

NSRA SCORERS COURSE

Guidance on Scoring

The purpose of this guidance is to help ensure a consistent and accurate standard of scoring and consistent application of rules related to scoring in NSRA and other competitions.

Following this guidance will help ensure consistent and fair scoring:

- At large shooting meetings, where many scorers are employed;
- In large postal leagues, with many divisions, particularly where individual awards and/or rankings are decided concurrently with the team competitions; and
- In self-scoring, postal competitions.

Definitions

A number of words used in this guidance have specific meanings, some being as defined in NSRA Rules.

Each aiming mark is termed a '**target**'. A '**card**' may comprise more than one target. The term 'card' shall be taken to include the printer strip and/or start card for competitions shot on electronic targets. (NSRA Rule 1.10.6)

The paper on which targets are printed is normally referred to as '**board**', being thicker than normal paper.

In rifle competitions '**short range**' targets are those used at 15, 20 and 25 yards and 25 metres.

The Scorer's Job

The scorer's first task is to score all cards in a fair, consistent and accurate manner, in accordance with the relevant rules.

The scorer's second task is accurately to record and present all scores and results to the competitors as soon as possible.

If there is any doubt about any issue relating to any score, then the benefit of the doubt must be given to the shooter.

Fast, accurate scoring is the ideal. The best scorers are very fast and very accurate - but accuracy must never be sacrificed for speed.

Scoring Essentials

A place to work

Scoring is a demanding job that requires sustained concentration.

A small number of competitions, such as ISSF 25m Pistol and 25m Standard Pistol, are normally scored at the butts. Otherwise scorers must have a comfortable, quiet and well-lit place to work effectively. Ideally, this will be an office somewhere away from the range.

A scorer will need a chair and a table, with enough space to work, lay out his equipment and to keep scored and un-scored cards.

Space is also needed for receiving and sorting cards from the range, and for filing shot cards.

Equipment

Each scorer must have, or have ready access to:

- The relevant Rules and Conditions for the competition(s) being scored.
- The relevant gauges or scoring machines.
- Score sheets, score cards, etc.
- Pens, pencils, erasers, etc.

Scorers may also need:

- A table lamp or other task lighting.
- A magnifying glass.

Rules

A scorer must know and understand the relevant rules and must have access to the latest edition of the relevant rules at all times when scoring any competition.

A scorer must also understand the various rules relating to the insertion of plug gauges into shot-holes, must be able to insert a gauge into a shot-hole in a proper manner and must understand the need to support shot targets adequately whilst they are being gauged.

Use of Plug Gauges

Plug gauges are used to determine the value of doubtful shots.

A simple plug gauge has a spindle, to centre the gauge in the shot-hole, and a somewhat larger, concentric flange, which rests on the surface of the target and is used as the reference to determine the value of the shot.



Targets

Targets comprise a series of scoring zones, normally wide concentric circles, each having a particular value. The scoring zones are separated by thinner concentric circles, called scoring rings, which have a width of about 0.1 mm to 1.0 mm, depending of the type of target.

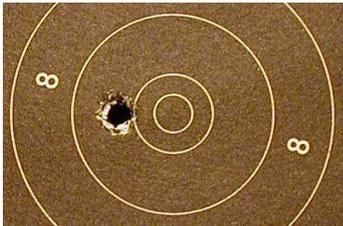
Scoring rings situated within the aiming mark are white, and outside the aiming mark are black. In the case of some targets (e.g. 10m air rifle (below), but not 50m rifle) the outside edge of the aiming mark may also serve as a scoring ring. With very limited exceptions, the principal ones being the British 50 yard slow fire pistol target (PL6) and the now largely unused 20 yard PL3 target, the distance between consecutive scoring rings is the same throughout the target.

Inward and Outward Gauging

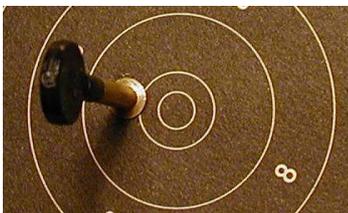
Targets are scored according to one of two different systems - inward gauging and outward gauging.

A scorer needs to know and understand the principles of both inward and outward gauging with plug gauges and with oversize plug gauges. This is explained in Rule 5.1 and Appendix B to NSRA Rules and in the relevant sections of ISSF Rules.

Inward Gauging



For inward gauging targets the principle is that the value of a shot is determined by the position of the edge of the shot-hole nearest the centre of the target.



When the shot-hole touches the outside of the scoring ring, the higher value is awarded.

This system applies to all ISSF and NSRA targets for rifle, pistol and airgun, with the exception of NSRA short range rifle targets of the British Match 1989 Series (and their predecessors in the 1966 and 1985 Series).

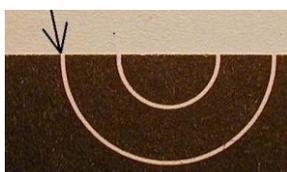
Outward Gauging

For outward gauging targets (NSRA short range rifle targets) the principle is that the value of a shot is determined by the position of the edge of the shot-hole furthest from the centre of the target. When the shot-hole touches the outside of the scoring ring, the lower value is awarded.



Shot Value

In both inward and outward gauging, the point at which the shot value changes is the outside edge of the scoring ring.

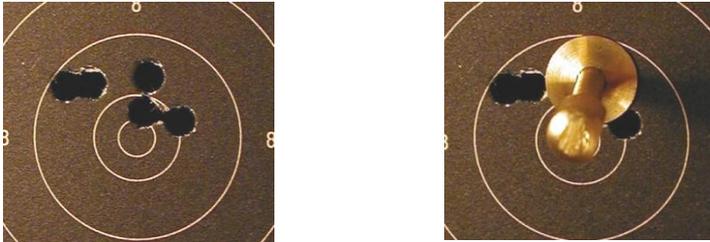


Scoring Muzzle Loading Competitions

Most competitions for muzzle loading score by reference to the centre of the shot-hole. In these competitions, the centre of the shot-hole (i.e. the greater part of the shot-hole) must be within the printed scoring ring to score the higher value.

Gauging with Oversize Gauges

In some circumstances it may be difficult or even impossible to gauge accurately to the ring



adjacent to the shot-hole. This may be because the scoring ring has been struck or otherwise damaged by the bullet, other adjacent shot-holes or splashback. In these cases, it is possible to use a gauge with an over-sized flange to determine the shot value by reference to another ring on the target.

