Terminal performance of the Cor-Bon 80gr DPX in 10% ballistic gelatin blocks

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Brass Fetcher Ballistic Testing

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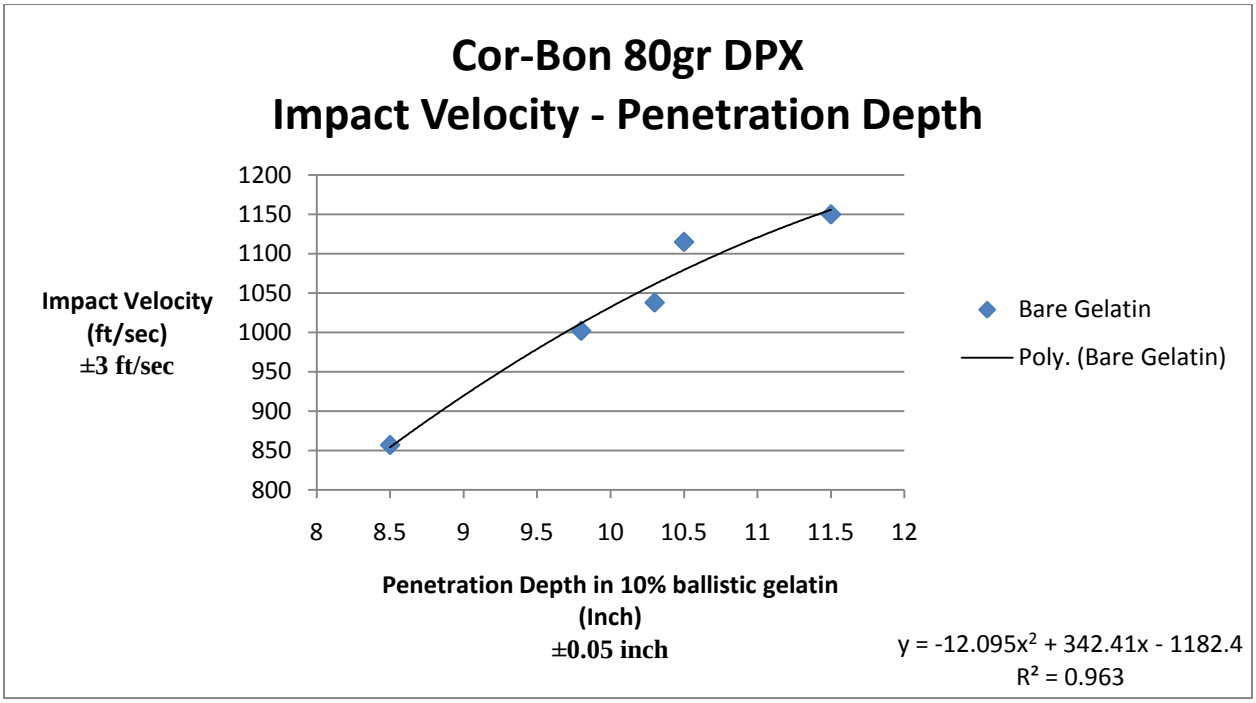
Introduction

As of this writing, the only commercially-loaded implementation of the Barnes 80gr DPX (0.355" diameter) bullet is being produced by Cor-Bon for usage in .380ACP handguns. This bullet is entirely composed of copper alloy and offers good terminal performance across a wide range of impact velocities, which makes it a good choice for usage in pocket pistols, compact firearms like the Walther PPK and .380ACP submachineguns as well.

A unique feature of this bullet is that the bullet weighs 80gr, which is significantly lighter than the typical .380ACP bullet, which comes in at 90-100gr. All else being equal, a lighter bullet (which typically travels at a higher velocity) will come to a stop at a shallower penetration depth than a heavier bullet. This implies that such a bullet will have more kinetic energy before striking the target and will transfer more kinetic energy at the shallower depths of penetration than would a heavier bullet. Regardless of shot angle, the vital blood vessels and bones in the legs and arms are located close to the surface of an attackers body. Given the close ranges typically involved with civilian self-defense, it is not unreasonable either to suspect that aiming for and striking an attackers head or neck is also possible. In the same light, this bullet is at an inherent disadvantage for penetrating deep into the chest of an attacker.

