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General
This section presents a partial summary of the operating limitations and aircraft information necessary for the safe operation of the C172R Skyhawk. This section is provided for quick reference only, and is not intended to substitute the approved Aircraft Flight Manual and other official materials.

All BSU Aircraft are operated in accordance with the FAA regulations and BSU Aviation policies and procedures. In some cases, BSU policies and procedures will be more restrictive. Pilots shall refer to the BSU AOM and be familiar with all general BSU aircraft operating procedures.

In all cases, pilots operating the BSU Cessna C172R Skyhawk shall be thoroughly familiar with the information contained in the approved Aircraft Flight Manual, FAA regulations and applicable BSU Aviation policies and procedures.

CAUTION
Observance of these limitations is mandatory. This chapter provides only a partial summary of limitations in accordance with the Aircraft Flight Manual. Pilots must refer to the Aircraft Flight Manual and BSU Aviation Operations manual to become familiar with all required information.

NOTE
For aircraft equipped with specific options, refer to the Pilot’s Information Manual (PIM) and FAA Approved Airplane Flight Manual (AFM) for amended operating limitations, procedures, performance data and/or other necessary information.

Kinds of Operations
The airplane is approved for the following operations when equipped in accordance with 14 CFR Part 91:

- Day V.F.R.
- Night V.F.R.
- Day I.F.R.
- Night I.F.R.
- Non-icing

CAUTION
The BSU C172R Skyhawk is not equipped for flight into icing conditions.

Flight into known icing conditions is PROHIBITED.
Structural and Weight Limitations

Maximum Ramp Weight (Normal Category) .......................................................... 2,457 lbs
Maximum Takeoff Weight (Normal Category) ......................................................... 2,450 lbs
Maximum Landing Weight (Normal Category) ......................................................... 2,450 lbs

Maximum Ramp Weight (Utility Category) .......................................................... 2,107 lbs
Maximum Takeoff Weight (Utility Category) .......................................................... 2,100 lbs
Maximum Landing Weight (Utility Category) .......................................................... 2,100 lbs

Baggage Area 1 Maximum Weight ................................................................. 120 lbs
Baggage Area 2 Maximum Weight ................................................................. 50 lbs
Combined Max Weight Baggage Areas 1 and 2 ................................................. 120 lbs

Maneuvering Limitations

The C172R Skyhawk is rated in the Normal and Utility categories. The only authorized maneuvers in the Skyhawk in Normal category are those maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and steep turns (with not more than 60° of bank).

In the Utility category, the only authorized maneuvers are those in the Normal category, plus spins.

**WARNING**

When operated in the Utility category, the rear seat must not be occupied and the baggage compartment must be empty.

Flight Load Factor Limitations - Normal Category

<table>
<thead>
<tr>
<th>Positive Load Limit</th>
<th>Negative Load Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3.8 g Flaps Up / +3.0 g Flaps Down</td>
<td>-1.52 g Flaps Up</td>
</tr>
</tbody>
</table>

Flight Load Factor Limitations - Utility Category

<table>
<thead>
<tr>
<th>Positive Load Limit</th>
<th>Negative Load Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4.4 g Flaps Up / +3.0 g Flaps Down</td>
<td>-1.76 g Flaps Up</td>
</tr>
</tbody>
</table>

Power Plant Limitations

Manufacturer: ................................................................. Textron / Lycoming
Model Numbers: ............................................................. IO-360-L2A
Maximum Horsepower: ......................................................... 160 BHP
Maximum Engine Rotation Speed (RPM): .......................................... 2400
Fuel Minimum Grade: ......................................................... 100 (Green) / 100 LL (Blue)
Engine Starter Limitations
Minimum voltage to attempt engine start ................................................................. 20 Volts
Maximum continuous cranking time (single start attempt) ................................. 10 seconds
Minimum cool-down time between attempts ......................................................... 20 seconds
Maximum number of start attempts .................................................................... 3

Engine Operating Limitations (all operations)
Maximum Continuous Power .................................................................................. 160 bhp @ 2400 RPM
Maximum RPM for all operations ........................................................................... 2400 RPM
Static RPM range at full throttle (takeoff power) .................................................... 2065-2165 RPM
Maximum oil temperature (red line) ..................................................................... 245º
Minimum oil pressure ............................................................................................ 20 PSI

NOTE
Proper engine (oil) temperature management is critical to air-cooled engine reliability and maximum service life. Flight crews will monitor oil temperature and adjust airspeed, climb gradient and power/mixture settings, as appropriate, in accordance with the AFM and above limitations for all operations.

