

REVENTION



INFORMATION



Professional Standards Division ☐ International Association of Chiefs of Police
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FIELD EVALUATION OF CHEMICAL AGENT GRENADES

As part of the Chemical Agents Program conducted by the I.A.C.P. for the Law Enforcement Assistance Administration of the U. S. Department of Justice, a field evaluation of commercial riot control agent grenades was conducted during March 1969. Facilities at Fort Belvoir and the Fairfax County Police Department in Virginia were used to evaluate several selected characteristics of 13 chemical agent grenades currently available for police use in the United States.

GRENADES EVALUATED¹

<u>Designation</u>	<u>Model/Catalog Number</u>	<u>Quantity</u>	<u>Agent</u>
<u>PYROTECHNIC</u>			
Brunswick Skitter Grenade	5001	24	CS
Federal Pocket Grenade	109	24	CS
Federal Spedeheat Grenade	555	24	CS
Federal Triple Chaser	515	24	CS
Lake Erie Continuous Discharge	2CS	24	CS
Penguin CN/Smoke Grenade	G3	24	CN
<u>EXPULSION</u>			
AAI Multipurpose Grenade	MPG 120	24	CS
Federal Blast Dispersion	514	24	CS
Federal Disintegrating	520	24	CS
Lake Erie Jumper Repeater	1 CS	24	CS
Lake Erie Mob Master	7 CS	24	CS
Lake Erie Model 34	4 CS	24	CS
Penguin Baseball Grenade	G-1 CS	24	CS

No attempt was made to define and evaluate *every* important characteristic of these munitions. In fact, effective airborne concentration, which is perhaps the most critical feature of all, cannot be measured or even estimated without elaborate and expensive laboratory testing facilities. What was intended here was the collection of certain observable performance data that relates to the tactical use of chemical agent grenades. Much of the information developed by this project was previously unavailable, incomplete or conflicting.

The procedures employed in this evaluation were simple and well within the ability of any law enforcement agency to duplicate. Although the expense of munitions generally precludes extensive field testing and evaluation by all but the largest departments, the procedures suggested in this report can serve as a guide for the development of at least minimal evaluation programs to assist law enforcement personnel in selecting riot control chemical munitions.

¹The Lake Erie Blast Dispersion grenade, which has been discontinued by the manufacturer, was not evaluated. The new Lake Erie Mighty Midget and Northrop Rubber Ball grenades were not on the market at the time the other munitions were purchased during February 1969 and consequently were also not included in this evaluation series.

PYROTECHNIC GRENADES

Pyrotechnic or burning dissemination is achieved by mixing a granulated chemical agent with an appropriate fuel. Upon ignition, the fuel burns and vaporizes the agent. The agent vapor exits from the grenade with the smoke from the fuel combustion and is quickly cooled and condensed into submicron particles that drift with the smoke until ultimately dissipated.

For grenades employing burning dissemination, three major characteristics were examined. Burning time, functioning, and temperature were evaluated for the three standard burning grenades, the multiple unit Triple Chaser, and two miniature grenades (Figure 1).

Burning Time. A standard stop-watch was used to measure the elapsed time between the first appearance of smoke and the termination of smoke emission under internal pressure. The continued smouldering or smoke drift from exit ports was not included as burning time. When actual burning time was compared with the emission time specified by the manufacturer, it was evident that all but one of the large pyrotechnic units burned for considerably longer than predicted.

A longer burning time could be either an advantage or a liability, depending upon the tactical situation. The extended burning period will permit more time for the return of the grenade by members of the crowd, but on the other hand, the more quickly a grenade burns, the more frequently it will have to be replaced on a release line when a given concentration is being maintained. In any event, manufacturers should make a greater effort to provide reasonably accurate statements regarding the burning time of their pyrotechnic grenades.

Functioning. None of the pyrotechnic grenades failed to function, but 17 out of 144 (12%) of the units tested functioned improperly. Eleven of the malfunctions resulted in the grenade "flaming", a condition in which fire instead of smoke is ejected from the exit ports. The flame typically burns with great intensity, often extending out for distances up to 12 inches from the grenade.

Five of the 24 Federal Triple Chaser grenades failed to separate completely into three sections in the normal manner, although this malfunction did not interfere with the normal burning of at least two of the sections. One of the Brunswick Skitter grenades was projected about 50 yards through the air after release, apparently as the result of a clogged or partially blocked exit port.

Temperature. The heat generated by burning grenades is of interest from two points of view. First, if the grenade remains cool enough to handle and also functions for any length of time, it can easily be picked up and thrown back at police or away from the target area. Secondly, grenades that emit flame during functioning present a potential fire hazard when used where combustible materials are present.

In order to determine how long grenades could be held after ignition, they were approached from upwind and picked up both with gloves and with bare hands. The most difficult grenade to handle was the Federal Spedeheat, which has exit ports on all surfaces and heats up rapidly as a result of the geometry of the burning mixture. Personnel highly motivated or whose hands were protected with heavy insulation could probably handle grenades for periods substantially exceeding the times reflected in Figure 1. Because it burns quickly and remains in motion, the Brunswick Skitter grenade is difficult to pick up while functioning and return is unlikely. The Federal Triple Chaser discourages return by the violent nature of its separation, although once separated the individual sections can be returned in the same manner as other burning grenades.

