6th edition | 2013

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About our contributors

Matthew Cameron

Matthew Cameron, author of our feature article "A case for Reloading" has been a contributing author to Australian shooting magazines since 1994. His articles have also been published in New Zealand as well as in Varmint Hunter Magazine in the USA.

Matthew commenced reloading in 1980 for a .243 Winchester and he has been addicted ever since. He is a keen experimenter when it comes to reloading and is always looking for a better and more accurate load, and his rifles have never digested a factory round.

Breil Jackson

Breil Jackson, author of "Australian Outback Ammunition Review" is the founding Editor of GUNS&GAME Magazine. He grew up and still lives in western NSW where he has been shooting since age seven. He has also been hunting and shooting across Australia and around the world on four continents.

Ron Byrant

Ron Bryant, author of "Bench Mark 8208 Review" is a regular contributor to Australian Shooter Magazine and his writing experience includes numerous coaching manuals and reporting on competition shooting events.

Ron has been reloading for about 30 years, and has been part of state and national shooting teams, competing in a variety of events, including SSAA field rifle. His experience at high level competition has taught him how to finetune a rifle to get the best result. Ron also manufactures custom rifle stocks for the competition market.

Rob Alman

Rob Alman, our contributor of "ADI Brass Review" began using firearms at an early age, starting off with just a small .177 air rifle and later graduating to .22 rimfire. In his early teens he was a member of a smallbore rifle club in Kalgoorlie.

Rob is an active member of Yarloop Rifle Club which has been in existence for more than 100 years. He is a regular blogger upon their website, hosting many forums and posting product reviews. His hobbies include mathematics, engineering drawing and machining and mechanics which have fed the bond with the sport he now enjoys.

Other interests include family, the community and all things computer related.

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Dear reloader

Welcome to the sixth edition of the ADI powders reloading guide. The new format, which will be published annually, introduces a number of changes to make the guide easier to use, as well as more interesting to browse through.

You'll notice that the guide is now in the format of a glossy magazine. This change makes it possible for us to include articles on reloading, as well as reviews of new powders and reloading kit. The addition of a modest cover price also makes it possible for us to publish the guide annually, without adding to the price of our powders.

Our reloading data is developed in cooperation with the Hodgdon Powder Company, with which we celebrate a remarkable 25-year partnership this year. Looking closer at the data, you will notice that we now supply figures for popular commercially available bullets by brand name, rather that simply by bullet weight.

This change brings our guide in step with the way Hodgdon publishes its data, and makes it easier for you to choose a powder that will give you the desired performance for your chosen bullet brand and weight.

All of our reloading information is also available on the internet at: www.adi-powders.com.au. The website is updated with new information as it becomes available, and we recommend checking it for the latest data when you are developing a new load.

We are proud to introduce Bench Mark 8208, already reverently referred to as the 'Cinderella Powder' in the US, to our range.

This powder meters with the consistency of a ball powder and drives light varmint bullets at higher velocities, while maintaining rock solid performance in varying environments. It's versatile as well, with good loads available up to the 458 Winchester Magnum. You'll find a review of Bench Mark 8208 by Ron Bryant in the pages of this guide.

On behalf of our team, thank you for using our proudly Australian-made powders. Enjoy our sport, and be safe out there. ✸

Ferdi Kluever
Head of Sales
ADI Reloading Powders

Bench Mark 8208 review ✸

- Ron Bryant

For a while now I've been trying a few different reloading variations for my "fox rifle" which is a Remington 700 sps in 204 ruger cal, I have done a bit of work on the rifle, with a jewel trigger, a new stock and a magnificent Leupold 8.5 to 25 scope.

I've been getting mixed results with reloading variations but when I saw that ADI had introduced a new "Bench Mark 8208" powder I thought why not .. after all the previous Bench Mark powders used to work a treat in my old PPC.

Reading the ADI launch info it describes "Benchmark 8208" as being very stable over a range of temperatures and will maintain good consistency between lot to lot. This means that comparing loads tested in the heat of the day and actual shooting late at night especially spotlighting or working the snowline will produce similar results out of your favorite firearm.

It's a short grain powder and I've found it throws beautifully out of the powder thrower with no chopping or hang-ups especially in the small diameter neck of the 204 ruger brass.

A quick search in the web found a PDF data sheet on the ADI website that has a specific chart just for the new powder and it lists a broad range of calibers, but for the 204 with a 40gn projectile it was a start load of 26 grains. The data sheet said it should be doing 3586 fps and I found the chrony showing 3600 fps so that was a good start, but what really impressed me was with just about all variations in the load workups all five shot groups at 100m were under an inch! This was no mean feat as the wind was howling on my trial day.

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I also actually got it to push a smaller projectile over the magic 4000 fps mark but having a cupboard full of 39gn sierra blitzkings that was the load I was wanting to tinker with and working around the max load of 27.3gns, I found I could drive it at a speed of 3850 fps with very little speed variation and no signs of pressure. With groups of .650 of an inch that will do just fine for me (and for the next fox) .

I then put up a 200m target with the same load and found the bullet drop to be only less than ¾ inch so I knew I was on the right track and a couple of 5 shot strings had it producing groups of just on 1 inch.

.. those foxes don't stand a chance.

As with all ADI Powders I found it to run fairly clean and the usual Hoppes/ Sweets technique made short work of it.

In terms of other components I was using Winchester brass, Fiocchi primers and Sierra 39gn blitzkings and as described I got very consistent results.

The list of calibers for the powder is fairly large, but if you want to try something new, give it a run as I certainly recommend it.

If you haven't shot a 204 it's a pleasure to shoot with it's relatively mild recoil, however it hits hard, due to the speed that it's travelling and if you're reloading the vast range of the ballistic tip projectiles make short work of small game.

Look out Mr Fox here I come. ✸

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A CASE FOR RELOADING ✸

- Matthew Cameron

The economics of loading your own are analysed in this article. The comparisons of reloaded versus factory ammunition costs are simply a guide, as component cost can vary locally. Gunshop specials and bulk purchasing can significantly reduce component costs. Some brands of factory loaded ammunition may be twice the cost of others in the same calibre. The use of premium projectiles in factory loads can significantly increase the cost. Keep all this in mind.

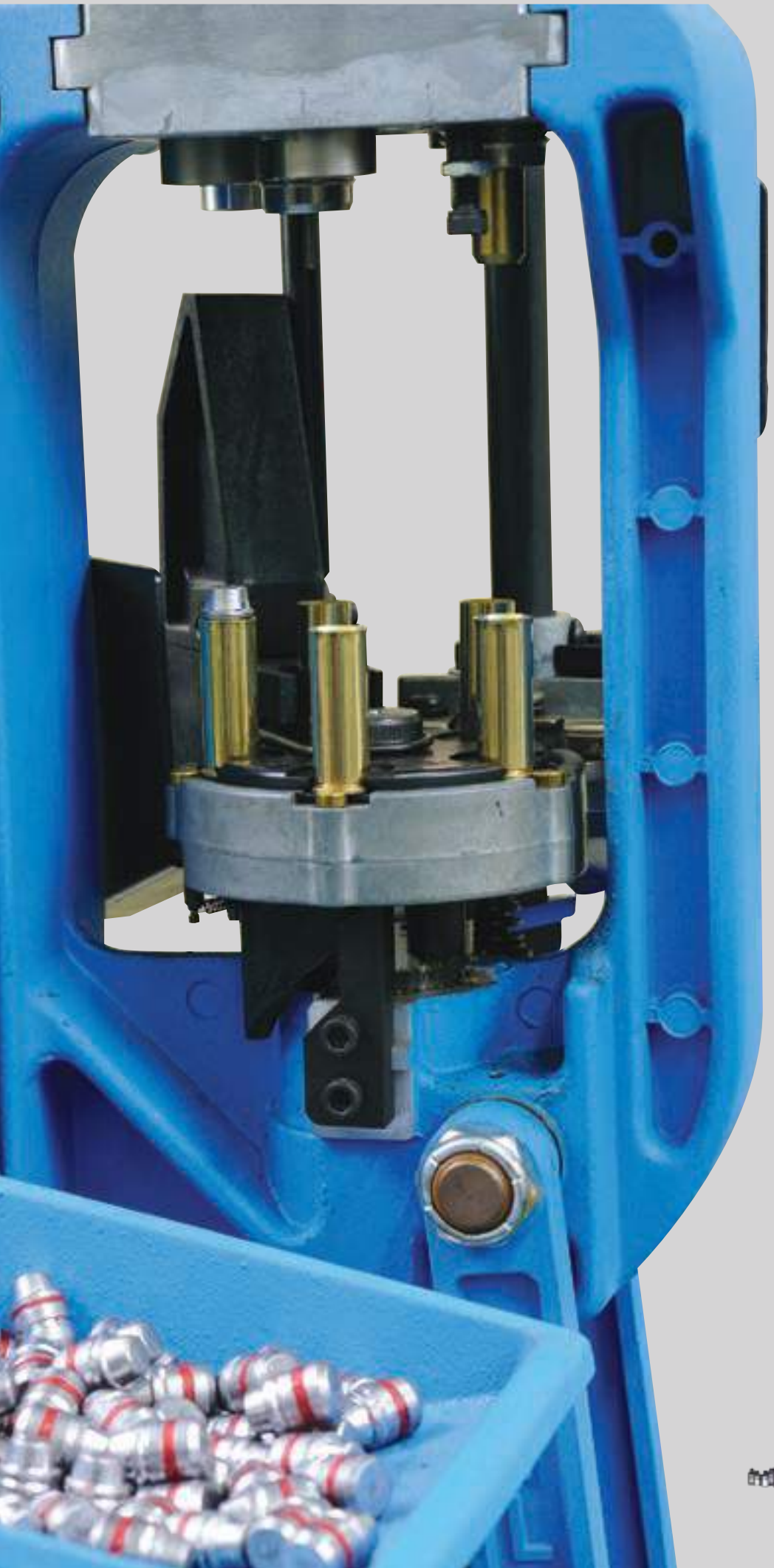
If you have purchased ammunition or components recently I do not have to tell you that prices are somewhat dearer than twelve months ago.

But the steep increases do raise a query; is reloading a preferable, more practical financial proposition than factory ammunition?

Further, is there a greater variation between the more common commercial rounds and those that are less popular? It looks a simple comparison, but I suspected that it might be a potential minefield. I was not mistaken. On one hand we have factory ammunition and on the other, brass, primers, powder and a veritable feast of projectiles that vary from the custom made to those turned out by the commercial ammunition manufacturers in their hundreds of thousands. In addition custom made projectiles vary from specialist benchrest requirements to those used by varmint and general hunters.

So the starting point has to be the commercial ammunition manufacturers. The following were selected as representative of what is available on the Australian market: Federal, Hornady, Highland, Remington and Winchester. We aimed to obtain an average price so that we could compare with component materials available to the average reloader.

Prices were obtained out of current magazines and off various internet sites of well known firearm retailers. The type of projectile will have a great influence on the price of individual loadings. Obviously premium bullets cost more; and I have selected the more common loadings as a representative range. Generally, except where noted, premium loads were not taken into consideration. To the casual shooter or those who only fire a few rounds per annum reloading is probably not worth the outlay of equipment and time. The .204 Ruger appears to be quite popular if one believes the shooting press, 32 or 40 grain cartridges averaged $177/100 rounds, the dearest being Remington at $210/100 rounds, and the cheapest Hornady at $119.00. The .223 is a popular round with varmint and vermin hunters. We concentrated on the 55 grain loading that averaged out at $138/100. Other rounds were available in heavier loading but were not considered.



The venerable .243 Winchester was next. Most 90/100 grain loads averaged $158 per 100. It should be noted that not all retailers carried a full range of a particular calibre. You should also consider the cost of delivery if purchased interstate, a slightly higher price locally may turn out to be the cheaper in the end result.

The longstanding and accurate 6.5 X 55 is the first metric calibre to be considered. Projectile weight was between 139 and 140 grains. Prices were very consistent and averaged out at $133/100. Commercial ammunition for the famous 7 X 57 Mauser, similar to the 6.5 X 55 is, as one would expect, a little thin on the ground in relation to American ammunition companies. Metric calibres despite their performance have had a slow acceptance rate in the U.S.A. In this case only Federal had two offerings in 140 gn and another singular 175 gn soft point. Together with Highlands 175 soft point they averaged $256/100.

With the .270 Winchester only the 130 grain bullet loading was considered, others in the range of 140 and 150 grain offerings were available, there was lots of competition for this cartridge. It averaged out at $194/100. The popular .308 W similar to the 270 W had many different loads, mainly 150 grain but some 165's, once again keen competition and it averaged at $248/100.

LEFT PAGE: Reloading tools are an essential investment and a one-off cost. Good quality loading tools last indefinitely.

RIGHT PAGE: The cases need only be purchased once. The reloader's cost is in powder, primers and projectiles.

The .375H & H is an interesting one. Any cartridge of this size is obviously aimed (pun not intended) at larger, tougher animals. Therefore, almost invariably, commercial rounds are loaded with premium projectiles. This is reflected in the higher prices. The top Federal load was $685.00/100 loaded with a trophy bullet. Average overall was $362/100. It is fair to say that the purchaser of factory ammunition also has the ability to reload the fired cases.

For many shooters, particularly hunters, the cases are left where they are ejected. Of the eight cartridges used only two are used enough to warrant reloading - the .243W and .270W. Now came the interesting part, how to compare the reloader's costs. The first item on the agenda was to allow for the number of times that the home reloader can use a cartridge case.