Summary of Results

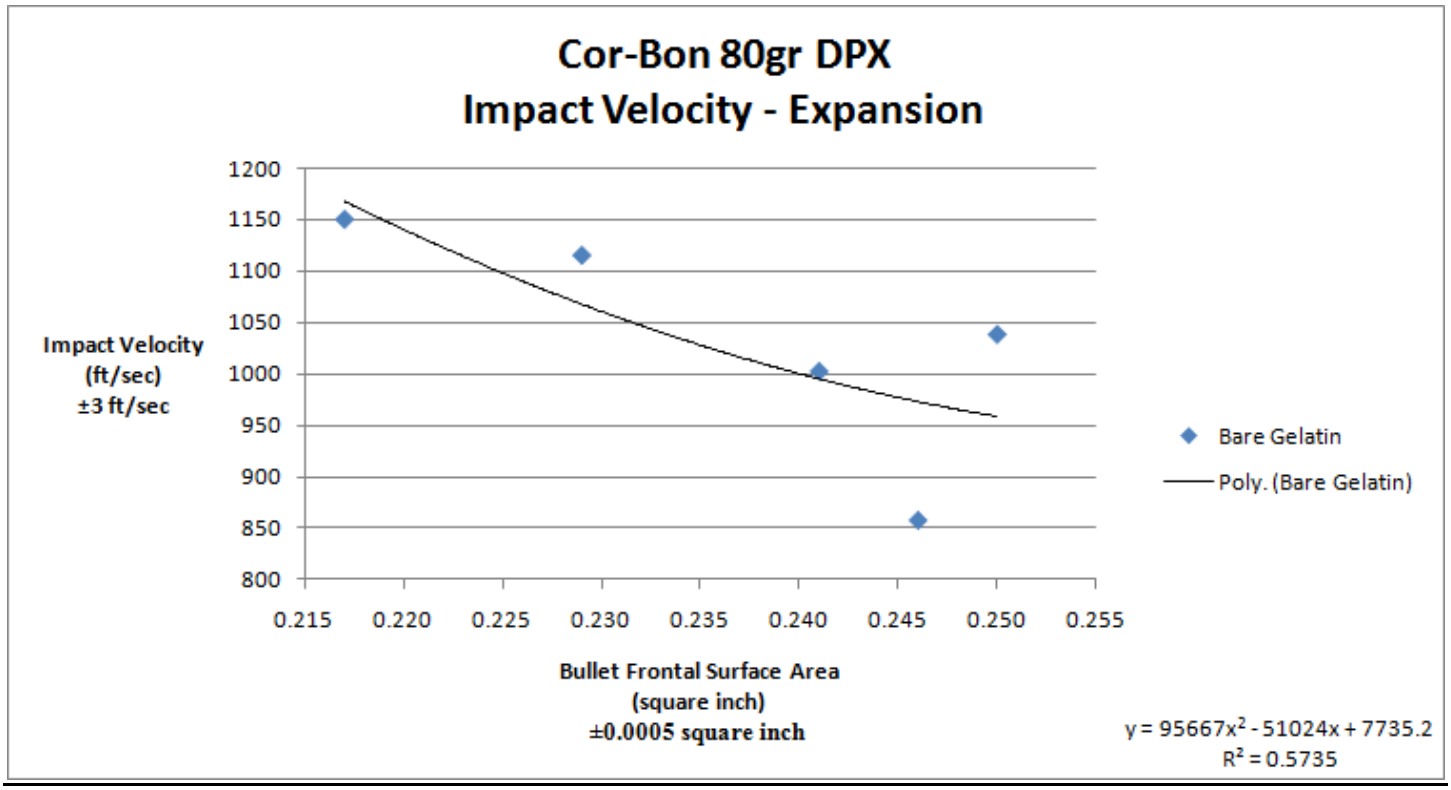
Impact velocity versus penetration depth in 10-percent ballistic gelatin



Notes

The curve for velocity is a fairly close fit, with the R^2 value being close to 1.0. It is possible that the 'outlier' in this data set, that for the 1115 ft/sec impact velocity, could be caused by the calibration for the gelatin block the bullet was fired into. The calibration information for a gelatin block is most relevant to the 'low velocity' flow regime as the bullet is traveling at low velocity just prior to coming to a stop. In this case, the block calibration was 586 ft/sec impact velocity, 41.7 degrees Fahrenheit and 3.6" penetration depth. Corrected, this equates to 3.7" penetration depth – approximately 8% 'weaker' than a perfect gelatin block.

