



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS



A. SANS1475.1:2012

3.8 gas cartridge

Cylinder that is attached externally to the extinguisher cylinder and that contains either compressed or liquefied gas.

3.14.1

External cartridge operated type

Extinguisher from which the medium is expelled by means of compressed gas that is released from an externally attached gas cartridge

3.14.2

Internal cartridge operated type

Extinguisher from which the medium is expelled by means of compressed gas that is released from an internal gas cartridge

4.2 Training and registration of staff

4.2.2 They shall have been **made fully aware of safe working practices and any dangers involved** in the reconditioning and use of an extinguisher.

5.5.3

Control of cartridges (external type only)

5.5.3.1 Damaged cartridges

Discard and replace damaged or corroded cartridges (see SANS 6406).

5.5.3.2 Replacement cartridges

5.5.3.2.1 Ensure that a replacement cartridge is of the **capacity and type recommended by the original manufacturer of the extinguisher.**





TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

5.5.3.2.2 Before fitting a replacement cartridge ensure that its actual mass is equal to the actual mass marked on the cartridge sticker (see 5.5.3.3), subject to a **tolerance determined by the original manufacturer.**

5.5.3.3 Recharging of used cartridges

(This cannot be done unless you have a specialised charging tool / tools.)



5.5.3.3.1 When, after inspection, a used cartridge proves suitable for re-use, recharge the cartridge with dry **carbon dioxide** to the full actual mass stamped on the cartridge, subject to a tolerance determined by the original manufacturer. **(Meaningless statement – it might not be CO2)**

5.5.3.3.2 Mark the cartridge, by means of a sticker of acceptable quality and purpose, with this mass and the date of filling.

5.5.3.3.3 Place the cartridge in bondage for 21days and, at the end of this period, check the total mass.

5.5.3.3.4 If there is a reduction in actual mass, consider the cartridge to have failed and repeat the procedure for recharging until no mass loss is noted.



There is still old internal cartridge types in the field – and they have to be dis-assembled.

Marine extinguisher technicians service both internal and external types.

1475-5.2.1 General procedure applicable to all types of extinguisher

WARNING: For safety, consider all extinguishers to be pressurized and therefore the pressure has to be relieved carefully, in an appropriate and safe way, before the extinguisher is opened. (See the standards have covered themselves well here).

Now what happens if somebody is injured: (Is there proof of training - NO)



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

BASIC PRINCIPLES OF OPERATION:

Internal and External cartridge types of extinguisher works in the same manner

What is this Type of Extinguisher?

This type has a cylinder where the medium is housed, and is not under pressure.

The expellant is contained under pressure in a high pressure cylinder.

So you could describe it as a No pressure High pressure extinguisher

Once the high pressure cylinder is activated (normally CO₂ or N₂) – By usually a punching pin which ruptures a bursting disc. The gas is allowed to enter the no pressure cylinder.

The pressure then builds up to the average normal working pressure of about 1500kpa.

Remember that CO₂ is effected by temperature the higher the temperature is. Pressure will also be higher at 20C the cartridge will be 5600kpa – So you are releasing that pressure in one instance burst into the cylinder holding the medium.



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

Basic Service

Reference should be made to the **manufacturer's recommendations and instructions for specific information on servicing and recharging**. Any fire extinguishers that are deemed unfit for use should be brought to the attention of the user and removed from service.

1. Visually inspect the fire extinguisher for corrosion and damage.
2. Check that the extinguisher has not been used, by checking that safety pin and tamper seal are in place
3. Check that the operating instructions on the extinguisher are clear and legible
4. Open the discharge nozzle and check for pressure, and then remove the discharge hose slowly

This is the first safety procedure that should be taken. If the extinguisher is under pressure the hose and nozzle could contain compacted medium (Powder), and by removing the hose slowly it may still be under pressure.

5. Remove the Top cap of the extinguisher **(slowly in case there is any pressure in the cylinder from a leaking cartridge)**

Remember the syphon tube could still be blocked by medium.

6. Remove the cartridge from the extinguisher Top cap and inspect it. There are 7 pieces of information that should be marked on cartridges; manufacturers' name, manufacture date, chemical sign of contents (i.e. CO₂), nominal weight of charge, full weight, empty weight and the Standard that the cartridge conforms to. If the extinguisher shows any signs of corrosion, does not display the 7 pieces of data, Replace.

