



Basic principles behind monolithic bullets

Important Disclaimer

In this specific discussion a monolithic bullet will always mean a pure copper bullet, computer controlled lathe turned to very tight tolerances from one batch to the next, perfectly designed to achieve the highest possible BC (ballistic coefficient) leading to an absolute stable flight when properly matched with the launching rifle's barrel twist rate, resulting in the greatest chance to achieve straight line penetration in the targeted animal.

We further specifically refer to GS Custom's drive band patent which is used in the manufacturing of their HV, SP and FN series of bullets making it possible to launch bullets at high velocities as specified by the manufacturer, without causing any signs of excessive pressure or barrel wear.

The properties, benefits and results forthcoming and referred to in this discussion is therefore **NOT** automatically applicable to any other type of monolithic bullets which may also be available on the market from time to time.

Normally one finds a disclaimer clause almost hidden somewhere at the end of a writing, but in this case we regarded it as being so important that we thought it good to put it right in the beginning of this discussion.

What are the basic principles behind monolithic bullets?

The HV (High Velocity) concept is enough of a departure from the norm, that it requires an open mind to fully evaluate all of the aspects.

HV bullets are deliberately designed with the longest, most slender possible ogives and with long rounded boattails. Coupled to the fact that they are turned from pure copper, these bullets are on average 20% longer than jacketed lead bullets of similar weight. The result is a range of bullets with ballistic coefficients comparable to the heavier bullets, but with the speed advantage of lighter bullets. The designs are refined to give reliable terminal performance over a wider velocity range with the best balance between expansion and weight retention.

GS Custom HV bullets have the following advantages:

- ❑ Load development is simplified - HV bullets are not speed sensitive to grouping
- ❑ Copper fouling is reduced to levels not previously possible. Barrel and throat life is more than doubled and barrels run cooler
- ❑ Due to the mono metal construction, terminal performance is enhanced and bullet failure due to complete fracture is eliminated
- ❑ Less wind drift - the two factors that control wind drift, BC and velocity, are maximized
- ❑ Trajectories are flatter, making range estimation less critical
- ❑ Momentum and energy levels are elevated, enhancing terminal performance over a wider range distances and speeds
- ❑ Meat damage is confined to the bullet path and bone fragment damage is also reduced, putting more meat in the freezer



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General information

GS Custom HV bullets are turned from pure copper to an accuracy on diameter of + or - 0,005 millimeters and a weight variation of less than 0,25 %. GSC bullets are manufactured to the following standards:

- Diameter tolerance + or – 0,005 mm (0.0002")
- Length tolerance + or – 0,10 mm (0.004")
- Uniformity of ogive curve + or – 0,005 mm (0.0002")
- Weight is within 0,25 % of the stated weight

This is an overall standard that is maintained from batch to batch - not just within a batch. HV designates a new technology bullet that lowers pressure in the bore and, thus increases velocity at standard pressure levels. HV bullets are manufactured to precisely fit a particular caliber by bore diameter, groove diameter and rate of twist as laid down by CIP and SAAMI.

**FOLLOW OUR RECOMMENDATIONS WITH REGARD TO SUITABLE CALIBERS FOR THESE BULLETS.
DO NOT USE HV BULLETS IN A CALIBER THAT DOES NOT APPEAR AS RECOMMENDED ON THE PRICE LIST OR
PACKAGE INSERT WITHOUT CONSULTING US.
IF YOU WISH TO DEVIATE FROM OUR GUIDELINES OR IF YOUR CALIBER IS NOT LISTED, CONSULT WITH US
FIRST.**

GS Custom HV bullets are different from all other bullets that are currently available. The reloader will find that often more propellant is required to achieve standard velocities for a given bullet weight with HV. Frequently it is necessary to switch to a faster burning propellant to achieve the full potential of the HV bullet. As a rule, normally accepted maximum powder charges can be exceeded with HV bullets. It is vitally important to develop loads with the intelligent use of a good chronograph. We use Oehler and CED equipment exclusively. If you are in any doubt whatsoever about what is required, please contact our technical helpline.

