



# APEX 3.1™

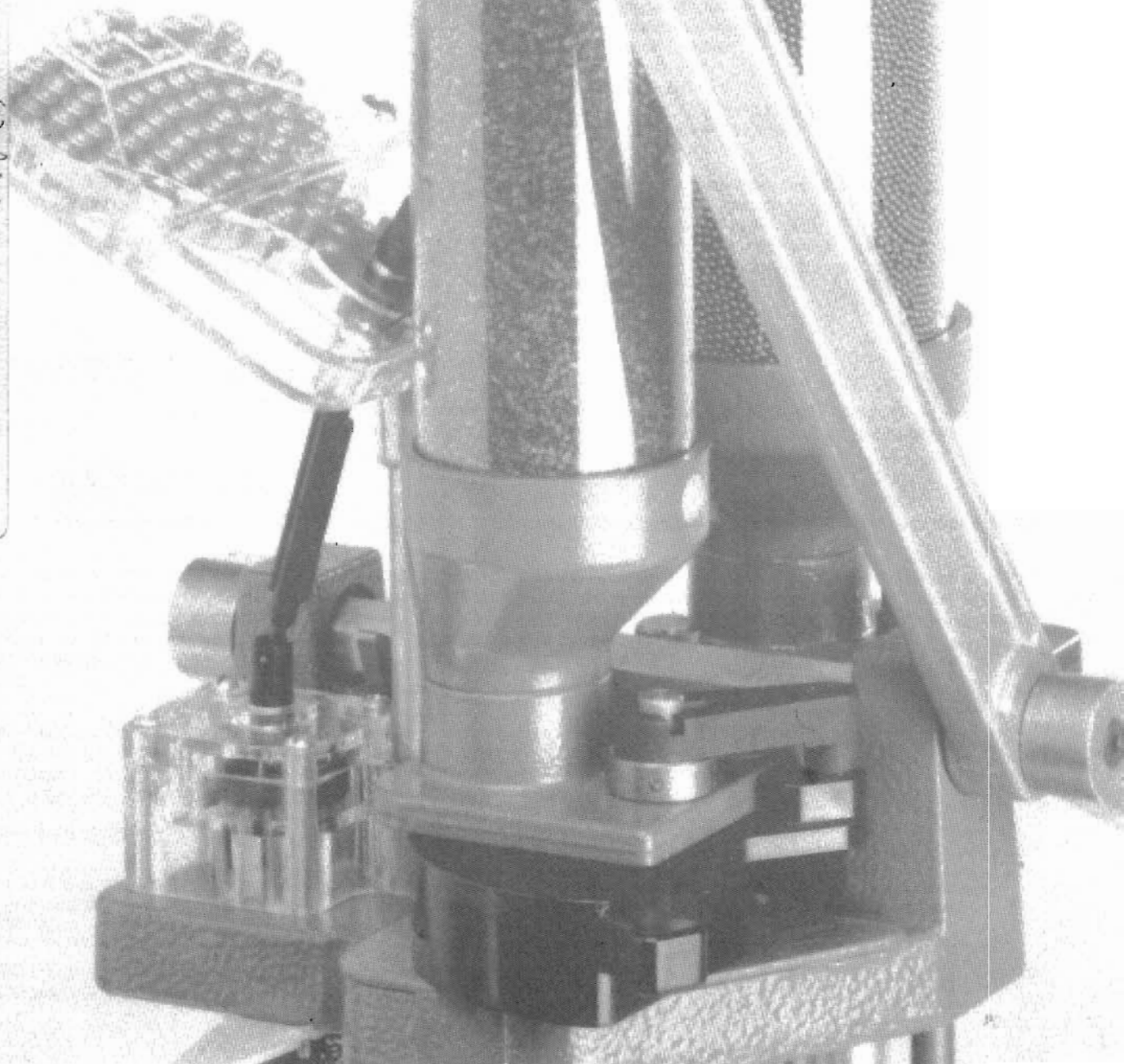
## INSTRUCTION MANUAL

*APEX 3.1 Automatic*

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\*NOTICE\*







# APEX 3.1™

## INTRODUCTION

This instruction manual will show you how easy it is to set up and operate the fully automatic APEX Auto.

To begin loading shotshells, you will need powder, shot, primers and wads, in addition to empty hulls. We have included several bushings with your loader. These bushings throw the most common charges used for most popular target loads.

There is a bushing chart on page 21. There, you will see a list of powders along with the bushings for those powders (additional bushings are available at your dealer). Find your bushings in that chart, and note the powder/loads they are designed for. Read the section "Selection of Bushings" for more information. If you prefer to use powder or shot other than the ones for the bushings that come with your loader, those bushings are available from your dealer or from Hornady. Call 1-800-338-3220 for information.

The APEX 3.1 reloader will use any of the standard bushings Hornady offers, should you want to change loads. These bushings, Versalite™ wads, and other reloading accessories are available at your Hornady dealer, or from Hornady Mfg. Order information is in the back of the manual.

## PARTS BAG CONTENTS

- 1 Powder/Shot Drain Tube
- 3 Powder Charge Bushings
- 1 Shot Charge Bushing
- 1 3/32" Hex Wrench
- 1 7/64" Hex Wrench
- 1 1/8" Hex Wrench
- 1 5/32" Hex Wrench
- 1 5/64" Hex Wrench

- 1 6-point Crimp Starter
- 1 Paper (smooth) Crimp Starter
- 1 Spent Primer Catcher
- 1 Spring Finger
- 1 Cleaning Brush
- 4 Plastic Hopper Attaching Rivet
- 1 Primer Feed Ball Joint Shaft

12 Gauge APEX 3.1 includes these bushings:

Bushing	Charge
#190108	1 1/8 oz. #7 1/2 lead shot
#363	19.5 gr. Winchester Superlite
#426	17.5 gr. Accurate Arms Nitro 100
#468	18 gr. Hercules Red Dot
	18.5 gr. Hodgdon Clays
	19.5 gr. Hodgdon International

20 Gauge APEX 3.1 includes these bushings:

#190101	7/8 oz. #9 lead shot
#381	17.5 gr. IMR SR 7625
#393	14.0 gr. Hercules Green Dot
#375	14.0 gr. Hodgdon International

## LOADING 3" SHELLS

With minor adjustments, the APEX 3.1 will load 3" shotshells. Simply adjust the heights of the case flaring sleeve, wad guide, crimp starter and crimp die. Also, if your loader has a collet size die, remove the internal spacer ring on the depriming pin.

## APEX 3.1™ LOAD DATA

All loads were developed for the APEX 3.1 using Hornady Versalite™ Shotshell wads and the bushings provided with the loader.

Dimensions and tolerances for shotshells are much more forgiving than with rifle and pistol cartridges. Every time a shotshell is fired, it will lengthen slightly. So long as the fired length is within .25" of standard, the hull is fine to reload. The only way to bring a shell back to exact standard is to measure and trim it after each firing if need be. Otherwise, be sure the crimped length is correct, even if it means there is a small amount of extra material in the crimp, causing it to swirl slightly. Just so long as the shell is not deformed during loading, it is safe to fire.

### DIMENSIONS AND TOLERANCES FOR SHOTSHELLS

Gauge	Fired Length	Crimped Length	Tolerance	Gauge	Fired Length	Crimped Length	Tolerance
12	2.75"	2.30"	(-.25")	20	3.00"	2.70"	(-.25")
12	3.00"	2.65"	(-.25")	28	2.75"	2.37"	(-.25")
20	2.65"	2.30"	(-.25")				

Before loading, double check the weight of your charges.

**CAUTION: Use of spray cleaners or lubricants containing 1,1,1-trichloroethane will destroy some of the engineering plastics strategically used on the APEX 3.1. Read the label on the spray. When in doubt, don't use it.**

PLEASE HELP! This instruction manual was designed to be as clear and accurate as possible, but there may be room for improvement. We would enjoy hearing your suggestions.

**WARNING:** You are the manufacturer of your shotshell ammunition and are ultimately responsible for proper loadings. The APEX 3.1 has built-in safety features designed to make it virtually impossible to double charge shells, but no system is foolproof, and these features can be manually bypassed. Check your charges regularly, and be sure your loader is functioning properly at all times. If it is not functioning properly, do not continue loading until the problem has been corrected. Doublecheck to make sure you're using the proper bushings, powder and shot for the desired loads, and do not exceed maximum recommended loads. Failure to load shells properly, and subsequently firing these shells, could result in serious damage to property, injury or even death.

Never mix powders or use un-identified powders. It is dangerous to use modern smokeless powders in old firearms unless that firearm is certified safe. Do not exceed recommended loads.

**LEAD WARNING:** Discharging firearms in poorly ventilated areas, cleaning firearms, reloading ammunition, handling ammunition or ammunition components may result in exposure to lead, a substance known to cause birth defects, reproductive harm, cancer and other serious physical injury. Have adequate ventilation at all times. Wash hands after exposure.

Before you begin: Please read through and understand all the information in this manual before you start to reload. It contains information which may save you some time and frustration. Also, we've included several booklets provided by powder companies which have more information about their products.

Always wear safety glasses while reloading.

**WARNING:** The Primer Feed Tube is constructed of brass — used for its ability to ward off static electricity. However, brass is a soft metal and may damage easier than steel if misused.

While loading shotshells, be aware of its position and realign it in the station when and if it is necessary. This will keep the end of the tube from coming in contact with the platen and possibly deforming, which could cause primers to back-up inside the tube.

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# SETTING UP THE APEX 3.1™ AUTOMATIC LOADER

## Tools & bolts needed:

9/16" wrench

Small flat blade screwdriver

Three 3/8" mounting bolts, long enough to go through your bench and the loader base with washers and nuts.

## MOUNTING THE APEX 3.1

**Figure 1** - Select an open area on your reloading bench for set-up. When selecting a place, keep in mind you will need space for the press and reloading components. The Apex 3.1 is designed to work equally well on the edge of the bench or set back, since the handle doesn't require any additional clearance on the down stroke. Mark the mounting hole positions and temporarily remove the Apex 3.1. Drill three holes into your bench top. Use 3 mounting bolts long enough to hold two washers and locking nut, going through the bench top and the Apex 3.1 base.

## INSTALLING HOPPERS

**Figure 2** - Install powder hopper into the front hopper casting and insert plastic rivet to secure. Do not fill hopper at this time.

**Figure 3** - As with the powder hopper, install shot hopper into the rear hopper casting and insert plastic rivet to secure. Do not fill hopper at this time.

**Figure 4** - For your convenience, shot drop tube has been installed. You will need to install the wad finger. See page 14 Figure 34.



