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## CHEMICAL WARFARE MUNITIONS FOR LAW ENFORCEMENT AGENCIES

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In connection with a discussion of the use of gas munitions and devices for employment by law enforcing agencies, it might be well to go back temporarily to the war days in order to gain a sketchy outline and idea of the initial use of this type of combat weapon, inasmuch as this subject invariably brings up in the minds of the users of chemical warfare devices its war characteristics. These war characteristics are much different than the peace time requirements, due to the mission involved, as well as its scope of action.

The first employment of gas during the war occurred when the Germans used chlorine in the early part of 1915. Chlorine is a greenish gas and the method the Germans used was to compress this into tanks and, when the wind conditions were right, that is blowing from themselves towards the allies, they opened the valves of these tanks and the chlorine gas drifted down on the opposing forces in a cloud-like formation. At that particular time, there was absolutely no gas protection available and a great number of casualties resulted, as chlorine is toxic or deadly when present in sufficient concentration. The allies soon extemporized crude methods of gas protection which eventually developed into the well-known gas mask. About the same time that the gas protection was being perfected, the Central Powers started to use other gases besides chlorine, with the final result that both sides, during the latter phases of the war, resorted to several highly destructive gassing agencies. The Germans principally used what is known as mustard gas, the name mustard being an arbitrary term ascribed to this agent which has no bearing on its chemical make-up. A suffocating gas known as phosgene was also used by the Germans. It has been practically decided, more or less, that mustard gas was quite effective and was apparently the most popular gas used on both sides, and there have been no outstanding developments in deadly gases for military use since the war days.

In military operations the object is, of course, to cause as many lasting casualties as possible, which condition does not prevail in the

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use of gas by civilian law enforcement agencies, and, accordingly, after the war, attention was given to the development of gases and methods of employment of these gases for use against civilians under conditions where only temporary blocking of their activities would be required, rather than permanent removal of such civilians from the scene of action. The result of these various developments in chemical warfare munitions manifests itself in the present-day line of tear and nauseating gas compounds which are available for police use.

There are quite a few compounds which are of the tear gas types, but the only generally employed one is chloracetophenone, commonly designated by the initials "CN," incorporated in various mixtures, most of which are subsidiary to CN itself in their effects.

The use of tear gas agencies represents a very humane method of dealing with unruly mobs and crowds of civilians where the seriousness of the situation is not such that it calls for the employment of firearms and, as all law enforcement officials know, the use of firearms by their agencies, whatever the provocation may be, is always accompanied by a very severe amount of criticism even if justifiable.

Tear gas, when properly used against mobs or groups of agitators, will effectually break up and disperse such groups with a minimum amount of personal injury and also with a minimum amount of undesirable publicity. If conditions are severe, and if conditions are such that warrant their use, certain nauseating compounds may be introduced with the tear gas devices and the result is a combination of the customary tear gas effect, which is intense flow of the tear ducts and general misery resulting from the irritation of the eyes, and general nausea as well. There are various methods commercially available whereby nauseating gases and the straight tear gas compounds may be successfully used against mobs and it is a fact that, when a person has been subjected to a mixture of tear gas and nauseating gas, he is thoroughly finished with that particular riot. There are no lasting ill effects attending the use of tear gas compounds, and danger from the proper use of the nauseating compounds is not very great, although the immediate effects are severe, and rapidly and thoroughly discourage the rioters from further activities.

The methods of using tear and nauseating gases against groups involve projecting these compounds into the mob at close quarters and also gassing a mob at longer ranges. At close quarters, the devices used to introduce gas are usually termed "candles" or "grenades." The tear gas candle, so-called, is the term applied to the customary military tear gas device, and commercial devices of this character are known by the same name. As a general rule, candles are con-

sidered devices so arranged as to give off tear gas by means of a comparatively slow release, which is accomplished ordinarily by a burning mixture of tear gas chemicals, powder, etc. These devices are quite efficient, although they possess some drawbacks, primarily due to the fact that a comparatively lengthy time of gas evolution results from their use.