Oil Limitations
Maximum Oil Capacity (per engine) ......................................................................... 8 qts
Minimum Oil Quantity (per engine) / Flight of under 2 hours (BSU Policy) ............. 6 qts
Minimum Oil Quantity (per engine) / Flight of 2 hours or more (BSU Policy) .......... 7 qts

CAUTION
Do not operate the engine with less than six (6) quarts of oil.

Propeller Specifications and Limitations
Manufacturer ............................................................................................................. McCauley / Model 1C235 / LFA7570
Type ......................................................................................................................... Fixed pitch
Max. Diameter ......................................................................................................... 75”
Min. Diameter ......................................................................................................... 74”

Fuel Limitations
Approved Fuel ........................................................................................................ Aviation Grade 100LL (Blue) or 100 (Green)
Total Capacity (all tanks) ..................................................................................... 56 Gallons
Total Usable Fuel (all tanks) ................................................................................ 53 Gallons
Total Unusable Fuel (all tanks) ............................................................................. 3 Gallons
Usable Fuel (each wing) ....................................................................................... 26.5 gallons
Unusable Fuel (each wing) ................................................................................... 1.5 Gallons
**WARNING**

The fuel selector must be set in the BOTH position for takeoff.
Avoid continuous operations with the fuel selector positioned on the RIGHT or LEFT tank.

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**CAUTION**

*Flight crews shall avoid maneuvers that could uncover or “un-port” the wing outlet in the fuel tanks. Un-porting can result in fuel flow interruption and power loss. Avoid extreme running takeoffs, slips/skids resulting in altitude loss in excess of 2000’, or other radical or extreme maneuvers.*

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**Electrical System Limitations**

- Alternator Output: 28 Volts
- Amps Load: Maximum 60 Amps
- Battery Output: 24 Volts
- Minimum voltage to attempt engine start: 20 Volts

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**WARNING**

*Alternator must be functional to initiate a flight. Departing on battery power alone, without a functional alternator, is prohibited.*

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**Airspeed Limitations**

**Airspeed Indicator Markings**

<table>
<thead>
<tr>
<th>Instrument Marking</th>
<th>Explanation</th>
<th>KIAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Arc</td>
<td>Full Flap Operating Range: Lower limit is max. weight $V_{SO}$ in the landing configuration. Upper limit is maximum speed permissible with flaps fully extended.</td>
<td>33-85</td>
</tr>
<tr>
<td>Green Arc</td>
<td>Normal Operating Range: Lower limit is max. weight $V_{S1}$ with flaps retracted. The upper limit is $V_{NO}$.</td>
<td>44-129</td>
</tr>
<tr>
<td>Yellow Arc</td>
<td>Caution Range: Flight in this range is limited to smooth air only, and then with caution.</td>
<td>129–163</td>
</tr>
<tr>
<td>Red Line</td>
<td>Never Exceed Speed: Maximum speed for all operations.</td>
<td>163</td>
</tr>
</tbody>
</table>

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**NOTE**

The maximum demonstrated crosswind component for this aircraft is **15 KNOTS**.

