.308 Win - Sierra SPBT 165gr - RS40

User Data:

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Comment	**450mm barrel - 69.85mm COL - 37.5gr start load - 702m/s - 2909bar**				
Cartridge / Caliber	**.308 Win. (CIP)**		**Bullet**	**.308, 165, Sierra SPBT 2145**	
Maximum Average Pressure, allowed	4150 bar	60191 psi. (Piezo CIP)		with boattail	
Groove Caliber	7.82 mm	0.308 in.	Bullet Weight	10.69 gm	165.0 gr.
Case Capacity, overflow	3.636 cm³	56.0 gr. H2O	Bullet Length	30.12 mm	1.186 in.
Case Length	51.16 mm	2.014 in.	Bullet Seating Depth	11.43 mm	0.450 in.
Cartridge O.A. Length	69.85 mm	2.750 in.	Barrel/Tube Length	450.0 mm	17.7165 in.
Shot Start / Init Pressure	250.0 bar	3626 psi.	Cross Section Area of Bore	0.4751 cm²	0.07364 in.²
Propellant type	**ReloadSwiss RS 40**				
Charge Weight	2.43 gm	37.5 gr.	Load Density	0.777 gm/cm³	196.5 gr./in.³
Heat of Explosion, Potential	3990 J/gm	258.5 J/gr.	Energy Density of Charge	3100 J/cm³	50800 J/in.³
Propellant Solid Density	1.6 gm/cm³	404.63 gr./in.³	Used Ratio of Specific Heats cp/cv	1.2293	
Burning Rate Factor Ba	0.643 1/s		Weighting Factor	0.5	
Burning Function Limit Z1	0.419		Prog.-/ Degressivity Factor a0	0.782	
Factor b	1.494		Bulk Density	0.938 gm/cm³	237.2 gr./in.³

Calculated and Estimated Data:

Bullet Shank Seating Depth	8.0 mm	0.315 in.	Capacity Displaced by Seated Bullet	0.508 cm³	0.031 in.³
Useable Case Capacity	3.128 cm³	0.1909 in.³	Bullet Travel at Muzzle Exit	410.26 mm	16.15 in.
Loading Ratio("Density") / Filling	82.8 %		Charge Fraction Burnt at Shot Start	1.81 %	
Predicted Data:					
Maximum Chamber Pressure	2909 bar	42191 psi.	Bullet Travel at Pmax	36.6 mm	1.44 in.
at Muzzle Exit:					
Bullet Velocity	701.9 m/s	2303 fps.	Pressure at Muzzle	630 bar	9136 psi.
Bullet Energy	2634 Joule	1943 ft.lbs.	Bullet Barrel Time	1.109 ms	
Propellant Burnt	96.8 %		Ballistic Efficiency	27.2 %	

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		Muzzle Vel.		Muzzle Energy		Max. Pressure		Muzzle Pressure		Prop.Burnt	B_Time	L.R./Filling
%	Gramm	Grains	m/s	fps	Joule	ft.lbs	bar	psi	bar	psi	%	ms	%
-20.0	1.94	30.0	571	1872	1741	1284	1696	24600	484	7013	88.0	1.393	66
-18.0	1.99	30.8	584	1915	1822	1344	1793	26006	500	7245	89.1	1.362	68
-16.0	2.04	31.5	597	1959	1906	1405	1894	27470	515	7475	90.2	1.332	70
-14.0	2.09	32.3	610	2002	1991	1468	1999	29000	531	7701	91.2	1.304	71
-12.0	2.14	33.0	623	2045	2077	1532	2111	30610	546	7922	92.1	1.275	73
-10.0	2.19	33.8	636	2088	2166	1598	2227	32305	561	8139	93.1	1.248	75
-8.0	2.24	34.5	650	2131	2256	1664	2350	34088	576	8351	93.9	1.221	76
-6.0	2.28	35.3	663	2174	2348	1732	2480	35963	590	8557	94.7	1.195	78
-4.0	2.33	36.0	676	2217	2442	1801	2616	37935	604	8757	95.5	1.168	80
-2.0	2.38	36.8	689	2260	2537	1871	2759	40009	617	8950	96.2	1.138	81
Nominal	**2.43**	**37.5**	**702**	**2303**	**2634**	**1943**	**2909**	**42191**	**630**	**9136**	**96.8**	**1.109**	**83**
+2.0	2.48	38.3	715	2345	2733	2016	3067	44487	642	9314	97.4	1.082	84
+4.0	2.53	39.0	728	2388	2833	2089	3234	46902	654	9484	97.9	1.055	86
+6.0	2.58	39.8	741	2430	2934	2164	3409	49443	665	9645	98.4	1.029	88
+8.0	2.62	40.5	754	2472	3037	2240	3593	52119	675	9796	98.8	1.005	89
+10.0	2.67	41.3	766	2514	3141	2316	3788	54936	685	9939	99.2	0.981	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	2.43	37.5	713	2339	2717	2004	3060	44377	633	9178	98.1	1.084	83

Data for burning rate decreased by 3% relative to nominal value :

Nominal	2.43	37.5	690	2264	2546	1878	2760	40026	625	9058	95.3	1.136	83