9 mm Luger - ALSA FMJ 124gr - RS20

User Data:

Date:2-Jun-2020 **Time:07:55:24** **File: *.dat**

Comment	**16" barrel - 28.85mm COL - 4.4gr start load - 381m/s - 1496bar**				
Cartridge / Caliber	**9 mm Luger (CIP)**		**Bullet**	**.355, 124, ALSA FMJ**	
Maximum Average Pressure, allowed	2350 bar	34084 psi. (Piezo CIP)		with flatbase	
Groove Caliber	9.02 mm	0.355 in.	Bullet Weight	8.04 gm	124.0 gr.
Case Capacity, overflow	0.895 cm³	13.79 gr. H2O	Bullet Length	15.7 mm	0.618 in.
Case Length	19.15 mm	0.754 in.	Bullet Seating Depth	6.0 mm	0.236 in.
Cartridge O.A. Length	28.85 mm	1.136 in.	Barrel/Tube Length	406.4 mm	16.0 in.
Shot Start / Init Pressure	150.0 bar	2176 psi.	Cross Section Area of Bore	0.6261 cm²	0.09705 in.²
Propellant type	**ReloadSwiss RS 20**				
Charge Weight	0.285 gm	4.4 gr.	Load Density	0.558 gm/cm³	141.1 gr./in.³
Heat of Explosion, Potential	4100 J/gm	265.7 J/gr.	Energy Density of Charge	2287 J/cm³	37477 J/in.³
Propellant Solid Density	1.52 gm/cm³	384.39 gr./in.³	Used Ratio of Specific Heats cp/cv	1.229	
Burning Rate Factor Ba	2.905 1/s		Weighting Factor	0.75	
Burning Function Limit Z1	0.569		Prog.-/ Degressivity Factor a0	-0.133	
Factor b	1.465		Bulk Density	0.617 gm/cm³	156.0 gr./in.³

Calculated and Estimated Data:

Bullet Shank Seating Depth	6.0 mm	0.236 in.	Capacity Displaced by Seated Bullet	0.384 cm³	0.0234 in.³
Useable Case Capacity	0.511 cm³	0.0312 in.³	Bullet Travel at Muzzle Exit	393.25 mm	15.48 in.
Loading Ratio("Density") / Filling	90.4 %		Charge Fraction Burnt at Shot Start	1.81 %	
Predicted Data:					
Maximum Chamber Pressure	1496 bar	21702 psi.	Bullet Travel at Pmax	5.4 mm	0.21 in.
at Muzzle Exit:					
Bullet Velocity	381.2 m/s	1251 fps.	Pressure at Muzzle	51 bar	739 psi.
Bullet Energy	584 Joule	431 ft.lbs.	Bullet Barrel Time	1.379 ms	
Propellant Burnt	100.0 %		Ballistic Efficiency	49.9 %	

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 reached before bullet's base passes muzzle.

Table of incremented charges ranging from +15.0% to -30.0% 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	%
-30.0	0.20	3.1	292	959	343	253	734	10639	38	555	94.7	1.854	63
-27.0	0.21	3.2	302	991	366	270	791	11475	40	580	95.9	1.792	66
-24.0	0.22	3.3	311	1022	390	287	852	12363	42	603	96.9	1.734	69
-21.0	0.23	3.5	321	1052	413	305	917	13307	43	625	97.7	1.680	71
-18.0	0.23	3.6	330	1083	437	323	987	14309	45	646	98.4	1.629	74
-15.0	0.24	3.7	339	1112	462	340	1060	15370	46	666	99.0	1.581	77
-12.0	0.25	3.9	348	1141	486	358	1137	16496	47	683	99.4	1.535	80
-9.0	0.26	4.0	356	1169	510	376	1220	17688	48	700	99.8	1.493	82
-6.0	0.27	4.1	365	1197	535	394	1307	18951	49	714	99.9	1.453	85
-3.0	0.28	4.3	373	1224	559	413	1399	20288	50	727	100.0	1.415	88
Nominal	**0.29**	**4.4**	**381**	**1251**	**584**	**431**	**1496**	**21702**	**51**	**739**	**100.0**	**1.379**	**90**
+3.0	0.29	4.5	389	1276	608	449	1599	23198	52	751	100.0	1.344	93
+6.0	0.30	4.7	397	1302	633	467	1708	24780	53	763	100.0	1.311	96
+9.0	0.31	4.8	404	1327	657	485	1824	26455	53	774	100.0	1.279	99
+12.0	0.32	4.9	412	1351	682	503	1946	28225	54	786	100.0	1.250	101
+15.0	0.33	5.1	419	1375	706	521	2075	30097	55	798	100.0	1.221	104

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	0.29	4.4	391	1283	614	453	1760	25525	48	698	100.0	1.316	90

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

Nominal	0.29	4.4	365	1199	537	396	1255	18195	54	777	98.4	1.463	90