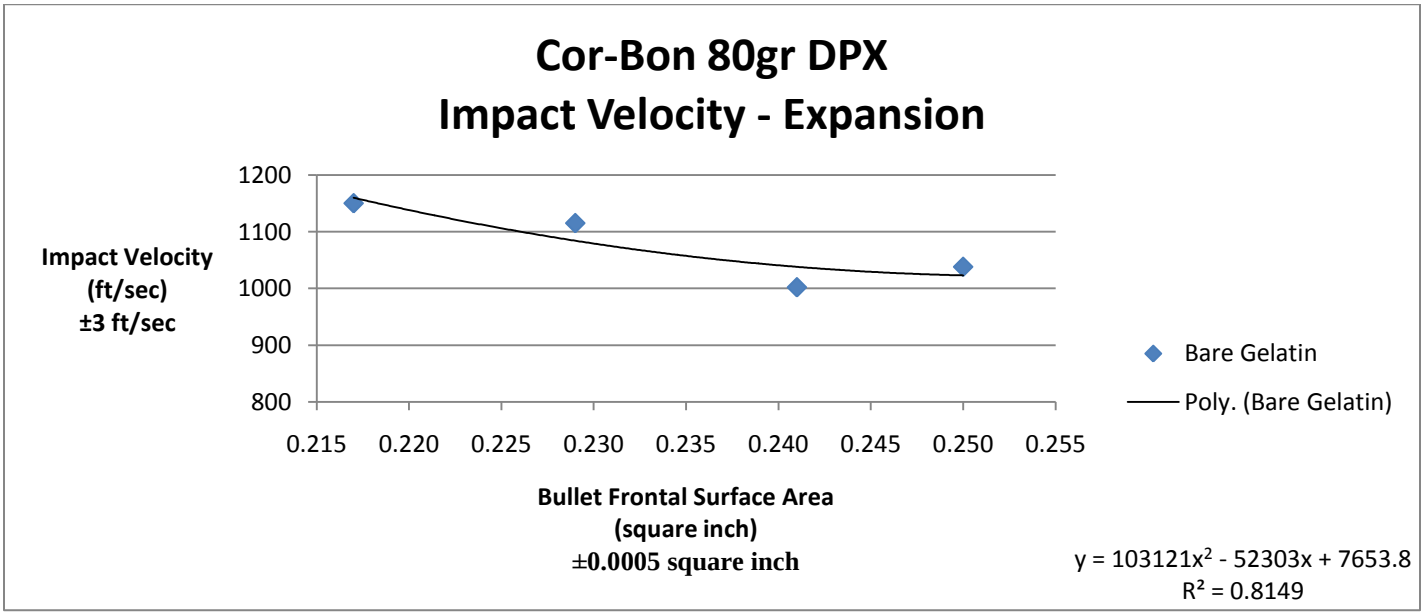
Impact velocity versus expansion in 10-percent ballistic gelatin



Notes

The 857 ft/sec data point (shot 5) needs some explanation as it skews the results significantly. As evident in the individual pictures further in this document, the impact velocity was low enough such that the bullet expanded, but the petals were not folded back in the manner typical of expanding bullets impacting at designed-for velocities.

Removing this data point and re-plotting the graph:



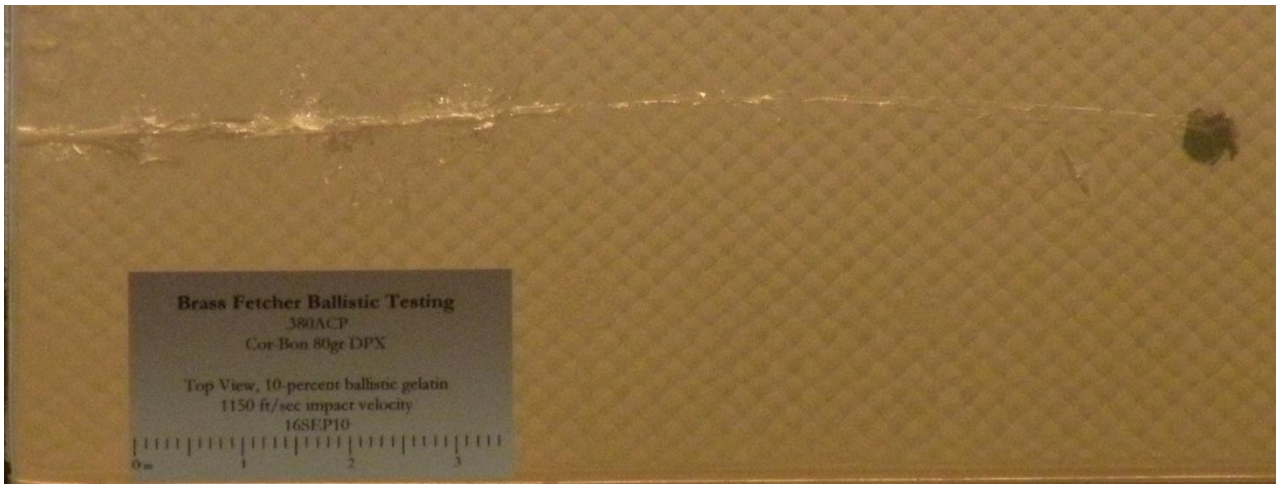
We see greater agreement here with the curve, with an R^2 value of 0.82 versus 0.57 with the outlier included.

