VICTORIA FLYING CLUB

# Contact Information

- Instructor: Stephan Heinemann
- SMS: *+1 (250) 891-5446*
- Email: stephanheinemann@flyvfc.com
- Bookings, Questions

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# Take-Off

- Definition and Motivation
- **Take-Offs**
  - **Normal, Short-Field, Soft-Field, Crosswind**
  - Factors

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# Definition and Motivation


- *Act of leaving a supporting surface including the immediately preceding and following acts*
- Leaving the ground and **becoming airborne**
- Essential maneuver used in every single flight

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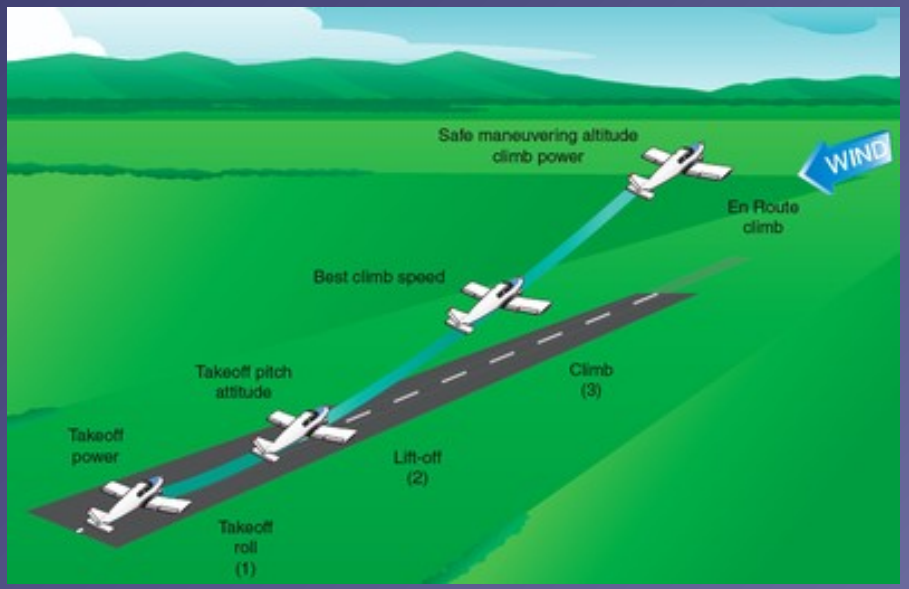
# Normal Take-Off




- *Criteria*: **hard uncontaminated surface**, **long runway**, **no obstacles**, **low density altitude**, **no** or **steady headwind**
- Check environment and consult **performance** data in POH
- Pre-take-off checks according to **checklists** in POH
- **Mixture full rich**, **lean** for **maximum RPM** above ***3000' DA***
- **Passenger**, **departure** and **emergency briefings**

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# Normal Take-Off – Line Up




- **Check** approach sector and **callout** *Approach Sector Clear*
- Align with **runway** **centerline** using **rudder** and **brakes**
- Keep **nose-wheel centered** and **stop** before take-off run
- Crosscheck **runway heading**, **magnetic compass**, **heading indicator**

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# Normal Take-Off – Run





- **Callout** *Take-Off* before initiating take-off run
- *Smoothly* apply **full power** **keeping** **straight** with **rudder**
- Use **runway end** as **reference** for directional control
- **Check** RPM/ASI and **callout** *RPM Checked*, *Airspeed Alive*
- Continue to **accelerate** to **lift-off speed** (***Vr = 55 KIAS***)
- *Gently* apply **elevator** **back-pressure** to lift off nose-wheel

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# Normal Take-Off – Initial Climb

*Adjust Attitude*

*Positive Rate*


*Maintain Vy*

*Vy..80*

*Control Direction*

- **Check** VSI and **callout** *Positive Rate*
- **Accelerate** to **best rate of climb airspeed** (*Vy = 74 KIAS*)
- Adjust and **maintain nose-up attitude** for **airspeed**
- **Trim** away **elevator forward-pressure** as required
- Maintain directional control and control **yaw** with **rudder**

