

.30-06 Spring - Barnes TSX 180gr - RS60

WARNING: Since we have no control over equipment or data which may be used with this program, no responsibility is implied or assumed for results obtained through its use. Input data and results may be incorrect or wrong. Therefore the use of this data for loading ammunition can cause serious injury to personell and material. The computer-results had to be checked against data available in current loading manuals.

LOT-TO-LOT VARIATIONS OF POWDERS, PRIMER SUBSTITUTION AND COMPONENT CHANGE OFTEN RAISE PRESSURES TO UNSAFE LEVELS. THE USER MUST ASSUME THE ENTIRE RISK OF USING THIS DATA FOR LOADING PURPOSES.

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| | | | | | |
|-----------------------------------|---|------------------------|------------------------------------|---------------------------------|----------------|
| User Data: | Date:18-Jul-2016 | | Time:21:28:06 | File: *.dat | |
| Comment | 600mm barrel - 84.84mm COL - 50.0gr start load - 780m/s - 2835bar | | | | |
| Cartridge / Caliber | .30-06 Spring. (CIP) | | Bullet | .308, 180, Barnes 'TSX'BT 30846 | |
| Maximum Average Pressure, allowed | 4050 bar | 58740 psi. (Piezo CIP) | | with boattail | |
| Groove Caliber | 7.82 mm | 0.308 in. | Bullet Weight | 11.66 gm | 180.0 gr. |
| Case Capacity, overflow | 4.428 cm³ | 68.2 gr. H2O | Bullet Length | 35.26 mm | 1.388 in. |
| Case Length | 63.35 mm | 2.494 in. | Bullet Seating Depth | 13.76 mm | 0.542 in. |
| Cartridge O.A. Length | 84.84 mm | 3.340 in. | Barrel/Tube Length | 600.0 mm | 23.622 in. |
| Shot Start / Init Pressure | 300.0 bar | 4351 psi. | Cross Section Area of Bore | 0.4752 cm² | 0.07366 in.² |
| Propellant type | ReloadSwiss RS 60 | | | | |
| Charge Weight | 3.24 gm | 50.0 gr. | Load Density | 0.857 gm/cm³ | 216.7 gr./in.³ |
| Heat of Explosion, Potential | 3990 J/gm | 258.5 J/gr. | Energy Density of Charge | 3418 J/cm³ | 56011 J/in.³ |
| Propellant Solid Density | 1.61 gm/cm³ | 407.15 gr./in.³ | Used Ratio of Specific Heats cp/cv | 1.2291 | |
| Burning Rate Factor Ba | 0.468 1/s | | Weighting Factor | 0.55 | |
| Burning Function Limit Z1 | 0.695 | | Prog.-/ Degressivity Factor a0 | 0.669 | |
| Factor b | 2.192 | | Bulk Density | 0.965 gm/cm³ | 244.0 gr./in.³ |

Calculated and Estimated Data:

| | | | | | |
|------------------------------------|------------|--------------|-------------------------------------|-----------|-------------|
| Bullet Shank Seating Depth | 10.59 mm | 0.417 in. | Capacity Displaced by Seated Bullet | 0.646 cm³ | 0.0394 in.³ |
| Useable Case Capacity | 3.782 cm³ | 0.2308 in.³ | Bullet Travel at Muzzle Exit | 550.41 mm | 21.67 in. |
| Loading Ratio("Density") / Filling | 88.8 % | | Charge Fraction Burnt at Shot Start | 1.79 % | |
| Predicted Data: | | | | | |
| Maximum Chamber Pressure | 2835 bar | 41125 psi. | Bullet Travel at Pmax | 45.5 mm | 1.79 in. |
| at Muzzle Exit: | | | | | |
| Bullet Velocity | 780.0 m/s | 2559 fps. | Pressure at Muzzle | 625 bar | 9061 psi. |
| Bullet Energy | 3549 Joule | 2618 ft.lbs. | Bullet Barrel Time | 1.337 ms | |
| Propellant Burnt | 99.5 % | | Ballistic Efficiency | 27.5 % | |

