



PERFORMANCE: TAKE OFF V SPEEDS

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PERFORMANCE: TAKE OFF V SPEEDS

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PERFORMANCE: TAKE OFF V SPEEDS

INTRO

This is our quick guide to help clarify the most important take off V speeds covered in the performance exam.

Some of these speeds are calculated depending upon the aircraft's weight, configuration and the airfield conditions. The remaining speeds are fixed speeds dependent upon aircraft type. These speeds can normally be found in the aircraft manual.



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DEFINITIONS

VMCG - SPEED FOR MINIMUM CONTROL ON THE GROUND

This is the minimum speed at which directional control would be maintained following an engine failure on the ground. The direction must be maintained using only aerodynamic controls, it is assumed the remaining engine has take off thrust applied.

VMCA - SPEED FOR MINIMUM CONTROL IN THE AIR

This is the minimum speed at which directional control would be maintained following an engine failure in the air. In this case, directional control can be maintained when the heading can be kept within 20 degrees of the planned heading using no more than 5 degrees angle of bank.

VEF - SPEED OF CRITICAL ENGINE FAILURE

The speed at which we assume the critical engine will fail. It is never less than VMCG and is equal to the speed attained 2 seconds before V1.

VMU - SPEED FOR MINIMUM 'UNSTICK'

At and above this speed the aircraft can safely lift off the ground and safely continue its take off and climb to screen height. It is the lowest unstick speed for a given set of conditions.

V1 - THE TAKE-OFF DECISION SPEED

This is both the fastest speed at which the aircraft can be stopped and the slowest speed at which the aircraft can continue the take-off roll following an engine failure.



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DEFINITIONS

VR - THE ROTATE SPEED

The calculated speed that the pilot should rotate the aircraft to lift the nose wheel from the runway.

VLOF - LIFT OFF SPEED

The speed at which the main wheels should lift off the ground following rotation at VR. This varies depending on certain conditions e.g mass and flap configuration.

V2 - THE TAKE-OFF SAFETY SPEED

The speed at which the aircraft should accelerate to after rotating at VR with one engine inoperative. It is the slowest speed at which it is deemed safe to climb the aeroplane with one engine inoperative.

VMBE - SPEED FOR MAXIMUM BREAK ENERGY

This speed is the highest speed from which the aircraft could come to a complete stop within the energy capabilities of the breaks.

VTYRE - THE HIGHEST ROTATING TYRE SPEED

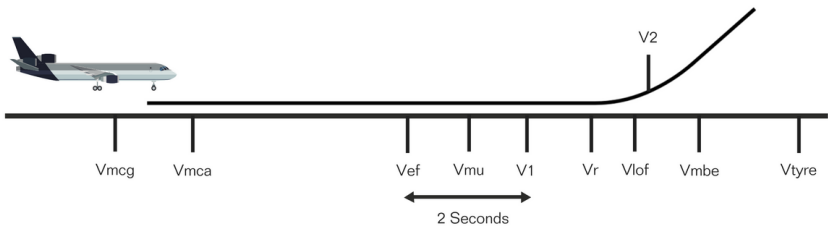
This is the highest speed along the ground that the tyre could rotate before losing its structural integrity and failing.



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TAKE OFF SPEEDS DIAGRAM

The diagram shows the typical positioning of the speeds on a take-off Roll, the table we have produced shows where speeds should be in relation to each other.



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V SPEEDS COMPARISON TABLE

This table compares VR and V2 to the speeds of VMCA and VS. Questions on the comparison of these speeds are frequently asked in the EASA exams so this is knowledge that we recommend obtaining!

	VR MINIMUM	V2 MINIMUM
VMCA	1.05 VMCA	1.1 VMCA
VS	1.1VS (CLASS B AIRCRAFT)	1.2 VS (B) 1.12 VS (A)

NB: VS = Stall speed

Tip: Use this table to revise by covering up the boxes in blue and filling them in by memory.





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