6mmARC_105Hybrid_24in_2-285in_LVR_5-11-21-calibrated

User Data:

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Comment	**6mmARC_105Hybrid_24in_2-285in_LVR_5-11-21-calibrated**				
Cartridge / Caliber	**6 mm ARC**		**Bullet**	**.243, 105, Berger Hybr G7 #2443**	
Maximum Average Pressure, allowed	52000 psi.	3585 bar (Piezo)		with boattail	
Groove Caliber	0.242 in.	6.15 mm	Bullet Weight	105.0 gr.	6.8 gm
Case Capacity, overflow	34.81 gr. H2O	2.26 cm³	Bullet Length	1.256 in.	31.9 mm
Case Length	1.480 in.	37.59 mm	Bullet Seating Depth	0.451 in.	11.45 mm
Cartridge O.A. Length	2.285 in.	58.04 mm	Barrel/Tube Length	24.0 in.	609.6 mm
Shot Start / Init Pressure	3626 psi.	250.0 bar	Cross Section Area of Bore	0.04535 in.²	0.2926 cm²
Propellant type	**Hodgdon LVR ?**				
Charge Weight	28.4 gr.	1.84 gm	Load Density	239.0 gr./in.³	0.945 gm/cm³
Heat of Explosion, Potential	252.7 J/gr.	3900 J/gm	Energy Density of Charge	60370 J/in.³	3684 J/cm³
Propellant Solid Density	404.63 gr./in.³	1.6 gm/cm³	Used Ratio of Specific Heats cp/cv	1.238	
Burning Rate Factor Ba	0.507 1/s		Weighting Factor	0.67	
Burning Function Limit Z1	0.495		Prog.-/ Degressivity Factor a0	0.8	
Factor b	1.663		Bulk Density	232.7 gr./in.³	0.920 gm/cm³

Calculated and Estimated Data:

Bullet Shank Seating Depth	0.238 in.	6.04 mm	Capacity Displaced by Seated Bullet	0.0191 in.³	0.312 cm³
Useable Case Capacity	0.1189 in.³	1.948 cm³	Bullet Travel at Muzzle Exit	22.97 in.	583.46 mm
Loading Ratio("Density") / Filling	102.7 % = compressed		Charge Fraction Burnt at Shot Start	1.17 %	
Predicted Data:					
Maximum Chamber Pressure	53703 psi.	3703 bar	Bullet Travel at Pmax	1.45 in.	36.8 mm
at Muzzle Exit:					
Bullet Velocity	2664 fps.	812.1 m/s	Pressure at Muzzle	7236 psi.	499 bar
Bullet Energy	1655 ft.lbs.	2244 Joule	Bullet Barrel Time	1.231 ms	
Propellant Burnt	98.5 %		Ballistic Efficiency	31.3 %	

D A N G E R : PRESSURE EXCEEDS ALLOWED MAXIMUM LEVEL !
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 +3.5% to -7.0% 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	%
-7.0	1.71	26.4	757	2482	1947	1436	2934	42558	471	6827	96.3	1.362	95
-6.3	1.72	26.6	762	2500	1976	1458	3003	43552	474	6874	96.6	1.348	96
-5.6	1.74	26.8	768	2519	2005	1479	3073	44570	477	6919	96.8	1.335	97
-4.9	1.75	27.0	773	2537	2034	1500	3145	45608	480	6963	97.1	1.321	98
-4.2	1.76	27.2	779	2555	2064	1522	3219	46683	483	7006	97.3	1.308	98
-3.5	1.78	27.4	784	2573	2093	1544	3294	47779	486	7048	97.6	1.294	99
-2.8	1.79	27.6	790	2592	2123	1566	3372	48905	489	7088	97.8	1.281	100
-2.1	1.80	27.8	795	2610	2153	1588	3451	50058	491	7127	98.0	1.269	101
-1.4	1.81	28.0	801	2628	2183	1610	3533	51243	494	7165	98.2	1.256	101
-0.7	1.83	28.2	807	2646	2213	1632	*3617*	*52456*	496	7201	98.4	1.243	102
Nominal	**1.84**	**28.4**	**812**	**2664**	**2244**	**1655**	***3703***	***53703***	**499**	**7236**	**98.6**	**1.231**	**103**
+0.7	1.85	28.6	818	2682	2274	1677	*3791*	*54981*	501	7269	98.7	1.219	103
+1.4	1.87	28.8	823	2700	2305	1700	*3881*	*56293*	503	7301	98.9	1.207	104
+2.1	1.88	29.0	829	2718	2336	1723	*3974*	*57640*	505	7331	99.1	1.195	105
+2.8	1.89	29.2	834	2736	2367	1746	*4069*	*59022*	507	7360	99.2	1.183	106
+3.5	1.91	29.4	840	2754	2398	1769	*4168*	*60444*	509	7388	99.3	1.172	106

Results caused by ±10% powder lot-to-lot burning rate variation using nominal charge

Data for burning rate increased by 10% relative to nominal value :

Nominal	1.84	28.4	848	2784	2449	1807	*4482*	*65000*	483	7006	100.0	1.144	103

Data for burning rate decreased by 10% relative to nominal value :

Nominal	1.84	28.4	762	2499	1974	1456	3005	43589	488	7075	92.8	1.345	103