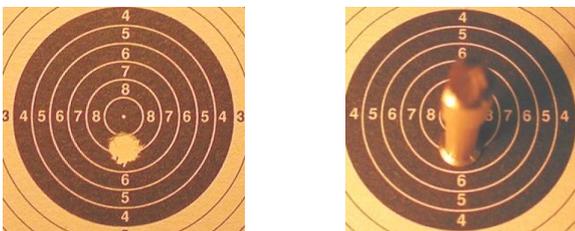
There is very little difference between the normal size of the hole produced by a flat-headed (wadcutter) pellet favoured by most ISSF airgun shooters (mandatory in competitions under NSRA rules) and the nominal size of the pellet. It is therefore normal for all ISSF and national airgun targets to be scored using oversize gauges.

Oversize gauges always score to a ring of lower value than the ring adjacent to the shot-hole in question.

The ISSF 10m air pistol gauge, the ISSF 50m rifle gauge (below) and the NSRA 50 and 100

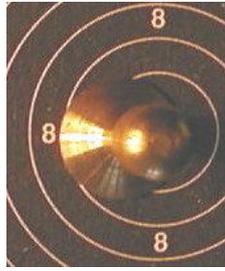


yard rifle gauges all score by reference to the next ring out, i.e. if the outside edge of the gauge falls within the outside edge of the 9-ring, the shot value is 10 points.



The NSRA 6 yard air rifle and ISSF 10 metre air rifle gauge (the same gauge is used for both targets) and the NSRA 6 yard air pistol gauge score by reference to the second ring out. Thus if the outside edge of the gauge falls within the 7-ring and outside the 8-ring, the shot value is 9 points.

NSRA short range, outward gauging rifle targets should always be scored using the oversize gauge for that distance. There is a different oversize gauge for each of the four distances. They all score to the next ring outwards. Thus if the outside edge of the gauge falls within the



7-ring and outside the 8-ring, the shot value is 9 points. The tolerance on the standard 5.6mm plug gauge is the wrong way for outward gauging targets and its use disadvantages the shooter.

There are also oversize gauges, which can be used instead of the standard 5.6mm plug gauge, for 50 yard, 50 metre and 100 yard rifle targets.

Shots in the Outer Scoring Rings

Oversize gauges can only be used where the required scoring ring, one or two rings further from the centre as appropriate, is printed and is of the correct dimension. For most targets the lowest value scoring shot is 1 point, but on some targets the lowest value may be higher, such as 4 points on the 50 yard rifle and 6 yard air rifle targets and 2 points on the 100 yard rifle target.

This means that on all targets a shot of the lowest scoring value cannot be assessed with the relevant oversize gauge.

In the cases of the 10 metre and 6 yard air rifle targets, shots in the outermost two rings (1 and 2 points at 10 metres: 4 and 5 points at 6 yards) similarly cannot be assessed with the relevant oversize gauge.

The 6 yard air pistol target is a special case as a zero-ring is printed. It can therefore have a shot counting 2 points assessed with an oversize gauge, but not a shot scoring 1 point.

Short Range Rifle Targets

On short range prone rifle targets, the lowest value scoring ring which follows the normal rule that scoring rings are equidistant is the boundary of the 6 point and 5 point scoring zones. Accordingly, the lowest value that can be determined by an oversize gauge is a "gauged-in" 7 points.

For determining shots with values of 5 and 4 points, the scoring ring is the edge of the aiming mark at each distance. Aiming marks are proportional as seen by the shooter (i.e. directly proportional to the shooting distance). Scoring rings are proportional in measuring the deviation of the centre of the bullet from the centre of the target by reference to the position of the edge of the shot-hole. Therefore not only can shots scoring 4 or 5 points not be scored with oversize gauges, the shots do not have the same deviation from the centre of the target and are therefore not exactly proportional at the four distances.

Gauging Rules

Inserting a shot-hole gauge alters the shot-hole. Re-inserting the gauge a second or subsequent time (re-gauging) may therefore give a different result.

For competitions shot under ISSF Rules, and for finals at meetings shot under NSRA Rules, a gauge may only be inserted once in each shot-hole. Three scorers must be present and once the gauge has been inserted, the value of the shot must be determined before the gauge is removed.

Each scorer assesses the value of the shot and, on a signal from the senior scorer, shows whether it is “in” (normally by a thumb-up gesture) or “out” (thumb down). The majority opinion determines the value of the shot. The target is then marked, to indicate that the shot-hole has been gauged and to show the value awarded. Each of the scorers then adds his initials against the decision, which is final.

For competitions shot under NSRA Rules, scorers are often operating alone. In these circumstances the scorer decides when to use the gauge and determines the value of the shot. As the value of the gauged shot has not been agreed by three scorers, it is permissible for the value of the shot to be challenged by the shooter or a team captain. In this case the re-gauge should be undertaken with an overlay gauge, not a plug gauge.

In competitions organised by some clubs or associations and shot under old rules, re-gauging with graduated gauges may be required to separate tied scores (see the section on Graduated Gauges).



To minimise wear & tear on shot-holes, a scorer working alone should insert the gauge only once and determine the value of the shot before removing the gauge.

NSRA Rule 5.1.5 requires that: “*The use of a gauge must be marked on the target by the scorer.*”. This will normally be done by indicating which shot-hole has been gauged (if there is more than one shot on the target) together with a letter "G" and either "+" or "-" to indicate whether the shot gauged as the higher or lower value.

Using Plug Gauges

Remove the card from any backing frame, holder, etc. If the card is wet, lay it aside to dry, if at all possible. Check the back of the card for debris, which might interfere with accurate gauging, and carefully remove if necessary.

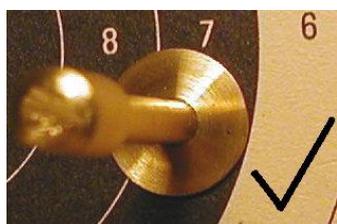
Lay or hold the card flat and horizontal, supporting it near the shot-hole, if necessary.

Many scorers use a frame with a small cut-out or cut-outs, to support targets which are being gauged.

Select the correct gauge.

Lower the gauge gently into the shot-hole, allowing the spindle to self-centre the gauge under its own weight. Very gently press the gauge into the shot-hole until the flange lies flat against the paper.

