

Properties of Black and Smokeless Powder



POWDER

There are three basic types of propellants used by sport shooters: black powder, black powder substitutes (Pyrodex®), and smokeless powders.

Black powder is the oldest class of propellant available. It is a mixture of charcoal, sulfur and potassium nitrate. It has many disadvantages as a metallic cartridge propellant, being very dirty and inefficient. The residue it leaves behind is hygroscopic and corrosive to brass and gun parts, thus immediate and meticulous cleaning is required after firing. Its proper use is largely restricted to certain large bore rifles and S.A.S.S. competition. Black powder is classified as an explosive and unlike smokeless will detonate unconfined. Therefore black powder requires proper storage and handling procedures. Pyrodex® and certain other black powder substitutes offer the handling convenience and stability of smokeless powders with load density and pressure characteristics similar to black powder. All are mildly corrosive and cleaning after firing with Pyrodex® is no less important. Pyrodex® is designed to be equivalent to black powder by VOLUME, NOT WEIGHT.

Black Powder Granulations

Black #	Use	Grain Size (Average)	Pyrodex® Equivalent (Volume-For-Volume)
Fg (1f)	Large Bore Rifles	.062"	N/A
FFg (2f)	Rifles and Carbines	.047"	RS or Select
FFFg (3f)	Small and Medium Pistols	.030"	'P'
FFFFg (4f)	Priming/Flint Lock	.014"	N/A



POWDER

Smokeless powders were developed from gun cotton in the 1870s, and first used in shotgun loads. Most smokeless powders are classified as follows:

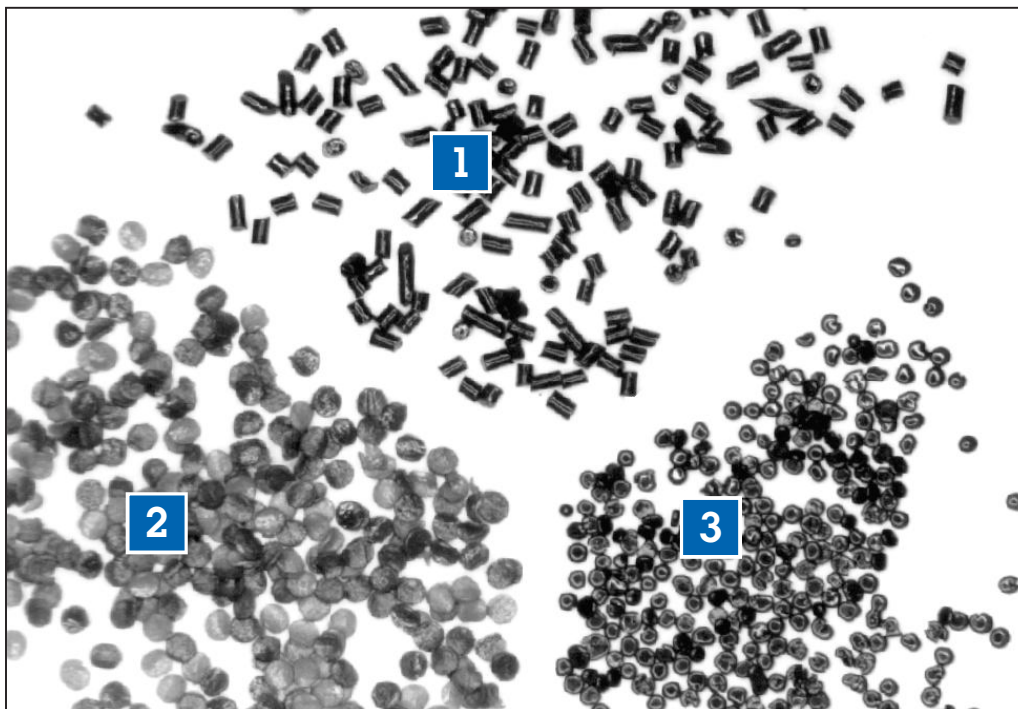
1. **Single base** - using nitrocellulose.
2. **Double base** - using nitrocellulose and nitroglycerin.

These basic compounds are moderated by their shape, area, density, and/or the addition of flame retardants to manufacture the full range of propellants, each with its specific and unique burn rate, specific gravity and loading characteristics. Solid film coatings and powdered graphite are used to enhance metering and storage stability.

Commonly, smokeless powders are further classified by shape:

1. **Extruded** - small cylindrical rods.
2. **Flake** - thin dots.
3. **Spherical** - small balls.

In practice, certain propellants are mixtures of two or more shapes and sizes. Because large flake and some extruded powders tend to settle and measure less consistently than spherical powders, attention to careful measuring and metering is crucial to accuracy. Many



Powder types: 1-extruded; 2-flake; 3-spherical.

manufacturers add dyes or unique grain shapes for identification purposes. It's a good idea to become familiar with the appearance of the various powders you use to help prevent potentially disastrous errors. Do not use powder you cannot positively identify!

Smokeless propellants are designed to burn readily and release large volumes of gas until consumed. All powders must be handled and stored away from potential sources of ignition, whether open flame, high heat, or electrical spark. Smokeless powders contain sufficient oxygen for combustion and can cause serious burns. Your shooting and reloading enjoyment would be impaired by the dispossession and skin grafts resulting from an accidental powder fire. Thus, your religious observance of all safety procedures is required.

POWDER DO'S AND DON'TS

Propellant powders are designed to burn readily with the release of hot gases and flames. Since burn rates and pressures rise with density and confinement, it follows that proper storage and handling of powders depends on separation and insulation:

- **NEVER** store large quantities of powder together. Instead store stocks of powder in several separate, lightly constructed but fire insulated cabinets or boxes. (Always follow manufacturer's guidelines for storage and handling of all components)
- **ALWAYS** wear eye protection when handling powder or primers.
- **AVOID SOURCES OF IGNITION**, such as: heat, flames, sparks and electrical equipment. Keep an appropriate fire extinguisher at the entrance to your reloading area.
- **NEVER** store powders near solvents, flammables or aerosols.
- **NEVER** transfer powders into non-DOT approved or incorrectly marked containers.



POWDER



POWDER

- Store powders in a cool, dry environment.
- **NEVER** use any powder or other components that are not clearly identified. Guessing powder types by appearance will result in disaster! If you aren't sure, don't load with it.
- **NEVER** use powder reclaimed from pulled ammunition or blank rounds.
- To preserve quality and correct identification, **ALWAYS** return unused powder from your measure to its original container when you finish loading.
- **NEVER** discard waste powder in your trash. Destroy old or discarded powders according to manufacturer's directions only.
- **ALWAYS** reduce charges 10% and work up slowly whenever you change lots of a given powder. Many powders can vary considerably lot to lot. (EXCEPTION: Certain powders should not be used in reduced loads and are identified herein. Reduce these 3% to start.)
- Reloading components are hazardous when improperly handled. **PROTECT CHILDREN AND OTHERS FROM INJURY OR DEATH** by securing all components from unauthorized access.