

National Institute of Standards and Technology

Bag on Valve Meeting

Gaithersburg, MD

January 9, 2014



Introduction

Hank Picken

President & CEO Beaumont Products, Inc.

- ❖ Over 40 years of Consumer Products Industry Experience
 - Unilever
 - Pfizer
 - Colgate Palmolive

- ❖ Aerosol Experience - Marketing
 - Pfizer (Barbasol – Shave Cream)
 - Colgate Palmolive (Nordika – Personal Deodorant)

- ❖ Manufacturing & Marketing
 - AMREP – Specialty Chemicals (I & I)

About Beaumont Products, Inc

- Manufacturer & Marketer of Natural Consumer Products since 1991
- Produce and ship approximately 1 MM Bag-on-Valve (BOV) containers per year – mostly under the *Citrus Magic* brand name
- Significant Presence in the Natural Products Industry
- Pioneered non-aerosol delivery systems (natural positioning)
 - Excel/Atmos
 - Hans Stoffel
 - CCL
- Aligned with the “BOV Group”
- Not members of, nor are we represented by, the Aerosol Products Division of the CSPA (Consumer Specialty Products Association)
- We do not support the January 22, 2013 CSPA/NAA proposal on this subject requiring BOV’s to declare both weight & volume



Presentation Outline

- I. Objectives:
 - a. Meeting Invitation
 - b. Beaumont's Objectives

- II. Definitions of Pressurized Packaging - Aerosols and Barrier Packages

- III. Major Differences Between Aerosols and BOV's

- IV. FTC Guidelines on Comparative Advertising

- V. Labeling Requirements

- VI. Summary and Recommendations

Objectives (As stated in the meeting invitation)

- To provide a recommendation on the method of sale for labeling the net quantity of products sold using BOV technology and how products using BOV technology should be classified.
- There is a requirement in the Uniform Packaging & Labeling Regulations (UPLR) that the net quantity on aerosol packages and similar pressurized containers be labeled in terms of net weight.
- Another provision in the UPLR states that “any net content statement that does not permit price and quantity comparison is forbidden”.
- Products using BOV technology versus traditional aerosol *products* cannot be easily distinguished when placed side by side, creating a challenge when consumers attempt to make value comparisons when the two different methods of sale (i.e. weight and volume) are used.”

Objectives – Beaumont Products

- BOV's should be easily distinguishable, by consumers, from Aerosols.
- Properly define a BOV package as a Non-Aerosol container to clearly communicate the differences between Aerosols and BOV's so that consumers can **easily distinguish** between BOV's and Aerosols.
- Clearly communicate the “dispensable” content of a BOV container to consumers, while emphasizing the differences between BOV's and Aerosols
- It is therefore recommended that BOV's be labeled - **“Non-Aerosol, Pressurized BOV Spray Container”** *(Provided that only inert, non-flammable/non-combustible gas is used and that no gas is introduced into the bag with the payload)*
- And that net (dispensable) contents continue to be declared in fluid ounces (mL's) to clearly communicate the “dispensable” contents of a BOV, further emphasizing the differences between BOV's and Aerosols. *(Please Note - the EU requires liquid fill declaration for both Aerosols and BOV's).*



Video 1 - Aerosol vs BOV.mp4

Definitions of Pressurized Packaging

Aerosols:

From Hawley's Condensed Chemical Dictionary:

“A suspension of liquids or solid particles in a gas, the particles often being in the colloidal size range. Fog and smoke are common examples of natural aerosols, fine spray (perfumes, insecticides, inhalants anti-perspirants, paints, etc.) are man-made.”

From Merriam-Websters Dictionary:

“A suspension of fine solid or liquid particles in gas <smoke, fog, and mist are *aerosols*>; *also plural* : the fine particles of an aerosol”

From Consumer Research⁽¹⁾:

“A pressurized can, containing a mixture of gas and product (payload) that is sprayed by pressing the button (actuator). The sprayed product is thus diluted with gas”.