I settled on five as a reasonable number, in truth most will attain more reloads out of any particular cartridge. However when you consider that in hunting situations some brass is lost I think that five is a reasonable averaged number.

There is a wide variation in the type and amount of brass carried by various retail stores. The less popular calibres are sometimes limited to one or two makers; they may be in short supply and/or expensive. In addition to Remington and Winchester other suppliers included Nosler, Highland, P.M.C., Lapua and RWS.

The next item, primers were much easier and averaged out at $6.00/100 for large rifle and large rifle magnum primers only. Powder also proved to be remarkably consistent. If you averaged out the price of ADI and Winchester the result was $50 per 500 gm bottle. If you took ADI in isolation the price dropped to $43.

For some ADI rifle powders it is possible to buy in 4 Kg bottles and the price drops to an equivalent of $27 per 500 gm bottle.

I think that it is reasonable to assume for our purposes that most Australian reloaders use ADI powder, each 500 gm bottle of powder contains 7717 grains. The next trick is to apportion the appropriate amount of powder in relation to each particular cartridge (who said this was easy). Using the ADI Handloaders guide we will average out the maximum powder charges for each bullet weight. You can argue the methodology but I consider it reasonable.

Thus for the Ruger .204 the average top charge is 27.5 grains of powder. Dividing the contents of a 500 gram bottle (7717 grains) we will get 280 reloads per bottle at a cost of $43. This equates to 15.4 cents per reload or $15 per 100. The .223 uses slightly faster powders with the 55 grain projectile, the average being 24.5 grains. 7717 divided by 24.5 gives 314 reloads. This is equal to 13.8 cents per reload or $14/100.

With the .243W we are starting to get into the heavier powder loads, the average of the 90/95/100 grains loads is 40.5 grains, this equals 190 loads per 500 gram bottle at a cost of 22.6 cents per load or $23/100.

The 6.5 X 55 Swedish Mauser produced an average of 43.0 grains using the 140 grain load, equal to 180 reloads at a cost of $24/100, this was more than the 7 X 57 which averaged out a little below the .243 W at 39.0 grains per load, this is equal to 198 loads from a 500 gm bottle of powder at a cost of $22/100 reloads.

The .270 W and its 130 grain bullet produced an average powder load of 54.0 grains which equated to 140 reloads at just over 30 cents each or $30/100, the .308W by contrast averaging out the powder loads for 150, 155 and 168 grain projectiles produced 175 reloads for 25 cents each or $25/100. And finally the .375 H&H, its 300 grain load consuming an impressive 70.0 grains of powder for 111 reloads at a cost of 39 cents each or $39/100.

Although we are only going to complete this exercise by considering the cost of the projectiles the so far unmentioned costs for the home reloader are those of the tools required. The most basic needs are a press and a set of dies for each calibre, perhaps we should also include all the other bits and pieces that reloaders seem to accumulate over time. Yes, you could amortize this cost over say 50 years but it really depends on the number of reloads a particular shooter will make over any time period.

▶▶

Some shooters will, depending on calibre, reload for one and purchase factory ammunition for others. One father and son pair I know shoot .270 W, .30/30 W, .45/70, .308W and a 9.3 X 62 between them. They reload for all calibres except the .308 W.

On the subject of projectiles, the following companies were considered, Hornady, Nosler, Remington, Sierra and Speer. Starting with the Ruger .204 the choice was fairly limited, I could only find two lots, one from Nosler and one from Sierra, for both projectile sizes. They averaged out at $40/100.

With the .223 and 55 grain projectiles the choice was much wider as this weight is also used in a wide variety of other calibres. There was a very large range of prices that varied from as low as $26/100 to $60/100 for premium projectiles for an average $39/100.

The .243W 90-100 grain projectiles varied considerably in price depending on both the company and the retailer, possibly some stock was much older and was not reflecting the current higher prices, overall they averaged out at $55/100. With the .270 W only the 130 grain projectile was considered and this averaged out at $80/100. With the 6.5 X 55 Swedish Mauser projectiles of any weight were not all that common and averaged $87/100.

An exception not considered were RWS premium projectiles at an advertised $154.00/100. In similar fashion the 7 X 57 had a variety of projectile weights and averaged $66/100.

The two 175 grain Sierra projectiles averaged $54/100.As expected the range of projectiles for the .308W was the greatest number researched, not surprising when you consider the popularity of both the .308 W and the .30/06 Springfield. Cost averaged out at $58/100. The range of projectiles in 300 gn for the .375 H & H tended to be the more expensive trophy type, a good idea when confronting any animal that may want to alter your appearance. The dearest was the RWS FMJ at $236/100 with the mean average $166/100.

When perusing the above figures remember the cost of brass per 100 allows for a minimum of five time use. The 6.5 X 55 is in fact the only factory load (in one brand) that is cheaper than reloading. The main reason for this is that the only factory ammunition I could find was Highland.

Most American companies load this round but it was simply not available when researching this article. It is a reasonably popular round with some Military Rifle Club members. If you allow for this fact then the reloader wins every time.

Owners of older, obsolete or less popular rifles almost invariably have to reload, as factory cartridges are almost certainly not available or the cost is prohibitive. In addition, there are specialist rounds that have only a limited application such as the 6 mm PPC benchrest round. Only Lapua & Norma produce this cartridge. All of the benchrest shooters that I know hand load for a specific rifle and never interchange ammunition from one rifle to another, possibly it would not fit anyhow.

I must stress yet again that it is possible to cut reloading costs even further by purchasing in bulk and keeping an eye on sales that appear in magazines and on the internet. It also depends on the game you seek. In many cases the use of a trophy bullet could reasonably be considered an unnecessary expense and the end result may do no better than a cheaper soft point.

Another consideration is that the ammunition companies spend a considerable amount on developing, advertising, promotion and packaging of their products. In addition the amount of ammunition produced in Australia is insignificant and thus there are importing transport costs. Winchester Australia only produces military and domestic .223 loads.
In the end the home reloader has the ability to tailor a round that is specific to his needs, whatever they may be. Personal satisfaction in producing such ammunition will always overcome the time element involved.✸

The following chart shows a summary of the average cost per hundred compared to factory ammunition.

	Brass	Primer	Powder	Bullet	Total	Factory Ammo
Ruger 204	$16	$6	$15	$40	$77	$177
.223	$13	$6	$14	$39	$72	$138
.243 W	$20	$6	$23	$55	$104	$158
6.5 X 55	$25	$6	$24	$65	$81	$133
7 X 57 Mauser	$53	$6	$22	$65	$146	$256
.270 W	$19	$6	$30	$65	$120	$193
.308 W	$19	$6	$25	$55	$108	$248
.375 H & H	$80	$6	$39	$120	$245	$380

ADI BRASS REVIEW

- Rob Alman

I first began shooting 5.56mm with 62gn projectiles over ADI brass and soon moved to 69 grainers whilst still remaining faithful to the same ADI brass. The changeover to Sierra's 80gn pill came with many changes and thankfully ADI were now producing a new batch of brass more in tune with the modern requirements of accuracy aficionados.

Current Choices Available - .223 Rem and 50 Cal.

My aim here is not to write another one of those articles where I tell you how to handload but simply to provide a comparison between new ADI brass straight out of the packet to the same brass after case prep during the course of being fired four times.

ADI was kind enough to supply me with 300 cases to carry out this review.

The first thing to notice is ADI's tougher plastic bag that would ensure shells get to you in a better state than that of many other brands should they be subject to rough handling.

The next thing to notice is the visible annealing on the cases. This has been done very evenly and gives piece of mind that a professional job has been done in the preparation of delivering a reliable product. Some other manufacturers polish their cases to remove this.

Note: This factory annealing should normally not need to be repeated throughout the useful life of the brass and doing so should only be carried out by the most experienced handloaders. It is extremely difficult to monitor and apply evenly the heat required without rendering the brass "Dangerous."

Weighing of new unused brass before any preparation alone may not give much useful information nor improve accuracy but it is my intention to show just what is achieved by creating uniformed brass ready for match use. It is my expectation that the extreme spread will be reduced and create batches with less deviation in weight.

ADI brass has an ES of 1.5gn straight off the shelf, which alone puts it streets ahead of many other brands I have tried.

Interesting though is that ADI's average weight of 96.79gn is heavier than most other .223R brass. This didn't limit me in the amount of powder I could load and some of this weight could also be attributed to the smaller amount of material removed to accommodate the improvement of the small flash hole.

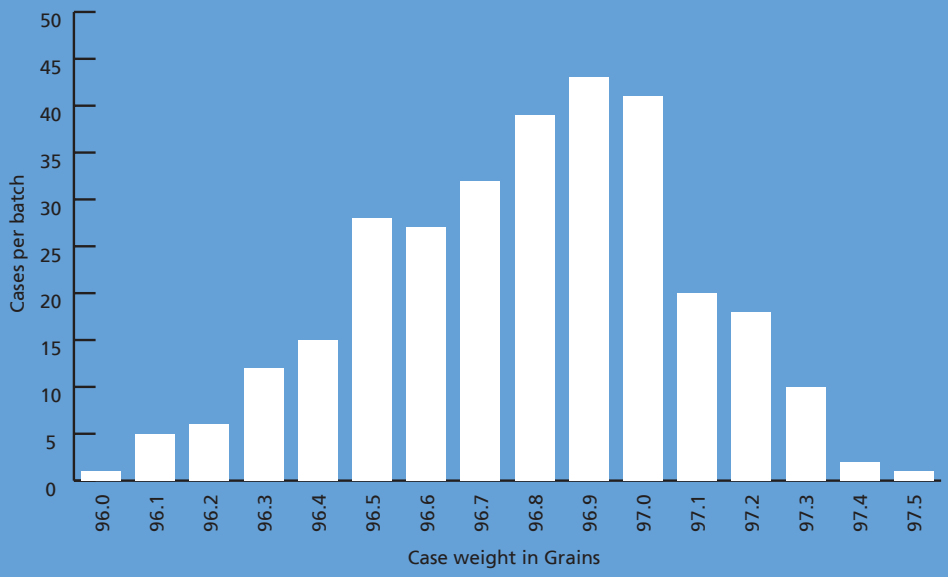
From the figures in the chart (right) we see a median weight, for new ADI brass, at just under 97gn's and also a good number of cases within that median weight.

We can deduce from this that the ADI cases will maintain an average weight heavier than that of many of the other commonly used cases and if this characteristic carries through to the match prep brass then a smaller case capacity may result.

Now to start case prep - the first stage will be to run all 300 through my Redding F/L Sizing die.

Note, that at this stage, I should remind you that the ADI has a very modern 70 thou flash hole.

New ADI brass



With F/L sizing completed it's off to my Lyman tumbler for a light clean and polish.

Some de-capping pins will not fit these smaller holes and either a smaller pin will need to be sourced or removed for first sizing to enable you to get started.

I am not about to list the dies that will suit but my Redding pin at 0.0625" was a goer without modification.

It will probably take a few firings for the annealing marks to disappear but this will in no way play a role in accuracy.

Straight from packet.

After tumbling.

Now to create a uniform length case.

Note that the ADI cases have been trimmed to the same length. Trimmed length = 1.749" or 44.425mm

ADI (left), Another brand with large flash hole (middle) & my reloads for weekend (right)

Test ammo ready for the range.

RCBS 3 Way cutter

Base to ogive measurement.

With the RCBS 3 Way cutter installed it is a breeze to trim and chamfer whilst reproducing consistent results for each case. After a clean with some compressed air and another visual inspection it was time to remove any internal flash hole burs.

I didn't have a tool that would fit the small flash hole and couldn't wait for the one to arrive that I ordered (the Redding one for .22), so off to the shed to make one. Modification to a No1 centre drill and a little bit of stainless rod coupled with a depth stop from another tool and I was ready. I soon discovered I had wasted my time because not one flash hole needed de-burring.

This ADI stuff is really shaping up and I can't wait to get some down range.

Initial case prep removed a total of 52.6gn of brass and has reduced the ES of ADI cases to 1.2gn.

The average weight of the ADI brass decreased by 0.18gn to 96.61 gn... (These results will be revisited once cases are fired and further case prep carried out).

To work up a load that suits I will start with light loads and run them across my chronograph. The first thing to do is find a weight shell and decide on that for the strings.

To maintain a control I will start with a clean barrel then fire 4 fouling shots followed by a string of 9 ADI loaded from 24.6 through 25.4 of AR2208.

In addition to this I have batched my 80gn Sierra's by weight (0.1gn ES over 500...I love Sierra!) and then by base to ogive (just 2 thou over same 500)...That's near enough for me.

I should also note that none of these loads are compressed. This may be partly because of a long throat/freebore in my rifle of 0.100 and in no way am I suggesting that these loads will be safe in any other combination. If in doubt, start loads much lighter.

Load	Velocity	mm from centre
24.6	2914	-22.7
24.7	2954	19.4
24.8	2941	18.3
24.9	2967	15.1
25	3004	11.4
25.1	2981	4.7
25.2	2982	14.6
25.3	2986	19.8
25.4	3000	28.8
Av = 2970	ES = 89.71	SD = 29.05

Fouling Shot Velocities	mm from centre
2938	21.3
3006	12.9
3026	14.9
3011	16.7

The first thing I noted was the low reading for the first fouling shot of the group, and is one of the reasons to include such shots prior to testing. This however did not detract from 8.4mm vertical dispersion at 300m. or an average of 1/6th MOA.

Secondary to this was the fact that the ADI velocities started high and finished high even with the load variations. Add to this just 2/3rd MOA vertical over the entire 9 shots.

