr>
<tr>
<td>D4</td>
<td>3.61</td>
<td>11.84</td>
<td>3.53</td>
<td>11.58</td>
<td>3.73</td>
</tr>
<tr>
<td>C1</td>
<td>1.99</td>
<td>6.53</td>
<td>2.05</td>
<td>6.73</td>
<td>2.10</td>
</tr>
<tr>
<td>C2</td>
<td>2.14</td>
<td>7.02</td>
<td>2.09</td>
<td>6.86</td>
<td>2.26</td>
</tr>
<tr>
<td>C3</td>
<td>2.20</td>
<td>7.22</td>
<td>2.14</td>
<td>7.02</td>
<td>2.33</td>
</tr>
<tr>
<td>FUSELAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>1.73</td>
<td>5.68</td>
<td>1.78</td>
<td>5.84</td>
<td>1.84</td>
</tr>
<tr>
<td>F2</td>
<td>1.87</td>
<td>6.14</td>
<td>1.82</td>
<td>5.97</td>
<td>1.99</td>
</tr>
<tr>
<td>F4</td>
<td>6.01</td>
<td>19.72</td>
<td>5.96</td>
<td>19.55</td>
<td>6.13</td>
</tr>
<tr>
<td>BF1</td>
<td>1.64</td>
<td>5.38</td>
<td>1.62</td>
<td>5.31</td>
<td>1.76</td>
</tr>
<tr>
<td>CP1</td>
<td>4.19</td>
<td>13.75</td>
<td>4.29</td>
<td>14.07</td>
<td>4.30</td>
</tr>
<tr>
<td>WINGS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>6.70</td>
<td>21.98</td>
<td>6.67</td>
<td>21.88</td>
<td>6.82</td>
</tr>
<tr>
<td>W2</td>
<td>4.06</td>
<td>13.32</td>
<td>4.03</td>
<td>13.22</td>
<td>4.18</td>
</tr>
<tr>
<td>TAILPLANE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP</td>
<td>4.73</td>
<td>15.52</td>
<td>4.61</td>
<td>15.12</td>
<td>4.86</td>
</tr>
<tr>
<td>VT</td>
<td>11.97</td>
<td>39.27</td>
<td>11.85</td>
<td>38.88</td>
<td>12.10</td>
</tr>
<tr>
<td>ENGINE/ NACELLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1 (CFM LEAP−1A)</td>
<td>0.46</td>
<td>1.51</td>
<td>0.47</td>
<td>1.54</td>
<td>0.58</td>
</tr>
<tr>
<td>N1 (PW1100G)</td>
<td>0.46</td>
<td>1.51</td>
<td>0.47</td>
<td>1.54</td>
<td>0.58</td>
</tr>
</tbody>
</table>

NOTE:

PASSENGER AND CARGO DOOR GROUND CLEARANCES ARE MEASURED FROM THE CENTER OF THE DOOR SILL AND FROM FLOOR LEVEL.
**ON A/C A321-100 A321-200 A321neo

---

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>FLAP 1 INBD</td>
<td>A</td>
<td>2.49</td>
<td>8.17</td>
</tr>
<tr>
<td>FLAP 1 TAB INBD</td>
<td>B</td>
<td>1.95</td>
<td>6.40</td>
</tr>
<tr>
<td>FLAP 1 OUTBD</td>
<td>C</td>
<td>2.71</td>
<td>8.89</td>
</tr>
<tr>
<td>FLAP 2 INBD</td>
<td>D</td>
<td>2.84</td>
<td>9.32</td>
</tr>
<tr>
<td>FLAP 2 TAB OUTBD</td>
<td>E</td>
<td>3.53</td>
<td>11.58</td>
</tr>
<tr>
<td>FLAP 2 OUTBD</td>
<td>F</td>
<td>3.74</td>
<td>12.27</td>
</tr>
</tbody>
</table>

Ground Clearances
Trailing Edge Flaps - Extended
FIGURE-2-3-0-991-022-A01
**ON A/C A321-100 A321-200 A321neo

## Ground Clearances

**Flap Tracks - Extended**

**FIGURE-2-3-0-991-045-A01**
**ON A/C A321-100 A321-200 A321neo

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>FLAP TRACK 2</td>
<td>A</td>
<td>2.70</td>
<td>8.86</td>
</tr>
<tr>
<td>FLAP TRACK 3</td>
<td>B</td>
<td>3.10</td>
<td>10.17</td>
</tr>
<tr>
<td>FLAP TRACK 4</td>
<td>C</td>
<td>3.50</td>
<td>11.48</td>
</tr>
</tbody>
</table>

Ground Clearances
Flap Tracks - Retracted
FIGURE-2-3-0-991-023-A01
**ON A/C A321-100 A321-200 A321neo

### FLAP TRACKS 1+F

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>FLAP TRACK 2 A</td>
<td>1.95</td>
<td>6.40</td>
<td>1.85</td>
</tr>
<tr>
<td>FLAP TRACK 3 B</td>
<td>2.31</td>
<td>7.58</td>
<td>2.21</td>
</tr>
<tr>
<td>FLAP TRACK 4 C</td>
<td>2.89</td>
<td>9.48</td>
<td>2.78</td>
</tr>
</tbody>
</table>

Ground Clearances
Flap Tracks - 1 + F
FIGURE-2-3-0-991-046-A01
**ON A/C A321-100 A321-200 A321neo

## Aileron Down

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m ft</td>
<td>m ft</td>
<td>m ft</td>
</tr>
<tr>
<td>AILERON INBD A</td>
<td>3.81 12.50</td>
<td>3.70 12.14</td>
<td>3.67 12.04</td>
</tr>
<tr>
<td>AILERON OUTBD B</td>
<td>4.15 13.62</td>
<td>4.03 13.22</td>
<td>4.00 13.12</td>
</tr>
</tbody>
</table>

Ground Clearances
Aileron Down
FIGURE-2-3-0-991-024-A01
**ON A/C A321-100 A321-200 A321neo

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>AILERON INBD A</td>
<td>4.33</td>
<td>14.21</td>
<td>4.22</td>
</tr>
<tr>
<td>AILERON OUTBD B</td>
<td>4.53</td>
<td>14.86</td>
<td>4.42</td>
</tr>
</tbody>
</table>

Ground Clearances
Aileron Up
FIGURE-2-3-0-991-047-A01
**ON A/C A321-100 A321-200 A321neo**

---

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>SPOILER 1 INBD A</td>
<td>3.74</td>
<td>12.27</td>
<td>3.63</td>
</tr>
<tr>
<td>SPOILER 1 OUTBD B</td>
<td>4.04</td>
<td>13.25</td>
<td>3.94</td>
</tr>
<tr>
<td>SPOILER 2 INBD C</td>
<td>4.08</td>
<td>13.39</td>
<td>3.97</td>
</tr>
<tr>
<td>SPOILER 2/3 D</td>
<td>4.20</td>
<td>13.78</td>
<td>4.10</td>
</tr>
<tr>
<td>SPOILER 4/5 F</td>
<td>4.46</td>
<td>14.63</td>
<td>4.35</td>
</tr>
<tr>
<td>SPOILER 5 OUTBD G</td>
<td>4.59</td>
<td>15.06</td>
<td>4.48</td>
</tr>
</tbody>
</table>

---

Ground Clearances
Spoilers - Extended
FIGURE-2-3-0-991-025-A01
**ON A/C A321-100 A321-200 A321neo

### LEADING EDGE SLATS EXTENDED

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A/C IN MAINTENANCE CONFIGURATION MID CG</th>
<th>MAXIMUM RAMP WEIGHT FWD CG</th>
<th>MAXIMUM RAMP WEIGHT AFT CG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>SLAT 1 INBD</td>
<td>A</td>
<td>2.58</td>
<td>8.46</td>
</tr>
<tr>
<td>SLAT 1 OUTBD</td>
<td>B</td>
<td>2.98</td>
<td>9.78</td>
</tr>
<tr>
<td>SLAT 2 INBD</td>
<td>C</td>
<td>3.07</td>
<td>10.07</td>
</tr>
<tr>
<td>SLAT 2/3</td>
<td>D</td>
<td>3.36</td>
<td>11.02</td>
</tr>
<tr>
<td>SLAT 3/4</td>
<td>E</td>
<td>3.61</td>
<td>11.84</td>
</tr>
<tr>
<td>SLAT 4/5</td>
<td>F</td>
<td>3.85</td>
<td>12.63</td>
</tr>
<tr>
<td>SLAT 5 OUTBD</td>
<td>G</td>
<td>4.08</td>
<td>13.39</td>
</tr>
</tbody>
</table>

Ground Clearances
Leading Edge Slats - Extended
FIGURE-2-3-0-991-026-A01
2-4-1 Interior Arrangements - Plan View

**ON A/C A321-100 A321-200 A321neo**

*Interior Arrangements - Plan View*

1. This section provides the typical interior configuration.
**ON A/C A321-100 A321-200 A321neo**

Interior Arrangements - Plan View
Typical Configuration - Single-Class, High Density
FIGURE-2-4-1-991-004-A01
**ON A/C A321-100 A321-200 A321neo**

Interior Arrangements - Plan View  
Typical Configuration - Two-Class

FIGURE-2-4-1-991-006-A01
**ON A/C A321neo**

Interior Arrangements - Plan View for A321NEO-ACF
Typical Configuration - Single-Class, Standard
FIGURE-2-4-1-991-011-A01
2-5-0 Interior Arrangements - Cross Section

**ON A/C A321-100 A321-200 A321neo

Interior Arrangements - Cross Section

1. This section provides the typical configuration.
6 ABREAST—WIDER AISLE

**ON A/C A321-100 A321-200 A321neo

Interior Arrangements - Cross Section
Economy Class, 6 Abreast - Wider Aisle (Sheet 1 of 2)
FIGURE-2-5-0-991-005-A01
**ON A/C A321-100 A321-200 A321neo

Interior Arrangements - Cross Section
Economy Class, 6 Abreast - Wider Seat (Sheet 2 of 2)
FIGURE-2-5-0-991-005-A01
**ON A/C A321-100 A321-200 A321neo

Interior Arrangements - Cross Section
First-Class
FIGURE-2-5-0-991-006-A01
2-6-0 Cargo Compartments

**ON A/C A321-100 A321-200 A321neo

Cargo Compartments
1. This section provides the cargo compartments locations, dimensions and loading combinations.
**ON A/C A321-100 A321-200 A321neo

Cargo Compartments
Locations and Dimensions
FIGURE-2-6-0-991-004-A01
**ON A/C A321-100 A321-200 A321neo

NOTE:
VALID FOR A321−100, A321−200, A321 NEO AND A321 NEO−ACF WITHOUT ACT INSTALLED

Cargo Compartments
Loading Combinations
FIGURE-2-6-0-991-007-A01
**ON A/C A321-100 A321-200 A321neo

LOCATIONS OF CARGO COMPARTMENTS FOR A321NEO−ACF WITHOUT ACT INSTALLED

LOCATIONS OF CARGO COMPARTMENTS FOR A321NEO−ACF WITH ACT INSTALLED

DIMENSIONS OF CARGO COMPARTMENTS FOR A321NEO−ACF (WITH AND WITHOUT ACT INSTALLED)

Cargo Compartments for A321NEO-ACF
Locations and Dimensions for A321NEO-ACF
FIGURE-2-6-0-991-012-A01
**ON A/C A321-100 A321-200 A321neo

**Note:**

Cargo Compartments for A321NEO-ACF
Loading Combinations for A321NEO-ACF
FIGURE-2-6-0-991-013-A01

N_AC_020600_1_0130101_01_00
**ON A/C A321-100 A321-200 A321neo

Door Clearances

1. This section provides door identification and location.

   **NOTE:** Dimensions of the ground clearances are approximate and will vary with tire type, weight and balance and other special conditions.
**ON A/C A321-100 A321-200 A321neo

Door Identification and Location
Door Identification (Sheet 1 of 2)
FIGURE-2-7-0-991-004-A01
**ON A/C A321-100 A321-200 A321neo

Door Identification and Location
Door Location (Sheet 2 of 2)
FIGURE-2-7-0-991-004-A01
**ON A/C A321neo

Door Identification and Location for A321 NEO-ACF
Door Identification for A321 NEO-ACF (Sheet 1 of 2)
FIGURE-2-7-0-991-047-A01
**ON A/C A321neo

Door Identification and Location for A321NEO-ACF
Door Location for A321NEO-ACF (Sheet 2 of 2)
FIGURE-2-7-0-991-047-A01
**ON A/C A321-100 A321-200 A321neo

Doors Clearances
Forward Passenger/Crew Doors
FIGURE-2-7-0-991-033-A01
**ON A/C A321neo

Doors Clearances for A321NEO-ACF
Forward Passenger/Crew Doors for A321NEO-ACF
FIGURE-2-7-0-991-048-A01
**ON A/C A321-100 A321-200 A321neo**

Doors Clearances
Emergency Exits
FIGURE-2-7-0-991-034-A01
**ON A/C A321neo

NOTE:
ESCAPE SLIDE COMPARTMENT DOOR OPENS ON WING UPPER SURFACE.

Doors Clearances for A321NEO-ACF
Emergency Exits for A321NEO-ACF
FIGURE-2-7-0-991-046-A01
Doors Clearances
Aft Passenger/Crew Doors
FIGURE-2-7-0-991-035-A01
**ON A/C A321neo

Doors Clearances for A321NEO-ACF
Aft Passenger/Crew Doors for A321NEO-ACF
FIGURE-2-7-0-991-049-A01
**ON A/C A321-100 A321-200

Door Clearances
Forward Cargo Compartment Door
FIGURE-2-7-0-991-036-A01
**ON A/C A321neo

Door Clearances
Forward Cargo Compartment Door
FIGURE-2-7-0-991-037-A01
Doors Clearances
Aft Cargo Compartment Door
FIGURE-2-7-0-991-038-A01
**ON A/C A321-100 A321-200 A321neo

Doors Clearances
Bulk Cargo Compartment Door
FIGURE-2-7-0-991-039-A01
**ON A/C A321-100 A321-200 A321neo**

NOTE:
VALUE OF CG: 25% RC.

Doors Clearances
Main Landing Gear Doors
FIGURE-2-7-0-991-040-A01
**ON A/C A321-100 A321-200 A321neo

Doors Clearances
Radome
FIGURE-2-7-0-991-041-A01
**ON A/C A321-100 A321-200 A321neo**

NOTE:
VALUE OF CG: 25% RC.

Doors Clearances
APU and Nose Landing Gear Doors
FIGURE-2-7-0-991-042-A01
2-8-0 Escape Slides

**ON A/C A321-100 A321-200 A321neo

Escape Slides
1. General
   This section provides location of slides/rafts facilities and related clearances.

2. Location
   Slides/rafts facilities are provided at the following location:
   - One single or dual lane slide at each door 1 and 4 (total 04)
   - One single lane slide at each door 2 and 3 (total 04).

**ON A/C A321neo

3. Location for A321NEO-ACF
   Slides/rafts facilities are provided at the following locations:
   - One single or dual lane slide at each door 1 and 4 (total 04)
   - One single lane slide at each door 3 (total 02)
   - One dual lane overwing slide at each wing (total 2).
**ON A/C A321-100 A321-200 A321neo

NOTE:
LH SHOWN, RH SYMMETRICAL.

Escape Slides
Location
FIGURE-2-8-0-991-007-A01
EMERGENCY DESCENT THROUGH THE WINDOW OPENING WITH THE ESCAPE ROPE

GRID EQUALS 1 m (3.28 ft) IN REALITY

NOTE:
- LH SHOWN, RH SYMMETRICAL.
- DIMENSIONS ARE APPROXIMATE.
**ON A/C A321neo

NOTE:
LH SHOWN, RH SYMMETRICAL.

Escape Slides for A321neo-ACF
Location for A321neo-ACF
FIGURE-2-8-0-991-010-A01
**ON A/C A321neo

Escape Slides for A321NEO-ACF
Dimensions for A321NEO-ACF
FIGURE-2-8-0-991-011-A01
2-9-0  Landing Gear

**ON A/C A321-100 A321-200 A321neo

Landing Gear

1. General

   The landing gear is of the conventional retractable tricycle type comprising:
   - Two main gears with twin-wheel,
   - A twin-wheel nose gear.

   The main landing gears are located under the wing and retract sideways towards the fuselage centerline.
   The nose landing gear retracts forward into a fuselage compartment located between FR9 and FR20.

   The landing gears and landing gear doors are operated and controlled electrically and hydraulically.
   In abnormal operation, the landing gear can be extended by gravity.

   For landing gear footprint and tire size, refer to 07-02-00.

2. Main Landing Gear

   A. Twin-Wheel

      Each of the two main landing gear assemblies consists of a conventional two-wheel direct type with an integral shock absorber supported in the fore and aft directions by a fixed drag strut and laterally by a folding strut mechanically locked when in the DOWN position.

3. Nose Landing Gear

   The nose landing gear consists of a leg with a built-in shock absorber strut, carrying twin wheels with adequate shimmy damping and a folding strut mechanically locked when in the DOWN position.

4. Nose Wheel Steering

   Steering is controlled by two hand wheels in the cockpit. For steering angle controlled by the hand wheels, refer to AMM 32-51-00.
   For steering angle limitation, refer to AMM 09-10-00.

   A steering disconnection box is installed on the nose landing gear to allow steering deactivation for towing purposes.

5. Landing Gear Servicing Points

   A. General

      Filling of the landing-gear shock absorbers is done through MIL-PRF-6164 standard valves.
Charging of the landing-gear shock absorbers is accomplished with nitrogen through MIL-PRF-6164 standard valves.

B. Charging Pressure

For charging of the landing-gear shock absorbers, refer to AMM 12-14-32.

6. Braking
   A. General

   The four main wheels are equipped with carbon multidisc brakes.

   The braking system is electrically controlled and hydraulically operated.

   The braking system has four braking modes plus autobrake and anti-skid systems:
   - Normal braking with anti-skid capability,
   - Alternative braking with anti-skid capability,
   - Alternative braking without anti-skid capability,
   - Parking brake with full pressure application capability only.

   B. In-Flight Wheel Braking

   The main gear wheels are braked automatically before the wheels enter the wheel bay.

   The nose gear wheels are stopped by the wheels contacting a rubbing strip (the brake band) when the gear is in the retracted position.
**ON A/C A321-100 A321-200 A321neo

NOTE: MAIN DOOR SHOWN OPEN IN GROUND MAINTENANCE POSITION.

Landing Gear
Main Landing Gear - Twin-Wheel (Sheet 1 of 2)
FIGURE-2-9-0-991-016-A01

N_AC_020900_1_0160101_01_00
**ON A/C A321-100 A321-200 A321neo

Landing Gear
Main Landing Gear - Twin-Wheel (Sheet 2 of 2)
FIGURE-2-9-0-991-016-A01
**ON A/C A321-100 A321-200 A321neo

Landing Gear
Main Landing Gear Dimensions - Twin-Wheel
FIGURE-2-9-0-991-017-A01

N_AC_020900_1_0170101_01_00
**ON A/C A321-100 A321-200 A321neo**

Landing Gear
Nose Landing Gear (Sheet 1 of 2)
FIGURE-2-9-0-991-018-A01
**ON A/C A321-100 A321-200 A321neo

Landing Gear
Nose Landing Gear (Sheet 2 of 2)
FIGURE-2-9-0-991-018-A01
**ON A/C A321-100 A321-200 A321neo

Landing Gear
Nose Landing Gear Dimensions
FIGURE-2-9-0-991-019-A01
Landing Gear Maintenance Pits

1. Description

The minimum maintenance pit envelopes for the landing-gear shock absorber removal are shown in FIGURE 2-9-0-991-026-A and FIGURE 2-9-0-991-027-A.

All dimensions shown are minimum dimensions with zero clearances.

The dimensions for the pits have been determined as follows:
- The length and width of the pits allow the gear to rotate as the weight is taken off the landing gear.
- The depth of the pits allows the shock absorber to be removed when all the weight is taken off the landing gear.

Dimensions for elevators and associated mechanisms must be added to those in FIGURE 2-9-0-991-026-A and FIGURE 2-9-0-991-027-A.
**ON A/C A321-100 A321-200 A321neo

Landing Gear Maintenance Pits
Maintenance Pit Envelopes
FIGURE-2-9-0-991-026-A01
**ON A/C A321-100 A321-200 A321neo

### Aircraft Characteristics - Airport and Maintenance Planning

**NOTE:**

1. Dimensions quoted are with wheels removed and 33 mm (1.3 ft) clearance at jacking dome.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>m</th>
<th>ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52</td>
<td>1.71</td>
<td>1.17</td>
<td>3.84</td>
</tr>
</tbody>
</table>

### Landing Gear Maintenance Pits

- Maintenance Pit Envelopes
- FIGURE-2-9-0-991-027-A01

- **1** represents top of mechanical or hydraulic elevator, with aircraft weight supported and landing gear shock absorbers extended.
- **2** represents top of mechanical or hydraulic elevator, shown with zero clearance lowered for shock absorber removal.

FROM X0
2-10-0  Exterior Lighting

**ON A/C A321-100 A321-200 A321neo

Exterior Lighting

1. General

This section provides the location of the aircraft exterior lighting.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RIGHT NAVIGATION LIGHT (GREEN)</td>
</tr>
<tr>
<td>2</td>
<td>TAIL NAVIGATION LIGHT (WHITE)</td>
</tr>
<tr>
<td>3</td>
<td>LEFT NAVIGATION LIGHT (RED)</td>
</tr>
<tr>
<td>4</td>
<td>RETRACTABLE LANDING LIGHT</td>
</tr>
<tr>
<td>5</td>
<td>RUNWAY TURN OFF LIGHT</td>
</tr>
<tr>
<td>6</td>
<td>TAXI LIGHT</td>
</tr>
<tr>
<td>7</td>
<td>TAKE-OFF LIGHT</td>
</tr>
<tr>
<td>8</td>
<td>LOGO LIGHT</td>
</tr>
<tr>
<td>9</td>
<td>UPPER ANTI-COLLISION LIGHT/BEACON (RED)</td>
</tr>
<tr>
<td>10</td>
<td>LOWER ANTI-COLLISION LIGHT/BEACON (RED)</td>
</tr>
<tr>
<td>11</td>
<td>WING STROBE LIGHT (HIGH INTENSITY, WHITE)</td>
</tr>
<tr>
<td>12</td>
<td>TAIL STROBE LIGHT (HIGH INTENSITY, WHITE)</td>
</tr>
<tr>
<td>13</td>
<td>WING/ENGINE SCAN LIGHT</td>
</tr>
<tr>
<td>14</td>
<td>WHEEL WELL LIGHT (DOME)</td>
</tr>
<tr>
<td>15</td>
<td>CARGO COMPARTMENT FLOOD LIGHT</td>
</tr>
</tbody>
</table>
**ON A/C A321-100 A321-200 A321neo

Exterior Lighting
FIGURE-2-10-0-991-013-A01
Exterior Lighting
FIGURE-2-10-0-991-014-A01
**ON A/C A321-100 A321-200 A321neo

Exterior Lighting
FIGURE-2-10-0-991-015-A01

N_AC_021000_1_0150101_01_00
**ON A/C A321-100 A321-200 A321neo

EXAMPLE FOR LIGHT N° 15

CEILING LIGHT

SPOT LIGHT

GROUND

Exterior Lighting
FIGURE-2-10-0-991-020-A01
2-11-0 Antennas and Probes Location

**ON A/C A321-100 A321-200 A321neo

Antennas and Probes Location

1. This section gives the location of antennas and probes.
NOTE: DEPENDING ON AIRCRAFT CONFIGURATION

Antennas and Probes
Location
FIGURE-2-11-0-991-004-A01
Power Plant

**ON A/C A321-100 A321-200 A321neo**

Auxiliary Power Unit

1. General

   The APU is installed at the rear part of the fuselage in the tail cone. An air intake system with a flap-type door is installed in front of the APU compartment. The exhaust gases pass overboard at the end of the fuselage cone.