Note : (1) Consumer Market Research Project conducted by the Atlantis Group in Atlanta, Georgia in June of 2012

Definitions of Pressurized Packaging

Differences between Aerosols and “Barrier” Packages:

- There are two broad classifications of Pressurized Packaging Systems:
 - **Aerosols**
 - **Barrier Packages**
- Aerosols are pressurized containers in which the product (pay-load) is mixed with gas in the container and when product is dispensed from an aerosol; both the product and gas are expelled, simultaneously.
- Barrier Packages are designed to separate the product from the gas inside the container so that when the product is dispensed from a barrier package only the product is expelled, while the gas remains in the package and is never mixed with the product.
- There are several types of barrier packages and BOV is one of them. Other barrier packages have been described as “Piston” packages and others as “Metal Box” packages. All three Barrier Packages - BOV’s, Pistons and Metal Boxes share the same feature of separating product from gas, both inside and outside of the container.

Packages Using BOV Technology Are Non-aerosol by Definition

- “There are a number of products in the marketplace bearing quantity statements in terms of fluid measure that utilize the BOV technology. Packages using BOV technology are non-aerosol by definition because the propellant is not dispensed with the product. “

Consumers Cannot Compare Price and Quantity

- “Consumers cannot do price and quantity comparison between product packaged using BOV technology and similar product in aerosol packaging because the aerosol packaged product includes the propellant in the net weight and the propellant is dispensed with the product.”

The Southern Weights and Measures Association (SWMA) - SWMA Laws and Regulations Committee, 2013 Annual Final Report, Maxwell Gray, Chairman, Florida Weights and Measures, October 6-9, 2013 Charleston, WV

Major Differences

#	List of Major Differences
1	QC Checks – Content Confirmations
2	Mixing of Gas and Payload
3	Propellants
4	Percent of Declared Weight as Propellant
5	DOT – Council on Safe Transportation of Hazardous Articles Requirement (COSTHA) Water Bath
6	NFPA #58 (National Fire Protection Association) Gas House Requirements
7	Natural Products Industry Acceptance
8	Health Care Industry Acceptance
9	Consumer Perceptions

Major Differences

1 – QC Checks (Content Confirmation)

Aerosols

- Cannot measure dispensed product, only measure fill (Net Weight).

BOV

- Easily measure “dispensable” liquid content



Video 2 - BOV Protocol Applied to BOV.mov



Video 3 - BOV Protocol Applied to Aerosol.mov

Major Differences

#2 – Mixing of GAS and Payload

Aerosols

The propellant (gas) is mixed with the payload and is dispensed with the product.

BOV

Product is separated from the gas inside the container. Only the product is dispensed ... the gas (ambient air) remains in the package.

Major Differences

#3 – Propellants

Aerosols

- Typically use LPG's (Liquefied Petroleum Gases) which are VOLATILE hydrocarbons, typically propane, n-butane and isobutene

BOV

- Typically use INERT gas – either ambient air or nitrogen

Major Differences

#4 – Percent of Declared Weight as Propellant

Aerosols

- Typically gas contributes 33% of the declared net weight of the product

BOV

- Does not declare the gas as part of the Net Contents
- Note: Ambient air, compressed in a filled BOV represents 0.7 grams or 0.3% of the weight of the filled package.

Percent of Declared Weight as Propellant

- Aerosol “norm” is 33% weight of Gas, there are many applications which are much higher!
- “Aerosol solutions have been used to make foot preparations, local anesthetics, spray on protective films, anti-inflammatory preparations and aerosols for oral and nasal applications. They contain **50 to 90%** for topical aerosols and up to **99.5%** propellant for oral and nasal aerosols ... “

Source: The Pharmaceutics and Compounding Laboratory, University of North Carolina Eshelman School of Pharmacy.

- “In aerosol spray paints...the percentage of propellant could be as high as **50%**. In room foggers, the percentage of propellant can be **85%**, or more.”

Source: The Science and Practice of Pharmacy – David B. Troy, Paul Beringer

Major Differences

#5 – DOT Council on Safe Transportation of Hazardous Articles Requirement (COSTHA) Water Bath

Aerosols

- Must pass through a “hot water bath” (130° F) to test for “over-pressurized” cans to protect common carriers
- Burst test

BOV

- Hot Water Bath Exemptions

- The structure of the bag hanging inside the can replicates a thermos bottle and the payload is difficult to heat.
- Inert Gas will not expand significantly and heat will not burst cans.

