

7 mm Rem Mag - Sierra SPBT 1920 160gr - RS70

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LOT-TO-LOT VARIATIONS OF POWDERS, PRIMER SUBSTITUTION AND COMPONENT CHANGE OFTEN RAISE PRESSURES TO UNSAFE LEVELS. THE USER MUST ASSUME THE ENTIRE RISK OF USING THIS DATA FOR LOADING PURPOSES.

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User Data:	Date:1-Jun-2016	Time:16:43:19	File: *.dat
Comment	600mm barrel - 83.57mm COL - 61.0gr start load - 831m/s - 2958bar		
Cartridge / Caliber	7 mm Rem. Mag.(CIP)	Bullet	.284, 160, Sierra SPBT 1920
Maximum Average Pressure, allowed	4300 bar	62366 psi. (Piezo CIP)	with boattail
Groove Caliber	7.21 mm	0.284 in.	Bullet Weight
Case Capacity, overflow	5.324 cm³	82.0 gr. H2O	Bullet Length
Case Length	63.5 mm	2.500 in.	Bullet Seating Depth
Cartridge O.A. Length	83.57 mm	3.290 in.	Barrel/Tube Length
Shot Start / Init Pressure	250.0 bar	3626 psi.	Cross Section Area of Bore
			0.4039 cm²
			0.0626 in.²
Propellant type	ReloadSwiss RS 70		
Charge Weight	3.953 gm	61.0 gr.	Load Density
Heat of Explosion, Potential	3950 J/gm	256.0 J/gr.	Energy Density of Charge
Propellant Solid Density	1.6 gm/cm³	404.63 gr./in.³	Used Ratio of Specific Heats cp/cv
Burning Rate Factor Ba	0.411 1/s		Weighting Factor
Burning Function Limit Z1	0.628		Prog./ Degressivity Factor a0
Factor b	1.963		Bulk Density
			0.812 gm/cm³
			205.3 gr./in.³
			3207 J/cm³
			52553 J/in.³
			1.2294
			0.5
			0.689
			0.980 gm/cm³
			247.8 gr./in.³

Calculated and Estimated Data:

Bullet Shank Seating Depth	8.2 mm	0.323 in.	Capacity Displaced by Seated Bullet	0.455 cm³	0.0278 in.³
Useable Case Capacity	4.869 cm³	0.2971 in.³	Bullet Travel at Muzzle Exit	548.38 mm	21.59 in.
Loading Ratio("Density") / Filling	82.8 %		Charge Fraction Burnt at Shot Start	1.67 %	

Predicted Data:

Maximum Chamber Pressure	2958 bar	42898 psi.	Bullet Travel at Pmax	77.1 mm	3.04 in.
at Muzzle Exit:					
Bullet Velocity	830.8 m/s	2726 fps.	Pressure at Muzzle	876 bar	12707 psi.
Bullet Energy	3579 Joule	2640 ft.lbs.	Bullet Barrel Time	1.377 ms	
Propellant Burnt	98.7 %		Ballistic Efficiency	22.9 %	

Check Loading Manuals for Safe Minimum Charge Weight to Avoid Hazardous Ignition Conditions like Secondary Explosion Effects !

Real maximum (peak) of pressure is reached while bullet moves within barrel.

End of combustion occurs after the bullet's base passes muzzle.

Table of incremented charges ranging from +10.0% to -20.0% of above specified charge

D A N G E R ! : Table data may exceed maximum average pressures ! Pressures exceeding SAAMI or CIP specs are printed underlined!

Diff. %	Charge Weight Gramm	Grains	Muzzle Vel. m/s	fps	Muzzle Energy Joule	ft.lbs	Max. Pressure bar	psi	Muzzle Pressure bar	psi	Prop.Burnt %	B_Time ms	L.R./Filling %
-20.0	3.16	48.8	665	2181	2292	1690	1655	24009	670	9715	88.6	1.749	66
-18.0	3.24	50.0	681	2235	2406	1775	1755	25448	694	10067	90.0	1.710	68
-16.0	3.32	51.2	698	2289	2524	1862	1860	26973	718	10411	91.4	1.672	70
-14.0	3.40	52.5	714	2343	2645	1951	1971	28587	741	10746	92.6	1.635	71
-12.0	3.48	53.7	731	2398	2770	2043	2089	30294	763	11070	93.8	1.599	73
-10.0	3.56	54.9	748	2453	2898	2137	2213	32102	785	11382	94.9	1.563	75
-8.0	3.64	56.1	764	2507	3029	2234	2346	34019	805	11680	95.9	1.529	76
-6.0	3.72	57.3	781	2562	3162	2332	2485	36049	825	11963	96.7	1.494	78
-4.0	3.79	58.6	798	2617	3299	2433	2634	38201	843	12229	97.5	1.456	80
-2.0	3.87	59.8	814	2671	3437	2535	2791	40481	860	12477	98.2	1.416	81
Nominal	3.95	61.0	831	2726	3579	2640	2958	42898	876	12707	98.8	1.377	83
+2.0	4.03	62.2	847	2780	3722	2745	3135	45464	891	12916	99.2	1.340	84
+4.0	4.11	63.4	864	2834	3868	2853	3322	48187	904	13104	99.6	1.303	86
+6.0	4.19	64.7	880	2887	4015	2961	3521	51069	915	13270	99.8	1.268	88
+8.0	4.27	65.9	896	2940	4164	3071	3734	54153	925	13413	100.0	1.234	89
+10.0	4.35	67.1	912	2993	4314	3182	3959	57418	933	13533	100.0	1.202	91

Results caused by ±3% powder lot-to-lot burning rate variation using nominal charge

Data for burning rate increased by 3% relative to nominal value :													
Nominal	3.95	61.0	845	2774	3706	2733	3136	45489	875	12687	99.6	1.341	83
Data for burning rate decreased by 3% relative to nominal value :													
Nominal	3.95	61.0	815	2673	3442	2538	2786	40415	872	12647	97.4	1.416	83