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Cordite Branch  
Rules 1895

Please do not bend

11-95 W. M. Hodson

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RULES  
FOR THE  
Gordite Branch,  
ROYAL  
GUNPOWDER FACTORY,  
WALTHAM ABBEY.



1895.

The following Rules are published for the information and guidance of all employed in the Cordite Branch of the Royal Gunpowder Factory. They supplement the Rules and Regulations of the Ordnance Factories.

Every individual on joining, will be provided with a copy of both, which he is to keep in good order, and show when required to do so; and he must make himself thoroughly acquainted with all such portions as specially concern him.

Any infringement of any of the Rules, which have been drawn up with a view to the prevention of accidents, as well as to the due regulation of the Factory, will render the offender liable to dismissal or suspension.

Workpeople are immediately to report to their Chargeman, or to anyone in superior authority, any breach of any of the Rules which may come to their notice.

J. B. ORMSBY,  
COLONEL,  
SUPERINTENDENT R.G.P.F.

WALTHAM ABBEY,  
February, 1895.

R.L. 2000-2-4-95

## DEFINITIONS.

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The expression "*workman*" includes every man and boy of whatever rank or position, employed in the Cordite Branch of the Royal Gunpowder Factory.

The expression "*Danger Building*" means any building, or part thereof, in which any process of the manufacture of Nitro-glycerine and Cordite is carried on, or in which Nitro-glycerine and Cordite, either in the finished state or in any stage of manufacture are kept, or in which wet Guncotton is dried, or dry Guncotton is manipulated.

## I. General Rules.

1.

No one is to smoke in any part of the Factory.

2.

No matches of any kind, or means for procuring a light, are to be taken into the Factory, except by duly authorized persons, who are responsible for their safe custody and use. Any matches so brought in are to be safety matches or vesuvians. The only places where such matches are allowed, are as follows:—

Manager's Office.  
Plumber's Shop.

3.

Any workman when inside the Factory, found with matches of any kind, or with means for procuring a light, or with a tobacco pipe in his possession, will be discharged. Nor will tobacco be allowed to be taken in, either in the hands or in the clothes.

4.

No person under the influence of liquor is to be allowed to enter the Factory. Any workman coming to work, or who, whilst inside the Factory is discovered to be under the influence of liquor, will be deemed to commit a breach of these Rules. No beer, wine, or spirituous liquors are to be brought into the Factory without the written permission of the Superintendent.

5.

No workman, unless specially authorized by the Superintendent, is to enter or leave the Factory except by the Cobbin's Brook, or the Cordite Gate, Sewardstone Road entrances.

Persons having entrance keys of the Factory are to use them for themselves only, and only when on duty. In the case of an accident, they are authorized to admit those who are employed in the Factory, should their services be required, but none others.

6.

Workmen on entering and leaving the Factory, must submit to be searched, and must allow any bag, basket, and parcel brought into, or taken from the Factory by them, to be examined by the Police, or other authorized person.

7.

Before going to work in any Danger Building, all workmen must take off, in the Shifting Room appointed them, and there only, the clothes in which they enter the Factory, with the exception of shirts, drawers and socks, and put on the Danger Building clothes provided. Under these clothes they may wear private clothes, from which all pockets and metal fastenings have been removed, and which must have been approved and marked by the Manager. Their private clothes, as well as the Danger Building clothes, are to be taken off when work is over, and left in the Shifting Rooms, before the workmen leave the Factory.

All Danger Building clothes will be marked with the workman's number to whom they are issued.

8.

Workmen of the Guncotton Section, the Acid Sheds and Denitrating House, and of the Acetone House, will be provided with special, but not Danger Building clothes, which they are to change into, in the rooms set apart for the purpose.

The canvas suits issued for use in the Beater, Poacher, and Moulding Room of the Guncotton Section, are to be put on and taken off in the appointed place in that room; on no account are they to be removed from, or worn outside it.

9.

The great coats provided, when not actually in use, are to be hung up in the Shifting Rooms, or in the "dirty" portion of the Shoe Rooms or porches of the Danger Buildings in which their wearers are employed. They are not to be worn or hung up inside Danger Buildings.

10.

Trousers of Danger Building, or private clothes, when the latter are worn under Danger Building clothes, are not to be turned up at the ankle, as small stones and grit are liable in this way to be carried into Danger Buildings.

11.

No workman is to enter a Danger Building without first putting on the special shoes provided for that building. Workmen are to change their boots or shoes for these special shoes, in the Shoe Rooms or porches, where such exist, otherwise at the "clean" barriers, before entering any Danger Building, leaving their boots or shoes in the appointed places.

The special shoes are never to be taken off for any purpose inside a Danger Building. On no account are the special shoes to be deposited in any place where they are liable to come in contact with grit. When not left in Danger Buildings, they are to be kept hung up on the pegs in the Shifting Rooms.

12.

The overboots provided for the use of Officers and others entering Danger Buildings, are never to be worn by workmen. They are to be kept within the "clean" barriers. They are to be put on and taken off on the "dirty" side of the barrier, on "clean" boards provided for the purpose. Anyone wearing overboots must have the bottoms of his trousers turned down and tucked inside them. Sticks or umbrellas are not to be taken into Danger Buildings.

13.

No Government clothing of any description is to be worn, or taken outside the Factory.

14.

Workmen are not to carry or wear any articles of iron, steel, or metal, when in Danger Building clothes.

15.

Workmen are to be searched by the Chargeman under whom they work, after they have put on their Danger Building or other special clothes, and immediately before commencing work. Danger Building shoes are also to be examined before they are put on.

Workmen who do not change into Danger Building or other special clothes, are also to be searched by their Chargemen before proceeding to their work.

The Chargemen are to be searched by the Foremen.

The Chargemen are to sign the certificate to the above effect, before leaving the Factory.

16.