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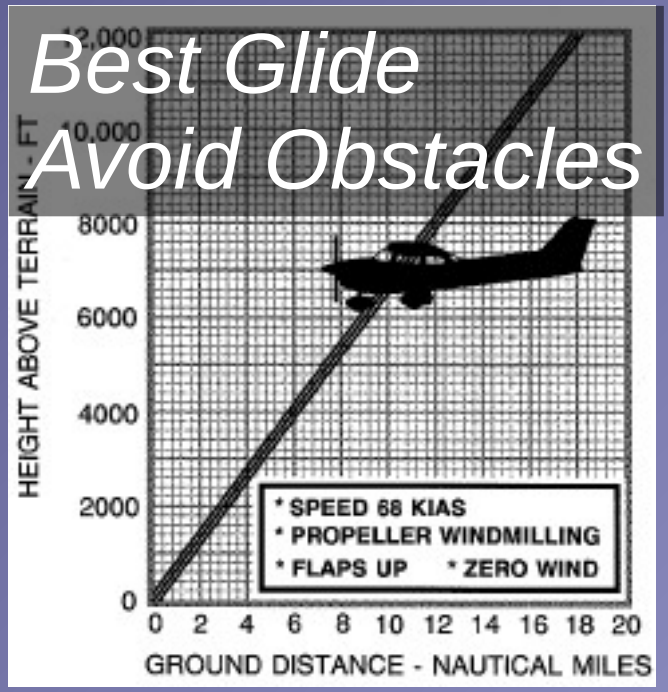
# Aborted / Rejected Take-Off

*Power Idle*


*Apply Brakes*

*Best Glide*
*Avoid Obstacles*




- *Reasons*: failures, traffic, animals, humans
- *During Take-Off Run*: **power idle**, apply **brakes**
- *Immediately after Take-Off*: **best glide airspeed** (***68 KIAS***), **avoid obstacles**

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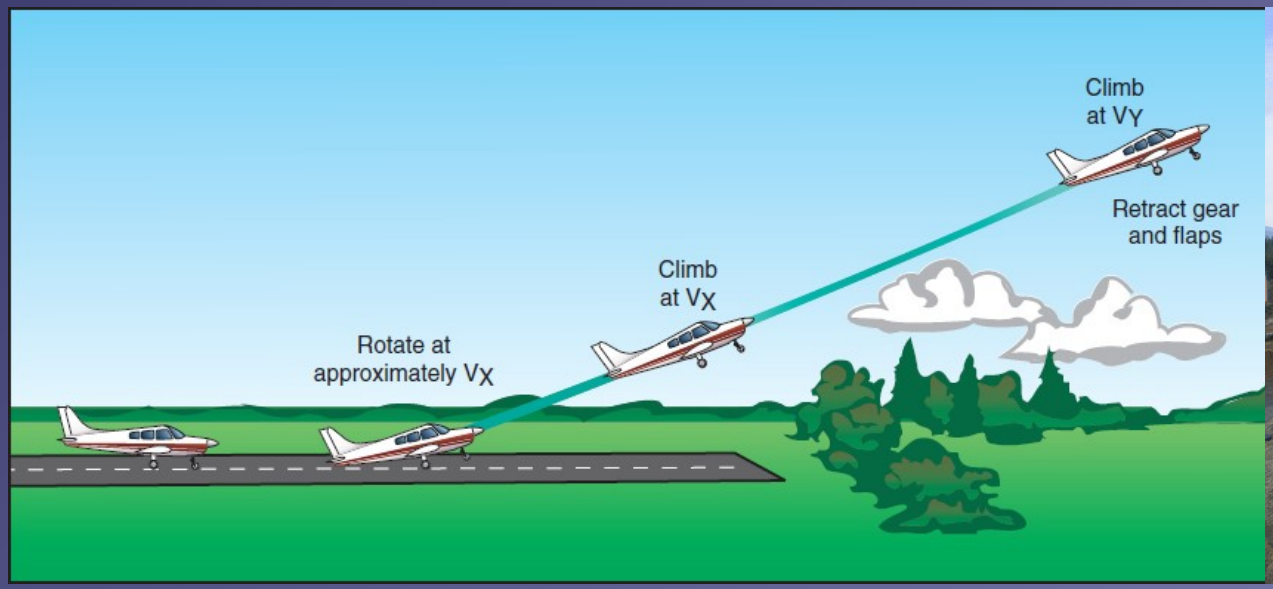
# Short-Field Take-Off