Fig. 1

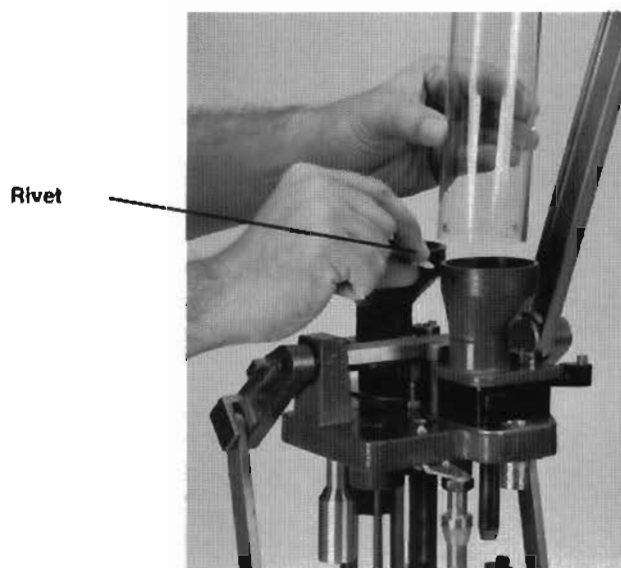


Fig. 2

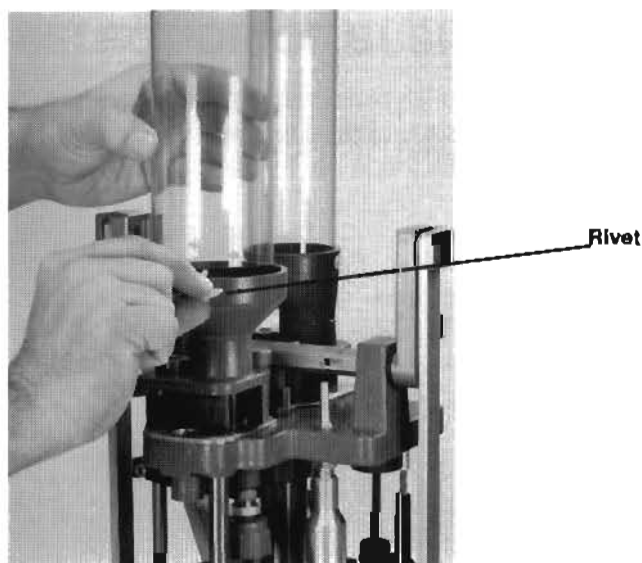


Fig. 3

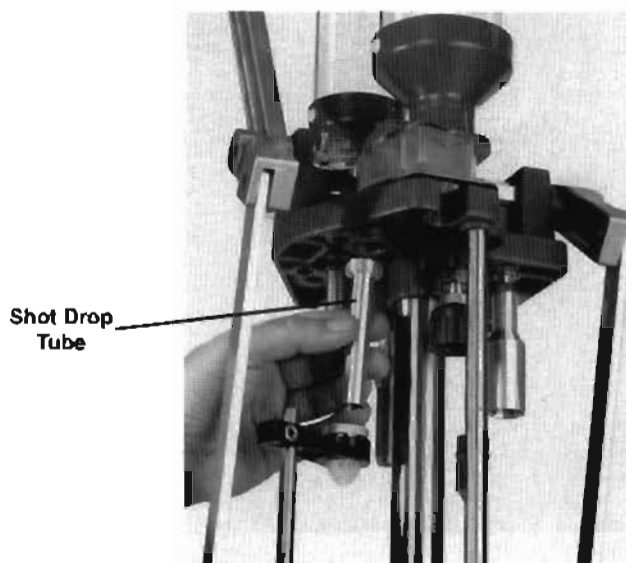


Fig. 4

## INSTALLING SPENT PRIMER CATCHER

**Figure 5** - Place the Spent Primer Catcher into its recessed position in the base of the Apex 3.1

## INSTALLING AUTOMATIC PRIMER FEED ASSEMBLY

**Figure 6** - Install the primer feeder so the guide aligns with the slot in the drop tube. At the same time, align the Primer Feed Universal Drive Arm into the slots in the top of the drive assembly and the bottom of the feeder.

**Figure 7** - When completed, the primer tray should fit down over the Universal Drive Arm and the brass primer drop tube.

**CAUTION:** When removing the primer tray from your loader, don't twist it. It's designed for a very close fit, and may crack or break if not removed straight up.

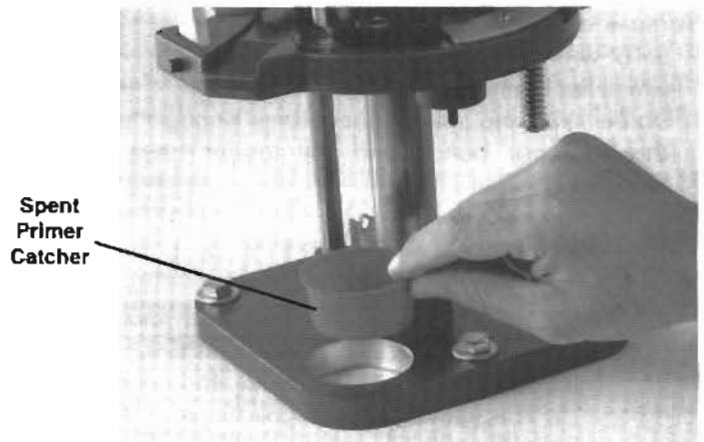


Fig. 5

Primer Feed  
Universal  
Drive Arm

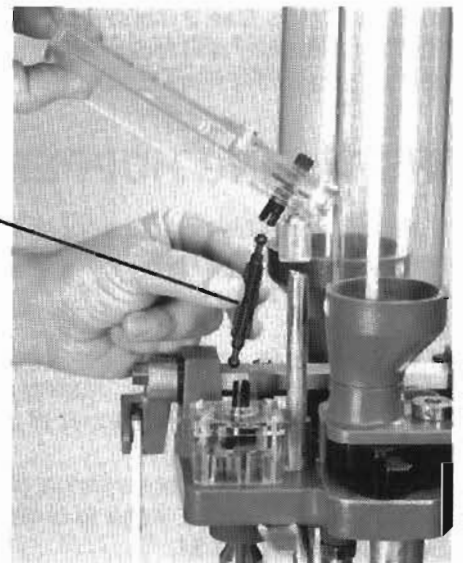


Fig. 6

## INSTALLING AUTOMATIC ADVANCE

**Figure 8** - Loop the retainer clip around the short arm of the Automatic Advance Indexer, and fit the clip down over the assembly.

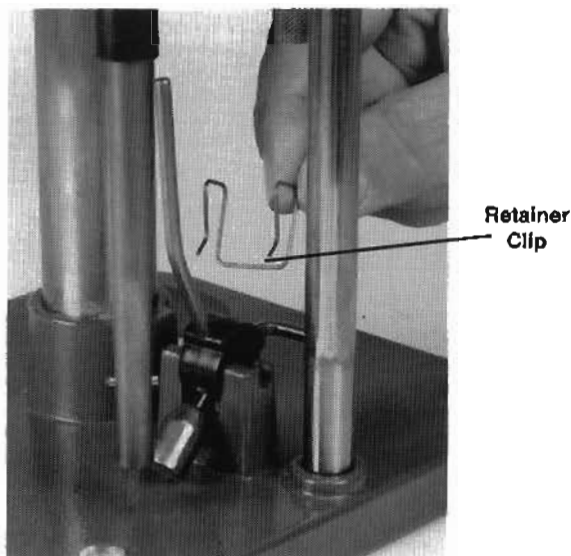


Fig. 8



Fig. 7

**Figure 9** - Raise the platen and thread the Index Drive Bolt into position directly above the indexor. Tighten the lock nut.

**Figure 10 A & B** - When properly adjusted, the Index Drive Bolt pushes the short index arm down, the long index arm rotates and advances the shellplate—stopping just to clear the bottom of the shellplate or below top of shell retainer.. **You must cycle the handle completely, and the shellplate must advance fully to the next station, for proper indexing.** By attempting to advance without fully cycling the handle each time, you risk jamming the machine or breaking the shellplate.

**WARNING:** If the handle does not come all the way down smoothly, or return smoothly—STOP—Find out why and **DON'T FORCE!**

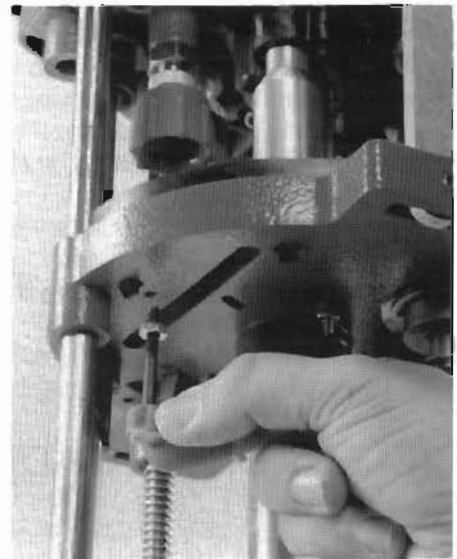


Fig. 9

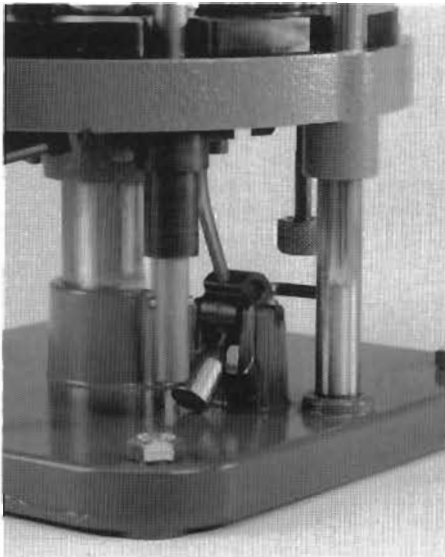


Fig. 10A

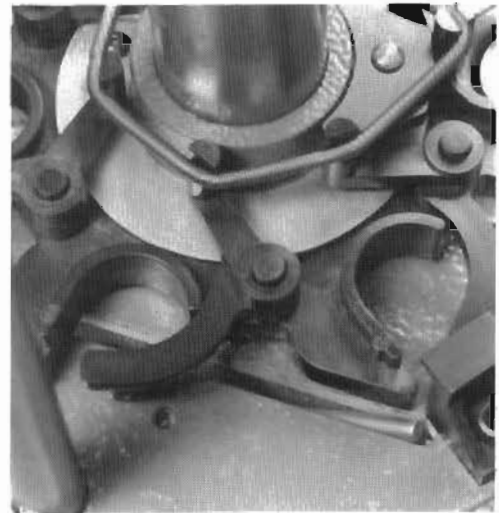


Fig. 10B

## SELECTION OF BUSHINGS

**Figure 11** - The press comes packaged with several standard-charge bushings, and two shot and powder bushing covers. The bushings drop into the charge bars through holes in the measure castings, and are easily removed the same way. After inserting each bushing, snap the small powder bushing cover and the larger shot bushing cover into the measure casting holes above the bushings. Keep the covers in place during loading.