You will find oddities in our line of bullets such as the fact that we make two distinctly different 7 mm bullet sizes. If you research the CIP specifications you will find that 7 mm Remington Magnum and 7x57 are not the same size bore or groove. Many such examples exist and we do not make caliber recommendations without good reasons. It is important for optimum results that you use the bullet that is best suited to your particular caliber.

**Particular attention should be paid to the length of bullet and the rate of twist of the rifle.
This is perhaps the most overlooked key to good terminal performance.
Selecting a bullet by weight makes as much sense as buying shoes by weight rather than size.**

HV and FN bullets reloading data and guidelines

The unique construction of HV and FN bullets allows the reloader to achieve higher speeds with a given weight of bullet than what was previously possible. Terminal ballistics of HV and FN bullets rely on the additional speed to perform optimally.

HV and FN bullets should not be loaded down to usual speeds as they will then perform in a similar manner to standard monometal bullets as far as external and terminal ballistics are concerned.



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The exception would be if you require only standard speeds and want to reduce recoil. HV and FN bullets work at lower pressure levels and therefore reduce recoil at standard speeds. Internal ballistics are superior with HV and FN bullets in all cases. Use our HP Bullet range at normal speeds if you do not want the advantages that HV technology makes available to you. Follow the guidelines below for optimal performance with HV and FN bullets.

Always use a magnum primer

We do not recommend magnum primers for speed, we recommend magnum primers for the additional initial pressure they generate. This starts the bullet earlier and artificially creates a bigger volume for when powder starts burning. The further out the bullet is, when powder starts burning, the lower the pressure and the more powder can be used to drive the bullet while remaining within pressure limits.

Use an HV or FN bullet that is recommended for the caliber. The correct length of bullet for the rate of twist and case capacity of the cartridge is more important than the weight.

We recommend that powder be selected to give a full case at the speed selected, because that gives the best accuracy, not because it gives more speed. We state on our website that the reloader selects the speed he wants and then chooses the appropriate powder. Here is the specific quote:

"Select a propellant that will reduce airspace in the cartridge case as much as possible. The ideal is to have the bullet seated touching the powder charge. Propellants at the fast end of the spectrum for a given bullet weight tend to give better results."

Start load development with the bullet touching the rifling if throat, magazine box and case dimensions will allow it. HV and FN bullets do not raise pressure levels like jacketed lead and standard and grooved monometal bullets do, when seated against the rifling.

Reloaders must understand that GSC drive band bullets, that are started with conventional bullet start loads, will produce less speed than conventional bullets and will often not even seal the case. Close to a similar weight, conventional bullet, max load is usually a good place to start a drive band bullet but it remains a start load. Just as you would up the powder charge when going to a lighter bullet of similar construction, because of the lower resistance to acceleration, the powder charge for drive band bullets must be increased, for the same reason.

This does not mean that we recommend maximum HV bullet loads across the board. The reloader chooses what pressure level he wants to work with and accepts the extra speed that he gains with HV or FN bullets as a bonus, whatever it is.

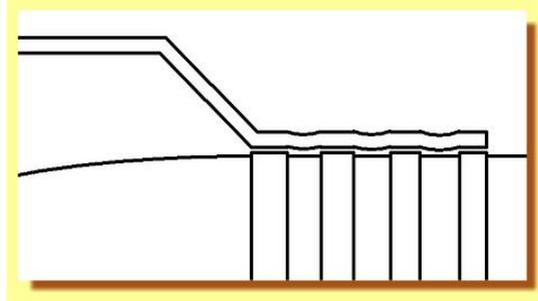
Develop the speed of your load first. Once the desired speed is achieved, then tune the accuracy of the grouping by experimenting with overall cartridge length. Trying to do both at the same time will require more bullets than separating the two elements.



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Do not crimp HV, FN or SP bullets

Reasons for this is given by Gerard Schultz below'



We reckon that crimping is not required with a drive band bullet because the brass springs back slightly between the drive bands when the bullet is seated. This acts as a multiple crimp but has great precision because the variables from cartridge to cartridge are held to a minimum. When a normal crimp is applied to a case, varying case lengths, however small, will cause the crimp to vary and bullet pull weight will vary also.

Should you find that a drive band bullet moves under recoil, first check that the case neck is sized down as it should be, then check that the sizer button is not over size and, if both are within spec, only then should a crimp be applied. Make sure that the crimp falls between two drive bands. I have fired up to nine shots over a cartridge left in the magazine of my .375H&H and found no movement of the bullet in the case.

Another area where GS Custom bullets depart from convention:

Caliber	Bullet	Powder	Start Load Grains	Max. Load Speed
.375H&H	375265HV091	S341	74	2900

Based on the following question, the above load recommendation made on the .375H&H 265gr GS Custom HV bullet, asked by a person:

"The other strange thing for me is the recommendation of a start load of 74 gr of S341, which I understand but then a velocity ceiling limit? How is this derived in terms of a pressure limit? Surely the logical way would be to put a load ceiling and not a velocity ceiling?"

GSC's logical and proven reply:

"I have taken same caliber rifles to the range for load development and testing, more times than I care to mention. Invariably, identical start loads on three to five rifles of the same caliber, will result in different speeds. As you work up the scale, such a set of rifles will show pressure at different powder levels, but at similar speed levels, if barrel lengths are the same.

It is quite clear to me that the relationship between maximum pressure and muzzle velocity, is closer than the relationship between maximum pressure and powder charge.

A load that is safe in one rifle may blow a primer in another and will always result in more speed as well. However, if you bring the two rifles to the same muzzle velocity with different powder charges, pressure levels between the two will also be closer. Once a powder charge has been decided on, check it by loading and firing the same case with it until the primer pocket loosens. If you get more than five or six loads from a case, pressure is not over the top."

"Load data that specify a maximum powder charge always carry the caution that the loads are only applicable to the test barrel used. It makes more sense to me to specify a known safe start load and a maximum speed that should not be exceeded.



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Such a maximum speed will occur at differing powder levels from rifle to rifle but will be closer to the correct maximum pressure for that rifle than blindly following a stated maximum powder charge."

It once again underscores the necessity to control your loading by use of a chronograph and loading to the expected velocities, but never exceed the specified maximum velocity.

In a recent discussion of various types of hunting bullets on a popular hunting forum, the following was said by GS Custom's Gerard Schultz:

"Our HV, FN and SP bullets remain unique in the way that shot start pressure, gas leakage and bullet accuracy is dealt with. No other bullet, currently manufactured or manufactured at any time previously, have the specific design features that make GSC drive band bullets unique in these areas. GS Custom manufactures bullets from copper for specific reasons that have to do with terminal performance. We do not use any of the brass/bronze alloys, because they fail more frequently than copper. Compared to brass/bronze alloys, copper is more difficult to machine, is tougher on tooling and more expensive as a raw material. If we believed brass/bronze to be superior in terminal performance, we would use it in a heartbeat."

That in a nutshell, are the principles behind this specific monolithic bullet, namely GS Custom HV, SP and FN.

From personal hunting experiences with GS Custom HV bullets in three different calibers, .308Win, 7mm Rem Mag and .270Win with light for caliber bullets, 130gr and 110gr respectively, over five different hunts, each with its own unique hunting conditions, I can only say that the ability to kill animals with one shot is an amazingly monotonous event.

The surprisingly small amount of meat damage with such high velocity bullets is totally astonishing to all who see the carcasses once they are skinned.

Having said all this, bear in mind that there is no such thing as the magic bullet. All we can promise is that, if you place the bullet properly, GS Custom HV, SP and FN bullets will give you the best possible shot.