As an indication of their tendency to start fires, six of each of the grenades were discharged in a container of shredded newspaper. Those grenades that, as a result of their normal functioning, caused the newspaper to burn three or more times were rated "probable" in terms of fire potential. Those grenades that, as a result of their normal functioning, ignited the paper less than 3 out of 6 times were rated "possible" and those grenades that failed to ignite the paper or did so only when malfunctioning, were rated "unlikely" to start fires. It should be stressed, however, that any pyrotechnic grenade can cause fires — none are completely fireproof!

GRENADE	Specified Load Weight (grams)		Specified Burning Time (seconds)	Actual Burning Time (seconds)		Failed to Function	Functioned Improperly		Time Hand Held After Ignition (seconds)			Fire Potential in Combustible Material	Catalog Price (Jan. 69)
	Agent	Other		Average	Range		Number	%	With Glove	Bare Hand			
			Average			Range							
Federal Spedeheat	104	276	25-35	71.95	60-90	0	0	0%	20	14.5	12-16	Probable	\$11.30
Lake Erie Continuous Discharge	106	179	25-30	152	137-170	0	5 flame	21%	40	22.15	15-27	Probable	\$11.30
Penguin CN/Smoke	69	161	40	40	30-53	0	2 flame	8%	Total burning time	16.25	15-20	Probable	\$ 9.95
Federal Triple Chaser	72	193	25-35	103.72	60-157	0	3 flame 5 incomplete separation	33%	NOT EVALUATED			Probable	\$13.75
Brunswick Skitter Grenade	16	22	10-20	12.86	11-18	0	1 flame 1 flight	8%	NOT EVALUATED			Unlikely	\$ 3.50
Federal 109 Pocket Grenade	20	30	16	19.27	16-21	0	0	0%	Total burning time	17.8	15-20	Probable	\$ 3.75
STANDARD													
MULTIPLE													
MINIATURE													

FIGURE 1 - Summary of Selected Performance Characteristics of Pyrotechnic Grenades
(See text for explanation)

EXPULSION GRENADES

Expulsion grenades are munitions that employ an explosive force to eject micropulverized agent into the air. This is accomplished either by rupturing or disintegrating the container or by forcing the agent out through exit ports.

Grenades that rupture or disintegrate present some risk of injury when they are discharged near the heads of unprotected personnel. They do release most of their agent loading, but when they explode on the ground a large percent of the agent is "dumped", resulting in a substantial loss in effective airborne concentration.

Those expulsion grenades that do not rupture or disintegrate present less potential for injury, but generally expel less of their loading because of their more complex internal design. An exception is the AAI Multi-Purpose grenade, which releases a high percent of its agent loading.

In this series of evaluations seven expulsion grenades were examined for functioning and fire potential. In addition, three of the grenades that do not rupture or disintegrate were checked for weight loss after release. (Figure 2)

Functioning. Only one of the 168 expulsion grenades failed to function. One Penguin Baseball grenade blew the burster and fuze assembly clear of the grenade body without releasing the agent. One AAI Multi-Purpose grenade malfunctioned as the result of a defective spin weld where the base attaches to the grenade body.

Fire Potential. Although it has been widely assumed that expulsion grenades could be used without risk of fire, it was found during this evaluation that several of the expulsion grenades are capable of igniting combustible material during normal functioning.

Weight Loss. As a general index to efficiency in the release of their micropulverized agent payload, 72 grenades were weighed before and after release with adjustment made for the weight of firing pins, safety levers, and other separating parts. While not exact (since the weight of the expended fuze and expulsion components is also lost) the results suggest that the Lake Erie Mob Master and Model 34 release up to about half of their specified loading and that the AAI Multi-Purpose grenade releases almost all of its agent content. The apparent performance differential between the Lake Erie and AAI systems is somewhat modified however by another characteristic.

When discharged on the ground, the AAI grenade evidences the same tendency to "dump" its payload as the rupturing or disintegrating grenades and, in fact, the manufacturer does not recommend the AAI grenade for any tactical use which would result in a ground release of the unit. On the other hand, the Lake Erie grenades evidence no tendency to "dump" their agent even during ground release. The average weight loss for both the Mob Master and the Model 34 did not vary significantly during air, rolling, or stationary releases.¹

SUMMARY

The field evaluation of 312 chemical agent grenades resulted in the following conclusions regarding certain of their operating characteristics.

- Only 1 out of 312 grenades failed to function.
- 19 out of 311 grenades (6%) functioned improperly. Pyrotechnic grenades are the most likely to malfunction (8 to 1 in this evaluation).

¹There was, of course, no way of determining what portion of the load became airborne and what portion, if any, was destroyed or decomposed in the expulsion process.