I picked the 25.3gn load @ 2986 fps and loaded 24 rounds and fired them from 800m and was extremely impressed with the results. Apart from requiring three sighters they all went in the middle with a 50% V-Bull count and a daily score of 99.10.

More testing...

After removing a massive 225gn of material by neck turning, primer pocket uniforming and again trimming to length, the ADI brass ES reduced by a further 0.1gn but the effect of this was that each 0.1gn group now has larger workable amount of brass.

The average weight again decreased 0.11gn to 96.5gn which is now close to a full 0.3gn from new.

Unfortunately, I have not found any other brass that closely resembles such characteristics as well as maintaining a price per unit that makes it affordable for hunters and target shooters alike.

NOTE: An ultrasonic cleaner is used to clean brass inside and out to eliminate discrepancies from contaminate residues from firing.

The number of batches continues to decrease which in turn provides a larger number of useful cases per batch.

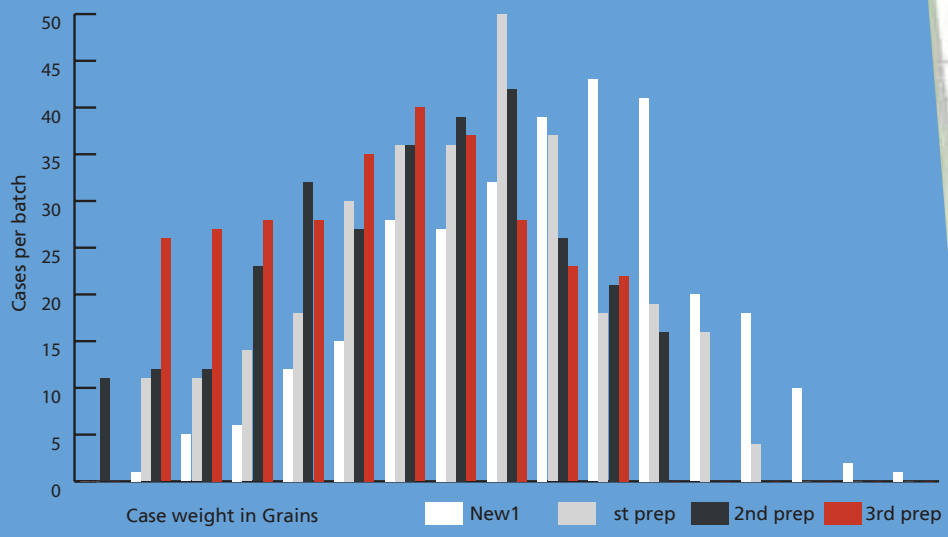
600y at Bindoon Rifle Club, 50.8... I really am looking forward to using this brass after firing & full match prep.

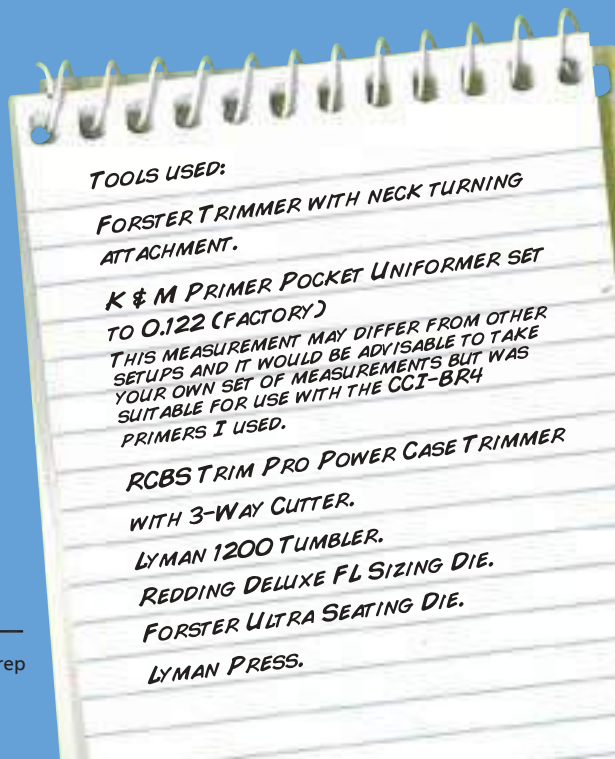
With the ES now down to 1.0 sorting into two or three batches will be sufficient for the life of the brass and whilst I do believe the ES may reduce even further following additional firings, there's enough evidence of the new ADI Brass quality that it will remain my choice of brass for now.

Actual removal of material (brass) appears to have levelled out somewhat with just 0.054gn average taken from each case bringing the average weight of each case to a shade over 96.44gn.

An overall comparison of the various stages of preparation is more indicative than any words. ✸

ADI brass preparation comparison





Outback Ammunition review

- Breil Jackson

Newly released from ADI is their line of Outback ammunition. It is currently available in two calibres - .223 and .308, in a range of different loadings. The ammunition is loaded at their Benalla facility, on fully refurbished and modernised equipment. The packaging is striking, with an inland Australian red dirt scene, a couple of kangaroos and a windmill. Of course, no Australian outback scene would be quite complete without including the Southern Cross.

The cartridges are in the better class of ammunition as evidenced by the fact they are loaded with Sierra or Swift bullets, including Sierra MatchKing and Swift Scirocco bullets. Sent for testing were loads in .223 Remington – 55gr Sierra BlitzKing and 69gr Sierra Hollowpoint MatchKing and .308 Winchester - 165gr Sierra Soft Point Boattail GameKing, 168gr Sierra Hollowpoint Boattail MatchKing and a 150gr Swift Scirocco II BTS.

The headstamp is marked ADI and the cases are manufactured in Australia, from imported brass cups. Both cases are fully reloadable with no problems extracting the primers or reseating new ones. In fact, on that front, I reloaded a couple of .223 cases ten times, as fast as I could shoot and load them, and they showed no sign of neck splitting or rupturing, and the primer pockets were still tight after ten reloads of 26 grains of AR2206H and a 55gr bullet. This is the maximum listing for a .223 with that bullet in the ADI handbook. I also sectioned a .308 case to observe how heavy the brass was.

It was slightly heavier than a commercial Winchester case in terms of thickness and head construction. Weighing half a dozen or so cases revealed them to be about 14 grains heavier than the Winchester, with about a half grain of variation case to case.

The great claim about this new Outback ammunition is what it says on the box – "extreme performance whatever the weather". This all boils down to the propellant used in the ammunition which is claimed to be extremely stable under varying temperature conditions, from +125°F (53°C) to 5°F (-20°C). In fact, the velocity is supposed to be only minimally changed regardless of the ammunition temperature within those parameters listed, so that you will get more consistent trajectory over the longer ranges.

Internally the ammunition is packaged in two plastic holders, each holding ten rounds.

Powders from ADI have for a long time been some of the most temperature stable available anywhere. This stems back to work done after the Vietnam war, where they had problems with 5.56 ammunition running high pressure when it got hot. They have been working on it since then and refining the process to the point where now they are getting the propellants so good that they hardly vary over a 60-70°C temperature range. I have been told that the new Benchmark powder is one of the better examples of the more temperature stable propellants they have produced, and this propellant is in the .223 Outback loads. However, the .308 loads have an entirely new propellant available only at this time in the Outback ammo. It is this propellant that exhibits the best temperature stability ADI has yet produced.

This temperature stability is being called Ballistic Temperature Independence (BTI).

On the back of the box, it says that BTI ammunition will hold a 1-inch high and 1-inch low trajectory variation out to 600 yards, due to highly consistent muzzle velocity from 125°F to 5°F, whereas they are suggesting, again on the box, that competitive ammunition without BTI would be 7-inches high at 600 yards at 125°F and 11-inches low at 5°F. You'll have to forgive me on the Fahrenheit readings, because that is what is on the box. It is obviously angled at the American market, particularly with the Whitetail deer on the back of the package. But that is the claim.

A claim like that needs to be tested. I set up my range and ran a target out to a measured 600 yards. I tuned up my old ballistic temperature oven that I bought off a ballistician years ago. We set up a deep freeze with freezer blocks, and set up the chronograph and waited for a dead calm day. Shooting at 600 yards has a lot of variables, so we had to try and do as much shooting as possible to get averages, and we were not so worried about horizontal dispersion, due to wind. In a .308, which was the primary focus of the 600 yard shooting, the time in flight is considerable, so the potential for wind drift is always there. Bear in mind too, that I only had a couple of packets of each type of ammunition, so I concentrated on the 168gr Sierra Hollowpoint MatchKing for the 600 yard testing, as it proved to be highly accurate. This would make the test a lot simpler, keeping all the bullets on the target.

Setting up the temperature control in the oven. The oven has its own temperature control, but I put a second thermometer in there to make sure we were around that 125°F for testing. We left them in there for an hour at this temperature to make sure everything was stabilised.

For testing I used a standard heavy barrel Sako 75 factory rifle with a 3.5-10x Leupold scope. This rifle features a set trigger and will happily put five shots into half an inch with its favoured ammunition consistently. A typical 5-shot group at 100 yards with this ammo was going about 0.85". A quick look at the Sierra ballistic table out to 600 yards showed we needed to be around 15" high at 100 yards for a dead on 600 yard zero at the published muzzle velocity of around 2800fps as specified on the packet.

We started shooting with the ammunition at room temperature. The ambient temperature on the day was about 26°C. Doing velocity testing we found the velocity average to be 2746fps, which is about 45fps lower than the factory specified figure, but still near enough. Obviously, a test gun in test conditions may well produce the 2790fps and some other rifles with different chambering and barrel specifications may well produce the stated velocity. That is really not of significance, in any case my chronograph is set up almost 2 metres from the muzzle, and measures over a 72" span.

Then came the interesting part. We set the ballistic oven at 53°C which is roughly 125°F, and the average of six shots was 2750fps, or 4fps more than the standard temperature. The cartridges felt quite hot to touch. Then at -15°C, which is as cold as I could get them, the performance of 6 shots was 2732fps, or 14fps lower than the standard temperature reading. That means we have an almost 70°C temperature variation producing 14fps velocity variation. Now that is staggering. I will get to what happened at the 600 yard target in a moment.

In years past, I have had boxes of factory ammo sitting on the dash of a vehicle on a hot day pop primers when fired and lock the bolt closed. Variation due to propellant temperature is real. When reloading in winter we often have to be mindful of maximums, because a safe maximum in winter may be too hot in summer.

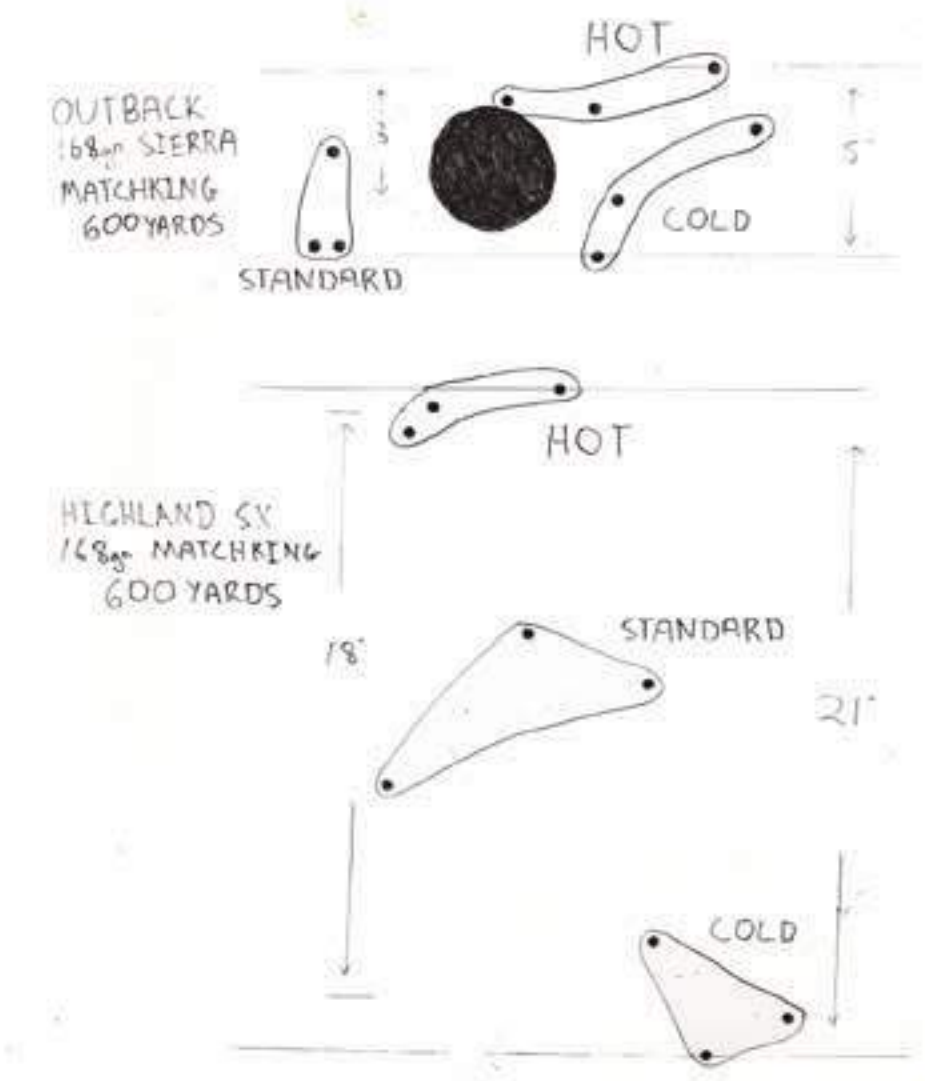
Just for comparison, we also subjected some Highland SX ammunition to the same testing, mainly because it is factory loaded with the 168gr Sierra MatchKing bullet. For simplicity's sake, getting all the bullets on the target when you are shooting the same weight and the same projectile, should be a lot easier at 600 yards. The SX is better than average bread and butter factory ammunition also, so it is a good comparison.

