

Central Weights & Measures Association

Annual Meeting

May 3 – 6, 2009

St Louis, MO



Norman Peiffer

Cob Products Division, Maumee, OH

WHICH WEIGHS MORE?

A Pound of Feathers

Or

A Pound of Iron



WHICH HAS MORE VOLUME?

A Pound of Feathers

Or

A Pound of Iron



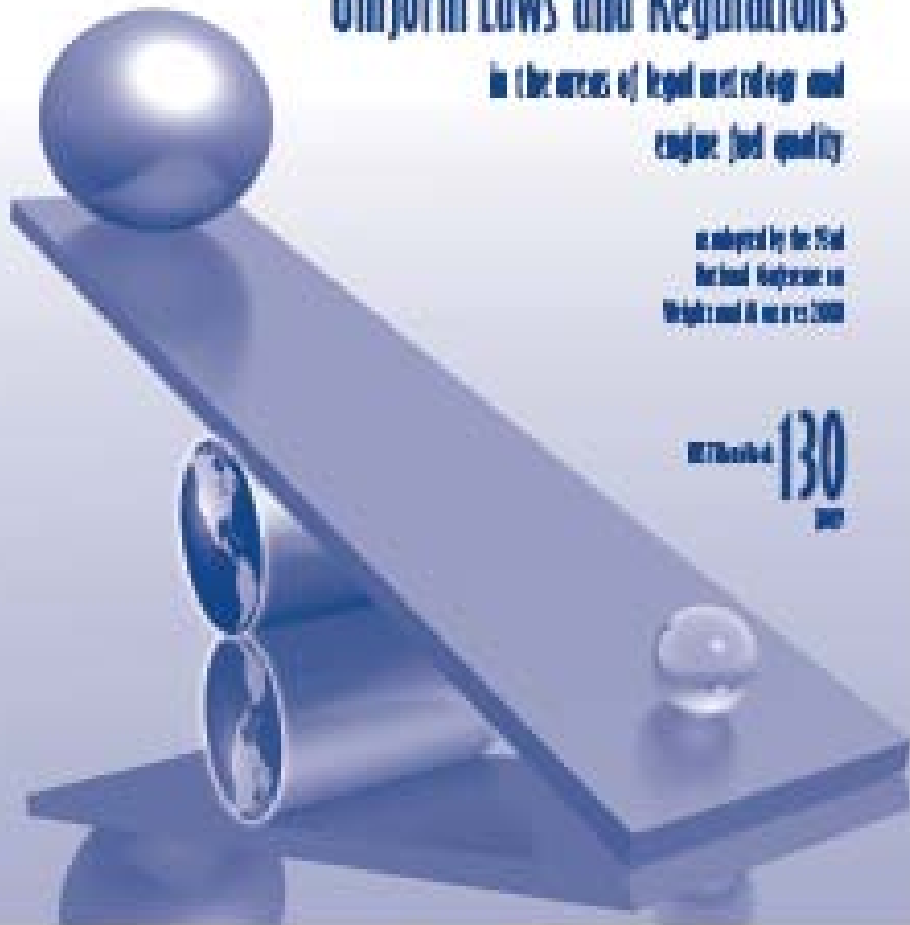


NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

Uniform Laws and Regulations in the areas of legal metrology and engine fuel quality

developed by the 15th
Interim Conference on
Weights and Measures 2000

130
mm



**The concept of
WEIGHT vs VOLUME
is portrayed on the
NIST handbook cover**

**On the teeter totter, the rather small
marble has more weight than the
much larger ball. However, their
volumes are just the opposite!!**



