User Data:

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Cartridge / Caliber	**.222 Rem.**		**Bullet**	**.224 42GR XPERT**	
Maximum Average Pressure, allowed	53664 psi.	3700 bar (Piezo CIP)		with flatbase	
Groove Caliber	0.224 in.	5.69 mm	Bullet Weight	42.0 gr.	2.72 gm
Case Capacity, overflow	26.9 gr. H2O	1.747 cm³	Bullet Length	0.772 in.	19.6 mm
Case Length	1.700 in.	43.18 mm	Bullet Seating Depth	0.346 in.	8.78 mm
Cartridge O.A. Length	2.126 in.	54.0 mm	Barrel/Tube Length	24.0 in.	609.6 mm
Shot Start / Init Pressure	3625 psi.	249.94 bar	Cross Section Area of Bore	0.03889 in.²	0.2509 cm²
Propellant type	**Somchem S321**				
Charge Weight	24.0 gr.	1.555 gm	Load Density	258.2 gr./in.³	1.021 gm/cm³
Heat of Explosion, Potential	259.8 J/gr.	4010 J/gm	Energy Density of Charge	67089 J/in.³	4094 J/cm³
Propellant Solid Density	409.68 gr./in.³	1.62 gm/cm³	Used Ratio of Specific Heats cp/cv	1.221	
Burning Rate Factor Ba	0.56 1/s		Weighting Factor	0.6	
Burning Function Limit Z1	0.39		Prog.-/ Degressivity Factor a0	1.649	
Factor b	1.641		Bulk Density	250.4 gr./in.³	0.990 gm/cm³

Calculated and Estimated Data:

Bullet Shank Seating Depth	0.346 in.	8.78 mm	Capacity Displaced by Seated Bullet	0.0136 in.³	0.224 cm³
Useable Case Capacity	0.0929 in.³	1.523 cm³	Bullet Travel at Muzzle Exit	22.65 in.	575.2 mm
Loading Ratio("Density") / Filling	103.1 % = compressed		Charge Fraction Burnt at Shot Start	1.02 %	
Predicted Data:					
Maximum Chamber Pressure	40870 psi.	2818 bar	Bullet Travel at Pmax	1.21 in.	30.8 mm
at Muzzle Exit:					
Bullet Velocity	3231 fps.	984.9 m/s	Pressure at Muzzle	5665 psi.	391 bar
Bullet Energy	974 ft.lbs.	1320 Joule	Bullet Barrel Time	1.011 ms	
Propellant Burnt	85.4 %		Ballistic Efficiency	21.2 %	

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.