The main factors in safely dismantling a cartridge unit is as follows:

- a. At all times keep your upper body away from any part you are removing
- b. If it is an external cartridge remove the cartridge first.
- c. Open nozzle first and check for pressure
- d. Remove the top cap slowly checking for pressure (syphon tube could be blocked)



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

- e. If internal cartridge type remove the cartridge
- f. Remove hose slowly checking for pressure

REMEMBER AT ALL TIMES LEAVE THE SAFETY SEAL / CLIP IN PLACE UNTIL STRIPPED

NOW WE MOVE ONTO THE REQUIREMENT OF SANS1475

When it comes to this standard you simply cannot follow. The standard in fact covers themselves by saying refer to the **manufacturer instructions**.

| SANS STANDARDS | MANUFACTURER – EXAMPLE NOT SPECIFIC |
|--|---|
| <p>5.3.3.2 Except CO₂ extinguishers, all other extinguishers shall be tested to a minimum test pressure of 2 000 kPa or 1,5 times the working pressure, whichever is the greater, and maintained for at least 60 s.</p> | <p>ANSUL: Agent Cylinder – 600psi (4136 kPa) AMERAX: Agent Cylinder – 500 psi (3447 kPa) BUCKEYE: Agent Cylinder - 480 PSI (3309 kPa)</p> |
| <p>5.3.4.1 For low pressure-testing of extinguisher cylinders, use equipment that consists of a) a hydrostatic test pump of capacity at least 4000 kPa,</p> <p>Carry out pressure testing in accordance with the requirements of the original manufacturer for the class or type of extinguisher being tested.</p> | <p>If your pump is the minimum size of 4000 kpa. You would not be able to perform this task on a overseas extinguisher especially the American ones</p> <p>The Ansul 3 x the working pressure 1379 = 4137kpa. If we followed 1475 or even 1910 we would not be complying with the manufacturer’s requirements: working pressure 1379kPa x 1.5times = 2068 and this would be under the requirements by 2067kPa.</p> |
| <p>SANS 1910: The actual working pressure to which an extinguisher is pressurized for service shall be marked on the extinguisher label and shall not exceed 1 500 kPa or 2 500 kPa, as relevant.</p> | <p>Other Parts that require pressure testing Some Extracts from a Manufacturers instruct: (Not specific) Hose: Clear by flexing or blowing dry air or nitrogen through the hose at 50 psi (344.8 kPa).</p> |



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

| | |
|--|--|
| | Nozzle: Strip, clean, adjust. Then subject nozzle to 250psi (1723kPa) Safety Valves – regulators (Regulator is not the one on your nitrogen workshop cylinder) |
| SANS 1910:When tested in accordance with 8.6.2, the burst pressure of the components shall be at least equal to 3,4 times the working pressure measured and shall not be less than 5 500 kPa. | The way Burst pressure of an Ansul is 6 x working pressure (8274kpa) |
| Other parts that require pressure test. These part will include things like the regulator fitted to usually trolley unit. Pressure relief valves which are also fitted to both hand portables and trolleys | Some Extracts from a Manufacturers instruct: (Not specific) Hose: Clear by flexing or blowing dry air or nitrogen through the hose at 50 psi (344.8 kPa). Nozzle: Strip, clean, adjust. Then subject nozzle to 250psi (1723kPa) |
| Weights of Cartridges: The 5% rule used in SABS 1475 cannot be used– But at least the do refer to Manufacturing specification. | ANSUL: Remove the safety shipping cap from the replacement cartridge assembly and weigh the cartridge. Weigh the cartridge. If weight is 1/4 oz. (7.1 g) (Model 10) or 1/2 oz. (14.2 g) (Model 20 or 30) less than stamped on the cartridge, replace with a fully charged cartridge. Cartridges which weigh more than 1/8 oz. (3.6 g) over stamped weight should also be replaced. |



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

These gas cartridges are designed to fit Ansul RedLine cartridge-operated extinguishers. They are available with nitrogen or carbon dioxide for 5, 10, 20, and 30 lb. extinguishers. Right-handed (reverse threaded) nitrogen cartridges are used in low-temperature extinguisher models, the remaining models use a left-hand thread. Most of the non-low T models use a CO2 cartridge, but some specialty units use the left-hand nitrogen cartridges. It is critically important that you check your extinguisher nameplate label and owner's manual before ordering and installing the cartridges.