2. Controls and Indication

   The primary APU controls and indications are installed on the overhead panel, on the center pedestal and on the center instrument panel. Additionally, an external APU panel is installed on the nose landing gear to initiate an APU emergency shutdown.
**ON A/C A321-100 A321-200 A321neo

NOTE:
LH ACCESS DOOR 315AL NOT SHOWN FOR CLARITY.
**ON A/C A321-100 A321-200 A321neo

Auxiliary Power Unit
General Layout
FIGURE-2-12-0-991-008-A01
**ON A/C A321-100 A321-200 A321neo**

**Engine and Nacelle**

**ON A/C A321-100 A321-200**

1. Engine and Nacelle - CFM Engine
   
   **A. Engine**
   
   The engine is a dual-rotor, variable stator, high bypass ratio turbofan powerplant for subsonic services. The principal modules of the engine are:
   - low pressure compressor (fan stator and fan rotor)
   - high pressure compressor
   - turbine frame
   - combustion chamber
   - high pressure turbine
   - low pressure turbine
   - accessory drives (gear box).

   The 9 stage high pressure compressor is driven by 1 stage high pressure turbine, and the integrated front fan and booster is driven by 4 stage low pressure turbine. An annular combustor converts fuel and compressor discharge air into energy to provide engine thrust part through primary exhaust and to drive the turbines. The accessory drive system extracts energy from the high pressure rotor to drive the engine accessories and the engine mounted aircraft accessories. Reverse thrust for braking the aircraft after landing is supplied by an integrated system which acts on the fan discharge airflow.

   **B. Nacelle**
   
   The cowls enclose the periphery of the engine so as to form the engine nacelle. Each engine is housed in a nacelle suspended from a pylon attached to the wing lower surface. The nacelle consists of the demountable powerplant, the fan cowls and the thrust reverser cowls.

   The nacelle installation is designed to provide cooling and ventilation air for engine accessories mounted along the fan and core casing. The nacelle provides:
   - protection for the engine and the accessories
   - airflow around the engine during its operation
   - lighting protection
   - HIRF and EMI attenuation.

2. Engine and Nacelle - IAE Engine
   
   **A. Engine**
   
   The engine is a two spool, axial flow, high bypass ratio turbofan powerplant for subsonic service. The main modules of the engine are:
- low pressure compressor (fan and booster) assembly
- LP compressor/intermediate case
- No. 4 bearing and combustion section
- high pressure compressor
- HP turbine section
- LP turbine section
- accessory drives (gear box).

The four stage Low Pressure Compressor (LPC) is driven by a five stage Low Pressure Turbine (LPT) and the ten stage High Pressure Compressor (HPC) by a two stage High Pressure Turbine (HPT). The HPT also drives a gearbox which, in turn drives the engines and aircraft mounted accessories. The two shafts are supported by five main bearings.

The V2500 incorporates a Full Authority Digital Engine Control (FADEC) which governs all engine functions, including power management. Reverse thrust for braking the aircraft after landing is supplied by an integrated system which acts on the fan discharge airflow.

B. Nacelle

The cowls enclose the periphery of the engine so as to form the engine nacelle. Each engine is housed in a nacelle suspended from a pylon attached below the wing.

The nacelle installation is designed to provide cooling and ventilation air for engine accessories mounted along the fan and core casing. The nacelle provides:
- protection for the engine and the accessories
- airflow around the engine during its operation
- lighting protection
- HIRF and EMI attenuation.
Power Plant Handling
Major Dimensions - CFM56 Series Engine
FIGURE-2-12-0-991-035-A01
**ON A/C A321-100 A321-200**

POWER PLANT HANDLING

MAJOR DIMENSIONS - CFM56 SERIES ENGINE

FIGURE-2-12-0-991-036-A01
**ON A/C A321-100 A321-200

NOTE: APPROXIMATE DIMENSIONS.

<table>
<thead>
<tr>
<th>m (ft)</th>
<th>$\varphi$</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIEW COWLING AFT</td>
<td>42°27</td>
<td>1.8 (5.9)</td>
<td>1.5 (4.9)</td>
<td>1.3 (4.3)</td>
</tr>
<tr>
<td></td>
<td>55°15</td>
<td>2.0 (6.6)</td>
<td>1.8 (5.9)</td>
<td>1.7 (5.6)</td>
</tr>
<tr>
<td>VIEW COWLING FWD</td>
<td>40°40</td>
<td>1.8 (5.9)</td>
<td>1.4 (4.6)</td>
<td>1.3 (4.3)</td>
</tr>
<tr>
<td></td>
<td>52°56</td>
<td>2.0 (6.6)</td>
<td>1.7 (5.6)</td>
<td>1.6 (5.2)</td>
</tr>
</tbody>
</table>

Power Plant Handling
Fan Cowls - CFM56 Series Engine
FIGURE-2-12-0-991-037-A01
**ON A/C A321-100 A321-200

NOTE: APPROXIMATE DIMENSIONS.

CAUTION
DO NOT ACTUATE SLATS:
- WITH THRUST REVERSER COWLS 45° OPEN POSITION
- WITH BLOCKER DOORS OPEN AND THRUST REVERSER
  COWLS AT 35° AND 45° OPEN POSITION.

Power Plant Handling
Thrust Reverser Cowls - CFM56 Series Engine
FIGURE-2-12-0-991-038-A01
Power Plant Handling
Major Dimensions - IAE V2500 Series Engine
FIGURE-2-12-0-991-039-A01
**ON A/C A321-100 A321-200

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>W</th>
<th>U</th>
<th>V</th>
<th>PPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>ft</td>
<td>m</td>
<td>ft</td>
</tr>
<tr>
<td>A–A</td>
<td>2.01</td>
<td>6.58</td>
<td>0.99</td>
<td>3.25</td>
</tr>
<tr>
<td>B–B</td>
<td>2.01</td>
<td>6.58</td>
<td>1.00</td>
<td>3.29</td>
</tr>
<tr>
<td>C–C</td>
<td>1.98</td>
<td>6.50</td>
<td>0.97</td>
<td>3.19</td>
</tr>
<tr>
<td>D–D</td>
<td>1.93</td>
<td>6.32</td>
<td>0.93</td>
<td>3.06</td>
</tr>
<tr>
<td>E–E</td>
<td>1.64</td>
<td>5.38</td>
<td>0.78</td>
<td>2.57</td>
</tr>
<tr>
<td>F–F</td>
<td>1.24</td>
<td>4.07</td>
<td>0.60</td>
<td>1.96</td>
</tr>
</tbody>
</table>

NOTE: ALL SIZES GIVEN ON THIS ILLUSTRATION ARE APPROXIMATE

Power Plant Handling
Major Dimensions - IAE V2500 Series Engine
FIGURE-2-12-0-991-040-A01

2-12-0
**ON A/C A321-100 A321-200

**NOTE:** APPROXIMATE DIMENSIONS.

Power Plant Handling
Fan Cowls - IAE V2500 Series Engine
FIGURE-2-12-0-991-041-A01
**ON A/C A321-100 A321-200

AFT VIEW

2 m
(6.6 ft)

CLOSED

WL100

THrust REVERSEr
OPEN 45°

3.6 m
(11.8 ft)

0.9 m
(3 ft)

1 m
(3.3 ft)

SEE CHAPTER
2-3

NOTE: APPROXIMATE DIMENSIONS.

Power Plant Handling
Thrust Reverser Halves - IAE V2500 Series Engine
FIGURE-2-12-0-991-042-A01
**ON A/C A321neo

Power Plant Handling
Major Dimensions - PW 1100G Engine
FIGURE-2-12-0-991-049-A01
**ON A/C A321neo

Power Plant Handling
Fan Cowls - PW 1100G Engine
FIGURE-2-12-0-991-050-A01
**ON A/C A321neo

Power Plant Handling
Thrust Reverser Halves - PW 1100G Engine
FIGURE-2-12-0-991-051-A01
**ON A/C A321neo

Power Plant Handling
Major Dimensions - CFM LEAP-1A Engine
FIGURE-2-12-0-991-056-A01
**ON A/C A321neo

Power Plant Handling
Major Dimensions - CFM LEAP-1A Engine
FIGURE-2-12-0-991-057-A01
2-13-0 Leveling, Symmetry and Alignment

**ON A/C A321-100 A321-200 A321neo**

Leveling, Symmetry and Alignment

1. Quick Leveling
   There are three alternative procedures to level the aircraft:
   - Quick leveling procedure with Air Data/Inertial Reference Unit (ADIRU).
   - Quick leveling procedure with a spirit level in the passenger compartment.
   - Quick leveling procedure with a spirit level in the FWD cargo compartment.

2. Precise Leveling
   For precise leveling, it is necessary to install sighting rods in the receptacles located under the fuselage (points 11 and 12 for longitudinal leveling) and under the wings (points 2LH and 2RH for lateral leveling) and use a sighting tube. With the aircraft on jacks, adjust the jacks until the reference marks on the sighting rods are aligned in the sighting plane (aircraft level).

3. Symmetry and Alignment Check
   Possible deformation of the aircraft is measured by photogrammetry.
**ON A/C A321-100 A321-200 A321neo

Location of the Leveling Points
FIGURE-2-13-0-991-005-A01
Jacking

**ON A/C A321-100 A321-200 A321neo**

## Jacking for Maintenance

### 1. Aircraft Jacking Points for Maintenance

#### A. General

(1) The A321 can be jacked:

- At not more than 69,000 kg (152,119 lb),
- Within the limits of the permissible wind speed when the aircraft is not in a closed environment.

#### B. Primary Jacking Points

(1) The aircraft is provided with three primary jacking points:

- One located under the forward fuselage (FR8),
- Two located under the wings (one under each wing, located at the intersection of RIB9 and the datum of the rear spar).

(2) Three jack adapters are used as intermediary parts between the aircraft and the jacks:

- One male spherical jack adapter of 19 mm (0.75 in) radius, forming part of the aircraft structure (FR8),
- Two wing jack pads (one attached to each wing at RIB9 with 2 bolts) for the location of the jack adaptor. Wing jack pads are ground equipment.

#### C. Auxiliary Jacking Points (Safety Stay)

(1) When the aircraft is on jacks, it is recommended that a safety stay be placed under the fuselage, between FR73 and FR74, to prevent tail tipping caused by accidental displacement of the center of gravity.

(2) The safety stay must not be used to lift the aircraft.

(3) A male spherical ball pad with a 19 mm (0.75 in) radius, forming part of the aircraft structure, is provided for using the safety stay.

### 2. Jacks and Safety Stay

#### A. Jack Design

(1) The maximum permitted loads given in the table in FIGURE 2-14-0-991-038-A are the maximum loads applicable on jack fittings.

(2) In the fully retracted position (jack stroke at minimum), the height of the jack is such that the jack may be placed beneath the aircraft in the most adverse conditions, namely, tires deflated and shock absorbers depressurized. In addition, there must be a clearance of approximately 50 mm (1.97 in) between the aircraft jacking point and the jack upper end.
(3) The lifting jack stroke enables the aircraft to be jacked up so that the fuselage longitudinal datum line (aircraft center line) is parallel to the ground, with a clearance of 100 mm (3.94 in) between the main landing gear wheels and the ground. This enables the landing gear extension/retraction tests to be performed.

3. Shoring Cradles

When it is necessary to support the aircraft in order to relieve the loads on the structure to do modifications or major work, shoring cradles shall be placed under each wing and the fuselage as necessary.

**NOTE**: The aircraft must not be lifted or supported by the wings or fuselage alone without adequate support of the other.
**ON A/C A321-100 A321-200 A321neo

Jacking for Maintenance
Jacking Point Locations
FIGURE-2-14-0-991-038-A01
Jacking for Maintenance
Forward Jacking Point
FIGURE-2-14-0-991-039-A01

SPHERICAL RADIUS
19 mm (0.75 in)
**ON A/C A321-100 A321-200 A321neo

Jacking for Maintenance
Wing Jacking Points
FIGURE-2-14-0-991-040-A01
**ON A/C A321-100 A321-200 A321neo

Jacking for Maintenance
Safety Stay
FIGURE-2-14-0-991-041-A01
**ON A/C A321-100 A321-200 A321neo**

---

**TYPICAL JACK INSTALLATION SHOWN**

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>DESCRIPTION</th>
<th>DISTANCE BETWEEN JACKING/SAFETY POINTS AND THE GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>- AIRCRAFT ON WHEELS</td>
<td>- NLG SHOCK ABSORBER DEFLATED AND MLG STANDARD TIRES, WITH STANDARD SHOCK ABSORBERS</td>
<td>L: 1 603 mm (63.11 in) M: 3 124 mm (122.99 in) N: 3 635 mm (143.11 in)</td>
</tr>
<tr>
<td></td>
<td>- MLG STANDARD TIRES, WITH STANDARD SHOCK ABSORBERS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TIES FLAT SHOCK ABSORBERS DEFLATED</td>
<td>L: 1 654 mm (65.12 in) M: 2 761 mm (108.70 in) N: 2 889 mm (113.74 in)</td>
</tr>
<tr>
<td></td>
<td>STANDARD TIRES STANDARD SHOCK ABSORBERS</td>
<td>L: 1 924 mm (75.75 in) M: 3 125 mm (123.03 in) N: 3 341 mm (131.54 in)</td>
</tr>
<tr>
<td>- AIRCRAFT ON JACKS (FORWARD JACK AND WING JACKS) - FUSELAGE DATUM LINE PARALLEL TO THE GROUND</td>
<td>STANDARD TIRES MLG SHOCK ABSORBERS EXTENDED WITH WHEEL CLEARANCE OF 120 mm (4.72 in) FOR MLG RETRACTION OR EXTENSION</td>
<td>L: 2 605 mm (102.56 in) M: 3 706 mm (145.91 in) N: 3 830 mm (150.79 in)</td>
</tr>
<tr>
<td></td>
<td>STANDARD TIRES MLG SHOCK ABSORBERS EXTENDED WITH WHEEL CLEARANCE OF 770 mm (30.31 in) FOR REPLACEMENT OF THE MLG</td>
<td>L: 3 255 mm (128.15 in) M: 4 356 mm (171.50 in) N: 4 480 mm (176.38 in)</td>
</tr>
<tr>
<td>- AIRCRAFT ON FORWARD JACK - MLG WHEELS ON THE GROUND</td>
<td>STANDARD TIRES NLG SHOCK ABSORBERS EXTENDED WITH WHEEL CLEARANCE OF 60 mm (2.36 in) FOR NLG RETRACTION OR EXTENSION</td>
<td>L: 2 371 mm (93.35 in) M: NA N: 2 930 mm (115.35 in)</td>
</tr>
</tbody>
</table>

**NOTE:**
THE SAFETY STAY IS NOT USED FOR JACKING.

Jacking for Maintenance
Jacking Design
FIGURE-2-14-0-991-042-A01
EXAMPLE: ASSUME AIRCRAFT WITH GROSS WEIGHT OF 67 500 kg (A) AND CENTER OF GRAVITY AT 23 % RC (B). THE REACTION AT THE WING JACKING POINTS IS 62 750 kg (31 375 kg PER SIDE) (C) AND THE REACTION AT THE FORWARD FUSELAGE JACKING POINT IS 4 750 kg (D). IF THE AIRCRAFT MUST BE LIFTED OUTSIDE THE WIND SPEED MUST NOT BE IN EXCESS OF 70 km/h.
**ON A/C A321-100 A321-200 A321neo

NOTE: THE SHORING CRADLE MUST BE INSTALLED AT THE EXACT LOCATION OF THE FRAME.

Jacking for Maintenance
Location of Shoring Cradles
FIGURE-2-14-0-991-044-A01
**ON A/C A321-100 A321-200 A321neo

Jacking of the Landing Gear

1. General

   Landing gear jacking will be required to lift the landing gear wheels off the ground.

   NOTE: You can lift the aircraft at Maximum Ramp Weight (MRW).

   NOTE: The load at each jacking position is the load required to give a 25.4 mm (1 in) clearance between the ground and the tire.

**ON A/C A321-100 A321-200

2. Main Gear Jacking

   The main gears are normally jacked up by placing a jack directly under the ball pad.

   The ball spherical radius is 19 mm (0.75 in).

   It is also possible to jack the main gear using a cantilever jack.

   The reactions at each of the jacking points are shown in the table, see FIGURE 2-14-0-991-061-A.

**ON A/C A321neo

3. Main Gear Jacking

   The main gears are normally jacked up by placing a jack directly under the ball pad.

   The ball spherical radius is 19 mm (0.75 in).

   It is also possible to jack the main gear using a cantilever jack.

   The reactions at each of the jacking points are shown in the table, see FIGURE 2-14-0-991-064-A.

**ON A/C A321-100 A321-200

4. Nose Gear Jacking

   For nose gear jacking, a 19 mm (0.75 in) radius ball pad is fitted under the lower end of the shock-absorber sliding tube. Jacking can be accomplished either by placing a jack directly under the ball pad, or using an adapter fitting provided with an identical ball pad.

   The reactions at each of the jacking points are shown in the table, see FIGURE 2-14-0-991-061-A.
**ON A/C A321neo**

5. Nose Gear Jacking

For nose gear jacking, a 19 mm (0.75 in) radius ball pad is fitted under the lower end of the shock-absorber sliding tube. Jacking can be accomplished either by placing a jack directly under the ball pad, or using an adapter fitting provided with an identical ball pad. The reactions at each of the jacking points are shown in the table, see FIGURE 2-14-0-991-064-A.
**ON A/C A321-100 A321-200 A321neo

NOTE: TWIN WHEEL TRACK IS 927 mm (36.5 in).
THE FLAT TIRES VIEW SHOWS THE MINIMUM HEIGHT TO ENGAGE JACK WITH 2 FLAT TIRES.
THE INFLATED TIRES VIEW SHOWS THE JACKING HEIGHT TO GIVE 25 mm (1 in) CLEARANCE BETWEEN THE TIRE AND GROUND.
**ON A/C A321-100 A321-200 A321neo

Jacking of the Landing Gear
MLG Jacking with Cantilever Jack - Twin Wheels

FIGURE-2-14-0-991-025-A01
**ON A/C A321-100 A321-200 A321neo

The flat tires view shows the minimum height to engage jack with 2 flat tires. The inflated tires view shows the jacking height to give 25 mm (1 in) clearance between the tire and ground.

Jacking of the Landing Gear
NLG Jacking - Point Location
FIGURE-2-14-0-991-028-A01
**ON A/C A321-100 A321-200**

### A321−100/−200

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM DESIGN TAXI WEIGHT (MTW)</td>
<td>93 900 kg (207 014 lb)</td>
</tr>
<tr>
<td>MAXIMUM DESIGN TAKE−OFF WEIGHT (MTOW)</td>
<td>93 500 kg (206 132 lb)</td>
</tr>
<tr>
<td>MAXIMUM LOAD VALUE TO BE APPLIED ON NLG JACKING POINT</td>
<td>9 000 kg (19 842 lb)</td>
</tr>
<tr>
<td>NUMBER OF JACKING POINTS ON ONE MLG</td>
<td>1</td>
</tr>
<tr>
<td>MAXIMUM LOAD VALUE TO BE APPLIED ON MLG JACKING POINT (LEFT OR RIGHT)</td>
<td>44 500 kg (98 106 lb)</td>
</tr>
</tbody>
</table>

Jacking of the Landing Gear
Maximum Load Capacity to Lift Each Jacking Point
FIGURE-2-14-0-991-061-A01
**ON A/C A321neo

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM DESIGN TAXI WEIGHT (MTW)</td>
<td>93 900 kg (207 014 lb)</td>
</tr>
<tr>
<td>MAXIMUM DESIGN TAKE-OFF WEIGHT (MTOW)</td>
<td>93 500 kg (206 132 lb)</td>
</tr>
<tr>
<td>MAXIMUM LOAD VALUE TO BE APPLIED ON NLG JACKING POINT</td>
<td>12 207 kg (26 912 lb)</td>
</tr>
<tr>
<td>NUMBER OF JACKING POINTS ON ONE MLG</td>
<td>1</td>
</tr>
<tr>
<td>MAXIMUM LOAD VALUE TO BE APPLIED ON MLG JACKING POINT (LEFT OR RIGHT)</td>
<td>59 103 kg (130 300 lb)</td>
</tr>
</tbody>
</table>

Jacking of the Landing Gear
Maximum Load Capacity to Lift Each Jacking Point
FIGURE-2-14-0-991-064-A01
**AIRCRAFT PERFORMANCE**

3-1-0 General Information

**ON A/C A321-100 A321-200 A321neo**

General Information

1. Standard day temperatures for the altitudes shown are tabulated below:

<table>
<thead>
<tr>
<th>Altitude (FEET)</th>
<th>Altitude (METERS)</th>
<th>Standard Day Temperature °F</th>
<th>Standard Day Temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>59.0</td>
<td>15.0</td>
</tr>
<tr>
<td>2 000</td>
<td>610</td>
<td>51.9</td>
<td>11.1</td>
</tr>
<tr>
<td>4 000</td>
<td>1 220</td>
<td>44.7</td>
<td>7.1</td>
</tr>
<tr>
<td>6 000</td>
<td>1 830</td>
<td>37.6</td>
<td>3.1</td>
</tr>
<tr>
<td>8 000</td>
<td>2 440</td>
<td>30.5</td>
<td>-0.8</td>
</tr>
</tbody>
</table>
3-2-1 Payload / Range - ISA Conditions

**ON A/C A321-100 A321-200 A321neo

Payload/Range - ISA Conditions

1. This section provides the payload/range at ISA conditions.
**ON A/C A321-100 A321-200**

Payload/Range - ISA Conditions

FIGURE-3-2-1-991-019-A01
NOTE: THESE CURVES ARE GIVEN FOR INFORMATION ONLY.
THE APPROVED VALUES ARE STATED IN THE OPERATING
MANUALS SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Payload/Range - ISA Conditions
Sharklet
FIGURE-3-2-1-991-020-A01

N_AC_030201_1_0200101_01_00
**ON A/C A321neo**

Payload/Range - ISA Conditions

FIGURE-3-2-1-991-021-A01

**NOTE:**
THESE CURVES ARE GIVEN FOR INFORMATION ONLY.
THE APPROVED VALUES ARE STATED IN THE "OPERATING MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.
3-3-1 Take-off Weight Limitation - ISA Conditions

**ON A/C A321-100 A321-200 A321neo

Take-Off Weight Limitation - ISA Conditions

1. This section gives the take-off weight limitation at ISA conditions.
NOTE: THESE CURVES ARE GIVEN FOR INFORMATION ONLY
THE APPROVED VALUES ARE STATED IN THE "OPERATING
MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA Conditions
CFM56 Series Engine
FIGURE-3-3-1-991-007-A01
NOTE: THESE CURVES ARE GIVEN FOR INFORMATION ONLY
THE APPROVED VALUES ARE STATED IN THE "OPERATING MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA Conditions
IAE V2500 Series Engine
FIGURE-3-3-1-991-008-A01
**ON A/C A321neo

NOTE:
THESE CURVES ARE GIVEN FOR INFORMATION ONLY
THE APPROVED VALUES ARE STATED IN THE "OPERATING
MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA Conditions
LEAP-1A Series Engine
FIGURE-3-3-1-991-010-A01
3-3-2 Take-off Weight Limitation - ISA +15°C (+59°F) Conditions

**ON A/C A321-100 A321-200 A321neo

Take-Off Weight Limitation - ISA +15°C (+27°F) Conditions

1. This section gives the take-off weight limitation at ISA +15°C (+27°F) conditions.
NOTE: THESE CURVES ARE GIVEN FOR INFORMATION ONLY.
THE APPROVED VALUES ARE STATED IN THE "OPERATING MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA +15 °C (+27 °F) Conditions
CFM56 Series Engine
FIGURE-3-3-2-991-007-A01
**ON A/C A321-100 A321-200

NOTE: THESE CURVES ARE GIVEN FOR INFORMATION ONLY
THE APPROVED VALUES ARE STATED IN THE "OPERATING
MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA +15 °C (+27 °F) Conditions
IAE V2500 Series Engine
FIGURE-3-3-2-991-008-A01
**ON A/C A321neo

NOTE:
THESE CURVES ARE GIVEN FOR INFORMATION ONLY
THE APPROVED VALUES ARE STATED IN THE "OPERATING
MANUALS" SPECIFIC TO THE AIRLINE OPERATING THE AIRCRAFT.