On all occasions workmen are to keep to the paths. Loitering or skylarking in proceeding to and from the Danger and other Buildings, are strictly forbidden. Workmen are on no account to interfere with the tram lines, points, or rolling stock.

17.

No workman is to enter into any other part of the Factory than the one in which he is employed. No workman is to enter a Danger Building in which he is not employed. No workman

is to leave any Danger Building without the permission of the Chargeman under whom he is working. No workman is to enter the Shifting or Dining Rooms during his working hours, without a written authority from the Foreman.

18.

Trucks containing explosives, in any stage of manufacture, or their ingredients, when being moved from one building to another, are always to be kept closed or covered over. On no account are they to be left on the tram lines without someone being with them in charge.

19.

All persons and workmen are to scrape their boots on the scrapers, and wipe them carefully on the india-rubber mats before entering the Shoe rooms or lobbies of Danger Buildings. These india-rubber mats are to be kept well away from the "clean" barriers.

20.

No meals are to be taken anywhere except in the appointed Dining Rooms. Workmen are allowed to take drink cans into the Shoe rooms or lobbies of the Danger Buildings in which they are employed; any drink however is to be taken in the Shoe room or lobby, not in the Danger Building itself. No one but Engine Drivers and Stokers are to take their meals in the Engine and Boiler Houses.

21.

No tools or implements are to be in any Danger Building, or its Porch, Lobby, or Shoe room, except those provided and entered on the "Use List." All such tools and implements are to be marked with the name and number of the Danger Building to which they belong, and from which they are not to be removed. When not in use they are to be deposited in the appointed places.

All fire buckets and hand fire pumps are to be kept filled with clean water, and ready for use.

22.

The Chargeman of any Danger Building is responsible that the limits of the quantity of explosives affixed to, or exhibited in the Danger Building of which he is in charge, are always strictly observed. He is also responsible that no workman in excess of the authorized number, enters without the written order of a superior authority.

## 23.

Before commencing work in any Danger Building, all doors are to be unlocked and unbolted, and nothing is to be placed in front of them while work is going on. When not at work or in use, all Danger Buildings and Houses are to be kept locked up. Before commencing work the Chargemen are to inspect their respective Danger Buildings to see that all is correct.

## 24.

Workmen are strictly forbidden to meddle with anything in the Factory, either buildings and their fittings, plant, machinery, tools, implements, or materials, either in course of manufacture or manufactured, except in the strict fulfilment of their labour.

## 25.

Workmen employed in Danger Buildings, are to carry on the work entrusted to them in as gentle and careful a manner as possible. They are immediately to check, either in themselves or others, any tendency towards trifling or carelessness. No undue haste must ever be made, and no greater force employed than is absolutely necessary to effect the object in view. All tools are to be handled carefully, and are never to be thrown down violently, or be allowed to fall or drop on to the floor.

## 26.

Workmen in Danger Buildings are immediately to report to their Chargeman, anything which they may observe unusual or dangerous in the machines or apparatus, or in the appearance of materials with which they are working, or in the acts or conduct of their fellow workmen.

## 27.

Boxes and their covers or lids, and other vessels, also reels, are on no account to be roughly handled, let drop, or fall about. Boxes, whether full or empty, are to be lifted clear from place to place, they are never to be pushed, slid, or dragged, nor are they to be allowed to drop or to be sharply put down. Covers and lids of boxes are always to be most carefully put on and taken off.

## 28.

In the Nitro-glycerine Section, earthenware cocks are at all times to be handled with the greatest care. A cock which requires more than the ordinary pressure to move it must not be forced in any way, but is to be loosened by the application

of cloths soaked in warm water, or by the direct application of moderately warm water. Cocks are more likely to stick in winter, owing to the freezing of the nitro-glycerine.

## 29.

The greatest care must be taken at all times to keep the floors and interiors of Danger Buildings perfectly free from dirt and grit, and from all accumulation of unnecessary material.

In the Nitro-glycerine Buildings every precaution must be taken to prevent any nitro-glycerine escaping on to the floors and walls. Should any splash over the tanks, or get about, it is to be immediately wiped up with a damp cloth.

When the operations of nitrating, settling, and washing nitro-glycerine are finished for the day, the plant and apparatus in each house is to be thoroughly washed down.

In the Cordite Buildings the floors are to be constantly swept over, and the sweepings put into the special boxes provided for the purpose.

## 30.

Should the machinery, apparatus, or plant in any Danger Building appear out of order, or should anything go wrong with it, work is to be stopped at once, if practicable, and an immediate report made to the Foreman, or other superior authority, and work is not to be re-commenced without permission.

Workmen are not to carry out any repairs, however trivial, to machinery, apparatus, plant, tools, or implements, or to buildings, while the Danger Building is in use.

## 31.

No repairs or alterations to buildings, machinery, apparatus, or plant, are to be taken in hand, nor, on the completion of such repairs or alterations, is work to be resumed, until the special rules for repairs and alterations have been carried out.

## 32.

When any machine in a Danger Building requires adjustment by the Machinery Section, all explosives are to be removed from the building and the machine thoroughly cleaned out. The Principal Foreman, Chemist-in-Charge, or Foreman is then, on the prescribed form, to require the Foreman of the Machinery Section, or Foreman Plumber, to send a mechanic to effect the adjustment, and the Chargeman of the Danger Building is not to allow any mechanic to enter the building, without such written authority, and he is himself to be present in the building during the whole time the mechanic is at work.

33.

On the approach of a thunder-storm, the machinery is to be stopped, and all doors and windows closed, and all the workmen are to retire to the Dining Rooms until the storm has passed over, or until they receive orders to return to their work. Should however the Manager or Chemist-in-Charge of a Section, consider it unsafe or impracticable to suspend any process that may be in hand, such men only as are necessary for its continuance are to remain at their work.

34.

Oily sponge-cloths are not to be taken into any Danger or other Building, except for the purpose of immediate use in such building, and upon the cessation of such use, they are to be removed to the receptacles provided for the purpose. These receptacles are to be emptied at the end of the day's work, or of the shift, and the oily sponge-cloths deposited in the appointed places.