Determine the value of the shot. This must be done by looking at the position of the gauge flange at an angle, not from directly above, as the latter can lead to distortion and inaccurate scoring.



Gauges

Every scorer must have access to all necessary gauges or machines for scoring the competition and must be able to select the appropriate gauge for each scoring task.

The technical specification of gauges is in Appendix B of NSRA Rules and Chapter 6 of ISSF Rules.

For short range rifle competitions, shot on proportional British Match Targets, it is essential to use the correct oversize plug gauges for the particular distance (15, 20 or 25 yards or 25 metres). The 5.6mm gauge is designed for use on inward scoring targets and with the exception of shots striking the outermost rings of short range rifle targets, where an oversize gauge cannot be used, they should not be used.

For all other ISSF and NSRA inward scoring smallbore rifle targets, the standard 5.6mm plug gauge is normally used (although there may be oversize gauges available as alternatives.)

For all lightweight sport rifle events (where either .22LR or air rifles not exceeding .22" may be used) the standard 5.6mm gauge is used irrespective of the calibre of the rifle.

For all small-bore pistol events and their 20 yard or 25 metre air pistol equivalents, the standard 5.6mm gauge is used irrespective of the calibre of the pistol.

For ISSF Centre Fire Pistol, ISSF approved gauges with a 9.65mm flange and with a variable spindle diameter, according to calibre, are used.

For NRA pistol and gallery rifle events, NRA gauges with a flange size according to calibre are used.

For ISSF and NSRA 10m airgun competitions the correct oversize gauge should be used for normal scoring.

Great care should be taken not to confuse similar gauges, for example air rifle with 5.6mm small-bore gauges, and 6 yard air pistol with 10m air pistol gauges.

Special Airgun gauge

A 4.5mm gauge is available for measuring inner tens and the outer scoring rings of airgun targets, when the oversize gauge cannot be used.

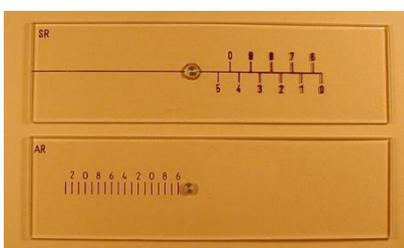
This gauge may be used on any airgun target as an inward scoring gauge. However great care is needed when inserting this gauge into a shot-hole, as wadcutter pellets make almost full calibre holes in the target, so that the 4.5mm diameter flange is only slightly larger than that of the spindle. It is, therefore, very easy to push this gauge right through the target, damaging the shot-hole.

Decimal gauging

A scorer must understand the use of decimal and vernier plug gauges to determine the value of shots in finals of competitions to ISSF Rules, where shots are scored to one decimal place, e.g. 10.2.

There are a variety of decimal and vernier gauges on the market. The more complicated gauges are likely to come boxed and with full instructions.

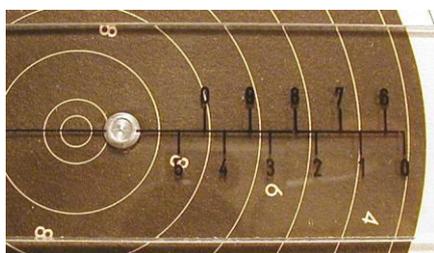
The simplest gauges are small sheets of clear plastic, about 100mm x 25mm with a metal



spindle to locate the gauge in the shot-hole and a series of engraved lines.

For large targets, such as the 50 metre pistol target (NSRA PL7), the gauge is engraved with lines 1/10th of a ring apart. To score the shot the spindle is placed in the shot-hole with the line showing the long axis of the gauge pointed to the centre of the target. The number of tenths to be added to the whole point score for that shot, is then determined as indicated by the value on the engraved line just inside the scoring ring.

For small targets, such as the 50 metre rifle (below), air rifle and air pistol targets, the rings are too small for 1/10ths to be easily seen. Gauges for these targets work on the vernier principle



for ease of reading. The gauge is inserted in the target in the same way as the decimal gauge. However in this case the number of tenths to be added is determined by which of the numbered, engraved lines aligns with a line on the target. If no line aligns accurately, then the value is that of the nearest line *just inside* a scoring ring on the target, e.g. 10.1 in the illustration above.

When using these gauges it is important to remember that the accurate points of reference are the outside edge of the lines on the target and on the gauges. It is also important to remember that there is no rounding up or down of scores. Just as a shot falling anywhere in the 9-ring always scores nine points in normal shooting, a shot falling between 9.70 and 9.79 will be recorded as 9.7.

Overlay Gauges

It is not uncommon for an obvious double or multiple-shot hole to occur where one or more of the shots has removed the scoring ring and one or more of the shots in the group are of doubtful value. In such cases the size of the hole means that a plug gauge cannot be accurately centred in each of the shots forming the hole.

Instead an engraved plastic overlay gauge is used in these circumstances to determine the values of the individual shots.

The first step is to examine the shot-hole and determine how many shots need to be scored. The shot target is then placed on top of an un-shot target of the same type, aligning the scoring ring on the un-shot target to show the position of the scoring ring that has been shot away.

The overlay gauge is now aligned with the outer circumference of each doubtful shot within the group, so that the gauge shows the relationship between the shot and the ring, allowing the score for each clear shot to be judged.

An overlay gauge may also be useful for determining the value of doubtful shots on airgun targets, where the pellet has ripped the board, as opposed to punching a clean hole in the normal way. In these cases, it is usually possible to see an indentation of the paper, made by the head of the pellet before the board ripped. If the value of the shot is in doubt, it can be gauged by replacing the torn strip of paper as accurately as possible and then aligning an overlay gauge with the mark made by the head of the pellet to gauge the score.

Overlay gauges should not be used for scoring purposes if it is possible to use a plug gauge.

As with plug gauges, and depending on the competition being shot, it may be necessary for more than one scorer to agree the shot value and/or for the use of the gauge and the shot value to be recorded on the target.

Many overlay gauges are printed to show the centre of the shot-hole as well as the circumference. This feature is of particular use if scoring targets in a muzzle-loading competition.

In some cases overlay gauges may be used by shooters to estimate scores. This is possible, and acceptable, because the use of an overlay gauge does not damage the target or shot-holes. There are some overlay gauges which are designed and sold for the purpose of estimating scores. They are not intended for scoring and should not be used for that purpose.