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 Gramm | Grains | Muzzle Vel. m/s | fps | Muzzle Energy Joule | ft.lbs | Max. Pressure bar | psi | Muzzle Pressure bar | psi | Prop.Burnt % | B_Time ms | L.R./Filling % |
|----------------|------------------------|-------------|--------------------|-------------|------------------------|-------------|----------------------|--------------|------------------------|-------------|-----------------|--------------|-------------------|
| -20.0 | 2.59 | 40.0 | 627 | 2058 | 2294 | 1692 | 1612 | 23374 | 489 | 7094 | 90.5 | 1.681 | 71 |
| -18.0 | 2.66 | 41.0 | 642 | 2107 | 2406 | 1775 | 1704 | 24719 | 506 | 7341 | 91.9 | 1.643 | 73 |
| -16.0 | 2.72 | 42.0 | 657 | 2157 | 2521 | 1860 | 1803 | 26145 | 523 | 7581 | 93.2 | 1.606 | 75 |
| -14.0 | 2.79 | 43.0 | 673 | 2207 | 2640 | 1947 | 1907 | 27655 | 539 | 7811 | 94.3 | 1.570 | 76 |
| -12.0 | 2.85 | 44.0 | 688 | 2257 | 2762 | 2037 | 2017 | 29254 | 554 | 8030 | 95.4 | 1.535 | 78 |
| -10.0 | 2.92 | 45.0 | 703 | 2308 | 2886 | 2129 | 2134 | 30950 | 568 | 8238 | 96.4 | 1.500 | 80 |
| -8.0 | 2.98 | 46.0 | 719 | 2358 | 3014 | 2223 | 2258 | 32752 | 581 | 8432 | 97.3 | 1.466 | 82 |
| -6.0 | 3.05 | 47.0 | 734 | 2409 | 3144 | 2319 | 2390 | 34661 | 594 | 8613 | 98.0 | 1.433 | 83 |
| -4.0 | 3.11 | 48.0 | 750 | 2459 | 3277 | 2417 | 2530 | 36688 | 605 | 8778 | 98.6 | 1.400 | 85 |
| -2.0 | 3.18 | 49.0 | 765 | 2509 | 3412 | 2517 | 2678 | 38839 | 616 | 8928 | 99.1 | 1.369 | 87 |
| Nominal | 3.24 | 50.0 | 780 | 2559 | 3549 | 2618 | 2835 | 41125 | 625 | 9061 | 99.5 | 1.337 | 89 |
| +2.0 | 3.30 | 51.0 | 795 | 2609 | 3688 | 2720 | 3003 | 43552 | 633 | 9175 | 99.8 | 1.307 | 91 |
| +4.0 | 3.37 | 52.0 | 810 | 2658 | 3828 | 2824 | 3181 | 46141 | 639 | 9272 | 100.0 | 1.275 | 92 |
| +6.0 | 3.43 | 53.0 | 825 | 2707 | 3970 | 2928 | 3371 | 48894 | 645 | 9350 | 100.0 | 1.241 | 94 |
| +8.0 | 3.50 | 54.0 | 840 | 2755 | 4113 | 3034 | 3573 | 51827 | 650 | 9421 | 100.0 | 1.208 | 96 |
| +10.0 | 3.56 | 55.0 | 854 | 2803 | 4258 | 3140 | 3789 | 54956 | 654 | 9489 | 100.0 | 1.177 | 98 |

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 | 3.24 | 50.0 | 794 | 2604 | 3673 | 2709 | 2998 | 43489 | 619 | 8971 | 100.0 | 1.309 | 89 |
| Data for burning rate decreased by 3% relative to nominal value : | | | | | | | | | | | | | |
| Nominal | 3.24 | 50.0 | 765 | 2510 | 3413 | 2517 | 2679 | 38853 | 626 | 9079 | 98.5 | 1.368 | 89 |