**ALWAYS DOUBLE CHECK AND WEIGH YOUR CHARGES.**

If you're working with non-standard loads, refer to the bushings chart on page 20 and find the charge you intend to use. **DOUBLE CHECK!**



Fig. 11



## SELECTION OF HULLS

When selecting hulls to load, we recommend those which were originally factory "target loads" made by U.S. manufacturers. This type of hull was designed to be reloaded. Other types of factory shells, called "field loads" are not designed to be reloaded. If you have some empty field load shells, and want to reload them, try one or two in the APEX 3.1. If you're satisfied, fine. But if the results are not good, it is better to throw them away and stick with the target style.

Sort through all the empty hulls you intend to reload, arrange by type, and discard any damaged ones. Different types of hulls vary from each other in appearance, construction, and dimension. It's best to load hulls of the same brand and type, rather than mixing them. By loading shells that are identical, it's much easier to adjust the loader for a perfect load and a safe load.

The crimp-starter station in the APEX 3.1 is set up for hulls with an eight-point crimp. If you are loading 6-point hulls or paper shells, replace the crimp starter with either the 6-point or smooth insert respectively.

## SELECTION OF WADS AND PRIMERS

Select the correct wad for the hull, shot and powder charge recommended by the powder manufacturers.

Because of the design differences, you may find some types of primers won't appear to seat in some

hulls. This is more cosmetic than functional. As long as the primer seats tight and flush with the base of the hull, it will work fine.

## LOADING SHOT AND POWDER HOPPERS

**Figure 12** - Remove the top cap from the rear hopper and slowly pour in shot to desired level. Replace cap.

**Figure 13** - Remove the cap from the front hopper and slowly pour in the powder. Replace the cap. Static electricity may cause powder to cling to the sides of the hopper. The static charge can be eliminated by rubbing the hopper with a laundry dryer "anti-static" sheet.

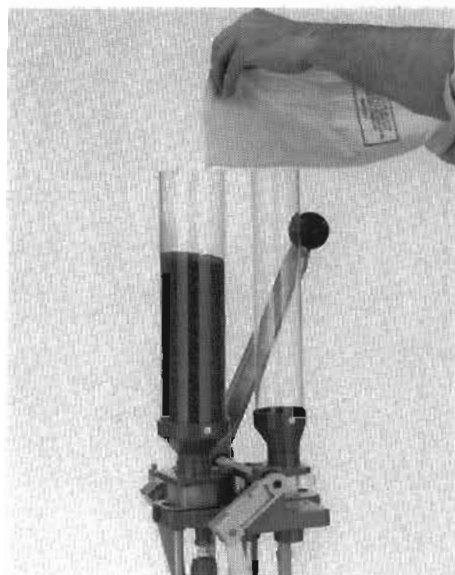


Fig. 12

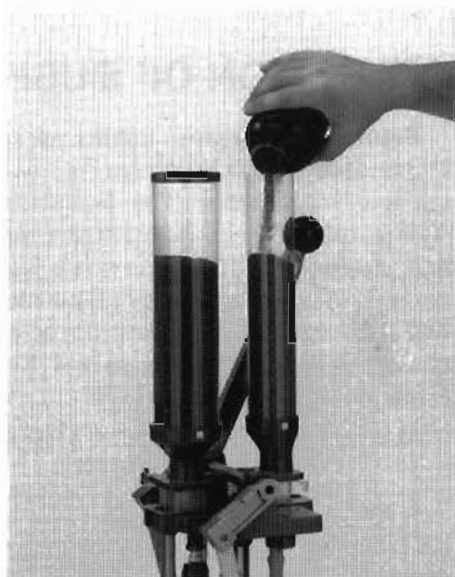


Fig. 13

## DROPPING LARGE SHOT

Larger-sizes shot (4's or bigger) may not feed or measure consistently through the shot charge bar. However, you can still load this shot by separately measuring it, or counting it, away from the loading process. Drop the measured shot directly through the bushing into the hull at that station.

The APEX 3.1 was designed to accommodate loading of steel shot. Loading steel shot is much more critical than that of lead shot. Steel shot loads are extremely sensitive in terms of loading pressures. There are companies who market steel shot loading components, and who have worked up loading data of their own. Since we have no control over these companies, we have no knowledge on the validity of their loading data.



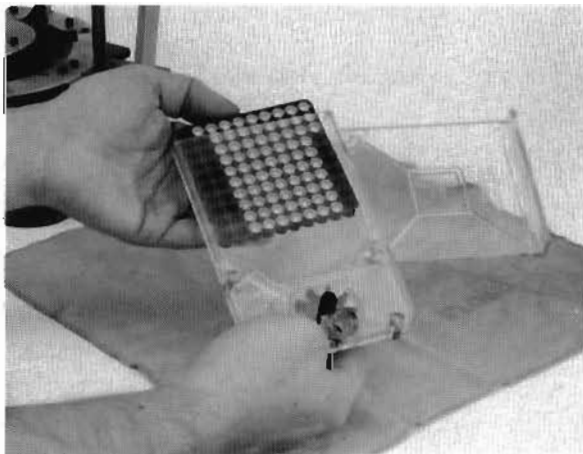
# APEX 3.1™ AUTOMATIC INSTRUCTIONS

**Figure 14** - The Apex 3.1 Automatic is the most advanced loader in its class. It lets you reload shells by simply inserting a case and wad then pulling the handle. The automatic features do the rest. The Apex 3.1 Automatic will seat primers, drop powder and shot, crimp the shells, and guide the cases through all the stations automatically.

In addition, the automatic features can be manually overridden at any station, should you desire. The shellplate can be rotated by hand in either direction, and hulls can be inserted or removed without disrupting the automatic loading sequence.

## LOADING PRIMER TRAY

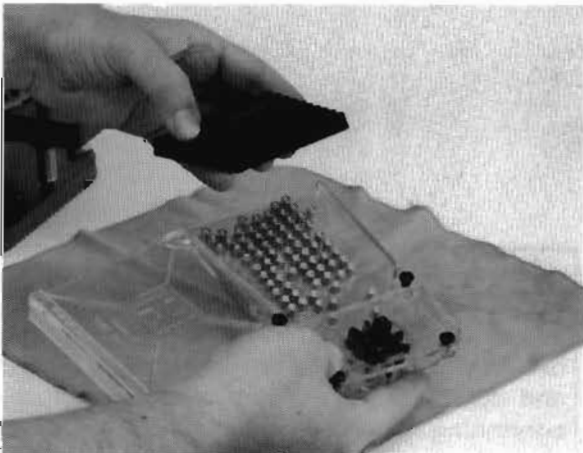
**Figure 15** - Open the top panel of the primer feeder by pivoting it around on its holding screw and hold the feeder upside down. Take a full tray of primers and remove the sleeve with the primers rightside up. Hold the primer tray tight against the underneath of the primer feeder.



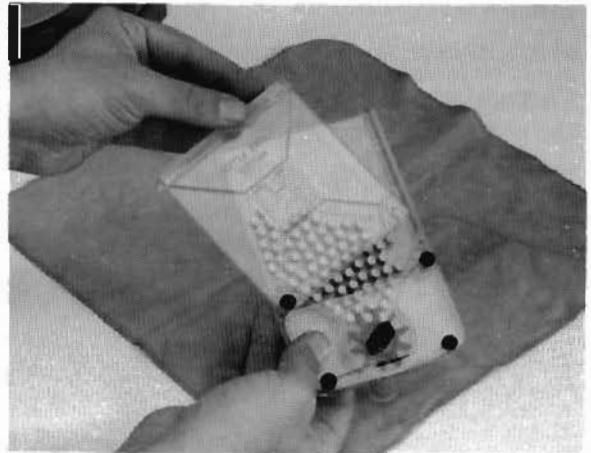
**Fig. 15**

**Figure 16** - Flip the feeder right side up and lift away the primer box.

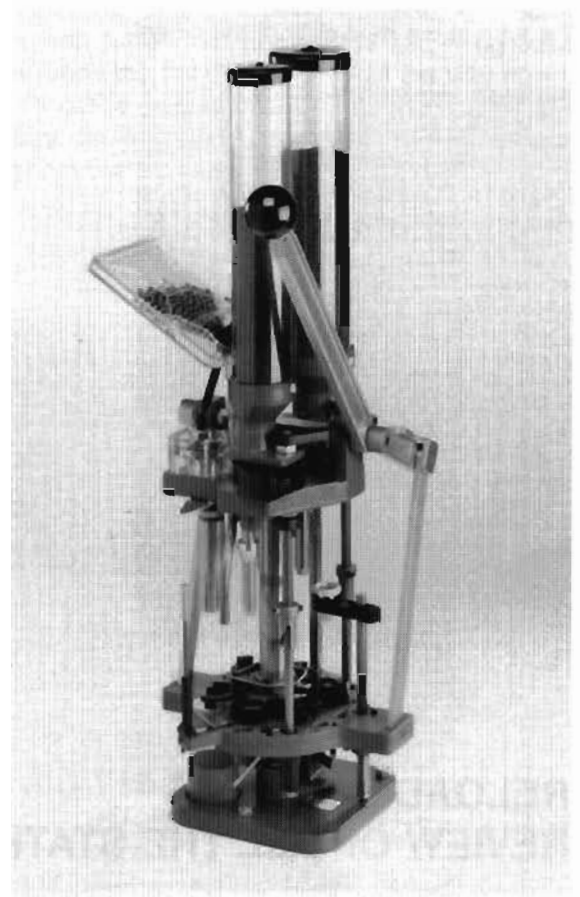
**Figure 17** - Rotate the primer feeder top panel back to its closed position, being careful not to upset or tip any of the primers inside.



**Fig. 16**



**Fig. 17**



**Fig. 14**

**Figure 20** - As you begin loading, both charge bars will be facing inwards towards the center of the Apex 3.1.

**Figure 21** - Place the hull onto the collet size-deprime station and lower the handle. As the hull rides up into the size die, it triggers the Automatic Primer Assembly which drops a primer into position in the primer transfer system. The primer transfer spring

then retracts the primer transfer slide. If there is no hull in this station, no primer will drop.

**Adjustment:** When properly adjusted, the collet size die will bottom out against the depriming base plunger when the handle is pulled all the way down. There should be no play in the base plunger. When the collet size die is positioned properly, tighten the lock ring against the die head.