- *Criteria*: **hard uncontaminated surface**, **short runway**, **obstacles**, **high density altitude**, **no** or **steady headwind**
- Check environment and consult **performance** data in POH
- Pre-take-off checks according to **checklists** in POH
- **Mixture full rich**, **lean** for **maximum RPM** above ***3000' DA***
- **Passenger**, **departure** and **emergency briefings**

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# Short-Field Take-Off – Line Up




- **Check** approach sector and **callout** *Approach Sector Clear*
- Align with **runway** **centerline** using **rudder** and **brakes**
- Keep **nose-wheel centered** and **stop** before take-off run
- Crosscheck **runway heading**, **magnetic compass**, **heading indicator**

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# Short-Field Take-Off – Run

*Flaps 10°*


*Hold Brakes*

*Full Power*

*Release Brakes*

- Set **flaps *10°*** **apply** and **hold brakes**
- *Smoothly* apply **full power** and check **static RPM** (***2300-2400***)
- **Callout** *Take-Off* before initiating take-off run
- **Release brakes**
- Apply *slight* **elevator back-pressure**
- **Check** RPM/ASI and **callout** *RPM Checked*, *Airspeed Alive*
- Keep straight with **rudder** accelerating to lift-off (***Vr = 44..51 KIAS***)

*Slight Back-Pressure*

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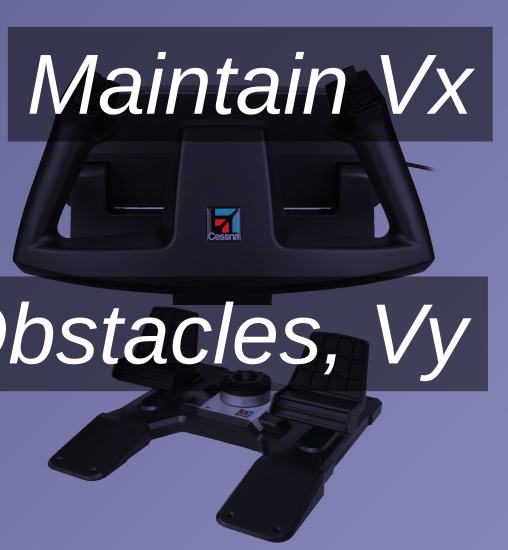
# Short-Field Take-Off – Initial Climb




- **Check** VSI and **callout** *Positive Rate*
- Accelerate to **best angle of climb airspeed** (*Vx = 62 KIAS*)
- Adjust and maintain **nose-up attitude** for **airspeed** and **trim**
- Maintain directional control and control **yaw** with **rudder**
- Accelerate to **best rate of climb airspeed** (*Vy = 74 KIAS*) after **obstacles** cleared and **trim**
- Retract **flaps** above ***500' AGL*** in **white arc**

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# Take-Off Performance

## SHORT FIELD TAKEOFF DISTANCE AT 2550 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 51 KIAS
Speed at 50 Ft: 56 KIAS