The earlier type of gas candles commercially available for law enforcing agencies and indeed some types that are still currently sold as modern, require nearly a minute or more to give off their maximum quantity of tear gas. This gas goes out in a smoke cloud which is formed by the products of combustion of the candle, but these candles present, when functioning, a highly efficient appearance. However, this efficiency is more visual than actual on account of the fact that there is a great deal of smoke mixed with the gas mixture and the products of the burning candle, as seen by the eye, are far from being all tear gas. Another objection to the burning types of candles is that they are consistently accompanied by a fire hazard. Owing to their make-up and essential method of gas evolution through the medium of a burning mixture, these candles can set fire to various articles in a room or in a building, or possibly if thrown into a garage. Another serious objection to the use of the slow burning types of gas munitions is that, with practically one exception, they may be seized in the early stages of their gas discharge and thrown back at the law enforcement agencies by members of the mob.

Tear gas is no longer the terrifying agency that it was once considered to be, this impression coming from the deadly gases of war days; and many occurrences are on record where strikers and agitators have successfully thrown these burning types of devices back at the officers with accompanied confusion to the police themselves. One large chemical warfare munitions company, however, developed a method of accomplishing gas evolution in the shortest space of time compatible with efficiency in their candle which gives off its tear gas at a comparatively high rate of speed, most effectually preventing the candle being picked up and returned. However, there is a certain point in the design of any device of this type where gas content has to be sacrificed to other things to result in rapid gas evolution and, accordingly a different method has been worked out for projecting gas, eliminating the undesirable features referred to.

The latest and most modern development of gas munitions for law enforcement agencies employs methods whereby the gas content of required intensity is instantaneously evolved and distributed without loss of time, without any fire hazard whatsoever, and without

any possibility of the gas device being picked up and thrown back at the officers. Also, another very important feature of this latest development is the elimination of the accompanying smoke cloud which, as it was intermixed with the gas, plainly outlined to the strikers the location of the gas and would enable them to avoid the gas area by keeping free from the cloud. The new instantaneous grenades evolve their gas accompanied by only a slight trace of smoke, which means that the invisible gas clouds are carried into the midst of the agitators, who are unable to avoid them in any way.

A device which, when discharging or releasing its contents instantaneously, must not be, by virtue of this quick release, a hazardous device in itself, such as a war-type hand grenade is. Much experimental work has been involved in the final design of instantaneous grenades to avoid the point where severe rupture of the container occurs with flying parts, etc., which might cause serious injury to persons in the immediate vicinity of these grenades when they function. However, the result of these experiments is now available in a "jumper repeater" gas grenade which not only incorporates all of the desirable features of the burning types of grenades, but has an additional advantage of being a multi-shot or repeating device.

The "jumper repeater" tear gas grenade is so designed that, upon being thrown, it discharges instantaneously without fire hazard and, almost invisibly, one-third of its gas content after a delay of about  $1\frac{3}{4}$  seconds. This time is sufficient to allow the grenade to be hurled through the air or on to the ground a distance of fifty or sixty feet away. After this first instantaneous evolution of gas, the reaction of the grenade discharging itself, causes it to jump ten or fifteen feet from the position of the first discharge. The passage of the grenade through the air from this ten or fifteen feet is ended by a second discharge of gas and the jump is again repeated and, at the end of the third second, a third discharge of gas occurs. This action renders it impossible for any member of a mob to pick up this grenade and hurl it back at the officers. If he is leaning over when it goes off, he is so effectually gassed that he will have no further interest in the proceedings and, at the time he is gassed, the grenade jumps to another area, gases another group, and so on.