Take-Off Weight Limitation - ISA +15 °C (+27 °F) Conditions
LEAP-1A Series Engine
FIGURE-3-3-2-991-010-A01
3-3-3 Aerodrome Reference Code

**ON A/C A321-100 A321-200 A321neo

Aerodrome Reference Code

1. A321-100, A321-200 and A321neo are classified as code 4C as per ICAO Aerodrome Reference Code.
3-4-1 Landing Field Length - ISA Conditions

**ON A/C A321-100 A321-200

Landing Field Length - ISA Conditions

1. This section provides the landing field length.
**ON A/C A321-100 A321-200

Landing Field Length - ISA Conditions
CFM56 Series Engine
FIGURE-3-4-1-991-007-A01

NOTE:
These curves are given for information only. The approved values are stated in the "Operating Manuals" specific to the airline operating the aircraft.

N_AC_030401_1_0070101_01_01
**ON A/C A321-100 A321-200**

**NOTE:**

These curves are given for information only. The approved values are stated in the "Operating Manuals" specific to the airline operating the aircraft.

Landing Field Length - ISA Conditions
IAE V2500 Series Engine
FIGURE-3-4-1-991-008-A01
Final Approach Speed

**ON A/C A321-100 A321-200 A321neo

1. Final Approach Speed
   A. This section gives the final approach speed which is the indicated airspeed at threshold in the landing configuration at the certificated maximum flap setting and Maximum Landing Weight (MLW) at standard atmospheric conditions. The approach speed is used to classify the aircraft into Aircraft Approach Category, a grouping of aircraft based on the indicated airspeed at threshold.
   
   B. The final approach speed is 140 kt at a MLW of 75 500 kg (166 449 lb) and classifies the aircraft into the Aircraft Approach Category C.

   **NOTE**: This value is given for information only.

   C. The final approach speed is 142 kt at a MLW of 77 800 kg (171 520 lb) and classifies the aircraft into the Aircraft Approach Category D.

   **NOTE**: This value is given for information only.

**ON A/C A321neo

2. Final Approach Speed
   A. This section gives the final approach speed which is the indicated airspeed at threshold in the landing configuration at the certificated maximum flap setting and MLW at standard atmospheric conditions. The approach speed is used to classify the aircraft into Aircraft Approach Category, a grouping of aircraft based on the indicated airspeed at threshold.
   
   B. The final approach speed is 136 kt at a MLW of 79 200 kg (174 606 lb) and classifies the aircraft into the Aircraft Approach Category C.

   **NOTE**: This value is given for information only.
**On A/C A321-100 A321-200 A321neo**

General Information

1. This section provides aircraft turning capability and maneuvering characteristics.

For ease of presentation, this data has been determined from the theoretical limits imposed by the geometry of the aircraft, and where noted, provides for a normal allowance for tire slippage. As such, it reflects the turning capability of the aircraft in favorable operating circumstances. This data should only be used as a guideline for the method of determination of such parameters and for the maneuvering characteristics of this aircraft type.

In ground operating mode, varying airline practices may demand that more conservative turning procedures be adopted to avoid excessive tire wear and reduce possible maintenance problems. Airline operating techniques will vary in the level of performance, over a wide range of operating circumstances throughout the world. Variations from standard aircraft operating patterns may be necessary to satisfy physical constraints within the maneuvering area, such as adverse grades, limited area or a high risk of jet blast damage. For these reasons, ground maneuvering requirements should be coordinated with the airlines in question prior to layout planning.
Turning Radii

**ON A/C A321-100 A321-200 A321neo

Turning Radii

1. This section provides the turning radii.
**ON A/C A321-100 A321-200 A321neo

NOTE: FOR STEERING DIMENSION TABLE SEE SHEET 2. APPLICABLE FOR A321−100 AND A321−200.

TURN TYPE:
1. ASYMMETRIC THRUST DIFFERENTIAL BRAKING (PIVOTTING ON ONE MAIN GEAR).
2. SYMMETRIC THRUST NO BRAKING.

Turning Radii, No Slip Angle
(Sheet 1)
FIGURE-4-2-0-991-007-A01
**ON A/C A321-100 A321-200 A321neo**

AIRCRAFT CHARACTERISTICS - AIRPORT AND MAINTENANCE PLANNING

---

### Turning Radii, No Slip Angle

**NOTE:** ABOVE 50°, AIRLINES MAY USE TYPE 1 OR TYPE 2 TURNS DEPENDING ON THE SITUATION. TYPE 1 TURNS USE: ASYMMETRIC THRUST DURING THE WHOLE TURN; AND DIFFERENTIAL BRAKING TO INITIATE THE TURN ONLY.

TYPE 2 TURNS USE: SYMMETRIC THRUST DURING THE WHOLE TURN; AND NO DIFFERENTIAL BRAKING AT ALL. IT IS POSSIBLE TO GET LOWER VALUES THAN THOSE FROM TYPE 1 BY APPLYING DIFFERENTIAL BRAKING DURING THE WHOLE TURN.

<table>
<thead>
<tr>
<th>TURN TYPE</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>R1 - RMLG</th>
<th>R2 - LMLG</th>
<th>R3 - NLG</th>
<th>R4 - WING</th>
<th>R5 - NOSE</th>
<th>R6 - THS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STEERING ANGLE (deg)</td>
<td>EFFECTIVE STEERING ANGLE (deg)</td>
<td>m</td>
<td>ft</td>
<td>m</td>
<td>ft</td>
<td>m</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>19.6</td>
<td>44.3</td>
<td>145</td>
<td>51.9</td>
<td>170</td>
<td>50.7</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>24.5</td>
<td>34.0</td>
<td>112</td>
<td>41.6</td>
<td>136</td>
<td>41.1</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>29.4</td>
<td>26.9</td>
<td>88</td>
<td>34.5</td>
<td>113</td>
<td>34.7</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>34.3</td>
<td>21.7</td>
<td>71</td>
<td>29.3</td>
<td>96</td>
<td>30.3</td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>39.2</td>
<td>17.6</td>
<td>58</td>
<td>25.2</td>
<td>83</td>
<td>27.0</td>
</tr>
<tr>
<td>6</td>
<td>45</td>
<td>44.0</td>
<td>14.4</td>
<td>47</td>
<td>22.0</td>
<td>72</td>
<td>24.6</td>
</tr>
<tr>
<td>7</td>
<td>50</td>
<td>48.8</td>
<td>11.7</td>
<td>38</td>
<td>19.3</td>
<td>63</td>
<td>22.7</td>
</tr>
<tr>
<td>8</td>
<td>55</td>
<td>53.6</td>
<td>9.4</td>
<td>31</td>
<td>16.9</td>
<td>56</td>
<td>21.2</td>
</tr>
<tr>
<td>9</td>
<td>60</td>
<td>58.3</td>
<td>7.3</td>
<td>24</td>
<td>14.9</td>
<td>49</td>
<td>20.0</td>
</tr>
<tr>
<td>10</td>
<td>65</td>
<td>63.0</td>
<td>5.5</td>
<td>18</td>
<td>13.1</td>
<td>43</td>
<td>19.1</td>
</tr>
<tr>
<td>11</td>
<td>70</td>
<td>67.4</td>
<td>3.9</td>
<td>13</td>
<td>11.5</td>
<td>38</td>
<td>18.4</td>
</tr>
<tr>
<td>12</td>
<td>75 (MAX)</td>
<td>71.6</td>
<td>2.5</td>
<td>8</td>
<td>10.1</td>
<td>33</td>
<td>17.9</td>
</tr>
<tr>
<td>13</td>
<td>50</td>
<td>49.1</td>
<td>11.5</td>
<td>38</td>
<td>19.1</td>
<td>63</td>
<td>22.6</td>
</tr>
<tr>
<td>14</td>
<td>55</td>
<td>54.0</td>
<td>9.2</td>
<td>30</td>
<td>16.8</td>
<td>55</td>
<td>21.1</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
<td>58.8</td>
<td>7.1</td>
<td>23</td>
<td>14.7</td>
<td>48</td>
<td>19.9</td>
</tr>
<tr>
<td>16</td>
<td>65</td>
<td>63.6</td>
<td>5.3</td>
<td>17</td>
<td>12.9</td>
<td>42</td>
<td>19.0</td>
</tr>
<tr>
<td>17</td>
<td>70</td>
<td>68.4</td>
<td>3.6</td>
<td>12</td>
<td>11.2</td>
<td>37</td>
<td>18.3</td>
</tr>
<tr>
<td>18</td>
<td>75 (MAX)</td>
<td>73.1</td>
<td>2.0</td>
<td>7</td>
<td>9.6</td>
<td>32</td>
<td>17.8</td>
</tr>
</tbody>
</table>
4-3-0 Minimum Turning Radii

**ON A/C A321-100 A321-200 A321neo

Minimum Turning Radii

1. This section provides the minimum turning radii.
**ON A/C A321-100 A321-200 A321neo

NOTE: NOSE GEAR RADIUS TRACK MEASURED FROM OUTSIDE FACE OF TIRE.
THEORETICAL CENTER OF TURN FOR MINIMUM TURNING RADIUS.
SLOW CONTINUOUS TURNING, APPROXIMATELY IDLE THRUST ON ALL ENGINES.
NO DIFFERENTIAL BRAKING.

<table>
<thead>
<tr>
<th>TYPE OF TURN</th>
<th>STEERING ANGLE (DEG)</th>
<th>EFFECTIVE STEERING ANGLE</th>
<th>Y (m)</th>
<th>A (ft)</th>
<th>R3 NLG (m)</th>
<th>R4 WING</th>
<th>R5 NOSE</th>
<th>R6 THS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75 (MAX)</td>
<td>73.1°</td>
<td>5.1</td>
<td>17</td>
<td>27.7</td>
<td>22.6</td>
<td>23.4</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>91</td>
<td>58</td>
<td>17.8</td>
<td>74</td>
<td>77</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>75 (MAX)</td>
<td>71.6°</td>
<td>5.6</td>
<td>18</td>
<td>28.3</td>
<td>23.1</td>
<td>23.9</td>
<td>22.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>93</td>
<td>59</td>
<td>17.9</td>
<td>76</td>
<td>78</td>
<td>74</td>
</tr>
</tbody>
</table>

NOTE: IT IS POSSIBLE TO GET LOWER VALUES THAN THOSE FROM TYPE 1 BY APPLYING DIFFERENTIAL BRAKING DURING THE WHOLE TURN.

Minimum Turning Radii
FIGURE-4-3-0-991-004-A01
Visibility from Cockpit in Static Position

**ON A/C A321-100 A321-200 A321neo**

Visibility from Cockpit in Static Position

1. This section gives the visibility from cockpit in static position.
NOT TO BE USED FOR
LANDING APPROACH VISIBILITY

VISUAL ANGLES IN VERTICAL
PLANE THROUGH PILOT
EYE POSITION.

DIMENSIONS ARE APPROXIMATE

FIRST OFFICER
FIELD OF VIEW

CAPTAIN FIELD OF VIEW

MAX AFT VISION WITH HEAD TURNED
AROUND SPINAL COLUMN.
WING TIP CAN BE SEEN WHEN HEAD IS MOVED
TO THE SIDE.

VISUAL ANGLES IN HORIZONTAL
PLANE THROUGH PILOT
EYE POSITION.

WITH HEAD MOVED
125 mm (5 in) OUTBOARD

VISUAL ANGLES IN PLANE
PERPENDICULAR TO
LONGITUDINAL AXIS.

NOTE:
• PILOT EYE POSITION WHEN PILOT’S EYES ARE IN LINE WITH THE RED AND WHITE BALLS.

ZONE THAT CANNOT BE SEEN

Visibility from Cockpit in Static Position
FIGURE-4-4-0-991-001-A01

N_AC_040400_1_0010101_01_04
**ON A/C A321-100 A321-200 A321neo

Binocular Visibility Through Windows from Captain Eye Position
FIGURE-4-4-0-991-005-A01
4-5-0 Runway and Taxiway Turn Paths

**ON A/C A321-100 A321-200 A321neo

Runway and Taxiway Turn Paths
1. Runway and Taxiway Turn Paths.
4-5-1 135° Turn - Runway to Taxiway

**ON A/C A321-100 A321-200 A321neo

135° Turn - Runway to Taxiway

1. This section gives the 135° turn - runway to taxiway.
**ON A/C A321-100 A321-200 A321neo

135° Turn - Runway to Taxiway
Cockpit Over Centerline Method
FIGURE-4-5-1-991-006-A01
**ON A/C A321-100 A321-200 A321neo

NOTE:
FAA GROUP III FACILITIES.

135° Turn - Runway to Taxiway
Judgemental Oversteering Method
FIGURE-4-5-1-991-007-A01
4-5-2 90° Turn - Runway to Taxiway

**ON A/C A321-100 A321-200 A321neo

90° Turn – Runway to Taxiway

1. This section gives the 90° turn - runway to taxiway.
**ON A/C A321-100 A321-200 A321neo

90° Turn - Runway to Taxiway
Cockpit Over Centerline Method
FIGURE-4-5-2-991-006-A01

NOTE:
FAA GROUP III FACILITIES.
**ON A/C A321-100 A321-200 A321neo

90° Turn - Runway to Taxiway
Judgemental Oversteering Method
FIGURE-4-5-2-991-007-A01
4-5-3 180° Turn on a Runway

**ON A/C A321-100 A321-200 A321neo

180° Turn on a Runway

1. This section provides the 180° turn on a runway.
RUNWAY CENTERLINE

14.4 m (47 ft)

3 m (10 ft)

R3 = 17.8 m (58 ft)

R5 = 22.6 m (74 ft)

45 m (148 ft)

180° Turn on a Runway
Edge of Runway Method (Sheet 1 of 2)
FIGURE-4-5-3-991-002-A01

N_AC_040503_1_0020101_01_05
**ON A/C A321-100 A321-200 A321neo

180° Turn on a Runway
Center of Runway Method (Sheet 2 of 2)
FIGURE-4-5-3-991-002-A01
4-5-4 135° Turn - Taxiway to Taxiway

**ON A/C A321-100 A321-200 A321neo**

135° Turn – Taxiway to Taxiway

1. This section gives the 135° turn - taxiway to taxiway.
**ON A/C A321-100 A321-200 A321neo

135° Turn - Taxiway to Taxiway
Cockpit Over Centerline Method (Sheet 1 of 2)
FIGURE-4-5-4-991-007-A01
135° Turn - Taxiway to Taxiway
Judgemental Oversteering Method (Sheet 2 of 2)
FIGURE-4-5-4-991-007-A01
4-5-5 90° Turn - Taxiway to Taxiway

**ON A/C A321-100 A321-200 A321neo

90° Turn - Taxiway to Taxiway

1. This section gives the 90° turn - taxiway to taxiway.
**ON A/C A321-100 A321-200 A321neo

NOTE:
FAA GROUP III FACILITIES.

90° Turn - Taxiway to Taxiway
Cockpit Over Centerline Method (Sheet 1 of 2)
FIGURE-4-5-5-991-004-A01
**ON A/C A321-100 A321-200 A321neo

NOTE:
FAA GROUP III FACILITIES.

90° Turn - Taxiway to Taxiway
Judgemental Oversteering Method (Sheet 2 of 2)
FIGURE-4-5-5-991-004-A01
Runway Holding Bay (Apron)

**ON A/C A321-100 A321-200 A321neo**

Runway Holding Bay (Apron)

1. This section gives the runway holding bay (Apron).
**ON A/C A321-100 A321-200 A321neo

**NOTE:** APPLICABLE FOR A321–100 AND A321–200.

Runway Holding Bay (Apron)
FIGURE-4-6-0-991-004-A01
Minimum Line-Up Distance Corrections

**ON A/C A321-100 A321-200 A321neo**

1. The ground maneuvers were performed using asymmetric thrust and differential braking only to initiate the turn.
   - TODA: Take-Off Distance Available
   - ASDA: Acceleration-Stop Distance Available

2. 90° Turn on Runway Entry
   This section gives the minimum line-up distance correction for a 90° turn on runway entry. This maneuver consists in a 90° turn at minimum turn radius. It starts with the edge of the MLG at a distance of 3 m (10 ft) from the taxiway edge, and finishes with the aircraft aligned on the centerline of the runway, see FIGURE 4-7-0-991-020-A.
   During the turn, all the clearances must meet the minimum value of 3 m (10 ft) for this category of aircraft as recommended in ICAO Annex 14.

3. 180° Turn on Runway Turn Pad
   This section gives the minimum line-up distance correction for a 180° turn on the runway turn pad. This maneuver consists in a 180° turn at minimum turn radius on a runway turn pad with standard ICAO geometry.
   It starts with the edge of the MLG at a distance of 3 m (10 ft) from the pavement edge, and it finishes with the aircraft aligned on the centerline of the runway, see FIGURE 4-7-0-991-021-A.
   During the turn, all the clearances must meet the minimum value of 3 m (10 ft) for this category of aircraft as recommended in ICAO Annex 14.

4. 180° Turn on Runway Width
   This section gives the minimum line-up distance correction for a 180° turn on the runway width. For this maneuver, the pavement width is considered to be the runway width, which is a frozen parameter (30 m (100 ft), 45 m (150 ft) and 60 m (200 ft)).
   As per the standard operating procedures for the "180° turn on runway" (described in the Flight Crew Operating Manual), the aircraft is initially angled with respect to the runway centerline when starting the 180° turn, see FIGURE 4-7-0-991-022-A.
   The value of this angle depends on the aircraft type and is mentioned in the FCOM.
   During the turn, all the clearances must meet the minimum value of 3 m (10 ft) for this category of aircraft as recommended in ICAO Annex 14.

**NOTE:** The minimum line-up distances may need a steering angle lower than the maximum one.
**ON A/C A321-100 A321-200 A321neo**

### 90° Turn on Runway Entry

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Max Steering Angle</th>
<th>30 m (100 ft) Wide Runway</th>
<th>45 m (150 ft)/60 m (200 ft) Wide Runway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum Line-Up Distance Correction</td>
<td>Minimum Line-Up Distance Correction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On TODA</td>
<td>On ASDA</td>
</tr>
<tr>
<td>A321</td>
<td>75°</td>
<td>13.9 m</td>
<td>46 ft</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.6 m</td>
<td>41 ft</td>
</tr>
</tbody>
</table>

---

ASDA: ACCELERATION-STOP DISTANCE AVAILABLE  
TODA: TAKE-OFF DISTANCE AVAILABLE

Minimum Line-Up Distance Corrections  
90° Turn on Runway Entry  
FIGURE-4-7-0-991-020-A01
**ON A/C A321-100 A321-200 A321neo

--- ASDA: ACCELERATION-STOP DISTANCE AVAILABLE
--- TODA: TAKE-OFF DISTANCE AVAILABLE

### Minimum Line-Up Distance Corrections

180° Turn on Runway Turn Pad

**FIGURE-4-7-0-991-021-A01**
**ON A/C A321-100 A321-200 A321neo**

**Minimum Line-Up Distance Corrections**

180° Turn on Runway Width

**FIGURE-4-7-0-991-022-A01**

---

<table>
<thead>
<tr>
<th>AIRCRAFT TYPE</th>
<th>MAX STEERING ANGLE</th>
<th>30 m (100 ft) WIDE RUNWAY</th>
<th>45 m (150 ft)/60 m (200 ft) WIDE RUNWAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MINIMUM LINE-UP DISTANCE CORRECTION</td>
<td>MINIMUM LINE-UP DISTANCE CORRECTION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ON TODA</td>
<td>ON ASDA</td>
</tr>
<tr>
<td>A321</td>
<td>75°</td>
<td>NOT POSSIBLE</td>
<td>21.0 m</td>
</tr>
</tbody>
</table>

**NOTE:**

"NOT POSSIBLE" MEANS THAT IT IS NOT POSSIBLE FOR THE AIRCRAFT TO TURN ON SUCH A RUNWAY WIDTH WITH THE GIVEN ASSUMPTIONS DEFINED IN THIS SECTION (4–7–0) WHILE MAINTAINING THE MINIMUM 3 m (10 ft) MARGIN RECOMMENDED BY ICAO.

---

ASDA: ACCELERATION–STOP DISTANCE AVAILABLE
TODA: TAKE-OFF DISTANCE AVAILABLE
**Aircraft Mooring**

1. This section provides information on aircraft mooring.
**ON A/C A321-100 A321-200 A321neo

Aircraft Mooring
FIGURE-4-8-0-991-001-A01
**ON A/C A321-100 A321-200 A321neo**

**Aircraft Servicing Arrangements**

1. This section provides typical ramp layouts, showing the various GSE items in position during typical turn-round scenarios.

   These ramp layouts show typical arrangements only. Each operator will have its own specific requirements/regulations for positioning and operation on the ramp.

This table gives the symbols used on servicing diagrams.

<table>
<thead>
<tr>
<th>Ground Support Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
</tr>
<tr>
<td>AS</td>
</tr>
<tr>
<td>BULK</td>
</tr>
<tr>
<td>CAT</td>
</tr>
<tr>
<td>CB</td>
</tr>
<tr>
<td>CLEAN</td>
</tr>
<tr>
<td>FUEL</td>
</tr>
<tr>
<td>GPU</td>
</tr>
<tr>
<td>LDCL</td>
</tr>
<tr>
<td>LV</td>
</tr>
<tr>
<td>PBB</td>
</tr>
<tr>
<td>PS</td>
</tr>
<tr>
<td>TOW</td>
</tr>
<tr>
<td>ULD</td>
</tr>
<tr>
<td>WV</td>
</tr>
</tbody>
</table>
5-1-2 Typical Ramp Layout - Open Apron

**ON A/C A321-100 A321-200 A321neo

Typical Ramp Layout - Open Apron

1. This section gives the typical servicing arrangement for pax version (Open Apron).

   The Stand Safety Line delimits the Aircraft Safety Area (minimum distance of 7.5 m from the aircraft). No vehicle must be parked in this area before complete stop of the aircraft (wheel chocks in position on landing gears).
**ON A/C A321-100 A321-200 A321neo

STAND SAFETY LINE

NOTE: TYPICAL RAMP LAYOUT APPLICABLE TO AIRCRAFT WITH OR WITHOUT SHARKLETS.

Typical Ramp Layout
Open Apron - Bulk Loading
FIGURE-5-1-2-991-005-A01
**ON A/C A321-100 A321-200 A321neo

Typical Ramp Layout
Open Apron - ULD Loading
FIGURE-5-1-2-991-010-A01

NOTE: TYPICAL RAMP LAYOUT APPLICABLE TO AIRCRAFT WITH OR WITHOUT SHARKLETS.
5-1-3 Typical Ramp Layout - Gate

**ON A/C A321-100 A321-200 A321neo

Typical Ramp Layout - Gate

1. This section gives the typical servicing arrangement for pax version (Passenger Bridge).

   The Stand Safety Line delimits the Aircraft Safety Area (minimum distance of 7.5 m from the aircraft). No vehicle must be parked in this area before complete stop of the aircraft (wheel chocks in position on landing gears).
**ON A/C A321-100 A321-200 A321neo

**

NOTE: TYPICAL RAMP LAYOUT APPLICABLE TO AIRCRAFT WITH OR WITHOUT SHARKLETS.

Typical Ramp Layout
Gate
FIGURE-5-1-3-991-003-A01
5-2-0 Terminal Operations - Full Servicing Turn Round Time Chart

**ON A/C A321-100 A321-200 A321neo

Terminal Operations - Full Servicing Turn Round Time

1. This section provides a typical turn round time chart showing the typical time for ramp activities during aircraft turn round.
   Actual times may vary due to each operator’s specific practices, resources, equipment and operating conditions.

2. Assumptions used for full servicing turn round time chart

   FIGURE 5-2-0-991-007-A

   A. PASSENGER HANDLING
      185 pax: 16 F/C + 169 Y/C.
      All passengers deplane and board the aircraft.
      1 Passenger Boarding Bridge (PBB) used at door 1L.
      Equipment positioning + opening door = +2 min.
      Closing door + equipment removal = +1.5 min.
      No Passenger with Reduced Mobility (PRM) on board.
      Deplaning:
      - 185 pax at door 1L
      - Deplaning rate = 20 pax/min
      - Priority deplaning for premium passengers.
      Boarding:
      - 185 pax at door 1L
      - Boarding rate = 12 pax/min
      - Last Pax Seating allowance (LPS) + headcounting = +2 min.