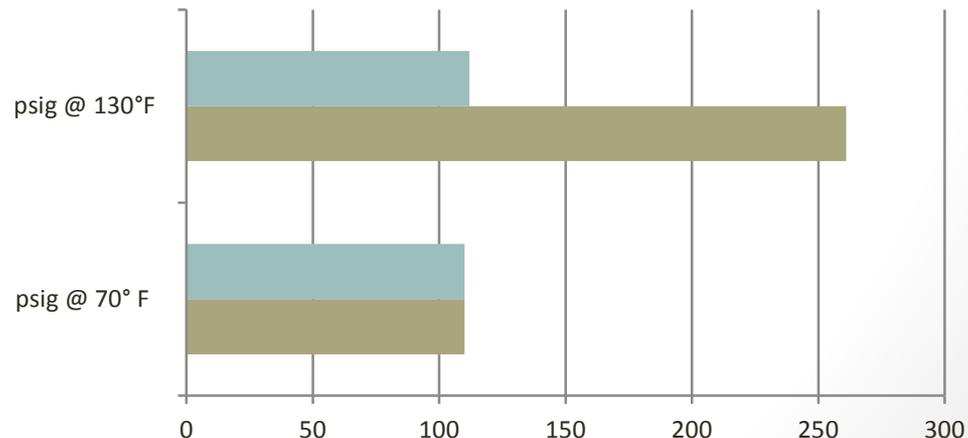
For Example:

Propane Charged Aerosol

110 psig @ 70° F
261 psig @ 130° F

Ambient Air Charged BOV

110 psig @ 70° F
112 psig @ 130° F



Major Differences

#6 – NFPA #58 (National Fire Protection Association) Gas House Requirements.

Aerosols

- Must be “gassed” or “charged” in a “gas-house” to contain (or isolate) a potential explosion to protect production personnel from Fire and/or Explosion
- Gas House Required Specifications:
 - a. Construction
 - b. Ventilation
 - c. Gas Detection
 - d. Suppression (Fenwal – Oxygen Scavenger)
 - e. Grounded Electrical System

BOV

- No gas house required - inert gases do not present an Explosion risk

Major Differences

#7 – Natural Products Industry Acceptance

Aerosols

- Rejected – “Non-Natural” Propellants (Typically Hydrocarbons)

BOV

- Accepted by the Natural Products industry and in distribution

Major Differences

#8 – Health Care Industry Acceptance

Aerosols

- Cannot use around oxygen equipment

BOV

- Acceptable around oxygen equipment

Sample guidelines:

- “Do not used aerosol sprays Because they may spontaneously burn (ignite more readily) in an oxygen-enriched environment”
- (ACCE) Healthcare Technology Foundation
- (IRS) Independent Respiratory Services, Inc.
- (NAMDRC) The National Association for Medical Direction of Respiratory Care

Major Differences

#9 – Consumer Perceptions. The consumers' purchase decision to buy a BOV instead of an Aerosol is based on real (and perceived) differences between two packaging systems

Positives that Aerosols & BOV's Share:

- Convenient
- Light Weight.
- Easy to Use
- Targeted Spray
- Even Distribution
- Less Messy than Other Packages
- Quick Application
- Good, Even Coverage

Perceived Negatives of Aerosols (Not Shared by BOV's):

- Harmful to the environment
- Contains CFC's
- Bad for the Ozone Layer
- Highly Flammable
- Harmful to Breathe
- Hazardous to Inhale
- Causes Respiratory Problems
- Puts Toxic Fumes into the Environment
- Causes Allergic Reaction (Asthma Attacks)
- Contains Many Chemicals
- Noisy, High-Powered Spray
- Less "Product" in the Can
- Expensive – Aerosols Charge for Product & Propellant
- Not Appropriate for Food Related Use

FTC Guidelines on Comparative Advertising

From a “Statement of Policy Regarding Comparative Advertising” FTC (August 13, 1979):

- “(Advertisers should not be restrained) from making truthful and non-deceptive statements that a product has certain desirable properties or qualities which a competing product or products do not possess”.
- “Such a comparison may have the effect of disparaging the competing product, but we know of no rule of law which prevents a seller from honestly informing the public of the advantages of its products as opposed to those of competing products.”
- “Industry codes which restrain comparative advertising in this manner are subject to challenge by the Federal Trade Commission”.