SUMMARY OF THIS THEORY TRAINING AND WHY YOU JUST CANNOT ASSUME THAT ALL CARTRIDGE TYPES OF EXTINGUISHER ARE THE SAME:

1. Principle of operation is the same.
2. You require knowledge of this type of extinguisher because you may have to decommission a unit.
3. They are documented in SANS1475:1
4. SAQCC requires you to be trained in at least the theory of these extinguishers for safety reasons.
5. Some of you are SAMSA approved, and they only approve you if you are SABS approved with SAQCC registered competent people. Marine technician will be exposed to various types of internal cartridge type of extinguishers on international non South African registered vessels. I have even come across a Russian Extinguisher which used a Shot gun cartridge, unfortunately the maintenance manual was in Russian only. One went off, and I was as loud as a shot gun.
Just think what would have happened if that cartridge went off in your hand?
6. It falls under the PER (Pressure Equipment Regulations).

Special Tools:

You cannot just use the tools listed in the SABS requirement list, you need the Manufacturers Manual which will give you the special tool requirements (Most you can download from the internet).



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

You will have to have a pressure pump that produces more than 4000kPa.

You will need test tools for the purpose of testing regulators fitted to trolley units.

You need special tool to remove the top cap.

Servicing:

You will need the manufacturers Manual for the servicing procedures especially when it comes to pressure testing of the various components, and the size and type of cartridge used.

You cannot just use the fitted instruction label information on its own – **What if the unit has had the instruction label replaced by the wrong one by a previous service technician** (It does happen in SA on stored pressure extinguishers)

Stripping:

You will need the Manufacturers Manual for information especially when it comes to the stripping procedures – Safety.

Listed is come General Safety Instructions

1. Normal Safety external inspections. Rust, Dents / bangs / gouges, and last pressure test date etc.
2. Leave the safety Seal and Pin in Place.
3. Open nozzle, and check for pressure. Ensure the nozzle opens and closes properly. (At this stage there may be no indication of pressure – But the hose, and or the syphon tube might be blocked.
4. If external type of cartridge remove the cartridge – Check the bursting Disc to see if punctured or intact. (place to one side)
5. Secure the cylinder containing the medium – keep you head and shoulders away from the top cap, and loosen the cap slowly checking for pressure (pressure should expel via the vent holes or slots – But they could be blocked). If there is no pressure you should be able to unscrew via the use of your hand.
6. If it is an internal cartridge type same procedure as 5.



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

If under 5&6 you suspect pressure retighten the top cap – The problem now is to get the pressure out safely (also the tightness of the top cap could be that the threads are crossed – If you can see the threads or brass, allow fragments. This will probably be the case).

Take the extinguisher upend it and allow the medium to fall toward the top cap – loosen medium with your rubber mallet by tapping the shell of the cylinder. Re-clamp in the chain vice upside down. Slowly remove the discharge hose, and nozzle assembly. Relieve any pressure.

7. Place the cylinder back in the chain vice in the upright position again. Remove to cap slowly keeping you upper body clear.

Note: It is advisable to wear full enclosed safety goggles during this process.

Face Value:

You cannot take anything at face value, and you have to follow the manufacturer's procedures because:

1. May not be the correct instruction label
2. Maybe the wrong size cartridge fitted
3. Maybe the wrong component fitted
4. May be fitted with the wrong or maladjusted regulator
5. Maybe fitted with the wrong or maladjusted pressure relief valve

Example: NATEX and CHUBB CENTURION old cartridge types had top caps that could be and were mixed.

Natex top cap had at "o" fitted to the top inner of this cap – This seated on the "o" ring seat at the top of the cylinder neck.

Centurion on the other hand had the "o" fitted to the bottom of the top cap – This seated on the "o" ring seat at the bottom of the cylinder neck

The threads were also slightly different.

If you put the Centurion top cap on the Natex cylinder and tighten the "o" ring was seated in the wrong position with little thread contact – When operated the top cap flew off due to this reason.



TOOL BOX 031- SERVICE OF CARTRIDGE EXTINGUISHERS

SEE ALSO TOOL BOX TALK 25

| | | |
|-------------------------------------|----------------------|---------------------------|
| Presented By: Name: _____ | Date _____ | Signature _____ |
|-------------------------------------|----------------------|---------------------------|

NAME **SIGNATURE** **NAME** **SIGNATURE**

| | | | |
|--|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |