



CIP REGULATIONS ON STEEL SHOT AMMUNITION AND SHOTGUN PROOF

This paper summarises the current CIP (Permanent International Commission for the Proof of Small Arms) regulations relating to steel shot cartridges for 12 and 20 bore shotguns, and the proof requirements of guns used to fire steel shot ammunition. The information is based on recent CIP Decisions taken in plenary meetings, with some explanatory material added.

1. Steel shot cartridges.

1.1 The steel shot must have the following hardness values (Vickers):

Surface VH1 < 110

Core VH1 < 100

1.2 The steel shot load must be provided with a sufficiently strong and direct acting protective device designed to prevent any abrasion by the shot on the internal barrel wall (*i.e. plastic or other wad*). This protection must be effective for firing at temperatures from - 20°C to + 50°C.


1.3 The marking "Steel Shot" must be printed on the cartridge tube. The same inscription in one of the languages used by the CIP member states may also be added.

2. Standard 12 bore steel shot cartridges.

These cartridges, if they are to be fired from standard proof shotguns (*ie those proved to 960 bar (transducer) or, previously, 850 bar (crusher)*), or magnum proof shotguns (*ie those proved to 1370 bar (transducer) or, previously, 1200 bar (crusher)*) must not exceed the maximum admissible service pressure of 74 MPa (*new units "megapascals", in place of the old 740 bar*) specified by the CIP and measured by means of a piezo-electric transducer.

- 2.1 The steel shot diameter must be ≤ 3.25 mm (*i.e. equal to or less than 3.25 mm – which is smaller than English no. 3*).
- 2.2 The mean velocity, measured at a point 2.50 m from the muzzle, must be ≤ 400 m/s (*around 1,300 ft/s*). This velocity is to be measured using a cylindrical barrel and the mean value of a series of 10 shots.
- 2.3 The momentum must be: $M_o = mV \leq 12$ Ns. (*Momentum = mass of shot x its velocity, measured in Newton-seconds (!). It is calculated by multiplying the weight of shot load (in kgs) by the velocity (at 2.5 m) in m/s. So, a 30 g load at 385 m/s has a momentum of $0.030 \times 385 = 11.55$ Ns i.e. just under the 12.0 Ns limit*). See Endnote.
- 2.4 Markings to be borne on the basic packaging, in addition to the normal safety warnings:
 - “Beware of ricochets: avoid firing at rigid and hard surfaces”
 - “Steel Shot cartridges”. The same inscription in one of the languages used by the CIP member states may also be added.

3. High Performance 12 bore steel shot cartridges.

These cartridges, whether 12/70 or 12/73 and longer (*i.e. 12 bore cartridges for 70 mm (2 3/4in) or 73 mm chambers*), can *only* be fired from 12 bore guns specially designed to fire steel shot ammunition and bearing the Steel Shot proof mark (*this includes the words “Steel Shot” and a Fleur de Lys *). They must *all* observe the maximum admissible service pressure of 105 MPa (1,050 bar (transducer)).

- 3.1 The mean velocity measured at a point 2.50 m from the muzzle, for any 12/70 or longer cartridge, must be ≤ 430 m/s (*around 1,400 ft/s*). This velocity is to be measured using a cylindrical barrel and the mean value of a series of 10 shots.
- 3.2 For 12/70 cartridges the momentum must be: $M_o = mV \leq 13.5$ Ns (*see para 2.3 above*).
For 12/73 or longer cartridges, the momentum must be: $M_o = mV \leq 15$ Ns (*see para 2.3 above*). See Endnote.
- 3.3 Where the steel shot diameter exceeds 4 mm (“BB” or larger), only weapons having barrels with a choke less than 0.5 mm (*equivalent to half choke*) are to be used.

3.4 Markings to be borne on the cartridge:

- identification as laid down for High Performance ammunition;
- the wording "Steel Shot". The same inscription in one of the languages used by the CIP member states may also be added.

3.5 Markings to be borne on the basic packaging, in addition to normal safety warnings:

- "Only for use in weapons designed to fire steel shot cartridges and bearing the Steel Shot proof mark"
- "Where the steel shot diameter exceeds 4 mm, it is only to be fired from weapons bearing the Steel Shot proof mark and having barrels fitted with a choke less than 0.5 mm"
- "Beware of ricochets: avoid firing at rigid and hard surfaces".

4 Standard 20 bore steel shot cartridges.

In order to be fired in weapons already on the market (guns proved to 1,080 bar) these cartridges must not exceed the maximum admissible service pressure specified by the CIP of 83 MPa (830 bar) when measured by means of piezo-electric transducers.

4.1 The steel shot pellet diameter must be ≤ 2.60 mm (*English no. 6*).

4.2 The mean velocity at 2.50 m from the muzzle must be ≤ 390 m/s (*1,280 ft/s*). This is to be measured using cylindrical barrel and is to be the mean value of a series of 10 shots.

4.3 The momentum $M_o = mV \leq 9.3$ Ns (*see para 2.3*).

4.4 Markings on the basic packaging in addition to normal safety warnings:

- "Beware of ricochets: avoid firing at rigid and hard surfaces"
- "Steel Shot cartridges", plus possibly the same information in one of the languages used by CIP member states.

5 High Performance 20 bore steel shot cartridges.

These cartridges are *only* to be fired from 20 bore guns specially designed to fire steel shot ammunition and bearing the Steel Shot proof mark (*see para 3*). They

must comply with the CIP maximum admissible service pressure limit of 105 MPa (1,050 bar).

5.1 The mean velocity at 2.50 m from the muzzle must be ≤ 410 m/s (1,350 ft/s). This is to be measured using a cylindrical barrel and is to be the mean value of a 10 shot series.

5.2 The momentum M_0 must be: $mV \leq 11.5$ Ns (see para 2.3).

5.3 Where the steel shot pellet diameter exceeds 3.5 mm (English no. 1 and larger) they are only for use with weapons having a choke less than 0.5 mm (half choke).

5.4 Markings to be borne on the cartridge:

- identification as laid down for High Performance steel shot ammunition
- the words "Steel Shot", plus possibly the same information in one of the languages used by CIP member states.

5.5 Markings on the basic packaging, in addition to normal safety warnings:

- "Only for use in weapons designed to fire steel shot cartridges and bearing the Steel Shot proof mark"
- "Where the steel shot pellets exceed 3.5 mm in diameter, only for use with weapons bearing the Steel Shot proof mark and having a choke less than 0.5 mm"
- "Beware of ricochets: avoid firing at rigid and hard surfaces".

6. Shotguns specially designed to fire High Performance steel shot cartridges.

These guns can use both Standard and High Performance steel shot cartridges, as defined in paragraphs 2 and 3, as well as all cartridges loaded with lead shot.

6.1 The quality of the barrel material is defined as:

R = tensile strength (resistance) in N/mm² (measured on the finished gun).

S = cross section in mm² of the barrel crown, measured at the muzzle, and, in the case where the barrel has a choke, measured at a point halfway along the length of the choke.

Q = R x S and must be > 65,000 N.

6.2 The choke profile is to be the most elongated possible, the maximum slope recommended by the CIP being 0° 30' (angle of 1° at the centre).

7. Proof of smooth bore guns designed to fire 12 bore steel shot cartridges.

This proof is carried out as follows:

7.1 Three steel shot proof cartridges, loaded with shot of diameter 4.6 mm (*between BB and AAA!*), and with hardness values of VH1 between 80 and 110 (*see para 1.1*), are fired per barrel.

Each proof cartridge must develop simultaneously:

- a mean pressure of at least 137 MPa (1,370 bar) at the first measuring point;
- a mean pressure of at least 50 MPa (500 bar) at the second measuring point;
- for 12/70 cartridges a momentum $M_o \geq 15$ Ns (*see para 2.3*);
- for 12/73 or longer cartridges, a momentum $M_o \geq 17.5$ Ns (*see para 2.3*).

7.2 If the shotgun, after proof firing, complies with CIP regulations and requirements, it will be marked with the Steel Shot proof (*see para 3*) and in any other way laid down in the CIP regulations.

8 Proof of smooth bore guns designed to fire 20 bore steel shot cartridges.

This proof is to be conducted as follows:

8.1 Three proof cartridges, each loaded with steel shot pellets of 3.7 mm diameter (*English no.1*) and having a hardness value of between 80 and 110 VH1 (*see para 1.1*), are to be fired per barrel. Each proof cartridge must develop simultaneously:

- a mean pressure of at least 137 MPa (1,370 bar) at the first measuring point
- a mean pressure of at least 50 MPa (500 bar) at the second measuring point
- a momentum $M_o \geq 14.5$ Ns (*see para 2.3*).

8.2 If the weapon, after being fired, complies with CIP specifications then it is to be marked with the Steel Shot proof mark (*see para 3*) and any other markings as laid down in CIP regulations.

Other types of shotgun

These regulations apply only to 12 and 20 bore shotguns. In time regulations for 10 bore and larger bored guns may also be developed.

A reminder

These regulations are intended to ensure the safety with steel shot of the most vulnerable guns, namely old, thin-walled, perhaps poor-condition guns. CIP's remit does not extend to the performance in the field of the steel shot cartridges meeting these regulations.

Manufacturers and retailers are strongly encouraged by the British proof authorities to supply steel shot cartridges in this country which conform to the regulations. Any individual who chooses to use cartridges which exceed the recommendations for a particular type of gun does so at his or her own risk. In the event of any problem arising the basis for any claim would likely be weakened if it were shown that the CIP recommendations had not been followed.

Endnote:

Guidance on the practical interpretation of the Standard and High Performance 12 bore steel shot cartridge velocity and momentum limits

Standard Steel (12/70, $V_{2.5} \leq 400$ m/s, $Mo \leq 12$ Ns)

Cartridge size (g)	Max velocity (m/s @ 2.5m) allowable
30 and lighter	400
Some 32	375
Note: 1. Pellet size in <i>any</i> size of cartridge must not be greater than 3.25mm. 2. Velocity is measured at 2.5m - <i>not</i> at the muzzle.	

High Performance (12/70, $V_{2.5} \leq 430$ m/s, $Mo \leq 13.5$ Ns)

Cartridge size (g)	Max velocity (m/s @ 2.5m) allowable
30 and lighter	430
32	420
Some 34	395
Some 36	375

High Performance (12/73+, $V_{2.5} \leq 430$ m/s, $Mo \leq 15$ Ns)

Cartridge size (g)	Max velocity (m/s @ 2.5m) allowable
34 and lighter	430
36	415
Some 42	355