| Press Alt In Feet | 0°C | | 10°C | | 20°C | | 30°C | | 40°C | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst |
| S. L. | 860 | 1465 | 925 | 1575 | 995 | 1690 | 1070 | 1810 | 1150 | 1945 |
| 1000 | 940 | 1600 | 1010 | 1720 | 1090 | 1850 | 1170 | 1990 | 1260 | 2135 |
| 2000 | 1025 | 1755 | 1110 | 1890 | 1195 | 2035 | 1285 | 2190 | 1380 | 2355 |
| 3000 | 1125 | 1925 | 1215 | 2080 | 1310 | 2240 | 1410 | 2420 | 1515 | 2605 |
| 4000 | 1235 | 2120 | 1335 | 2295 | 1440 | 2480 | 1550 | 2685 | 1660 | 2880 |
| 5000 | 1355 | 2345 | 1465 | 2545 | 1585 | 2755 | 1705 | 2975 | 1825 | 3205 |
| 6000 | 1495 | 2605 | 1615 | 2830 | 1745 | 3075 | 1875 | 3320 | 2010 | 3585 |
| 7000 | 1645 | 2910 | 1785 | 3170 | 1920 | 3440 | 2065 | 3730 | 2215 | 4045 |
| 8000 | 1820 | 3265 | 1970 | 3575 | 2120 | 3880 | 2280 | 4225 | 2450 | 4615 |

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

## SHORT FIELD TAKEOFF DISTANCE AT 2400 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 48 KIAS
Speed at 50 Ft: 54 KIAS

| Press Alt In Feet | 0°C | | 10°C | | 20°C | | 30°C | | 40°C | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst | Grnd Roll Ft | Total Ft To Clear 50 Ft Obst |
| S. L. | 745 | 1275 | 800 | 1370 | 860 | 1470 | 925 | 1570 | 995 | 1685 |
| 1000 | 810 | 1390 | 875 | 1495 | 940 | 1605 | 1010 | 1720 | 1085 | 1845 |
| 2000 | 885 | 1520 | 955 | 1635 | 1030 | 1760 | 1110 | 1890 | 1190 | 2030 |
| 3000 | 970 | 1665 | 1050 | 1795 | 1130 | 1930 | 1215 | 2080 | 1305 | 2230 |
| 4000 | 1065 | 1830 | 1150 | 1975 | 1240 | 2130 | 1335 | 2295 | 1430 | 2455 |
| 5000 | 1170 | 2015 | 1265 | 2180 | 1360 | 2355 | 1465 | 2530 | 1570 | 2715 |
| 6000 | 1285 | 2230 | 1390 | 2410 | 1500 | 2610 | 1610 | 2805 | 1725 | 3015 |
| 7000 | 1415 | 2470 | 1530 | 2685 | 1650 | 2900 | 1770 | 3125 | 1900 | 3370 |
| 8000 | 1560 | 2755 | 1690 | 3000 | 1815 | 3240 | 1950 | 3500 | 2095 | 3790 |

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

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# Soft-Field Take-Off


- *Criteria*: **soft**, **rough** or **contaminated** **surface**, **long** **runway**, **no obstacles**, **low density altitude**, **no** or **steady headwind**
- Check environment and consult **performance** data in POH
- Pre-take-off checks according to **checklists** in POH
- **Mixture** **full rich**, **lean** for **maximum RPM** above ***3000' DA***
- **Passenger**, **departure** and **emergency briefings**

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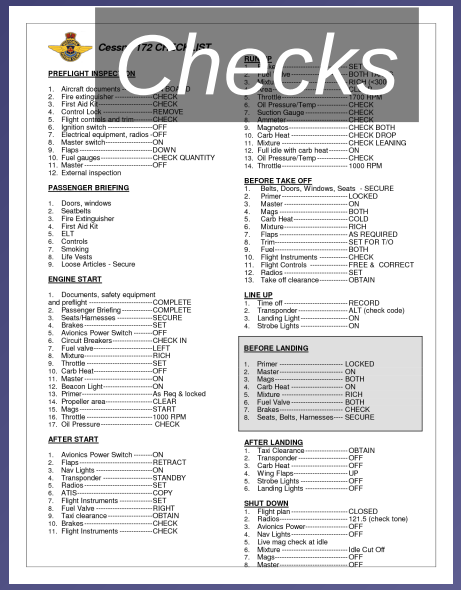
# Soft-Field Pre-Take-Off



Checks

Briefings

Mixture

Flaps 10°


- Complete pre-take-off checks on **supporting** **surface**
- Setup aircraft for **rolling** **take-off** on **soft surface**
- Departure and emergency **briefings**, **mixture**, **flaps**