Skid Gauges

A scorer needs to know and understand the proper use of a skid gauge, which is used to determine the validity of late shots fired in competitions where turning targets are used.

A skid shot occurs when a bullet passes through the target after it has started to turn away from the shooter, leaving a shot-hole that is elongated horizontally.

The shooter is credited with the value of a skid shot provided the elongation of the shot-hole does not exceed certain limits. The elongation of the hole is measured using a skid gauge.

ISSF Rule 6.3.5.11 sets out the specification for a skid gauge, which is a flat, transparent plastic plate with two parallel lines engraved on one side. For ISSF Center Fire Pistol, the lines are 11.00mm apart and for smallbore pistol and lightweight sport rifle 7.00mm apart, measured between the inside edges.

To use, the card is placed flat and the gauge laid over the shot-hole, with the engraved lines at right angles to the long axis of the hole. The shot is scored as a hit, if the shot-hole is contained between the two engraved lines, and as a miss, if the extended shot-hole is longer than this.

A skid shot can also be the result of a ricochet. Skid shots on fixed targets and running targets are always the result of a ricochet. Skid shots on turning targets, which are not horizontal may also be the result of a ricochet. A ricochet is scored as a miss.

Graduated Gauges

The use of graduated gauges to separate ties in NSRA competitions was discontinued in 2002 and the relevant rules have been removed from the current edition of NSRA Rules and Regulations. However some organisations still have these gauges and may wish to use them in some competitions. The conditions of a competition may also provide for the use of



graduated gauges in other circumstances.

Graduated gauges are oversized, with the size increasing by increments. The standard set of six are of dimensions 0.25", 0.30", 0.35", 0.40", 0.45" and 0.50". These were used on 25 yard rifle targets, and graduated gauges of different dimensions, to preserve proportionality, had to be used on the targets of those shooting at 15 yards (0.238" to 0.388") and 20 yards (0.244" to 0.444"). No proportional set of graduated gauges for 25 metres was produced or sold by the NSRA.

For 50 yard rifle targets the standard set of gauges was used, followed if necessary by a further five gauges of sizes from 0.60" to 1.00". For 100 yard rifle targets, the 11 gauges from 0.25" to 1.00" were used, followed if necessary by a further five gauges from 1.20" to 2.00".

A full list of the dimensions of graduated gauges can be found in the 1999 and earlier editions of NSRA Rules and Regulations.

The standard set of gauges can also be used on any other cards shot with .22 rifles or pistols, normally starting with the 0.25" gauge, but are not used in connection with .177 airgun targets.

Graduated gauges are used to determine shot values in exactly the same way as they would be with the standard 5.6mm (0.22") gauge. The effect of using a 0.25" gauge on inward gauging cards is to increase the value of a shot that just misses the higher value when scored with the 0.22" gauge. The effect of using successive graduated gauges on inward gauging cards is to move the total score progressively closer to the highest possible score.

The use of graduated gauges on outward gauging cards has the opposite effect, moving the total score progressively further away from the highest possible.

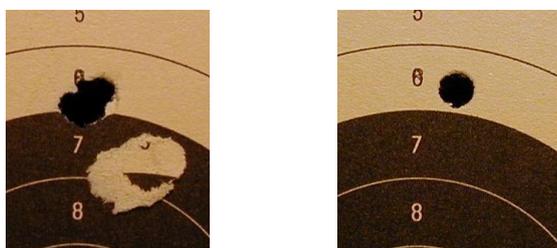
It was not normally necessary to use more than two or three graduated gauges before most ties could be settled in favour of one shooter. However there are a total of 28 graduated gauges in a complete set. The high cost of a full set, together with the unsatisfactory situation of having to insert plug gauges into shot-holes on a number of occasions, led the NSRA Shooting Council to approve the alternative arrangements for settling ties now found in NSRA Rule 5.5.

Unusual Shot-holes

A scorer should be able to discriminate between normal and unusual shot-holes for the entire range of calibres and firearm types used in the competitions he is likely to score.

Most scoring under NSRA and ISSF Rules will involve targets shot with .22LR bullets and 4.5mm wadcutter airgun pellets. Scorers should be familiar with the normal holes made by these types of ammunition on a range of targets.

Scorers should be aware that the appearance of shot-holes can vary according to the velocity



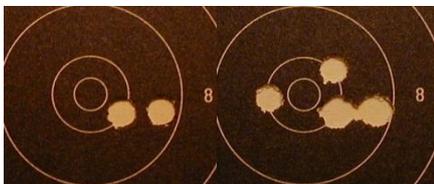
and shape of the ammunition and the type of board used for the cards. In particular, very slow airgun pellets are likely to rip the board, rather than make clean holes.

In some circumstances, for example when airguns are used on cards intended for .22LR, the quality of board used may mean that shots do not make clean holes. Although this makes life difficult for scorers, shooters should not be penalised.

Abnormal shot-holes can occur for a variety of reasons, some legitimate and others not within the rules.

For example, when one card has been shot behind another it may have been accidental, or a deliberate attempt to shoot two cards at once, infringing NSRA Rule 1.10.10 (*The whole of the target scoring area and the aiming mark must be visible to the firer.*).

On targets shot with airguns, the sign for this is the larger than normal hole that will appear on



the card that was underneath (see the holes between 3 and 4 o'clock).

On targets shot with cartridge-firing guns the card underneath (right) will show rather more



extensive cracking of the board than usual, often with several large tears, and an absence of bruising of the paper surface and the printing of the aiming mark.

In the case of both types of firearm, there will be a lack of lead or grease marks where the projectile has passed through the target.

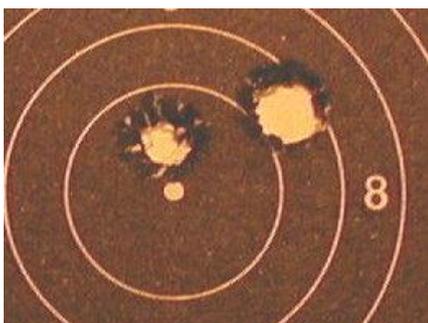
It may also be detected if both cards go to the same scorer, in that when the two cards are held together there is a perfect match of shot-holes.