The back of the package shows ADI Outback ammunition's claim of temperature stability. On my testing, at least with the .308 ammo, I think their claim is pretty accurate.

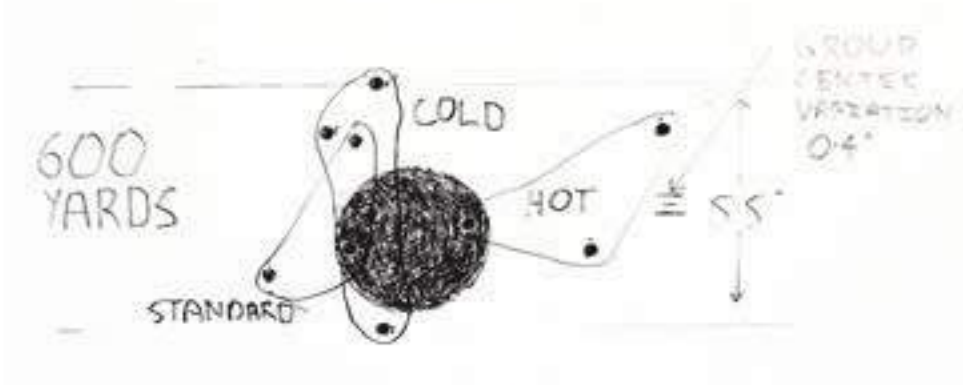
However, to my knowledge, the Highland round has no Ballisitic Temperature Independence powder in its loading. It has a slightly lower velocity of average 2589fps, so it was always a little lower on the target at 600 yards, which was probably helpful to view the results. At 53°C, it was 2636fps, that is +47fps above ambient, and at -15°C it was -69fps with a figure of 2520fps. That is 116fps variation over the same 70°C temperature range. However, it is on the 600 yard target where you really see the difference.

First up, I must tell you I am no benchrest shooter, and I have never been. I am not brilliant at doping the wind because I have never had a huge amount of experience at it, not at 600 yards, anyway. Our first few standard groups measured around 4" at 600 yards. We then shot the hot and the cold groups, and the extreme vertical spread from outside bullet to outside bullet was 5.5", at 600 yards. I paid no attention to horizontal dispersion because at 600 yards in a .308, as previously explained, field conditions cannot be controlled and you really can't use it as a basis for testing equipment. We are interested in velocity and vertical performance in this test and little else.

Interestingly, the extreme spread was all covered with the cold group, so the standard and the hot bullets, all landed within the cold group extreme height variation. The most interesting thing was that, at 5.5", we are still inside the vital zone of just about any animal you would care to hunt. That is not accounting for doping of the wind, and I certainly don't recommend that people shoot animals at 600 yards. This is a ballistic test on a target only. If you average the centre of each group (hot, cold, ambient) and compare the variation between them, it was a staggering 0.4" at 600 yards. This means the average vertical movement in the three groups sizes over the nine shots was less than 0.5".



Testing comparison of Outback Ammunition with Highland SX – both loads shooting exactly the same bullet – a 168gr SX MatchKing at 600 yards, using the same aiming point. This is a graphic illustration of the temperature stability of the Outback ammo. Note how the hot, cold and standard temperature loads with the Outback all fell within a 5" band. If you average the centre of each group, you will find they have all landed within a 3" band which is actually, in this example, more than I got with other groups shot at the same distance with the same ammo. Note the Highland SX ammo, without a BTI propellant varies in extreme range 21". Even the group centres are varying some 18" from hot, cold and standard temperature.



A replicated test at 600 yards with the 168gr MatchKing load – this time all the bullets landed within a 5.5" vertical band at 600 yards with the actual groups centres between hot, cold and standard varying less than 0.5". This is truly amazing temperature stability.

Top left: 100 metre groups with .308 Winchester ammunition supplied. Five shots for the MatchKing, three for the Swift and GameKing – these were typical of the results achieved at these distances.

Top right: The groups with .223 ammo at 100 yards. The bottom left group with the 69gr MatchKings needs a tighter twist rifle than I had, as they didn't shoot particularly well. The centre group with the 55gr BlitzKing measures about 0.65" the other groups with the same ammo up the top are hot and cold groups. The bottom right hand corner is nine shots of Winchester Supreme with a standard, hot and cold temperature all at 100 yards for comparison.

With this in mind, I decided to replicate the test. This time we got more horizontal dispersion and again a 5" extreme height variation, with the average height change of the three group centres being 1.4" at 600 yards. Finally, we thought we would try it one more time to confirm the results. I also shot the Highland MatchKing at 600 yards and put them on the target. The extreme variation with the third group was again 5", and the average of the three groups centre to centre was a neat 3". Interestingly, the Highland ammunition's extreme variation was 21", remembering that the Outback ammo with the same bullet was 5". The centre to centre group extreme variation with SX, was 18", which is quite amazing. On the back of the Outback ammo box, it suggests other ammunition could be 7" high and 11" low giving an extreme variation of 18", which is about exactly where it worked out in total variation, anyway. It is a graphic illustration of the benefit of having a stable propellant under all temperature ranges.

Obviously, in your hunting career, you may take the odd long shot, but everything would have to go your way. I would suggest that 500-yards is probably getting to the outer edge of where people should ever be hunting, because of the reliability of placing the projectile, due mostly to environmental factors. Even with this Ballistic Temperature Independence, animal welfare is always an issue. A wounded animal at 600 yards is a far bigger problem to solve than it is at 100 yards. Of course for someone who shoots at long range targets, they are going to love the stability of this ammunition.

We took the ammo out hunting pigs using the Scirocco and GameKing loads. Both these bullets performed well, with Scirocco being exceptional. Deep penetration, big mushroom, and high weight retention. The core bonding of the Scirocco is superior to the unbonded GameKing, which routinely shed its core. The GameKing was more accurate however, with 3 shots into 0.7" as opposed to the Sciroccos 1.5".

When it came time to shoot the .223, we could not replicate the same temperature stability as in the .308. It uses a different propellant, even though it is quite stable, it is not to the level of the .308 load. To test the .223, we again used a heavy barreled Sako 75 – a rifle that consistently puts five shots into 0.5" at 100 yards. Testing of the .223 focused on 100 yards, and we utilised velocity measurements to test the changes. The bottom line with the .223 was we got an extreme temperature variation over the 70°C of 70fps. To put it in perspective, we tested it against some Winchester Supreme 55gr Nosler Ballistic Tip, which is a very similar bullet to the Sierra BlitzKing used in the ADI Outback ammo. The Winchester Supreme, loaded with ball powder, had an extreme variation of 127fps, which is getting up towards double that of the BTI ammunition. So the Outback .223 still exhibits the same characteristics, only not as extreme as the .308 version.

On the accuracy front, five shots into 0.6" with factory ammunition was possible, with the largest groups being around 1.3". You can see the five shot groups on the target with the hot, cold and standard temperature. I did little more than velocity test the 69 grain .223 load as a faster twist than one in 10 is required to stabilize the bullets for best accuracy.

Outback Ammunition looks to be a very good quality product, and more calibres will be added in time. Those I have heard suggested are .243, .270 and .30-06, and in time even .22-250 and .30-30. This ammunition is also being exported in a big way. With ADI's new powder manufacturing facility currently being built, you would have to believe that these outstanding quality propellants will only get better, and the extreme BTI features shown in the .308 ammunition will be replicated across the range.

If you hunt in highly variable temperature conditions, from the heat of the Australian outback in the summer, to the cold, snow and ice of the sambar hills in the winter, then check out the range of Outback ammunition that is being distributed in Australia by Winchester. It is indeed right at the forefront of the future of high performance, highly temperature stable factory ammunition. ✸

Outback Ammunition .308 168gr Sierra Matchking

	High	Low	Extreme Spread	Average	Variation from ambient
Factory Spec				2791fps	+45fps
Ambient Temp 26°C	2798fps	2745fps		2746fps	-------
53°C	2755fps	2743fps	3.4fps	2750fps	+4fps
-15°C	2736fps	2726fps	12.6fps	2732fps	-14fps

Highland SX 168gr Sierra Matchking

	High	Low	Extreme Spread	Average	Variation from ambient
Ambient Temp 26°C	2594fps	2586fps	7.6fps	2589fps	
53°C	2650fps	2685fps	24.3fps	2636fps	+47fps
-15°C	2533fps	2507fps	26.5fps	2520fps	-69fps

Outback Ammunition .223 55gr Sierra Blitzking

	High	Low	Extreme Spread	Average	Variation from ambient
Factory Spec				3264fps	+166fps
Ambient Temp 27°C	3112fps	3073fps	38fps	3098fps	-------
53°C	3155fps	3130fps	24fps	3140fps	+42fps
-15°C	3097fps	3046fps	51fps	3070fps	-28fps

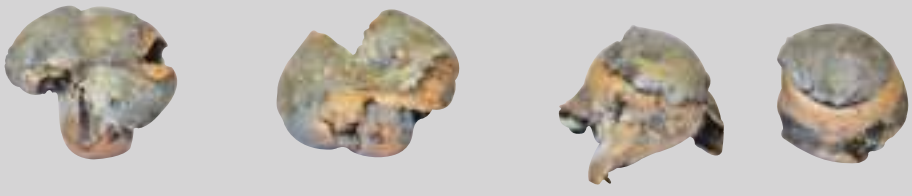
Winchester Supreme 55gr Nosler Ballistic Silver Tip

	High	Low	Extreme Spread	Average	Variation from ambient
Factory Spec				3240fps	+98fps
Ambient Temp 26°C	3202fps	3043fps	108fps	3142fps	-------
53°C	3203fps	3170fps	33fps	3186fps	+44fps
-15°C	3098fps	3024fps	75fps	3067fps	-83fps

ADI Outback Loads

	Factory Spec	Tested
165gr GameKing .308	2840fps	2790fps
150gr Scirocco II .308	2854fps	2823fps
69gr Sierra MatchKing .223	2959fps	2801fps

Sectioning of the cases shows the ADI case in the right, slightly heavier in construction than the Winchester case on the left, about 14 grains heavier, actually. I found the cases to be solid and did a reloading torture test on the .223s – I reloaded three cases ten times without any neck splitting or rupturing, and the primer pockets after ten loads were still tight.



Four Outback ammunition projectiles recoverd from pigs. Two on the left are Swift, two on the right are Sierra GameKings. Note the high core retention of the Swift Scirocco with its bonded construction, as compared to the GameKings.

ADI Powders

Powder	Application
Trail boss	Rifle/Pistol
AS30N	Shotgun/Pistol
AP50N	Pistol
AS50N	Shotgun
AP70N	Shotgun/Pistol
AP100	Pistol
AR2205	Rifle/Pistol
AR2207	Rifle

Powder	Application
Bench Mark 1	Rifle
AR2219	Rifle
Bench Mark 2	Rifle
Bench Mark 8208	Rifle
AR2206H	Rifle
AR2208	Rifle
AR2209	Rifle
AR2213SC	Rifle

Powder	Application
AR2217	Rifle
AR2225	Rifle
AR2218	Rifle

Bullet glossary

Brand abbreviation	
BAR	Barnes
BEAR CRK	Bear Creek
BER	Berger
BERB	Berry's Bullets
BLX	Bull-X
BTB	Beartooth Bullets
CPB	Cast Performance
FA	Freedom Arms
HDY	Hornady
LY	Lyman SPM
MEI	Meister
NOS	Nosler
REM	Remington
SFIRE	Sinterfire
SFT	Swift
SIE	Sierra
SPR	Speer
WDLGH	Woodleigh
WIN	Winchester

Bullet abbreviation	
AB	Accu-Bond
AF/SS	A-Frame Semi-Spitzer
BK	Blitz King
BR	Bench Rest
BT	Ballistic Tip
BTSP	Boat Tail Spire Point
FMC	Full Metal Case
FMJ	Full Metal Jacket

Bullet abbreviation	
FMJBT	Full Metal Jacket Boat Tail
FN	Flat Nose
FP	Flat Point
FPJ	Full Plated Jacket
FS	Fail Safe
GC	Gas Check
GDHP	Gold Dot Hollow Point
GDSP	Gold Dot Soft Point
GS	Grand Slam
HB	Hollow Base
HC	Hollow Cavity
HP	Hollow Point
HPBT	Hollow Point Boat Tail
HSP	Hollow Soft Point
IB	Inter Bond
JFP	Jacketed Flat Point
JHC	Jacketed Hollow Cavity
JRN	Jacketed Round Nose
JSWC	Jacketed Semi-Wadcutter
LBBWC	Lead Bevel Base Wadcutter
LCN	Lead Conical Nose
LF	Lead Free
LFN	Lead Flat Nose
LFNPB	Lead Flat Nose Plain Base
LFP	Lead Flat Point
LHBWC	Lead Hollow Base Wadcutter
LRN	Lead Round Nose
LSWC	Lead Semi-Wadcutter
MK	Match King
MT-SP	Mag Tip Soft Point

Bullet abbreviation	
PART	Partition
PSPCL	Pointed Soft Point Core-Lokt
RN	Round Nose
SB	Solid Base
SBT	Spitzer Boat Tail
SCIR	Scirocco
SJ	Short Jacket
SMP	Semi-Pointed
SP	Soft Point, Spitzer, Spire Point
SPBT	Soft Point Boat Tail
SPT	Spitzer
SSP	Single Shot Pistol
SST	Super Shock Tip
ST	Silver Tip
SX	Super Explosive
TACT	Tactical
TARG	Target
TMJ	Totally Metal Jacket
TSX	Triple Shock X
VAR	Varmint
VG FB	Varmint Grenade
VLD	Very Low Drag
W/GCK	With Gas Check
WC	Wadcutter
XBT	X Boat Tail
XBTC	X Boat Tail Coated
XFB	X Flat Base
XPB	X Pistol Bullet
XTP	Extreme Terminal Performance

SHOTGUN POWDERS

AS30N

A versatile fast burning rate, low bulk density shotgun and handgun powder. It can be loaded over a broad range of handgun cartridges giving superb accuracy, weapon function and clean burning. As a shotgun powder it can be loaded into 24 gram to 28 gram loads in 12 gauge with consistency and the cleanest burning characteristics gained.