Fig. 20

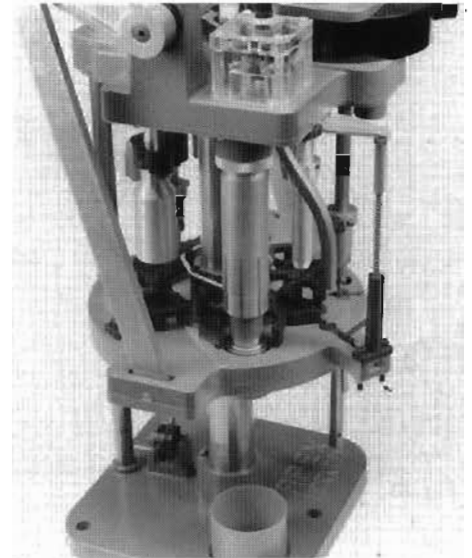


Fig. 21

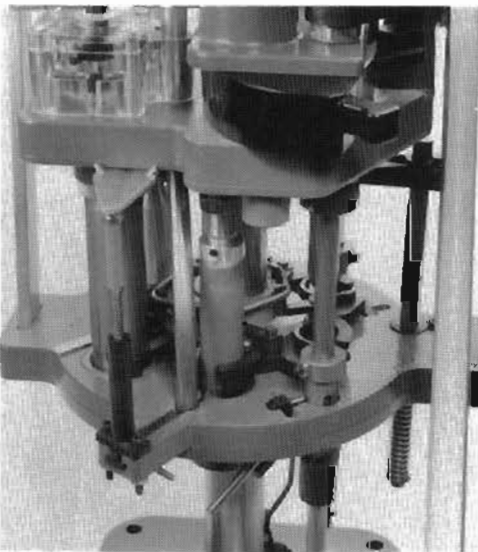


Fig. 22

**Figure 22** - With each return stroke, the shellplate advances and the primer transfer slide inserts a primer in the pad. It is important to always fully return the handle on the upstroke for full advance. When the handle is pulled again, the new primer is seated at the second station.

**Adjustment:** Remove the primed hull from the shell plate to inspect. The primer should be flush with the bottom of the hull. If the primer is seated too shallow, the primer seater punch located on the die head can be adjusted for height. If the primer seating is difficult or seems to need extra effort, adjust the ram upwards. The flaring sleeve might also have to be adjusted at this time. The primer seater pad is factory-adjusted, and does not change the primer seating depth. It should be flush with the platen surface. If not, it can be reset by loosening the primer seater bolt and raising or lowering it. Tighten the bolt when finished. Double check your adjustment using a new hull and primer.

**Figure 18** - Replace the feeder onto the loader. Manually click the primer feed wheel around counter-clockwise until the first primer is aligned to drop down the tube at the next click of the wheel.



Fig. 18

**Figure 19** - You can replace or add individual primers without opening the feeder by inserting primers into the access hole located in the top panel as shown.

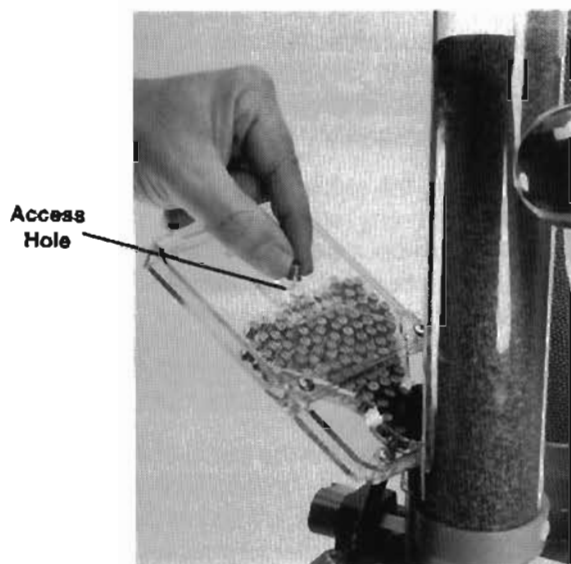


Fig. 19

## RELOADING STEPS

### REVIEW OF ALL THE STATIONS

The APEX Automatic has six loading stations. Each station, except the shot drop tube, has been factory adjusted and should not need further adjustments on your part. You should, however, inspect the loader to ensure everything appears as pictured.

**STATION ONE** deprimers and sizes the hull and ejects the spent primers into a cup located in the base.

**STATION TWO** seats the new primer and flares the shell mouth.

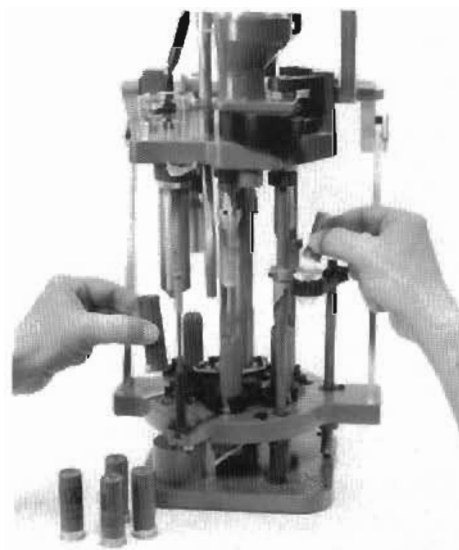
**STATION THREE** drops the powder charge.

**STATION FOUR** sets the wad and drops the shot.

**STATION FIVE** starts the crimp.

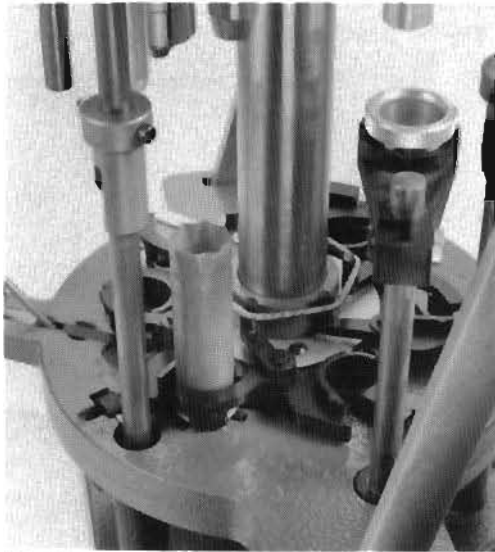
**STATION SIX** finishes the crimp and tapers the shell. The shell is then ejected with the turn of the shellplate.

It's best to begin reloading on the APEX 3.1 Automatic using a single hull and taking it through all the stations. If a station needs adjusting, refer to the adjustment procedures.



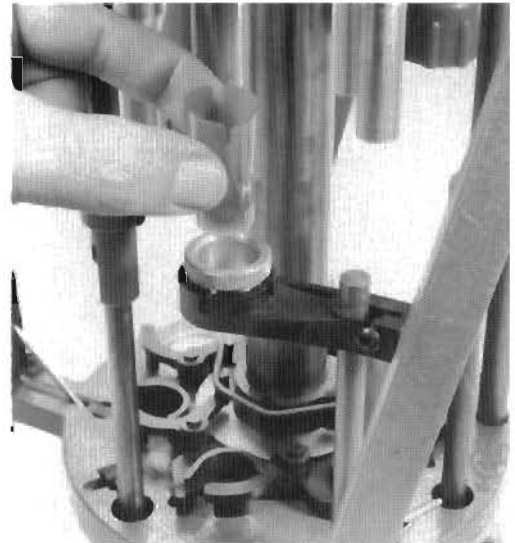
Take reasonable care while operating the APEX 3.1. All parts are machined for easy use and to tight tolerances. If for any reason the loader doesn't operate properly, STOP and determine what the problem is before continuing. Don't force the loader to operate.

**Figure 23** - The hull advances to the powder drop station and actuates the charge bar drive pin. By completely lowering the handle, the drive pin causes the drive rod to rotate and drop the powder charge. If there is no hull at this station, or if you don't lower the handle to the bottom of the stroke, no powder will drop.



**Fig. 23**

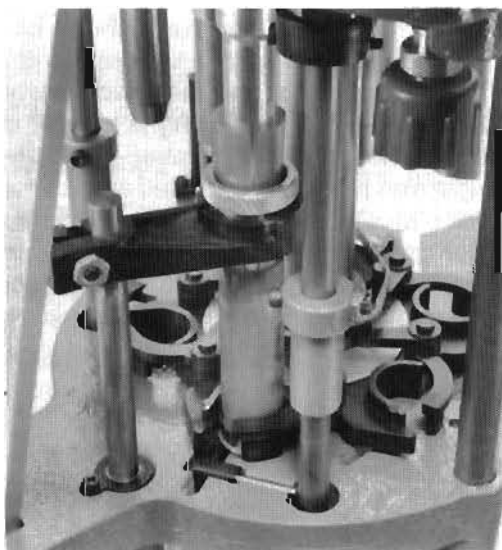
**Figure 24** - Return the handle to the up position. This returns the charge bar to its original position and advances the hull. Place a wad into the swing out wad guide.



**Fig. 24**

**Figure 25** - Lower the handle completely until it cams over. The shot drop tube inserts the wad into the hull, and shot is dispensed. This station also has a shell detect feature, which operates like the powder drop, and no shot will drop without a hull being in position or the handle being lowered completely.

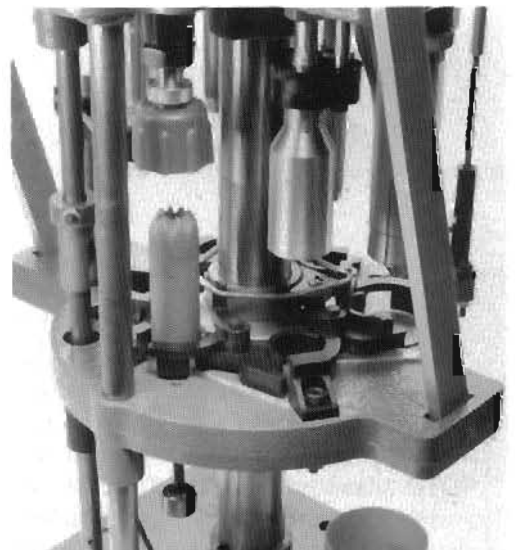
**Adjustment:** If the wad is too deep, screw the shot drop tube into the die head. If the wad is too shallow, screw the tube out from the die head. Double check your adjustment when you wad your next shell. The wad guide spring fingers should have approximately 1/8" clearance above the hulls.



**Fig. 25**

**Figure 26** - Continue to cycle the handle, advancing the hull through the remaining stations. Following the shot drop, the crimp is started.

**Adjustment:** The starting crimp should be nicely rounded and symmetrical, with about 1/4" hole in the center. If the crimp is too tight, raise the crimp starter. If the hole in the center is too large, lower the die slightly. Hulls vary in material and length and won't all close the same. Double check your adjustment.



**Fig. 26**

**Figure 27** - At the last station, the Cam-Actuated Crimp die crimps and tapers the shell.

**Adjustment:** The finished shell should have a flat and symmetrical recessed top, with no sags or bulges. The top ridge should be tight all way round, and the shell should show a slight taper at the top. The crimp



Fig. 27

die can be raised or lowered by loosening the nut on top of the die head. After loosening, insert a flat-blade screwdriver and turn up or down as needed to get desired crimp. Re-tighten lock nut.

