## COULD 3/4 OZ SHELLS FOR SPORTING CLAYS BECOME THE FUTURE STANDARD ASKS TIM WOODHOUSE

# DAWN OF A NEW ERA

With the ever-higher cost of lead shot and the inevitable rise in the price of shells, shooters are looking for savings – especially on their practice ammo. Even among those shooters that don't reload, some have gone over to steel shot target loads to save a few dollars over the course of a weekend. However, they have quickly found that, although they can be used for most types of clay target, their ranging power for edge on targets is distinctly limited – along with the problem of steel pellet ricochets which are very real – and believe me they hurt like hell!

With the price of a 25lb bag of shot on the up and up, the merits of a much lighter load have been thoroughly investigated by the shotshell reloading fraternity – the net result is the 3/4 oz practice shell. Interestingly, a 25lb of shot makes 355 1 1/8 oz loads and 541 3/4 oz loads. Yes that's right – a whopping 186 more shells per bag (better than 52% more shells per 25lb bag). Right about now I think I just got your full attention – so this is clearly a subject worthy of an in-depth investigation.

After receiving numerous emails from readers for practical 3/4 oz advice and reloading data, and almost as many requests for a full article on the subject of the super light 12 gauge 3/4 oz clay shooting load, it is clearly time to do the subject justice – so let's proceed with a full examination of the whys and wherefores of this flyweight performer. If ever the use of the well-worn cliché 'less is more' was appropriate, then with the 3/4 oz load it truly describes the quite remarkable downrange patterning performance of this apparently unlikely contender.

But surely the very concept of a 3/4 oz 12 gauge load flies in the face of perceived wisdom? A twelve gauge load should be 1 1/8 oz, or maybe even down to 1oz with those fancy European FITASC numbers, but why would a sub-gauge shot payload work in a full sized 12 gauge shell; after all, there can't be enough pellets in the load to fill out the pattern properly – or can there?

Well, just about here, we diverge from the path of what most shooters think should be the case with this pipsqueak, and what the reality of the downrange performance actually is – it clearly doesn't pay to get hung up on tradition.

## A LITTLE BACKGROUND

Firstly let's consider the historic uses of the 3/4oz load and the gauges and types of guns used. The 3/4oz load has been with us for a very long time, it was undoubtedly used in muzzle-loaders when appropriate and was the standard load for the 2 1/2 inch cased 20 gauge from the introduction of self contained shotshells, and breechloaders. It also found its way into the 24 gauge shell, and of course became just about the standard for the 28 gauge, with NSSA Skeet shooting keeping the 3/4oz load alive and kicking for many years before the resurgence of popularity of the smaller gauges for sporting clays targets. Additionally, there was of course Winchester's early 1930s launch of the 3/4oz .410 magnum shell. While not intended primarily for clay targets, it could be used in the .410 for NSSA Skeet in the 28 gauge class – and many shooters frequently did so. This had the advantage of using the same gun for the NSSA 1/2oz .410 class as well.

## EARLY LOADS

All of this is fine, but the 3/4oz load has never had an airing in the 12 gauge shell – or has it?

Back around the time that the stubby 2 inch 12 gauge shells got started, they were in fact loaded with 3/4oz of shot. The idea was that a light, short chambered and handy 12 gauge, with the standard 20 gauge shot load, would effectively negate the need for the 20 gauge in the field. This was done primarily to avoid the unpleasantness of the 12-20 gauge shell mix-ups, where a mistakenly loaded 20 gauge shell in a 12 gauge was followed into the chamber by a 12 gauge shell – resulting in a wrecked gun and seriously injured shooter.


*EARLY BRITISH 2 INCH 12 GAUGE SHELLS WERE LOADED WITH 3/4OZ OF SHOT.*

This was taken so seriously that many homes would not have a 20 gauge gun amongst a clutch of 12 gauges.

These new short 12 gauge numbers were soon found to produce prodigious patterns and when they were being regulated needed little choke to deliver what was required – with their field performance being exceptional. So where are these 3/4oz stubby loads now?

Sadly the powders available at the time were not ideally suited to the lighter resistance offered by just 3/4oz of shot in the 12 gauge bore. Although they worked well enough most of the time, in difficult and cold weather conditions they would occasionally produce a 'blooper' because insufficient pressure was being developed to allow the powder to burn properly. To remedy this, the shot load was increased to 7/8oz. This stabilized the powder burn, with more normal pressures.

