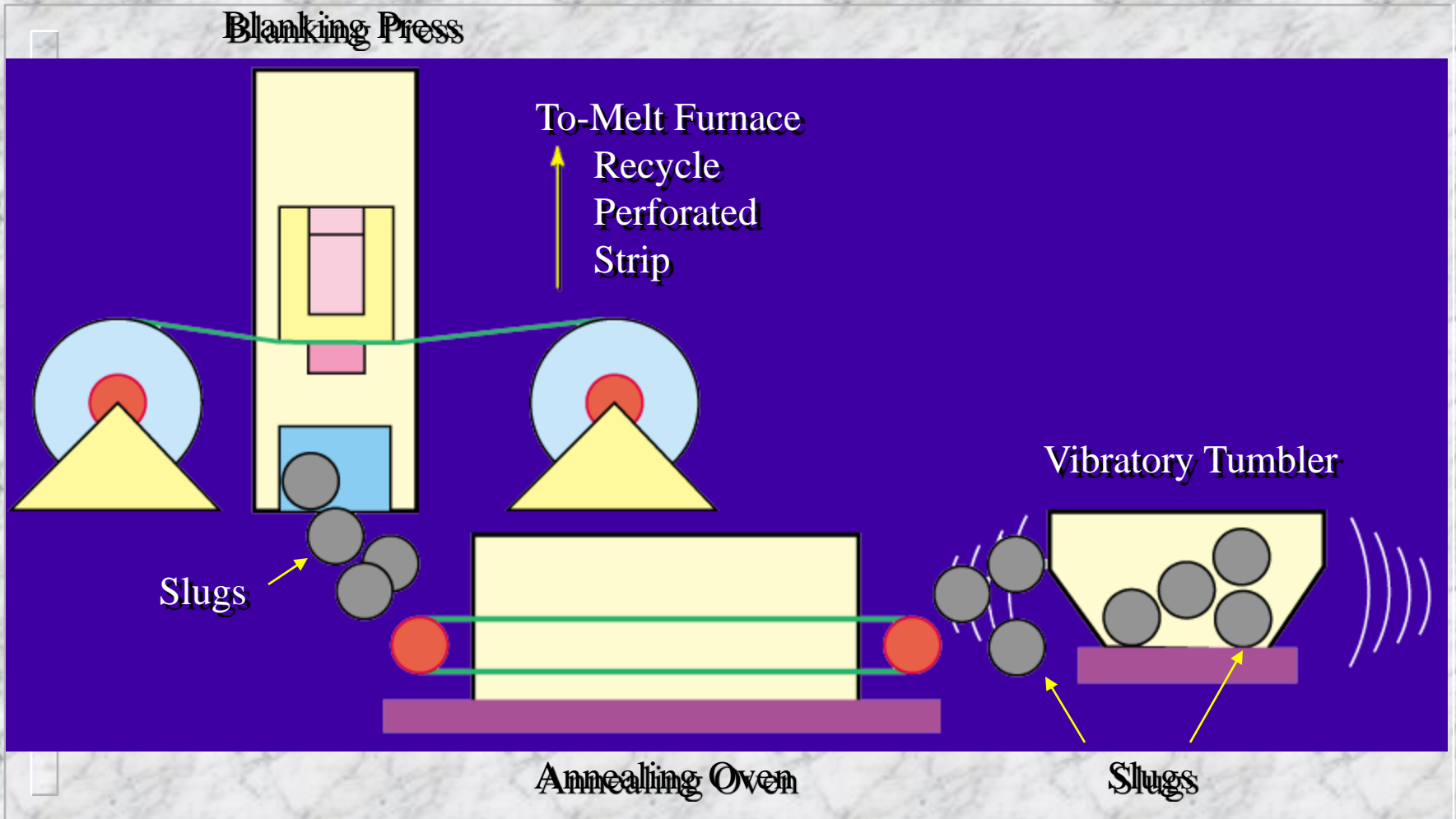


**ALUMINUM
IMPACT EXTRUSION
CAN MAKING**

Fred Spohr

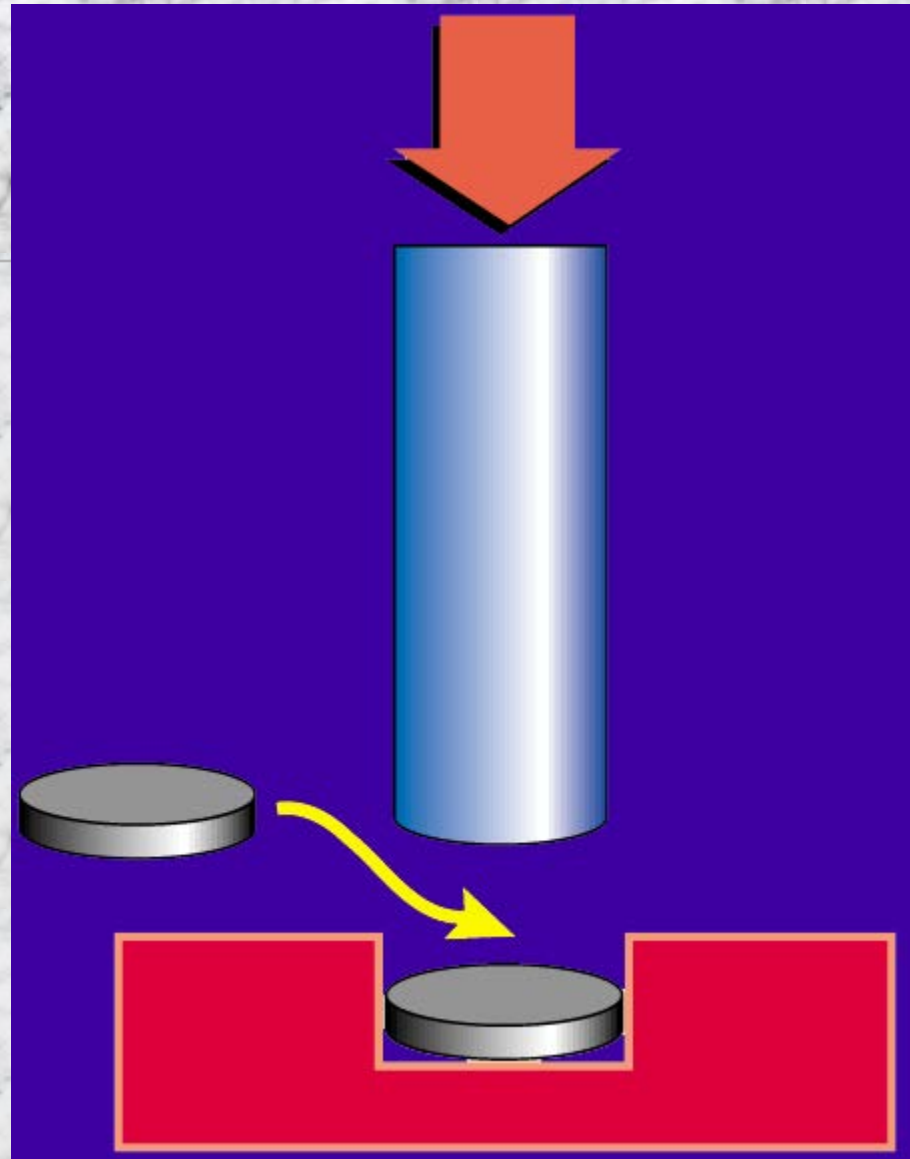
September 11, 2012