**Figure 28** - Returning the handle to the up position, the completed shell is ejected.

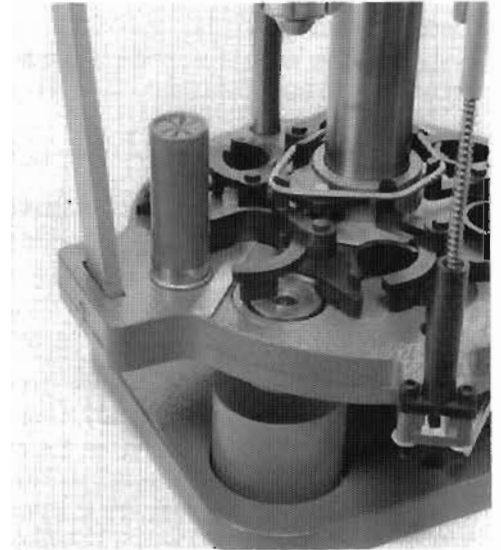


Fig. 28

**Figure 29** - After loading the single case, you can now run multiple cases through the Apex 3.1 Automatic. The three shell detects will automatically drop primers, powder and shot whenever hulls are in those positions. All you need to do is place a shell in the first station, and place a wad in the wad guide and pull the handle.

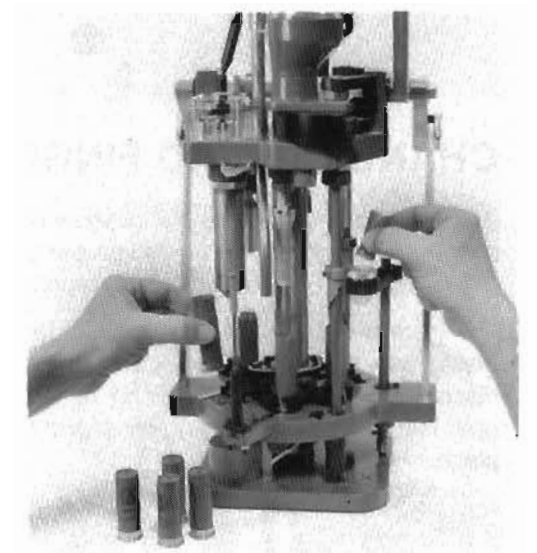


Fig. 29

## RELOADED SHELL INSPECTION

Your reloaded shell should look similar to a factory load. The case walls are straight and smooth. The top crimp is symmetrical and completely closed without sinking or bulging, and no shot should be visible. Don't worry if your reloaded shell looks slightly different. This is normal, every shell is different — automated factory loading procedures are impossible to duplicate at home. Shells elongate when they are fired, which causes some stretching and minor cosmetic variations

in the crimp, but will not affect performance.

Trimming your hulls to uniform length will help to reduce the variations, but it generally isn't worth it. Most reloading variations will not affect firing. Some pronounced variations may affect such things as feeding reliability. One note: if a shell has been wrinkled once, it will always wrinkle when reloaded. You might want to discard it after firing and not reload it again.

## COMMON RELOADING VARIATIONS

**Figure 30** - Not enough shot or powder, or the wad may be seated too deep. The crimp is proper, but the shell looks slightly empty. Recheck your bushings combination to make sure you are dropping the proper charges, and recheck the wad seating depth.

**Figure 31** (swirl) - Too much case in the crimp causing the swirls. The shell may have elongated during its previous firing. As long as the overall cartridge length is correct for the gauge, this swirl pattern won't have any affect on performance. Trimming the shell before loading it next time may eliminate the swirl. But even some new factory shells have a swirl.



Fig. 30



Fig. 31



Fig. 32



Fig. 33

**Figure 32** (wrinkled) - Finish Crimp die down too far, or the shell may have elongated during previous firing, or the components are wrong — double check your bushings. If all the shells coming off the press are wrinkled, raise the crimp die enough so it does not crush the hull during crimp. Double check the overall cartridge length to make sure it has not been affected.

**Figure 33** (deformed) - This can be caused by a number of factors including having a shell that was factory loaded with a different number of crimp points. The Apex 3.1 is furnished with an 8-point crimp.

## CHANGING WAD FINGERS

If the wad fingers wear out or show damage, they may no longer support the wad properly in the wad guide. The wad fingers are easily replaced.

**Figure 34** - Remove the Wad Guide Lock Ring by prying with a small screwdriver or coin. Remove and discard the old wad fingers and replace with a new one. Replace the Lock Ring by snapping it back into place.

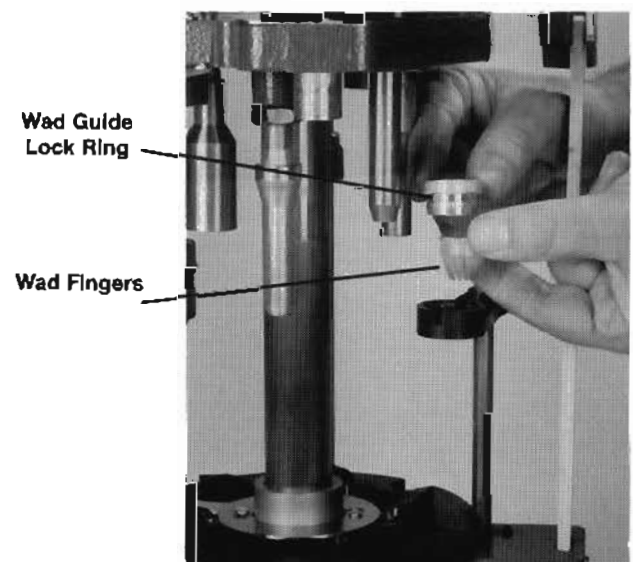


Fig. 34



## DRAINING SHOT AND POWDER

Shot and powder can be easily and quickly drained without removing the hoppers from the press.

Platen must be raised for return pins to clear the cams. This can easily be done by inserting a case between the base and the platen.

**Figure 35** - A clear drain tube has been provided for easier emptying. Fit the drain tube over the drain hole in the casting under either the shot or powder hoppers.

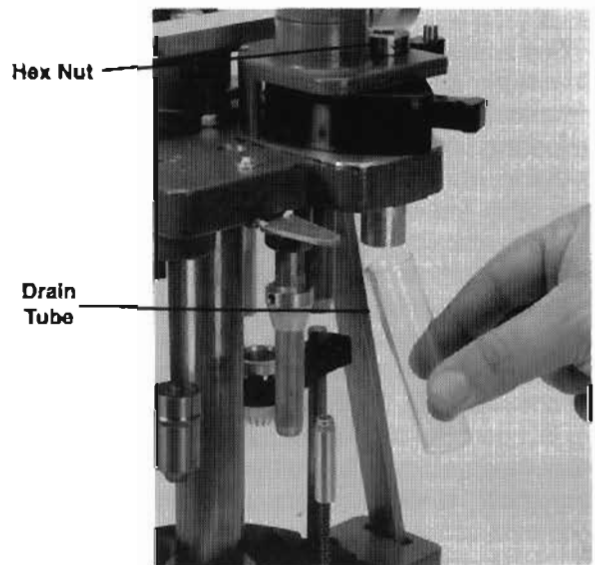


Fig. 35

**Figure 36** - Remove the measure attaching bolt that holds the measure casting in place. Loosen the hex nut on measure casting 1/2 turn.

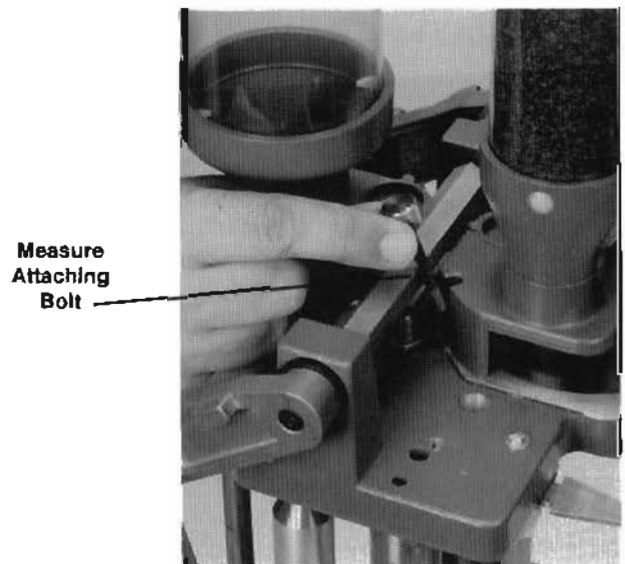


Fig. 36

**Figure 37** - Hold your powder can (or shot bag) underneath the tube. Swing the hopper casting out away from the press until it aligns with the extension tube. Rotate the charge bar until the bushing aligns with the hopper. The contents will flow out of the hopper and into your container. When the hopper appears empty, shake the charge bar to make sure. Swing the hopper casting back into its original position and replace the measure attaching bolt to hold the casting in place. Tighten nut on measure casting. Switch the drop tube to the other station and repeat the process of emptying the other hopper.



Fig. 37

## MAINTENANCE

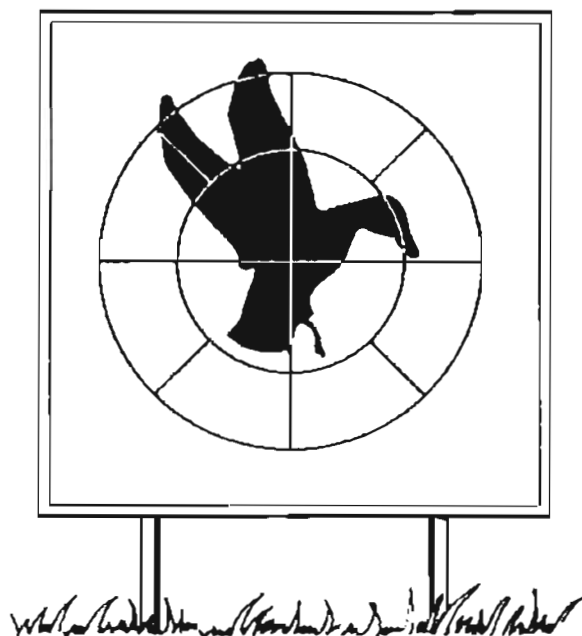
Your APEX 3.1 was designed and constructed with the same tight tolerances and quality as a valued firearm. With proper care, it will give you a lifetime of reloading enjoyment. During and after every reloading session, it's important to keep your APEX 3.1 running smoothly and efficiently. This means cleaning up stray powder and shot, and making sure the press is well-lubricated at all times. Clean-up is fairly easy to do since there are few tight spaces on the APEX 3.1.

The Apex 3.1 Automatic is built to reload hundreds of shells quickly. But like any machine, there are limits to its best operating speed. Jerking the handle up and down too quickly will result in spilled components, flying shells, pinched parts and possible damage. Use common sense. Get to know and understand how the machine operates.