Abnormal shot-holes also occur when non-wadcutter pellets are used in airgun competitions (instead of the wadcutters required by NSRA Rule 8.2.2). Similarly shot-holes will not look right when a .22" airgun has been used instead of a .22LR firearm.

Shot-holes may show variations even though shot fully in accordance with the rules. Many target frames will have thin wood or hardboard immediately behind most of the area of the card, with some parts having been either removed intentionally or shot away at the main impact areas.

A cartridge rifle or pistol shot hitting a target which has wood immediately behind it will produce a hole with a more sharply defined edge and will have more of the paper torn away (below right) than with a normal shot-hole (below left). It is quite feasible to have both such abnormal and normal shot-holes on the same card, and even on the same aiming mark.

All these types of unusual shot-hole are easily recognisable and scorers should be able to



identify them. If necessary a few experimental shots can be fired to illustrate the differences between these and normal shot-holes.

On rare occasions defective bullets, cartridges or pellets may cause unusual shot-holes. An unstable bullet, for example, may well wobble, tip over in flight and pass through the target at a strange angle, making an elongated hole. In extreme cases, the bullet may even pass through the target sideways. A lead bullet striking a nail beneath the target may expand, leaving a larger calibre hole in the board. These shots should be scored according to where they strike the target.



Ricochets and splashback may also cause unusual holes and are always scored as misses. In the case of splashback the tell-tale damage to the fringe of the hole is on the target side of the card.

Some designs of centre fire bullet, for example skirted wadcutters, may sometimes come apart in flight, leaving two holes in the paper for one shot. In this case, the hole made by the front of the bullet is scored and that made by the separated skirt is ignored.

A scorer must be able to use gauges and other methods to determine the presence of double or multiple shot-holes on targets.

Where multiple shots are fired at a single target it is not uncommon for two or more shots to fall very close together so that those shots make a single hole. If the points of impact differ slightly, the shape of the hole will usually indicate the double or multiple shot-hole. However, where shots have almost exactly the same point of impact, it can be difficult to see which shot-hole is double.

When shooting one shot per target a double shot-hole may also occur if there is a cross-shot or if the shooter fires an extra shot at a target.

Where a target has less than the expected number of shot-holes on it, and where there is no other explanation (eg cross-shot, confirmed miss) the scorer should suspect, and look for, double or multiple shot-holes.

The first step should always be a close, visual inspection of each shot-hole on the target and, if available, the backing card. Sometimes a double shot-hole which cannot be identified from the front of the target will appear different to the others if viewed from the back of the target. Inspecting the edge of the shot-holes with a magnifying glass may reveal other clues, for example, the second bullet may have left extra grease or lead marks on the paper or even that the rifling marks on it were not lined up with those on the first.

Gauges should only be used to determine double shot-holes if there is still doubt after close visual inspection.

A double shot-hole will tend to be looser than a single one, even if the two bullets struck the target in exactly the same place. This is because the board at the fringe of the hole has been pushed aside by a bullet more than once. This makes it possible to use an ordinary plug gauge to find double shot-holes.

To do this the card, which must not have been gauged, is placed flat and is supported as for normal gauging. The spindle of the gauge is placed in each shot-hole and the card is agitated by gently tapping the side. For single shot-holes the gauge will normally fall out of the hole. If the shot-hole is double, the gauge will normally fall into the shot-hole under its own weight.

If the gauge will not fall into any shot-hole under its own weight, it may still be possible feel a difference in resistance, by gently pushing the gauge into each shot-hole in turn. Again, the loose hole will be the double.

This is a method of last resort as the act of gauging destroys the evidence. It cannot be used under ISSF Rules - as only one person is able to test the evidence. Under NSRA Rules, and

where the shooter has further rights of appeal, it may be better to award a miss without gauging, leaving the shooter to challenge the score and the Range Committee or Referees the opportunity to use this method as their last resort.

If it is necessary to use the gauge to determine the value of a particular shot, this must be done immediately, and before removing the gauge from the hole.

For shooting under NSRA Rules, there is a special taper gauge, which works on the same



principle and which can be used to determine double shot-holes. This is a long, tapered plug, with a series of graduations along its length.

The gauge is lowered gently into several shot-holes on the card, none of which will require gauging to determine their value, and note is taken of the depth to which the gauge sinks under its own weight. The same procedure is then followed in respect of the hole or holes which have been identified as possible doubles. The gauge will go deeper into the double shot-hole than the single ones.

Because of the variations in quality of board and characteristics of ammunition, this penetration test can only be conducted on shot-holes on a single card and fired by the same firearm using the same ammunition. For example the Eley EPS ammunition tears away more paper, and will thus allow greater penetration than will a shot-hole produced by a bullet with a round-nose profile.

Tests on one card therefore cannot be used as the standard against which shot-holes on a different card are judged.

Remember that every use of the gauge, for whatever purpose, must be marked on the target.

Backing Cards

A scorer must be able to use backing cards to determine the presence of cross-shots, double and multiple shot-holes and, in the case of cross-shots, to determine the likely firing points from which they originated.

Backing cards are used mainly to detect cross shooting in outdoor competition. They are plain sheets of white paper normally placed 25 to 50cm behind competition cards, so that all shots striking the target are likely to pass through the backer.

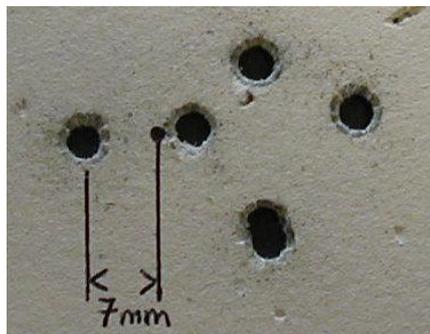
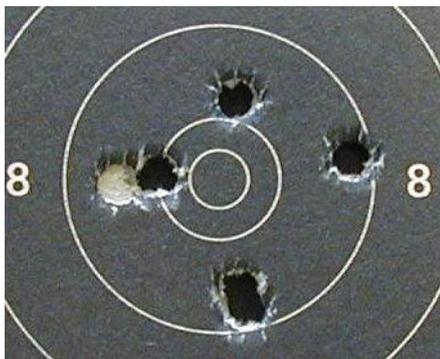
The backing card is close enough to the competitor's card so that, to all intents and purposes, the competitor's shots on any diagram will fall in the same pattern on the backing card as on the competition card. In the event another competitor cross fires, his shot will be displaced to one side on the backing card. This allows cross-shots to be identified by lining up the shot-holes on the competitor's card with those on the backing card. The five or ten legitimate shots will line up exactly with the corresponding shot-holes on the backing card, as will any excess shots fired by the competitor. Any cross-shots will not line up and so will easily be identified by the backing card showing immediately behind the shot-hole.