Slug Blanking



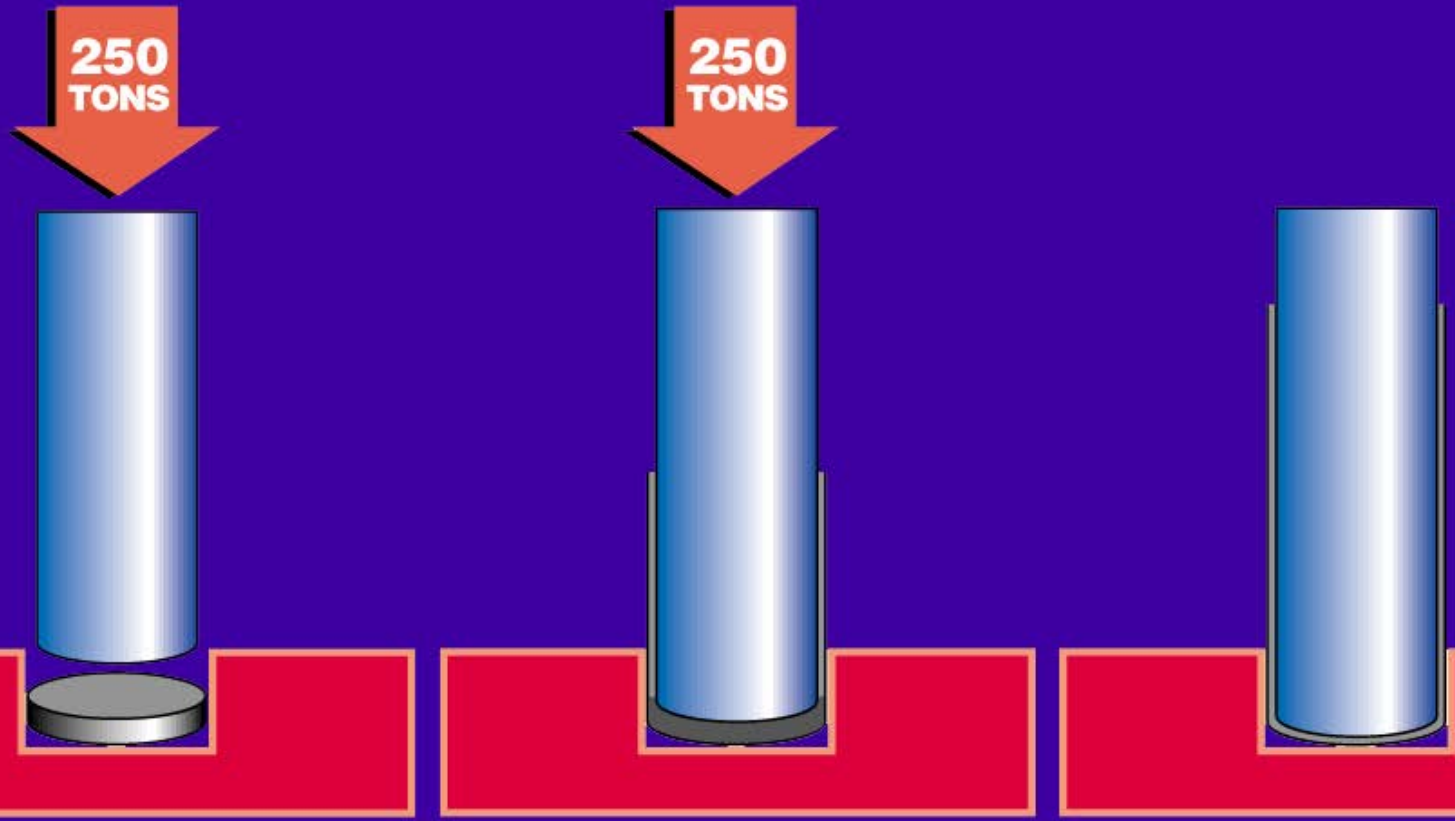
Impact

Extrusion



Slug inserted into die
under Punch Mandrel

Impact Extrusion

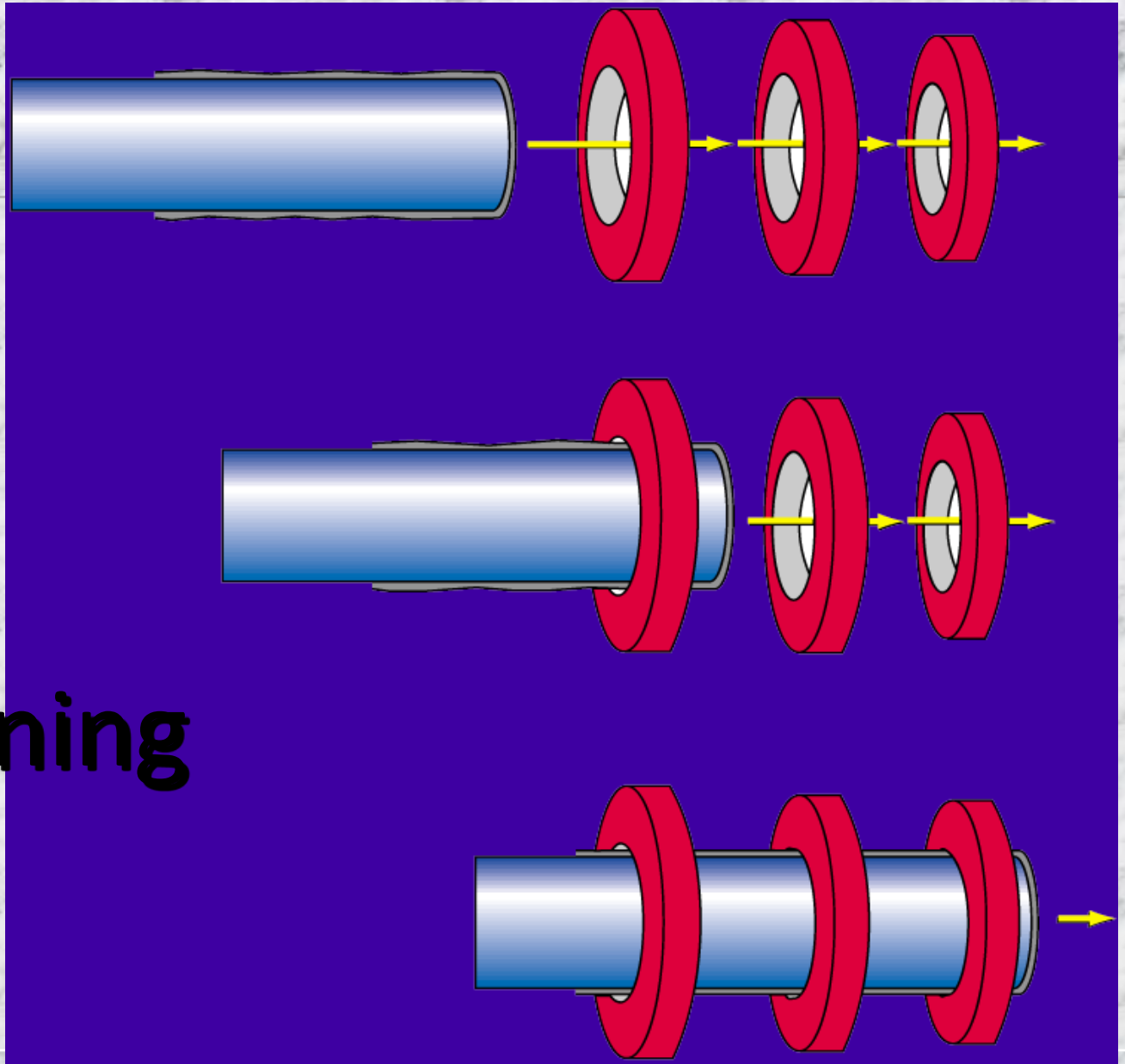


250 Tons of Force Applied through a Mandrel

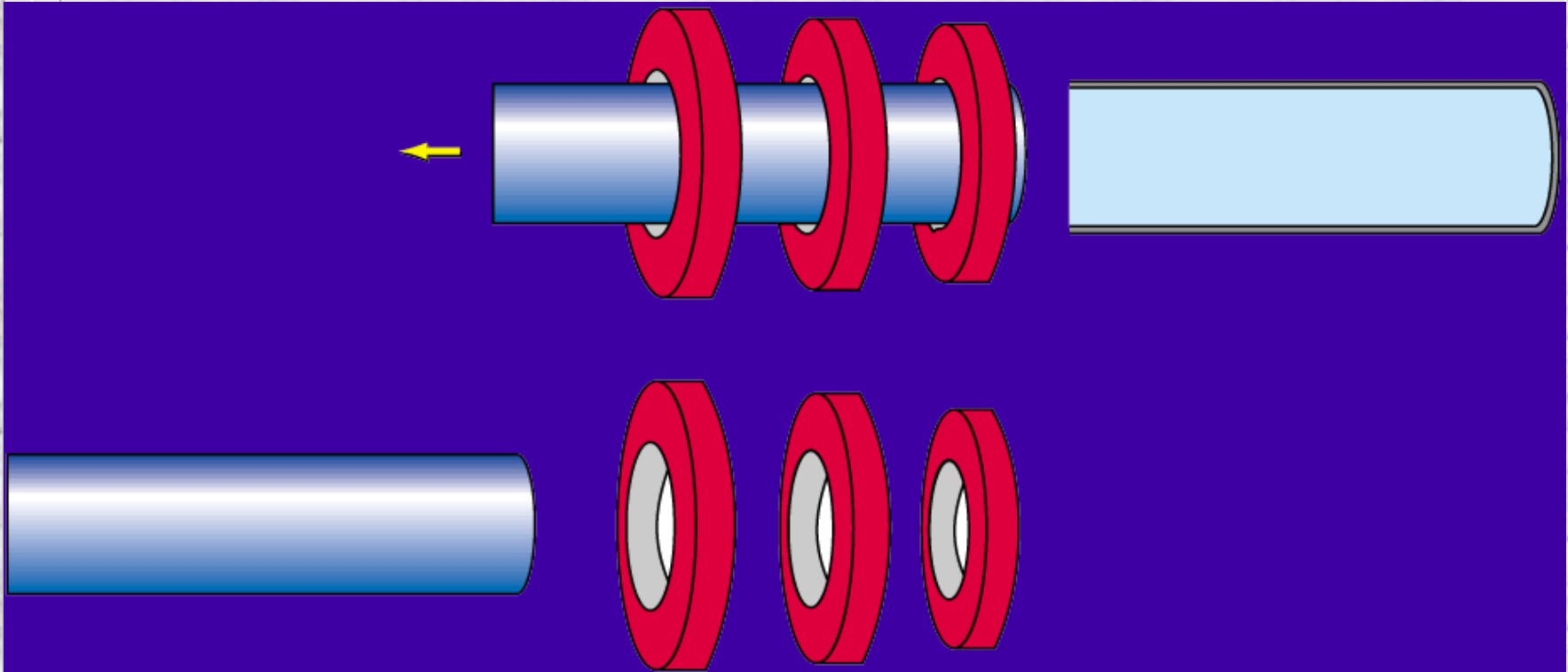
Aluminum Flows Up the Wall of the Mandrel

Completed Cylinder

Wall Ironing



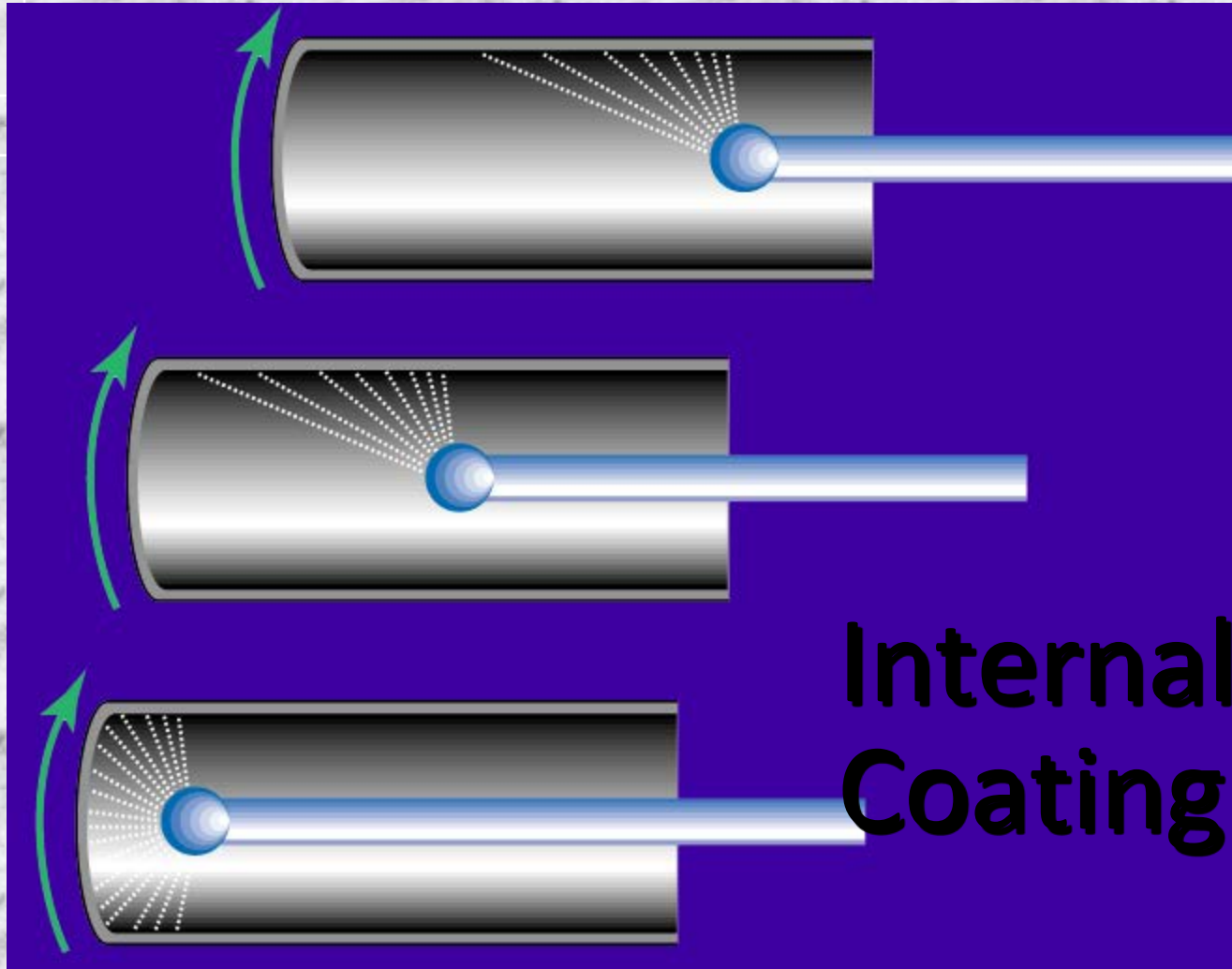
Wall Ironing



Washing Machine Remove Extrusion Lube

- Caustic Solution
- City Water Rinse
- Deionized Water Rinse
- Blow Dry



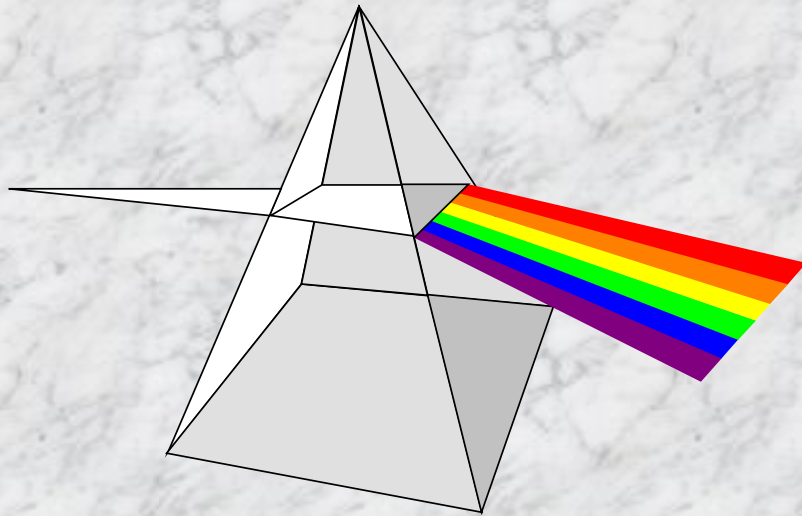


**Internal Spray
Coating**

Film Chemistries and Their Applications

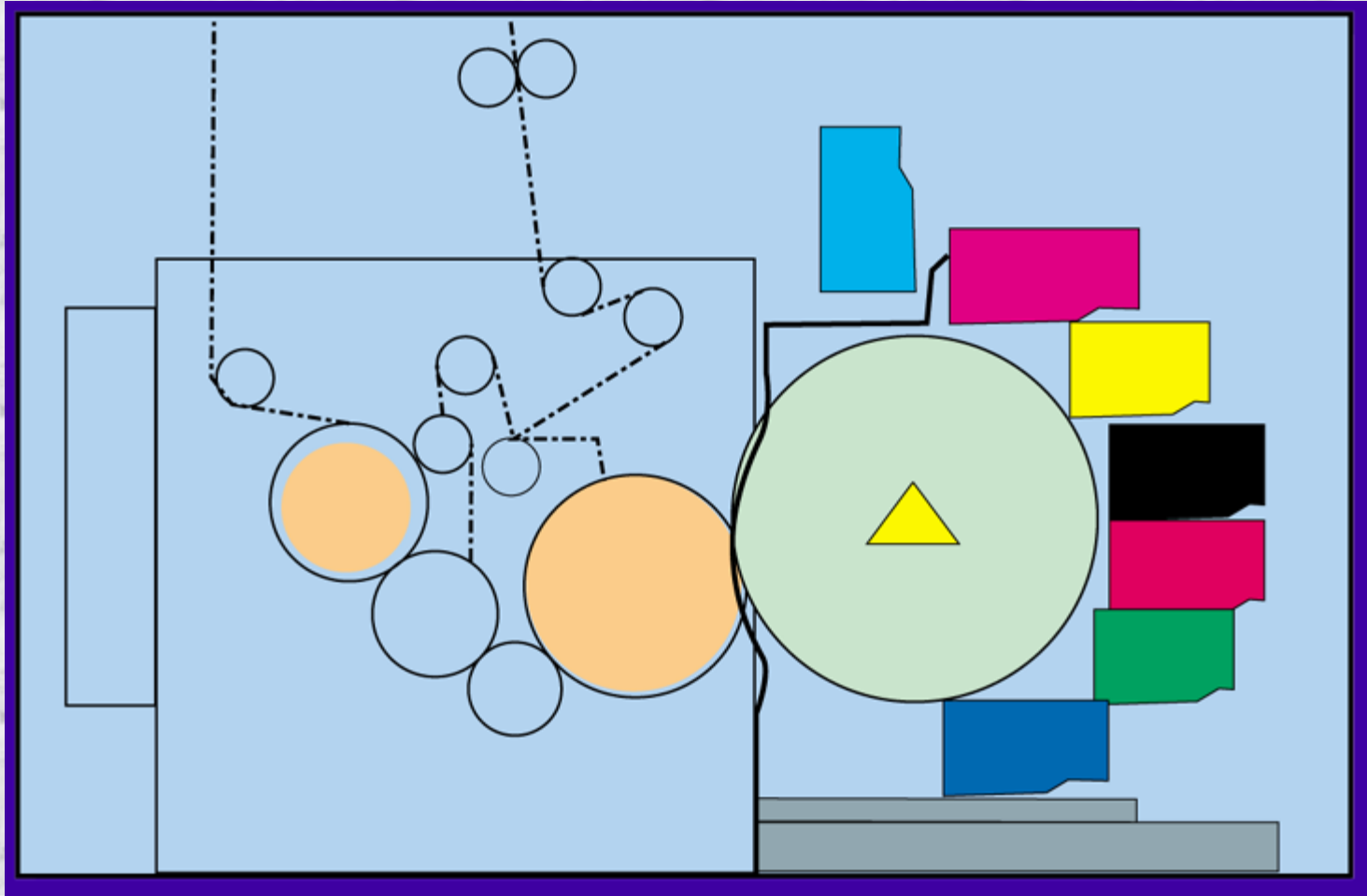
Enamel	Use	FDA Approved
Epoxy Phenolic Resins	Can Interior	Yes
Vinyl Resins	Can Interior	Yes
Alkyd Resins (Polyester)	Can Exterior	No
Amino Resins	Can Interior and Exterior	No
Acrylic Resins	Can Exterior	No
Polyamide Inside Resins	Can Interiors	Certain Times

Aluminum Alloy 1070 Assay

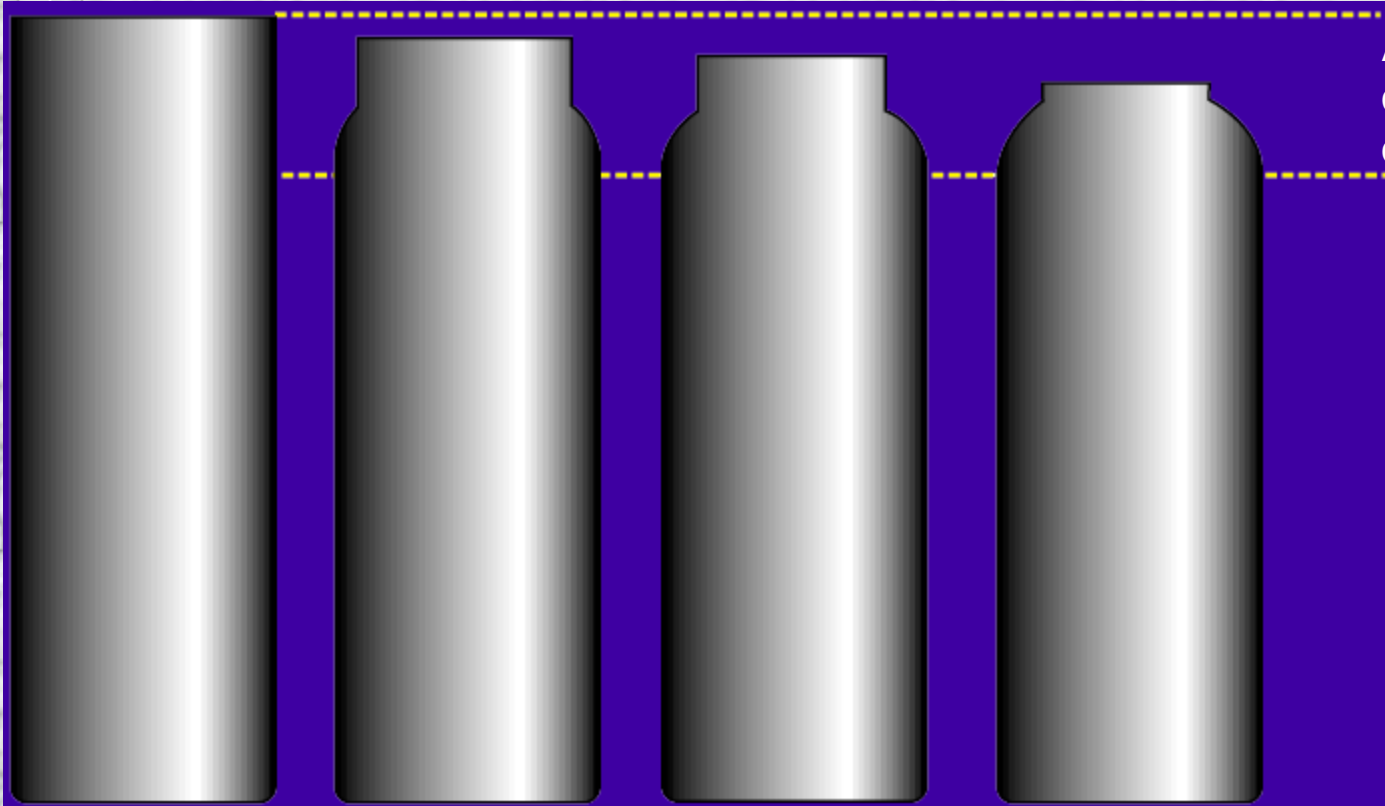


- **Aluminum = 99.7% Min**
- **Silicone = .25% Max**
- **Iron = .30% Max**
- **Copper = .05% Max**
- **Manganese = .05% Max**
- **Zinc = .05% Max**
- **Titanium = .03% Max**

7-Color Lithography Station



Neck Down Illustration



Area of tooling
contact during neck
down operation

Process Sequence Overview

1 Piece Aluminum Containers

- Slug Lube Application
- Cylinder Extrusion
- Cylinder Trimming
- Cylinder Washing
- Cylinder Drying
- Inside Liner Spray Application
- Inside Liner Curing

Process Sequence Overview

1 Piece Aluminum Containers

- Lithography Application (3 Separate Films)
- Neck-Down, Trimming & Curl Roll
- Curl Milling (As Required)
- Bundling
- Palletization
- Ship To Filler

North American Producers of Aluminum Aerosols

- **CCL Container -- Hermitage, PA**
- **Exal Corp. -- Youngstown, OH**
- **Montebello Pkg. – Hawkesbury, ON**

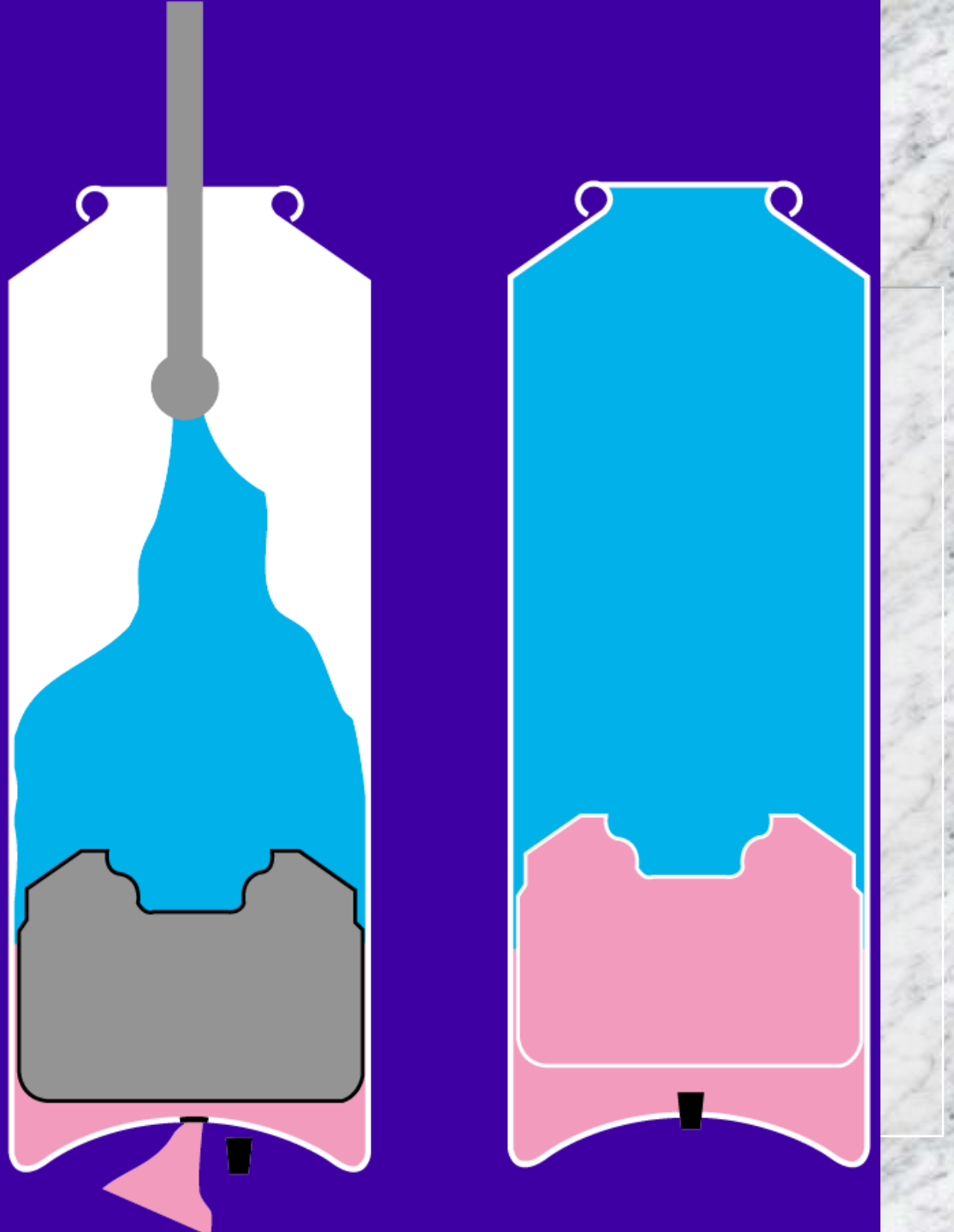
Aluminum Aerosols/Advantages (Aluminum vs. Steel)

- 360 Degree Wrap-Around, Seven-Color Printing
- Superior Point-of-Purchase Appeal
- Infinite Number of Sizes Available
- Totally Integrated 1-Site Manufacturing
- Lighter in Weight

Aluminum Aerosols/Advantages (Aluminum vs. Steel)

- 1-piece, No Seams, Juncture or Weld
- Sprayed Interior Enamel, Less Metal Exposure
- Inherently Stronger
- Abrasive Substrate, Better Enamel Adhesion
- No Rust Ring

Piston Barrier System



Piston Barrier Pack Dispensing Advantages

- Maintains Product / Propellant Separation
- Provides Smooth, Controlled Discharge
- Maximizes Product Evacuation
- Meets FDA Requirements For Food Products
- Seamless Construction, Reduces Bi-Pass
- Precision Engineered Gassing Hole
- 360 Degree Operation

Piston Barrier Pack

Commercial Size Options

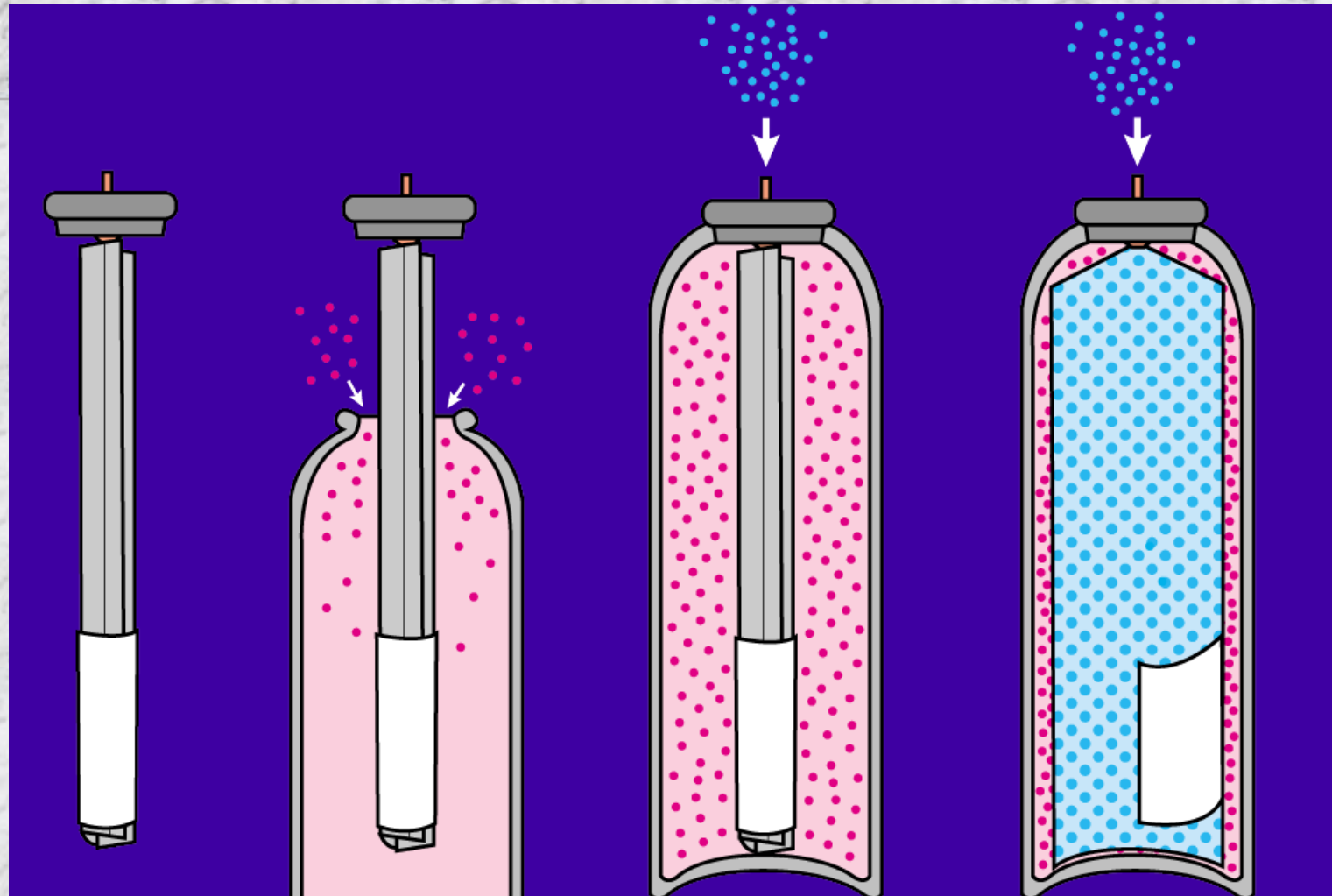
Diameters (mm)	Height Range (mm)	Approximate Capacity (US FL OZ)
35	70 – 140	1.5 – 3.5
53	120 – 210	5.0 – 11.5
55	110 – 220	5.0 – 13.0

Capacity Values Are Approximations. Actual Product Fill-To-Container Ratios Must Be Determined On A Case-By-Case Basis

Piston Barrier Pack Options

Diameter	Mold Cavities	Piston Type	Plastic Chemistry	Application	FDA Clearance	Propellant
35mm	4	Free-Float	ABS	Personal Care	No	LPG or Nitrogen
38mm	1	Free-Float	ABS	Personal Care	No	LPG or Nitrogen
45mm	2	Free-Float	ABS	Personal Care	No	LPG or Nitrogen
50mm	1	Free-Float	ABS	Personal Care	No	LPG or Nitrogen
53mm	8 Cavity	Free-Float	ABS	Personal Care	No	LPG or Nitrogen
	4 Cavity	Free-Float	PP	Food	Yes	Nitrogen
55mm	2-18 cavity tools	Wall-Wipe	PP	Food	Yes	Nitrogen Only
66mm	1 Cavity	Free-Float	PP	Food	Yes	

Bag on Valve Systems



Rolled
Pouch

Pouch Inserted

1 Bar of
Pressure
Injected

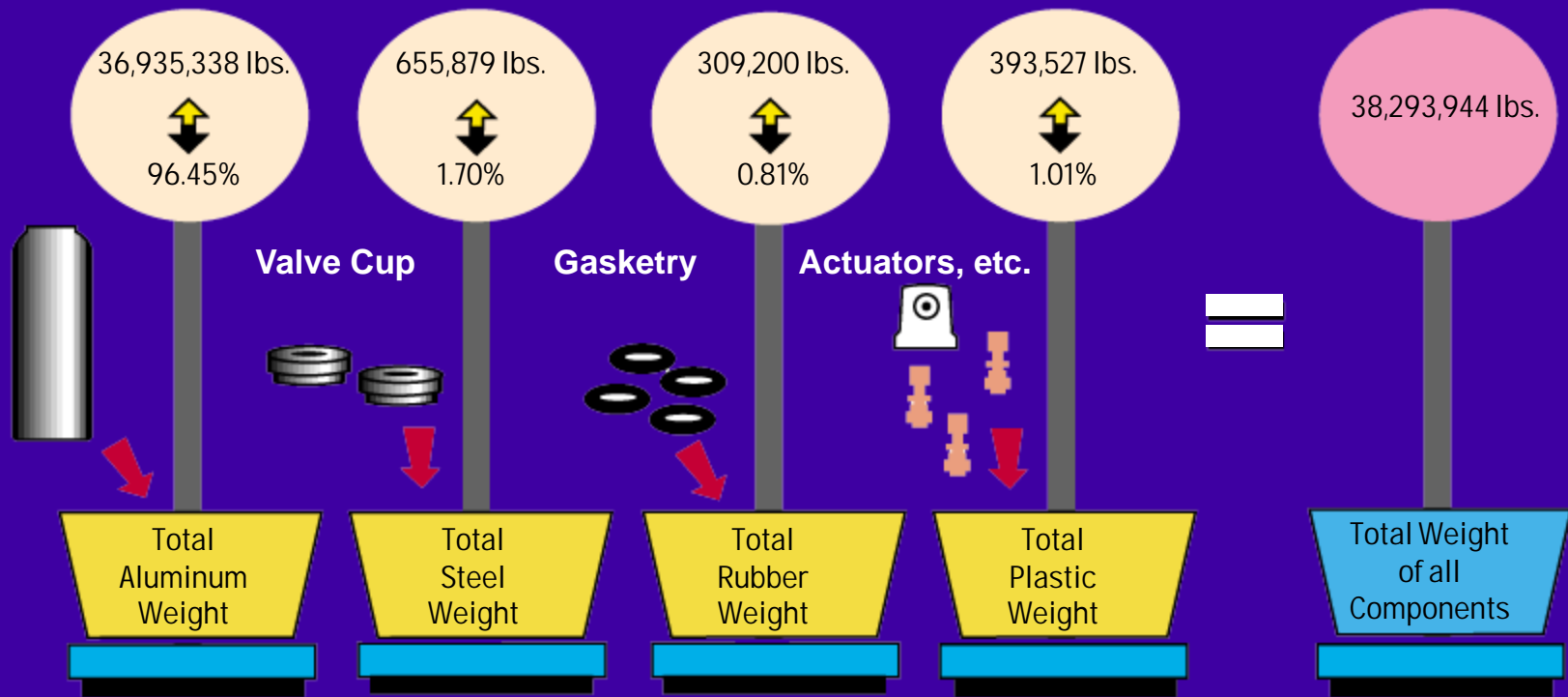
As Bag is Filled
it Compresses
Gasses

Bag on Valve Barrier System

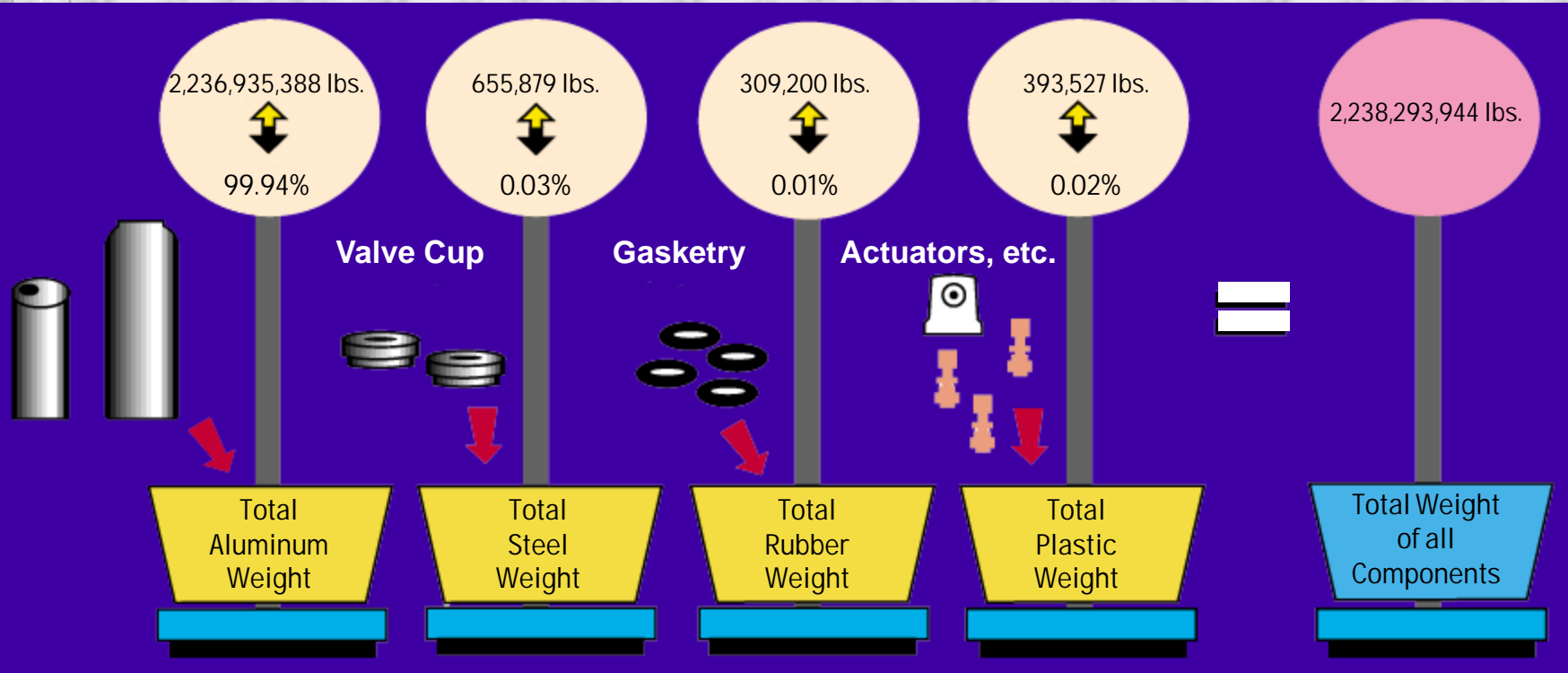
Bag-In-Can

- Bag on Valve Advantages
 - Maintains Product Integrity & Freshness
 - Excellent For Concentrated Products
 - Meets FDA Requirements For Food
 - Offers Quiet, Non-Chilling Discharge For Pets
 - 360 Deg. All Attitude Dispense
 - Excellent Evacuation Rates
 - Uses Existing TTV Filling Technique

Components of Typical Aluminum Aerosol Cans



Components of a Typical Aluminum Aerosol Can/Used Beverage Can Mix



Life Expectancy of Waste Products

- Banana Peel -- 1 week to 6 months
- Cotton Rag -- 2 to 4 weeks
- Paper -- 2 to 4 weeks
- Wax Paper Cup -- Up to 5 years
- Styro Cup -- 10 to 20 years
- Cigarette Filter -- 15 years
- Plastic Containers -- 50 to 70 years
- 3 Piece Steel Containers -- 100 years
- Aluminum Containers -- 100 to 500 years
- Glass Containers -- Theoretically, they never break down



Packaging Principles 101

MS = MD (Monkey See = Monkey Do)

MNS = MNKWTO (Monkey Not See = Monkey Not Know What To Do)

MDI = 1 / F (Marketing Director's Interest Will Always Be Reciprocal To Feasibility)

PrMaC < LL (Product Manager's Career Will Always Be Less Than or Equal to Label Life)

PaMaC < PL (Packaging Manager's Career Will Always Be Less Than or Equal to Package Life)

MT < DTR (Marketing Timetable is Always Less Than Development Time Required)

PAB = 1000PDB (Product Advertising Budget Will Always be 1000x Product Development Budget)

IA > / < IR (Inventory Available is Always Less Than or Greater Than Inventory Required)

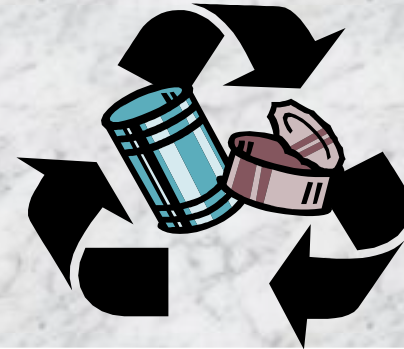
S = S (Sales Will Always Be Sales)

100R < 1W (100 Rights is Always Outweighed by 1 Wrong)

PS = 1/TMI (Product Success is Always Reciprocal to Top Management Involvement)

Aluminum Recycling

- Aluminum has value. American consumers earn about \$2.5 million a day recycling used aluminum cans.
- The aluminum industry operates a large coast-to-coast recycling network with an estimated 10,000 buy-back locations.



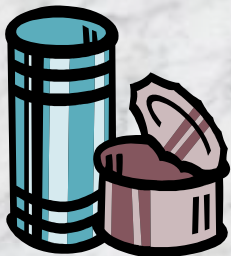
Aluminum Recycling

- Recycling diverted 12-billion pounds of aluminum from the solid waste stream during the 1980's.
- The aluminum industry pays cash for used products such as automotive parts, cans, empty aerosols, tubes, frozen food trays, pie plates, window and storm doors, frames and siding, etc.



Aluminum Recycling

- Aluminum aerosols and tubes are made of 99.7% pure aluminum. No other containers have greater recycling value.
- Industry goal is to add 40% of all consumer-spent aluminum aerosols, squeeze tubes, and other packages to the recycle stream. Plant producers already recycle all of their scrap.



Aluminum Recycling

- Aluminum is recycled and reused over and over in a never-ending process of resource recovery and energy conservation.
- Scrap aluminum is an invaluable supply source for aluminum producers and fabricators.
- Recycling aluminum saves 95% of the energy needed to produce new metal from bauxite.

Can\$