The Chargemen are to sign the certificate to the above effect before leaving the Factory. This rule applies to every building throughout the Factory.

35.

In the Nitro-glycerine Section, on cessation of work for the week, the apparatus and plant of all kinds is to be thoroughly cleaned and freed from nitro-glycerine, under the direction of the Chemist-in-Charge. When this has been done the Foreman Plumber, accompanied by the Chemist-in-Charge and the Foreman of the Nitro-glycerine Houses, is to make a thorough inspection of the whole of the apparatus and plant; and all defects, of whatever nature, are to be thoroughly repaired and everything put in good order, before the making of nitro-glycerine is resumed.

The result of this inspection is to be reported to the Manager on the prescribed form, for the information of the Superintendent.

36.

In the Cordite Section, the Guncotton Weighing Room, also the Press Houses, Reeling House, and Blank Cutting House, and the machines in them, are to be thoroughly swept down and cleaned out on the cessation of work for the week. The Incorporating Houses and Incorporating machines are to be similarly treated, as ordered by the Principal Foreman.

Machines in motion are never to be cleaned, nor are the safety guards to be removed from them.

37.

The Chargemen are not to leave at the cessation of work until the doors, windows, and shutters of their Danger Buildings have all been fastened and bolted, and all outer doors locked.

The keys of all Danger Buildings not at work or in use, are to be deposited by the Chargemen on the boards in the Manager's or Principal Foreman's Office, before they leave the Factory.

38.

Workmen are not to touch in any way the wires, lamps, or other appliances belonging to the electric lighting.

Should anything go wrong with the electric lights, an immediate report is to be made to the Foreman or Chemist-in-Charge.

In the Cordite Section, electric lamps which go out are not to be replaced till the next morning, unless they are absolutely necessary; if this is the case, the electric light of the particular house is to be switched off before the defective lamp is replaced by the Foreman.

In the Nitro-glycerine Section, electric lights, whether inside or outside, which go out, are only to be replaced while the house is at work if absolutely necessary, and then only by the Foreman.

## II. Special Rules.

### Repairs and Alterations.

When repairs or alterations have to be carried out to any Danger Building, or to the apparatus or machinery in it, the following procedure is to be observed:—

- (a). All explosives are to be removed, and the building, apparatus, and machinery thoroughly cleaned out under the direction of the Chemist-in-Charge in the case of the Nitro-glycerine Section, and of the Principal Foreman in the case of the Cordite Section, who are responsible that this has been done and will so certify on the prescribed form.
- (b). In the case of repairs or alterations to buildings, the Chemist-in-Charge, or the Principal Foreman, as the case may be, is to notify on the prescribed form, to the Clerk of Works, Building Works Department, that the building has been placed in safe working order, and to request him to commence work.

- (c). In the case of repairs or alterations to apparatus or machinery, the same course as in (b) is to be pursued, the notification being in this instance sent to the Foreman Plumber, or to the Foreman of the Machinery Section.
- (d). The Chemist-in-Charge, or the Principal Foreman, as the case may be, is to detail a workman to be constantly present during the whole time the building, apparatus, or machinery is under repair or alteration, to see that the floors and building generally, are kept clean.
- (e). On the completion of the repairs or alterations, the building, apparatus, and machinery, are to be cleaned out thoroughly before work is resumed, under the direction of the Chemist-in-Charge, or Principal Foreman, who are to report to the Manager on the prescribed form that this has been done.

#### Shifting Rooms.

The Caretaker is responsible for the due observance of the following Special Rules:—

1.  
Every workman will have a peg allotted to him, and a bag in which he must leave his clothes tidily hung up. Danger Building shoes, when not left in the Danger Buildings, are also to be placed in the bags; on no account are they to be placed on the floor, or anywhere where they would be liable to come in contact with grit or dirt.
2.  
The Caretaker is only responsible for money, or other valuables actually given into his charge by the owner, who must receive them back again in person.
3.  
Order and decorum are to be strictly maintained in Shifting Rooms. The Caretaker will report any workman causing a disturbance.
4.  
No workman is to interfere with the electric light, gas, heating apparatus, or fires.
5.  
No workman is permitted to enter the Shifting Rooms during his working hours, on any pretence whatever, unless provided with a pass signed by the Foreman of the shift.

#### Dining Rooms.

The Caretakers are responsible for the due observance of the following Special Rules:—

1.  
The Dining Rooms are for the exclusive use of the workmen of the Cordite Branch. No other persons will be permitted to enter them at any time, on any pretence whatever.
2.  
In each Dining Room a table or tables will be set apart for workmen not in Danger Building clothes.
3.  
No tea-leaves, papers, or other refuse are to be thrown or left about in the Dining Rooms or their vicinity; anything of the sort is to be put into the receptacle provided for the purpose.
4.  
No clothing of any description is to be hung up to dry in any part of the Dining Rooms.
5.  
Workmen are not to interfere in any way with the fires, gas stoves, and lighting arrangements of the Dining Rooms.
6.  
No workman is permitted to enter the Dining Rooms during his working hours, on any pretence whatever, unless provided with a pass signed by the Foreman of the shift.

### III.—Special Rules.

#### NITRO-GLYCERINE SECTION.

##### Nitrating Houses.

1.  
Before the mixed acids are run into the nitrating apparatus, the connection with the drowning tank must be placed in position and ready at a moment's notice.



2.

Before glycerine is allowed to enter the nitrating apparatus, the mixed acids are to be cooled down by means of the coils, and by air-stirring, until the temperature falls to 16° C., when the glycerine injector may be opened. If the mixed acids are below 16° C., the glycerine injector may be opened at once.

3.

