D47   A Classification System and Identification Key for .177 Caliber Pellets

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After attending this presentation, the participant will understand: 1) the variety of .117 caliber air gun pellets styles available; 2) the procedure for classifying .117 caliber air gun pellets based on class characteristics; and 3) the advantages and disadvantages of identifying .117 caliber pellets based on class characteristics.

This presentation will demonstrate the development of a classification system that can be incorporated into the forensic laboratory to aid in the investigation and identification of pellet brands.

The purpose of this presentation is to present the results of a .117 caliber pellet classification system for identifying different brands of pellets based on their class characteristics.

In some cases, a pellet recovered from the crime scene may assist investigators by identifying the product brand. Even though all product brands cannot be identified, various brands of pellets can be eliminated based on the pellet's class characteristics.

An examination of 68 pellets from fifteen companies was conducted to determine if the brand of an unidentified pellet could be identified based on the pellet's class characteristics. The pellet producers were from China, Czech Republic, England, Korea, Spain, and the United States.

The five class characteristics used in the pellet classification system were the pellet's head shape, skirt type, length, weight and other markings or observations. The last characteristic was used to distinguish pellets with similar head style, skirt type, length and weight measurements.

The first division in the pellet classification was pellet head shape. These included: domed or round, wadcutter, pointed, and hollow point. Of the 68 pellets examined, 24 (35%) were domed or round; 21 (31%) were wadcutter; 17 (25%) were pointed; and six (9%) were hollow points.

The second division in the pellet classification was based on the skirt type. Pellet skirts were either plain or ribbed. Of the pointed pellets, 14 (82%) were plain and three (18%) ribbed. The domed pellets were 16 (66%) plain and eight (33%) ribbed; the wadcutters were 20 (95%) plain and one (5%) ribbed. None of the hollow pointed pellets was ribbed.

The third division was based on the pellet's length. Ten pellets from each of the 68 types were measured with dial calipers to determine the average length of each pellet type. Pellets were grouped according to similar lengths but placed in separated categories when the length dimension exceeded .010 inches. The length for all pellets ranged from .199 to .392 inches.

The fourth category used to separate the pellets was weight. Ten pellets from each of the 68 types were weighed with a digital scale to determine the average weight for each pellet type. The weight for all pellets ranged from 7.0 to 18.2 grains.

The last category used to separate the pellets was other observations. These observations included whether the pellet had a visible seam on the side of the pellet. Pellets may be a non-diabolo style. They may have rings around the head or be manufactured out of plastic or metals other than lead. Also, they may have a coating.

Symbols used in the classification system for pellet head type were "P" for pointed, "D" for domed, "W" for wadcutter, and "H" for hollow point. Symbols for pellet skirt type were "P" for plain and "R" for ribbed. The length of the pellet was recorded in thousandths of an inch and the weight was recorded in grains. Markings and observations were noted in parenthesis. The class characteristics were separated by dashes in the classification system. For example P - P - .298 - 11.5 - (3-ring head) indicates a pointed pellet with a plain skirt that is .298 inches in length, weighs 11.5 grains and has three rings on its head. An identification key was made using the symbols so that when a recovered pellet is classified it may be checked against the 68 known types. This is not an absolute pellet identification system; however, it provides possible product identification of some pellets for the investigator. The system can also eliminate numerous pellet brands.

After classification, the domed pellets were subdivided into four groups. Group I contained seven pellet types; group II, five pellet types; group III, four pellet types; and group IV, eight pellet types. The wadcutter pellets were subdivided into five groups. Group I had seven pellet types; group II, ten pellet types; group III, two pellet types; group IV, one pellet type; and group V, one pellet type. The pointed pellets were subdivided into four groups. Group I contained four pellet types; group II, seven pellet types; group III, three pellet types; and group IV, three pellet types. The hollow point pellets were subdivided into four groups. Group I contained three pellet types; group II, one pellet type; group III, one pellet type; and group IV, one pellet type.

In conclusion, after subdividing the pellets, the largest category was the wadcutter type. This subdivision contained ten (17%) of the pellets. Even though individual pellets could not be identified in this wadcutter group 58 (83%) of the other pellet types could be eliminated. The smallest category was the hollow point pellets. This subdivision contained seven (10%) of the pellets. Of the 68 pellets examined 12 (18%) had unique class characteristics that permitted individual identification based on visual comparison with known pellets. Of the

pellets with unique class characteristics, three were domed, three wadcutter, five pointed and one was a hollow pointed pellet. The pellet classification system and identification key would assist investigators in the identification of some pellet brands and the elimination others.

Air gun, Pellet, Class Characteristics