A bullet passing through any part of a card supported by a frame is likely to be deflected as it passes through the frame, so that the shot-hole in the backer does not line up with the corresponding shot-hole on the card.

If no-one admits to firing a cross-shot, it is possible to use the backing card to determine where the shot came from and thus who is responsible and should be penalised.

The procedure to determine the source of a cross-shot is as follows:

1. Line up the competitor's shot-holes from the front and make a pencil mark on the backing card through the centre of the cross-shot hole on the target.



2. Determine which hole on the backing card was made by the cross-shot.
3. Measure the distance between the pencil mark on the backing card and the centre of the cross-shot and note the direction of displacement. A shot-hole to the left of the pencil mark indicates the shot came from the right, and vice versa.
4. The distance between the competitor and the erring shooter is calculated using the formula:

$$\frac{\text{Shooting distance}}{\text{Distance between target \& backer}} \times \text{Displacement of shot}$$

5. Knowing the distance and direction from which the shot came, only the width of the firing point is now needed to identify the culprit.

In the illustrated example, fired at 50 metres with the backing card 30cm behind the target, the calculation (in metres) is:

$$(50 / 0.3) \times 0.007 = 1.16 \text{ metres}$$

i.e. the cross-shot was fired from the firing point immediately to the right of the shooter who received the cross-shot.

Backing cards may also be used to help identify double or multiple shot-holes. Quite often a double shot-hole which is difficult to detect on the competition card will clearly show as a double on the backer.

Be aware that it is possible for a cross-shot to pass through one shot-hole on the target and



through the hole corresponding to another of the competitor's shots on the backing card. At first glance in the above illustration there are five shots on the target scoring 47 points.

However the backer reveals that there are three shots in the 10-ring, one of which is a cross-shot from the right which appears on the backer as a double with one of the firer's own shots (the nine at 8 o'clock).

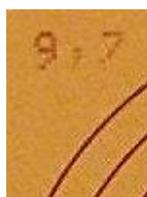
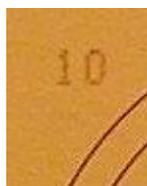
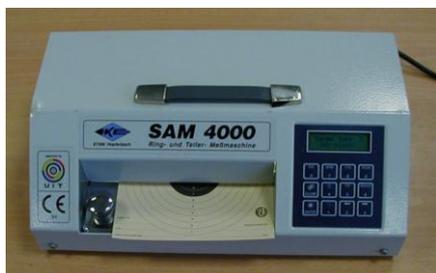
Backing cards are issued for some competitions. They are not prohibited for others, including postal competitions, and may be used. Many shooters use backing cards outdoors to aid spotting of shot-holes. They may also be used to detect any cross-shots or doubles which might occur in postal league shooting and shooters may choose to submit their backing cards to assist the scorer. Where shooters do this it is only necessary for them to send sufficient of the backing card to show the groups and cross-shots on the diagram concerned, plus a few centimetres extra, so that the scorer can confirm what has happened.

Electronic Scoring

A scorer may come in contact with, and thus need a general understanding of electronic scoring machines and electronic target systems, but does not need be familiar with the use of every system.

Electronic Scoring Machines

Electronic scoring machines work by scanning the target, measuring the distance of each shot from the centre, calculating the score and usually printing the score on the card. They can be set up to score in whole points, for normal shooting, or in tenths of a point, for finals.



Some can also score targets on which more than one shot has been fired. Other possible features include the ability to input scores directly to a computer.



Electronic machines are generally easy to set up and use, and come with good instructions, but are only available for ISSF targets. The important things to check are that the machine is properly set up for the competition and the targets in use.

As an alternative to scoring a complete set of targets, a machine can be used to score only the shots that would otherwise need to be checked with a plug gauge. A machine does nothing to the shot-hole or target that would preclude the subsequent checking of a score with a plug gauge.

Operators need not be skilled scorers. However, there is always a possibility that scoring machines or the electricity supply will fail. It is therefore a wise precaution to have plug gauges and skilled scorers available as standby, whenever machines are used.

Electronic Target Systems

Electronic target systems, as currently used at international and major domestic meetings, do not use paper targets. Instead the shooter fires at a target comprising a sheet of card or corrugated plastic which has a circular hole in the middle. Behind this is a roll of black paper or rubber which, when seen through the hole, forms the aiming mark.



There are no scoring rings for the shooter to see, but the position of a shot is recorded by a number of sensors around the edge of the target. The shot is detected from the sound of the bullet or pellet hitting the target face, and a computer converts the co-ordinates into the score for the shot.

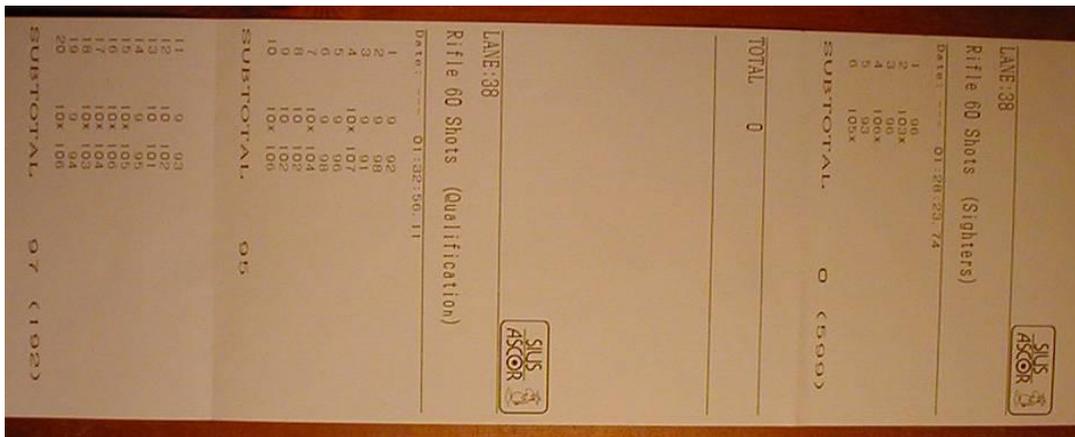
The value of each shot is immediately displayed on the monitor beside the shooter. It is also recorded on a paper strip in a control box behind the firing point.

Shot	Score	Score
1	9	92
2	9	98
3	9	91
4	10x	107
5	9	96
6	9	98
7	10x	104
8	10	102
9	10	102
10	10x	106
SUBTOTAL		95

At the present time the ISSF has approved the use of certain electronic targets manufactured by the Sius, Spieth, Polytronic and Megalink companies. ISSF-approved systems have also been given general approval by the NSRA for use in its postal competitions, although the electronic targets installed by associations and clubs must also be individually registered with NSRA Competitions Department.

The scorer of an NSRA postal competition who receives an electronic target printer strip needs to be assured that the electronic target used has been registered with the NSRA.

If the competition is run by another organisation, the scorer will need to ensure that the organisation has agreed to the use of electronic targets in its competitions.



The detailed requirements and rules for shooting and witnessing of postal competitions on electronic targets, including how competition stickers are used in conjunction with the printer strip, are set out in NSRA Rule 7.4.7.

Unusual Occurrences

A scorer must know and understand the rules relating to cross-shots, extra shots, shots on the wrong target of the competitor's own card and missing shots, for the full range of events likely to be encountered. This includes dealing with allowable and non-allowable malfunctions in events fired on turning targets or in rapid fire rifle competitions.

These matters are dealt with in the various competition rules and it is important for the scorer to ensure that he refers to the correct rules. For example the conditions of a rifle competition at 50 metres may state that it will be scored in accordance with either NSRA or ISSF Rules.

A confirmed cross-shot under NSRA Rules is credited to the firer subject to a penalty of two points. Under ISSF Rules a cross-shot is scored as a miss.

Similarly under NSRA Rules a shooter firing too many shots at one of his own targets, but not firing more shots than are required for the competition as a whole, incurs a penalty of one point for each excess shot on any target. Under ISSF Rules there is no penalty for the first two such occurrences in a course of fire, but a two point penalty applies to the third and each subsequent excess shot on a target.

A scorer must know what action to take if he suspects that a competitor might be cheating. NSRA Rule 1.7 sets out the general requirements for shooters to know, understand and observe the Rules, their liabilities should they fail to do so, and the requirement of shooters and officials to report misconduct.

The scorer's main task is to score targets and to apply the relevant penalties for any irregularity, wrongdoing or omission.

Deliberate intention to cheat can be difficult to prove and an accusation of cheating can have very serious consequences for a shooter. It is often the case that some action, which might be seen as evidence of intentional cheating, could also have been the result of a genuine mistake, for example shooting one card behind another. Scorers should therefore be careful not to make statements which could be construed as an accusation of deliberate wrongdoing.

In many situations, for example where one card has clearly been shot behind another, or with the wrong ammunition, the occurrence is not in accordance with the Rules, so that the scorer should disallow the card anyway. Should there be indications of interference with shot-holes, and if there is no explanation of the reason for this, the scorer should, in the first instance, rule

that the card is damaged. NSRA Rule 7.4.5 provides for such cards not to be scored. These are severe penalties which the shooter may or may not choose to contest. In these cases, notification of the results, and the reasons for disqualification/non scoring, to the competition organiser will be sufficient.

If there is evidence of sustained, systematic or intentional cheating, the scorer must take immediate steps to make the competition organiser aware of the possibility. In these cases, it will usually be possible to disqualify the card or to decline scoring under Rule 7.4.5. and to issue scores as usual. If this is not possible, score sheets should be issued with the relevant results delayed.

Comments on score sheets, relating to disqualification or non-scoring of cards should be limited to reference to the Rule(s) applied. In the event of a delayed result the score sheet should state "Result delayed", but make no further comment.

Scorers should limit their activities to scoring, applying the Rules and advising competition organisers of irregularities. They should neither investigate irregularities, nor confront or accuse shooters.

Speeding Up Scoring

The scorer's responsibility is to score all cards in a fair, consistent and accurate manner, in accordance with the relevant Rules. Accuracy is essential; fast, accurate scoring is the ideal. The best scorers are very fast and very accurate - but accuracy must never be sacrificed for speed.

Good organisation prevents wasted effort and saves time. Good working conditions, with everything necessary to hand saves time. Simply being well-organised can speed up scoring considerably, without any need to increase skill.

Overworked and tired scorers become less efficient. As an individual, don't take on too much. If you need a team of scorers, make sure you have enough people. Make time for proper breaks and refreshments, to maintain efficiency. Errors and inaccuracies increase work and slow things down in the long run.

A fast and accurate scoring technique can only be developed through experience and constant search for improvement. Speed is generally more easily increased by improving efficiency than by trying to do things more quickly. Fast scorers seldom appear to be harassed or hurried.

Using gauges is one of the slowest processes in scoring. The best and most experienced scorers tend to make far less use of the gauges than less experienced scorers, which accounts for much of the difference in speed. They are able to do this because they have developed their ability to estimate scores. This is not difficult to do, but it does take time and practice.

Every time a shot is scored, the scorer asks the question, "Is the shot "clearly in", "clearly out", or "of doubtful value"?" If he is unsure, the gauge must be used. Estimating can be improved by systematically looking again at doubtful shots, before the gauge is used. In particular, look closely at the edge of the shot-hole and its relationship to the scoring ring. Look for clues, such as grease or lead marks on the paper. Ask yourself the question, "Is it "probably in", "probably out" or "still doubtful"?", then gauge. Compare your predictions for "in" and "out" with the gauged result and you should find that, with practice, your ability to judge the values of shots accurately, without gauging, improves, and that you need to use the gauge less.

However no scorer can reach the stage where every shot can be accurately scored without recourse to the use of a gauge. A scorer who frequently fails to use a gauge when it is necessary is liable to create an increase in the number of challenges made, and probably in the proportion that are successful. This will lead to a waste of time and added expense for

both participating clubs and the competition organisers, and the aggravation to both sides of having to issue revisions to results previously published. The scorer also gets a reputation for being unreliable.

The ability to add up or work out scores in your head can save lots of time, compared to using a calculator and - provided you can do so accurately - is worth developing.