The employment of nauseating compounds, popularly known as KO (Knockout) Gas, or DM (Army designation for nauseating gas) is usually accompanied by the use of tear gas. The nauseating compounds do not have the immediate effect on an individual that straight tear gas agents have. When a man is exposed to the modern type of tear gas (liquid loading, atomized and finely distributed), he is

instantaneously stopped. There is no question of his being gradually exposed to an increasing concentration of tear gas, resulting finally in intense eye irritation and accompanied by an excessive discharge of the tear ducts; he is stopped in his tracks! Instead of incorporating the tear gas in a cloud of smoke, thereby thinning it out considerably and having to build up a concentration over a longer period of time, the liquid gas loaded grenades instantaneously atomize their contents and the gas goes out as a fine invisible cloud of vapor which clings tenaciously to clothing and any other articles present and acts instantaneously upon the eyes and nose, causing a severe immediately unbearable irritation. The gassed victim, when exposed to this treatment, can only wander around blindly and endeavor to get away from the scene. He is incapable of any coordinated fighting proclivities from then on and if, as is usually the case, his clothes are impregnated with the gaseous vapors, even when he goes away from the immediate scene, the gradual, continual evolution of gas from his clothes keeps up his eye irritation until he has to get rid of the garments themselves to stop the action.

Nauseating compounds alone require about ten minutes before the extreme effects are noticeable to the person exposed. These effects, when apparent, result in increasingly severe nausea very much like a severe attack of sea-sickness and persist, if the person has been well exposed to nauseating gases, for about twenty-four hours. The person exposed is absolutely incapable of taking any interest in any further riot proceedings for at least a day. To offset the delay of about ten minutes before the nauseating compounds take effect, the employment of tear gas mixed with nauseating compounds is very desirable as the delay time is then occupied by the "patient's" endeavors to get away from the tear gas exposure and then the nauseating effects step in. From then on, he is through with riot activities.

In using tear gas against mobs, two maxims should be followed:

First, be sure the wind conditions are such that the gas is carried into the mob and secondly use plenty of gas agents at the start. The proper analysis of wind conditions is sometimes difficult because the presence of buildings, structures or even large trees will set up wind currents, fifty to seventy-five feet away from the point where the officers are throwing gas, that are different from the wind conditions where the officers are. The use of a couple of smoke candles at the start of hostilities before gas is thrown is a very desirable action to take, as the smoke candles will burn for two or three minutes and the smoke cloud is affected exactly as the gas cloud would be by the wind conditions if they are varying at the target. This prevents the

loss of much gas efficiency which otherwise will happen if proper regard is not paid to wind conditions.

Also, sufficient gas should be used at the start. To quote an old maxim of poker, "Do not send a boy to do a man's job." In other words, use more gas than you think would be required at the start. The result will be that the mob will receive such a thorough drenching with gas it will be thoroughly disheartened. If this procedure is not followed and gas is used sparingly at the start, owing to its apparent cost, it will often become necessary to continue the engagement, using more and more gas until the final results are obtained. An analysis of the amount of material used will bring out the fact that, if much more material was used at the start with the resultant breaking up of the mob, the total consumption would have been less than was the case when a continual dribbling out of gas was resorted to for a protracted period of time. It is economical in the end to be uneconomical in using gas at the start of a conflict.

A word about the harmful results of tear and nauseating gas. No lasting, ill effects accompany the use of any commercially available tear gas because concentrations of these compounds that are unbearable to the individual are much lower than that required to constitute a dangerous exposure. A person may feel that he has been so badly gassed that he is about to die, but, if tear gas alone is the gassing agent, fifteen minutes to a half hour's exposure to clean fresh air, if not accompanied by a gas evolution from the clothes, will clear away the crying effects and ease almost entirely the eye irritation. Exposure to ordinary concentrations of nauseating compounds, of course, results in a longer period of irritation, but, again, twenty-four hours will generally suffice to eradicate all of the nausea which was very severe during the first few hours after exposure. It is not necessary to shoot tear gas directly into the face or eyes of an individual. In fact, it is dangerous on account of small flying particles of wads, etc. Tear gas follows air currents the same as a smoke cloud does and, under normal conditions, moves around in just the same way and, if the effect of the wind is properly taken into consideration, the wind, itself, carries the gas in a widespread area, distributed just where it is wanted.

It should be regarded as necessary that all law enforcing agencies, using gas, be provided with gas masks themselves. A change of wind conditions might blow the gas cloud back on the police officers, and gas is no respecter of persons, and if the officers are not thoroughly protected by means of gas masks, they are no more immune to the effects of gas than the agitators themselves.