Spilled powder and shot can cause the detents to jam resulting in failure to operate correctly. Always pay close attention to your work and clean up spills. At the end of each reloading session, brush or wipe away any spilled powder or shot. Lubricate all moving parts as needed, and wipe down all steel parts with a high-quality rust repellent. Do not use spray lubricants that contain 1,1,1-trichloroethane — a chemical which will severely damage some of the engineering plastics used on the loader. Read the label carefully. If in doubt, don't use the spray.

Treat your Apex 3.1 Automatic like your valued firearm, and it will last a lifetime.

# PATTERNING YOUR SHOTGUN



Like sighting in a rifle, patterning a shotgun is best analyzed by shooting at a patterning target. The Hornady Shotgun Patterning Kit is a convenient package of targets.

When at the range, determine the yardage you feel most comfortable shooting within and test your shotgun's pattern from that distance. As a guide, waterfowlers generally shoot within 50 yards, pheasant and grouse hunters within 40 yards and quail shooters less than 25 yards. Competition shooters need to evaluate their own preferred shooting range.

After measuring the yardage and placing the patterning kit into the ground, place some type of marker at the point at which you'll shoot. Remember, try not to stray too far from your original shooting point - even a couple of feet variation can produce different overall results.

Once you're set up and ready, each load should be fired at least five times. That will give you enough information to provide an analysis of your shotgun and where it shoots.

For the sake of this explanation, we'll use one of the most popular gauges and loads used by bird shooters.

With the patterning kit set up at 40 yards, place the gun to your shoulder (in a standing, normal shooting position) and set the bead on the center of the bird in the target. Remember to hold the gun in the same position each time - this will help determine the gun's point of aim.

Once you fire the shot, proceed down range and inspect the target for holes. Locate the approximate center of the shot pattern and then note the gun, load, gauge and shot size on the target.

Take down the target, replace it with another clean target and repeat the steps until you've shot at least five times on separate targets.

When you're finished shooting, take the targets and begin the simple, systematic method of counting pellet holes in the target.

With Hornady's exclusive target, it's easy to determine the number of holes in a quadrant. Simply count each hole in a given quadrant, circle each hole after it's been counted (to avoid counting the same hole twice) and write the number of holes with a marker in that quadrant. Repeat the steps until all the holes have been counted.

After the pellets have been counted, it's time to compute the percentage of hits on the target. Simply multiply the number of pellets (see chart) times the ounces of shot and you get the number of pellets in that specific load. (Example: a 1-1/8 oz. load of No. 7-1/2 shot contains 394 pellets — 350 pellets per ounce times 1-1/8 ounces (1.125) — equals 394 pellets).

If the pattern contained 335 holes, then 335 divided by 394 shows about 85 percent of the shot hit the target within the outer circle. Opinions may vary, but 85% hit at 30 yards would be a full choke shotgun.

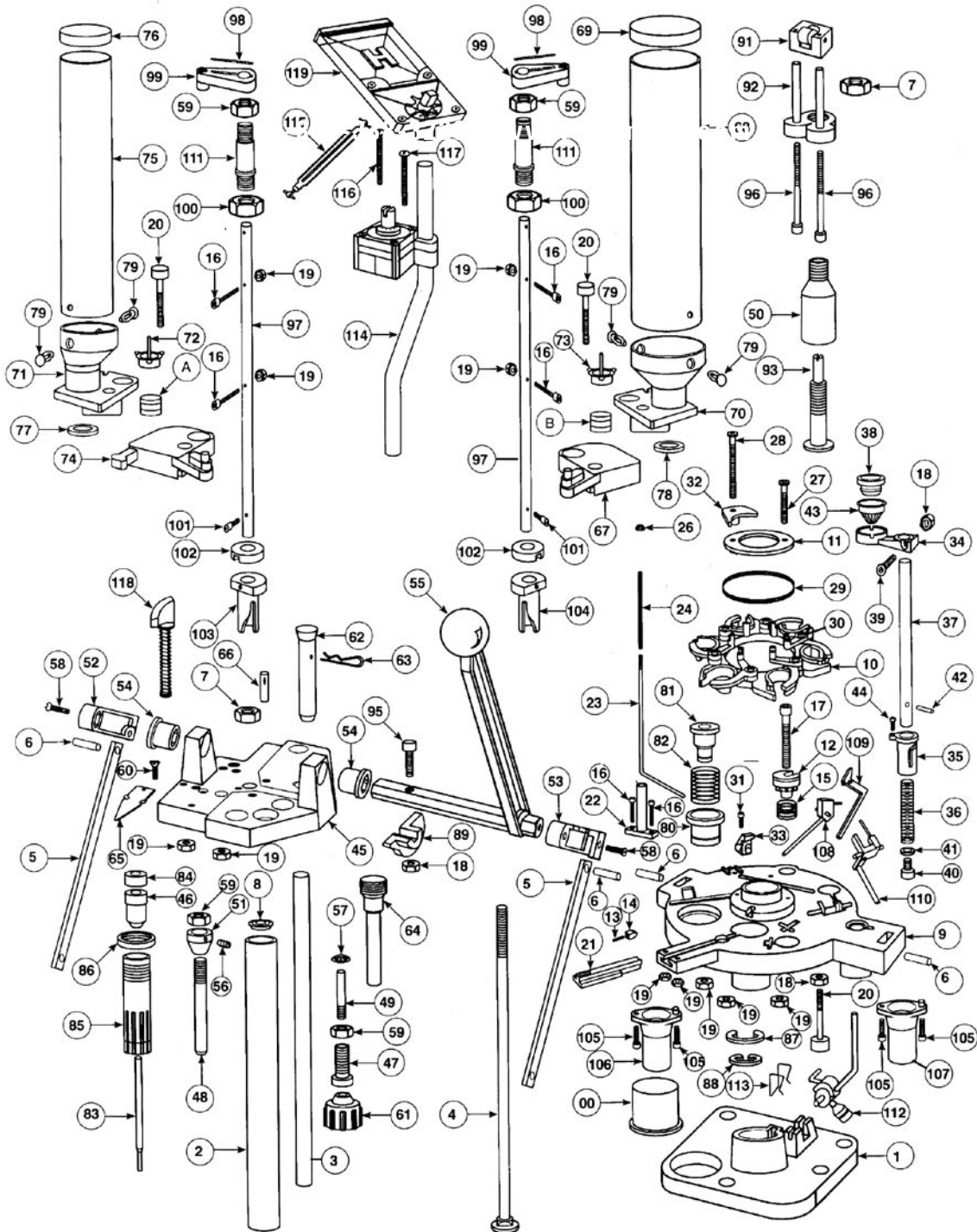
Because of the unique diameters of the two target rings, each quadrant contains the same amount of space in square-inches. Having equal size quadrants to work with, you will get a more accurate picture of the hit percentage in each of the quadrants.

Once you've calculated the percentage of holes in the target and analyzed your shotgun's choke pattern, you should now be able to determine your gun's "point of aim," as well as whether the gun shoots a poor pattern, a pattern different than which the gun is marked and other variations that, in the past, might have led to missed shots.

To summarize:

- Step 1 - shoot at the center of the target at 40 yards (shoot at least five targets). Mark the gun, gauge, load and shot size on the paper.
- Step 2 - count the number of pellet holes in each quadrant and mark the number in each section. Total the number at the top of the page.
- Step 3 - compute the number of pellets in your load by multiplying the number of pellets times the ounces of shot in the load you shot. (Example: 1-1/8 oz. load of No. 7-1/2 Shot contains 394 pellets. Consult the chart for No. 7-1/2 shot (350) and multiply 350 x 1.125 (1-1/8 oz. load) for a total of 394 pellets.
- Step 4 - compute the percentage of hits in the target. Take the total number of hits on the target and divide by 394 pellets in the shotshell (350 divided by 394 equals 85 percent).
- Step 5 - determine the "point of aim" of the shotgun, the pattern of the choke, and whether the pattern is uniform or scattered.

Shot Size	Diameter (Inches)	#Pellets Per Ounce (5% Antimony)	Shot Size	Diameter (Inches)	#Pellets Per Ounce (5% Antimony)
No. 00 Buckshot	.330	8	No. 4	.130	138
No. 0 Buckshot	.320	9	No. 6	.110	228
No. 1 Buckshot	.300	11	No. 7-1/2	.095	350
No. 3 Buckshot	.250	19	No. 8	.090	417
No. 4 Buckshot	.240	21	No. 8-1/2	.085	495
BB	.180	51	No. 9	.080	594
No. 2	.150	90	No. 11	.060	1410

**APEX 3.1**



**APEX 3.1****PARTS LISTING****APEX 3.1™ PARTS LIST**

KEY NO.	PART NO.	DESCRIPTION
1	310121	Base
2	370501	Main Guide Post
3	170502	Auxiliary Guide Post
4	170505	Main Guide Post Bolt
5	170508	Drive Link (2)
6	390074	1/4 X 3/4 Dowel Pin (4)
7	390097	3/8 -16 Plain Steel Hex Nut (2)
8	390654	Guide Post Bolt Retainer

**PLATEN ASSEMBLY**

9	310101	Platen
10	310105	Shell Plate 12 GA
	310107	Shell Plate 20 GA
	310108	Shell Plate 28 GA
	310109	Shell Plate 410 Bore
11	310120	Shell Plate Retainer
12	370116	Primer Seater Pad
13	370334	Shell Plate Detent Spring
14	370333	Shell Plate Detent
15	370047	Primer Seater Spring
16	390104	6-32 X 1 Cap Screw (6)
17	370113	10-32 X 1 1/4 Cap Screw
18	392011	10-32 Hex Nut (4)
19	392452	6-32 Hex Nut (10)
20	170413	Measure Mount Bolt (3)
21	370520	Primer Slide
22	370521	Primer Slide Cam Holder
23	370522	Primer Feed Cam
24	370525	Primer Slide Cam Spring
26	370252	6-32 Nylock Nut
27	310131	6-32 x 1 1/4 BHSCS
28	310132	6-32 x 2 BHSCS
29	310119	Case Retainer Spring
30	310118	Case Retainer (6)
31	310130	10-32 x 5/8 SHCS
32	310110	Case Release Cam, 12 GA
	310111	Case Release Cam, 20 GA
	310112	Case Release Cam, 28 GA
	310113	Case Release Cam, 410 GA
33	310114	Case Lock, 12GA
	310115	Case Lock, 20 GA
	310116	Case Lock, 28 GA
	310117	Case Lock, 410 GA

**WAD GUIDE ASSEMBLY**

34	170600	Wad Guide Arm
35	170601	Wad Guide Cam
36	170602	Wad Guide Return Spring
37	170603	Wad Guide Shaft
38	170610	Wad Guide Cap 12 GA
	170612	Wad Guide Cap 20 GA
	170613	Wad Guide Cap 28 GA
	170614	Wad Guide Cap 410 Bore
39	390116	10-32 X 3/4 Button Hd Cap Screw
40	390130	10-32 X 1/2 Cap Screw
41	390651	10 SAE Plain Washer
42	390655	3mm x 12mm Dowel Pin
43	480007	Spring Finger 12 GA
	480009	Spring Finger 20 GA
	480010	Spring Finger 28 GA
	480011	Spring Finger 410 Bore
44	390200	5-40 x 3/8" Cap Screw

**NOTICE:** Prices and/or specifications are subject to change without notice. Discontinued products may or may not have replacement parts available. Call for availability 800-338-3220.