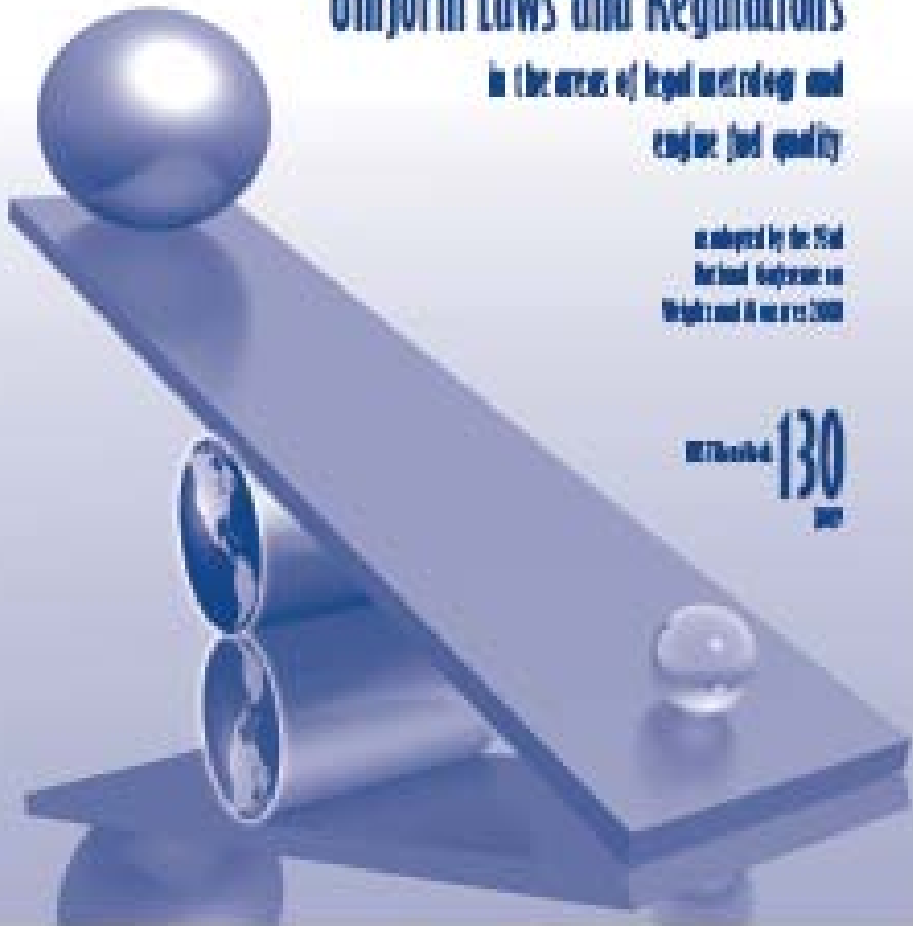
NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

Uniform Laws and Regulations

in the areas of legal metrology and
engine fuel quality

as adopted by the 25th
National Conference on
Weights and Measures 2008

effective **130**
2009



2.23. Animal Bedding. – Packaged animal bedding of all kinds, except for baled straw, shall be **sold by volume**, that is, by the cubic meter, liter, or milliliter and by the cubic yard, cubic foot, or cubic inch. If the commodity is packaged in a compressed state, the quantity declaration shall include both the quantity in the compressed state and the usable quantity that can be recovered.

Example: 250 mL expands to 500 mL (500 in³ expands to 1000 in³).

(page 126)

Agricultural Products Have a Wide Density per Cubic Foot

Loose Density (Per Cubic Foot)

Saw dust & Wood Shavings* 10 to 25 lbs (species dependent)

Corn Cob
1/4" Bedding 20 to 27 lbs
1/8" Bedding 26 to 33 lbs

Paper fluff

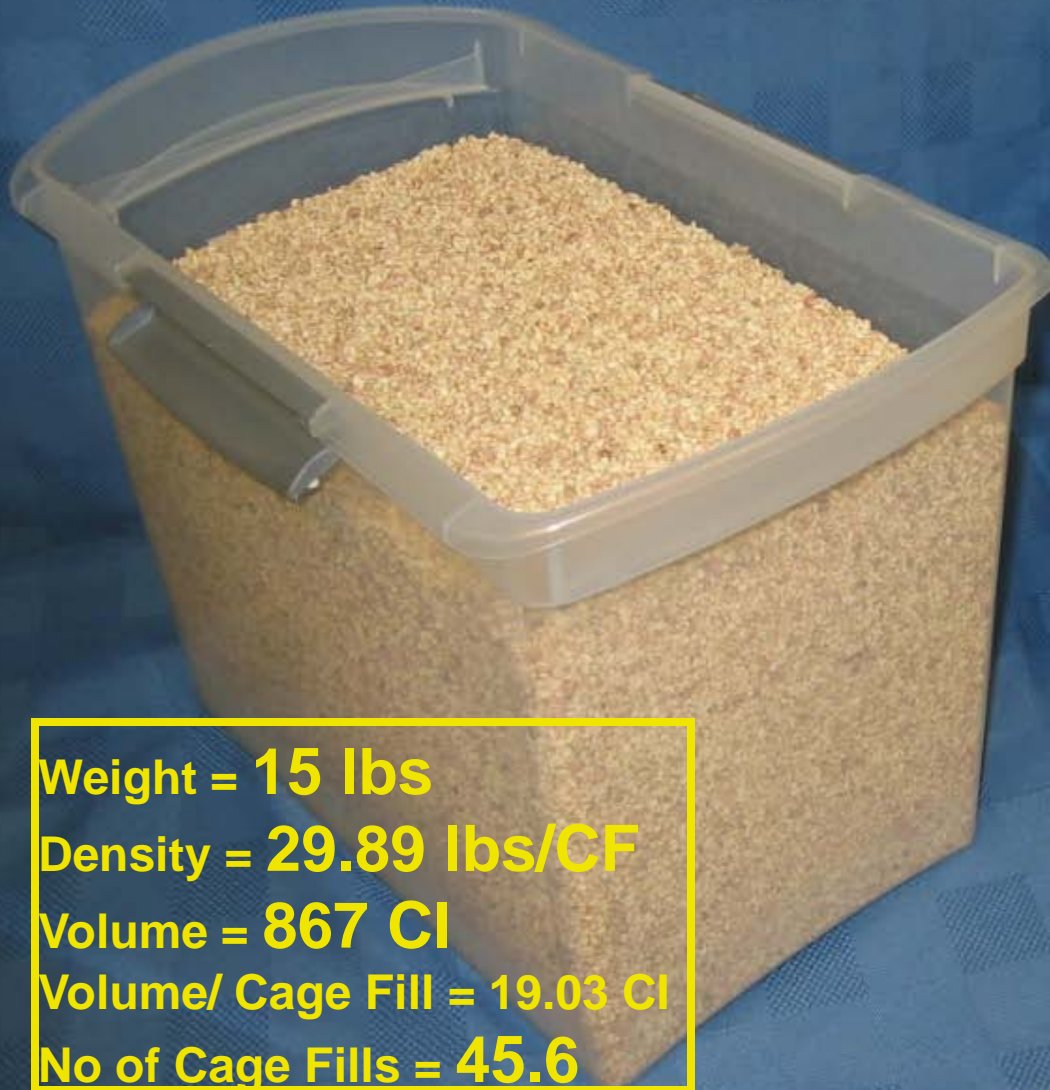
Density when Compressed (per Cubic Foot)

Pellets

Sawdust 32 to 45

Corn Cob 36 to 45

IMPACT OF WEIGHT vs VOLUME MEASURE



Research Animal Bedding Filled by Volume not by Weight
Cages are filled to ¼” depth (typical)



Making the Switch – Educating Bedding Users

bed-o'cobs

Speaks
Volume
Volume
Volume
Volume
Volume
Volume
Volume
Volume
Volume

How We Calculate Cage Fill Amounts for Bedding

We know that cage sizes vary by manufacturer. So for our example, a "standard" shoe cage measured at the bottom of the cage is 10.5" x 7.25".

Plug in your cage size to the formula to determine your cage fill amount.

$$10.5" \times 7.25" = 76.125 \text{ square inches}$$

Multiply 76.125 by the recommended depth required to fill the cage with bedding. We recommend 1/4 of an inch or .25 bedding per cage.

$$76.125 \times .25 = 19.03 \text{ cubic inches}$$

19.03 cubic inches is the volume of bedding required to perform the proper working action and control, provide proper working action and maintain proper cage conditions. Always use the maximum layer rates shown. Always use the water portion of the urine back into the air.

How We Calculate The Number of Cage Fills Per 1.25 Cubic Foot Bag

The Andersons bedding is packaged in 1.25 cubic foot bags, filled by volume.

1.25 x 1728 (the number of cubic inches in a cubic foot) = 2,160 cubic inches per bag

Divide 2,160 by 19.03 = 113.50

113.50 is the number of cage fills that equated to fill a shoe box volume bag.

113.50 is the number of cage fills that equated to fill a shoe box volume bag.

We're aware that not everything works perfectly when changing a cage. Because of this, we have incorporated a 5% buffer of 2.25% to our 1.25 cubic foot bags provide!

The Andersons quality line of bedding products work best when used at the recommended 1/4" depth.

Facilities that use second bedding products typically add more bedding per cage than recommended 1/4" depth.

This can result in wasted product and cost!

bed-o'cobs
Innovative Bedding Products
990-324-2251, ext. 6222
FAX 419-891-6330
www.bedocobs.com

The Andersons
The Andersons Inc.
P.O. Box 118
Miamine, OH 43041
1-800-324-2251
Fax 419-891-6330

CAGE FILL COST PER COB DENSITY (WEIGHT PER CUBIC FOOT)

DENSITY PER CUBIC FOOT	BAG WEIGHT SOLD BY WGT	
	40	40
Bedding Volume per bag (CUBIC FEET)	26	30
One cubic foot is 1728 cubic inches (12 x 12 x 12)	1.54	1.33
Bedding Volume per bag (CUBIC INCHES)	1728	1728
SHOE BOX CAGE LENGTH (INCHES)	2658	2304
SHOE BOX CAGE WIDTH (INCHES)	11	11
SHOE BOX CAGE FILL DEPTH (INCHES)	7.09	7.09
Standard shoe box cage fill volume (CUBIC INCHES)	0.25	0.25
Number of cage fills per bag	19.50	19.50
COST PER BAG	136	118
COST PER FILL	\$ 10.00	\$ 10.00
	\$ 0.07	\$ 0.08

3D Bar Chart: CAGE FILLS PER BAG

Y-axis: No. of Fills (95 to 140)
X-axis: 1 (Current Bag), 2 (New Bag)
Bar 1: 136 fills per bag
Bar 2: 118 fills per bag

One-Quarter Inch BED-O'COBS		
	Current Bag	NEW BAG
	Weight Bag	Volume Bag
Weight per bag	40	
Bedding Volume per bag (CUBIC FEET)	1.90	1.25
One cubic foot is 1728 cubic inches (12 x 12 x 12)		1728
Bedding Volume per bag (CUBIC INCHES)	3291	2160
SHOE BOX CAGE LENGTH (INCHES)	11	11
SHOE BOX CAGE WIDTH (INCHES)	7.09	7.09
SHOE BOX CAGE FILL DEPTH (INCHES)	0.25	0.25
Standard shoe box cage fill volume (CUBIC INCHES)	19.50	19.50
Number of cage fills per bag	169	110.8
PLEASE ENTER CURRENT COST PER BAG HERE →	\$ 8.00	\$ 5.25 ← NEW COST PER BAG
Bedding cost per fill per bag	\$ 0.047	\$ 0.047
Comparing the Weight Bag to the Volume bag	Bags	Bags
PLEASE ENTER BAG USAGE Here →	500	762
Weekly Bag Expense	\$ 4,000.00	\$ 4,000.00
Total cage fills per week	84406	84406
CURRENT COST PER FILL →	\$ 0.047	\$ 0.047 ← NEW COST PER FILL

How We Calculate Cage Fill Amounts for Bedding

We know that cage sizes vary by manufacturer. So for our example, a typical "shoe box" mouse cage measured at the bottom of the cage is 10.5" x 7.25".



Plug in your cage size to the formula to determine your cage fill amount.

$10.5" \times 7.25" = 76.125$ square inches.

Multiply 76.125 by the recommended depth required to fill the cage with bedding. We recommend 1/4 of an inch or .25 bedding per cage.

$76.125 \times .25 = 19.03$ cubic inches.

19.03 cubic inches is the *volume of bedding required* to perform the function of ammonia control, provide proper wicking action and transpiration vapor rates which absorb urine, trap the ammonia crystal, then releases the water portion of the urine back into the air.

How We Calculate The Number of Cage Fills Per 1.25 Cubic Foot Bag

The Andersons bedding is packaged in 1.25 cubic foot bags, filled by volume.

$1.25 \times 1,728$ (the number of cubic inches in a cubic foot) = 2,160 cubic inches per bag.

Divide 2,160 by 19.03 = 113.50.
(19.03 is the number of cubic inches of bedding specified to fill a shoe box mouse cage).

113.50 is the number of cage fills that our 1.25 cubic foot bags provide!

We're aware that not everything works perfectly when changing a cage. Because of this, we have incorporated a shrink factor of 2.5% to arrive at our claim of 110.8 cage fills per bag.

The Andersons quality line of bedding products work best when used at the recommended 1/4" depth.

Facilities that use wood bedding products typically add more bedding per cage than is required to control ammonia. This can result in wasted product and cost!

Educating our Customer Base



bed-o'cobs®

Innovative Bedding Products

866-234-0505, ext. 6325
FAX 419-891-6539
www.bedocobs.com

The Andersons

The Andersons, Inc.
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Maumee, Ohio 43537

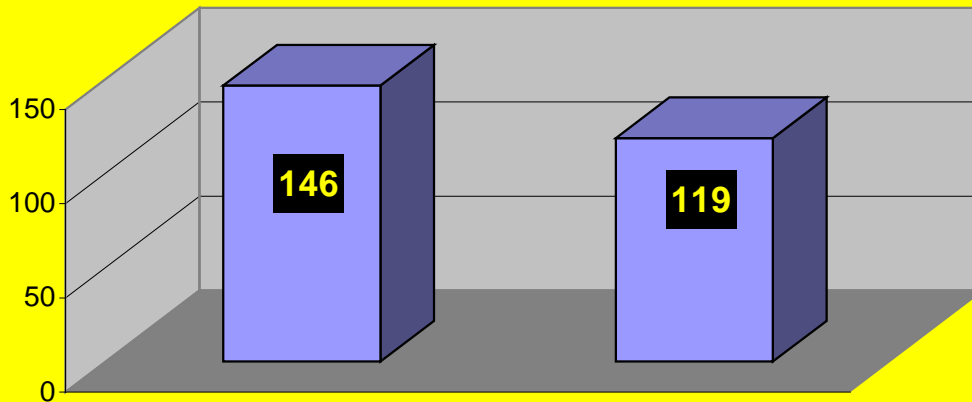
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COST PER FILL @ EQUAL BAG WEIGHTS WITH UNEQUAL PRODUCT DENSITY

	BAG WEIGHT	40	40
DENSITY OF BEDDING PER CUBIC FOOT		24.2	29.89
Bedding Volume per bag (CUBIC FEET)		1.65	1.34
One Cubic foot = 1728 inches (12" X 12" X 12")		1728	1728
Bedding volume per bag (CUBIC INCHES)		2856	2312.48
SHOE BOX CAGE LENGTH (INCHES)		11	11
SHOE BOX CAGE WIDTH (INCHES)		7.09	7.09
SHOE BOX CAGE FILL DEPTH (INCHES)		0.25	0.25
CAGE BEDDING FILL VOLUME (CUBIC INCHES)		19.50	19.50
Number of cage fills per bag		146	119
COST PER BAG	\$	10.00	\$ 10.00
COST PER FILL	\$	0.068	\$ 0.084

Cages	5000
Weeks	52
Cost Var	\$ 4,173.12

CAGE FILLS PER BAG



Cost per Fill Comparison

- Same bag Weight
- Same bag cost
- Higher cost per fill on higher density

One-Quarter Inch BED-O'COBS

	Current Bag	NEW BAG	
	Weight Bag	Volume Bag	
Weight per bag	40		
Bedding Volume per bag (CUBIC FEET)	1.90	1.25	
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Total cage fills per week	84406	84406	
CURRENT COST PER FILL →	\$ 0.047	\$ 0.047 ←	NEW COST PER FILL

Making the transition from weight to volume
and showing a consistent cost per fill

Cat Litter Pans are also filled by volume



Most cat litter manufacturers recommend using 2" to 3" of litter. I use 3" to 4", because my cats are all deep scratchers, and will dig all the way to the bottom of the litter box if I use less. Start with two inches and experiment until you find the ideal depth for your cat.*

*<http://z.about.com/d/cats/1/0/h/J/fillthebox.jpg>

WHICH HAS MORE WEIGHT?

A Pound of Feathers

Or

A Pound of Gold



THANK YOU!!

The 
Andersons