Raw Data

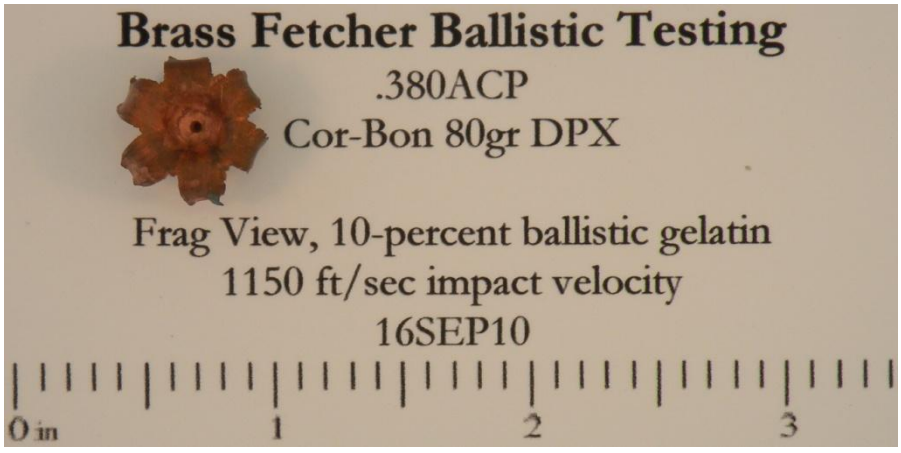
Shot number	Block calibration velocity (ft/sec)	Corrected Calibration Depth (inch)	Block calibration depth (inch)	Block calibration temperature (degrees Fahrenheit)	Gelatin block core temperature (degrees Fahrenheit)	Impact velocity (ft/sec)	Frontal Surface Area ($inch^2$)	Deepest penetration depth (inch)	Non-cavitation depth (inch)	Largest crack diameter (inch)	Largest crack diameter location (inch)
1	576	3.6	3.4	39.9	39.9	1150	0.217	11.5	7.3	2.3	2.7
2	585	3.5	3.6	41.8	42.0	1002	0.241	9.8	6.5	2.1	3.7
3	587	3.5	3.5	42.2	42.2	1038	0.250	10.3	8.4	1.7	2.6
4	586	3.4	3.6	41.7	41.0	1115	0.229	10.5	6.9	2.0	2.3
5	584	3.7	3.9	40.2	40.1	857	0.246	8.5	6.6	2.0	2.2

Shot 1 (Side View)

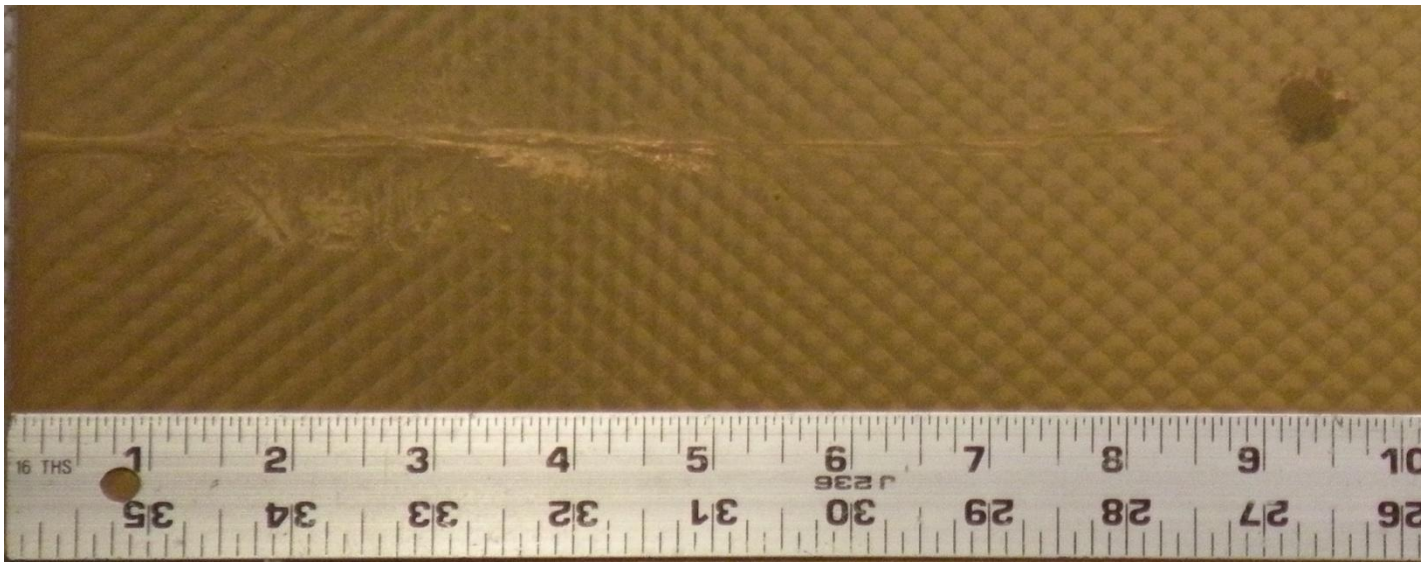
Shot 1 (Top View)



