

C20R Engine Upgrade STC - Performance Comparison

AS355 F1 : STC Ref FAA SH7961SW-D, Transport Canada SH91-33, EASA. IM.R.S.01203 - AS355 F1R

AS355 F2 : STC Ref FAA SH7962SW-D, Transport Canada SH91-34, EASA. IM.R.S.01201 - AS355 F2R

This table compares the performance of the AS355F2R (ie F series + Rolls Royce Allison C20R engines) to that of the other Squirrel helicopters, both single and twin. Although the AS355NP has some extraordinary OEI performance figures, the usefull load and range which this aircraft delivers is not so extra-ordinary. A good judge of the power ability of an engine should be based on the Max Continuous figure, where the C20R shows it is a solid and powerful performer, not OEI emergency figures which are only used in case of engine failure. It should be noted that except for the max takeoff weight, 2400 Kg not 2540 Kg, the AS355 F1R data is identical to that of the F2R, as the performance charts are simply truncated.

	AS355 F2	AS355 N	AS355 F2R	AS355NP			
	Kg	Kg	Kg	Kg			
Takeoff Weight in Kg for 200ft/min climb at Max Cont OEI power							
4000 ft +27°C (ISA +20°C)	2050	2350	A 2350	2450			
Usefull load	637	814	937	860			
MaxWeight to avoid H/V restriction@ 4000ft	2250	2380	2350	2370			
Max usefull load to avoid H/V restriction	837	844	937	780			
1000 ft +33°C (ISA+20°C)	2280	2580	A 2470	2590			
Usefull load	867	1044	1057	1000			
MaxWeight to avoid H/V restriction@ 500ft	2400	2540	2500	2540			
Max usefull load to avoid H/V restriction	987	1004	1087	950			
	Kg	Kg	Kg	Kg	AS350 B2	AS350 B3	
Max take off weight and useful load (Kg) in hover OGE on two engines:							
10,000 ft 0°C (ISA +5°C)	2120	2340	2300	2320	2050	2275	
Useful load	707	804	887	730	726	947	
8,000 ft +19°C (ISA +20°C)	2120	2280	2280	2260	2015	2250	
Useful load	707	744	867	670	691	922	
5,000 ft +20°C (ISA +15°C)	2400	2500	2490	2600	2300	2580	
Useful internal load only	987	964	1077	1010	926	922	
Useful internal + external load	987	964	1077	1010	976	1252	
Endurance in hours at cruise with average fuel consumption at the given internal weight:							
	Hours	Hours	Hours	Hours	Hours	Hours	
Pilot + 4 Pax (550Kg / 1210lb) at Max Weight	3,26	2,81	3,50	2,49	2,84	2,72	
Pilot + 4 Pax (550Kg / 1210lb) limited to 2300Kg	1,90	1,17	2,04	0,86	2,84	2,72	
Max endurance at cruise, full tanks, no reserve	3,26	3,15	3,50	3,12	2,84	2,79	
GENERAL FIGURES USED TO GENERATE THE ABOVE COMPARISON TABLES:							
	AS355 F2	AS355 N	AS355 F2R	AS355NP	AS350 B2	AS350 B3	
WEIGHT							
Max take off weight Int only	Kg 2540	2600	2540	2600	2250	2250	
Max take off weight Int + Ext	Kg 2600	2600	2600	2800	2500	2800	
Average Operational Weight of Aircraft	Kg 1413	1536	1413	1590	1324	1328	
Useful Internal Load	Kg 1127	1064	1127	1010	926	922	
Useful Load with 1+4 Pax (550 Kg)	Kg 577	514	577	460	376	372	
FUEL							
Fuel Capacity	KG 577	577	577	577	426	432	
Average fuel consumption in cruise	Kg/hr 177	183	165	185	150	155	
SPEED AND ENDURANCE							
VNE	Kts 150	150	150	150	155	155	
Max endurance at cruise, full tanks, no reserve	Hrs 3,26	3,15	3,50	3,12	2,84	2,79	
POWER RATINGS (All % refer to Transmission % of AS355 F1/F2N, NOT engine limits)							
Engine	RR C20F	Arrius 1A	RR C20R	Arrius 1A1	Arriell 1D1	Arriell 2B	
Take Off (Each engine)	Kw 313	95% 340	104% 342	104% 343	105% 546	632	
	SHP 420	95% 456	104% 458	104% 460	105% 732	847	
Max Continuous (Each engine)	Kw 313	95% 296	90% 342	104% 305	93% 466	543	
	SHP 420	95% 397	90% 458	104% 409	93% 625	728	
One Engine Inoperative (OEI)							
OEI Max Continuous	Kw 313	95% 302	92% 342	104% 386	118% 518		
	SHP 420	95% 406	92% 458	104% 458	118% 518		
OEI 30 Min	Kw 313	95% 358	109% 342	104% 386	118% 518		
	SHP 420	95% 480	109% 458	104% 518	118% 518		
OEI 2 1/2 Min	Kw 313	95% 387	118% 342	104% 415	127% 556		
	SHP 420	95% 520	118% 458	104% 556	126% 556		
OEI 16 Sec (C20F&R)/Transient	Kw 350	107% 460	140% 417	127% 460	140% 618		
	SHP 470	107% 618	140% 559	127% 618	140% 618		
Transmission 100% = 328 Kw, 384 ftlb, 440 SHP							
AEO Take-Off	Kw 512	156% 512	156% 512	156% 567	173% 439	439	
	SHP 686	156% 686	156% 686	156% 760	173% 590	590	
AEO Max Continuous	Kw 480	146% 480	146% 480	146% 471	144% 439	439	
	SHP 644	146% 644	146% 644	146% 632	144% 590	590	
OEI Max Continuous	Kw 328	100% 328	100% 328	100% 377	115% N/A	N/A	
	SHP 440	100% 440	100% 440	100% 505	115% N/A	N/A	
		AS355 F2	AS355 N	AS355 F2R	AS355 NP	AS350 B2	AS350 B3

Figures are indicative only, all data has been taken from original manufacturers material and have been prepared as shown.