GRENADE	Specified Average Load Weight (grams)	Weight Loss After Release (grams)		Average Weight Loss	Failed To Function		Functioned Improperly		Fire Potential In Combustible Material	Catalog Price (Jan. 69)
		Average	Range		Number	%	Number	%		
All Multi-Purpose Grenade	120	114.24	95.8-122.5	95.2%	0		Defective Spin Weld	4%	Unlikely	\$15.00
	100	54.81	44.3-67.9	54.8%	0		0		Possible	\$14.25
	50	25.21	16.7-31.4	50.4%	0		0		Possible	\$11.30
Lake Erie Jumper Repeater	70	NOT EVALUATED			0		0		Unlikely	\$13.75
Federal Blast Dispersion	220	NOT EVALUATED			0		0		Unlikely	\$11.30
	220	NOT EVALUATED			1	4%	0		Unlikely	\$11.30
	40	NOT EVALUATED			0		1 Fuze-Body Separation	4%	Possible	\$10.95
EXPULSED FROM EXIT PORT(S)		RUPTURE/DISINTEGRATION								

FIGURE 2 - Summary of Selected Performance
Characteristics of Expulsion Grenades
(See text for explanation)

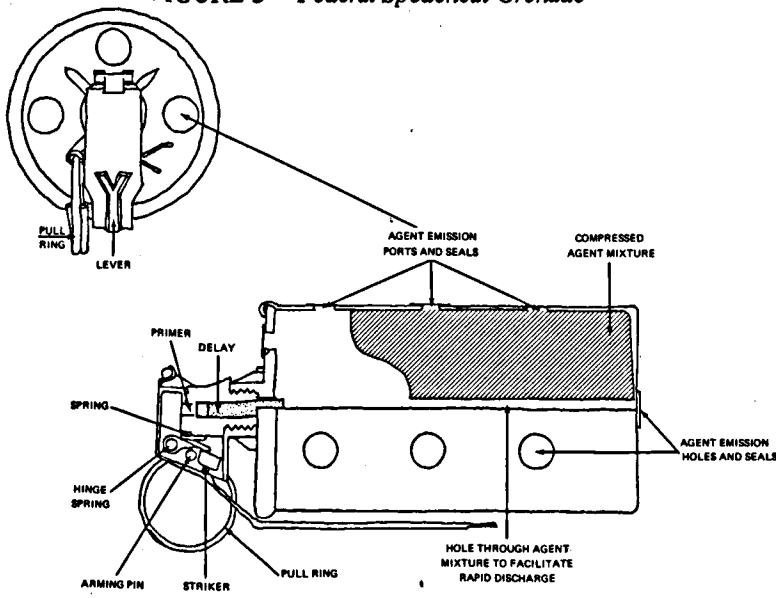
- There is substantial risk of fire with almost all pyrotechnic and some expulsion grenades.
- The specified burning times for several standard pyrotechnic grenades are extremely inaccurate and should be adjusted.
- Pyrotechnic grenades can be handled for a sufficient period of time after ignition to permit their return or diversion by target personnel.
- Expulsion grenades that disintegrate of rupture lose most of their effectiveness when exploded on the ground.
- Expulsion grenades that expel agent from exit ports vary in efficiency. The AAI grenades deliver almost all of their payload while it is estimated that the Lake Erie Instantaneous Discharge munitions expel only about 50%. This differential is significant, however, only in air releases. Ground releases do not appear to affect the efficiency of the Lake Erie grenades, but under similar conditions the AAI grenade is sharply limited in its ability to develop an effective airborne concentration.

GENERAL OBSERVATIONS

In addition to the specific evaluation of those grenade characteristics that have already been discussed, other data was noted and is summarized in this section for the convenience of those who have not had an opportunity to observe the functioning of some or all of the munitions included in this evaluation.

STANDARD PYROTECHNIC GRENADES

FIGURE 3 – Federal Spedeheat Grenade

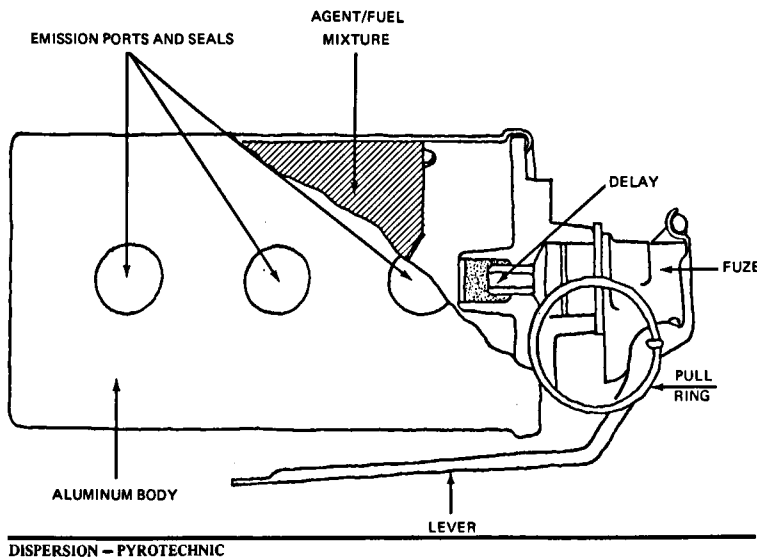


Federal Spedeheat. The Federal Spedeheat grenade (Figure 3) is a time tested pyrotechnic munition with design features that make it very difficult to handle while it is functioning. Exit ports are located on all surfaces of the grenade body and combustion is vigorous. It functioned very reliably during this evaluation. Fuze timing was dependable, but burning time averaged 71.95 seconds, a considerable increase over the specified 25 to 35 seconds.