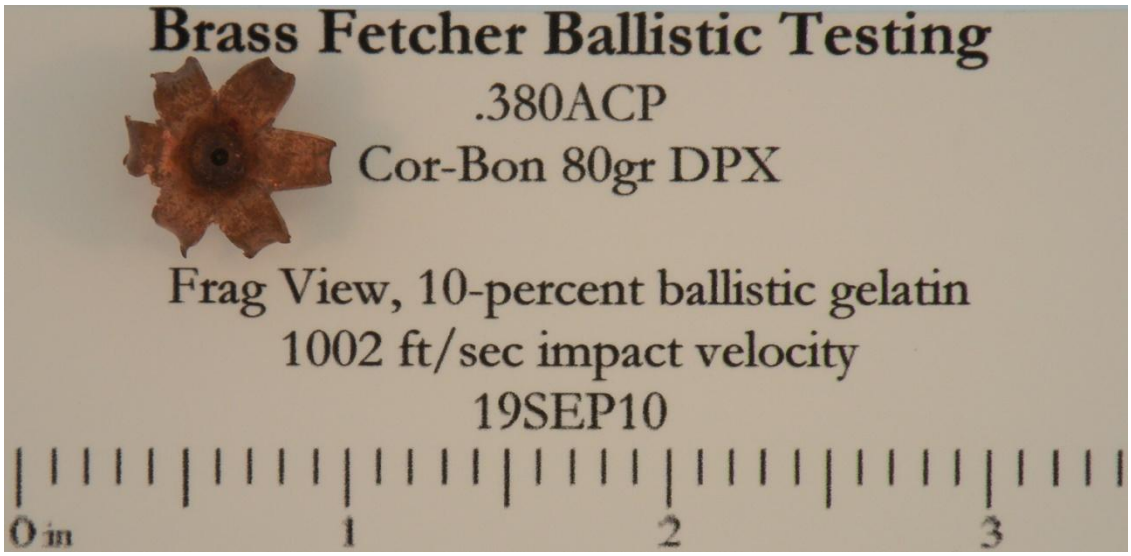
Shot 1 (Frag View)



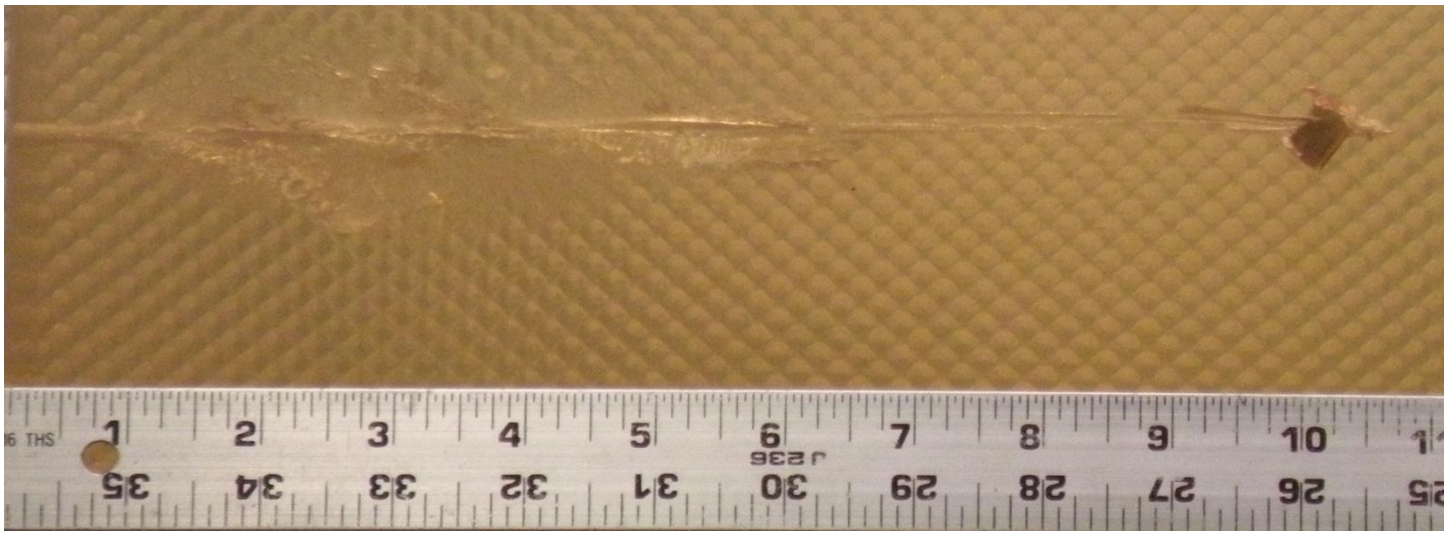
Shot 2 (Side View)



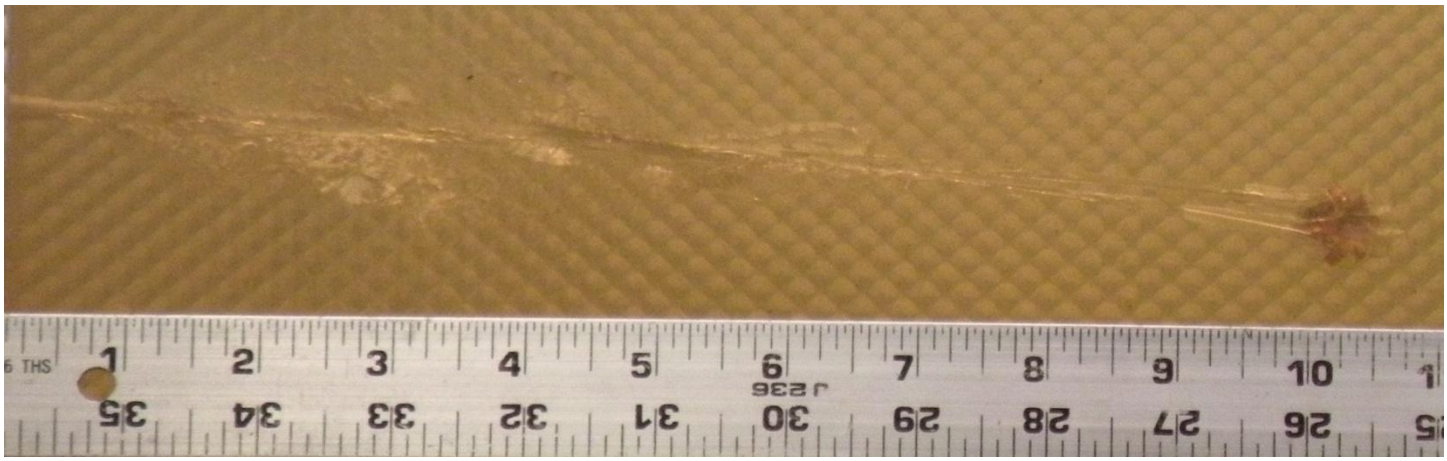
Shot 2 (Fragment View)



