7 mm Rem Mag - Sierra HPBT 1925 160gr - RS70

User Data:

Date:22-Jun-2016 **Time:21:54:02** **File: *.dat**

Comment	**620mm barrel - 83.57mm COL - 61.0gr start load - 843m/s - 3009bar**				
Cartridge / Caliber	**7 mm Rem. Mag.(CIP)**		**Bullet**	**.284, 160, Sierra HPBT 1925**	
Maximum Average Pressure, allowed	4300 bar	62366 psi. (Piezo CIP)		with boattail	
Groove Caliber	7.21 mm	0.284 in.	Bullet Weight	10.37 gm	160.0 gr.
Case Capacity, overflow	5.324 cm³	82.0 gr. H2O	Bullet Length	33.27 mm	1.310 in.
Case Length	63.5 mm	2.500 in.	Bullet Seating Depth	13.21 mm	0.520 in.
Cartridge O.A. Length	83.57 mm	3.290 in.	Barrel/Tube Length	620.0 mm	24.4094 in.
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	0.820 gm/cm³	207.4 gr./in.³
Heat of Explosion, Potential	3950 J/gm	256.0 J/gr.	Energy Density of Charge	3238 J/cm³	53061 J/in.³
Propellant Solid Density	1.6 gm/cm³	404.63 gr./in.³	Used Ratio of Specific Heats cp/cv	1.2294	
Burning Rate Factor Ba	0.411 1/s		Weighting Factor	0.5	
Burning Function Limit Z1	0.628		Prog.-/ Degressivity Factor a0	0.689	
Factor b	1.963		Bulk Density	0.980 gm/cm³	247.8 gr./in.³

Calculated and Estimated Data:

Bullet Shank Seating Depth	9.65 mm	0.38 in.	Capacity Displaced by Seated Bullet	0.502 cm³	0.0306 in.³
Useable Case Capacity	4.822 cm³	0.2942 in.³	Bullet Travel at Muzzle Exit	569.71 mm	22.43 in.
Loading Ratio("Density") / Filling	83.7 %		Charge Fraction Burnt at Shot Start	1.64 %	
Predicted Data:					
Maximum Chamber Pressure	3009 bar	43641 psi.	Bullet Travel at Pmax	75.8 mm	2.99 in.
at Muzzle Exit:					
Bullet Velocity	843.2 m/s	2766 fps.	Pressure at Muzzle	842 bar	12212 psi.
Bullet Energy	3686 Joule	2719 ft.lbs.	Bullet Barrel Time	1.390 ms	
Propellant Burnt	99.0 %		Ballistic Efficiency	23.6 %	

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	3.16	48.8	676	2217	2367	1746	1677	24323	650	9430	89.4	1.770	67
-18.0	3.24	50.0	692	2271	2484	1832	1778	25792	673	9763	90.8	1.731	69
-16.0	3.32	51.2	709	2326	2606	1922	1885	27347	696	10088	92.1	1.692	70
-14.0	3.40	52.5	726	2381	2731	2014	1999	28994	717	10403	93.3	1.654	72
-12.0	3.48	53.7	743	2436	2859	2108	2119	30738	738	10707	94.5	1.617	74
-10.0	3.56	54.9	759	2491	2990	2205	2247	32587	758	10997	95.5	1.581	75
-8.0	3.64	56.1	776	2547	3124	2304	2382	34546	777	11274	96.4	1.545	77
-6.0	3.72	57.3	793	2602	3261	2405	2525	36623	795	11535	97.3	1.511	79
-4.0	3.79	58.6	810	2657	3400	2508	2677	38825	812	11779	98.0	1.470	80
-2.0	3.87	59.8	827	2712	3542	2613	2838	41159	828	12005	98.6	1.429	82
Nominal	**3.95**	**61.0**	**843**	**2766**	**3686**	**2719**	**3009**	**43641**	**842**	**12212**	**99.1**	**1.390**	**84**
+2.0	4.03	62.2	860	2821	3833	2827	3190	46273	855	12399	99.5	1.352	85
+4.0	4.11	63.4	876	2875	3981	2936	3383	49069	866	12564	99.8	1.315	87
+6.0	4.19	64.7	893	2928	4131	3047	3588	52038	876	12707	99.9	1.280	89
+8.0	4.27	65.9	909	2982	4282	3158	3806	55202	884	12828	100.0	1.246	90
+10.0	4.35	67.1	925	3034	4435	3271	4038	58562	892	12935	100.0	1.213	92

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	858	2814	3814	2813	3191	46281	839	12166	99.8	1.354	84

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

Nominal	3.95	61.0	827	2714	3548	2617	2834	41110	840	12180	97.9	1.428	84