DISPERSION – PYROTECHNIC

	CN LOAD	CS LOAD
FILLER WEIGHT	370 grams	380 grams
ACTIVE AGENT	124 grams	104 grams
OTHER	246 grams	276 grams
FUZE DELAY 1 second		
HEIGHT 6-1/4 inches with fuze	SHOTGUN LAUNCH	Yes
CONTAINER BODY MATERIAL Aluminum	DIAMETER	2-5/8 inches at base

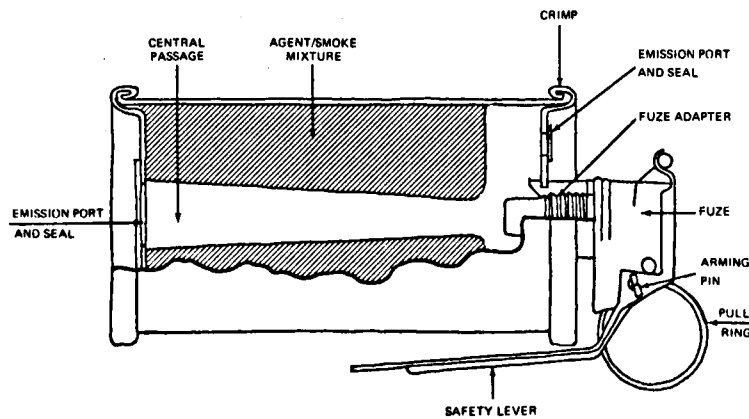
FIGURE 4 – Lake Erie Continuous Discharge Grenade



DISPERSION – PYROTECHNIC

	CN LOAD	CS LOAD
FILLER WEIGHT	306 grams	285 grams
ACTIVE AGENT	128 grams	106 grams
OTHER	178 grams	179 grams
FUZE DELAY	2 seconds	
HEIGHT	6-1/2 inches with fuze	
CONTAINER BODY MATERIAL	Aluminum	
		SHOTGUN LAUNCH
		DIAMETER
		Yes
		2-5/8 inches
		at base

FIGURE 5 – Penguin CN/Smoke Grenade



DISPERSION — PYROTECHNIC

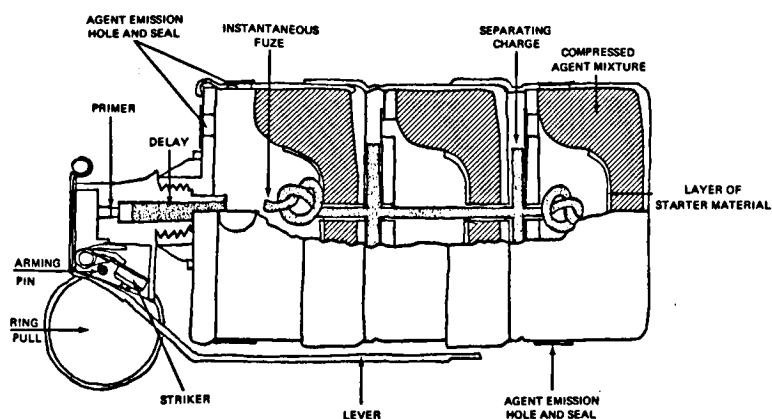
	CN LOAD	CS LOAD
FILLER WEIGHT	230 grams	
ACTIVE AGENT	69 grams	
OTHER	161 grams	
FUZE DELAY	4 seconds	
HEIGHT	5-3/4 inches	
CONTAINER BODY MATERIAL	Steel	
		SHOTGUN LAUNCH
		DIAMETER
		Yes
		2-1/2 inches

Lake Erie Continuous Discharge. This grenade (Figure 4) has exit ports on all but the base surface and burning of the payload is slower than with the Spedeheat unit. This grenade burns a 285 gram payload in an average of 152 seconds as contrasted with a burning time of 71.95 seconds for the 380 gram payload of the Spedeheat. It is interesting to note, however, that both grenades contain about the same amount of agent. Fuze timing was reliable and all tested units functioned, although the number of "flame" defects was the highest recorded for the three standard pyrotechnic grenades.

Penguin CN/Smoke. The Penguin grenade (Figure 5) burned for the specified period of 40 seconds. With exit ports in the top and base only, this unit was the easiest to handle. In fact, if the paraffin into which the grenade is dipped during manufacture did not heat up, it would probably be possible to handle this unit with bare hands for an even longer period of time. Although all three of the standard pyrotechnic grenades present a substantial risk of fire when used near combustible materials, only the Penguin unit contains a warning to this effect on the label.

MULTIPLE PYROTECHNIC GRENADE

FIGURE 6 – Federal Triple Chaser Grenade



DISPERSION — PYROTECHNIC

	CN LOAD	CS LOAD
FILLER WEIGHT	290 grams	265 grams
ACTIVE AGENT	92 grams	72 grams
OTHER	198 grams	193 grams
FUZE DELAY	2 seconds	
HEIGHT	6-1/4 inches with fuze	
CONTAINER BODY MATERIAL	Aluminum	
	SHOTGUN LAUNCH DIAMETER	Not Recommended
		2-5/8 inches at base

Federal Triple Chaser. This grenade (Figure 6) separates upon ignition into three sections which then burn in the normal manner. The separation is violent and usually accompanied by a visible flash. Each section travels in an unpredictable direction, occasionally ranging up to thirty or forty yards with a total separation distance of up to sixty or seventy yards. Although air bursts usually resulted in the greatest separation distance, even this was not absolutely consistent.