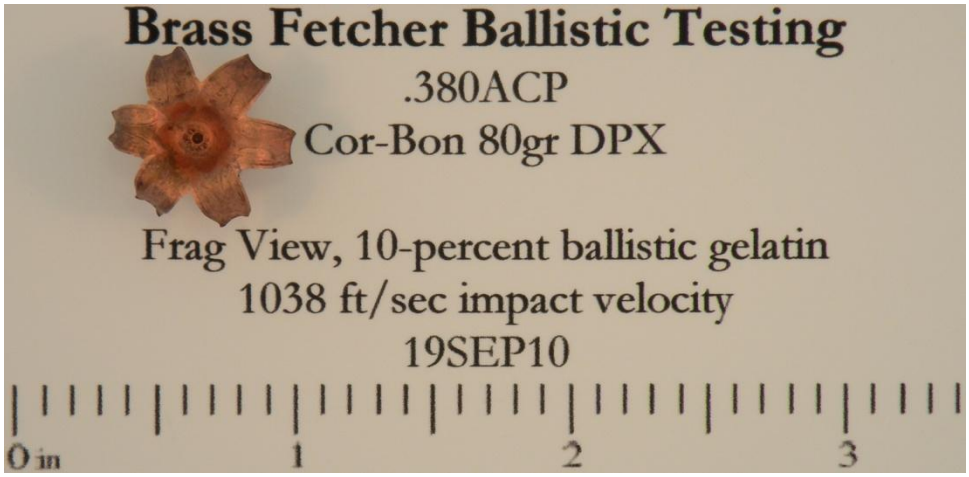
Shot 3 (Side View)



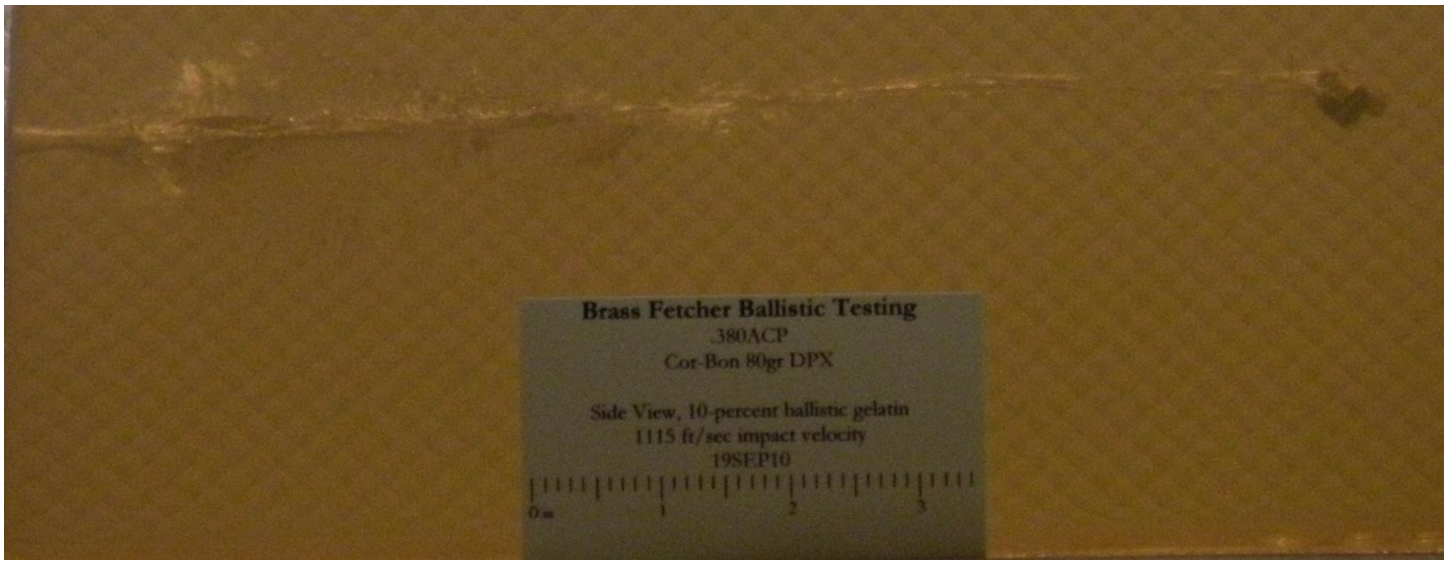
Shot 3 (Top View)