The maximum crosswind component allowed for any BSU C172R operations is **15 KNOTS**, unless specifically authorized otherwise prior to flight.
## NORMAL OPERATIONS AIRSPEEDS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Reference</th>
<th>Definition</th>
<th>KIAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{FE(\text{full})}$</td>
<td>Max Full Flap Extend Speed</td>
<td>Do not exceed this speed with wing flaps extended beyond 10°.</td>
<td>85</td>
</tr>
<tr>
<td>$V_{FE(10)}$</td>
<td>Max 10 ° Flap Extend Speed</td>
<td>Do not exceed this speed with wing flaps extended 10°.</td>
<td>110</td>
</tr>
<tr>
<td>$V_{A}$</td>
<td>Maneuvering Speed</td>
<td>Do not make full or abrupt control movements above this speed. 2450 lbs. 2000 lbs. 1600 lbs.</td>
<td>99 92 82</td>
</tr>
<tr>
<td>$V_{NO}$</td>
<td>Max Structural Cruising Speed</td>
<td>Do not exceed this speed except in smooth air, and then only with extreme caution</td>
<td>129</td>
</tr>
<tr>
<td>$V_{NE}$</td>
<td>Never Exceed Speed</td>
<td>Maximum speed for all operations.</td>
<td>163</td>
</tr>
<tr>
<td>$V_{S1}$</td>
<td>Stall Speed, Specified Configuration</td>
<td>Stall speed in a specified configuration, flaps up</td>
<td>44</td>
</tr>
<tr>
<td>$V_{SO}$</td>
<td>Stall Speed, Landing Configuration</td>
<td>Stall speed in the landing configuration, typically flaps down</td>
<td>33</td>
</tr>
<tr>
<td>$V_{r}$</td>
<td>Rotation speed</td>
<td>Rotate at this speed on take-off</td>
<td>55</td>
</tr>
<tr>
<td>$V_{X}$</td>
<td>Best Angle of Climb (max climb over distance)</td>
<td>Maintain this speed until clear of obstacles, to gain maximum altitude in minimum forward distance</td>
<td>60</td>
</tr>
<tr>
<td>$V_{Y}$</td>
<td>Best Rate of Climb (max vertical speed in climb)</td>
<td>Maintain this speed to gain greatest altitude in minimum time</td>
<td>79</td>
</tr>
<tr>
<td>$V_{\text{climb}}$</td>
<td>Enroute or cruise climb speed</td>
<td>Maintain this speed for the best combination of visibility, engine cooling and climb performance</td>
<td>90</td>
</tr>
<tr>
<td>Traffic Pattern</td>
<td>Typical speed to be maintained at TPA, if appropriate</td>
<td>Maintain this airspeed in the downwind leg of a traffic pattern</td>
<td>90</td>
</tr>
<tr>
<td>$V_{\text{ref(normal)}}$</td>
<td>Final approach speed / NORMAL landing</td>
<td>Maintain this airspeed on final approach (with no gusts)</td>
<td>65</td>
</tr>
<tr>
<td>$V_{\text{ref(short)}}$</td>
<td>Final approach speed / SHORT-FIELD landing</td>
<td>Maintain this airspeed on final approach (with no gusts)</td>
<td>61</td>
</tr>
<tr>
<td>$V_{\text{ref(no flap)}}$</td>
<td>Final approach speed / NO FLAP landing</td>
<td>Maintain this airspeed on final approach (with no gusts)</td>
<td>70</td>
</tr>
<tr>
<td>X/W component</td>
<td>Maximum crosswind component on takeoff and landing</td>
<td>Do not intentionally exceed this crosswind component on takeoff and landing</td>
<td>15</td>
</tr>
</tbody>
</table>
EMERGENCY OPERATIONS AIRSPEEDS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Reference</th>
<th>Definition</th>
<th>KIAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{\text{ref (no flap)}}$</td>
<td>Final approach speed / NO FLAP landing</td>
<td>Maintain this airspeed on final approach during no-flap landings (with no gusts)</td>
<td>70</td>
</tr>
<tr>
<td>$V_G$</td>
<td>Best Glide Speed (engine inoperative)</td>
<td>Maintain this speed with the engine inoperative</td>
<td>65</td>
</tr>
<tr>
<td>Window Open</td>
<td>Max window open speed</td>
<td>Do not open the window above this speed</td>
<td>163</td>
</tr>
</tbody>
</table>

Training maneuvers limitations

**WARNING**

All intentional aerobatic maneuvers are prohibited.

Spins require prior approval.

Min. altitude for any portion of stalls and slow flight, including recovery, is 1500’ AGL.

Intentional banks in excess of 60° are prohibited.