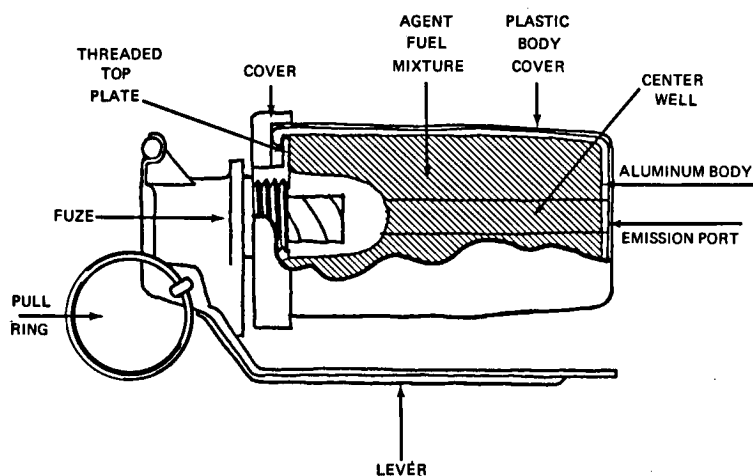
As indicated in the following table, the bottom or base section tended to burn for the longest period of time.

SAMPLE	RELEASE	BURNING TIME (MINUTES/SECONDS)		
		TOP (FUZE)	CENTER	BOTTOM (BASE)
1	Air	2.00	1.05	1.12
2	Air	0	1.15	1.25
3	Air	0.55	1.10	2.00
4	Air	0.15	0.55	2.00
5	Air	1.05	1.00	1.25
6	Air	0.50	1.15	1.52
7	Ground	.50	1.00	1.00
8	Ground	.45	0.55	1.25
9	Ground	.25	1.25	2.00
10	Ground	.20	0.55	2.00
11	Ground	.25	1.30	1.50
12	Ground	.28	1.15	0.50

Three of the Triple Chasers "flamed" and five did not separate completely. The failure to separate did not seem to prevent at least one of the attached sections from burning normally. Again, the burning period greatly exceeded the specified period. The violent separation, unpredictable behavior, and relatively low agent loading of the Triple Chaser would suggest that for most situations this grenade should be regarded as a special supplement rather than as a substitute for the standard pyrotechnic munitions.

MINIATURE PYROTECHNIC GRENADES

FIGURE 7 – Brunswick Skitter Grenade

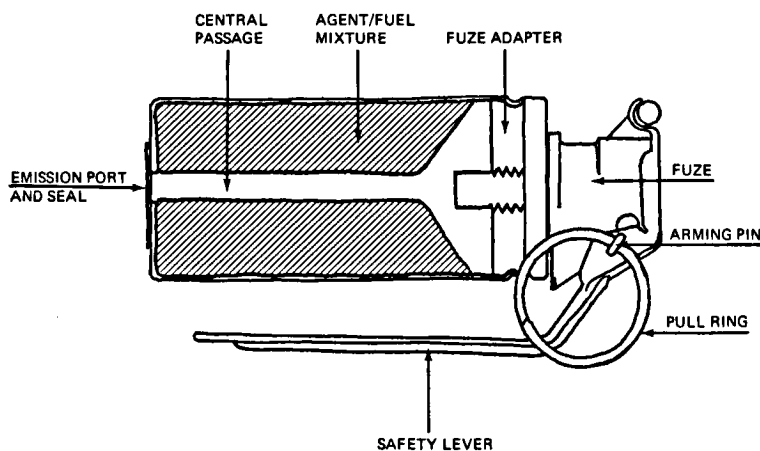


DISPERSION — PYROTECHNIC

	CN LOAD	CS LOAD
FILLER WEIGHT	38 grams	38 grams
ACTIVE AGENT	16 grams	16 grams
OTHER	22 grams	22 grams
FUZE DELAY	1-1/2 seconds	SHOTGUN LAUNCH
HEIGHT	4 inches with fuze	DIAMETER
CONTAINER BODY MATERIAL	Plastic Covered Aluminum	Not Recommended
		1-3/8 inches

Both Skitter grenade malfunctions apparently were the result of the plastic outer cover failing to rupture completely over the exit port. In one case, this resulted in the burning of the plastic cover. This grenade did not “flame” in the usual manner, but simply burned its outer protective cover. The second malfunction resulted in the grenade traveling airborne for about 50 yards from the release point. In both cases, the grenades burned and discharged their fuel/agent mixture.

FIGURE 8 – Federal Pocket Grenade



DISPERSION — PYROTECHNIC

	CN LOAD	CS LOAD
FILLER WEIGHT	50 grams	50 grams
ACTIVE AGENT	20 grams	20 grams
OTHER	30 grams	30 grams
FUZE DELAY	1-1/2 seconds	SHOTGUN LAUNCH
HEIGHT	4-1/8 inches	DIAMETER
CONTAINER BODY MATERIAL	Aluminum	Not Recommended
		1-3/8 inches

Although the Pocket grenades were otherwise impressive, they did frequently emit a shower of sparks or flame when discharged and this characteristic undoubtedly was responsible for their tendency to start fires in combustible materials.