The workman in charge of the nitrating operation must watch the thermometer, and if it should rise too quickly, the inflow of glycerine must be checked. On no account is the temperature to be allowed to exceed 22° C. If the temperature should rise beyond 22° C., the injector is to be closed and additional air let in through the auxiliary air pipe, and no further inflow of glycerine is to be allowed until the temperature has fallen below 22° C. The glass fume tube is to be watched, and if red fumes should appear, the injector must be immediately closed and additional air let in until red fumes cease. If they continue and cannot be stopped, then the whole charge is to be run into the drowning tank, the air being kept in both tanks all the time.

A workman is to be in charge of the cock connecting the nitrating apparatus with the drowning tank, from the time of the opening of the injector, until the last of the charge is in the separating tank.

4.

When the whole of the glycerine has been injected into the nitrating apparatus, and the temperature brought to that degree which will equal as near as possible 15° C. when the whole charge reaches the separating tank, the whole of the contents of the nitrating apparatus are to be discharged into the separating tank, by turning the cock leading into it. Before running the charge into the separating tank, it must be seen that the connection with the drowning tank is in position, that there is no water lying in it, and that the cocks are closed.

5.

From the moment the charge arrives in the separating tank, until it is run down to the washing-house tank, it is to be watched closely. In the separating tank the temperature must not be allowed to exceed 17° C. If the nitro-glycerine in the separating tank should show signs of heat, or should give off red fumes, the air must be turned on at once, and if the temperature cannot be kept down to 17° C. and red fumes are given off, then the charge must be sent to the drowning tank, the air being kept on both tanks during the running off.

6.

When the nitro-glycerine is sufficiently separated from the acids, and the bulk of the nitro-glycerine run to the preliminary washing tank, the cock leading to the after-separating house is to be opened, and the acids allowed to flow through the gutter into the refuse acid tank in the after-separating house, until the remaining nitro-glycerine has reached the gauge glass, when the cock is to be shut. The cock leading to the preliminary washing tank is then to be opened and the nitro-glycerine run slowly into the tank.

7.

As a rule the temperature in the preliminary washing tank is not to exceed 18° C., and it is better to keep it lower if possible. This, except in very hot weather, can be managed by copious washings with water.

8.

When the nitro-glycerine has been well washed with water in the preliminary washing tank, it is to be run to the final washing tank in the Washing House, into which a quantity of soda solution at a temperature of about 50° C., has previously been run.

9.

All washings are to be run to the wash-water settling tank.

10.

No nitro-glycerine is to remain in the house after work has finished for the day.

### Washing House.

1.

The thermometer inside the house is to register at least 50° F. before work begins.

2.

The temperature of washing is not to exceed 30° C.

3.

The nitro-glycerine must be thoroughly washed in the washing tank until every trace of acid is removed.

Every charge is to be tested by the Chemist, to ascertain its freedom from acidity, before he allows it to be run into the filtering tank. If the Chemist finds it unsatisfactory, he must continue the washing as long as he thinks necessary, and until a fresh sample shews the charge to be free from acidity. A sample is to be taken from every charge, for testing in the Laboratory.

4.

After filtering, the charge is to be run into the tank in one or other of the Mixing Houses.

The bend connecting the filter tank with the nitro-glycerine gutter, is always to be removed as soon as a charge has been run down.

5.

The bend in the Junction House is always to connect the gutter leading from the Washing House with the Junction House tank, except when a charge of nitro-glycerine is to be run down to one of the Mixing Houses. As soon as a charge has been run down to one of the Mixing Houses, the connection is again to be made with the Junction House tank, and the gutter leading from the Washing House is to be washed down with water.

6.

All washings are to be run to the wash-water settling tank.

7.

No unwashed nitro-glycerine is to remain in the house overnight.

#### Mixing Houses.

1.

The temperature of the house is to be taken and noted in a book before beginning to weigh out nitro-glycerine, and work must not be commenced if the thermometer has registered below 50° F., since the previous weighing, until the Chemist has been informed and he has made the necessary arrangements. Work is to stop at once if the thermometer falls below 50° F.

2.

The floors of these houses, and the trestles are to be kept wet while work is going on.

3.

Boxes are to be kept not less than 3 feet away from the steam pipes.

#### Wash-water Settling House.

1.

The large inlet water cock is not to be opened while the water is being used through the coils of the nitrating apparatus. The workmen in this house must first make arrangements with the Foreman before filling the tank with water.

2.

The gravity of the liquid in the wash-water settling tank must not exceed 8° Twaddell, otherwise the lining will be rapidly destroyed. The gravity can be reduced by running fresh water into the tank.

3.

All the wash-water is to be run through the labyrinth to the pond. The liquid in the tank must have at least 10 minutes to settle, after the air is shut off, before running off.

4.

The nitro-glycerine which gathers in the tank, is to be drawn off in buckets from the bottom cock, and sent to the Washing Shed for filtering and washing.

5.

When the wash-water settling tank and the small tank in front of it are cleaned out, all washings from them are to be passed through the labyrinth to the pond.

#### Washing Shed and Pond.

1.

Every precaution must be taken to prevent any nitro-glycerine escaping on to the sand floor, or to the Pond. The sand floor is to be replaced by fresh sand from time to time, under the direction of the Manager.

2.

When washing nitro-glycerine or mud in this shed, all washings are to be passed through the labyrinth to the Pond.

3.

The washed nitro-glycerine which gathers in the tank, is to be drawn off in buckets and returned to the Washing House tank for washing.

4.

The mud, etc., after thorough washing, to free it from as much nitro-glycerine as possible, is to be destroyed from time to time under the direction of the Manager.

5.

The Pond is to be fired every Saturday morning at 11.40 a.m., under the direction of the Manager.

## After-Separating House.

1.

When a charge of refuse acid arrives in the tank, it is to be run as soon as possible to one of the separators, and the tank and pipes washed with settled or cold denitrated sulphuric acid.

The separators are to be connected with the After-separating House drowning tank, except during the time the acids are being run to the Denitrating House.

2.