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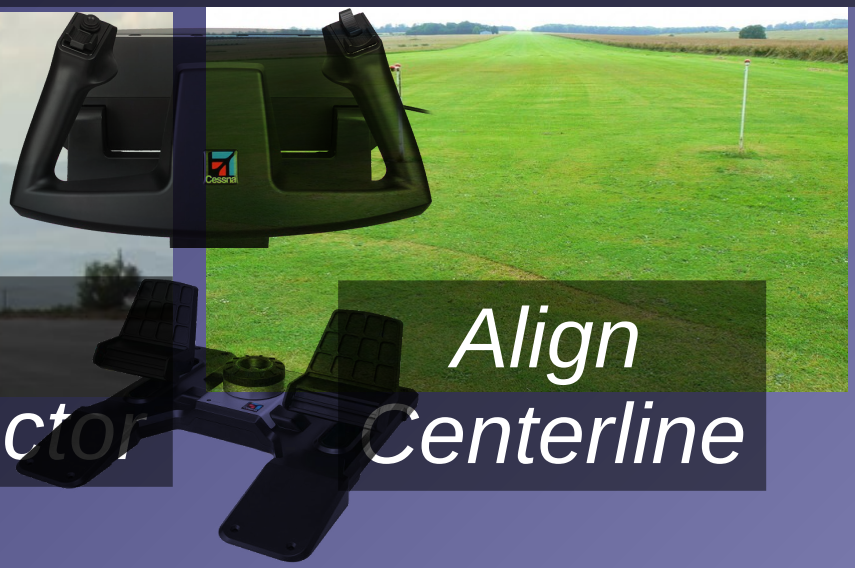
# Soft-Field Take-Off – Line Up

## *Relieve Nose-Wheel and Keep Rolling*

*Check Approach Sector*



*Align Centerline*

*Crosscheck Instruments*

- Apply and **hold** **elevator** **back-pressure** to **relieve nose-wheel**
- **Check** approach sector and **callout** *Approach Sector Clear*
- Perform **rolling** **take-**off – do **not stop** after **centerline alignment**
- Crosscheck **runway heading**, **magnetic compass**, **heading indicator**

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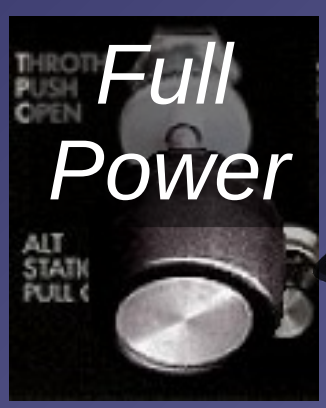
# Soft-Field Take-Off – Run







- **Callout** *Take-Off* before initiating take-off run
- *Smoothly* apply **full power** **keeping** **straight** with **rudder**
- Use **runway end** as **reference** for directional control
- Apply *slight* **elevator** **back-pressure** to **raise nose-wheel**
- **Check** RPM/ASI and **callout** *RPM Checked*, *Airspeed Alive*
- Lift off at **slowest speed** possible commensurate

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# Soft-Field Take-Off – Initial Climb


- **Level-off** and **remain in ground effect** after lift-off
- Accelerate in **ground effect** to desired **climb airspeed** (*Vx*, *Vy*)
- At **best angle of climb** (*Vx = 62 KIAS*) transition into climb and
- Accelerate to **best rate of climb** (*Vy = 74 KIAS*)
- Retract **flaps** in **white arc** when above ***500' AGL***