   B. CARGO
      2 cargo loaders + 1 belt loader.
      Opening door + equipment positioning = +2 min.
      Equipment removal + closing door = +1.5 min.
      100% cargo exchange (baggage only):
      - FWD cargo compartment: 5 containers
      - AFT cargo compartment: 5 containers
      - Bulk compartment: 500 kg (1 102 lb).
      Container unloading/loading times:
      - Unloading = 1.5 min/container
      - Loading = 1.5 min/container.
      Bulk unloading/loading times:
      - Unloading = 150 kg/min (331 lb/min)
      - Loading = 120 kg/min (265 lb/min).

   C. REFUELING
      20 000 l (5 283 US gal) at 50 psig (3.45 bars-rel), one hose (right wing).
Dispenser positioning/removal + connection/disconnection times = +2.5 min.

D. CLEANING
Cleaning is performed in available time.

E. CATERING
1 catering truck for servicing galleys sequentially at doors 1R and 4R.
Equipment positioning + opening door = +2 min.
Closing door + equipment removal = +1.5 min.
Time to drive from one door to the other = +2 min.
Full Size Trolley Equivalent (FSTE) to unload and load: 14 FSTE
- 4 FSTE at door 1R
- 10 FSTE at door 4R.
Time for trolley exchange = 1.2 min per FSTE.

F. GROUND HANDLING/GENERAL SERVICING
Start of operations:
- Bridges/stairs: t0 = 0
- Other equipment: t = t0 + 1 min.
Ground Power Unit (GPU): up to 90 kVA.
Air conditioning: one hose.
Potable water servicing: 100% uplift, 200 l (53 US gal).
Toilet servicing: draining + rinsing.

**ON A/C A321neo

3. Assumptions used for full servicing turn round time chart for A321NEO-ACF
FIGURE 5-2-0-991-009-A

A. PASSENGER HANDLING
202 pax (all Y/C).
All passengers deplane and board the aircraft.
1 PBB used at door 1L.
Equipment positioning + opening door = +2 min.
Closing door + equipment removal = +1.5 min.
No PRM on board.
Deplaning:
- 202 pax at door 1L
- Deplaning rate = 20 pax/min
Boarding:
- 202 pax at door 1L
- Boarding rate = 12 pax/min
- LPS allowance + headcounting = +2 min.

B. CARGO
2 cargo loaders + 1 belt loader.
Opening door + equipment positioning = +2 min.
Equipment removal + closing door = +1.5 min.

100% cargo exchange (baggage only):
- FWD cargo compartment: 5 containers
- AFT cargo compartment: 5 containers
- Bulk compartment: 500 kg (1 102 lb).

Container unloading/loading times:
- Unloading = 1.5 min/container
- Loading = 1.5 min/container.

Bulk unloading/loading times:
- Unloading = 150 kg/min (331 lb/min)
- Loading = 120 kg/min (265 lb/min).

C. REFUELING
20 000 l (5 283 US gal) at 50 psig (3.45 bars-rel), one hose (right wing).
No optional coupling.
Dispenser positioning/removal + connection/disconnection times = +2.5 min.
Refuelling with passengers on board: No

D. CLEANING
Cleaning is performed in available time.

E. CATERING
1 catering truck for servicing galleys sequentially at doors 1R and 4R.
Equipment positioning + opening door = +2 min.
Closing door + equipment removal = +1.5 min.
Time to drive from one door to the other = +2 min.
FSTE to unload and load: 11 FSTE
- 4 FSTE at door 1R
- 7 FSTE at door 4R.
Time for trolley exchange = 1.2 min per FSTE.
Maximum catering time = +13.2 min.

F. GROUND HANDLING/GENERAL SERVICING
Start of operations:
- Bridges/stairs: t0 = 0
- Other equipment: t = t0 + 1 min.
Ground Power Unit (GPU): up to 90 kVA.
Air conditioning: one hose.
Potable water servicing: 100% uplift, 200 l (53 US gal).
Toilet servicing: draining + rinsing.

G. SECURITY/SAFETY CHECKS
No security or safety checks are applicable.
**ON A/C A321-100 A321-200 A321neo**

TRT: 52 min

Full Servicing Turn Round Time Chart
FIGURE-5-2-0-991-007-A01
**ON A/C A321neo

Full Servicing Turn Round Time Chart for A321NEO-ACF
FIGURE-5-2-0-991-009-A01
**Terminal Operation - Outstation Turn Round Time Chart**

**ON A/C A321-100 A321-200 A321neo**

**Terminal Operations - Transit Turn Round Time**

1. This section provides a typical turn round time chart showing the typical time for ramp activities during aircraft turn round. Actual times may vary due to each operator’s specific practices, resources, equipment and operating conditions.

2. Assumptions used for transit turn round time chart
   
   **FIGURE 5-3-0-991-004-A**

   **A. PASSENGER HANDLING**
   220 pax (all Y/C).
   All passengers deplane and board the aircraft.
   2 stairways used at doors 1L and 4L.
   Equipment positioning + opening door = +2 min.
   Closing door + equipment removal = +1.5 min.
   No Passenger with Reduced Mobility (PRM) on board.
   Deplaning:
   - 110 pax at door 1L
   - 110 pax at door 4L
   - Deplaning rate = 20 pax/min. per door
   Boarding:
   - 110 pax at door 1L
   - 110 pax at door 4L
   - Boarding rate = 12 pax/min. per door
   - Last Pax Seating allowance (LPS) + headcounting = +2 min.

   **B. CARGO**
   2 cargo loaders.
   Opening door + equipment positioning = +2 min.
   Equipment removal + closing door = +1.5 min.
   100% cargo exchange:
   - FWD cargo compartment: 5 containers
   - AFT cargo compartment: 5 containers
   Container unloading/loading times:
   - Unloading = 1.5 min./container
   - Loading = 1.5 min./container.

   **C. REFUELLING**
   No refueling.

   **D. CLEANING**
   Cleaning is performed in available time.
E. CATERING
One catering truck for servicing the galleys as required.

F. GROUND HANDLING/GENERAL SERVICING
Start of operations:
- Bridges/stairs: \( t_0 = 0 \)
- Other equipment: \( t = t_0 \).

Ground Power Unit (GPU): up to 90 kVA.
Air conditioning: one hose.
No potable water servicing.
No toilet servicing.

**ON A/C A321neo

3. Assumptions used for transit turn round time chart for A321NEO-ACF
FIGURE 5-3-0-991-007-A

A. PASSENGER HANDLING
202 pax (all Y/C).
All passengers deplane and board the aircraft.
2 Stairs used at door 1L and 4L.
Equipment positioning + opening door = +2 min.
Closing door + equipment removal = +1.5 min.
No PRM on board.
Deplaning:
- 101 pax at door 1L
- 101 pax at door 4L
- Deplaning rate = 20 pax/min. per door
Boarding:
- 101 pax at door 1L
- 101 pax at door 4L
- Boarding rate = 12 pax/min. per door
- LPS + headcounting = +2 min.

B. CARGO
2 cargo loaders.
Opening door + equipment positioning = +2 min.
Equipment removal + closing door = +1.5 min.
100% cargo exchange:
- FWD cargo compartment: 5 containers
- AFT cargo compartment: 5 containers
- Bulk compartment: 500 kg (1 102 lb).
Container unloading/loading times:
- Unloading = 1.5 min/container
- Loading = 1.5 min/container.
Bulk unloading/loading times:
- Unloading = 150 kg/min (331 lb/min)
- Loading = 120 kg/min (265 lb/min).

C. REFUELING
20 000 l (5 283 US gal) at 50 psig (3.45 bars-rel). No optional coupling.
Dispenser positioning/removal + connection/disconnection times = +2.5 min.
Refuelling with passengers on board: No.

D. CLEANING
Cleaning is performed in available time.

E. CATERING
1 catering truck for servicing galleys sequentially at doors 1R and 4R.
Equipment positioning + opening door = +2 min.
Closing door + equipment removal = +1.5 min.
Time to drive from one door to the other = +2 min.
Full Size Trolley Equivalent (FSTE) to unload and load: 11 FSTE
- 4 FSTE at door 1R
- 7 FSTE at door 4R.
Time for trolley exchange = 1.2 min per FSTE
Maximum catering time = +13.2 min.

F. GROUND HANDLING/GENERAL SERVICING
Start of operations:
- Bridges/stairs: t0 = 0
- Other equipment: t = t0.
GPU: up to 90 kVA.
Air conditioning: one hose.
Potable water servicing: 100% uplift, 200 l (53 US gal).
Toilet servicing: draining + rinsing.

G. SECURITY/SAFETY CHECKS
No safety or security checks are available.
**ON A/C A321-100 A321-200 A321neo

TRT: 23 min

- DEPLANING/BOARDING AT DOOR 1L
- DEPLANING/BOARDING AT DOOR 4L
- LPS + HEADCOUNTING
- SECURITY/SAFETY CHECKS
- CATERING
- CLEANING
- CARGO AFT CC
- CARGO FWD CC
- REFUELING
- WASTE WATER SERVICING
- POTABLE WATER SERVICING

GSE POSITIONING/REMOVAL
ACTIVITY
CRITICAL PATH

Outstation Turn Round Time Chart
FIGURE-5-3-0-991-004-A01
**ON A/C A321neo

TRT: 38 min

Outstation Turn Round Time Chart for A321NEO-ACF
FIGURE-5-3-0-991-007-A01
5-4-1 Ground Service Connections

**ON A/C A321-100 A321-200 A321neo

Ground Service Connections Layout

1. This section provides the ground service connections layout.
**ON A/C A321-100 A321-200 A321neo

1 – GROUND ELECTRICAL POWER CONNECTOR
2 – OXYGEN SYSTEM
3 – NLG GROUNDING (EARTHING) POINT
4 – POTABLE WATER DRAIN PANEL
5 – LOW PRESSURE AIR PRE-CONDITIONING
6 – HIGH PRESSURE AIR PRE-CONDITIONING
7 – REFUEL/DEFUEL INTEGRATED PANEL
8 – IDG/STARTER OIL SERVICING
9 – ENGINE OIL SERVICING
10 – OVERPRESSURE PROTECTOR
11 – REFUEL/DEFUEL COUPLINGS (OPTIONAL–LH WING)
12 – OVERWING REFUEL (IF INSTALLED)
13 – NACA VENT INTAKE
14 – YELLOW HYDRAULIC–SYSTEM SERVICE PANEL
15 – BLUE HYDRAULIC–SYSTEM SERVICE PANEL
16 – ACCUMULATOR CHARGING (GREEN SYSTEM) AND RESERVOIR DRAIN (GREEN SYSTEM)
17 – GREEN HYDRAULIC–SYSTEM SERVICE PANEL
18 – MLG GROUNDING (EARTHING) POINT
19 – WASTE WATER SERVICE PANEL
20 – POTABLE WATER SERVICE PANEL
21 – APU OIL SERVICING

Ground Service Connections Layout
FIGURE-5-4-1-991-007-A01
5-4-2 Grounding Points

**ON A/C A321-100 A321-200 A321neo**

**Grounding (Earthing) Points**

1. Grounding (Earthing) Points

<table>
<thead>
<tr>
<th>DISTANCE</th>
<th>AFT OF NOSE</th>
<th>FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
</tr>
<tr>
<td>On Nose Landing Gear leg:</td>
<td>5.07 m (16.63 ft)</td>
<td>On Centerline</td>
<td>0.94 m (3.08 ft)</td>
</tr>
<tr>
<td>On left Main Landing Gear leg:</td>
<td>21.97 m (72.08 ft)</td>
<td>3.79 m (12.43 ft)</td>
<td>1.07 m (3.51 ft)</td>
</tr>
<tr>
<td>On right Main Landing Gear leg:</td>
<td>21.97 m (72.08 ft)</td>
<td>-</td>
<td>3.79 m (12.43 ft)</td>
</tr>
</tbody>
</table>

A. The grounding (earthing) stud on each landing gear leg is designed for use with a clip-on connector (such as Appleton TGR).

B. The grounding (earthing) studs are used to connect the aircraft to an approved ground (earth) connection on the ramp or in the hangar for:
   - Refuel/defuel operations,
   - Maintenance operations,
   - Bad weather conditions.

NOTE: In all other conditions, the electrostatic discharge through the tire is sufficient.

If the aircraft is on jacks for retraction and extension checks or for the removal/installation of the landing gear, the grounding (earthing) alternative points (if installed) are:
   - In the hole on the avionics-compartment lateral right door-frame (on FR14),
   - On the engine nacelles,
   - Adjacent to the high-pressure connector,
   - On the wing upper surfaces.
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Grounding (Earthing) Points - Landing Gear
FIGURE-5-4-2-991-007-A01
**ON A/C A321-100 A321-200 A321neo

FOR SPECIFICATIONS REFER TO FLIGHT MANUAL

NOTE: R SIDE SYMMETRICAL

Ground Service Connections
Grounding (Earthing) Points - Wing (If Installed)
FIGURE-5-4-2-991-008-A01
Ground Service Connections
Grounding (Earthing) Point - Avionics Compartment Door-Frame
FIGURE-5-4-2-991-018-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Grounding (Earthing) Point - Engine Air Intake (If Installed)
FIGURE-5-4-2-991-019-A01
5-4-3 Hydraulic System

**ON A/C A321-100 A321-200 A321neo**

Hydraulic Servicing

1. Access

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>AFT OF NOSE</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
<td></td>
</tr>
<tr>
<td>Green System: Access Door 197CB</td>
<td>23.44 m (76.90 ft)</td>
<td>1.27 m (4.17 ft)</td>
<td>1.76 m (5.77 ft)</td>
</tr>
<tr>
<td>Yellow System: Access Door 198CB</td>
<td>23.44 m (76.90 ft)</td>
<td></td>
<td>1.76 m (5.77 ft)</td>
</tr>
<tr>
<td>Blue System: Access Door 197EB</td>
<td>24.49 m (80.35 ft)</td>
<td>1.27 m (4.17 ft)</td>
<td>1.76 m (5.77 ft)</td>
</tr>
</tbody>
</table>

2. Reservoir Pressurization

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>AFT OF NOSE</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
<td></td>
</tr>
<tr>
<td>Access Door 195BB</td>
<td>19.92 m (65.35 ft)</td>
<td>0.25 m (0.82 ft)</td>
<td>1.74 m (5.71 ft)</td>
</tr>
</tbody>
</table>

3. Accumulator Charging

Four MIL-PRF-6164 connections:

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>AFT OF NOSE</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
<td></td>
</tr>
<tr>
<td>Yellow System Accumulator: Access Door 196BB</td>
<td>19.92 m (65.35 ft)</td>
<td>0.25 m (0.82 ft)</td>
<td>1.74 m (5.71 ft)</td>
</tr>
</tbody>
</table>
### ACCESS

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
</tr>
<tr>
<td></td>
<td>MEAN HEIGHT FROM GROUND</td>
</tr>
<tr>
<td></td>
<td>LH SIDE</td>
</tr>
<tr>
<td>Green System</td>
<td></td>
</tr>
<tr>
<td>Accumulator: Left MLG Door</td>
<td>21.04 m</td>
</tr>
<tr>
<td></td>
<td>(69.03 ft)</td>
</tr>
<tr>
<td>Blue System</td>
<td></td>
</tr>
<tr>
<td>Accumulator: Access Door 195BB</td>
<td>19.92 m</td>
</tr>
<tr>
<td></td>
<td>(65.35 ft)</td>
</tr>
<tr>
<td>Yellow System Braking</td>
<td></td>
</tr>
<tr>
<td>Accumulator: Access Door 196BB</td>
<td>19.92 m</td>
</tr>
<tr>
<td></td>
<td>(65.35 ft)</td>
</tr>
</tbody>
</table>

4. Reservoir Filling

Centralized filling capability on the Green System ground service panel:

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
</tr>
<tr>
<td></td>
<td>MEAN HEIGHT FROM GROUND</td>
</tr>
<tr>
<td></td>
<td>LH SIDE</td>
</tr>
<tr>
<td>Access Door 197CB</td>
<td>23.44 m</td>
</tr>
<tr>
<td></td>
<td>(76.90 ft)</td>
</tr>
</tbody>
</table>

Filling: Ground pressurized supply or hand pump.

5. Reservoir Drain

Three 3/8 in. self-sealing connections:
<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
</tr>
<tr>
<td>Blue System: Access Door 197EB</td>
<td>24.49 m (80.35 ft)</td>
<td>1.27 m</td>
</tr>
</tbody>
</table>

**NOTE**: The drain valve is on the Blue System ground service panel for the reservoir of the Blue hydraulic system. The drain valve is on the reservoir for the Green and Yellow Hydraulic Systems.

6. Ground Test

On each ground service panel:
- One self-sealing connector (suction).
- One self-sealing connector (delivery).
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Green System Ground Service Panel
FIGURE-5-4-3-991-004-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Blue System Ground Service Panel
FIGURE-5-4-3-991-005-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Yellow System Ground Service Panel
FIGURE-5-4-3-991-006-A01
**ON A/C A321-100 A321-200 A321neo

NOTE:

01 FOR A318, A319 AND A320
02 FOR A321

Ground Service Connections
RAT
FIGURE-5-4-3-991-007-A01
5-4-4 Electrical System

**ON A/C A321-100 A321-200 A321neo

Electrical System

1. Electrical System
   This chapter provides data related to the location of the ground service connections.

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FROM AIRCRAFT CENTERLINE</td>
</tr>
<tr>
<td></td>
<td>LH SIDE</td>
</tr>
<tr>
<td>A/C External Power: Access Door 121AL</td>
<td>2.55 m (8.37 ft)</td>
</tr>
</tbody>
</table>

**NOTE:** Distances are approximate.

2. Technical Specifications

A. External Power Receptacle:
   - One receptacle according to MS 90362-3 (without shield MS 17845-1) – 90 kVA.

   **NOTE:** Make sure that for connectors featuring micro switches, the connector is chamfered to properly engage in the receptacle.

B. Power Supply:
   - Three-phase, 115/200V, 400 Hz.

C. Electrical Connectors for Servicing:
   - AC outlets: HUBBELL 5258
   - DC outlets: HUBBELL 7472.
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
External Power Receptacles
FIGURE-5-4-4-991-001-A01
5-4-5 Oxygen System

**ON A/C A321-100 A321-200 A321neo

Oxygen System

1. Oxygen System

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
</tr>
<tr>
<td>Oxygen Replenishment:</td>
<td>3.45 m</td>
<td>1.15 m</td>
</tr>
<tr>
<td>Access Door 812</td>
<td>(11.32 ft)</td>
<td>(3.77 ft)</td>
</tr>
</tbody>
</table>

2. Technical Specifications
   - One 3/8 in. MIL-DTL 7891 standard service connection.

**NOTE:** External charging in the avionics compartment.
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Oxygen System
FIGURE-5-4-5-991-001-A01
## Fuel System

**ON A/C A321-100 A321-200 A321neo**

### 1. Refuel/Defuel Control Panel

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>AFT OF NOSE</th>
<th>POSITION FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
</tr>
<tr>
<td>Refuel/Defuel Integrated Panel: Access Door 192MB</td>
<td>20.65 m (67.75 ft)</td>
<td>-</td>
<td>1.8 m (5.91 ft)</td>
</tr>
</tbody>
</table>

### 2. Refuel/Defuel Connectors

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>AFT OF NOSE</th>
<th>POSITION FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
</tr>
<tr>
<td>Refuel/Defuel Coupling, Left: Access Panel 522HB (Optional)</td>
<td>21.84 m (71.65 ft)</td>
<td>9.83 m (32.25 ft)</td>
<td>-</td>
</tr>
<tr>
<td>Refuel/Defuel Coupling, Right: Access Panel 622HB</td>
<td>21.84 m (71.65 ft)</td>
<td>-</td>
<td>9.83 m (32.25 ft)</td>
</tr>
<tr>
<td>Overwing Gravity-Refuel Cap</td>
<td>23.35 m (76.61 ft)</td>
<td>12.4 m (40.68 ft)</td>
<td>12.4 m (40.68 ft)</td>
</tr>
</tbody>
</table>

A. Refuel/Defuel Couplings:
- Right wing: one standard ISO 45, 2.5 in.
- Left wing: one optional standard ISO 45, 2.5 in.

B. Refuel Pressure:
- Maximum Pressure: 3.45 bar (50 psi).

C. Average Flow Rate:
- 1250 l/min (330 US gal/min).
3. Overpressure Protectors and NACA Vent Intake

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE</th>
<th>POSITION FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
<td>RH SIDE</td>
</tr>
<tr>
<td>Surge Tank Overpressure-Protector: 550CB (650CB)</td>
<td>24.61 m (80.74 ft)</td>
<td>14.9 m (48.88 ft)</td>
<td>14.9 m (48.88 ft)</td>
</tr>
<tr>
<td>Wing Tank Overpressure-Protector: 540PB (640PB)</td>
<td>24.2 m (79.40 ft)</td>
<td>12.15 m (39.86 ft)</td>
<td>12.15 m (39.86 ft)</td>
</tr>
<tr>
<td>NACA Vent Intake: 550AB (650AB)</td>
<td>24.05 m (78.90 ft)</td>
<td>13.7 m (44.95 ft)</td>
<td>13.7 m (44.95 ft)</td>
</tr>
</tbody>
</table>

**NOTE**: Distances are approximate.
**ON A/C A321-100 A321-200 A321neo**

**NOTE:** STANDARD CONFIGURATION OF REFUEL/DEFUEL PANEL.

Ground Service Connections
Refuel/Defuel Control Panel
FIGURE-5-4-6-991-001-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Refuel/Defuel Couplings
FIGURE-5-4-6-991-002-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Overwing Gravity-Refuel Cap (If Installed)
FIGURE-5-4-6-991-003-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Overpressure Protectors and NACA Vent Intake
FIGURE-5-4-6-991-004-B01
### Pneumatic System

**ON A/C A321-100 A321-200 A321neo**

#### Pneumatic System

1. **High Pressure Air Connector**

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
</tr>
<tr>
<td>HP Connector:</td>
<td>Access Door 191DB</td>
<td>17.25 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(56.59 ft)</td>
</tr>
</tbody>
</table>

   **A. Connector:**
   - One standard 3 in. ISO 2026 connection.

2. **Low Pressure Air Connector**

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
</tr>
<tr>
<td>LP Connector:</td>
<td>Access Door 191CB</td>
<td>16.72 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(54.86 ft)</td>
</tr>
</tbody>
</table>

   **A. Connector:**
   - One standard 8 in. SAE AS4262 connection.
**ON A/C A321-100 A321-200 A321neo**

Ground Service Connections
LP and HP Ground Connectors
FIGURE-5-4-7-991-001-A01
5-4-8 Oil System

**ON A/C A321-100 A321-200 A321neo

Oil System

**ON A/C A321-100 A321-200

1. Engine Oil Replenishment for CFM56 Series Engine (See FIGURE 5-4-8-991-003-A):
   One gravity filling cap and one pressure filling connection per engine.

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE ENGINE 1 (LH)</td>
<td>ENGINE 2 (RH)</td>
</tr>
<tr>
<td>Engine Oil Gravity Filling Cap:</td>
<td>17.38 m (57.02 ft)</td>
<td>6.63 m (21.75 ft)</td>
</tr>
<tr>
<td>Access door: 437BL (LH), 447BL (RH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Oil Pressure Filling Port:</td>
<td>17.26 m (56.63 ft)</td>
<td>6.49 m (21.29 ft)</td>
</tr>
</tbody>
</table>

**NOTE**: Distances are approximate.

A. Tank capacity:
   - Full level: 19.6 l (5 US gal),
   - Usable: 9.46 l (3 US gal).

B. Maximum delivery pressure required: 1.72 bar (25 psi).
   Maximum delivery flow required: 180 l/h (48 US gal/h).

2. IDG Oil Replenishment for CFM56 Series Engine (See FIGURE 5-4-8-991-004-A):
   One pressure filling connection per engine: OMP 2506-18 plus one connection overflow: OMP 2505-18.

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE ENGINE 1 (LH)</td>
<td>ENGINE 2 (RH)</td>
</tr>
<tr>
<td>IDG Oil Pressure Filling Connection: Access door: 438AR (LH), 448AR (RH)</td>
<td>16.46 m (54.00 ft)</td>
<td>6.90 m (22.64 ft)</td>
</tr>
</tbody>
</table>
NOTE: Distances are approximate.