Scores should always be shown as positive results, eg 87 ex 100; 292 ex 300; etc, but the "points dropped" system is a useful tool for speeding up scoring where scores tend to be near the maximum possible, as in prone rifle shooting. In this system, a ten is "no points dropped", a nine is "one point dropped", an eight "two points dropped" and so on. Apart from checking all the shots are present, the tens are not considered and only the points dropped need be added up. The total points dropped are then deducted from the highest possible score. For example a ten shot card (hps 100) with one nine and one eight would be "3 points dropped" or "3 off", score = 100 - 3 = 97 ex 100.

Speeding Up Prize Lists

Producing prize lists, etc can be a problem when scores are recorded manually and there are many competitors. The problem is caused by constantly searching through long lists for the next lowest score, until the prize list is complete. This typically happens at the end of the competition, when there is great pressure to complete the work in time for a prize giving.

The majority of competitors will not appear in the prize lists and, for many, this will become evident well before the end of the meeting. If these competitors are eliminated from consideration as soon as possible, there is no need to waste time considering their scores at the end of the day. This can easily be done:

For each competition, there will be a number of prizes (or a number of competitors qualifying for the next stage). This is usually a small number. Make a note of how many on the score sheet.

For example if there are five prize winners:

- As soon as possible after six or more have completed their shoot, scores have been entered on the score sheet and checked, find the leading five scores, mark lower scores as "not qualifying" and make a note of the current lowest qualifying score.
- As new scores are added and checked, they can be discarded and marked immediately, if below the current lowest qualifying score.
- If a new score is higher than the old lowest qualifying score, then that score is discarded and marked and a new lowest qualifying score determined from the five scores still in contention.
- This procedure is followed as scores are added and until all competitors have completed their shoot, at which stage the five leading scores, being the only ones still under consideration, can be ranked 1 to 5.

Using this method, it may even be possible to produce score sheets before everyone has finished shooting if it is clear that none of the remaining competitors can complete their shoot with a qualifying score. For example if fifth place is currently 291 ex 300 and no-one on the last detail shoots better than 190 on their first two cards, the prize winners are already decided and a list can be produced.

Manual systems such as this are still used on occasions. However the use of a computer to record scores can greatly speed up the process. The "Sort Data" facility of spreadsheets can not only rank shooters by total score, and also rank shooters on a particular score where ties are settled on count-back.

Scoring System

Determine if the card can be scored.

- Is it signed, witnessed, undamaged, etc?
- Was it shot “in time”?
- Does it have the proper sticker?
- Is it for the correct round?
- Have the rules regarding substitution been complied with?
- Are the shot-holes of unusual appearance?
- The above all save wasting time on cards which are going to be disqualified.

Check for problems.

Are the correct number of shots present? If not, why not? What penalties, if any, will apply?
Are there any cross-shots or doubles? Which are they and if appropriate, where do they belong?

Determine the score.

Score every shot, gauging and recording as necessary.

If appropriate determine which shots count and which do not.

Add up the total of the valid shots.

Apply penalties, if any, and determine the final score.

Enter the score and any relevant additional information on the score sheet or results sheet.
(Or, if you are lucky, pass the scored card to recording angel to complete this task.)

Producing Results

“The job’s not finished till the paperwork’s done.”

One of shooters’ greatest complaints, particularly for postal competitions, is the slow appearance of results. There are four possible causes for this:

- Slow or inefficient scoring;
- Slow or inefficient processing of results;
- Slow or inefficient processing of challenges; and
- Slow publication of processed results.

Scoring

Slow scoring is avoided by devoting sufficient resources to the job. This may mean having extra scorers for a Meeting. For individual scorers, it may mean rationing the amount of work you take on.

Results

Whatever system is used, and whatever the circumstances, scores should be recorded and processed as soon as possible after the cards have been scored. It is important to have sufficient people to enter and process data.

Computerised systems, provided they work, can greatly speed up the process of producing results.

It is possible to produce results very quickly using manual methods. Adding up and checking additions as you go along can save a great deal of time at the end of a Meeting. Scores which will clearly not make the prize lists can be eliminated early on, so that there are less scores to be considered and ranked at the end of the competition.

Protests and Challenges

The secret of dealing with protests and challenges promptly and efficiently is having an efficient filing system, so that cards can be retrieved and challenges considered quickly.

At Meetings it is usual to file shot cards by detail and firing point number. For smaller events cards might be filed by competitor. For postal leagues, it may be convenient to file by round and division. Nothing is actually cast in stone, but the important thing is that cards are filed according to a known system, so that they can be located quickly as and when required.

Protest and Challenge Procedures

All scorers are human and can make mistakes. All shooters are human and are likely to disagree with the judgement of others, particularly if the outcome could make the difference between a prize and nothing. Shooting rules make allowance for this and give shooters the right to challenge scores.

As a scorer you need to accept protests and challenges with a good grace. It is the shooter's right to challenge your judgement and many will do so more in hope than in expectation of success. There is also the possibility that you made a genuine mistake, which needs to be corrected.

Most competitions will have a formal protest or challenge procedure, usually involving the payment of a fee, which is refundable should the shooter be successful. This will be set out in the competition conditions.

It is unusual, but not unknown, for challenges to be made direct to the original scorer. Whoever is responsible for receiving challenges or protests should first ensure that it is valid, e.g.:

- The challenge is made by the proper person (competitor or team official).
- It is in time.
- It is in the correct form.
- The proper fee has been paid.

As a scorer, you will normally become aware of a challenge when you are asked to supply the disputed card for consideration by the appeal body, whether it be a Jury, the Range Committee or the Meeting Referees. You should see that they are retrieved from the filing system and forwarded as soon as possible.

If you spot an obvious scoring error at this stage, you should admit your mistake and advise the appeal body. However you must not do anything to the card, such as re-gauging the shot-holes, which might prejudice the outcome of the challenge.

As a general principal the appeal body determining any protest or challenge should not include any person who has been involved in the earlier scoring of a card in dispute.

When a valid protest or challenge is received and the cards in dispute are available, it should be determined as soon as possible by the appeal body. The result should be posted and scores amended, if necessary, as soon as possible after that.

The formal challenge or protest procedures should always be followed for major events. A less formal approach may be more appropriate for minor events and friendly matches.