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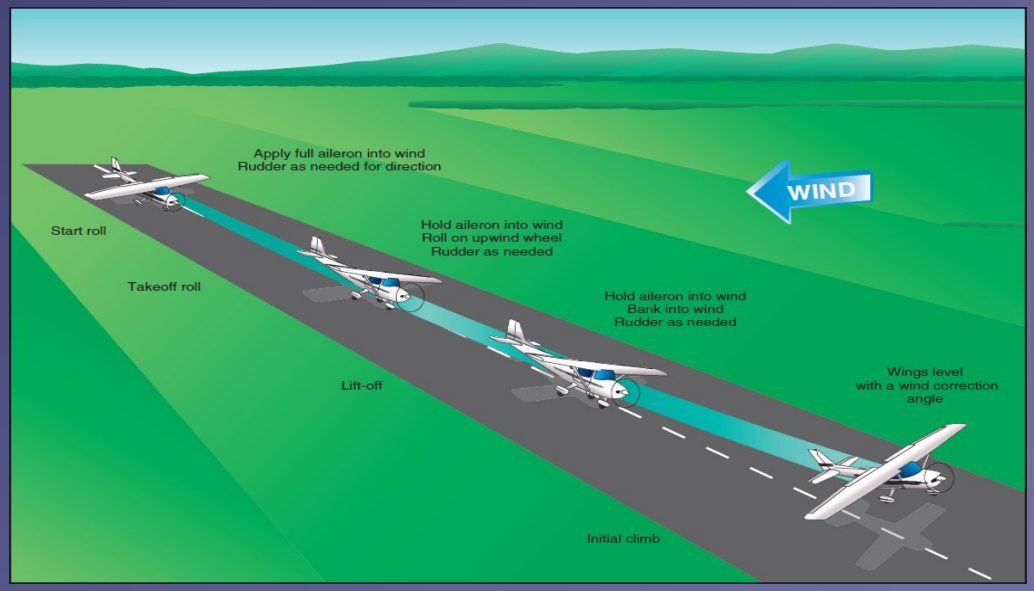
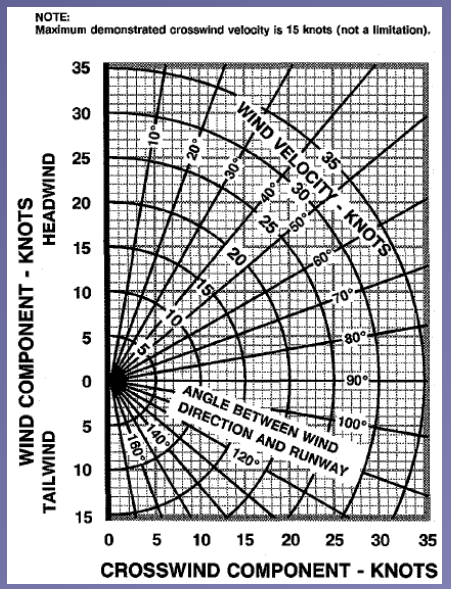
# Crosswind Take-Off




- *Criteria*: **steady** or **gusty crosswind** **component** (windshear)
- Check environment and consult **performance** data in POH
- Pre-take-off checks according to **checklists** in POH
- **Maximum demonstrated crosswind component *15 knots***
- **Mixture full rich**, **lean** for **maximum RPM** above ***3000' DA***
- **Passenger**, **departure** and **emergency briefings**

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# Crosswind Take-Off – Run


- Use **minimum flap** setting required and **hold full ailerons into the wind**
- **Callout** *Take-Off* before initiating take-off run
- *Smoothly* apply **full power keeping straight** with **rudder**
- Use **runway end** as **reference** for directional control
- **Check** RPM/ASI and **callout** *RPM Checked*, *Airspeed Alive*
- Continue to **accelerate** to *slightly* **higher lift-off speed**
- *Gradually* **reduce aileron input** – some ailerons required at lift-off
- *Briskly* apply **elevator back-pressure** to lift off

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# Crosswind Take-Off – Initial Climb

*Level Wings*

*Coordinated Turn into Wind*

- **Check** VSI and **callout** *Positive Rate*
- **Level wings** when airborne
- Perform **coordinated turn** into the wind (crab) maintaining desired **track**
- **Accelerate** to desired **climb airspeed** (*Vx, Vy*)
- Adjust and **maintain nose-up attitude** for **airspeed** and **trim**
- Retract **flaps** in **white arc** above ***500' AGL***

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# Crosswind Component