The acid in the separators is to be allowed to remain there one or more days, to give the nitro-glycerine time to separate from the acid. The nitro-glycerine which appears on the surface is to be drawn off from time to time, and drowned in the small tank provided for that purpose inside the house.

After settling for one or more days, the acid is to be run to the tank at the Denitrating House.

3.

The temperature of the nitro-glycerine in the separator is to be watched, and if it rises above 20° C., air is to be turned on occasionally. If the temperature cannot be kept under 25° C., the contents of the separator are to be drowned in the after-separating drowning tank, air being kept on both during the operation. If red fumes are given off the acid in any separator at any time, air should be turned on. If they still continue and the temperature is rising, the contents of the separator should be drowned in the after-separating drowning tank, air being kept on both during the operation.

4.

As long as there are any refuse acids in the house, the workman in charge must not leave the house until relieved by another man.

5.

All the washings, both of the nitro-glycerine and apparatus, are to be run to the after-separating drowning tank.

6.

The gravity of the liquid in the after-separating drowning tank must not exceed 8° Twaddell, otherwise the lining will be rapidly destroyed. The gravity can be reduced by running fresh water into the tank.

7.

The liquid in the after-separating drowning tank must have at least 20 minutes to settle after the air is shut off, before running off from the upper cock.

8.

The nitro-glycerine which gathers in the after-separating drowning tank is to be drawn off in buckets from the bottom cock, and sent to the Washing Shed for washing and filtering.

9.

When the after-separating drowning tank is cleaned out, the washings are to be transferred to the small tank outside. After settling, the water is to be syphoned off, and every care is to be taken to prevent the escape of any nitro-glycerine down the drain.

## Denitrating House.

1.

When a charge of acid arrives in the store tank, the temperature is to be taken from time to time; if it shows signs of heating, or if red fumes are given off, air is to be turned on. If the temperature of the mass rises beyond 25° C., or if the red fumes cannot be stopped, the whole charge is to be run down the drain.

2.

When the process of denitrating is completed, the last of the charge in the store tank is to be run into carboys and taken to the After-separating House, where any nitro-glycerine which separates out is to be drawn off and placed in the small drowning tank. The acid which remains is to be run back to the Denitrating House with the next charge.

## IV.—Special Rules.

## GUNCOTTON SECTION.

1.

Every care is to be taken to prevent the cotton waste coming in contact with dirt or grit, from the time it is picked until it is dipped.

2.

The temperature in the cotton waste drying machine is never to exceed 180° F.

3.

Dipping is not to be carried on if the temperature of the acids in the dipping pans at any time exceeds 70° F.

4.

In the boiling room, any guncotton which may fall on to the floor is to be collected and returned to a vat which is being charged. On no account is it to be mixed with finished washed guncotton.

5.

No beater of guncotton is to be run to a poacher, except by the Foreman or Chargeman. No poacher is to be run to the stuff chest until it has been passed by the Chemist-in-Charge.

### Guncotton Press Houses.

1.

Before pressing is commenced, the following parts of the press are to be most carefully examined to see that they are in good order, thoroughly clean, free from any pieces of guncotton, and that the holes or channels cut in them are clear, viz.:—plates, plungers, ram, bush, and sliding block. The ram is also to be worked up and down to ascertain that the valves are working correctly.

2.

The plates and plungers are to be examined from time to time, and the holes cleaned out when necessary.

3.

Great care is to be taken to see that the sliding block is always in its proper place before pressing, and before extracting guncotton from the bush block. The indicator bell attached to the press rings, when the sliding block is in its proper position.

4.

In replacing the bottom plate, the plunger is to be raised until flush with the top of the bush block; the plate is then to be carefully placed flat on the top of the plunger, and the plunger then to be lowered.

5.

If by any chance a top or bottom plunger jams in the bush, it must be left in that position, and reported immediately to the Foreman. No attempt is to be made to clear it by the workman.

6.

Previous to pressing, the moulded guncotton is to be examined, and all loose pieces of guncotton, or any of the lacquer from the boxes, or foreign substances of any kind adhering to it, are to be removed.

7.

No guncotton, either moulded or pressed, is to be left inside the rope mantlets while the pressure is on.

8.

When guncotton is being pressed, or kept under pressure, the workmen are to remain behind the rope mantlets, and are not to move out until the whole pressure has been taken off.

9.

No workmen are to enter the house when guncotton is being pressed, or kept under pressure.

10.

The amount of guncotton, both moulded and pressed, in the house at any one time, is not to exceed 100 lb.

11.

When not in use, the house is always to be kept locked up.

## V.—Special Rules.

### CORDITE SECTION.

#### Guncotton Stoves.

1.

While loading with wet guncotton, clean indiarubber shoes are to be worn inside the inner barrier. The wet guncotton boxes are always to be placed inside the "clean" box, before being taken into the Stove.

The "clean" box is to be placed only on the "clean" stool just outside the inner door of the Stove.

2.

During the time guncotton is drying, the temperature recorded by the thermometers in the hot-air supply pipes, and at the windows, is to be taken every 2 hours and entered in a book.

The temperature as recorded by the thermometers in the hot-air supply pipes, is not to exceed 140° F., so long as the guncotton contains not less than 10 per cent. of moisture; after that time, until the guncotton is dry, it is not to exceed 120° F. The temperature as recorded by the window thermometer is at no time to exceed 100° F.

3.

No one is to enter the Stove during the time guncotton is drying, except to take samples for testing.

4.

While unloading *dry* guncotton, those inside the inner barrier are to be barefooted, or to wear "*clean*" socks only.

5.

When dry guncotton is being removed from the trays, it is to be very carefully placed in, not thrown into the boxes.

The boxes when filled are to be placed on the "*clean*" stool as above, the top of the stool being kept wet.

6.

While unloading *dry* guncotton, the racks and trays are never to be moved.

7.

The whole Stove is to be thoroughly swept out after each unloading. It is to be washed down after every 4 stovings.