TYPICAL LOAD: 12 gauge Winchester compression formed case 70mm length

WAD	Winchester WAA1224
PRIMER	Winchester W209
SHOT WEIGHT	24 grams lead shot
CHARGE WEIGHT	18.5 grains
VELOCITY	1,300 ft/sec
PRESSURE	9,500 psi

AS30N

An effective intermediate bulk density, fast/medium burning rate shotgun powder very suitable for 28 gram loads up to 1350 ft/sec in 12 gauge.

TYPICAL LOAD: 12 gauge Winchester compression formed case 70mm length

WAD	Winchester WAA12SL
PRIMER	Winchester W209
SHOT WEIGHT	28 grams lead shot
CHARGE WEIGHT	21.5 grains
VELOCITY	1,300 ft/sec
PRESSURE	10,450 psi

AP70N

A versatile medium burning rate handgun powder and an effective slow/medium burning rate shotgun powder. It can be loaded over a broad range of handgun cartridges, from .32 to .45 calibre. As a shotgun powder it can be loaded into 32 gram to 36 gram loads in 12 gauge as well as loads in 20 and 28 gauges.

TYPICAL LOAD: 12 gauge Winchester compression formed case 70mm length

WAD	Winchester WAA12
PRIMER	Winchester W209
SHOT WEIGHT	32 grams lead shot
CHARGE WEIGHT	24.5 grains
VELOCITY	1,300 ft/sec
PRESSURE	11,200 psi

Pistol powders

AS30N

A versatile fast burning rate, low bulk density shotgun and handgun powder. It can be loaded over a broad range of handgun cartridges giving superb accuracy, weapon function and clean burning. As a shotgun powder it can be loaded into 24 gram to 28 gram loads in 12 gauge with consistency and the cleanest burning characteristics gained.

TYPICAL LOAD: .38 Special (4" vented barrel) with 148 grain cast lead projectile

CHARGE WEIGHT	2.5 grains
VELOCITY	836 ft/secTrail

Trail Boss

Trail Boss is designed specifically for low velocity lead bullet loads for Single Action shooting. It is based on a whole new technology that allows very high loading density, good flow through powder measures, stability in regard to temperature variation and most importantly, additional safety for the handloader.

TYPICAL LOAD: 45 Colt with 200 grain cast lead projectile

CHARGE WEIGHT	6.5 grains
VELOCITY	855 ft/sec

AP50N

An effective intermediate bulk density medium/fast burning rate handgun powder very suitable for medium target loads in .38 special. It has proven its usefulness in equipment such as 'Ammo' Load for the automated reloading of ammunition for police and paramilitary applications in this calibre. Its burning rate, bulk density and clean burning properties are similar to those of AS50N shotgun powder but it has superior metering characteristics for small charge weights.

TYPICAL LOAD: .38 Special (4" vented barrel) with 148 grain cast lead projectile

CHARGE WEIGHT	3.6 grains
VELOCITY	745 ft/sec

AP70N

A versatile medium burning rate handgun powder and an effective slow/medium burning rate shotgun powder. It can be loaded over a broad range of handgun cartridges, from .32 to .45 calibre. As a shotgun powder it can be loaded into 32 gram to 36 gram loads in 12 gauge as well as loads in 20 and 28 gauges.

TYPICAL LOAD: .44 Remington Magnum (8" barrel) with 240 grain cast lead

CHARGE WEIGHT	10 grains
VELOCITY	1,225 ft/sec

AP100

An effective single base slow burning rate handgun powder suitable for major power factor loads in .38 super and similar cartridges. It shares the same clean burning and superior metering characteristics with the other ADI handgun powders.

TYPICAL LOAD: .38 Special (4" vented barrel) with 148 grain cast lead projectile

CHARGE WEIGHT	7.5 grains
VELOCITY	1,325 ft/sec

AR2205

A very fine grained, very fast burning rifle powder suited to .22 Hornet loads but also useful in some Magnum pistol loads. Its burning rate is close to that of IMR 4227.

TYPICAL LOAD: .357 Magnum (10" barrel) with 150 grain jacketed projectile

CHARGE WEIGHT	16.5 grains
VELOCITY	1,583 ft/sec

RIFLE POWDERS

Trail Boss

Trail Boss is designed specifically for low velocity lead bullet loads for Single Action shooting. It is based on a whole new technology that allows very high loading density, good flow through powder measures, stability in regard to temperature variation and most importantly, additional safety for the handloader.

TYPICAL LOAD: 45-70 Government with 385 grain cast lead projectile

CHARGE WEIGHT	16.0 grains
VELOCITY	1,140 ft/sec

AR2205

A very fine grained, very fast burning rifle powder suited to .22 Hornet loads but also useful in some Magnum pistol loads. Its burning rate is close to that of IMR 4227.

TYPICAL LOAD: .22 Hornet with 45 grain jacketed projectile

CHARGE WEIGHT	9.8 grains
VELOCITY	2,484 ft/sec

AR2207

A very useful fine grained fast burning rifle powder for cartridges such as the .222 Remington and 7.62mm x 39 Russian. Its burning rate is close to that of IMR 4198 although it meters significantly better through standard powder loaders.

TYPICAL LOAD: .222 Remington with 50 grain jacketed projectile

CHARGE WEIGHT	20.5 grains
VELOCITY	3,160 ft/sec

Bench Mark 1

A very fine grained powder with very high bulk density and superior metering characteristics for use by bench rest shooters in cartridges such as .22 PPC. It is intermediate in burning rate between AR2207 and AR2206.

TYPICAL LOAD: .223 Remington with 55 grain jacketed projectile

CHARGE WEIGHT	22.6 grains
VELOCITY	2,995 ft/sec

AR2219

Originally developed for the Australian Defence Force 5.56mm its burning rate lies between Bench Mark 1 and Bench Mark 2. It is considered having good accuracy in small and medium capacity cartridges.

TYPICAL LOAD: 6mm PPC with 70 grain jacketed projectile

CHARGE WEIGHT	26.5 grains
VELOCITY	3,068 ft/sec

Bench Mark 2

A fine grained powder with very high bulk density and superior metering characteristics for use in national rifle association match loads such as .223 Remington with 68-69 grain projectiles. It is similar in burning rate to AR2206, but can be faster depending on the calibre used.

TYPICAL LOAD: .22-250 Remington with 52 grain jacketed projectile

CHARGE WEIGHT	34.6 grains
VELOCITY	3,755 ft/sec

Bench Mark 8208

This short grain reloading powder has acquired a deserved reputation among serious shooters for accuracy and stability over a wide temperature range. Bench Mark 8208 will maintain consistency from lot to lot, meaning that a load developed for this powder will need less tweaking.

TYPICAL LOAD: .204 Ruger

CHARGE WEIGHT	27.3 grains
VELOCITY	3755 ft/sec

AR2206

TYPICAL LOAD: .308 Winchester with 155 grain jacketed projectile

CHARGE WEIGHT	44.5 grains
VELOCITY	2,825 ft/sec

RIFLE POWDERS

AR2206H

Has a burning rate slightly slower than AR2206, but faster than AR2208. A very versatile powder in a range of calibres giving outstanding accuracy.

TYPICAL LOAD: .308 Winchester with 155 grain jacketed projectile

CHARGE WEIGHT	46 grains
VELOCITY	2,873 ft/sec

AR2208

A useful fine grained medium/slow burning rifle powder for medium sized cartridges such as .308 Winchester and 25-06. Its burning rate is close to that of IMR 4064 but its bulk density is higher.

TYPICAL LOAD: 30-30 Winchester with 150 grain jacketed projectile

CHARGE WEIGHT	34.5 grains
VELOCITY	2,349 ft/sec

AR2209

A useful fine grained, moderately slow burning rifle powder for cartridges such as 22-250, .243 Winchester, .270 Winchester, 30-06 and 300 Winchester Magnum. Its burning rate is close to that of IMR 4350 but its bulk density is a little higher and its metering through a powder loader is better.

TYPICAL LOAD: .30-06 Springfield with 165 grain jacketed projectile

CHARGE WEIGHT	59 grains
VELOCITY	2,835 ft/sec

AR2213SC

A slow burning rate rifle powder for cartridges such as .270 Winchester and 300 Winchester Magnum. AR2213SC replaced AR2213 in the Australian reloading market.

TYPICAL LOAD: .300 Winchester Magnum with 165 grain jacketed projectile

CHARGE WEIGHT	75.5 grains
VELOCITY	3,055 ft/sec

AR2217

A fine grained, very slow burning rifle powder, suited for use in most large calibre magnums.

TYPICAL LOAD: .7mm Remington Magnum with 150 grain jacketed projectile

CHARGE WEIGHT	68 grains
VELOCITY	2,936 ft/sec

AR2225

A very slow burning rate propellant optimised for the 300 Remington Ultra Magnum. It is also suitable for large capacity magnum cases and small overbore cartridges.

TYPICAL LOAD: 300 Remington Ultra Magnum with 180 grain jacketed projectile

CHARGE WEIGHT	100.5 grains
VELOCITY	3,300 ft/sec

AR2218

An extremely slow burning rifle propellant, initially developed for the Australian Defence Force 0.50 cal and is perfect for over-bore, large capacity magnums.

TYPICAL LOAD: 30-378 Weatherby with 220 grain jacketed projectile

CHARGE WEIGHT	118.5 grains
VELOCITY	3,145 ft/sec

Rifle cases

.223 Cases

Our cases have been exclusively developed for military application and are manufactured to exacting military specifications. When you use ADI's cases you will achieve optimal performance and consistency every time. Used in conjunction with ADI powders you will be taking your quality, consistency and performance to the next level.

TYPICAL LOAD: 55 grain jacketed projectile with Bench Mark 1 Propellant

.50 Cal Cases

Nothing will prepare you for the performance of our .50 calibre cases. This highly specialised military case was designed and is manufactured for ultimate performance to military specifications. When used in conjunction with ADI powders you will experience rifle shooting at the highest level. Cases will be sold in bags of 10.

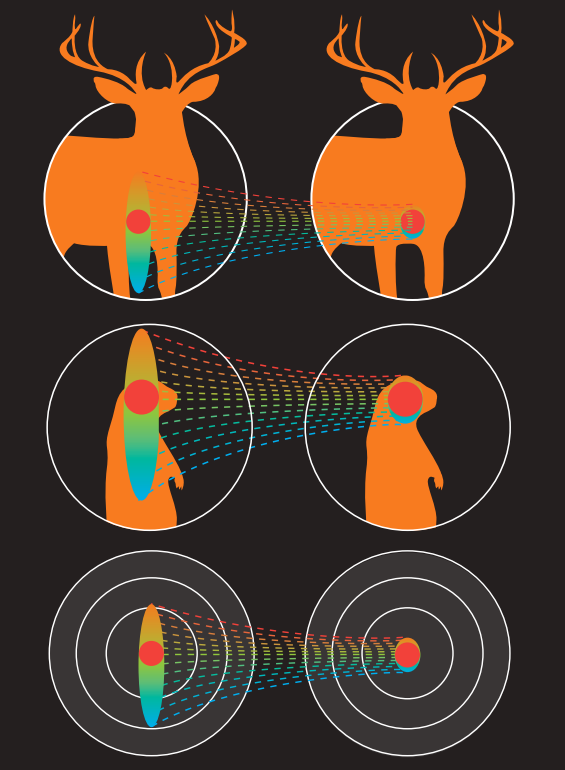
TYPICAL LOAD: 655 grain jacketed projectile and AR2218 Propellant.

AUSTRALIAN OUTBACK

EXTREME PERFORMANCE – WHATEVER THE WEATHER

The only ammunition with Ballistic Temperature Independence (BTI) technology.

No matter if it's scorching hot or freezing cold, Australian Outback ammunition delivers consistent extreme high velocity and accuracy in all shooting conditions.



- .223 Rem., 55gr., Sierra BlitzKing
- .223 Rem., 69gr., Sierra HPBT MatchKing
- .308 Win., 150gr., Swift Scirocco II BTS
- .308 Win., 165gr., Sierra SBT GameKing
- .308 Win., 168gr., Sierra HPBT MatchKing

www.outbackammo.com.au

RELOADING SAFETY

1. These instructions on Reloading Safety should be read in conjunction with the Warnings section.

2. Take care at all times - items and equipment used for reloading can all be dangerous if mishandled or abused.

3. Keep reloading components out of the reach of children - in particular powder, primers and lead projectiles.

4. Keep powder away from other combustible material and from possible sources of ignition.

5. Do not keep old powders, salvaged powders or powders of uncertain origins.

6. Do not smoke in areas where powder is stored or while handling powder or primers.

7. Only store powder in its original container to avoid the risk of the powder being mislabelled.

8. Do not leave any powder or primers in reloading presses or in powder/primer dispensers after handloading is completed.