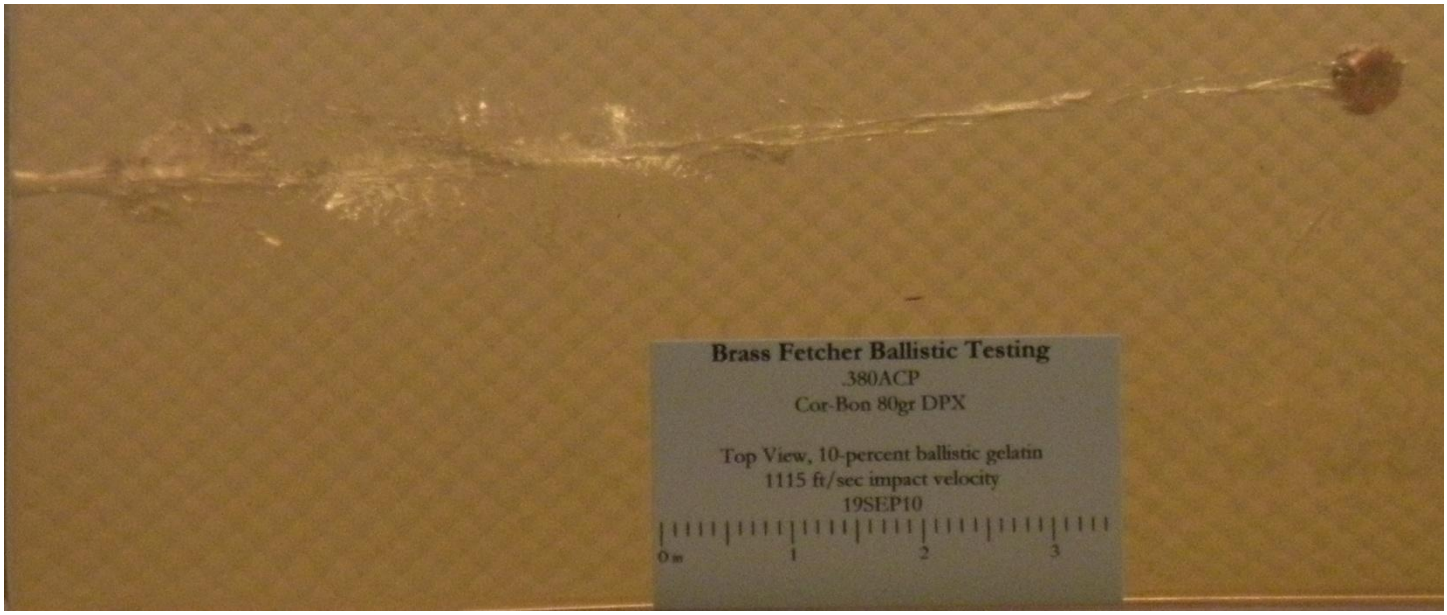
Shot 3 (Frag View)



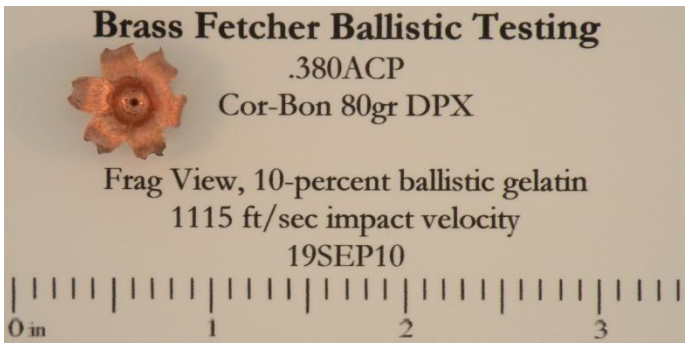
Shot 4 (Side View)