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### Guncotton Weighing Room.

1.

In weighing out the dry guncotton, it is to be very carefully transferred from the store box to the weighing box, and then from the weighing box to the charge box.

2.

All movements of boxes, covers, etc., in or near to the Weighing Room, are to be carried out with the greatest care.

3.

The floor of the Weighing Room is to be kept wet while work is going on.

### Mixed Material Store.

1.

The temperature of this store is never to be below 50° F.

2.

The floor and approaches to this store are to be kept wet while boxes and barrels are being taken in or out.

3.

The lids of boxes and barrels are never to be removed in this store.

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### Incorporating Houses.

1.

Workmen are on no account to take material out of the incorporating machines, nor put their hands into them for any purpose whatever, while the machines are in motion, or while stopped, unless the safety catch on the left side is in its proper position.

2.

Belts are only to be replaced and the shafting oiled, by those detailed for the purpose; their names are to be posted up in the houses.

3.

During incorporation the temperature of the material is never to exceed 40° C. (104° F.)

4.

Boxes, whether containing mixed or incorporated material, are to be stored only in the bay set aside for that purpose.

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### Press Houses.

1.

Every man and boy will have special duties assigned to him, and is not to do any other work, unless so ordered by the Chargeman.

2.

Reels and trays as soon as they are filled, are to be removed to the trucks in the porches.

3.

The cylinders of the presses are to be very carefully and gently put into the ramming machine for filling, and into the presses for squirting. Any material which may have got into the cylinder seatings must be removed each time, on the removal of the cylinder from the ramming machine or press, and before another one is put in.

4.

No one but the authorized persons are allowed on the oiling platforms. Belts are only to be replaced by those detailed for the purpose; their names are to be posted up in the house.

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#### Tray Stoves.

1.

The temperature in the Stove is to be taken every 2 hours and entered in a book. It is never to exceed 100° F.

2.

The Stoves are to be kept locked when no one is inside them.

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#### Reel Stove.

1.

The temperature in the Stove is to be taken every 2 hours and entered in a book. It is never to exceed 100° F.

2.

In moving the step ladders from place to place, they are to be lifted clear of, and not dragged or pushed along the floor.

3.

The floor of the Stove is to be constantly swept clean, and the sweepings deposited in the box provided for the purpose. This box is to be emptied at the end of every shift, or oftener if necessary.

4.

The big bar on the Sewardstone Road door, is to be taken down before commencing work on Monday morning, and only replaced the last thing on Saturday.

### Blank Cutting House.

1.

The drowning tanks are at all times to be kept filled with clean water and ready for use.

2.

The door of the partition between the cutting machine and the reels, must remain closed while the machine is at work.

3.

While the house is working, the handrail of the "clean" platform is to be taken down.

4.

No one but the Chargeman is to touch the machine.

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### Blending House.

1.

In arranging the boxes for blending, care must be taken to leave everywhere clear passages for exit.

2.

Before closing the house, all oils, paints, wipers, etc., are to be deposited by the Chargeman in the iron cupboard outside the house, provided for the purpose.

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### Magazine.

1.

All workmen when at the Magazine, are to obey all orders and directions given them by the Magazine Chargeman.

2.

The ventilation of the Magazine is to be carried out by the Magazine Chargeman, in accordance with the instructions contained in the the latest edition of the "Magazine Regulations," which are supplied to him.

3.

Every cordite case and barrel is to be carefully examined, and if found defective in any of the following particulars, it is not to be admitted into the Magazine, viz. :—

(a.) Should sand, grit, or dirt, or other objectionable matter be found on it.

(b.) If iron is found on any part of the case or barrel.

(c.) If open, or imperfectly closed, so that any cordite can escape.

4.

No cordite dust or sweepings, nor stores of any kind, other than cordite in service packages, are to be received into the Magazine.

5.

No case or barrel of cordite is on any account to be opened or closed in, or near, the Magazine. For either purpose it is to be removed to the Blending House.

6.

The Magazine Chargeman is not to leave the Magazine during the whole time the receipt or issue of cordite is going on, nor as long as anyone is present. In a case of absolute necessity, the senior workman present is to take charge.

### Burning Shed.

1.

Not more than 1 lb. of explosives is to be burnt at one time, and each burning is to be completely finished and the plate drenched with water, before another quantity is attempted to be burnt.

2.

The bulk of the explosives for disposal, is to be placed at a safe distance from the shed, and kept covered up while the burning is going on.

## VI. Special Duties.

### Chemist-in-Charge.—Nitro-glycerine Section.

1.

He is to be constantly present within the Factory, unless he is relieved by one of the other Chemists of the Branch, from the commencement of nitration of the first charge, until the last charge has been sent to the Washing House.

2.

- He is responsible under the Manager, that every operation in the Nitro-glycerine Section is carried out in the prescribed manner, regularly and unfailingly, and that no changes whatever are made in any single detail of the work; and he is further responsible that the General and Special Rules are strictly observed by all employed under him.

3.

Any accident, break-down, unusual occurrence or irregularity coming to his notice, is at once to be reported in writing to the Manager, for the information of the Superintendent.

Should he at any time consider that any repairs or alterations are required to buildings, plant, or apparatus, he is at once to submit the necessary requisitions to the Manager, for the Superintendent's approval.

4.

He is responsible that before any repairs or alterations are commenced to buildings, plant, or apparatus, all nitro-glycerine is removed from the building, and the building, plant, and apparatus thoroughly cleaned out; also that on completion of the repairs or alterations, the building, plant, and apparatus are again thoroughly cleaned out before the resumption of work.

If from any cause it should be impossible to remove all nitro-glycerine from the building for the purpose of carrying out a repair, he is himself to be present and is to see that all possible precautions are taken while the repair is in progress.

5.

He is responsible that none but the authorized tools and implements, as enumerated on the "Use Lists," are in any Danger Building or House, and that all such tools and implements are stamped with the name and number of the Danger Building or House to which they belong.