9. Clean up spilled powder promptly. Use a brush and dustpan. Do not use a vacuum cleaner. Keep the waste powder under water in a suitable container until it can be disposed of safely. Do not accumulate large amounts of waste powder.

10. Each ADI Powder has specific burning rate and bulking characteristics determined by its composition, geometry and manufacturing process. The factors are carefully controlled during manufacture to ensure consistent ballistic performance. Do not attempt to mix or blend different powders as such mixtures may produce dangerous and erratic velocities and pressures.

11. Develop a strict routine for reloading operations and avoid distraction such as television, visitors etc.

12. Recheck each operation for safety and uniformity.

13. Double check critical points like powder type, projectile weight and diameter before starting.

14. Only have one powder type and one projectile type in the actual working area while reloading.

15. Do not trim cases below the minimum design length for any calibre.

16. Ensure that cases are not deformed and are free of body splits, mouth cracks, enlarged primer pockets, enlarged flash holes and any foreign matter. Only use cases which are dry (but do not dry cases by direct heating or in an oven above 150° C).

17. Check projectiles for damage and ensure that lead projectiles are free from casting defects.

18. Always wear safety glasses or goggles while reloading and wear gloves while handling lead projectiles.

19. Owing to the effect of variations within allowable manufacturing tolerances for cartridge components made by different manufacturers, weapon variations and conditions, operating temperatures etc, pressures developed by any given rifle or pistol load can vary significantly from those that apply to our recommended loads. It is therefore essential that loads be worked up from a charge weight lower than the recommended maximum, watching for any signs of excessive pressure (difficult extraction, gas leaks, flattened or blown primers, unusual recoil or expanded case heads). Loads can then be worked up to safe comfortable levels providing signs of excessive pressure are not observed. If signs of excessive pressure are noticed then loads must be reduced until they are at least 5% lower than the load at which the excessive pressure signs were first noted.

20. Take special care when working up trial loads with slow burning powders in large calibre cartridges. Light loads in some calibres may produce occasional dangerously high pressures. It is suggested that minimum loads in large calibre cartridges should not be reduced below about 75% case capacity.

RELOADING SAFETY

21. Keep detailed records of your safe loads for your weapons and consult them before reloading. However, be prepared to work them up again whenever you change the lot of powder or alter the weapon. Normally a starting reduction of 5% in charge weight is all that should be necessary when you change lots of powder.

22. Never exceed maximum recommended loads.

23. Carry out frequent check weighing of powder charges thrown either by a hand operated powder measure or reloading press to ensure the setting has not changed. At least five charges should be used for each check using a good set of powder scales.

24. Because many recommended loads (especially for pistols) do not fill the cartridge case it is essential that, prior to bullet seating, each filled case is individually inspected to ensure that it contains only a single charge. Never load a cartridge with a double charge as excessively dangerous pressures are certain to occur. After bullet seating, the cartridge overall length must be individually checked to ensure that it has not fallen below the minimum design value where excessive dangerous pressures may be experienced.

25. Ensure that all reloaded cartridges are free from oil, grease, excess lead bullet lubricant and any other foreign matter prior to firing.

26. Never attempt to decap live primers from a cartridge case. Primed cases or cartridges should always be fired in a firearm to destroy the primer. NOTE: Whenever practicable, avoid loading to maximum possible velocity. Experienced shooters know that velocities which are somewhat slower than maximum will usually give the best accuracy while helping to prolong weapon and barrel life and making shooting more comfortable.

27. Any questions or concerns related to the use of ADI Powders should be directed to:
Australian Munitions, Mulwala NSW at
reload.support@adi-powders.com.au

WARNING

1. For the safety of the purchaser and others, ADI powders must be used in accordance with the latest edition of the ADI Powders Handloaders' Guide. Overloading, incorrect storage or improper use can result in personal injury or death to the user and/or other persons as well as damage to property. It is essential that users of ADI powders:

- Follow the recommendations of the ADI Powders Handloaders' Guide by not exceeding the maximum loads.
- Use only the latest reloading data.
- Keep the powders out of reach of children and those persons unfamiliar with the properties of powders.
- Store the powders in a cool, dry and safe place with the lid tightly closed.
- Check the powders at least once per year for any signs of deterioration as described below.
- Store all powders in the original containers.
- Do not smoke in areas where ADI powders are stored and used.
- Do not have loaded firearms in areas where ADI powders are stored and used.

2. Loading data provided within the ADI Powders Handloaders' Guide has been compiled from many sources including actual ballistic testing by Australian Munitions under controlled conditions and published loading/ballistic information available in the literature. The ballistic performance of powders varies considerably depending upon factors such as the type of firearm being used and its condition, the particular components being used in a cartridge with a powder, the reloading techniques used, the actual batch of the powder being loaded, weather conditions at the time of firing, etc. Therefore, it is not possible for the loading data in the ADI Powders Handloaders' Guide (or any other similar manual) to be other than a guide to a safe load for any particular application. Exceeding the recommended loading data will increase the chance of obtaining unsafe pressures and may result in damage and/or personal injury or even death.

3. While Australian Munitions controls the burning rate of its various powders within tight limits at the time of manufacture, all other factors affecting the ballistic performance of these powders at the time of use are outside Australian Munitions's control. Australian Munitions therefore disclaims any and all warranties concerning the use of its various powders for any particular application. Australian Munitions does not assume, nor does it authorise any person to assume for it, any liability in connection with the use of any product or data.

4. The buyer of ADI Powders assumes the risk of having to follow safe loading practices otherwise damage and/or severe personal injury (including death) may occur.

5. NEVER substitute ADI Powders for black powder or Pyrodex® and NEVER mix ADI powders with these materials. NEVER use ADI powders in black powder firearms, saluting cannons or similar devices. Any of these practices may result in the firearm blowing apart resulting in property damage, personal injury or even death.

6. Store powders in a cool dry place separate from solvents, flammable gases and other combustible materials. Ensure that the storage area selected is free from any possible source of excess heat and is isolated from open flame, hot water heaters, furnaces, chimneys, flue pipes, etc. Avoid storing powders in areas which may be heated by the sun or where electrical, electronic or mechanical equipment is operated. Do not allow containers of powder to contact walls of storage areas that are exposed on the other side to sunlight or other form of heating. Any such form of heating or ignition may result in a fire, either immediately or after some time due to accelerated chemical deterioration and subsequent spontaneous ignition. An average storage temperature below 25° C is recommended to obtain a safe shelf life of at least 10 years from the date of packing. Increased storage temperature will reduce the safe shelf life significantly—by approximately one-third for every 10° C above 25° C.

7. All powders deteriorate chemically as they get older. This rate of deterioration can be accelerated by storage in warm conditions, exposure to other chemicals and exposure to direct sunlight etc. Any such deterioration may ultimately lead to a fire through spontaneous ignition of the powder. CHECK containers of smokeless powder for possible chemical deterioration through age or inadequate storage. Yearly checks are recommended. Chemical deterioration may ultimately lead to spontaneous ignition of the powder. Chemical deterioration of smokeless powder can be recognised by carefully smelling the contents of the container. Any deterioration produces an acrid, acidic odour quite different from the normal sweet smelling odours of ethanol or ether that are usually present. Rusting of metal surfaces exposed to smokeless powder can also indicate deterioration.

8. Deteriorated smokeless powder should be disposed of by carefully burning it in thin layers (not more than 10mm deep) in small quantities (never more than 500 gram) in an isolated location (at least 10 metres from any other combustible material). DO NOT LIGHT THE POWDER DIRECTLY. Always use an ignition train of slow burning combustible material so that you are able to retreat to a safe distance before the powder ignites.

WARNING

9. Store ADI Powders in their original containers, which have been approved for that purpose. Storage cabinets used for storage of containers of powders should be constructed of insulating materials with weak walls, seams or joints to provide easy venting in the event of a fire. Such storage cabinets should not be located on walls where heating on the other side (by the sun or other heating arrangement) will occur.

10. DO NOT SMOKE in areas where smokeless powder is stored or used.

11. DO NOT HAVE LOADED FIREARMS in areas where ADI Powders are stored or used—accidental or intended operation of the firearm may cause ignition of smokeless powder, either by direct ignition of powder in the open or through bullet impact on containers of powders.

12. Do not cut, pierce or puncture powder containers.

13. ADI rifle powders are designed to give less ballistic variation with temperature changes than regular powders. This does not mean that ballistics will never change with temperature. The extent to which change is minimised depends upon many factors including the calibre, primer brand and projectile weight. Care should always be taken to ensure that any particular load is safe at the extreme temperatures at which it will be used.

14. Powders can change their moisture reasonably quickly if exposed to the atmosphere. Any change of moisture can affect the powder burning rate and the effectiveness or safety of a particular load. Always minimise the exposure of any smokeless powder to the atmosphere during loading. Use minimum quantities of powder at any time in powder loaders and keep lids on containers tightly closed at all times. Do not keep powders in loaders for long periods of time. In this way you are more likely to preserve the appropriate level of moisture for the lot of the powder in use and obtain consistent reliable ballistic performances from every load.

15. Follow the hints on Reloading Safety given in the ADI Powders Reloader's Guide. Remember that powders and ammunition are explosive and that firearms are only designed to operate within safe working limits and are not indestructible. The wrong combination of powder burning rate, charge weight, cartridge components and weapon can be disastrous. ALWAYS TAKE EXTREME CAUTION when you are reloading.

16. Never mix any varieties of powder, regardless of their type, brand or source.

17. Do not salvage powder from old cartridges, and do not mix new and salvaged powder.

18. Always store powder in the smallest practical quantities. If you have large quantities of powder, do not maintain it all in one place only. Spread your containers, and remember that small containers are safer than large containers.

SHOTGUN DATA

Introduction

The shotgun data for this edition was developed through the use of pressure/proof barrels. All loads for standard cartridges adhere to the guidelines provided by the Sporting Arms and Ammunition Manufacturers Institute (SAAMI).

Loads have been listed in a convenient presentation that lists all components used for a given set of data. The data shown is to be used for lead shot only and should not be used with steel or bismuth shot. Never substitute components when loading shotshells using this data. Substitution of different components could cause excessive or unsafe pressures, which may result in damage to your firearm and/or personal injury.

Velocity

Velocity is measured electronically with the use of two magnetic sightscreens. The screens measure the time taken for the shot to pass through the screens. Screens are set at 3 feet apart with the first screen positioned 1½ feet from the muzzle.

Pressure

Pressures have been measured electronically with a transducer as pounds per square inch (psi). This method utilises a pressure transducer, which rests against the cartridge in the chamber. When the cartridge is fired, the gases cause the shotgun shell to expand against the pressure transducer.

Loading Instructions

When loading, weigh actual charges thrown by the bushing or charge bar. Bushing or charge bars do not throw the exact powder charge as listed in the tables. Charge weight variations occur because of small tolerances in bushing sizes, tolerances in bulk density of powder and the way each loader is mounted and operated. It is essential that charges being dropped are verified for safety and to ensure you are obtaining the charge weight listed.

SHOTGUN DATA

12 Gauge 2¾" (70mm) ACTIV Plastic Cases

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	19.0	6,150 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	19.0	6,150 PSI	1,200 fps	Gualandi	WIN209	30"
	20.0	6,600 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	20.0	6,600 PSI	1,250 fps	Gualandi	WIN209	30"
	20.5	7,150 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	20.5	7,150 PSI	1,300 fps	Gualandi	WIN209	30"
	21.5	7,700 PSI	1,350 fps	Gualandi	Fiocchi 616	30"
	21.5	7,700 PSI	1,350 fps	Gualandi	WIN209	30"
	22.5	8,250 PSI	1,400 fps	Gualandi	Fiocchi 616	30"
	22.5	8,250 PSI	1,400 fps	Gualandi	WIN209	30"

12 Gauge 2¾" (70mm) ACTIV Plastic Cases

28g - (1 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	19.0	8,100 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	19.0	8,100 PSI	1,200 fps	Gualandi	WIN209	30"
	19.8	9,000 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	19.8	9,000 PSI	1,250 fps	Gualandi	WIN209	30"
	21.0	10,200 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	21.0	10,200 PSI	1,300 fps	Gualandi	WIN209	30"
AS50N	21.0	7,050 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	21.0	7,050 PSI	1,200 fps	Gualandi	WIN209	30"
	21.6	7,850 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	21.6	7,850 PSI	1,250 fps	Gualandi	WIN209	30"
	22.6	8,700 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	22.6	8,700 PSI	1,300 fps	Gualandi	WIN209	30"

12 Gauge 2¾" (70mm) ACTIV Plastic Cases

32g - (1 1/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	18.7	11,250 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	18.7	11,250 PSI	1,200 fps	Gualandi	WIN209	30"
AS50N	21.0	8,550 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	21.0	8,550 PSI	1,200 fps	Gualandi	WIN209	30"
	22.0	10,450 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	22.0	10,450 PSI	1,250 fps	Gualandi	WIN209	30"
	22.6	11,350 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	22.6	11,350 PSI	1,300 fps	Gualandi	WIN209	30"
AP70N	26.0	8,800 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	26.0	8,800 PSI	1,250 fps	Gualandi	WIN209	30"
	27.0	9,850 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	27.0	9,850 PSI	1,300 fps	Gualandi	WIN209	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) ACTIV Plastic Cases