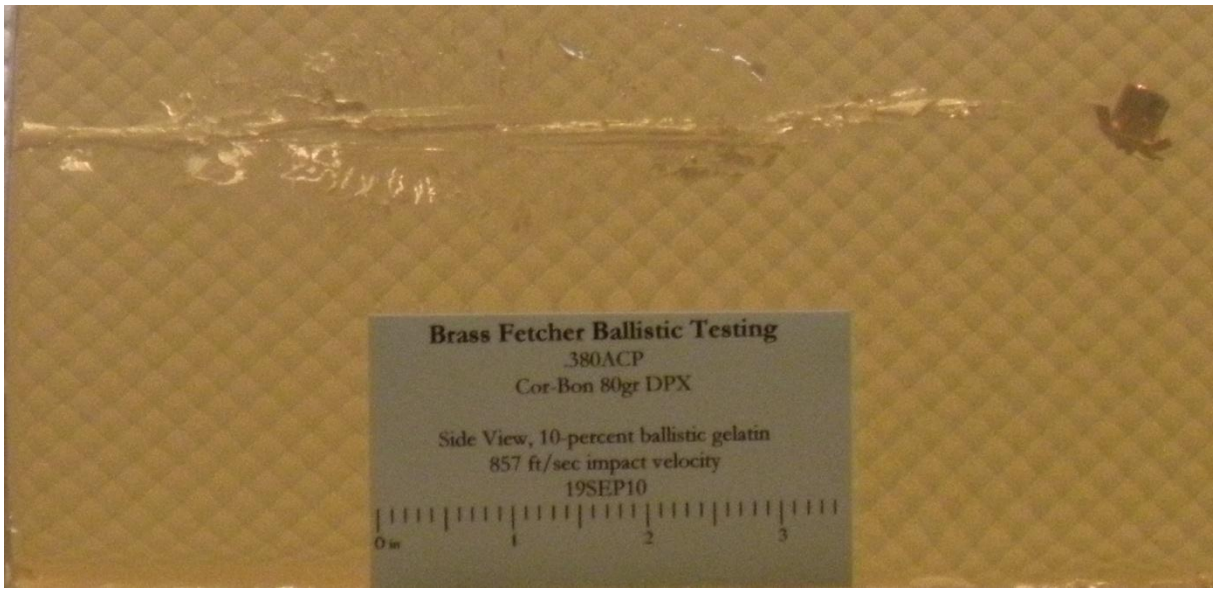
Shot 4 (Top View)



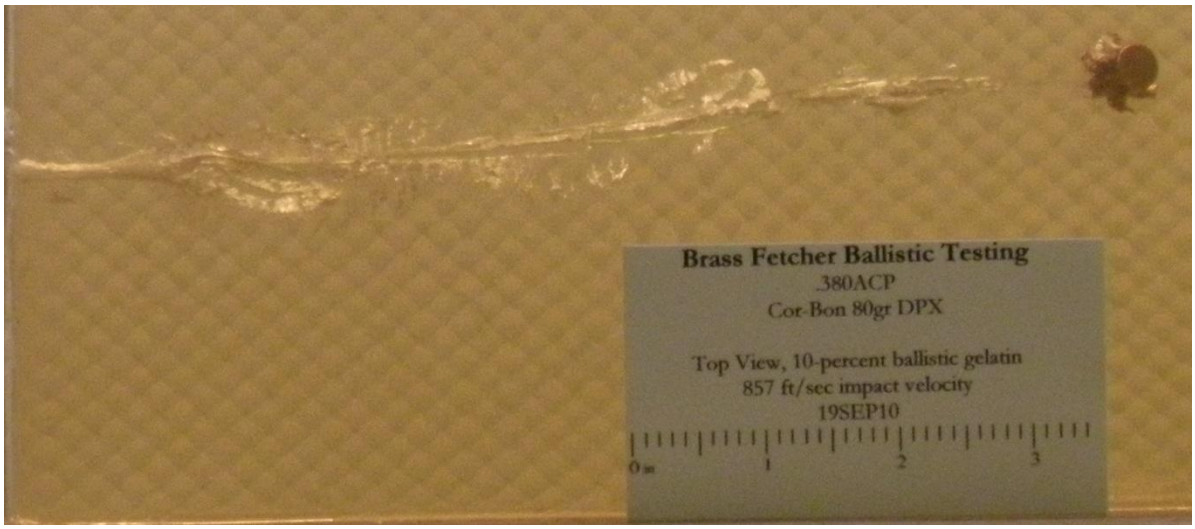
Shot 4 (Frag View)



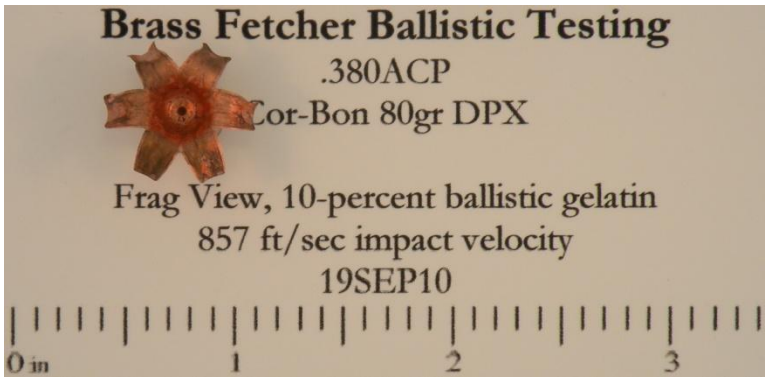
Shot 5 (Side View)



Shot 5 (Top View)



Shot 5 (Frag View)



Conclusion

The 80gr DPX round offers good performance when fired into bare gelatin/muscle tissue from barrel lengths ranging from the smallest mousegun to a full size pistol. One negative of the cartridge is the apparent lack of waterproof sealant on the casemouth of the cartridges. We would prefer to see both the primer pocket and the casemouth of defensive ammunition sealed with a waterproof coating. We would not hesitate to recommend this cartridge for general personal defense use with a .380ACP handgun.