## MODERN POWDERS

Happily, these problems are no longer with us and just about any powder that will work with an International Trap or Skeet 7/8oz load will deliver in spades when used with the 3/4oz payload. As for the design of the load, just about any combination of components that works for an International 7/8oz shell will provide a good starting point.

Most of these shells have a 3 1/2 dram equivalent rating with high three-foot velocities in the 1345 feet per second range, so the substitution of the lighter shot load has some leeway although it will produce lower peak pressures. The simplest way forward is to insert a 16 or 20 gauge card or cork (if preferred) wad of the correct thickness (usually a 16th or 1/8th of an inch card will suffice) into the wad shot cup and reset the shot drop for 3/4oz. This will normally be all that is needed to create a usable shell. But, if weak shooting is suspected, a slightly deeper crimp (do not overdo this as excessive crimp depths can raise pressures unduly) will often clear things up.

Another route is the substitution of the primer for one with a hotter rating. However, this must be done with care, especially if the International target load in question is already running close to 10,000psi pressure (if in doubt have the pressures tested first).

A 24gm (7/8oz) International load that uses the Fiocchi 2 3/4 inch plastic hull, the popular Fiocchi 616 primer and Alliant Red Dot powder, will have 8700psi with a Federal 12SO wad (20.5 grains Red Dot), 8500psi with a Winchester WAA12L (Gray) wad (21 grains Red Dot), and 8200psi with a Remington TGT 12 wad (20.5 grains Red Dot).


*3/4OZ OF #7.5 IS LOADED FOR PEST CONTROL USED BY AGUILA IN SPECIAL SHORT STUBBY 12 GAUGE HULLS THAT EVEN HAVE A PLASTIC SHOT WRAPPER, AND ARE FINISHED WITH AN EIGHT STAR CRIMP! THEY ARE SAID TO BE VERY HANDY IN SLIDE-ACTION SHOTGUNS FOR THIS PURPOSE, AS MANY MORE OF THEM CAN BE LOADED INTO THE MAGAZINE THAN THE STANDARD 2 3/4 INCH LENGHT SHELLS.*

*A TYPICAL EUROPEAN 12 GAUGE INTERNATIONAL TARGET WAD (B&P) DESGINED FOR 24 GM OF SHOT IN THE 2 3/4 INCH HULL. 3/4OZ OF SHOT GENERALLY FILLS THE CUP OF THESE WADS TO THE TOP OF THE PETALS OR SLIGHTLY HIGHER, AND WORKS GREAT WITH STANDARD 24GM INTERNATIONAL TARGET LOAD DATA IN 2 5/8 INCH (67MM) HULLS, WITHOUT THE NEED FOR CARD INSERTS IN THE SHOT CUP.*

If we compare the International data for the Federal Gold medal plastic hulls and the Federal 209A primer, we find that the Federal ISO wad is down to 20 grains of Red Dot and the pressure is up to 8900psi. Likewise, the Winchester WAA12L (Gray) is also down to 20 grains of Red Dot but the pressure has taken a hike up to 9000psi. However, the Remington TGT 12 wad still has the same 20.5 grains of Red Dot as in the Fiocchi hull, but the pressure is now up to 8900psi – that is plus 700psi. Realistically, the hull change will have made a difference to the pressure but we can still expect more pressure with the Federal 209A primer.

So, on balance, it would seem that a good starting point for a top speed $^{3}/_{4}$oz load with the Federal 209A primer in the Fiocchi hull would be a reduced charge of 20 grains of Red Dot and the Remington TGT 12 wad. Other powders such as Hodgdon, Solo, Winchester, IMR and European products can of course be used as well, with due reference to the recommended charge weights in their published 24gm International target load data. For lower three-foot velocities than 1345fps it is best to reduce the powder charge by a grain or two, until the desired ballistics are obtained. The $^{3}/_{4}$oz versions of the International loads will reliably cycle an autoloader, even if it is gas operated, but the felt recoil is down hugely when compared to the standard 1 $^{1}/_{8}$oz, the 1oz loads and is noticeably less than the 24gm International loads.