6.

He is responsible that all workmen on joining are provided with copies of the "Rules and Regulations of the Ordnance Factories," and of the "Rules for the Cordite Branch, R.G.P.F." and that all alterations or additions which may be made from time to time by competent authority, are duly inserted in them. He is also responsible that such "Special Rules" as apply to them, are read by the Foreman to the workmen once a week.

### Chemist-in-Charge.—Guncotton Section.

1.

He is responsible, under the Manager, for the due and careful performance of the work carried on in the Guncotton Section, and that the General and Special Rules are strictly observed by all employed under him.

2.

Any accident, break-down, unusual occurrence, or irregularity coming to his notice, is at once to be reported in writing to the Manager, for the information of the Superintendent. Should he at any time consider that any repairs or alterations are required to buildings, machinery, or plant, he is at once to submit the necessary requisitions to the Manager, for the Superintendent's approval.

3.

He is responsible that all workmen on joining are provided with copies of the "Rules and Regulations of the Ordnance Factories," and of the "Rules for the Cordite Branch of the R.G.P.F.," and that all alterations or additions which may be made from time to time by competent authority, are duly inserted in them. He is also responsible that such "Special Rules" as apply to them, are read by every Chargeman to his workmen once a week.

#### Principal Foreman.—Cordite Section.

1.

He is responsible, under the Manager, for the due and careful performance of the work carried on in the Cordite Section, and that the General and Special Rules are strictly observed by all employed under him.

2.

Any accident, break-down, unusual occurrence, or irregularity coming to his notice, is at once to be reported in writing to the Manager, for the information of the Superintendent. Should he at any time consider that any repairs or alterations are required to buildings, machinery, or plant, he is at once to submit the necessary requisitions to the Manager, for the Superintendent's approval.

3.

He is responsible that before any repairs or alterations are commenced to buildings or machines, all explosives are removed from the building, and the building and machines thoroughly cleaned out; also that on completion of the repairs or alterations, the building and machines are again thoroughly cleaned out before the resumption of work.

4.

He is responsible that none but the authorized tools and implements as enumerated on the "Use Lists," are in any Danger Building or House, and that all such tools and implements are stamped with the name and number of the Danger Building or House to which they belong.

5.

He is responsible that all workmen on joining are provided with copies of the "Rules and Regulations of the Ordnance Factories," and of the "Rules for the Cordite Branch of the R.G.P.F.," and that all alterations or additions which may be made from time to time by competent authority, are duly inserted on them. He is also responsible that such "Special Rules" as apply to them, are read by every Chargeman to his workmen once a week.

#### Foremen.—Nitro-Glycerine Section.

1.

He is to examine carefully every day, the whole of the apparatus and plant under his charge. The examination is to be as thorough as possible, so that he may feel confident that everything is in good order.

2.

He is to search all the workmen employed under him, after they have put on their Danger Building clothes, and immediately before commencing work; he is also to examine the Danger Building shoes. He is to sign the daily certificate book to the above effect before leaving the Factory. He is responsible that all overboots are kept clean and in good order. He is once a week to read to the workmen under him, the Special Rules of the Nitro-glycerine Section.

3.

Before the mixed acids are run into the nitrating apparatus, he must satisfy himself by personal examination:—

1.—That the high-level tank is full of water.

2.—That the drowning tank in the Nitrating House is nearly full of water.

3.—That there is sufficient water in the wash-water settling tank.

4.—That the nitrating apparatus is free from water.

N.B.—A little may have collected from the last night's washing of the apparatus. If there is a larger quantity than usual, this indicates a leak in some of the coils, which must be repaired before the apparatus is used.



5.—That the air cocks, stoneware cocks, and air gauges are in good order.

When he has ascertained that all is right, he is to open the water trap of the air pipes and blow off the condensed water, and then open the water taps of the coils and let the water flow through them, at the same time he is to let off any air that may have accumulated in the pipes.

4.

He is to accompany the Foreman Plumber on his weekly inspection of the apparatus and plant, and point out all known defects.

5.

He is not to leave the Nitro-glycerine Section for meals or other purposes, without the permission of the Chemist-in-Charge.

#### Foremen.—Guncotton Section.

1.

They are responsible, under the Chemist-in-Charge, for the due and careful performance of the work carried on in the Guncotton Section during their shifts, and that the General and Special Rules are strictly observed by all the workmen under them. Any accident, break-down, or irregularity coming to their notice, is to be reported to the Chemist-in-Charge at once, if he is in the Factory, or if of a serious character; if of a minor nature, a full report in writing is to be left for him with the Chargeman of the Boiling Room.

2.

They are specially responsible that the Rules relating to the searching of workmen and removal of oily sponge-cloths are strictly observed by all Chargemen under them. They are to countersign the Chargeman's daily certificate book to the above effect.

#### Foremen.—Cordite Section.

1.

They are responsible, under the Principal Foreman, for the due and careful performance of the work carried on in the Cordite Section during their shifts, and that the General and Special Rules are strictly observed by all the workmen under

them. Any accident, break-down, or irregularity coming to their notice, is to be reported to the Principal Foreman at once, if he is in the Factory, or if of a serious character; if of a minor nature, a full report in writing is to be left with the relieving Foreman for him.

2.

They are specially responsible that the Rules relating to the following matters are strictly observed by all Chargemen under them, viz. :—

(a.) Searching of workmen and examination of Danger Building shoes. They are themselves constantly to search the Chargemen.

(b.) The sweeping out of all Danger Buildings at work, and the removal from them of all oily sponge-cloths at the end of their shift.

They are to countersign the Chargemen's daily certificate book to the above effect.

#### Chief Engineer.

The Chief Engineer will carry out the following special duties in connection with the Cordite Branch :—

1.

He is responsible to the Superintendent that the whole of the machinery in the several Danger and other Buildings, is in thorough repair and working order.

2.