A. Tank capacity: 5 l (1 US gal).

B. Delivery pressure required: 0.34 bar (5 psi) to 2.76 bar (40 psi) at the IDG inlet.

3. Starter Oil Replenishment for CFM56 Series Engine (See FIGURE 5-4-8-991-005-A):
   One gravity filling cap per engine.

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter Oil Filling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection:</td>
<td>AFT OF NOSE</td>
<td>ENGINE 1 (LH)</td>
</tr>
<tr>
<td></td>
<td>16.81 m (55.15 ft)</td>
<td>5.30 m (17.39 ft)</td>
</tr>
</tbody>
</table>

NOTE: Distances are approximate.

A. Tank capacity: 0.8 l (0.21 US gal).

4. Engine Oil Replenishment for IAE V2500 Series Engine (See FIGURE 5-4-8-991-006-B):
   One gravity filling cap per engine.

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Oil Gravity Filling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cap:</td>
<td>AFT OF NOSE</td>
<td>ENGINE 1 (LH)</td>
</tr>
<tr>
<td>Access door: 437BL (LH),</td>
<td>16.50 m (54.13 ft)</td>
<td>6.56 m (21.52 ft)</td>
</tr>
<tr>
<td>447BL (RH)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Distances are approximate.

A. Tank capacity:
   - Full level: 28 l (7 US gal),
   - Usable: 23.50 l (6 US gal).

5. IDG Oil Replenishment for IAE V2500 Series Engine (See FIGURE 5-4-8-991-007-B):
   One pressure filling connection per engine: 2506-2 plus one overflow connection: 2505-2.
### IDG Oil Pressure Filling Connection:

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>ENGINE 1 (LH)</td>
</tr>
<tr>
<td>IDG Oil Pressure Filling</td>
<td>17.06 m</td>
<td>5.42 m</td>
</tr>
<tr>
<td>Connection:</td>
<td>(55.97 ft)</td>
<td>(17.78 ft)</td>
</tr>
</tbody>
</table>

**NOTE:** Distances are approximate.

- Tank capacity: 4.10 l (1 US gal).

6. **Starter Oil Replenishment for IAE V2500 Series Engine (See FIGURE 5-4-8-991-008-B):**
   - One gravity filling cap per engine.

### Starter Oil Filling Connection:

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>ENGINE 1 (LH)</td>
</tr>
<tr>
<td>Starter Oil Filling</td>
<td>19.66 m</td>
<td>5.30 m</td>
</tr>
<tr>
<td>Connection:</td>
<td>(64.50 ft)</td>
<td>(17.39 ft)</td>
</tr>
</tbody>
</table>

**NOTE:** Distances are approximate.

- Tank capacity: 0.35 l (0.09 US gal).

**ON A/C A321-100 A321-200 A321neo**

7. **APU Oil System (See FIGURE 5-4-8-991-009-A):**
   - APU oil gravity filling cap.

### APU Oil System:

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>ENGINE 1 (LH)</td>
</tr>
<tr>
<td>GTCP 36-300</td>
<td>42.42 m (139.17 ft)</td>
<td>0.30 m (0.98 ft)</td>
</tr>
<tr>
<td>APS 3200</td>
<td>42.42 m (139.17 ft)</td>
<td>0.30 m (0.98 ft)</td>
</tr>
<tr>
<td>131-9</td>
<td>42.32 m (138.85 ft)</td>
<td>0.35 m (1.15 ft)</td>
</tr>
</tbody>
</table>

**NOTE:** Distances are approximate.
A. Tank capacity (usable):
- APU type GTCP 36-300: 6.20 l (2 US gal),
- APU type APS 3200: 5.40 l (1 US gal),
**ON A/C A321-100 A321-200

Ground Service Connections
Engine Oil Tank – CFM56 Series Engine
FIGURE-5-4-8-991-003-A01
**ON A/C A321-100 A321-200

1 – PRESSURE FILL VALVE
2 – CASE DRAIN PLUG
3 – DUST CAP
4 – DUST CAP
5 – OVERFLOW DRAIN VALVE

NOTE:
A IF THE OIL LEVEL IS ABOVE
   THE YELLOW BAND, OIL SERVICING
   IS REQUIRED.
B IF THE OIL LEVEL IS WITHIN
   THE GREEN AND YELLOW BANDS,
   OIL SERVICING IS NOT REQUIRED.
C IF THE OIL LEVEL IS BELOW
   THE GREEN BAND, OIL SERVICING
   IS REQUIRED.

Ground Service Connections
IDG Oil Tank – CFM56 Series Engine
FIGURE-5-4-8-991-004-A01
Ground Service Connections
Starter Oil Tank – CFM56 Series Engine
FIGURE-5-4-8-991-005-A01
**ON A/C A321-100 A321-200**

Ground Service Connections
Engine Oil Tank – IAE V2500 Series Engine
FIGURE-5-4-8-991-006-B01

"FULL" LEVEL NOTCH
27.3 LT
29.0 US QTS
6.0 IMP GAL
(WITHIN 60 MIN FROM SHUTDOWN)

NOTCH '1'
26 LT
27 US QTS
5.7 IMP GAL

NOTCH '2'
23 LT
24 US QTS
5.1 IMP GAL

NOTCH '3'
20 LT
22 US QTS
4.5 IMP GAL
**ON A/C A321-100 A321-200**

The oil level must not be in the yellow band but it can be immediately above the lower limit of the yellow band because of the aircraft ramp angle. Do the IDG servicing to get the correct IDG oil level.

After servicing or engine shutdown (cold oil/IDG), the oil level must not be in the red band. Perform IDG oil servicing to get the correct IDG oil level. Do not use the overflow drain hose to get the correct IDG oil level.

After engine shutdown (hot oil/IDG), the oil level can be in the green band or the yellow band.

Correctly filled IDG

Incorrectly filled IDG

Ground Service Connections
IDG Oil Tank – IAE V2500 Series Engine
FIGURE-5-4-8-991-007-B01

N_AC_050408_1_0070201_01_00

Feb 01/19
THE STARTER IS FULL WHEN THE OIL LEVEL SHOWS NOT LESS THAN 3/4 FULL ON THE SIGHT GLASS.

Ground Service Connections
Starter Oil Tank – IAE V2500 Series Engine
FIGURE-5-4-8-991-008-B01
5-4-9 Potable Water System

**ON A/C A321-100 A321-200 A321neo

Potable Water System

1. Potable Water Ground Service Panels

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE</th>
<th>POSITION FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFT OF NOSE</td>
<td>LH SIDE</td>
<td>RH SIDE</td>
</tr>
<tr>
<td>Potable-Water Service Panel: Access Door 171AL</td>
<td>38.2 m (125.33 ft)</td>
<td>0.3 m (0.98 ft)</td>
<td>-</td>
</tr>
<tr>
<td>Potable-Water Drain Panel: Access Door 133AL</td>
<td>11.8 m (38.71 ft)</td>
<td>0.15 m (0.49 ft)</td>
<td>-</td>
</tr>
</tbody>
</table>

**NOTE**: Distances are approximate.

2. Technical Specifications

A. Connectors:

   (1) On the potable-water service panel (Access Door 171AL)
   - One ground air-pressure connector.

   (2) On the potable-water drain panel (Access Door 133AL)
   - Drain Nipple 3/4 in. (ISO 17775).

B. Usable capacity:
   - Standard configuration - one tank: 200 l (53 US gal).

C. Filling pressure:
   - 3.45 bar (50 psi).

D. Typical flow rate:
   - 50 l/min (13 US gal/min).
Ground Service Connections
Potable Water Ground Service Panels
FIGURE-5-4-9-991-029-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Potable Water Tank Location
FIGURE-5-4-9-991-030-A01
5-4-10 Waste Water System

**ON A/C A321-100 A321-200 A321neo

Vacuum Toilet System

1. Vacuum Toilet System

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTANCE</th>
<th>POSITION FROM AIRCRAFT CENTERLINE</th>
<th>MEAN HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LH SIDE</td>
<td>RH SIDE</td>
<td></td>
</tr>
<tr>
<td>Waste-Water Ground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Panel: Access</td>
<td>38.2 m</td>
<td>0.8 m</td>
<td>2.8 m</td>
</tr>
<tr>
<td>door 172AR</td>
<td>(125.33 ft)</td>
<td>(2.62 ft)</td>
<td>(9.19 ft)</td>
</tr>
</tbody>
</table>

**NOTE:** Distances are approximate.

2. Technical Specifications

A. Connectors:
   - Draining: 4 in. (ISO 17775).
   - Flushing and filling: 1 in. (ISO 17775).

B. Usable waste tank capacity:
   - Standard configuration - one tank: 177 l (47 US gal).

C. Waste tank - Rinsing:
   - Operating pressure: 3.45 bar (50 psi).

D. Waste tank - Precharge:
   - 10 l (3 US gal).
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Waste Water Ground Service Panel
FIGURE-5-4-10-991-001-A01
**ON A/C A321-100 A321-200 A321neo

Ground Service Connections
Waste Tank Location
FIGURE-5-4-10-991-004-A01
Engine Starting Pneumatic Requirements

**ON A/C A321-100 A321-200 A321neo**

**Engine Starting Pneumatic Requirements**

1. The purpose of this section is to provide the minimum air data requirements at the aircraft connection, needed to start the engine within no more than 60 seconds, at sea level (0 feet), for a set of Outside Air Temperatures (OAT).

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>Aircraft</td>
</tr>
<tr>
<td>ASU</td>
<td>Air Start Unit</td>
</tr>
<tr>
<td>HPGC</td>
<td>High Pressure Ground Connection</td>
</tr>
<tr>
<td>OAT</td>
<td>Outside Air Temperature</td>
</tr>
</tbody>
</table>

A. Air data (discharge temperature, absolute discharge pressure) are given at the HPGC.

B. For a given OAT the following charts are used to determine an acceptable combination for air discharge temperature, absolute discharge pressure and mass flow rate.

C. This section addresses requirements for the ASU only, and is not representative of the start performance of the aircraft using the APU or engine cross bleed procedure.

D. To protect the A/C, the charts feature, if necessary:
   - The maximum discharge pressure at the HPGC
   - The maximum discharge temperature at the HPGC.
**ON A/C A321-100 A321-200 A321neo**

**EXAMPLE:**

For an OAT of 15° C (59° F) and an ASU providing a discharge temperature of 220° C (428° F) at HPGC:

- The required pressure at HPGC is 41 psia
- The required airflow at A/C connection is 49.5 kg/min.

**NOTE:**

In case the actual discharge temperature of the ASU differs substantially from the ones given in the charts, a simple interpolation (linear) is sufficient to determine the required air data.

Example for Use of the Charts

FIGURE-5-5-0-991-016-A01
Engine Starting Pneumatic Requirements
IAE V2500 Series Engine
FIGURE-5-5-0-991-017-A01

ASU DISCHARGE TEMPERATURE:
- 100° C (212° F)
- 150° C (302° F)
- 220° C (428° F) MAX.
**ON A/C A321-100 A321-200 A321neo**

Engine Starting Pneumatic Requirements
CFM56 Series and CFM LEAP-1A NEO Engine
FIGURE-5-5-0-991-018-A01

ASU DISCHARGE TEMPERATURE:
- 100° C (212° F)
- 150° C (302° F)
- 220° C (428° F) MAX.
**ON A/C A321neo

PW 1100G NEO/SEA LEVEL
STARTING TIME: LESS THAN 60 s
AIR DATA AT AIRCRAFT CONNECTION

Engine Starting Pneumatic Requirements
PW 1100G NEO Engine
FIGURE-5-5-0-991-019-A01
5-6-0  Ground Pneumatic Power Requirements

**ON A/C A321-100 A321-200 A321neo**

Ground Pneumatic Power Requirements

1. General
   This section describes the required performance for the ground equipment to maintain the cabin temperature at 27 °C (80.6 °F) for the cooling or 21 °C (69.8 °F) for heating cases after boarding (Section 5.7 - steady state), and provides the time needed to cool down or heat up the aircraft cabin to the required temperature (Section 5.6 - dynamic cases with aircraft empty).

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>Aircraft</td>
</tr>
<tr>
<td>AHM</td>
<td>Aircraft Handling Manual</td>
</tr>
<tr>
<td>AMM</td>
<td>Aircraft Maintenance Manual</td>
</tr>
<tr>
<td>GC</td>
<td>Ground Connection</td>
</tr>
<tr>
<td>GSE</td>
<td>Ground Service Equipment</td>
</tr>
<tr>
<td>IFE</td>
<td>In-Flight Entertainment</td>
</tr>
<tr>
<td>OAT</td>
<td>Outside Air Temperature</td>
</tr>
<tr>
<td>PCA</td>
<td>Pre-Conditioned Air</td>
</tr>
</tbody>
</table>

A. The air flow rates and temperature requirements for the GSE, provided in Sections 5.6 and 5.7, are given at A/C ground connection.

   **NOTE**: The cooling capacity of the equipment (kW) is only indicative and is not sufficient by itself to ensure the performance (outlet temperature and flow rate combinations are the requirements needed for ground power). An example of cooling capacity calculation is given in Section 5.7.

   **NOTE**: The maximum air flow is driven by pressure limitation at the ground connection.

B. For temperatures at ground connection below 2 °C (35.6 °F) (Subfreezing), the ground equipment shall be compliant with the Airbus document "Subfreezing PCA Carts - Compliance Document for Suppliers" (contact Airbus to obtain this document) defining all the requirements with which Subfreezing Pre-Conditioning Air equipment must comply to allow its use on Airbus aircraft. These requirements are in addition to the functional specifications included in the IATA AHM997.

2. Ground Pneumatic Power Requirements
   This section provides the ground pneumatic power requirements for:
   - Heating (pull up) the cabin, initially at OAT, up to 21 °C (69.8 °F) (see FIGURE 5-6-0-991-001-A)
   - Cooling (pull down) the cabin, initially at OAT, down to 27 °C (80.6 °F) (see FIGURE 5-6-0-991-002-A).
**ON A/C A321-100 A321-200 A321neo

PULL UP PERFORMANCE

OAT ISA −38 °C (−36.4 °F); GC INLET +70 °C (+158 °F); EMPTY CABIN; IFE OFF; NO SOLAR LOAD; LIGHTS ON; GALLEYS OFF; RECIRCULATION FANS ON

Ground Pneumatic Power Requirements

Heating

FIGURE-5-6-0-991-001-A01
**ON A/C A321-100 A321-200 A321neo**

**PULL DOWN PERFORMANCE**

![Diagram showing pull down performance with airflow at GC (kg/s) and time to cool cabin to +27°C (+80.6°F) on ground (min).]

- **Maximum Airflow**
  - OAT ISA +23°C (+73.4°F); GC INLET +2°C (+35.6°F); EMPTY CABIN; IFE OFF; NO SOLAR LOAD; LIGHTS ON; GALLEYS OFF; RECIRCULATION FANS ON
  - OAT ISA +23°C (+73.4°F); GC INLET −10°C (+14°F); EMPTY CABIN; IFE OFF; NO SOLAR LOAD; LIGHTS ON; GALLEYS OFF; RECIRCULATION FANS ON

Ground Pneumatic Power Requirements

Cooling

FIGURE-5-6-0-991-002-A01

N_AC_050600_1_0020101_01_00

Feb 01/19
5-7-0  Preconditioned Airflow Requirements

**ON A/C A321-100 A321-200 A321neo

Preconditioned Airflow Requirements

1. This section provides the preconditioned airflow rate and temperature needed to maintain the cabin temperature at 27 °C (80.6 °F) for the cooling or 21 °C (69.8 °F) for the heating cases.

These settings are not intended to be used for operation (they are not a substitute for the settings given in the AMM). They are based on theoretical simulations and give the picture of a real steady state.

The purpose of the air conditioning (cooling) operation (described in the AMM) is to maintain the cabin temperature below 27 °C (80.6 °F) during boarding (therefore it is not a steady state).
**ON A/C A321-100 A321-200 A321neo**

Preconditioned Airflow Requirements

FIGURE-5-7-0-991-003-A01
5-8-0 Ground Towing Requirements

**ON A/C A321-100 A321-200 A321neo**

Ground Towing Requirements

1. This section provides information on aircraft towing. This aircraft is designed with means for conventional or towbarless towing. Information/procedures can be found for both in AMM 09. Status on towbarless towing equipment qualification can be found in ISI 09.11.00001.

   **NOTE**: The NLG steering deactivation pin has the same design for all Airbus programs.

   One towbar fitting is installed at the front of the leg. The main landing gears have attachment points for towing or debogging (for details, refer ARM 07).

   This section shows the chart to determine the drawbar pull and tow tractor mass requirements as a function of the following physical characteristics:
   - Aircraft weight,
   - Number of engines at idle,
   - Slope.

   The chart is based on the engine type with the highest idle thrust level.

2. Towbar design guidelines

   The aircraft towbar shall comply with the following standards:
   - ISO 8267-1, "Aircraft - Towbar Attachment Fitting - Interface Requirements - Part 1: Main Line Aircraft",
   - SAE AS 1614, "Main Line Aircraft Towbar Attach Fitting Interface",
   - SAE ARP 1915, "Aircraft Towbar",
   - ISO 9667, "Aircraft Ground Support Equipment - Towbar - Connection to Aircraft and Tractor",
   - EN 12312-7, "Aircraft Ground Support Equipment - Specific Requirements - Part 7: Aircraft Movement Equipment",
   - IATA Airport Handling Manual AHM 958, "Functional Specification for an Aircraft Towbar".

   A conventional type towbar is required which should be equipped with a damping system (to protect the nose gear against jerks) and with towing shear pins:
   - A traction shear pin calibrated at 9 425 daN (21 188 lbf),
   - A torsion pin calibrated at 826 m.daN (6 092 lbf.ft).

   The towing head is designed according to ISO 8267-1, cat. I.
**ON A/C A321-100 A321-200**

**EXAMPLE HOW TO DETERMINE THE MASS REQUIREMENT TO TOW A A321 AT 80 000 kg, AT 1.5% SLOPE, 1 ENGINE AT IDLE AND FOR WET TARMAC CONDITIONS:**

- ON THE RIGHT HAND SIDE OF THE GRAPH, CHOOSE THE RELEVANT AIRCRAFT WEIGHT (80 000 kg).
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUIRED SLOPE PERCENTAGE (1.5%).
- FROM THE POINT OBTAINED DRAW A STRAIGHT HORIZONTAL LINE UNTIL No. OF ENGINES AT IDLE = 2,
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUESTED No. OF ENGINES (1),
- FROM THIS POINT DRAW A STRAIGHT HORIZONTAL LINE TO THE DRAWBAR PULL AXIS,
- THE Y−COORDINATE OBTAINED IS THE NECESSARY DRAWBAR PULL FOR THE TRACTOR (4 900 kg),
- SEARCH THE INTERSECTION WITH THE "WET CONCRETE" LINE.
- THE OBTAINED X−COORDINATE IS THE TOTAL TRACTION WHEEL LOAD (8 660 kg).

**NOTE:**

USE A TRACTOR WITH A LIMITED DRAWBAR PULL TO PREVENT LOADS ABOVE THE TOW−BAR SHEAR−PIN CAPACITY.

Ground Towing Requirements
FIGURE-5-8-0-991-001-D01
EXAMPLE HOW TO DETERMINE THE MASS REQUIREMENT TO TOW A A321 AT 90 000 kg, AT 1.5% SLOPE, 1 ENGINE AT IDLE AND FOR WET TARMAC CONDITIONS:

- ON THE RIGHT HAND SIDE OF THE GRAPH, CHOOSE THE RELEVANT AIRCRAFT WEIGHT (90 000 kg).
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUIRED SLOPE PERCENTAGE (1.5%).
- FROM THIS POINT DRAW A STRAIGHT HORIZONTAL LINE UNTIL No. OF ENGINES AT IDLE = 2.
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUESTED No. OF ENGINES (1).
- THE Y–COORDINATE OBTAINED IS THE NECESSARY DRAWBAR PULL FOR THE TRACTOR (5 700 kg).
- SEARCH THE INTERSECTION WITH THE "WET CONCRETE" LINE. THE OBTAINED X–COORDINATE IS THE TOTAL TRACTION WHEEL LOAD (10 030 kg).

NOTE:
USE A TRACTOR WITH A LIMITED DRAWBAR PULL TO PREVENT LOADS ABOVE THE TOW–BAR SHEAR–PIN CAPACITY.
**ON A/C A321neo**

Example how to determine the mass requirement to tow an A321 at 90,000 kg, at 1.5% slope, 1 engine at idle and for wet tarmac conditions:

- On the right hand side of the graph, choose the relevant aircraft weight (90,000 kg).
- From this point draw a parallel line to the required slope percentage (1.5%).
- From the point obtained draw a straight horizontal line until No. of engines at idle = 2.
- From this point draw a parallel line to the requested No. of engines (1).
- From this point draw a parallel line to the total traction wheel load axis.
- The Y-coordinate obtained is the necessary drawbar pull for the tractor (5,700 kg).
- Search the intersection with the "Wet Concrete" line.
- The obtained X-coordinate is the total traction wheel load (10,030 kg).

**NOTE:**

Use a tractor with a limited drawbar pull to prevent loads above the tow-bar shear-pin capacity.

Ground Towing Requirements
CFM LEAP-1A Engine (Sheet 2 of 2)
FIGURE-5-8-0-991-001-G01
## 5-9-0 De-Icing and External Cleaning

**ON A/C A321-100 A321-200 A321neo**

### De-Icing and External Cleaning

1. **De-Icing and External Cleaning on Ground**
   The mobile equipment for aircraft de-icing and external cleaning must be capable of reaching heights up to approximately 13 m (43 ft).

2. **De-Icing**

<table>
<thead>
<tr>
<th>AIRCRAFT TYPE</th>
<th>Wing Top Surface (Both Sides)</th>
<th>Wingtip Devices (Both Inside and Outside Surfaces) (Both Sides)</th>
<th>HTP Top Surface (Both Sides)</th>
<th>VTP (Both Sides)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
<td>ft²</td>
</tr>
<tr>
<td>A321</td>
<td>103</td>
<td>1 109</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>A321 Sharklet/neo</td>
<td>103</td>
<td>1 109</td>
<td>10</td>
<td>108</td>
</tr>
</tbody>
</table>

### External Cleaning

<table>
<thead>
<tr>
<th>AIRCRAFT TYPE</th>
<th>Fuselage Top Surface (Top Third - 120° Arc)</th>
<th>Nacelle and Pylon (Top Third - 120° Arc) (All Engines)</th>
<th>Total De-Iced Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
</tr>
<tr>
<td>A321</td>
<td>167</td>
<td>1 798</td>
<td>24</td>
</tr>
<tr>
<td>A321 Sharklet/neo</td>
<td>167</td>
<td>1 798</td>
<td>24</td>
</tr>
</tbody>
</table>

**NOTE:** Dimensions are approximate.

3. **External Cleaning**

<table>
<thead>
<tr>
<th>AIRCRAFT TYPE</th>
<th>Wing Top Surface (Both Sides)</th>
<th>Wing Lower Surface (Including Flap Track Fairing) (Both Sides)</th>
<th>Wingtip Devices (Both Inside and Outside Surfaces) (Both Sides)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
</tr>
<tr>
<td>A321</td>
<td>103</td>
<td>1 109</td>
<td>109</td>
</tr>
<tr>
<td>A321 Sharklet/neo</td>
<td>103</td>
<td>1 109</td>
<td>109</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AIRCRAFT TYPE</th>
<th>HTP Top Surface (Both Sides)</th>
<th>HTP Lower Surface (Both Sides)</th>
<th>VTP (Both Sides)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
</tr>
<tr>
<td>A321</td>
<td>27</td>
<td>291</td>
<td>27</td>
</tr>
</tbody>
</table>
### Aircraft Characteristics - Airport and Maintenance Planning

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>HTP Top Surface (Both Sides)</th>
<th>HTP Lower Surface (Both Sides)</th>
<th>VTP (Both Sides)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
</tr>
<tr>
<td>A321 Sharklet/neo</td>
<td>27</td>
<td>291</td>
<td>27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Fuselage and Belly Fairing</th>
<th>Nacelle and Pylon (All Engines)</th>
<th>Total Cleaned Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>ft²</td>
<td>m²</td>
</tr>
<tr>
<td>A321</td>
<td>510</td>
<td>5 490</td>
<td>73</td>
</tr>
<tr>
<td>A321 Sharklet/neo</td>
<td>510</td>
<td>5 490</td>
<td>73</td>
</tr>
</tbody>
</table>

**Note:** Dimensions are approximate.
**ON A/C A321-100 A321-200 A321neo

**ON A/C A321-100 A321-200

1. General
   This section provides the estimated engine exhaust efflux velocities and temperatures contours for Ground Idle, Breakaway and Maximum Take-Off (MTO) conditions.