## RECOIL COMPARISON

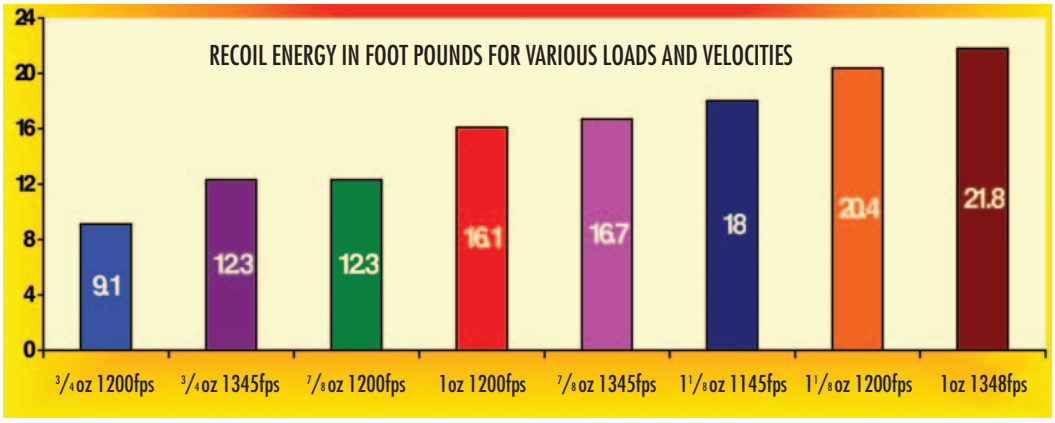
This is an important subject with regards to clay shooting. Excessive amounts of recoil have caused a lot of problems for many shooters – so much so that some have had to give up the sport altogether. The $^{3}/_{4}$oz load has the significant benefit of greatly reduced recoil energy when loaded at a three-foot velocity of 1200fps (virtually half that of a 1145fps 2 $^{3}/_{4}$ dram equivalent 1 $^{1}/_{8}$ trap load). Even with a 1345fps velocity, the recoil of the $^{3}/_{4}$oz load is exactly the same as a $^{7}/_{8}$oz shell at 1200fps.

We can also see from the chart that a 1345fps $^{7}/_{8}$oz International shell will actually have only slightly less recoil than the 1145fps trap load, but more pertinently, a specially assembled high performance 1345fps $^{3}/_{4}$oz load will have only 56% of the recoil of an International 1oz FITASC load at the same velocity!

## COMPONENTS

The interesting thing about the $^{3}/_{4}$oz load is that it does not require special components to achieve exceptional performance downrange. It can be put up in various hull lengths, with the correct balance of wad, shot and powder, and always delivers exceptional patterns without recourse to magnum grade shot. This is a function of the very short shot column which directly dictates huge percentage reductions in damaged shot pellets. What this means is that fliers are virtually eliminated for practical purposes, and the central core densities and distribution are noticeably superior for the numbers of pellets in the load.

Although high antimony content magnum shot is not realistically required with the $^{3}/_{4}$oz load, it would deliver shattering target breaking power for International trap, even with the same shot size as used in the existing 24gm shells. When conducting practical testing of $^{3}/_{4}$oz loads, it was found that three-foot velocities could be increased to 1400ps without blowing the patterns, as long as the pressures were kept to the 8500-9000psi range. This held true for good quality chilled shot with a 3 to 4% antimony content. All of the $^{3}/_{4}$oz loads tested needed much less choke than standard target loads to deliver their superior quality patterns. Another advantage of the $^{3}/_{4}$oz shell is that lighter shotguns become a practical reality, because the felt recoil is still going to be far less then with conventional shells and gun weights.

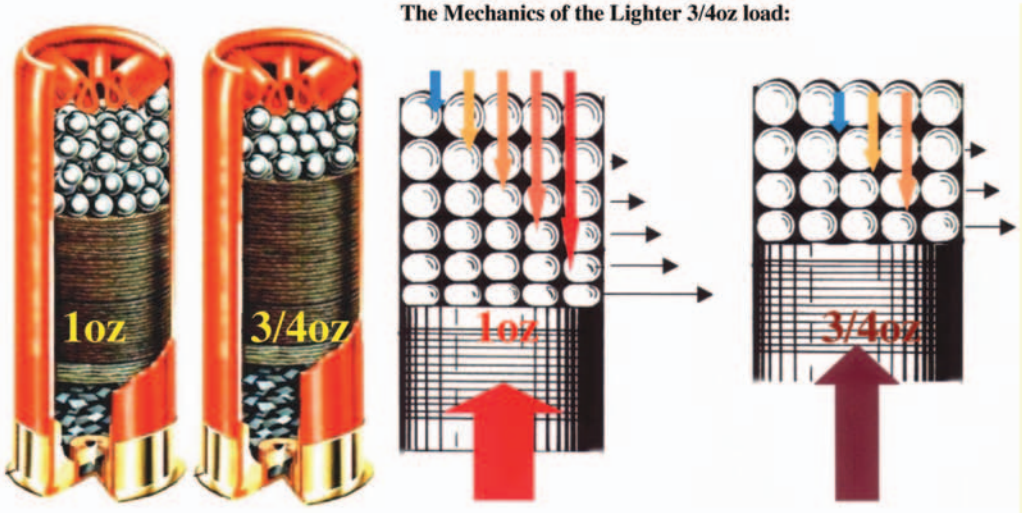



Recoil, as can be seen, is affected more by increases in velocity than by the weight of shot (the 1oz International FITASC loads kick harder than the 'heavy' 3dram 1 $^{1}/_{8}$oz trap loads with their 1200fps three-foot velocities). The good news with the $^{3}/_{4}$oz shell is that it can be accelerated to these top velocities without any penalty in the recoil department. Conversely, a 1200fps $^{3}/_{4}$oz load is the sweetest shell you can fire in a 12 gauge shotgun – perfect for recoil shy shooters and instructional purposes. Simply put, just about everyone shoots better with less recoil.

Longer shot columns crush much larger percentages of the pellets, which increases the overall spread of the pellets at any given range – but not the quality of their distribution within the pattern. This effectively answers the question that many readers have asked: *"will a 28 gauge shoot the $^{3}/_{4}$oz load more effectively than the 12 gauge?"* If the object is more fliers and an increased overall spread, with the need for more choke at longer ranges, then the answer is yes. But if downrange performance is the objective, together with superior pellet distribution, then the answer is no!

## THE MECHANICS OF THE LIGHTER $^{3}/_{4}$ OZ LOAD

We know that the 1oz International loads work fine for challenging FITASC targets, and that International Trap loads consistently break 40 meters plus going away targets, even though they contain only 24 grams of shot – so why not go to $^{3}/_{4}$oz loads for sporting clays?




**HOW AND WHY IT WORKS**

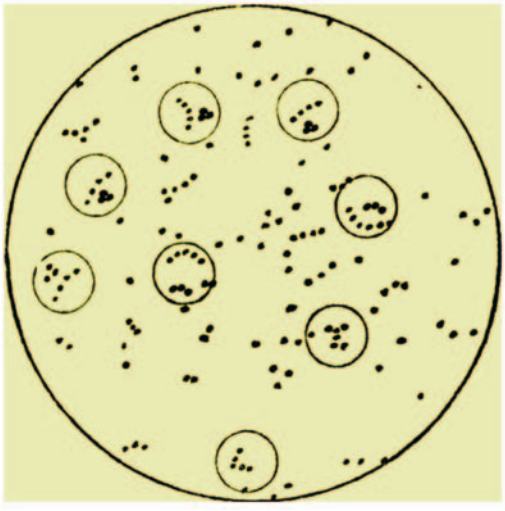
The two diagrams of the left show the approximate dimensional relationship of the 1oz and 3/4oz 12gauge loads both in a loaded shell (fiber wad column for clarity), and as an idealized pellet stack. When fired, the 'Set Back Forces' of acceleration will increase the pellet compression and deformation due to the longer shot column and its taller pellet stack. This is clearly shown with the red arrow indicating the greatest effective downward pressure and the light blue arrow the least. The two large arrows under the wad show the increase in breech pressure needed for the heavier load at identical velocity.

The intensity of the lateral pressure that crushes the pellets to the side (being a by-product of the downward pressure) is shown by the length of the black arrowed horizontal lines, pellets thus damaged, will be rendered as 'fliers', going wide of the mark, and being of no practical use as the range increases.

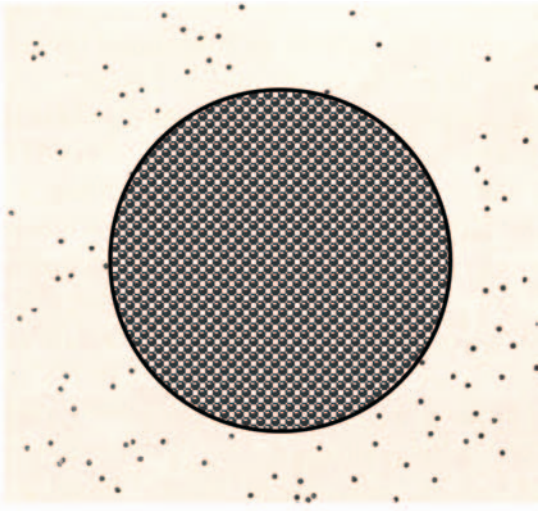
**We know that the 1oz International loads work fine for challenging FITASC targets, and that International Trap loads consistently smash 40meters plus going away targets, but actually contain only 24grams of shot (27/32oz or 370grains, which is less than a true 7/8oz 382.8grains) load; so why not go to 3/4oz loads for sporting clays?**

Damaged pellets do not fly true and tend to contribute to clumping on the pattern plate. This is literally the formation of clumps of pressure-welded pellets that have been squeezed together by the acceleration forces and have only been partially broken up again at the chamber cone or choke constriction. They can be easily recognized by their close proximity to each other on the pattern plate (see the circled groups of pellets in the clumped pellet pattern). Even when not formed into clumped strings, damaged and misshaped pellets will tend to fly to the outside of the pattern perimeter – frequently beyond – and make no useful contribution to the consistent breaking of the target. It is true that the odd target will be broken by one of these errant pellets, but this can indeed be more of a curse than a blessing. The problem is that if this occurs on the first pair of targets at any particular station, the shooter will quite understandable attempt to repeat the sight picture the next time. Here we hit on the nub of the problem.

Because the exact placement of the fliers on the outside edge of the pattern is an extremely random occurrence, it is highly unlikely that the broken target will be repeatable for subsequent shots. This is extremely frustrating – and can leave the shooter totally demoralized after coming off the stand. The 3/4oz load with its short shot string, and almost total lack of such 'fliers', will not suffer with this problem, so that an initial hit will be repeatable, without the lottery of the reliance on outside edge fliers to do the job – a task for which they are poorly suited.



***GROUPS OF CLUMPED PELLETS SHOWN CIRCLED WITHIN THE PATTERN FOR CLARITY; CAUSED BY A LONGER SHOT COLUMN AND HIGHER BREECH PRESSURES.***

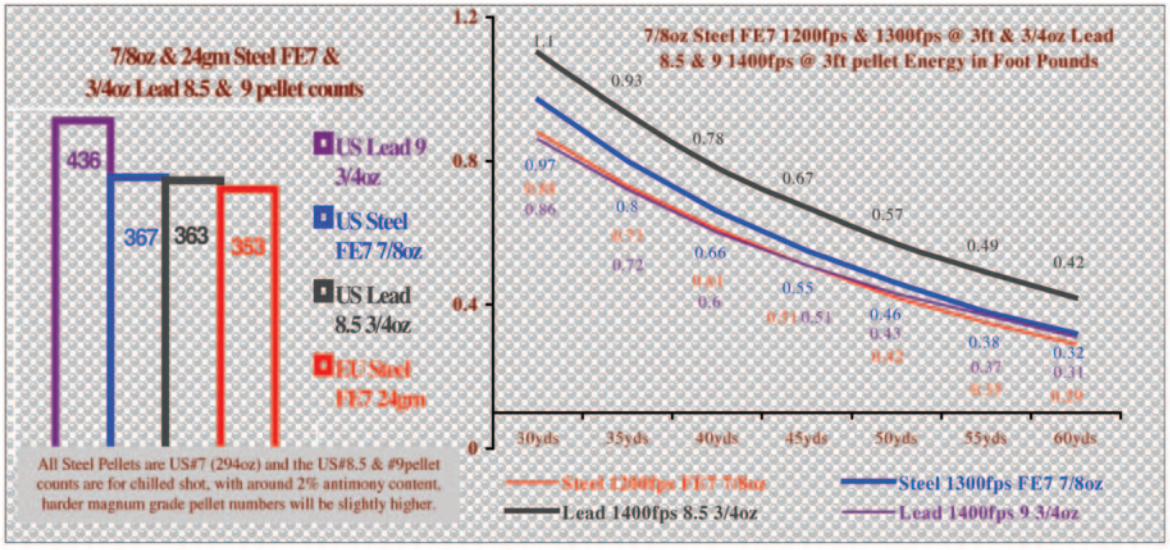


***OUTSIDE PATTERN EDGE FLIERS, CAN GIVE MISLEADING RESULTS ON A SHOOTING STAND, WITH INITIAL TARGET BREAKS PROVING TO BE IMPOSSIBLE TO REPEAT WITH FOLLOWING SHOTS.***

## THE CHOICES

For the economy minded clay target shooter, there are now two choices – either steel factory loads or lead 3/4oz reloads. However, a third choice could very easily become a reality – the 3/4oz factory load. The 3/4oz lead and steel 7/8oz target loads are quite similar in that they both pattern more tightly than standard lead shells, so let's take a look at the pellet counts for both types.

With chilled shot the 3/4oz lead 8.5 shell has only four pellets less than the steel FE7. However, the 3/4oz shell can be easily launched with a 1400fps three foot velocity. Even if the steel pellets achieve a three foot velocity of 1300fps (this is very unlikely in the vast majority of cases from a real shotgun where a 1200fps to 1250fps 3ft velocity is more realistic) they will




still be totally outclassed by the #8.5 3/4oz load.

The arbitrary 0.5ft/lbs pellet energy level is reached at: 1200fps Steel FE7 = 45.5 yds, 1300fps Steel FE7 = 47.5 yds, 1400fps Lead #8.5 = 54.5 yds and 1400fps Lead #9 = 46 yds. With standard lead target loads and 1200fps three foot velocities we know that lead 8.5pellets are a close match to 1300fps steel FE7's at moderate ranges. However, the high speed 1400fps 3/4oz load surpasses this level by quite a margin. Even 9 shot at a 1400fps three foot velocity can outperform some of the FE7 steel pellet loads downrange, because its striking energy is more concentrated in a 20% smaller diameter pellet (see the purple line on the graph) and also has a higher pellet count (436 pellets).

The recoil energy of the 1300fps steel 7/8oz load is considerably higher (15.2ft/lbs) than the 1400fps 3/4oz lead load (13.7ft/lbs) with an 8lb shotgun. But the actual 'felt recoil' of the steel load tends to be greater, mainly due to the structure of the components, and is more akin to the 1oz lead load.

## CONCLUSION

The 3/4oz load has always performed admirably in the smaller gauges. When used in the 12 gauge it really does punch well above its weight. It can be loaded for extreme range work with magnum shot and higher velocities, without ruining the superb patterns that are endemic with this charge weight – and still have much lower recoil than standard loads. Conversely, it can also be loaded with softer shot to standard speeds of around 1200fps @ 3ft for ultra low recoil. This is a major plus for training purposes which has to be a good thing for new and existing shooters alike.

It can also introduce real savings in the production costs of factory ammo with the use of lighter (and cheaper) charges of fast burning powder and around a 35% saving in lead shot costs when compared to the standard 1 1/8oz target shells (25% lead savings when compared to a 1oz shell).

The early 3/4oz 2 inch 12 gauge loads may not have been perfect, but those that used them soon discovered that they were on to a good thing, only to be hampered by the then available powders. We now have all of the components that we need to make this work, at least initially, and new specific 3/4oz 12 gauge wads designed for the 2 3/4 inch hull will surely not be long in coming to market once the demand is there. So, there are no new concepts under the sun – only the search for new applications! ■

***EXPERIMENTAL 3/4OZ LOADS: PICTURED: 1250FPS @ 3FT 3/4OZ SHELLS ASSEMBLED USING INTERNATIONAL 24GM TARGET WADS, FAST BURNING POWDER AND CHEDDITE 2 1/2 INCH (65MM) RED TRANSLUCENT HULLS WITH CHEDDITE 209 PRIMERS AND A DEEPER THAN STANDARD CRIMP. 1200FPS @ 3FT VERSIONS WERE ALSO LOADED.***


***COMPRESSION FORMED 2 3/4 INCH WINCHESTER AA AND REMINGTON BLUE MAGIC HULLS WERE USED FOR HIGH-SPEED 1400FPS @3 FT 3/4OZ RELOADS WITH WINCHESTER SUPER LIGHT WADS. ALL OF THE SHELLS WERE DESIGNED TO CYCLE A GAS OPERATED 12 GAUGE REMINGTON 1100 SELF-LOADER.***


***COMPRESSION FORMED HULLS LIKE THESE ROBUST BLUE MAGIC AND AA EXAMPLES WORK BRILLIANTLY WITH THE 3/4OZ LOAD, AS THEIR REDUCED INTERNAL VOLUME WHEN COMPARED WITH STRAIGHT WALLED HULLS IS A POSITIVE ADVANTAGE.***