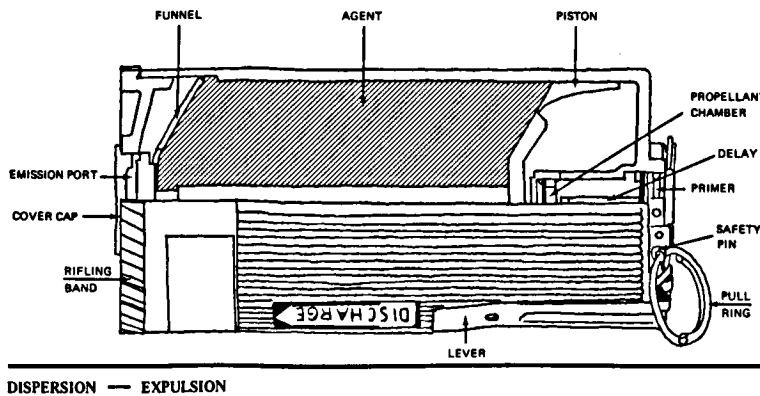
Brunswick Skitter. This grenade (Figure 7), one of two low-volume units evaluated, performed well and was considered the most unlikely of all the pyrotechnic grenades to start fires in combustible materials. When thrown onto a reasonably smooth surface the Skitter grenade usually remains in motion during a large portion of the burning time. The scooting or spinning action is produced by the rush of agent/smoke mixture from a single, off-center exit port on the base of the grenade. The motion and rapid emission make it unlikely that this unit will be picked up during functioning, but although this feature was not evaluated, the Skitter grenade probably remains cool enough to handle without gloves.

Federal Pocket. This grenade (Figure 8), the second of the two miniature units evaluated, performed well in all aspects observed. There were no failures or malfunctions and the burning time was well within the period specified by the manufacturer. This grenade, like the Skitter grenade, burns rapidly and the agent/smoke is released from an exit port in the base of the grenade. Because the exit port is larger and is centered, the Pocket grenade does not normally move about during functioning.

STANDARD EXPULSION GRENADES

All of the expulsion grenades functioned well during this evaluation and most of their essential characteristics were discussed earlier.

FIGURE 9 – AAI Multi-Purpose Grenade



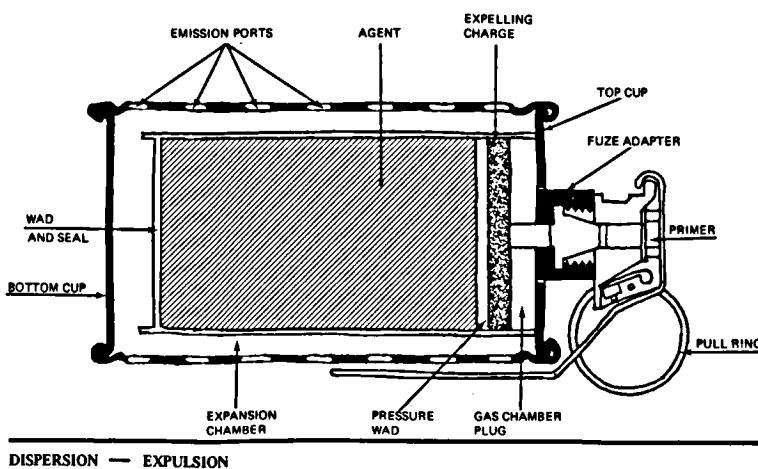
DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	140 grams	120 grams
ACTIVE AGENT	95 grams	114 grams
OTHER	45 grams	6 grams
FUZE DELAY	Adjustable delay 2 or 5 seconds	SHOTGUN LAUNCH
HEIGHT	6-1/2 inches	DIAMETER
CONTAINER BODY MATERIAL	Plastic	Yes
		3-1/4 inches

AAI Multi-Purpose. This grenade (Figure 9) was designed expressly for use by civilian police agencies and its design incorporates several features not generally found in traditional munitions. It has, for example, a selector that allows for either a 2 second or a 5 second fuze delay period. It can be hand held and directed during release and it will not start fires in combustible material during normal functioning.

Although the Multi-Purpose grenade is not, as discussed previously, effective in ground discharges, it delivers an impressive 95.2% weight loss during functioning and appeared, during this evaluation, to be one of the units least likely to cause personnel injury or fires.

FIGURE 10 – Lake Erie Mob Master

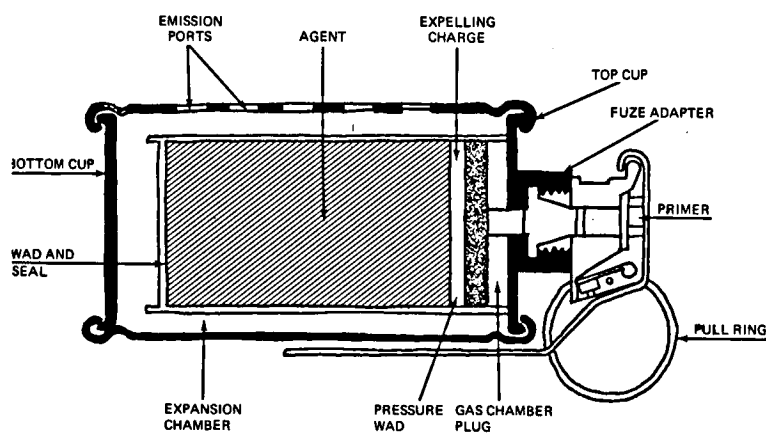


DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	125 grams	100 grams
ACTIVE AGENT	106 grams	85 grams
OTHER	19 grams	15 grams
FUZE DELAY	1-3/4 seconds	SHOTGUN LAUNCH
HEIGHT	6-3/4 inches	DIAMETER
CONTAINER BODY MATERIAL	Steel	Not Recommended
		3 inches at base

Lake Erie Mob Master and Model 34. These grenades (Figure 10 and 11) employ the same design features and differ only in size and payload. The Mob Master has a reported average loading of 100 grams as compared with a 50 gram loading for the Model 34. Both units employ an internal container that houses the micropulverized agent and an explosive charge. Upon detonation, the agent is blown out through the base of the internal container, into the space between the two containers, and ultimately out of exit ports in the external body wall.