**ON A/C A321neo

2. General
   This section provides the estimated engine exhaust velocity and temperature contours for MTO, Breakaway 12% MTO, Breakaway 24% MTO and Ground Idle conditions for the CFM LEAP-1A and PW 1100G engines.

The MTO data are presented at the maximum thrust rating. The Breakaway data are presented at a rating that corresponds to the minimum thrust level necessary to start the movement of the A/C from a static position at its maximum ramp weight. Breakaway thrust corresponds to 12% MTO if applied on both engines and 24% MTO when applied on a single engine (Idle thrust on the other engine).

The Idle data, provided by the engine manufacturer, are calculated for operational conditions ISA +15K (+15°C), Sea Level, Static and no headwind. In the charts, the longitudinal distances are measured from the inboard engine core-nozzle exit section. The lateral distances are measured from the aircraft fuselage centerline.

The effects of on-wing installation are not taken into account. The effects of ground proximity are not taken into account for PW 1100G engines, but they are taken into account for the CFM LEAP-1A engines.

The velocity contours are presented at 50 ft/s (15 m/s), 100 ft/s (30 m/s) and 150 ft/s (46 m/s). The temperature contours are shown at 313K (+40°C), 323K (+50°C) and 333K (+60°C). The velocity and temperature contours do not take into account possible variations affecting performance, such as ambient temperature, field elevation or failure cases leading to an abnormal bleed configuration. To evaluate the impact of these specific variables on the exhaust contours, a specific study of the airport where the aircraft is intended to operate should be carried out.
6-1-1 Engine Exhaust Velocities Contours - Ground Idle Power

**ON A/C A321-100 A321-200 A321neo**

Engine Exhaust Velocities Contours – Ground Idle Power

1. This section provides engine exhaust velocities contours at ground idle power.
Engine Exhaust Velocities
Ground Idle Power – CFM56-5B Series Engine
FIGURE-6-1-1-991-007-A01
Engine Exhaust Velocities
Ground Idle Power – IAE V2500 Series Engine
FIGURE-6-1-1-991-008-A01
**ON A/C A321neo

Engine Exhaust Velocities
Ground Idle Power – CFM LEAP-1A Engine
FIGURE-6-1-1-991-013-A01
Engine Exhaust Velocities
Ground Idle Power – PW 1100G Engine
FIGURE-6-1-1-991-014-A01
6-1-2 Engine Exhaust Temperatures Contours - Ground Idle Power

**ON A/C A321-100 A321-200 A321neo**

Engine Exhaust Temperatures Contours - Ground Idle Power

1. This section provides engine exhaust temperatures contours at ground idle power.
Engine Exhaust Temperatures
Ground Idle Power – CFM56-5B Series Engine
FIGURE-6-1-2-991-007-A01
Engine Exhaust Temperatures
Ground Idle Power – IAE V2500 Series Engine
FIGURE-6-1-2-991-008-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Ground Idle Power – CFM LEAP-1A Engine
FIGURE-6-1-2-991-013-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Ground Idle Power – PW 1100G Engine
FIGURE-6-1-2-991-014-A01
6-1-3 Engine Exhaust Velocities Contours - Breakaway Power

**ON A/C A321-100 A321-200 A321neo

Engine Exhaust Velocities Contours - Breakaway Power

1. This section provides engine exhaust velocities contours at breakaway power.
**ON A/C A321neo

Engine Exhaust Velocities
Breakaway Power 12% MTO – CFM LEAP-1A Engine
FIGURE-6-1-3-991-011-A01
**ON A/C A321neo

Engine Exhaust Velocities
Breakaway Power 12% MTO – PW 1100G Engine
FIGURE-6-1-3-991-012-A01
**ON A/C A321neo

Engine Exhaust Velocities
Breakaway Power 24% MTO – CFM LEAP-1A Engine
FIGURE-6-1-3-991-019-A01
**ON A/C A321neo

Engine Exhaust Velocities
Breakaway Power 24% MTO – PW 1100G Engine
FIGURE-6-1-3-991-020-A01
**ON A/C A321-100 A321-200

Engine Exhaust Velocities
Breakaway Power - CFM56 Series Engine
FIGURE-6-1-3-991-023-A01
**ON A/C A321-100 A321-200

Engine Exhaust Velocities
Breakaway Power - IAE V2500 Series Engine
FIGURE-6-1-3-991-024-A01
6-1-4   Engine Exhaust Temperatures Contours - Breakaway Power

**ON A/C A321-100 A321-200 A321neo**

**Engine Exhaust Temperatures Contours - Breakaway Power**

1. This section provides engine exhaust temperatures contours at breakaway power.
**ON A/C A321neo

Engine Exhaust Temperatures
Breakaway Power 12% MTO - CFM LEAP-1A Engine
FIGURE-6-1-4-991-017-A01
Engine Exhaust Temperatures
Breakaway Power 12% MTO - PW 1100G Engine
FIGURE-6-1-4-991-018-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Breakaway Power 24% MTO - CFM LEAP-1A Engine
FIGURE-6-1-4-991-019-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Breakaway Power 24% MTO - PW 1100G Engine
FIGURE-6-1-4-991-020-A01
**ON A/C A321-100 A321-200**

Engine Exhaust Temperatures
Breakaway Power - CFM56 Series Engine
FIGURE-6-1-4-991-023-A01
Engine Exhaust Temperatures
Breakaway Power - IAE V2500 Series Engine
FIGURE-6-1-4-991-024-A01
6-1-5 Engine Exhaust Velocities Contours - Takeoff Power

**ON A/C A321-100 A321-200 A321neo

Engine Exhaust Velocities Contours – Takeoff Power

1. This section provides engine exhaust velocities contours at takeoff power.
**ON A/C A321-100 A321-200**

Engine Exhaust Velocities
Takeoff Power – CFM56-5B Series Engine
FIGURE-6-1-5-991-007-A01
**ON A/C A321-100 A321-200

Engine Exhaust Velocities
Takeoff Power – IAE V2500 Series Engine
FIGURE-6-1-5-991-008-A01
**ON A/C A321neo

Engine Exhaust Velocities
Takeoff Power – CFM LEAP-1A Engine
FIGURE-6-1-5-991-013-A01
**ON A/C A321neo

Engine Exhaust Velocities
Takeoff Power – PW 1100G Engine
FIGURE-6-1-5-991-014-A01
**ON A/C A321-100 A321-200 A321neo**

Engine Exhaust Temperatures Contours – Takeoff Power

1. This section provides engine exhaust temperatures contours at takeoff power.
Engine Exhaust Temperatures
Takeoff Power – CFM56-5B Series Engine
FIGURE-6-1-6-991-007-A01
Engine Exhaust Temperatures
Takeoff Power – IAE V2500 Series Engine
FIGURE-6-1-6-991-008-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Takeoff Power - CFM LEAP-1A Engine
FIGURE-6-1-6-991-013-A01
**ON A/C A321neo

Engine Exhaust Temperatures
Takeoff Power - PW 1100G Engine
FIGURE-6-1-6-991-014-A01
6-3-0 Danger Areas of Engines

**ON A/C A321-100 A321-200 A321neo

Danger Areas of Engines

1. Danger Areas of the Engines
   
   A. The danger areas of the engines shown below are given in the normalized format:
      - Entry corridors are only available at ground idle.
      - Do not go into the areas between the engines.
      - The exhaust danger areas are given for 0 kt headwind (if not specified otherwise).
6-3-1 Ground Idle Power

**ON A/C A321-100 A321-200 A321neo

Ground Idle Power

1. This section provides danger areas of the engines at ground idle power conditions.
**ON A/C A321-100 A321-200**

1 m
(3.3 ft)

R = 2.23 m
(7.3 ft)

30°

TO 55 m (180 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)

INCLUDES CROSS WIND EFFECT

NOTE:

- INLET SUCTION DANGER AREA
- ENTRY CORRIDOR
- EXHAUST WAKE DANGER AREA

Danger Areas of the Engines
CFM56-5B Series Engine
FIGURE-6-3-1-991-009-A01

N_AC_060301_1_0090101_01_04
**ON A/C A321-100 A321-200

### Danger Areas of the Engines

IAE V2500 Series Engine

FIGURE-6-3-1-991-010-A01

**NOTE:**

- INTAKE SUCTION DANGER AREA MINIMUM IDLE POWER
- ENTRY CORRIDOR
- EXHAUST DANGER AREA

TO 55 m (180 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA) INCLUDES CROSS WIND EFFECT
**ON A/C A321neo

INTAKE SUCTION DANGER AREA MINIMUM IDLE POWER
ENTRY CORRIDOR
EXHAUST DANGER AREA

Danger Areas of the Engines
CFM LEAP-1A Engine
FIGURE-6-3-1-991-015-A01
**ON A/C A321neo

Danger Areas of the Engines
PW 1100G Engine
FIGURE-6-3-1-991-016-A01

NOTE:
- INTAKE SUCTION DANGER AREA MINIMUM IDLE POWER
- ENTRY CORRIDOR
- EXHAUST DANGER AREA

TO 40.3 m (132 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)
INCLUDES CROSS WIND EFFECT

R = 2.74 m (9 ft)
1 m (3.3 ft)
6-3-2 Breakaway Power

**ON A/C A321-100 A321-200 A321neo

Breakaway Power

1. This section provides danger areas of the engines at breakaway power.
**ON A/C A321-100 A321-200

NOTE:
INTAKE SUCTION DANGER AREA MAX. TAKEOFF POWER
EXHAUST WAKE DANGER AREA

30° TO 74.7 m (245 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)

Danger Areas of the Engines
CFM56-5B Series Engine
FIGURE-6-3-2-991-007-A01
**ON A/C A321-100 A321-200

NOTE:
TO 91.4 m (300 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)

- **INTAKE SUCTION DANGER AREA MAX. TAKEOFF POWER**
- **EXHAUST DANGER AREA**

Danger Areas of the Engines
IAE V2500 Series Engine
FIGURE-6-3-2-991-008-A01

N_AC_060302_1_0080101_01_02
**ON A/C A321neo

*Intake Suction Danger Area Max. Takeoff Power*  
*Exhaust Danger Area*

**NOTE:**

- TO 63.5 m (208 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)

Danger Areas of the Engines
CFM LEAP-1A Engine
FIGURE-6-3-2-991-013-A01
**ON A/C A321neo

Danger Areas of the Engines
PW 1100G Engine
FIGURE-6-3-2-991-014-A01
6-3-3 Max Take Off Power

**ON A/C A321-100 A321-200 A321neo

Take Off Power

1. This section provides danger areas of the engines at maximum take-off power conditions.
**ON A/C A321-100 A321-200**

Danger Areas of the Engine
CFM56-5B Series Engine
FIGURE-6-3-3-991-011-A01
**ON A/C A321-100 A321-200

Intake Suction Danger Area Max. Takeoff Power

Exhaust Danger Area

30°

R = 5.18 m
(17 ft)

1.7 m
(5.5 ft)

TO 348 m (1150 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA)
Includes Cross Wind Effect

Danger Areas of the Engine
IAE V2500 Series Engine
FIGURE-6-3-3-991-012-A01
**ON A/C A321neo

NOTE:

- **INTAKE SUCTION DANGER AREA MAX. TAKEOFF POWER**
- **EXHAUST DANGER AREA**

Danger Areas of the Engine
CFM LEAP-1A Engine
FIGURE-6-3-3-991-013-A01
**ON A/C A321neo

TO 243 m (797.4 ft) AFT OF COMMON NOZZLE ASSEMBLY (CNA) INCLUDES CROSS WIND EFFECT

NOTE:

- INTAKE SUCTION DANGER AREA MAX. TAKEOFF POWER
- EXHAUST DANGER AREA

Danger Areas of the Engine
PW 1100G Engine
FIGURE-6-3-3-991-014-A01
6-4-1 APU

**ON A/C A321-100 A321-200 A321neo

APU - APIC & GARRETT

1. This section gives APU exhaust velocities and temperatures.
**ON A/C A321-100 A321-200 A321neo

Exhaust Velocities and Temperatures
APU – APIC & GARRETT
FIGURE-6-4-1-991-004-A01
7-1-0 General Information

**ON A/C A321-100 A321-200 A321neo

General Information

1. A brief description of the pavement charts that follow will help in airport planning.

   To aid in the interpolation between the discrete values shown, each aircraft configuration is shown with a minimum range of five loads on the Main Landing Gear (MLG).

   All curves on the charts represent data at a constant specified tire pressure with:
   - The aircraft loaded to the Maximum Ramp Weight (MRW),
   - The CG at its maximum permissible aft position.

   Pavement requirements for commercial aircraft are derived from the static analysis of loads imposed on the MLG struts.

   Landing Gear Footprint:
   Section 07-02-00 presents basic data on the landing gear footprint configuration, MRW and tire sizes and pressures.

   Maximum Pavement Loads:
   Section 07-03-00 shows maximum vertical and horizontal pavement loads for certain critical conditions at the tire-ground interfaces.

   Landing Gear Loading on Pavement:
   Section 07-04-00 contains charts to find these loads throughout the stability limits of the aircraft at rest on the pavement.
   These MLG loads are used as the point of entry to the pavement design charts which follow, interpolating load values where necessary.

   Flexible Pavement Requirements - US Army Corps of Engineers Design Method:
   The report was prepared by the "U.S. Army Corps Engineers Waterways Experiment Station, Soils and Pavement Laboratory, Vicksburg, Mississippi".
   The line showing 10 000 coverages is used to calculate the Aircraft Classification Number (ACN).

   Flexible Pavement Requirements - LCN Conversion Method:
The Load Classification Number (LCN) curves are no longer provided in section 07-06-00 since the LCN system for reporting pavement strength is obsolete, having been replaced by the ICAO recommended ACN/PCN system in 1983. For questions regarding the LCN system, contact Airbus.

Rigid Pavement Requirements - PCA (Portland Cement Association) Design Method:
Section 07-07-00 gives the rigid pavement design curves that have been prepared with the use of the Westergaard Equation. This is in general accordance with the procedures outlined in the Portland Cement Association publications, "Design of Concrete Airport Pavement", 1973 and "Computer Program for Airport Pavement Design" (Program PDILB), 1967 both by Robert G. Packard.

Rigid Pavement Requirements - LCN Conversion:
The Load Classification Number (LCN) curves are no longer provided in section 07-08-00 since the LCN system for reporting pavement strength is obsolete, having been replaced by the ICAO recommended ACN/PCN system in 1983. For questions regarding the LCN system, contact Airbus.

ACN/PCN Reporting System:
Section 07-09-00 provides ACN data prepared according to the ACN/PCN system as referenced in ICAO Annex 14, "Aerodromes", Volume 1 "Aerodrome Design and Operations" Fourth Edition, July 2004, incorporating Amendments 1 to 6. The ACN/PCN system provides a standardized international aircraft/pavement rating system replacing the various S, T, TT, LCN, AUW, ISWL, etc., rating systems used throughout the world. ACN is the Aircraft Classification Number and PCN is the corresponding Pavement Classification Number. An aircraft having an ACN less than or equal to the PCN can operate without restriction on the pavement. Numerically the ACN is two times the derived single wheel load expressed in thousands of kilograms. The derived single wheel load is defined as the load on a single tire inflated to 1.25 MPa (181 psi) that would have the same pavement requirements as the aircraft. Computationally the ACN/PCN system uses PCA program PDILB for rigid pavements and S-77-1 for flexible pavements to calculate ACN values.

The Airport Authority must decide on the method of pavement analysis and the results of their evaluation shown as follows:

<table>
<thead>
<tr>
<th>PCN</th>
<th>PAVEMENT TYPE</th>
<th>SUBGRADE CATEGORY</th>
<th>TIRE PRESSURE CATEGORY</th>
<th>EVALUATION METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R – Rigid</td>
<td>A – High</td>
<td>W – No pressure limit</td>
<td>T – Technical</td>
</tr>
<tr>
<td></td>
<td>F – Flexible</td>
<td>B – Medium</td>
<td>X – High pressure limited to 1.75 MPa (254 psi)</td>
<td>U – Using Aircraft</td>
</tr>
</tbody>
</table>
### PCN

<table>
<thead>
<tr>
<th>PAVEMENT TYPE</th>
<th>SUBGRADE CATEGORY</th>
<th>TIRE PRESSURE CATEGORY</th>
<th>EVALUATION METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C – Low</td>
<td>Y – Medium pressure limited to 1.25 MPa (181 psi)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D – Ultra Low</td>
<td>Z – Low pressure limited to 0.5 MPa (73 psi)</td>
<td></td>
</tr>
</tbody>
</table>

For flexible pavements, the four subgrade categories (CBR) are:

- A. High Strength CBR 15
- B. Medium Strength CBR 10
- C. Low Strength CBR 6
- D. Ultra Low Strength CBR 3

For rigid pavements, the four subgrade categories (k) are:

- A. High Strength $k = 150 \text{ MN/m}^3 \ (550 \text{ pci})$
- B. Medium Strength $k = 80 \text{ MN/m}^3 \ (300 \text{ pci})$
- C. Low Strength $k = 40 \text{ MN/m}^3 \ (150 \text{ pci})$
- D. Ultra Low Strength $k = 20 \text{ MN/m}^3 \ (75 \text{ pci})$
7-2-0 Landing Gear Footprint

**ON A/C A321-100 A321-200 A321neo

Landing Gear Footprint

1. This section provides data about the landing gear footprint in relation to the aircraft MRW and tire sizes and pressures.
   The landing-gear footprint information is given for all the operational weight variants of the aircraft.
**ON A/C A321-100**

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>PERCENTAGE OF WEIGHT ON MAIN GEAR GROUP</th>
<th>NOSE GEAR TIRE SIZE</th>
<th>NOSE GEAR TIRE PRESSURE</th>
<th>MAIN GEAR TIRE SIZE</th>
<th>MAIN GEAR TIRE PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321−100 WV000</td>
<td>83 400 kg (183 875 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−100 WV002</td>
<td>83 400 kg (183 875 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−100 WV003</td>
<td>85 400 kg (188 275 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11 bar (160 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.9 bar (202 psi)</td>
</tr>
<tr>
<td>A321−100 WV004</td>
<td>78 400 kg (172 850 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.1 bar (146 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>12.8 bar (186 psi)</td>
</tr>
<tr>
<td>A321−100 WV005</td>
<td>83 400 kg (183 875 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−100 WV006</td>
<td>78 400 kg (172 850 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.1 bar (146 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>12.8 bar (186 psi)</td>
</tr>
<tr>
<td>A321−100 WV007</td>
<td>80 400 kg (177 250 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−100 WV008</td>
<td>89 400 kg (197 100 lb)</td>
<td>94.9%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
</tbody>
</table>

Landing Gear Footprint
FIGURE-7-2-0-991-028-A01
**ON A/C A321-200**

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>PERCENTAGE OF WEIGHT ON MAIN GEAR GROUP</th>
<th>NOSE GEAR TIRE SIZE</th>
<th>NOSE GEAR TIRE PRESSURE</th>
<th>MAIN GEAR TIRE SIZE</th>
<th>MAIN GEAR TIRE PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321−200 WV000</td>
<td>89 400 kg (197 100 lb)</td>
<td>95.5%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
<tr>
<td>A321−200 WV001</td>
<td>93 400 kg (205 900 lb)</td>
<td>95.3%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321−200 WV002</td>
<td>89 400 kg (197 100 lb)</td>
<td>95.5%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
<tr>
<td>A321−200 WV003</td>
<td>91 400 kg (201 500 lb)</td>
<td>95.4%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321−200 WV004</td>
<td>87 400 kg (192 675 lb)</td>
<td>95.7%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
<tr>
<td>A321−200 WV005</td>
<td>85 400 kg (188 275 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>13.9 bar (202 psi)</td>
</tr>
<tr>
<td>A321−200 WV006</td>
<td>83 400 kg (183 875 lb)</td>
<td>95.4%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−200 WV007</td>
<td>83 400 kg (183 875 lb)</td>
<td>95.4%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−200 WV008</td>
<td>80 400 kg (177 250 lb)</td>
<td>95.6%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321−200 WV009 (CG 40.08%)</td>
<td>78 400 kg (172 850 lb)</td>
<td>95.5%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>10.1 bar (146 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>12.8 bar (186 psi)</td>
</tr>
<tr>
<td>A321−200 WV009 (CG 40.08%)</td>
<td>78 400 kg (172 850 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>10.1 bar (146 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>12.8 bar (186 psi)</td>
</tr>
<tr>
<td>A321−200 WV100</td>
<td>85 400 kg (188 275 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11 bar (160 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>13.9 bar (202 psi)</td>
</tr>
<tr>
<td>A321−200 WV101</td>
<td>93 900 kg (207 025 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8−15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18−22)</td>
<td>15 bar (218 psi)</td>
</tr>
</tbody>
</table>

Landing Gear Footprint
FIGURE-7-2-0-991-035-A01

7-2-0
Page 3
Feb 01/19
**ON A/C A321neo**

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>PERCENTAGE OF WEIGHT ON MAIN GEAR GROUP</th>
<th>NOSE GEAR TIRE SIZE</th>
<th>NOSE GEAR TIRE PRESSURE</th>
<th>MAIN GEAR TIRE SIZE</th>
<th>MAIN GEAR TIRE PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321NEO WV050</td>
<td>89 400 kg (197 100 lb)</td>
<td>95.5%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
<tr>
<td>A321NEO WV051</td>
<td>89 400 kg (197 100 lb)</td>
<td>95.5%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>14.6 bar (212 psi)</td>
</tr>
<tr>
<td>A321NEO WV052</td>
<td>93 900 kg (207 025 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321NEO WV053</td>
<td>93 900 kg (207 025 lb)</td>
<td>95.2%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321NEO WV056</td>
<td>92 900 kg (204 800 lb)</td>
<td>95.3%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321NEO WV065</td>
<td>90 900 kg (200 400 lb)</td>
<td>95.4%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>11.6 bar (168 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15 bar (218 psi)</td>
</tr>
<tr>
<td>A321NEO WV070</td>
<td>80 400 kg (177 250 lb)</td>
<td>95.4%</td>
<td>30x8.8R15 (30x8.8–15)</td>
<td>10.8 bar (157 psi)</td>
<td>1 270x455R22 (49x18–22)</td>
<td>13.6 bar (197 psi)</td>
</tr>
<tr>
<td>A321NEO WV071</td>
<td>97 400 kg (214 725 lb)</td>
<td>95.0%</td>
<td>TBD</td>
<td>TBD</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15.7 bar (228 psi)</td>
</tr>
<tr>
<td>A321NEO WV072</td>
<td>97 400 kg (214 725 lb)</td>
<td>95.0%</td>
<td>TBD</td>
<td>TBD</td>
<td>1 270x455R22 (49x18–22)</td>
<td>15.7 bar (228 psi)</td>
</tr>
</tbody>
</table>

Landing Gear Footprint

FIGURE-7-2-0-991-038-A01
7-3-0 Maximum Pavement Loads

**ON A/C A321-100 A321-200 A321neo

Maximum Pavement Loads

1. This section provides maximum vertical and horizontal pavement loads for some critical conditions at the tire-ground interfaces.
   The maximum pavement loads are given for all the operational weight variants of the aircraft.
**ON A/C A321-100**

<table>
<thead>
<tr>
<th>Weight Variant</th>
<th>Max. Payload (kg)</th>
<th>Static Load at FWD CG (MAC) (a)</th>
<th>Static Load at AFT CG (MAC) (a)</th>
<th>Steady Braking at Instantaneous Deceleration (MAC) (a)</th>
<th>Maximum Horizontal Ground Load from Braking (PER STRUT) (MAC) (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321-100</td>
<td>83 400</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>WV000</td>
<td>85 400</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
</tr>
<tr>
<td>A321-100</td>
<td>86 400</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
</tr>
<tr>
<td>WV003</td>
<td>86 400</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
<td>18.3%</td>
</tr>
<tr>
<td>A321-100</td>
<td>78 400</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
</tr>
<tr>
<td>WV008</td>
<td>78 400</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
</tr>
<tr>
<td>A321-100</td>
<td>83 400</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>WV004</td>
<td>83 400</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>A321-100</td>
<td>89 400</td>
<td>16.3%</td>
<td>16.3%</td>
<td>16.3%</td>
<td>16.3%</td>
</tr>
<tr>
<td>WV007</td>
<td>89 400</td>
<td>16.3%</td>
<td>16.3%</td>
<td>16.3%</td>
<td>16.3%</td>
</tr>
<tr>
<td>A321-100</td>
<td>78 400</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
</tr>
<tr>
<td>WV006</td>
<td>78 400</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
<td>15.4%</td>
</tr>
</tbody>
</table>

NOTE:
(a) LOADS CALCULATED USING AIRCRAFT AT MRW.