Aerosol Content Exception

- Industry Practice is to disclose “Contents” (in either fluid or weight measure) which can be dispensed from the container.
- From Fair Packaging and Labeling Act, Paragraph 500.7:
“... The net quantity of contents statement shall be in terms of fluid measure if the commodity is liquid, or in terms of weight or mass if the commodity is solid, semi-solid, or viscous or a mixture of solid and liquid.”
- From the NIST Handbook 130 - Section 10.3:
“The declaration of a quantity on an aerosol package and on a similar pressurized package shall disclose the net quantity of the commodity (including propellant), in terms of weight, that will be expelled when the instructions for use as shown on the container are followed.”
- **BOV’s do not need the Aerosol “exemption” because dispensed content be easily measured. The liquid/fluid declarations should continue to apply.**

Summary

There are many differences between Aerosols and BOV's:

- Ability to Measure Dispensable Product
- Mixing of Gas and Payload
- Propellants
- Weight of Propellants
- Hot Water Bath – DOT Requirement

- Gas House Requirement
- Natural Products Industry Acceptance
- Health Care Industry Acceptance
- Consumer Perceptions

- We have a right (and obligation) , per FTC guidelines concerning comparative/competitive advertising) to clearly communicate these differences to consumers.
- Because dispensed liquid content can easily be measured, BOV's do not need the Aerosol exemption.
- To use net weight as the measure of net contents in a BOV could potentially mislead consumers into believing that the weight of the compressed air is part of the product.
- To use net weight, as Aerosols do, blurs the differences between BOV's and Aerosols.

Recommendations

Require the BOV to clearly communicate the differences between a BOV and an Aerosol by labeling each package as

- **“Non-Aerosol, Pressurized BOV Spray Container”** (Provided that only inert, non-flammable/non-combustible gas is used and that no gas is introduced into the bag with the payload)
- Net (dispensable) contents continue to be declared in fluid ounces (or mL’s), *as Beaumont Products has declared for over 20 years*, to clearly communicate the “dispensable” contents of a BOV, further emphasizing the differences between BOV’s and Aerosols.

Thank You!

Back-Up

Burst Pressure Test

7oz Can Burst Pressure Test

Date: 1/2/2013

Product	Pressure before oven/psi	Pressure after 1 hour in oven/psi	Pressure after 8 hours in oven/psi	Pressure next day at room temp./psi
Blend	106	107	107	104
	101	104	106	103
	98	102	104	101
	105	108	110	107
	105	108	110	107
Orange	110	111	115	110
Tested by	MC	MC	Tested by QC at 9:30pm	MC



REPORT ON AEROSOLS

The following represents consumer playback from a discussion on aerosols, which was part of a focus group project conducted by The Atlantis Group in Atlanta, GA on June 7, 2012.

Definition of an Aerosol:

A pressurized can, containing a mixture of gas and product (payload) that is sprayed by pressing the button (actuator). The sprayed product is thus diluted with gas.

Negative Comments About Aerosols:

- Harmful to the environment
- Contains CFC's
- Bad for the ozone layer
- Highly flammable
- Harmful to breath
- Hazardous to inhale
- Causes respiratory problems
- Puts toxic fumes into the environment
- Causes allergic reaction ... asthma attacks
- Contains a bunch of chemicals
- Noisy, high-powered spray
- Less "product" in the can
- Expensive – aerosols charge for product & propellant
- "Potentially causes cancer"
- Not appropriate for food related uses due to small particles in the propellant

Positive Comments about Aerosols:

- Convenient
- Light weight
- Easy to use
- Targeted Spray
- Even Distribution
- Less messy than other packages
- Quick application
- Good even coverage

CSPA/NAA Proposed Revision

CSPA/NAA Proposed Revisions To NIST Handbook 130 - 2012

Provisions Related to Aerosols and Similar Pressurized Containers

6.3. Net Quantity. – A declaration of net quantity of the commodity in the package, exclusive of wrappers and any other material packed with such commodity (except as noted in Section 10.3. Aerosols and Similar Pressurized Containers), shall appear on the principal display panel of a consumer package and, unless otherwise specified in this regulation (see Sections 6.6. through 6.9. Prescribed Units), shall be in terms of the largest whole unit.

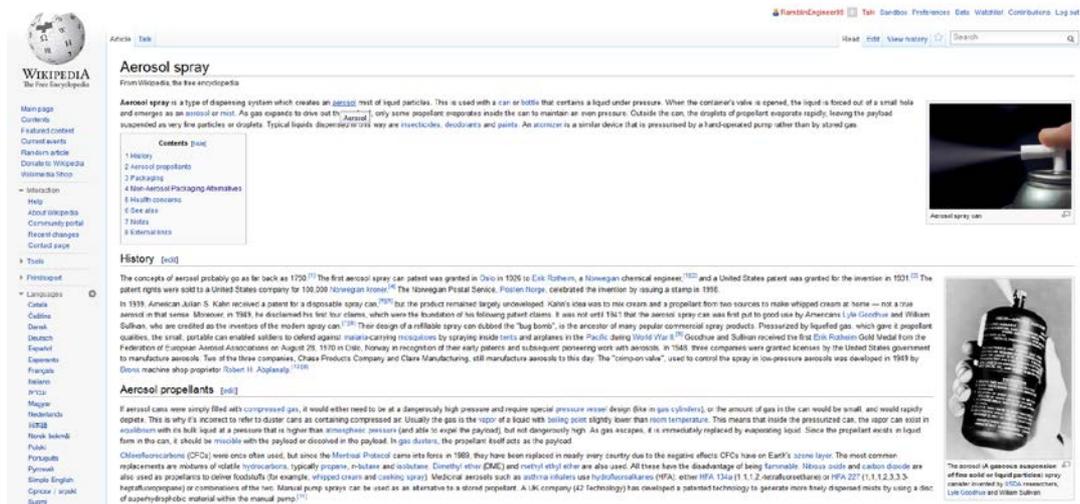
(...)

10.3 Aerosols and Similar Pressurized Containers - The declaration of quantity on a pressurized container shall disclose the net quantity of the commodity (including delivered propellant), in terms of weight, that will be expelled when the instructions for use as shown on the container are followed.

10.3.1 Pressurized Containers which utilize Bag-on-Valve (BOV) technology or similar technology that does not expel the propellant shall be permitted to disclose the net quantity in terms of both net weight and net volume. This option allows consumer value comparison with various other product delivery forms that may be either net weight or net volume.

Wikipedia

- https://en.wikipedia.org/wiki/Aerosol_spray



The screenshot shows the Wikipedia article for "Aerosol spray". The article text is partially visible, starting with "Aerosol spray is a type of dispensing system which creates an aerosol mist of liquid particles. This is used with a can or bottle that contains a liquid under pressure. When the container's valve is opened, the liquid is forced out of a small hole and emerges as an aerosol or mist. As gas expands to drive out the aerosol, only some propellant evaporates inside the can to maintain an even pressure. Outside the can, the majority of propellant evaporates rapidly, leaving the payload suspended as very fine particles or droplets. Typical liquids dispensed in this way are insecticides, deodorants and paints. An atomizer is a similar device that is pressurized by a hand-operated pump rather than by stored gas."

The article also includes a "Contents" table of contents, a "History" section, and an "Aerosol propellants" section. There are two images: one showing a hand spraying a can and another showing a can of aerosol propellant.

Non-Aerosol Packaging Alternatives [edit]

By definition, aerosol sprays release their propellant during use. [12][13]

Some non-aerosol alternatives include:

- Packaging that uses a piston barrier system by CCL Industries or EarthSafe by Crown Holdings is often selected for highly viscous products such as post-foaming hair gels and sealants. The main benefit of this system is that it eliminates gas permeation and assures separation of the product from the propellant, maintaining the purity and integrity of the product. This system also provides a consistent flow rate with minimal product retention.
- Another type of dispensing system is the bag-on-valve system where the product is separated from the propellant in a laminated pouch, which maintains complete formulation integrity so only pure product is dispensed. Among its many benefits, the bag-in-can system extends a product's shelf life and allows for a non-chilling discharge. This bag-in-can system is used in the packaging of pharmaceutical, industrial, household, pet care and other products that require complete separation of the product from the propellant.
- A new development is the 2K (two component) aerosol. A 2K aerosol device has main component stored in main chamber and a second component stored in an accessory chamber. The two components mix. The 2K aerosol can has the advantage for delivery of reactive mixtures. For example, 2K reactive mixture can use low molecular weight polymer to make final cross-linked high molecular weight polymer. 2K aerosol can increase solid contents and deliver high performance polymer products, such as curable coatings.