FIGURE 11 – Lake Erie Model 34 Instantaneous Discharge Grenade



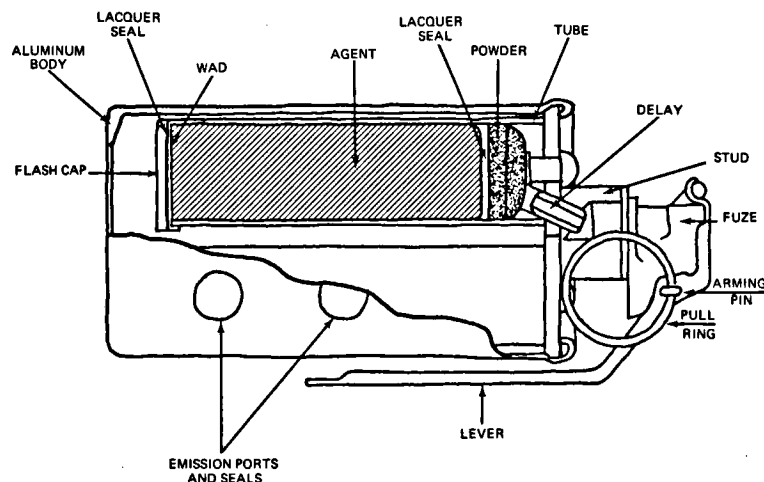
DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	70 grams	50 grams
ACTIVE AGENT	60 grams	43 grams
OTHER	10 grams	7 grams
FUZE DELAY	1-3/4 seconds	SHOTGUN LAUNCH
HEIGHT	6-1/4 inches	DIAMETER
CONTAINER BODY MATERIAL	Steel	Not Recommended*
		2-3/8 inches
		at base

*This grenade can be fired from an AR-15 rifle by means of a special launching fin supplied by Lake Erie Chemical Company.

MULTIPLE DISCHARGE EXPULSION GRENADES

FIGURE 12 – Lake Erie Jumper Repeater Grenade



DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	82 grams	70 grams
ACTIVE AGENT	70 grams	60 grams
OTHER	12 grams	10 grams
FUZE DELAY	2 seconds	SHOTGUN LAUNCH
HEIGHT	6-1/2 inches with fuze	DIAMETER
CONTAINER BODY MATERIAL	Steel	Not Recommended
		2-5/8 inches
		at base

From the standpoint of cost effectiveness, it is difficult to understand why the Jumper Repeater would be employed instead of the Mob Master or even the Model 34. This is especially true since the return or diversion of expulsion munitions is seldom a problem and the area coverage achieved by the Jumper Repeater is not substantially greater.

While this complex design avoids the fragmentation, concussion, and "dumping" characteristics of most expulsion grenades, it does result in the loss of about half of the reported payload. Even so, these grenades and their cousin the Jumper Repeater, are the only expulsion grenades that appear to function with any degree of efficiency during ground release.

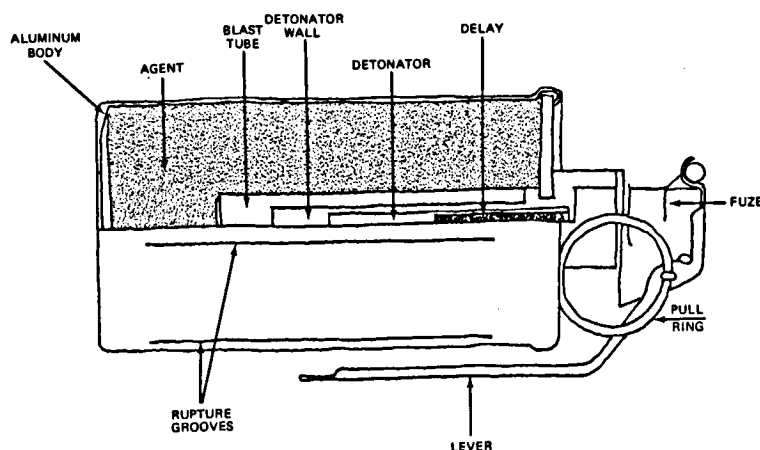
For some unknown reason, perhaps the use of black powder in the expulsion charge, both grenades started fires in combustible material during this evaluation.

Lake Erie Jumper Repeater. This grenade (Figure 12) employs the same design features as the Mob Master and Model 34, except that it contains 3 separate internal tubes that discharge at about one second intervals. In this way the release of agent is spread in three bursts over an area of up to about ten feet from the point of release, although the direction of movement during discharge is unpredictable.

Like the Mob Master and the Model 34, the Jumper Repeater grenade employs a steel body in order to adequately contain the internal explosion. Consequently, all three provide heavy missiles that can be thrown back at police after the grenade has functioned.