Maximum Pavement Loads

FIGURE-7-3-0-991-033-A01
<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>STATIC LOAD AT FWD CG</th>
<th>STATIC BRAKING AT 10 ft/s² DECELERATION</th>
<th>STEADY BRAKING AT 10 ft/s² DECELERATION</th>
<th>AT INSTANTANEOUS BRAKING COEFFICIENT = 0.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321−200 WV000</td>
<td>89 400 kg (197 100 lb)</td>
<td>8 680 kg (19 150 lb)</td>
<td>14 190 kg (31 275 lb)</td>
<td>42 700 kg (94 150 lb)</td>
<td>13 890 kg (30 625 lb)</td>
</tr>
<tr>
<td>A321−200 WV001</td>
<td>93 400 kg (205 900 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>14 110 kg (31 100 lb)</td>
<td>44 490 kg (98 100 lb)</td>
<td>14 510 kg (32 000 lb)</td>
</tr>
<tr>
<td>A321−200 WV002</td>
<td>89 400 kg (197 100 lb)</td>
<td>8 680 kg (19 150 lb)</td>
<td>14 190 kg (31 275 lb)</td>
<td>42 700 kg (94 150 lb)</td>
<td>13 890 kg (30 625 lb)</td>
</tr>
<tr>
<td>A321−200 WV003</td>
<td>91 400 kg (201 500 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>14 120 kg (31 125 lb)</td>
<td>43 600 kg (96 125 lb)</td>
<td>14 200 kg (31 325 lb)</td>
</tr>
<tr>
<td>A321−200 WV004</td>
<td>87 400 kg (192 675 lb)</td>
<td>8 490 kg (19 725 lb)</td>
<td>13 880 kg (30 600 lb)</td>
<td>41 810 kg (92 175 lb)</td>
<td>13 580 kg (29 550 lb)</td>
</tr>
</tbody>
</table>

**NOTE:**
(a) LOADS CALCULATED USING AIRCRAFT AT MRW.
(b) LOADS CALCULATED USING AIRCRAFT AT 89 000 kg (196 200 lb).
### Maximum Pavement Loads

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>STATIC LOAD AT FWD CG</th>
<th>STATIC BRAKING AT 10 ft/s² DECELERATION</th>
<th>STATIC LOAD AT AFT CG</th>
<th>STEADY BRAKING AT 10 ft/s² DECELERATION</th>
<th>AT INSTANTANEOUS BRAKING COEFFICIENT = 0.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321–200 WV005</td>
<td>85 400 kg (188 275 lb)</td>
<td>8 760 kg (19 325 lb)</td>
<td>14 030 kg (30 925 lb)</td>
<td>40 660 kg (89 625 lb)</td>
<td>39.1 % MAC (a)</td>
<td>13 270 kg (29 250 lb)</td>
</tr>
<tr>
<td>A321–200 WV006</td>
<td>83 400 kg (183 875 lb)</td>
<td>8 560 kg (18 750 lb)</td>
<td>13 710 kg (30 225 lb)</td>
<td>39 770 kg (87 675 lb)</td>
<td>39.7 % MAC (a)</td>
<td>12 960 kg (28 575 lb)</td>
</tr>
<tr>
<td>A321–200 WV007</td>
<td>83 400 kg (183 875 lb)</td>
<td>8 560 kg (18 750 lb)</td>
<td>13 710 kg (30 225 lb)</td>
<td>39 770 kg (87 675 lb)</td>
<td>39.7 % MAC (a)</td>
<td>12 960 kg (28 575 lb)</td>
</tr>
<tr>
<td>A321–200 WV008 (CG 40.51 %)</td>
<td>80 400 kg (177 250 lb)</td>
<td>8 510 kg (18 750 lb)</td>
<td>13 480 kg (29 725 lb)</td>
<td>38 420 kg (84 700 lb)</td>
<td>40.51 % MAC (a)</td>
<td>12 490 kg (27 550 lb)</td>
</tr>
<tr>
<td>A321–200 WV009 (CG 39.71 %)</td>
<td>83 400 kg (183 875 lb)</td>
<td>8 560 kg (18 750 lb)</td>
<td>13 710 kg (30 225 lb)</td>
<td>39 770 kg (87 675 lb)</td>
<td>39.71 % MAC (a)</td>
<td>12 960 kg (28 575 lb)</td>
</tr>
<tr>
<td>A321–200 WV009 (CG 40.08 %)</td>
<td>78 400 kg (172 850 lb)</td>
<td>8 470 kg (18 675 lb)</td>
<td>13 330 kg (29 375 lb)</td>
<td>37 420 kg (82 500 lb)</td>
<td>40.08 % MAC (a)</td>
<td>12 180 kg (26 850 lb)</td>
</tr>
<tr>
<td>A321–200 WV009 (CG 39.21 %)</td>
<td>78 400 kg (172 850 lb)</td>
<td>8 470 kg (18 675 lb)</td>
<td>13 330 kg (29 375 lb)</td>
<td>37 330 kg (82 300 lb)</td>
<td>39.21 % MAC (a)</td>
<td>12 180 kg (26 850 lb)</td>
</tr>
<tr>
<td>A321–200 WV010</td>
<td>85 400 kg (188 275 lb)</td>
<td>8 760 kg (19 325 lb)</td>
<td>14 030 kg (30 925 lb)</td>
<td>40 660 kg (89 625 lb)</td>
<td>39.1 % MAC (a)</td>
<td>13 270 kg (29 250 lb)</td>
</tr>
<tr>
<td>A321–200 WV011</td>
<td>93 900 kg (207 025 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>14 110 kg (31 125 lb)</td>
<td>44 720 kg (98 575 lb)</td>
<td>36.88 % MAC (a)</td>
<td>14 590 kg (32 175 lb)</td>
</tr>
</tbody>
</table>

**NOTE:**
- (a) LOADS CALCULATED USING AIRCRAFT AT MRW.
- (b) LOADS CALCULATED USING AIRCRAFT AT 89 000 kg (196 200 lb).
### AIRCRAFT CHARACTERISTICS - AIRPORT AND MAINTENANCE PLANNING

**ON A/C A321neo**

**NOTE:**

- (a) LOADS CALCULATED USING AIRCRAFT AT MRW.
- (b) LOADS CALCULATED USING AIRCRAFT AT 89 000 kg (196 200 lb).

#### Maximum Pavement Loads

**V(NG)** MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT FWD CG  
**V(MG)** MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT AFT CG  
**H** MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>MAXIMUM RAMP WEIGHT</th>
<th>STATIC LOAD AT FWD CG</th>
<th>V(NG)</th>
<th>STATIC BRAKING AT 10 ft/s² DECELERATION</th>
<th>V(MG) (PER STRUT)</th>
<th>STEADY BRAKING AT 10 ft/s² DECELERATION</th>
<th>H (PER STRUT)</th>
<th>AT INSTANTANEOUS BRAKING COEFFICIENT = 0.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321NEO WV050</td>
<td>89 400 kg (197 100 lb)</td>
<td>8 680 kg (19 150 lb)</td>
<td>17.5 % MAC (a)</td>
<td>14 190 kg (31 275 lb)</td>
<td>42 700 kg (94 150 lb)</td>
<td>38 % MAC (a)</td>
<td>13 890 kg (30 625 lb)</td>
<td>34 160 kg (75 325 lb)</td>
</tr>
<tr>
<td>A321NEO WV051</td>
<td>89 400 kg (197 100 lb)</td>
<td>8 680 kg (19 150 lb)</td>
<td>17.5 % MAC (a)</td>
<td>14 190 kg (31 275 lb)</td>
<td>42 700 kg (94 150 lb)</td>
<td>38 % MAC (a)</td>
<td>13 890 kg (30 625 lb)</td>
<td>34 160 kg (75 325 lb)</td>
</tr>
<tr>
<td>A321NEO WV052</td>
<td>93 900 kg (207 025 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (a)</td>
<td>14 110 kg (31 125 lb)</td>
<td>44 720 kg (98 575 lb)</td>
<td>36.88 % MAC (a)</td>
<td>14 590 kg (32 175 lb)</td>
<td>35 770 kg (78 875 lb)</td>
</tr>
<tr>
<td>A321NEO WV053</td>
<td>93 900 kg (207 025 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (b)</td>
<td>14 110 kg (31 125 lb)</td>
<td>44 720 kg (98 575 lb)</td>
<td>36.88 % MAC (a)</td>
<td>14 590 kg (32 175 lb)</td>
<td>35 770 kg (78 875 lb)</td>
</tr>
<tr>
<td>A321NEO WV056</td>
<td>92 900 kg (204 800 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (b)</td>
<td>14 120 kg (31 125 lb)</td>
<td>44 270 kg (95 670 lb)</td>
<td>37.12 % MAC (a)</td>
<td>14 440 kg (31 825 lb)</td>
<td>35 420 kg (78 075 lb)</td>
</tr>
<tr>
<td>A321NEO WV065</td>
<td>90 900 kg (199 000 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (b)</td>
<td>14 120 kg (31 125 lb)</td>
<td>44 270 kg (95 670 lb)</td>
<td>37.12 % MAC (a)</td>
<td>14 440 kg (31 825 lb)</td>
<td>35 420 kg (78 075 lb)</td>
</tr>
<tr>
<td>A321NEO WV070</td>
<td>80 400 kg (177 250 lb)</td>
<td>8 510 kg (18 750 lb)</td>
<td>16.28 % MAC (a)</td>
<td>13 480 kg (29 725 lb)</td>
<td>38 340 kg (84 525 lb)</td>
<td>39.71 % MAC (a)</td>
<td>12 490 kg (27 550 lb)</td>
<td>30 670 kg (67 625 lb)</td>
</tr>
<tr>
<td>A321NEO WV071</td>
<td>97 400 kg (214 725 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (b)</td>
<td>TBD</td>
<td>46 280 kg (102 025 lb)</td>
<td>36.07 % MAC (a)</td>
<td>15 140 kg (33 375 lb)</td>
<td>37 030 kg (81 625 lb)</td>
</tr>
<tr>
<td>A321NEO WV072</td>
<td>97 400 kg (214 725 lb)</td>
<td>8 640 kg (19 050 lb)</td>
<td>17.5 % MAC (b)</td>
<td>TBD</td>
<td>46 280 kg (102 025 lb)</td>
<td>36.07 % MAC (a)</td>
<td>15 140 kg (33 375 lb)</td>
<td>37 030 kg (81 625 lb)</td>
</tr>
</tbody>
</table>
7-4-0    Landing Gear Loading on Pavement

**ON A/C A321-100 A321-200 A321neo

Landing Gear Loading on Pavement

1. Landing Gear Loading on Pavement

This section provides data about the landing gear loading on pavement. The MLG loading on pavement graphs are given for the weight variants that produce (at the MRW and maximum aft CG) the lowest MLG load and the highest MLG load for each type of aircraft.

Example, see FIGURE 7-4-0-991-014-A, calculation of the total weight on the MLG for:
- An aircraft with a MRW of 78 400 kg (172 850 lb),
- The aircraft gross weight is 60 000 kg (132 275 lb),
- A percentage of weight on the MLG of 95.7% (percentage of weight on the MLG at MRW and maximum aft CG).

The total weight on the MLG group is 57 410 kg (126 575 lb).

NOTE: The CG in the figure title is the CG used for ACN/LCN calculation.
Landing Gear Loading on Pavement
WV004, MRW 78 400 kg, CG 41%
FIGURE-7-4-0-991-014-A01
Landing Gear Loading on Pavement
WV008, MRW 89 400 kg, CG 38%
FIGURE-7-4-0-991-016-A01
**ON A/C A321-200**

![Graph showing aircraft characteristics]

Landing Gear Loading on Pavement
WV009, MRW 78 400 Kg, CG 39.21%

FIGURE-7-4-0-991-017-A01
Landing Gear Loading on Pavement
WV011, MRW 93 900 kg, CG 36.88%
FIGURE-7-4-0-991-018-A01
**ON A/C A321neo

Landing Gear Loading on Pavement
WV070, MRW 80 400 kg, CG 39.71%
FIGURE-7-4-0-991-019-A01
**ON A/C A321neo**

Landing Gear Loading on Pavement
WV071, MRW 97 400 kg, CG 36.07%
FIGURE-7-4-0-991-020-A01
Flexible Pavement Requirements - U.S. Army Corps of Engineers Design Method

**ON A/C A321-100 A321-200 A321neo**

Flexible Pavement Requirements - US Army Corps of Engineers Design Method

1. This section provides data about the flexible pavement requirements.
   The flexible pavement requirement graphs are given at standard tire pressure for the weight variants producing (at the MRW and maximum aft CG) the lowest MLG load and the highest MLG load for each type of aircraft.
   They are calculated with the US Army Corps of Engineers Design Method.
   To find a flexible pavement thickness, you must know the Subgrade Strength (CBR), the annual departure level and the weight on one MLG.
   The line that shows 10 000 coverages is used to calculate the Aircraft Classification Number (ACN).
   The procedure that follows is used to develop flexible pavement design curves:
   - With the scale for pavement thickness at the bottom and the scale for CBR at the top, a random line is made to show 10 000 coverages,
   - A plot is then made of the incremental values of the weight on the MLG,
   - Annual departure lines are made based on the load lines of the weight on the MLG that is shown on the graph.

Example, see FIGURE 7-5-0-991-014-A, calculation of the thickness of the flexible pavement for MLG:
- An aircraft with a MRW of 78 400 kg (172 850 lb),
- A "CBR" value of 10,
- An annual departure level of 25 000,
- The load on one MLG of 30 000 kg (66 150 lb).
The required flexible pavement thickness is 57.4 cm (23 in).

**NOTE:** The CG in the figure title is the CG used for ACN calculation.
**ON A/C A321-100**

**SUBGRADE STRENGTH – CBR**

- WEIGHT ON ONE MAIN LANDING GEAR:
  - 37 510 kg (82 700 lb)
  - 35 000 kg (77 150 lb)
  - 30 000 kg (66 150 lb)
  - 25 000 kg (55 125 lb)
  - 20 000 kg (44 100 lb)

- MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAXIMUM RAMP WEIGHT AND AFT CG:
  - 37 510 kg (82 700 lb)
  - 35 000 kg (77 150 lb)
  - 30 000 kg (66 150 lb)
  - 25 000 kg (55 125 lb)
  - 20 000 kg (44 100 lb)

- 10 000 COVERAGES USED FOR ACN CALCULATIONS
  - ALPHA FACTOR = 0.9

- ANNUAL DEPARTURES:
  - 1 200
  - 3 000
  - 6 000
  - 15 000
  - 25 000
  - 20 YEAR PAVEMENT LIFE

**FLEXIBLE PAVEMENT THICKNESS**

- 1 270x455R22 (49x18−22) TIRES
- TIRE PRESSURE CONSTANT AT 12.8 bar (186 psi)

Flexible Pavement Requirements
WV004, MRW 78 400 kg, CG 41 %
FIGURE-7-5-0-991-014-A01
**ON A/C A321-100**

**FLEXIBLE PAVEMENT THICKNESS**

1 270x455R22 (49x18−22) TIRES

TIRE PRESSURE CONSTANT AT 14.6 bar (212 psi)

Flexible Pavement Requirements

WV008, MRW 89 400 kg, CG 38%

FIGURE-7-5-0-991-015-A01
SUBGRADE STRENGTH – CBR

WEIGHT ON ONE WING LANDING GEAR
- 37 330 kg (82 300 lb)
- 35 000 kg (77 150 lb)
- 30 000 kg (66 150 lb)
- 25 000 kg (55 125 lb)
- 20 000 kg (44 100 lb)

MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAXIMUM RAMP WEIGHT AND AFT CG

10 000 COVERAGES USED FOR ACN CALCULATIONS

ANNUAL DEPARTURES
- 1 200
- 3 000
- 6 000
- 15 000
- 25 000

20 YEAR PAVEMENT LIFE

Flexible Pavement Requirements
WV009, MRW 78 400 Kg, CG 39.21%
FIGURE-7-5-0-991-016-A01
**ON A/C A321-200**

**Flexible Pavement Requirements**

WV011, MRW 93 900 kg, CG 36.88 %

FIGURE-7-5-0-991-017-A01
**ON A/C A321neo**

**FLEXIBLE PAVEMENT THICKNESS**

1270x455R22 (46x18–22) TIRES

TIRE PRESSURE CONSTANT AT 13.6 bar (197 psi)

Flexible Pavement Requirements

WV070, MRW 80 900 kg, CG 39.71 %

FIGURE-7-5-0-991-018-A01
Flexible Pavement Requirements
WV071, MRW 97 400 kg, CG 36.07 %
FIGURE-7-5-0-991-019-A01
Flexible Pavement Requirements - LCN Conversion

**ON A/C A321-100 A321-200 A321neo**

Flexible Pavement Requirements - LCN Conversion

1. The Load Classification Number (LCN) curves are no longer provided in section 07-06-00 since the LCN system for reporting pavement strength is obsolete, having been replaced by the ICAO recommended ACN/PCN system in 1983. For questions regarding the LCN system, contact Airbus.
Rigid Pavement Requirements - Portland Cement Association Design Method

**ON A/C A321-100 A321-200 A321neo**

1. This section provides data about the rigid pavement requirements for the PCA (Portland Cement Association) design method. The rigid pavement requirement graphs are given at standard tire pressure for the weight variants producing (at the MRW and maximum aft CG) the lowest MLG load and the highest MLG load for each A/C type. They are calculated with the PCA design method. To find a rigid pavement thickness, you must know the Subgrade Modulus (k), the permitted working stress and the weight on one MLG.

The procedure that follows is used to develop rigid pavement design curves:
- With the scale for pavement thickness on the left and the scale for permitted working stress on the right, a random load line is made. This represents the MLG maximum weight to be shown,
- A plot is then made of all values of the subgrade modulus (k values),
- More load lines for the incremental values of the weight on the MLG are made based on the curve for $k = 150$ MN/m$^3$, which is already shown on the graph.

Example, see FIGURE 7-7-0-991-016-A, calculation of the thickness of the rigid pavement for the MLG:
- An aircraft with a MRW of 78 400 kg (172 850 lb),
- A k value of 80 MN/m$^3$ (300 lbf/in$^3$),
- A permitted working stress of 31.64 kg/cm$^2$ (450 lb/in$^2$),
- The load on one MLG is 30 000 kg (66 150 lb).

The required rigid pavement thickness is 257 mm (10 in).

**NOTE**: The CG in the figure title is the CG used for ACN calculation.
**ON A/C A321-100

1270x455R22 (49x18–22) TIRES
TIRE PRESSURE CONSTANT AT 12.8 bar (186 psi)

NOTE:
THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUES FOR k ARE EXACT.
FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR k = 80 MN/m³ BUT DEVIATE SLIGHTLY FOR ANY OTHER VALUES OF k.

REFERENCE:
"DESIGN OF CONCRETE AIRPORT PAVEMENTS" AND "COMPUTER PROGRAM FOR AIRPORT PAVEMENT DESIGN – PROGRAM PDILB" PORTLAND CEMENT ASSOCIATION.

WV004, MRW 78 400 kg, CG 41%

Rigid Pavement Requirements
WV004, MRW 78 400 kg, CG 41 %
FIGURE-7-7-0-991-016-A01
Rigid Pavement Requirements
WV008, MRW 89 400 kg, CG 38%
FIGURE-7-7-0-991-017-A01
**ON A/C A321-200

1270x455R22 (49x18–22) TIRES
TIRE PRESSURE CONSTANT AT 12.8 bar (186 psi)

NOTE:
THE VALUES OBTAINED BY USING
THE MAXIMUM LOAD REFERENCE
LINE AND ANY VALUES FOR k ARE
EXACT.
FOR LOADS LESS THAN MAXIMUM,
THE CURVES ARE EXACT FOR k =
80 MN/m³ BUT DEVIATE SLIGHTLY
FOR ANY OTHER VALUES OF k.

REFERENCE:
"DESIGN OF CONCRETE AIRPORT
PAVEMENTS" AND "COMPUTER
PROGRAM FOR AIRPORT
PAVEMENT DESIGN – PROGRAM
PDILB® PORTLAND CEMENT
ASSOCIATION.

WV009, MRW 78 400 kg, CG 39.21%

Rigid Pavement Requirements
WV009, MRW 78 400 kg, CG 39.21%
FIGURE-7-7-0-991-018-A01
**ON A/C A321-200

1270x455R22 (49x18-22) TIRES
TIRE PRESSURE CONSTANT AT 15 bar (218 psi)

NOTE:
THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUES FOR k ARE EXACT.
FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR k = 80 MN/m³ BUT DEVIATE SLIGHTLY FOR ANY OTHER VALUES OF k.

REFERENCE:
"DESIGN OF CONCRETE AIRPORT PAVEMENTS" AND "COMPUTER PROGRAM FOR AIRPORT PAVEMENT DESIGN – PROGRAM PDILB" PORTLAND CEMENT ASSOCIATION.

WV011, MRW 93 900 kg, CG 36.88%

Rigid Pavement Requirements
WV011, MRW 93 900 kg, CG 36.88 %
FIGURE-7-7-0-991-019-A01
**ON A/C A321neo

1270x455R22 (49×18–22) TIRES
TIRE PRESSURE CONSTANT AT 13.6 bar (197 psi)

Rigid Pavement Thickness (cm)

<table>
<thead>
<tr>
<th>cm</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>1.5</td>
</tr>
<tr>
<td>36</td>
<td>1.4</td>
</tr>
<tr>
<td>34</td>
<td>1.3</td>
</tr>
<tr>
<td>32</td>
<td>1.2</td>
</tr>
<tr>
<td>30</td>
<td>1.2</td>
</tr>
<tr>
<td>28</td>
<td>1.1</td>
</tr>
<tr>
<td>26</td>
<td>1.0</td>
</tr>
<tr>
<td>24</td>
<td>0.9</td>
</tr>
<tr>
<td>22</td>
<td>0.8</td>
</tr>
<tr>
<td>20</td>
<td>0.8</td>
</tr>
<tr>
<td>18</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Maximum Possible Main Gear Load at Maximum Ramp Weight and Aft CG

Weight on One Main Landing Gear
- 38 340 kg (84 525 lb)
- 35 000 kg (77 150 lb)
- 30 000 kg (66 150 lb)
- 25 000 kg (55 125 lb)
- 20 000 kg (44 100 lb)

Rigid Pavement Requirements
WV070, MRW 80 400 kg, CG 39.71 %

FIGURE-7-7-0-991-020-A01

Note:
The values obtained by using the maximum load reference line and any values for k are exact. For loads less than maximum, the curves are exact for k = 80 MN/m³ but deviate slightly for any other values of k.

Reference:
“Design of Concrete Airport Pavements” and “Computer Program for Airport Pavement Design – Program PDILB® Portland Cement Association.”

N_AC_070700_1_0200101_01_01
**ON A/C A321 neo**

1270x455R22 (49x18–22) TIRES
TIRE PRESSURE CONSTANT AT 15.7 bar (228 psi)

**MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAXIMUM RAMP WEIGHT AND AFT CG**

NOTE:
THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUES FOR k ARE EXACT.
FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR k = 80 MN/m³ BUT DEVIATE SLIGHTLY FOR ANY OTHER VALUES OF k.