36g - (1 1/4 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	25.5	9,200 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	25.5	9,200 PSI	1,200 fps	Gualandi	WIN209	30"
	26.4	10,150 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	26.4	10,150 PSI	1,250 fps	Gualandi	WIN209	30"
	27.5	10,900 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	27.5	10,900 PSI	1,300 fps	Gualandi	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

24g - (7/8 oz) - Lee Lead Slug

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	31.3	8,435 PSI	1,550 fps	B&P H.24	Fiocchi 616	30"
	32.6	7,812 PSI	1,550 fps	WAA12SL	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	19.0	6,150 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	19.0	6,150 PSI	1,200 fps	Gualandi	WIN209	30"
	16.8	6,200 PSI	1,200 fps	WAA12SL	WIN209	30"
	20.0	6,600 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	20.0	6,600 PSI	1,250 fps	Gualandi	WIN209	30"
	18.0	7,200 PSI	1,250 fps	WAA12SL	WIN209	30"
	20.5	7,150 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	20.5	7,150 PSI	1,300 fps	Gualandi	WIN209	30"
	19.0	8,000 PSI	1,300 fps	WAA12SL	WIN209	30"
	21.5	7,700 PSI	1,350 fps	Gualandi	Fiocchi 616	30"
	21.5	7,700 PSI	1,350 fps	Gualandi	WIN209	30"
	22.5	8,250 PSI	1,400 fps	Gualandi	Fiocchi 616	30"
	22.5	8,250 PSI	1,400 fps	Gualandi	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

28g - (1 oz) - Lee Lead Slug

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	30.4	8,303 PSI	1,450 fps	B&P H.24	WIN209	30"
	30.0	8,446 PSI	1,450 fps	WAA12	WIN209	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

28g - (1 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	17.1	7,800 PSI	1,180 fps	WAA12SL	WIN209	30"
	19.5	7,750 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	19.5	7,750 PSI	1,200 fps	Gualandi	WIN209	30"
	18.5	9,200 PSI	1,235 fps	WAA12SL	WIN209	30"
	20.0	8,200 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	20.0	8,200 PSI	1,250 fps	Gualandi	WIN209	30"
	19.3	10,060 PSI	1,290 fps	WAA12SL	WIN209	30"
	21.0	9,050 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	21.0	9,050 PSI	1,300 fps	Gualandi	WIN209	30"
	22.0	9,800 PSI	1,350 fps	Gualandi	Fiocchi 616	30"
	22.0	9,800 PSI	1,350 fps	Gualandi	WIN209	30"
AS50N	19.0	7,100 PSI	1,180 fps	WAA12SL	WIN209	30"
	21.5	6,600 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	21.5	6,600 PSI	1,200 fps	Gualandi	WIN209	30"
	20.0	8,600 PSI	1,235 fps	WAA12SL	WIN209	30"
	22.5	7,250 PSI	1,250 fps	Gualandi	Fiocchi 616	30"
	22.5	7,250 PSI	1,250 fps	Gualandi	WIN209	30"
	21.1	9,600 PSI	1,290 fps	WAA12SL	WIN209	30"
	23.5	8,050 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	23.5	8,050 PSI	1,300 fps	Gualandi	WIN209	30"
	24.5	9,500 PSI	1,350 fps	Gualandi	Fiocchi 616	30"
	24.5	9,500 PSI	1,350 fps	Gualandi	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

32g - (1 1/8 oz) - Shot size 2 to BBs Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	26.5	8,096 PSI	1,300 fps	B&P H.24	Fiocchi 616	30"
	26.7	7,934 PSI	1,300 fps	WAA12	WIN209	30"
	27.8	8,898 PSI	1,350 fps	B&P H.24	Fiocchi 616	30"
	27.9	8,722 PSI	1,350 fps	WAA12	WIN209	30"
	28.4	9,299 PSI	1,375 fps	B&P H.24	Fiocchi 616	30"
	28.5	9,116 PSI	1,375 fps	WAA12	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

32g - (1 1/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS50N	19.2	7,000 PSI	1,090 fps	WAA12	WIN209	30"
	19.7	7,400 PSI	1,145 fps	WAA12	WIN209	30"
	22.0	8,500 PSI	1,200 fps	Gualandi	Fiocchi 616	30"
	22.0	8,500 PSI	1,200 fps	Gualandi	WIN209	30"
	21.0	8,500 PSI	1,200 fps	WAA12	WIN209	30"
	22.8	9,500 PSI	1,255 fps	Gualandi	Fiocchi 616	30"
	22.8	9,500 PSI	1,255 fps	Gualandi	WIN209	30"
	23.5	11,000 PSI	1,300 fps	Gualandi	Fiocchi 616	30"
	23.5	11,000 PSI	1,300 fps	Gualandi	WIN209	30"
AP70N	23.3	9,100 PSI	1,200 fps	WAA12	WIN209	30"
	24.0	9,600 PSI	1,255 fps	WAA12	WIN209	30"
	25.0	10,800 PSI	1,310 fps	WAA12	WIN209	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

36g - (1 1/4 oz) - Shot size 2 to BBs Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	25.8	8,626 PSI	1,250 fps	B&P H.21	Fiocchi 616	30"
	26.1	8,313 PSI	1,250 fps	WAA12F114	WIN209	30"
	26.9	9,554 PSI	1,300 fps	B&P H.21	Fiocchi 616	30"
	26.9	9,305 PSI	1,300 fps	WAA12F114	WIN209	30"
	28.0	10,482 PSI	1,350 fps	B&P H.21	Fiocchi 616	30"
	27.7	10,296 PSI	1,350 fps	WAA12F114	WIN209	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

36g - (1 1/4 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	24.0	10,900 PSI	1,220 fps	WAA12F114	Fiocchi 616	30"

12 Gauge 2¾" (70mm) Plastic Reiffenhaauser style cases (Fiocchi Cheddite)

SG/00 - 9 Lead Balls

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS50N	22.7	7,153 PSI	1,250 fps	B&P H.21	Fiocchi 616	30"
	22.3	7,067 PSI	1,250 fps	WAA12F114	WIN209	30"
	23.9	8,243 PSI	1,300 fps	B&P H.21	Fiocchi 616	30"
	23.5	8,164 PSI	1,300 fps	WAA12F114	WIN209	30"
	25.0	9,334 PSI	1,350 fps	B&P H.21	Fiocchi 616	30"
	24.7	9,260 PSI	1,350 fps	WAA12F114	WIN209	30"
AP70N	25.8	7,931 PSI	1,300 fps	B&P H.21	Fiocchi 616	30"
	26.7	7,312 PSI	1,300 fps	WAA12F114	WIN209	30"
	27.2	8,523 PSI	1,350 fps	B&P H.21	Fiocchi 616	30"
	27.6	8,150 PSI	1,350 fps	WAA12F114	WIN209	30"
	28.5	9,115 PSI	1,400 fps	B&P H.21	Fiocchi 616	30"
	28.5	8,988 PSI	1,400 fps	WAA12F114	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

24g - (7/8 oz) - Lee Lead Slug

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	29.7	9,548 PSI	1,550 fps	WAA12SL	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	16.8	7,000 PSI	1,200 fps	WAA1224	CCI209	30"
	16.8	7,000 PSI	1,200 fps	WAA1224	Fiocchi 616	30"
	16.8	7,000 PSI	1,200 fps	WAA1224	WIN209	30"
	17.5	8,350 PSI	1,255 fps	WAA1224	CCI209	30"
	17.5	8,350 PSI	1,255 fps	WAA1224	Fiocchi 616	30"
	17.5	8,350 PSI	1,255 fps	WAA1224	WIN209	30"
	18.5	9,500 PSI	1,300 fps	WAA1224	CCI209	30"
	18.5	9,500 PSI	1,300 fps	WAA1224	Fiocchi 616	30"
	18.5	9,500 PSI	1,300 fps	WAA1224	WIN209	30"
	19.2	10,600 PSI	1,350 fps	WAA1224	CCI209	30"
	19.2	10,600 PSI	1,350 fps	WAA1224	Fiocchi 616	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
	19.2	10,600 PSI	1,350 fps	WAA1224	WIN209	30"
AS50N	21.0	7,800 PSI	1,300 fps	WAA1224	CCI209	30"
	21.0	7,800 PSI	1,300 fps	WAA1224	Fiocchi 616	30"
	21.0	7,800 PSI	1,300 fps	WAA1224	WIN209	30"
	22.0	8,300 PSI	1,350 fps	WAA1224	CCI209	30"
	22.0	8,300 PSI	1,350 fps	WAA1224	Fiocchi 616	30"
	22.0	8,300 PSI	1,350 fps	WAA1224	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

28g - (1 oz) - Lee Lead Slug

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	28.1	9,984 PSI	1,450 fps	WAA12	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

28g - (1 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	17.0	8,450 PSI	1,180 fps	WAA12SL	CCI209	30"
	17.0	8,450 PSI	1,180 fps	WAA12SL	Fiocchi 616	30"
	17.0	8,450 PSI	1,180 fps	WAA12SL	WIN209	30"
	18.5	9,750 PSI	1,250 fps	WAA12SL	CCI209	30"
	18.5	9,750 PSI	1,250 fps	WAA12SL	Fiocchi 616	30"
	18.5	9,750 PSI	1,250 fps	WAA12SL	WIN209	30"
	19.5	11,000 PSI	1,300 fps	WAA12SL	CCI209	30"
	19.5	11,000 PSI	1,300 fps	WAA12SL	Fiocchi 616	30"
	19.5	11,000 PSI	1,300 fps	WAA12SL	WIN209	30"
AS50N	19.5	8,000 PSI	1,180 fps	WAA12SL	CCI209	30"
	19.5	8,000 PSI	1,180 fps	WAA12SL	Fiocchi 616	30"
	19.5	8,000 PSI	1,180 fps	WAA12SL	WIN209	30"
	20.4	9,200 PSI	1,250 fps	WAA12SL	CCI209	30"
	20.4	9,200 PSI	1,250 fps	WAA12SL	Fiocchi 616	30"
	20.4	9,200 PSI	1,250 fps	WAA12SL	WIN209	30"
	21.5	10,450 PSI	1,300 fps	WAA12SL	CCI209	30"
	21.5	10,450 PSI	1,300 fps	WAA12SL	Fiocchi 616	30"
	21.5	10,450 PSI	1,300 fps	WAA12SL	WIN209	30"
	22.5	11,250 PSI	1,350 fps	WAA12SL	CCI209	30"
	22.5	11,250 PSI	1,350 fps	WAA12SL	Fiocchi 616	30"
	22.5	11,250 PSI	1,350 fps	WAA12SL	WIN209	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

32g - (1 1/8 oz) - Shot size 2 to BBs Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	24.1	8,403 PSI	1,250 fps	WAA12	WIN209	30"
	25.0	9,411 PSI	1,300 fps	WAA12	WIN209	30"
	25.9	10,418 PSI	1,350 fps	WAA12	WIN209	30"
	26.4	10,922 PSI	1,375 fps	WAA12	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

32g - (1 1/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS30N	16.3	7,500 PSI	1,090 fps	WAA12	CCI209	30"
	16.3	7,500 PSI	1,090 fps	WAA12	Fiocchi 616	30"
	16.3	7,500 PSI	1,090 fps	WAA12	WIN209	30"
	17.0	10,000 PSI	1,145 fps	WAA12	CCI209	30"
	17.0	10,000 PSI	1,145 fps	WAA12	Fiocchi 616	30"
	17.0	10,000 PSI	1,145 fps	WAA12	WIN209	30"
AS50N	19.0	9,000 PSI	1,145 fps	WAA12	CCI209	30"
	19.0	9,000 PSI	1,145 fps	WAA12	Fiocchi 616	30"
	19.0	9,000 PSI	1,145 fps	WAA12	WIN209	30"
	19.5	9,850 PSI	1,200 fps	WAA12	CCI209	30"
	19.5	9,850 PSI	1,200 fps	WAA12	Fiocchi 616	30"
	19.5	9,850 PSI	1,200 fps	WAA12	WIN209	30"
AP70N	23.0	9,750 PSI	1,200 fps	WAA12	CCI209	30"
	23.0	9,750 PSI	1,200 fps	WAA12	Fiocchi 616	30"
	23.0	9,750 PSI	1,200 fps	WAA12	WIN209	30"
	23.5	10,100 PSI	1,250 fps	WAA12	CCI209	30"
	23.5	10,100 PSI	1,250 fps	WAA12	Fiocchi 616	30"
	23.5	10,100 PSI	1,250 fps	WAA12	WIN209	30"
	24.5	11,200 PSI	1,300 fps	WAA12	CCI209	30"
	24.5	11,200 PSI	1,300 fps	WAA12	Fiocchi 616	30"
	24.5	11,200 PSI	1,300 fps	WAA12	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

36g - (1 1/4 oz) - Shot size 2 to BBs Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	23.8	10,365 PSI	1,250 fps	WAA12F114	WIN209	30"
	24.9	11,358 PSI	1,300 fps	WAA12F114	WIN209	30"

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

36g - (1 1/4 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	22.5	11,400 PSI	1,220 fps	WAA12F114	CCI209	30"
	23.0	10,900 PSI	1,220 fps	WAA12F114	WIN209	30"