RUPTURE/DISINTEGRATING EXPULSION GRENADES

FIGURE 13 – Federal Blast Dispersion Grenade



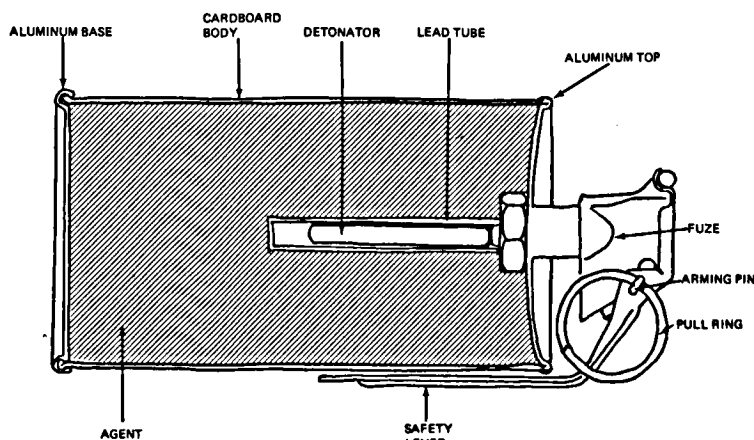
DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	220 grams	220 grams
ACTIVE AGENT	153 grams	152 grams
OTHER	67 grams	68 grams
FUZE DELAY	2 seconds	Not Recommended
HEIGHT	6-1/4 inches	2-5/8 inches
CONTAINER BODY MATERIAL	Aluminum	at base
	SHOTGUN LAUNCH	
	DIAMETER	

Federal Blast Dispersion and Disintegrating Grenades. The only major difference between these grenades (Figures 13 and 14) is that the former employs an aluminum container and the latter a fiber body. In functioning, the Blast Dispersion grenade ruptures open along pre-formed grooves in the body and the Disintegrating unit blows the container into small pieces.

Both grenades expel their entire payload during air bursts, but tend to “dump” badly during ground releases. Since these munitions carry by far the largest payloads in the expulsion grenade class, they can be effectively employed whenever fragmentation or concussion risks can be avoided.

FIGURE 14 – Federal Disintegrating Grenade

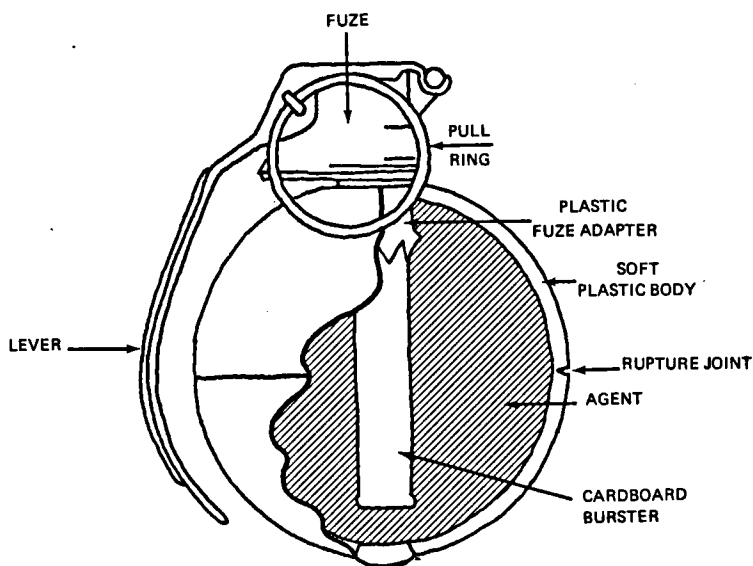


DISPERSION — EXPULSION

	CN LOAD	CS LOAD
FILLER WEIGHT	220 grams	220 grams
ACTIVE AGENT	153 grams	150 grams
OTHER	67 grams	70 grams
FUZE DELAY	2 seconds	Not Recommended
HEIGHT	6-1/2 inches	2-3/4 inches
CONTAINER BODY MATERIAL	Cardboard	at base
	SHOTGUN LAUNCH	
	DIAMETER	

The velocity of parts separating from these grenades is unknown, but during this evaluation six of each grenade were detonated on the ground within two to three feet of exposed personnel without injury of any sort resulting. Unfortunately, in the case of the Blast Dispersion grenade, the aluminum body did not impact on personnel and its injury potential remains unknown. However, from general observation of the flight of the lightweight aluminum body, it would appear that injury from a ground or air burst is unlikely unless the detonation takes place very close to exposed skin or the eyes are struck directly by fragments from a nearby release.

FIGURE 15 – Penguin Baseball Grenade



DISPERSION — EXPULSION

	CN LOAD		CS LOAD	
FILLER WEIGHT	40 grams		40 grams	
ACTIVE AGENT	20 grams		20 grams	
OTHER	20 grams		20 grams	
FUZE DELAY	4 seconds			
HEIGHT	4 inches			
CONTAINER BODY MATERIAL	Plastic			
		SHOTGUN LAUNCH DIAMETER		Not Recommended 2-7/8 inches

Penguin Baseball. The Penguin Baseball grenade (Figure 15) employs a cardboard burster to separate a round plastic body and releases about 40 grams of a 50% CS mixture (CS/X5). The separation is violent, frequently flinging the plastic hemispheres up to 30 or 40 yards, and is often accompanied by a visible flash at the moment of discharge. Like other grenades in its class, the Baseball "dumps" badly during ground release, but the violence and noise of the detonation may, in themselves, assist in scattering target personnel.

The weight and shape of the Baseball permit it to be thrown with considerable accuracy and the fuzing is reliable enough to allow air bursts to be achieved consistently with only a minimal amount of practice.

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