He is to visit at least once a week, such Danger and other Buildings as are at work, to see that the machinery is working correctly.

3.

He has also the supervision of all engines, and boilers, and is to report to the Superintendent as occasion may arise, with reference to any repairs or alterations that may be required.

#### Foreman of Machinery Section, and Foreman Plumber.

In addition to their general duties in connection with their shops, they are to carry out the undermentioned duties relative to work in Danger Buildings :—

1.

They are responsible that none of their workmen enter any Danger Building for the purpose of carrying out repairs or adjustments to machinery or plant, until they have received a written authority from the Chemist-in-Charge or Principal Foreman to commence work.

2.

They are responsible that their workmen are searched before they go to work in any Danger Building, and that they are correctly dressed in Danger Building clothes, and that their special shoes are clean and in good order.

3.

They are responsible that all tools and implements are examined and a list made of them before they are taken into a Danger Building, and on completion of the job, that the tools and implements are checked over, in order to ascertain that none have been left behind. They are to see that none but the "clean" bags provided for the purpose, are used for tools and implements in Danger Buildings, and that no iron nails, screws, or similar articles, are ever put into these bags.

4.

On completion of work for the week and after the apparatus and plant have been washed down, the Foreman Plumber, accompanied by the Chemist-in-Charge and the Foreman of the Nitro-glycerine Section, is to make a minute inspection of the whole of the apparatus and plant, reporting the result of this inspection to the Manager on the prescribed form, and he is at once to make good all defects and deficiencies, and put everything in good order before the making of nitro-glycerine is resumed.

#### Engine Drivers and Stokers.

1.

The relieving Engine Driver is to go round with the Engine Driver he is about to relieve, in order to ascertain that everything connected with the engine is correct.

2.

The relieving Stoker is to go round with the Stoker he is about to relieve, in order to ascertain the height of the water in the boiler, and satisfy himself as to the proper state of the feed-valve and safety-valves, and everything connected with the boiler, before taking charge.

3.

Engine Drivers and Stokers are not to allow workmen to enter the Engine-Rooms and Boiler Houses for any purpose whatever, nor are they themselves to enter any Danger Buildings.

4.

Stokers are to make themselves thoroughly acquainted with the printed "Instructions to Boiler Attendants," which are hung up in every Boiler House.

### VII.—Fire Arrangements.

1.

The Cordite Branch Fire Brigade, consists of trained men told off into local Detachments for the three Sections, viz.:—Guncotton, Nitro-glycerine, and Cordite, each shift having its own detachment.

The water supply is obtained from hydrants; in the Guncotton Section there is a fire engine in addition.

2.

Each Detachment is to be drilled once a month by the Chief Fireman, who is to keep a record of the dates. As it is of the greatest importance that every member of the Detachment should be thoroughly acquainted with his duties, no change is to be made in the Detachments without the sanction of the Superintendent, or Officer in charge of Danger Buildings.

3.

The Foremen and workmen of the Detachments are to make themselves thoroughly masters of the "Drill for the Hydrants," which is posted up about the Factory.

4.

On the alarm of "Fire," the nearest hydrant is to be got to work at once by the first men who can be collected; the men of the regular Detachment taking their proper posts as soon as possible.

5.

The Factory bells are not as a rule to be rung without orders from the Senior Officer of the Factory present at the time. In case however of emergency, the Manager, or senior Foreman present, may request the Police to ring the bells.

6.

The Police are at once to be informed of the fire, and are to be careful to prevent any persons who are not connected with the Factory from entering the grounds.

7.

The windows and doors of buildings which have caught fire, are to be kept shut as closely as possible, in order to diminish the draught of air to the fire.

8.

Great caution must be exercised in using the saws, axes, &c., to form a gap between burning buildings and others which the fire has not reached. As much unnecessary damage is often done in this way, no demolition is to be commenced except by the distinct orders of the senior Officer of the Factory present at the time.

### VIII.—Drill for Fire Hydrants.

#### Drill for 9 Men.

No. 1 runs out the seventh length of hose, and connects the branch.

No. 2 runs out the first length of hose, and connects to the hydrant and second length of hose.

No. 3 runs out the second length of hose, and connects it to the third length of hose.

No. 4 runs out the third length of hose, and connects it to the fourth length of hose.

No. 5 runs out the fourth length of hose, and connects it to the fifth length of hose.

No. 6 runs out the fifth length of hose, and connects it to the sixth length of hose.

No. 7 runs out the sixth length of hose, and connects it to the seventh length of hose.

No. 8 connects elbow delivery to hydrant and turns on the water.

NOTE.—Each additional length of hose requires an additional man.

The Foreman or Chargeman takes the wrenches, and carefully looks at the joints of each length of hose, and sees that they are securely connected.

Caution—The turning of the water on and off must be done carefully and slowly, as if turned on quickly it would burst the hose, if turned off quickly it would burst the water main.

### IX.—List of Stretcher and Medical Stores Bag Stations.

#### Stretcher Stations.

Fire Hydrant Hose House,	}	...	6
Cordite Section, Quinton Hill			
Fire Engine House,	}	...	2
Guncotton Section, Quinton Hill			
Fire Engine House, Lower Island...	...	...	2
Fire Engine House, Saltpetre Refinery	}	...	2
Gate (Hoppit)			
Fire Engine House, Group E.	}	...	2
Incorporating Mills			
Dining Room, near Superintendent's Office	...	...	1
Dining Room, near No. 1 Moulding House	...	...	1
Dining Room, Paynes Island	...	...	1

#### Medical Stores Bag Stations.

Principal Foreman's Office, Cordite Section	...	...	1
Guncotton Section Office	...	...	1
Manager's Office, Cordite Branch	...	...	1
Water Warder's Quarters, Lower Island	...	...	1
Foreman's Office, Saltpetre Refinery	...	...	1
Manager's Office, Gunpowder Branch	...	...	1
Machinery Shop, Gunpowder Branch	...	...	1