SHOTGUN DATA

12 Gauge 2¾" (70mm) Winchester Compression-formed AA & HS type plastic cases

SG/00 - 9 Lead Balls

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AS50N	21.1	8,963 PSI	1,250 fps	WAA12F114	WIN209	30"
	22.3	10,023 PSI	1,300 fps	WAA12F114	WIN209	30"
	23.5	11,084 PSI	1,350 fps	WAA12F114	WIN209	30"
AP70N	24.9	8,646 PSI	1,300 fps	WAA12F114	WIN209	30"
	25.8	9,498 PSI	1,350 fps	WAA12F114	WIN209	30"
	26.7	10,350 PSI	1,400 fps	WAA12F114	WIN209	30"

16 Gauge 2¾" (70mm) Winchester AA Plastic Compression-Formed Cases

28g - (1 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	19.0	9,200 PSI	1,165 fps	WAA16	WIN209	30"
	20.0	10,300 PSI	1,220 fps	WAA16	WIN209	30"
	20.7	11,000 PSI	1,275 fps	WAA16	WIN209	30"

20 Gauge 2¾" (70mm) ACTIV Plastic Cases

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	18.5	8,300 PSI	1,200 fps	WAA20	WIN209	30"

20 Gauge 2¾" (70mm) ACTIV Plastic Cases

28g - (1 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	18.5	8,700 PSI	1,165 fps	WAA20F1	CCI209	30"
	19.0	9,600 PSI	1,220 fps	WAA20F1	CCI209	30"

20 Gauge 2¾" (70mm) Winchester AA Plastic Compression-Formed Cases

22g - (3/4 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	15.0	8,700 PSI	1,180 fps	WAA20	CCI209	30"
	15.0	8,700 PSI	1,180 fps	WAA20	WIN209	30"
	16.0	9,820 PSI	1,245 fps	WAA20	CCI209	30"
	16.0	9,820 PSI	1,245 fps	WAA20	WIN209	30"
	17.0	11,050 PSI	1,320 fps	WAA20	CCI209	30"
	17.0	11,050 PSI	1,320 fps	WAA20	WIN209	30"

20 Gauge 2¾" (70mm) Winchester AA Plastic Compression-Formed Cases

24g - (7/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	15.0	10,100 PSI	1,125 fps	WAA20	CCI209	30"
	15.0	10,100 PSI	1,125 fps	WAA20	WIN209	30"
	15.5	10,700 PSI	1,160 fps	WAA20	CCI209	30"
	15.5	10,700 PSI	1,160 fps	WAA20	WIN209	30"
	16.0	11,400 PSI	1,200 fps	WAA20	CCI209	30"
	16.0	11,400 PSI	1,200 fps	WAA20	WIN209	30"

SHOTGUN DATA

20 Gauge 3" (75mm) Remington Premier Plastic Cases

32g - (1 1/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	17	10,070 PSI	1,075 fps	Rem. SP 20	WIN209	30"
	18	11,990 PSI	1,135 fps	Rem. SP 20	WIN209	30"

20 Gauge 3" (75mm) Winchester AA Plastic Compression-Formed Cases

32g - (1 1/8 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	16	11,130 PSI	1,070 fps	Rem. SP 20	WIN209	30"
	16.5	11,980 PSI	1,105 fps	Rem. SP 20	WIN209	30"

28 Gauge 2¾" (70mm) Winchester AA Plastic Compression-Formed Cases

22g - (3/4 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AP70N	13.0	10,800 PSI	1,200 fps	WWAA28	WIN209	30"

410 Bore 2½" Winchester AA Plastic Compression-Formed Cases

14g - (1/2 oz) - Shot size 3 to 12 Lead

Powder	Weight (grains)	Pressure	Velocity	Wad type	Primer type	Barrel length
AR2205	14.0	10,500 PSI	1,200 fps	WWAA41	CCI209M	28"
	14.0	10,500 PSI	1,200 fps	WWAA41	WIN209	28"

SHOTGUN POWDER BUSHING CHART AS30N

CHARGE WEIGHT (grains)	LEE	PONSNESS WARREN	BLAIR	MEC	LYMAN	REDDING	PACIFIC DL-155 DL-155APF DL-105	PACIFIC DL-266	PACIFIC DL-366	TEXAN GT, FW, LT A, AP, D, DP	TEXAN M	HORNADY
16.0	.141	H		29								429
16.5	.148	F1				12	414	420	420	124	126	
	.155	I	429	30	H10	13						
17.0	.163	J		31						125	127	441
17.5		J1	441		H11		423	432	432		128	
18.0		J2		32		14				127	129	456
18.5	.171	G	450				432	441	441	128		
		G1		33							130	
19.0	.180				H11A		444	450	450	1129	131	468
			449	34	H12							
19.5		M	465							130	132	
20.0	.189			35			453	459	462	131		483
20.5		N		36	H13	15				132		
21.0		O		37								495
21.5		P										
22.0	.198	Q		38								507
22.5				38A								
23.0												
23.5												

NOTE:
This bushing chart does not represent recommended charge weights. It is intended only as a guide to the approximate weight of powder which will be dropped by the listed bushing. It is essential that charges being dropped are weighed on each occasion a loading machine is used.

SHOTGUN POWDER BUSHING CHART AS50N

CHARGE WEIGHT (grains)	LEE	PONSNESS WARREN	BLAIR	MEC	LYMAN	REDDING	PACIFIC DL-155 DL-155APF DL-105	PACIFIC DL-266	PACIFIC DL-366	TEXAN GT, FW, LT A, AP, D, DP	TEXAN M	HORNADY
13.7	.105			21								
14.0												375
14.3				22								378
14.6												381
												384
14.9				23								387
												390
15.2	.116	D										393
15.5		D1		24								396
16.0	.122	E		25								402
16.5	.128	E1		26								408
				27								414
17.0		E2										
17.5	.134	F1		28								420
18.0				29								423
18.5	.141	H				12				124		429
19.0		I	429	30	H10	13	414	420	420	125	126	435
19.5	.148	J		31							127	441
20.0		J1	441		H11		423	423	432	126	128	447
20.5	.155	K	450	32		14				127		453
							432	441	441		129	
21.0				33						128	130	459
21.5	.163	L			H11A					129		465
			459		H12		444	450	450		131	
22.0				34						130		471
22.5	.171	M	465								132	477
23.0				35			453	459	462	131	133	483
23.5	.180	N		36		15	462	479	474	132		489
24.0		O			H13							495
24.5	.189	P		37								501
25.0		Q		38								507
25.5												
26.0	.198			38A								

NOTE:
This bushing chart does not represent recommended charge weights. It is intended only as a guide to the approximate weight of powder which will be dropped by the listed bushing. It is essential that charges being dropped are weighed on each occasion a loading machine is used.

SHOTGUN POWDER BUSHING CHART AP70N

CHARGE WEIGHT (grains)	LEE	PONSNESS WARREN	BLAIR	MEC	LYMAN	REDDING	PACIFIC DL-155 DL-155APF DL-105	PACIFIC DL-266	PACIFIC DL-366	TEXAN GT, FW, LT A, AP, D, DP	TEXAN M	HORNADY
12.7		C									112	
13.0		C		16								330
13.5				17							113	
13.6										111		
14.0		D1		18						112	114	342
14.5				19							115	
15.0											116	354
15.5	.095	E		20						113	117	
16.0				21						114		366
		E1		22						115		
16.5										116	118	372
	.105											
17.0		E2		22							119	378
		D								117		
17.4				23								384
	.110	D1								118	120	
18.0		F									121	390
18.5	.116	F1		24								393
19.0		F6		25						119	122	402
19.4	.122		26							120	123	405
20.0	.123	G		27						121	124	411
20.6		G1								122		417
21.0	.134			28						123		420
21.5							423	420	420		126	423
22.0		H		29		12				124	127	429
22.5	.141			30			432	432	432		128	432
23.0		I	429			13				125		438
23.5	.148			31	H10					126		441
						14				127		
24.0	.151	J	441		H11		447	447	447		129	447
24.5	.155	J1		32							130	450
25.0		K					456	456	456	128	131	456
	.163	L	450	33						129		
26.0			459	34			468	468	468		132	468
				35						130	133	
27.0	.171	M	465				480	480	480	131		480
28.0		N		36		15				132		489
29.0		O		37	H13					133		501

NOTE:
This bushing chart does not represent recommended charge weights. It is intended only as a guide to the approximate weight of powder which will be dropped by the listed bushing. It is essential that charges being dropped are weighed on each occasion a loading machine is used.

PISTOL

17 Bumble Bee

Case: Winchester (reformed) **Barrel length:** 10"
Twist: 1:10" **Trim length:** 0.910"
Primer: Federal 200

				Start loads			Maximum loads		
Bullet	**Powder**	**Bullet Diam.**	**C.O.L.**	**Grs.**	**Velocity**	**Pressure**	**Grs.**	**Velocity**	**Pressure**
25 GR. HDY HP	AR2205	.172"	1.290"	6.0	2,033 fps	-	7.0	2,331 fps	-

22 Hornet

Case: Winchester **Barrel length:** 15"
Twist: 1:16" **Trim length:** 1.393"
Primer: Winchester SR

				Start loads			Maximum loads		
Bullet	**Powder**	**Bullet Diam.**	**C.O.L.**	**Grs.**	**Velocity**	**Pressure**	**Grs.**	**Velocity**	**Pressure**
35 GR. HDY V-MAX	AR2205	.224"	1.725"	10.5	2,579 fps	35,600 CUP	11.6C	2,770 fps	42,500 CUP
40 GR. SPR SP	AR2205	.224"	1.725"	9.0	2,403 fps	39,900 CUP	10.2	2,458 fps	43,000 CUP
45 GR. BAR XBT	AR2205	.224"	1.850"	8.5	2,189 fps	37,000 CUP	9.8	2,339 fps	42,700 CUP
	AR2207	.224"	1.850"	10.5	2,010 fps	31,500 CUP	11.5C	2,261 fps	36,900 CUP
45 GR. HDY SP	AR2205	.224"	1.750"	8.5	2,202 fps	39,900 CUP	9.8	2,349 fps	42,000 CUP
	AR2207	.224"	1.750"	10.5	2,002 fps	28,000 CUP	11.5C	2,200 fps	32,000 CUP
50 GR. SIE SP	AR2205	.224"	1.850"	8.4	2,120 fps	39,700 CUP	9.4	2,270 fps	41,800 CUP
	AR2207	.224"	1.850"	10.5	2,007 fps	28,200 CUP	11.5C	2,203 fps	34,100 CUP
53 GR. BAR XFB	AR2205	.224"	1.850"	8.0	1,943 fps	37,600 CUP	8.7	2,068 fps	43,000 CUP
	AR2207	.224"	1.850"	10.0	1,859 fps	31,600 CUP	11.0	2,098 fps	40,600 CUP
55 GR. HDY SP	AR2205	.224"	1.850"	8.0	1,987 fps	41,800 CUP	9.0	2,151 fps	43,000 CUP
	AR2207	.224"	1.850"	10.0	1,846 fps	30,000 CUP	11.5	2,182 fps	41,000 CUP

22 Remington Jet Magnum

Case: **Barrel length:** 10"
Twist: - **Trim length:** -
Primer:

				Start loads			Maximum loads		
Bullet	**Powder**	**Bullet Diam.**	**C.O.L.**	**Grs.**	**Velocity**	**Pressure**	**Grs.**	**Velocity**	**Pressure**
40 GR.	AP100	-	-	-	-	-	8.0	1,800 fps	-
40 GR. *	AR2205	-	-	-	-	-	13.5	2,290 fps	32,900 CUP
45 GR.	AP100	-	-	-	-	-	7.5	1,700 fps	-
	AR2205	-	-	-	-	-	12.5	2,300 fps	-

* 8 3/8" Barrel

22 K Hornet

Case: Winchester **Barrel length:** 15"
Twist: 1:14" **Trim length:** 1.393"
Primer: Winchester SR

				Start loads			Maximum loads		
Bullet	**Powder**	**Bullet Diam.**	**C.O.L.**	**Grs.**	**Velocity**	**Pressure**	**Grs.**	**Velocity**	**Pressure**
35 GR. HDY V-MAX	AR2205	.224"	1.725"	11.0	2,747 fps	39,500 CUP	12.3	2,924 fps	46,000 CUP
40 GR. NOS BT	AR2205	.224"	1.900"	11.0	2,644 fps	37,500 CUP	12.2C	2,822 fps	45,500 CUP
45 GR. BAR XBT	AR2205	.224"	1.850"	10.5	2,502 fps	40,900 CUP	11.3	2,619 fps	45,300 CUP
45 GR. SPR SP	AR2205	.224"	1.750"	10.7	2,520 fps	40,700 CUP	11.7	2,669 fps	45,500 CUP
50 GR. SIE BK	AR2205	.224"	1.900"	10.0	2,375 fps	40,200 CUP	11.0	2,520 fps	45,700 CUP
	AR2207	.224"	1.900"	11.5	2,201 fps	30,100 CUP	12.5C	2,386 fps	38,700 CUP
53 GR. BAR XFB	AR2205	.224"	1.850"	9.5	2,240 fps	39,000 CUP	10.5	2,357 fps	45,900 CUP
	AR2207	.224"	1.850"	11.5	2,153 fps	30,200 CUP	12.5C	2,335 fps	42,600 CUP
55 GR. HDY SP	AR2205	.224"	1.850"	10.0	2,313 fps	43,400 CUP	11.0	2,443 fps	46,100 CUP

C = Compressed Load: **L** = Lead Projectile