KEY NO.	PART NO.	DESCRIPTION
45	310122	<b>DIE HEAD ASSEMBLY</b>
46	170215	Die Head
	170217	Case Ejector/Depprime 12 GA
	170218	Case Ejector/Depprime 20 GA
	170219	Case Ejector/Depprime 28 GA
	170219	Case Ejector/Depprime 410 Bore
47	170315	Crimp Starter Holder
48	170337	Primer Seater Punch 10/12/20 GA
	170338	Primer Seater Punch 28 GA
	170339	Primer Seater Punch 410 Bore
49	392101	Crimp Starter Rod
50	170380	Crimp Die Body 12 GA
	170357	Crimp Die Body 20 GA
	170358	Crimp Die Body 28 GA
	170359	Crimp Die Body 410 Bore
51	170365	Case Flaring Sleeve 12 GA/20 GA
	170368	Case Flaring Sleeve 28 GA
	170369	Case Flaring Sleeve 410 Bore
52	170503	Left Toggle
53	170504	Right Toggle
54	170511	Driveshaft Bushings (2)
55	170512	Handle/Driveshaft Assembly
56	390064	10-32 X 1/8 Set Screw
57	390066	3/16 Push Nut
58	390079	10-32 X 5/8 Flat Hd Screw (2)
59	370251	1/2-20 Steel Hex Jam Nut (4)
60	390187	6-32 X 1/2 Slit Flat Hd Screw
61	490500	Crimp Starter 12 GA-8 Pt
	490501	Crimp Starter 12 GA-6 Pt
	490313	Crimp Starter 12 GA-Paper
	490503	Crimp Starter 20 GA-8 Pt
	490504	Crimp Starter 20 GA-6 Pt
	490319	Crimp Starter 20 GA-Paper
	490509	Crimp Starter 28 GA-6 Pt
	490321	Crimp Starter 28 GA-Paper
	490511	Crimp Starter 410 Bore-6 Pt
	490323	Crimp Starter 410 Bore-Paper
62	170470	Powder Drop Tube 10/12/20 GA
	170471	Powder Drop Tube 28 GA
	170472	Powder Drop Tube 410 GA
63	390640	Hitch Pin
64	170370	Shot Drop Tube 12/10 GA
	170371	Shot Drop Tube 20 GA
	170373	Shot Drop Tube 28 GA
	170372	Shot Drop Tube 410 Bore
65	370523	Primer Feed Cam Bar
66	370249	Groove Pin

**SHOT & POWDER DROP ASSEMBLIES**

67	370300	Shot Charge Bar Assembly
68	170304	Shot Hopper Tube
69	170305	Shot Hopper Cap
70	310123	Shot Measure Assy
71	310124	Powder Measure Assy
72	170344	Powder Bushing Cover
73	170345	Shot Bushing Cover
74	370400	Powder Charge Bar Assembly
75	170404	Powder Hopper Tube
76	170405	Powder Hopper Cap
77	170412	Powder Charge Bar Seal
78	480001	Shot Charge Bar Seal
79	390098	3/16 Plastic Drive Rivet (4)

80	170117	Collet Sizer Base
81	170118	Collet Sizer Plunger
82	170119	Collet Sizer Plunger Ret'n Spr'g
83	170210	Depprime Punch / Collet Sizer

KEY NO.	PART NO.	DESCRIPTION
84	170223	Ejector Spacer
85	170240	Size Die Body, 12 GA
	170242	Size Die Body, 20 GA
	170243	Size Die Body, 28 GA
	170244	Size Die Body, 410 Bore
86	170246	Size Die Lock Ring
87	390080	Crescent Ring
88	390081	E-Ring

89	170319	Crimp Die Cam
91	170341	Crimp Die Bracket (Upper)
92	170328	Crimp Die Bracket (Lower)
93	170360	Crimp Plunger 12 GA-Auto
	170362	Crimp Plunger 20 GA-Auto
	170363	Crimp Plunger 28 GA-Auto
	170364	Crimp Plunger 410 Bore-Auto
	310161	Bushing for 28/410 Crimp Plunger
95	390210	10-32 X 1 Cap Screw
96	390131	8-32 x 2 1/2 SHCS (2)

97	370309	Charge Bar Rod (2)
98	370258	1/8" x 1 1/2" Dowel Pin (2)
99	370311	Charge Bar Driver (2)
100	370250	9/16 x 18 Nut (2)
101	370257	Charge Bar Return Screw (2)
102	370310	Charge Bar Bearing (2)
103	370540	Upper Powder Cam
104	370545	Upper Shot Cam
105	370253	6-32 x 1/2 Cap Screw (4)
106	370541	Lower Powder Cam
107	370546	Lower Shot Cam
108	370530	Powder Actuator
109	370230	Powder Detect
110	370225	Shot Detect/Actuator
111	370312	Charge Bar Post (2)

112	370800	Indexer
113	170806	Indexer Retaining Clip

114	370700	Auto Primer Feed Assy
	170701	Primer Feed Cover
	170706	Primer Feed Upper Shaft
	170708	Primer Feed Lower Shaft
	170716	Primer Feed Spring
	370710	Primer Feed Housing Assembly
	390121	6 x 5/8 Screw (2)
	390192	3/8 Push Nut
	390411	O-Ring
115	170702	Primer Feed Ball Joint Shaft
116	390123	6-32 x 2 1/4" Machine Screw
117	370256	6-32 x 2 1/2" Machine Screw
118	070701	Primer Feed Cam Assy
119	170750NP	Primer Tube Filler Assy.
	390633	Primer Tube Filler Spring
	390634	10-32 x 3/8 Screw (4)
	480031	Fixed Lid
	480032	Moveable Lid
	480033	Rotor

**LOADER ACCESSORIES**

120	170342	Spent Primer Catcher
	370425	Powder/Shot Drain Tube
	390036	5/32 Short Arm Hex Key
	390652	7/64 Short Arm Hex Key
	390653	1/8 Short Arm Hex Key
	390656	3/32 Short Arm Hex Key
	390670	Chip Brush
	380045	Hex Key

A - Powder Bushing  
B - Shot Bushing

**For parts inquiries, call 1-800-338-3220**

# POWDER CHARGE BUSHINGS LIST

## Powder Charge Bushings For 366 Auto And APEX™ Shotshell Presses

GRAINS	Acc. Arms Nitro 100	DuPont 700-X	DuPont PB	DuPont SR 7625	DuPont 800-X	DuPont SR 4756	DuPont MR 4227	Hercules Red Dot	Hercules Green Dot	Hercules Unique	Hercules Herco	Hercules Blue Dot	Hercules 2400	Hodg. Clays	Hodg. HSS	Hodg. HS6	Hodg. H110	Royal Scot	Scot 1000	Solo 1250	Win. 452AA	Win. 473AA	Win. 540	Win. 571	Win. 296	Win. Super Target	Win. Super Lite	Win. Super Field
10		330																										
11		342	324										256															
12		357	339	324				384	363				266															
13		369	351	336	351			393	378	342	357		—				256			363					256			
14		387	366	345	363			405	390	354	369		291				266			375	360	327			266			
15		402	378	357	372	366	303	423	405	369	381		300				—			387	369	339						
16		414	390	369	390	378	312	438	420	381	393		312	429		303	291			399	381	348				333	330	
17	420	429	402	381	402	387	324	453	435	393	405		324	441		312	300		447	411	390	357	300			405	345	342
18	432	441	414	390	414	399	333	468	447	405	414	366	330	456		318	309	471	456	420	402	369	309			417	354	351
19	444	453	426	402	423	408	339	480	456	414	426	372	339	468		327	315	483	468	432	411	381	318	318		429	383	—
20	456	465	435	414	429	417	348	489	468	423	438	381		483		336	324	495	480	444	420	390	327	330		438	372	—
21	468	477	447	426	438	426	357	498	480	435	450	390		495		345		507	492	456	432	399	336	339		450	381	—
22		486	456	436	447	435	366	510	492	444	462	396		510		354		519	504	468	441	408	345	348		459	390	—
23		498	465	444	459	447	375	519	501	453	471	408				363		531	513	480	450	414	351	357		471	402	—
24			474	453	468	459	384		513	465	477	414				369		543	519	489	462	426	360	363		480		—
25			486	462	480	471	390		522	474	489	423				378		555	531	498	474	435	366	369				411
26			495	474	489	480	399		534	483	498	435			375	387						444	375	378				420
27			—	486	501	489	408		—	492	—	441			381	393						450	381	384				426
28			510	495	507	495	414		549	501	513	447			390	402						462	387	390				432
29			522	—	525	501	420		558	—	522	459			396	408						474	393	396				441
30				501	531	513	426			510	531	468			402	414						402	405					450
31				513	534	522	435				—	474			408	420						408	411					456
32				519	543	525	441				549	483			417	429						414	417					462
33					549	534	447				558	489			423	435						423	423					
34					558	543	453				564	495			429	441						429	429					
35					564	549	462				573	501				447						435	438					
36						558	468				—	510				453						441	444					
37						564	474				588	516				459						444	450					
38						573	480				594	522				465						450	456					
39						580	486					531				471						459	462					
40						588	492					534										465	468					
41						594	498					543										471	474					
42						—	—					549										477	480					
43						606	510					555										483	486					
44							519					561										489	492					

### HOW TO SELECT BUSHINGS FOR HALF-GRAIN CHARGES:

Hornady powder bushings are identified by numbers that correspond to the size of their inside diameter. (For instance, the inside diameter of the #402 bushing is .402 inches.) Bushings for powder charges in half-grain increments can be calculated from this chart. Simply "split the difference" between the two even-grain bushings, and select the bushing nearest the result.

Example: To find the bushing for 18 1/2 grains of Hercules Red Dot powder, note that bushing #468 gives a charge of 18 grains and that bushing #480 gives 19 grains. Split the difference between 468 and 480, and the result is 474. Thus, the correct bushing for 18 1/2 grains of Red Dot is bushing #474.



**IMPORTANT:** Due to agitation of powder during the loading operation, different models of loaders require different bushings. Therefore, the above chart should be used only for 366 Auto and Hornady's new APEX™. Additional charts are published for other Hornady loaders.

All charges listed on this chart are an average of several loads, weighed following the complete reloading cycle. Powders used in establishing these loads were from ballistic samples supplied by the manufacturer or sealed tins of recent manufacture. Charges may vary slightly due to operator's technique and/or moisture content of the powder.

— Means no bushing made for this grain weight.

If no bushing is listed or marked by dash, no load of this grain weight is recommended by powder manufacturer.



# SHOTSHELL RELOADER BUSHINGS

## Shot Charge Bushings

Item	Description	Lbs	UPC
190099	1/2 oz. #9	1/4	190099
190100	3/4 oz. #9	1/4	190100
190101	7/8 oz. #9	1/4	190101
190102	1 1/8 oz. #9	1/4	190102
190107	1 oz. #7 1/2	1/4	190107
190108	1 1/8 oz. #7 1/2	1/4	190108
190096	1 oz. #8	1/4	190096
190097	1 1/8 oz. #8	1/4	190097
190098	1 1/8 oz. # 8 1/2	1/4	190098

## Steel Shot Bushings

Item	Description	Lbs	UPC
290102	1 oz. #4 & 6	1/4	92102
290103	1 1/8 oz. #4&6	1/4	92103
290104	1 1/4 oz. #4&6	1/4	92104
290202	1 oz. #1 & 2	1/4	92202
290203	1 1/8 oz. #1&2	1/4	92203
290204	1 1/4 oz. #1&2	1/4	92204

**For Use in Models 155, 266 & Apex**

## Field Load Bushings

Item	Description	Lbs	UPC
190114	1 1/16 oz.	1/4	19114
190115	1/2 oz.	1/4	19115
190116	5/8 oz.	1/4	19116
190117	3/4 oz.	1/4	19117
190118	7/8 oz.	1/4	19118
190119	1 oz.	1/4	19119
190120	1 1/8 oz.	1/4	19120

Item	Description	Lbs	UPC
190121	1 1/4 oz.	1/4	19121
190122	1 3/8 oz.	1/4	19122
190123	1 1/2 oz.	1/4	19123
190124	1 5/8 oz.	1/4	19124
190125	1 3/4 oz.	1/4	19125
190126	1 7/8 oz.	1/4	19126
190251	2 oz.	1/4	19251
190252	2-1/8 oz.	1/4	19252

## Powder Charge Bushings

Item	#	UPC
190184	256	19184
190185	266	19185
190231	291	19231
190128	300	19128
190129	309	19129
190131	318	19131
190133	327	19133
190135	336	19135
190137	345	19137
190190	354	19190
190140	360	19140
190141	366	19141
190143	372	19143
190145	381	19145
190147	390	19147
190194	396	19194
190150	402	19150

Item	#	UPC
190151	408	19151
190153	414	19153
190155	420	19155
190156	423	19156
190196	426	19196
190157	429	19157
190158	432	19158
190197	435	19197
190159	438	19159
190198	441	19198
190160	444	19160
190199	447	19199
190161	450	19161
190162	453	19162
190163	456	19163
190164	459	19164

Item	#	UPC
190165	462	19165
190166	465	19166
190167	468	19167
190168	471	19168
190169	474	19169
190171	480	19171
190200	486	19200
190201	489	19201
190173	498	19173
190236	507	19236
190176	516	19176
190178	525	19178
190179	534	19179
190180	549	19180
190181	558	19181
190183	588	19183

## Universal Crimp Starter

Item	Description	wt.	UPC
490500	12 ga. 8 pt.	1/4	94500
490501	12 ga. 6 pt.	1/4	94501
490313	12 ga. paper	1/4	94313
490314	16 ga. 8 pt.	1/4	94314
490315	16 ga. 6 pt.	1/4	94315
490316	16 ga. paper	1/4	94316
490503	20 ga. 8 pt.	1/4	94503

Item	Description	wt.	UPC
490504	20 ga. 6 pt.	1/4	94504
490319	20 ga. paper	1/4	94319
490509	28 ga. 6 pt.	1/4	94509
490321	28 ga. paper	1/4	94321
490511	410 bore 6 pt.	1/4	94511
490323	410 bore pa.	1/4	94323
490512	10 ga. 6 pt.	1/4	94512
490325	10 ga. paper	1/4	94325

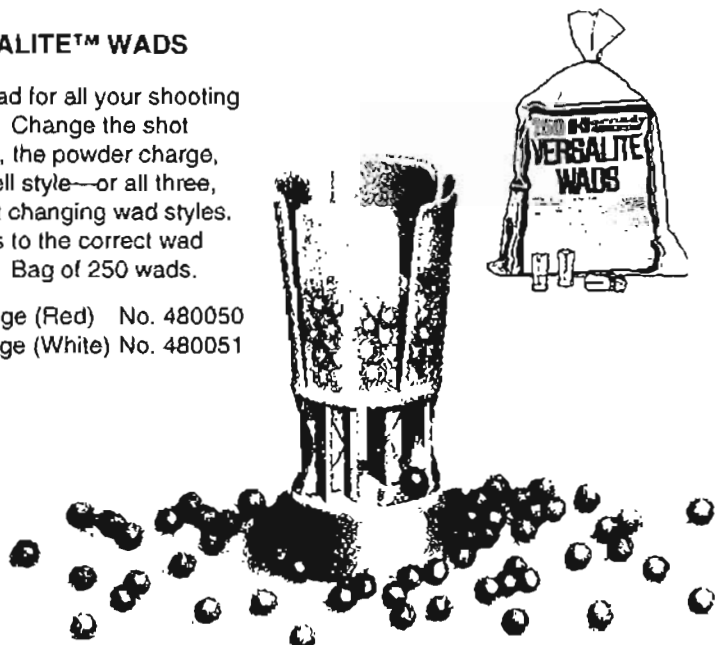
# SHOTSHELL RELOADING ACCESSORIES

Available at your local dealer or from Hornady, 1-800-338-3220

## VERSALITE™ WADS

One wad for all your shooting needs. Change the shot charge, the powder charge, the shell style—or all three, without changing wad styles. Adjusts to the correct wad length. Bag of 250 wads.

12 gauge (Red) No. 480050  
20 gauge (White) No. 480051



## WAD/HULL DISPENSER BOXES



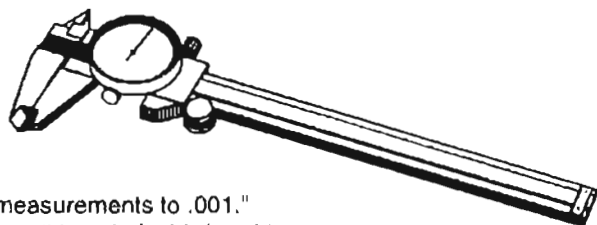
These sturdy cardboard dispensers hold up to 200 wads or shotshells. Frees up workspace while reloading. Twin Pack No. 480026

## STACK-N-PACK™



Fill the Stack-N-Pack with 25 loaded shells and slip them into your shotshell box all at once. Comes with 2 boxes. No. 480020

## STEEL DIAL CALIPER



Makes precision measurements to .001." Measures overall shell length, inside/outside diameters and primer pocket depth. Includes carrying case. No. 050075

## SHOTSHELL BOXES



Extra Boxes for 12-gauge reloads. Each holds 25 rounds and are reusable. 10-Pack No. 480024

## BUCKSHOT



Hornady Buckshot is cold swaged and hardened with 3% antimony. As a result you get buckshot that flies straighter and hits harder. Available in 5 lb. bags.

Size		Order No.
#4—	.240 Buckshot	6414
#3—	.250 Buckshot	6413
#2—	.270 Buckshot	6412
#1—	.300 Buckshot	6411
#0—	.320 Buckshot	6410
#00—	.330 Buckshot	6400
#000	Buckshot	64000

## UNIQUE™ CASE LUBE



Perfect for lubricating steel parts on your shotshell loader. Not harmful to polymer parts. No. 393299

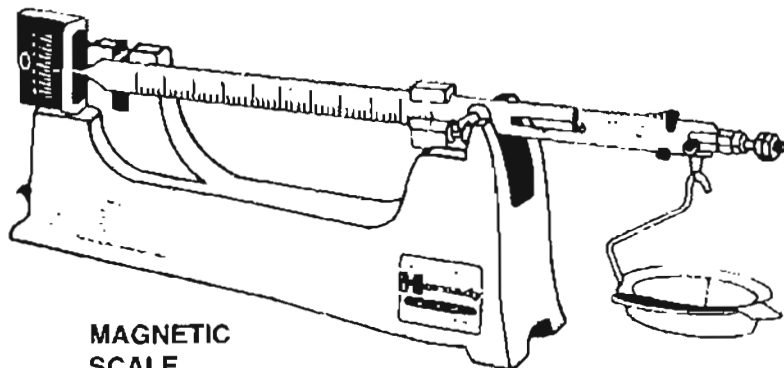
## WAD GUIDE SPRING FINGERS



Spring fingers guide the wad straight into the hull and prevents tipping.

10 gauge	No. 480012	20 gauge	No. 480009
12 gauge	No. 480007	28 gauge	No. 480010
16 gauge	No. 480008	.410 gauge	No. 480011

## MAGNETIC SCALE



Fast accurate weighing of charges. Model "M" scale weighs to within 1/10th grain, accuracy over a 0-510 grain range. Magnetic dampening stops beam swing. "M" Scale No. 050026



## WARRANTY

***"We guarantee every one of our reloading tools and accessories for life."***

### ***No-Risk, Lifetime Warranty***

All Hornady reloading tools and accessories are warranted against material defects and workmanship for the life of the product. Parts, which by the nature of their function are subject to normal wear such as springs, pins, bearings, etc. . . . and, parts which have been altered, abused or neglected — are excluded from the warranty.

If the product is deemed defective by either workmanship or materials, the reloading tool or accessory will either be repaired, reconditioned or replaced (at Hornady Manufacturing Company's option).

***If it breaks, we'll repair it or replace it without charge.***

This warranty supersedes all other warranties for Hornady products whether written or oral.

Please Note: Normally, few problems are encountered when reloading shotshells. However, variations in the powder lot, different brands of primers and other components can cause substantial changes in pressure. Hornady Manufacturing Company has no control over these components and other equipment that may be used with this published information; no responsibility is implied or assumed for results obtained through their use. The loading data provided was tested in modern firearms and does not exceed manufacturer's pressure recommendations.

Further information may be obtained from:

Accurate Arms  
Dupont Explosive Products  
Alliant Powder Company  
Hodgdon Powder  
Scot  
Winchester Division/Olin Corp.

To return a product, send it **TRANSPORTATION PREPAID**, to:

Hornady Manufacturing Company  
3625 Old Potash Highway  
Grand Island, NE 68803

Prices and/or specifications are subject to change without notice. For the best prices on any of our products, contact your nearest Hornady dealer.

Hornady Manufacturing Company cannot assume any liability for damage which may result from use of the product or information given herein, since Hornady has no control over the manner in which products or components are used in the reloading process.



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800-338-3220