REFERENCE:
"DESIGN OF CONCRETE AIRPORT PAVEMENTS" AND "COMPUTER PROGRAM FOR AIRPORT PAVEMENT DESIGN – PROGRAM PDILB" PORTLAND CEMENT ASSOCIATION.

Rigid Pavement Requirements
WV071, MRW 97 400 kg
FIGURE-7-7-0-991-021-A01
Rigid Pavement Requirements - LCN Conversion

**ON A/C A321-100 A321-200 A321neo**

Rigid Pavement Requirements - LCN Conversion

1. The Load Classification Number (LCN) curves are no longer provided in section 07-08-00 since the LCN system for reporting pavement strength is obsolete, having been replaced by the ICAO recommended ACN/PCN system in 1983. For questions regarding the LCN system, contact Airbus.
7-9-0 ACN/PCN Reporting System - Flexible and Rigid Pavements

**ON A/C A321-100 A321-200 A321neo**

**Aircraft Classification Number - Flexible and Rigid Pavements**

1. This section provides data about the Aircraft Classification Number (ACN) for an aircraft gross weight in relation to a subgrade strength value for flexible and rigid pavement.
   The flexible and rigid pavement requirement graphs are given at standard tire pressure for the weight variants producing (at the MRW and maximum aft CG) the lowest MLG load and the highest MLG load for each type of aircraft.
   To find the ACN of an aircraft on flexible and rigid pavement, you must know the aircraft gross weight and the subgrade strength.

   **NOTE**: An aircraft with an ACN equal to or less than the reported PCN can operate on that pavement, subject to any limitation on the tire pressure.

   Example, see FIGURE 7-9-0-991-020-A (sheet 1), calculation of the ACN for flexible pavement for:
   - An aircraft with a MRW of 78 400 kg (172 850 lb),
   - An aircraft gross weight of 65 000 kg (143 300 lb),
   - A low subgrade strength (code C).
   The ACN for flexible pavement is 38.

   Example, see FIGURE 7-9-0-991-020-A (sheet 2), calculation of the ACN for rigid pavement for:
   - An aircraft with a MRW of 78 400 kg (172 850 lb),
   - An aircraft gross weight of 65 000 kg (143 300 lb),
   - A medium subgrade strength (code B).
   The ACN for rigid pavement is 40.

2. Aircraft Classification Number - ACN table
   The tables in FIGURE 7-9-0-991-019-A, FIGURE 7-9-0-991-022-A and FIGURE 7-9-0-991-025-A provide ACN data in tabular format similar to the one used by ICAO in the "Aerodrome Design Manual Part 3, Pavements - Edition 1983" for all the operational weight variants of the aircraft.
   As an approximation, use a linear interpolation in order to get the ACN at the required operating weight using the following equation:
   \[
   ACN = ACN_{min} + (ACN_{max} - ACN_{min}) \times \frac{\text{Operating weight} - 47 000 \text{ kg}}{\text{MRW} - 47 000 \text{ kg}}
   \]
   As an approximation, also use a linear interpolation in order to get the aircraft weight at the pavement PCN using the following equation:
   \[
   \text{Operating weight} = 47 000 \text{ kg} + (\text{MRW} - 47 000 \text{ kg}) \times \frac{\text{PCN} - ACN_{min}}{ACN_{max} - ACN_{min}}
   \]
   With ACN max: ACN calculated at the MRW in the table and with ACN min: ACN calculated at 47 000 kg.
NOTE: The CG in the figure title is the CG used for ACN calculation.
**ON A/C A321-100**

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>ALL UP MASS (kg)</th>
<th>LOAD ON ONE MAIN GEAR LEG (%)</th>
<th>TIRE PRESSURE (MPa)</th>
<th>ACN FOR RIGID PAVEMENT SUBGRADES – MN/m³</th>
<th>ACN FOR FLEXIBLE PAVEMENT SUBGRADES – CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>A321–100</td>
<td>83 400</td>
<td>47.8</td>
<td>1.36</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>WV000</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>A321–100</td>
<td>83 400</td>
<td>47.8</td>
<td>1.36</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>WV002</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>A321–100</td>
<td>85 400</td>
<td>47.9</td>
<td>1.39</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td>WV003</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>A321–100</td>
<td>78 400</td>
<td>47.8</td>
<td>1.28</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>WV004</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>A321–100</td>
<td>83 400</td>
<td>47.8</td>
<td>1.36</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>WV005</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>A321–100</td>
<td>78 400</td>
<td>47.8</td>
<td>1.28</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>WV006</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>A321–100</td>
<td>80 400</td>
<td>47.8</td>
<td>1.36</td>
<td>49</td>
<td>52</td>
</tr>
<tr>
<td>WV007</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>A321–100</td>
<td>89 400</td>
<td>47.5</td>
<td>1.46</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>WV008</td>
<td>47 000</td>
<td>47.4</td>
<td></td>
<td>26</td>
<td>28</td>
</tr>
</tbody>
</table>
AIRCRAFT GROSS WEIGHT (x 1,000 lb)

AIRCRAFT CLASSIFICATION NUMBER (ACN)

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3, CHAPTER 1, SECOND EDITION 1983.

SEE SECTION 7−4−0.

1,270 x 1,000 lb (49418−22) TIRES

TIRE PRESSURE CONSTANT AT 12.8 bar (186 psi)

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3, CHAPTER 1, SECOND EDITION 1983.

SEE SECTION 7−4−0.

ALPHA FACTOR = 0.9

SUBGRADE STRENGTH

A − CBR 15 (HIGH)
B − CBR 10 (MEDIUM)
C − CBR 6 (LOW)
D − CBR 3 (ULTRA LOW)

Aircraft Classification Number
Flexible Pavement - WV004, MRW 78 400 kg, CG 41 % (Sheet 1 of 2)
FIGURE-7-9-0-991-020-A01
**ON A/C A321-100**

Aircraft Classification Number

Rigid Pavement - WV004, MRW 78 400 kg, CG 41 % (Sheet 2 of 2)

FIGURE-7-9-0-991-020-A01

Page 5

Feb 01/19
**ON A/C A321-100

AIRCRAFT CLASSIFICATION NUMBER (ACN)

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3 CHAPTER 1, SECOND EDITION 1983. SEE SECTION 7−4−0.

AIRCRAFT GROSS WEIGHT

C − CBR 6 (LOW)
B − CBR 10 (MEDIUM)
A − CBR 15 (HIGH)

SUBGRADE STRENGTH
D − CBR 3 (ULTRA LOW)

ALPHA FACTOR = 0.9

TIRE PRESSURE CONSTANT AT 14.6 bar (212 psi)

1 270x45R22 (49x18−22) TIRES

Aircraft Classification Number
Flexible Pavement - WV008, MRW 89 400 kg, CG 38 % (Sheet 1 of 2)
FIGURE-7-9-0-991-021-A01
**ON A/C A321-100**

A321

AIRCRAFT CHARACTERISTICS - AIRPORT AND MAINTENANCE PLANNING

AIRCRAFT CLASSIFICATION NUMBER (ACN)

TIRE PRESSURE CONSTANT AT 14.6 bar (212 psi)

1 270x455R22 (49x18−22) TIRES

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3

See Section 4-4-4.

80 90 100 110 120 130 140 150 160 170 190 180

15 20 25 30 35 40 45 50 65 55 60

SUBGRADE STRENGTH

A − k = 150 MN/m³ (HIGH)

D − k = 20 MN/m³ (ULTRA LOW)

C − k = 40 MN/m³ (LOW)

B − k = 80 MN/m³ (MEDIUM)

Aircraft Classification Number

Rigid Pavement - WV008, MRW 89 400 kg, CG 38 % (Sheet 2 of 2)

FIGURE-7-9-0-991-021-A01

N_AC_070900_1_0210102_01_00

7-9-0

Page 7

Feb 01/19
**ON A/C A321-200**

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>ALL UP MASS (kg)</th>
<th>LOAD ON ONE MAIN GEAR LEG (%)</th>
<th>TIRE PRESSURE (MPa)</th>
<th>ACN FOR RIGID PAVEMENT SUBGRADES – MN/m²</th>
<th>ACN FOR FLEXIBLE PAVEMENT SUBGRADES – CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321-200 WV00</td>
<td>89 400</td>
<td>47.8</td>
<td>1.46</td>
<td>57 60 62 65 50 52 58 64</td>
<td>50 52 56 60 64 68 72 76</td>
</tr>
<tr>
<td>A321-200 WV00</td>
<td>47 000</td>
<td>47.8</td>
<td></td>
<td>27 28 30 31 24 24 28 30</td>
<td>24 24 28 30 32 34 36 38</td>
</tr>
<tr>
<td>A321-200 WV001</td>
<td>93 400</td>
<td>47.6</td>
<td>1.50</td>
<td>60 63 66 68 52 55 61 67</td>
<td>52 55 61 68 70 73 78 80</td>
</tr>
<tr>
<td>A321-200 WV002</td>
<td>89 400</td>
<td>47.6</td>
<td>1.50</td>
<td>27 28 30 31 24 24 28 30</td>
<td>24 24 28 30 32 34 36 38</td>
</tr>
<tr>
<td>A321-200 WV003</td>
<td>91 400</td>
<td>47.7</td>
<td>1.50</td>
<td>59 62 64 67 51 54 60 65</td>
<td>51 54 60 65 68 72 76 79</td>
</tr>
<tr>
<td>A321-200 WV004</td>
<td>47 000</td>
<td>47.8</td>
<td>1.46</td>
<td>27 28 30 31 24 24 28 30</td>
<td>24 24 28 30 32 34 36 38</td>
</tr>
<tr>
<td>A321-200 WV005</td>
<td>85 400</td>
<td>47.6</td>
<td></td>
<td>53 56 58 61 46 49 54 60</td>
<td>46 49 54 60 65 70 74 78</td>
</tr>
<tr>
<td>A321-200 WV006</td>
<td>83 400</td>
<td>47.7</td>
<td>1.46</td>
<td>51 54 57 59 45 47 53 59</td>
<td>45 47 53 59 62 65 69 72</td>
</tr>
<tr>
<td>A321-200 WV007</td>
<td>47 000</td>
<td>47.7</td>
<td></td>
<td>26 27 29 30 23 24 26 30</td>
<td>23 24 26 30 32 34 36 38</td>
</tr>
<tr>
<td>A321-200 WV008 (CG 40.51%)</td>
<td>80 400</td>
<td>47.8</td>
<td>1.36</td>
<td>49 52 54 57 43 45 51 56</td>
<td>43 45 51 56 59 63 69 76</td>
</tr>
<tr>
<td>A321-200 WV009 (CG 39.71%)</td>
<td>80 400</td>
<td>47.7</td>
<td>1.36</td>
<td>49 52 54 56 43 45 50 56</td>
<td>43 45 50 56 59 63 69 76</td>
</tr>
<tr>
<td>A321-200 WV009 (CG 40.08%)</td>
<td>78 400</td>
<td>47.7</td>
<td>1.28</td>
<td>47 49 52 54 42 43 49 55</td>
<td>42 43 49 55 59 63 69 76</td>
</tr>
<tr>
<td>A321-200 WV009 (CG 39.21%)</td>
<td>78 400</td>
<td>47.6</td>
<td>1.28</td>
<td>46 49 52 54 41 43 49 55</td>
<td>41 43 49 55 59 63 69 76</td>
</tr>
<tr>
<td>A321-200 WV010</td>
<td>85 400</td>
<td>47.6</td>
<td>1.39</td>
<td>53 56 58 61 46 49 54 60</td>
<td>46 49 54 60 63 67 70 74</td>
</tr>
<tr>
<td>A321-200 WV011</td>
<td>47 000</td>
<td>47.6</td>
<td>1.50</td>
<td>26 28 29 30 23 24 26 30</td>
<td>23 24 26 30 32 34 36 38</td>
</tr>
</tbody>
</table>

ACN Table

FIGURE-7-9-0-991-022-A01
**ON A/C A321-200**

Aircraft Classification Number

Flexible Pavement - WV009, MRW 78 400 kg, CG 39.21 % (Sheet 1 of 2)

FIGURE-7-9-0-991-023-A01
Airplane: A321-200

Aircraft Classification Number
Rigid Pavement - WV009, MRW 78 400 kg, CG 39.21 % (Sheet 2 of 2)
FIGURE-7-9-0-991-023-A01
**ON A/C A321-200**

Aircraft Classification Number
Flexible Pavement - WV011, MRW 93 900 kg, CG 36.88 % (Sheet 1 of 2)
FIGURE-7-9-0-991-024-A01
AIRCRAFT CHARACTERISTICS - AIRPORT AND MAINTENANCE PLANNING

**ON A/C A321-200

---

**SUBGRADE STRENGTH**

- D: k = 20 MN/m³ (ULTRA LOW)
- A: k = 150 MN/m³ (HIGH)
- B: k = 80 MN/m³ (MEDIUM)
- C: k = 40 MN/m³ (LOW)

---

**AIRCRAFT GROSS WEIGHT** (x 1000 kg)

---

**AIRCRAFT CLASSIFICATION NUMBER (ACN)**

---

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3.
**ON A/C A321neo

<table>
<thead>
<tr>
<th>WEIGHT VARIANT</th>
<th>ALL UP MASS (kg)</th>
<th>LOAD ON ONE MAIN GEAR LEG (%)</th>
<th>TIRE PRESSURE (MPa)</th>
<th>ACN FOR RIGID PAVEMENT SUBGRADES − MN/m²</th>
<th>ACN FOR FLEXIBLE PAVEMENT SUBGRADES – CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>A321NEO WV050</td>
<td>89 400</td>
<td>47.8</td>
<td>1.46</td>
<td>57 60 62 65 50 52 58 64</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV051</td>
<td>89 400</td>
<td>47.8</td>
<td>1.46</td>
<td>57 60 62 65 50 52 58 64</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV052</td>
<td>93 900</td>
<td>47.6</td>
<td>1.50</td>
<td>61 64 66 69 53 56 61 67</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV053</td>
<td>93 900</td>
<td>47.6</td>
<td>1.50</td>
<td>61 64 66 69 53 56 61 67</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV056</td>
<td>92 900</td>
<td>47.7</td>
<td>1.50</td>
<td>60 63 65 68 52 55 61 66</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV057</td>
<td>90 900</td>
<td>47.7</td>
<td>1.50</td>
<td>59 61 64 66 51 53 59 65</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV070</td>
<td>80 400</td>
<td>47.7</td>
<td>1.36</td>
<td>49 52 54 58 43 45 50 58</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV071</td>
<td>97 400</td>
<td>47.5</td>
<td>1.57</td>
<td>64 67 70 72 55 58 64 70</td>
<td></td>
</tr>
<tr>
<td>A321NEO WV072</td>
<td>97 400</td>
<td>47.5</td>
<td>1.57</td>
<td>64 67 70 72 55 58 64 70</td>
<td></td>
</tr>
</tbody>
</table>

Aircraft Classification Number
ACN Table
FIGURE-7-9-0-991-025-A01

7-9-0  Page 13  Feb 01/19
**ON A/C A321neo**

Aircraft Classification Number
Flexible Pavement - WV070, MRW 80 400 kg, CG 39.71 % (Sheet 1 of 2)  
FIGURE-7-9-0-991-026-A01
**ON A/C A321neo

ACN WAS DETERMINED AS REFERENCED IN ICAO AERODROME DESIGN MANUAL PART 3 CHAPTER 1. SECOND EDITION 1983. SEE SECTION 7−4−0.

AIRCRAFT CLASSIFICATION NUMBER (ACN)

SUBGRADE STRENGTH
D − k = 20 MN/m³ (ULTRA LOW)
C − k = 40 MN/m³ (LOW)
B − k = 80 MN/m³ (MEDIUM)
A − k = 150 MN/m³ (HIGH)

1.270x55R22 (49x18−22) TIRES
TIRE PRESSURE CONSTANT AT 13.6 bar (197 psi)

AIRCRAFT GROSS WEIGHT
(x 1,000 lb)

60 100 150 175

Aircraft Classification Number
Rigid Pavement - WV070, MRW 80 400 kg, CG 39.71 % (Sheet 2 of 2)
FIGURE-7-9-0-991-026-A01
**ON A/C A321neo**

Aircraft Classification Number
Flexible Pavement - WV071, MRW 97 400 kg, CG 36.07 % (Sheet 1 of 2)
FIGURE-7-9-0-991-027-A01
Rigid Pavement - WV071, MRW 97 400 kg, CG 36.07 % (Sheet 2 of 2)

FIGURE-7-9-0-991-027-A01
8-0-0 SCALED DRAWINGS

**ON A/C A321-100 A321-200 A321neo

**Scaled Drawings**

1. This section provides the scaled drawings.

   **NOTE**: When printing this drawing, make sure to adjust for proper scaling.
**ON A/C A321-100 A321-200

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING.

Scaled Drawing
FIGURE-8-0-0-991-004-A01

N_AC_080000_1_0040101_01_00
NOTE:
WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING.

Scaled Drawing
FIGURE-8-0-0-991-007-A01
AIRCRAFT RESCUE AND FIRE FIGHTING

10-0-0 AIRCRAFT RESCUE AND FIRE FIGHTING

**ON A/C A321-100 A321-200 A321neo

Aircraft Rescue and Fire Fighting

1. Aircraft Rescue and Fire Fighting Charts
   This section provides data related to aircraft rescue and fire fighting.
   The figures contained in this section are the figures that are in the Aircraft Rescue and Fire Fighting Charts poster available for download on AIRBUSWorld and the Airbus website.
Highly Flammable and Hazardous Materials and Components

FIGURE-10-0-991-044-A01
**ON A/C A321neo**

Highly Flammable and Hazardous Materials and Components for A321NEO-ACF

FIGURE-10-0-991-059-A01
Wheel/Brake Overheat
Wheel Safety Area (Sheet 1 of 2)
FIGURE-10-0-0-991-045-A01
BRAKE OVERHEAT AND LANDING GEAR FIRE

WARNING: BE VERY CAREFUL WHEN THERE IS A BRAKE OVERHEAT AND/OR LANDING GEAR FIRE, THERE IS A RISK OF TIRE EXPLOSION AND/OR WHEEL RIM BURST THAT CAN CAUSE DEATH OR INJURY. MAKE SURE THAT YOU OBEY THE SAFETY PRECAUTIONS THAT FOLLOW.

THE PROCEDURES THAT FOLLOW GIVE RECOMMENDATIONS AND SAFETY PRECAUTIONS FOR THE COOLING OF VERY HOT BRAKES AFTER ABNORMAL OPERATIONS SUCH AS A REJECTED TAKE-OFF OR OVERWEIGHT LANDING. FOR THE COOLING OF BRAKES AFTER NORMAL TAXI-IN, REFER TO YOUR COMPANY PROCEDURES.

BRAKE OVERHEAT:

1 - GET THE BRAKE TEMPERATURE FROM THE COCKPIT OR USE A REMOTE MEASUREMENT TECHNIQUE. THE REAL TEMPERATURE OF THE BRAKES CAN BE MUCH HIGHER THAN THE TEMPERATURE SHOWN ON THE ECAM. NOTE: AT HIGH TEMPERATURES (>800°C), THERE IS A RISK OF WARping OF THE LANDING GEAR STRUTS AND AXLES.

2 - APPROACH THE LANDING GEAR WITH EXTREME CAUTION AND FROM AN OBLIQUE ANGLE IN THE DIRECTION OF THE TIRE SHOULDER. DO NOT GO INTO THE RIM HAZARD AREA AND ONLY GO IN THE TIRE HAZARD AREA WITH CAUTION. (REF FIG. WHEEL/BrAKE OVERHEAT HAZARD AREAS). IF POSSIBLE, STAY IN A VEHICLE.

3 - LOOK AT THE CONDITION OF THE TIRES:
   IF THE TIRES ARE STILL INFLATED (FUSE PLUGS NOT MELTED), THERE IS A RISK OF TIRE EXPLOSION AND RIM BURST. DO NOT USE COOLING FANS BECAUSE THEY CAN PREVENT OPERATION OF THE FUSE PLUGS.

4 - USE WATER MIST TO DECREASE THE TEMPERATURE OF THE COMPLETE WHEEL AND BRAKE ASSEMBLY. USE A TECHNIQUE THAT PREVENTS SUDDEN COOLING. SUDDEN COOLING CAN CAUSE WHEEL CRACKS OR RIM BURST. DO NOT APPLY WATER, FOAM OR CO2. THESE COOLING AGENTS (AND ESPECIALLY CO2, WHICH HAS A VERY STRONG COOLING EFFECT) CAN CAUSE THERMAL SHOCKS AND BURST OF HOT PARTS.

LANDING GEAR FIRE:

CAUTION: AIRBUS RECOMMENDS THAT YOU DO NOT USE DRY POWDERS OR DRY CHEMICALS ON HOT BRAKES OR LANDING GEAR FIRES. THESE AGENTS CAN CHANGE INTO SOLID OR ENAMELLED DEPOSITS. THEY CAN DECREASE THE SPEED OF HEAT DISSIPATION WITH A POSSIBLE RISK OF PERMANENT STRUCTURAL DAMAGE TO THE BRAKES, WHEELS OR WHEEL AXLES.

1 - IMMEDIATELY STOP THE FIRE:
   A) APPROACH THE LANDING GEAR WITH EXTREME CAUTION AND FROM AN OBLIQUE ANGLE IN THE DIRECTION OF THE TIRE SHOULDER. DO NOT GO INTO THE RIM HAZARD AREA AND ONLY GO IN THE TIRE HAZARD AREA WITH CAUTION. IF POSSIBLE, STAY IN A VEHICLE.
   B) USE LARGE AMOUNTS OF WATER, WATER MIST; IF THE FUEL TANKS ARE AT RISK, USE FOAM. USE A TECHNIQUE THAT PREVENTS SUDDEN COOLING. SUDDEN COOLING CAN CAUSE WHEEL CRACKS OR RIM BURST.
   C) DO NOT USE FANS OR BLOWERS.
**ON A/C A321-100 A321-200 A321neo

Composite Materials
FIGURE-10-0-0-991-046-A01
**ON A/C A321-100 A321-200 A321neo

L/G Ground Lock Safety Devices
FIGURE-10-0-0-991-047-A01
**ON A/C A321-100 A321-200 A321neo

Emergency Evacuation Devices
FIGURE-10-0-0-991-048-A01
Emergency Evacuation Devices for A321NEO-ACF
FIGURE-10-0-0-991-060-A01
Pax/Crew Doors and Emergency Exits

FIGURE-10-0-991-049-A01
**ON A/C A321-100 A321-200 A321neo

---

**WARNING:** ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF CARGO DOOR AREA.

**NORMAL OPERATION:**

1. PUSH THE DOOR HANDLE FLAP IN TO RELEASE THE DOOR STRUCTURE TO THE FULLY UNLOCKED POSITION.
2. PULL THE DOOR HANDLE AWAY AND UP FROM THE DOOR LATCH. (YOU CAN SEE A RED MARK THROUGH ALL THE INDICATION WINDOWS.)
3. OPEN THE ACCESS DOOR 134AR/154AR BELLOW THE HANDLE.
4. HOLD THE SELECTOR UP AND INSTALL THE HAN DELP ON THE HAND PUMP (YOU CAN FEEL THE FORCE INCREASE ON THE HAND PUMP.)
5. RELEASE THE SELECTO R.

---

FWD and AFT Lower Deck Cargo Doors

FIGURE-10-0-0-991-050-A01

---

Page 13
Feb 01/19
**ON A/C A321-100 A321-200 A321neo

APU ACCESS DOOR

APU Access Door
FIGURE-10-0-0-991-052-A01
DIMENSIONS ARE RELATED TO AIRCRAFT WEIGHT AND CG CONFIGURATION

**NOTE:**

PASSENGER AND CARGO DOOR GROUND CLEARANCES ARE MEASURED FROM THE CENTER OF THE DOOR SILL AND FROM FLOOR LEVEL.
**ON A/C A321-100 A321-200 A321neo

Structural Break-in Points
FIGURE-10-0-0-991-054-A01