Spitfire Mk IX Performance Testing



Aeroplane and Armament Experimental Establishment   
Boscombe Down   
*22 October 1942*

Spitfire F. Mk. IX BF.274   
(Merlin 61)   
Climb and level speed performance

SUMMARY

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| ..................Climb and level speed performance has been measured on Spitfire F. Mk. IX B.F.274 both with and without a 30 gallon external jettisonable tank fitted. The climb performance at combat rating and position error have also been measured without the tank fitted. The engine was fitted with a 0.477:1 reduction gear and a Rotol R3/4F5/3 metal propeller. |

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| Climb at normal rating: |  |
| Maximum rate of climb in M.S. supercharger | 3200 ft.min at 13,500 ft. |
| Maximum rate of climb in F.S. supercharger | 2540 ft/min. at 25,900 ft. |
| Service ceiling (100 ft/min) | 42,100 ft. |
| Time to 10,000 ft. | 3.1 mins. |
| Time to 20,000 ft. | 6.5 mins. |
| Time to 30,000 ft. | 10.7 mins |
| Time to 40,000 ft. | 20.2 mins |

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| Climb at Combat rating: |  |
| Maximum rate of climb in M.S. supercharger | 3860 ft.min at 12,600 ft. |
| Maximum rate of climb in F.S. supercharger | 3020 ft/min. at 25,200 ft. |
| Service ceiling (100 ft/min) | 43,400 ft. |
| Time to 10,000 ft. | 2.7 mins |
| Time to 20,000 ft. | 5.6 mins. |
| Time to 30,000 ft. | 9.2 mins |
| Time to 40,000 ft. | 16.6 mins |

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| Level Speeds. |  |
| Maximum true air speed in M.S. supercharger | 380 1/2 m.p.h. at 15,400 ft. |
| Maximum true air speed in F.S. supercharger | 403 m.p.h. at 27,400 ft. |

*Without 30 gallon tank*

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| [Performance on Climb](http://www.spitfireperformance.com/bf274climb.jpg) |
| [Speed and Boost at Height](http://www.spitfireperformance.com/bf274speed.jpg) |

For the full report see [Spitfire F. Mk. IX BF.274 Climb and level speed performance](http://www.spitfireperformance.com/bf274.html)

Aircraft and Armament Experimental Establishment   
Boscombe Down   
*17 March 1943*

Spitfire F. Mk. IX BS.428   
(Merlin 61)   
Level speed performance with and without  
a 500 lb bomb fitted

SUMMARY

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| ..................Level speed measurements have been carried out on this aircraft to assess the effect of fitting a 500 lb bomb on an unfaired rack beneath the fuselage. The installaton was one designed and fitted by Fighter Command personnel.  ..................Level speed performance was measured between 11,000 ft. and 21,000 ft. using all-out level power conditions in M.S. supercharger gear with the radiator flaps closed. |

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| Condition | Max. True Air speed m.p.h. | Full throttle height feet. |
| With one 500 lb. bomb fitted | 363 | 14,500 |
| With external bomb installations removed | 385 | 14,750 |

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| Conclusions  ..................The reduction in maximum true air speed in M.S. supercharger gear due to fitting a 500 lb. bomb and a bomb rack without fairing is 22 m.p.h. |

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| [Level Speed Performance](http://www.spitfireperformance.com/bs428speed.jpg) |

For the full report see [Spitfire F. Mk. IX BS.428 Level Speed Performance](http://www.spitfireperformance.com/bs428.html)

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| *First flight from Eastleigh 26-8-42. Transferred to 402 Sqdn. 26-8-42, Farnborough November 42 , Boscombe Down for above trials 14-1-43, 421 Sqdn 20-5-43, 611 Sqdn 15-10-44. Sold 24-11-49.* |

Aircraft and Armament Experimental Establishment   
Boscombe Down   
*4 March 1943*

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| Spitfire F. Mk. IX BS.543 | Spitfire F. Mk. IX BS.551 |
| (Merlin 66) | (Merlin 70) |

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| The performance of Spitfire IX aircraft fitted with high and low  altitude versions of the intercooled Merlin engine.  SUMMARY  ..................Two low altitude versions of the intercooled Merlin engine were made which were designated the RM-9SM and RM-10 SM. In addition an improved type of high altitude engine designated the RM-11 SM was made. The RM-10 SM and the RM-11 SM were subsequently given mark numbers and are now known as the Merlin 66 and Merlin 70 respectively.  Climbs |

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| Condition | Spitfire IX BS. 543 Merlin 66 | Spitfire IX  BS. 551  Merlin 70 |
| Rate of climb at Sea level | 4620 ft/min | 4390 ft/min. |
| Rate of climb at full throttle     height in M.S. supercharger gear | 4700 ft/min at 7000 ft. | 4530 ft/min.  at 11,900 ft. |
| Rate of climb at full throttle     height in F.S. supercharger gear | 3860 ft/min.  at 18,000 ft. | 3480 ft/min.  at 24,700 ft. |
| Rate of climb @ 30,000 ft. | 2125 ft/min. | 2600 ft/min. |
| Time to 10,000 ft | 2.15 mins. | 2.25 mins. |
| Time to 20,000 ft | 4.75 mins. | 4.85 mins. |
| Time to 30,000 ft | 8.4 mins. | 8.05 mins. |
| Height at which rate of climb is     1000 ft/min. | 37,100 ft. | 38,000 |
| Time to reach above height | 12.9 mins. | 12.6 mins. |
| Service ceiling (100ft/min) | 40,900 ft. | 41,000 ft. |
| Estimated absolute ceiling | 41,300 ft. | 41,300 ft. |

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| *Rate of climb corrected to 18.0 lb/sq.in. boost*  Level speeds |

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| Maximum level speed at sea level | 336 m.p.h. | 329 m.p.h. |
| Maximum level speed at M.S. gear     full throttle height | 384 m.p.h.  at 10,800 ft. | 396 m.p.h.  at 15,900 ft. |
| Maximum level speed at F.S. gear     full throttle height | 407 m.p.h.  at 22,000 ft. | 415.5  at 27,800 ft. |
| Level Speed at 30,000 f.t | 395 m.p.h. | 413 m.p.h. |

*Level speeds corrected to 18.0 lb/sq.in. boost*

*RM-9SM engined Spitfire omitted*

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| [Climb Performance](http://www.spitfireperformance.com/bs543climb.jpg) |
| [Level Speed Performance](http://www.spitfireperformance.com/bs543speed.jpg) |