

# Plural Component Spray Equipment

What Is It?

Why Do We Need It?

and

How Systems have evolved to ensure quality.



# What is “Plural Component Spray”

- A mechanical device to mix paint components such as “Resin” (part A) and “Curing Agent”, (part B) automatically in the correct proportions.
- Correct paint mixture then travels directly to spray gun for immediate application.
- Mix-as-you-go reduces waste.



# Definitions

- Pot Life:
  - The maximum period of time a coating can be used after it has been mixed. Typically a time/temperature relationship.
- Induction Time:
  - Some coatings must be mixed and allowed to stand for a given period before they can be applied. Also a time/temperature relationship.
- Mix Ratio:
  - Proportion of Part A and Part B that need to be mixed, example 1:1 (equal parts resin to cure), 4:1 (4 parts resin to 1 part cure)
- Plural Component spray is conducive to coatings that have a short pot life, and no induction times. They can accommodate most common mix ratios.

# Why some coatings require this technology.

- Today's "solventless" coatings are high in viscosity. Plural Component systems are usually equipped with heaters to reduce viscosity.
- 100% solids components are mixed, then cross-link to form a solid. There is no solvent to act as a "heat sink" and slow down the reaction.
- Reaction is subject to heat generation (exothermic reaction) that shortens an already short pot life. Larger quantities generate greater heat, leading to shorter pot life.

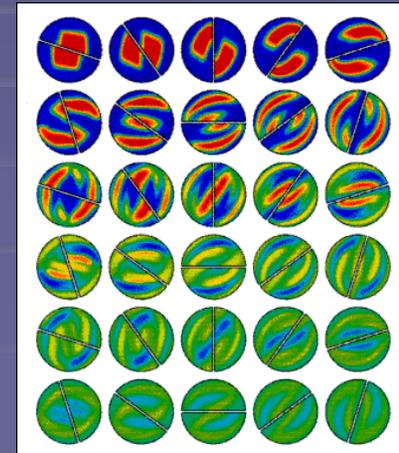
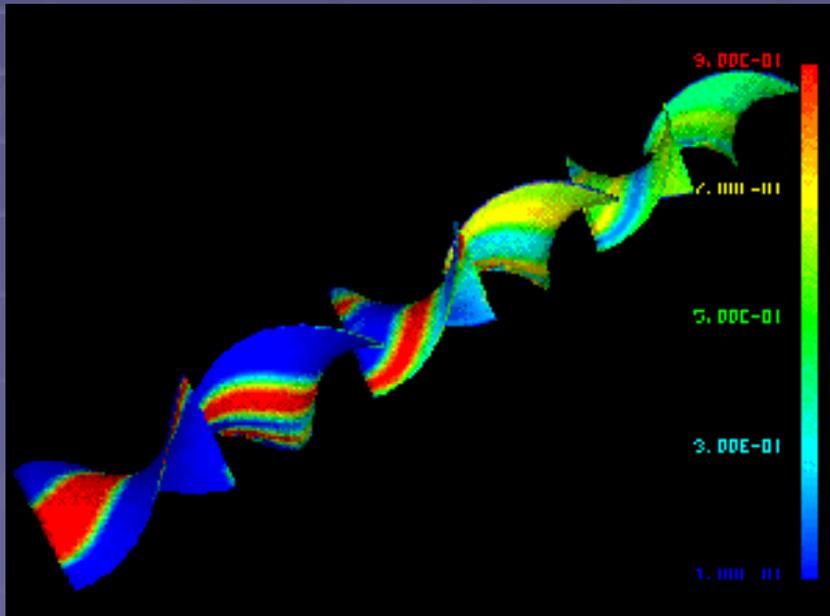
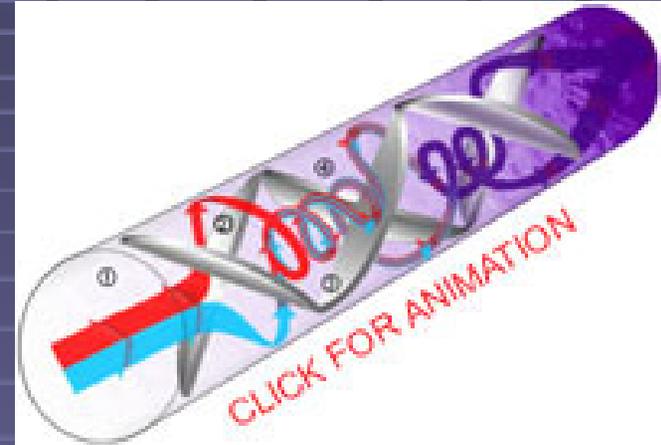
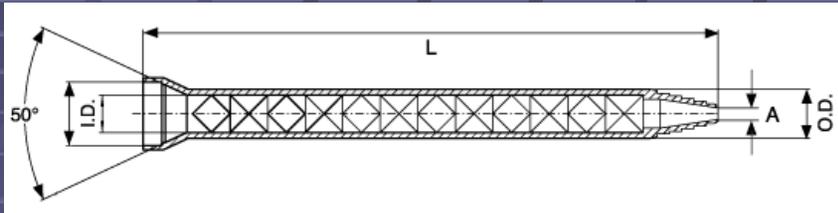
# Basic Equipment requirements



- Unmixed Material Loading
  - Tote, Drum, or pail with “slave pump” or gravity feed to deliver unmixed material to the proportioner.
- Proportioning Device
  - Lever, Stroke Volume, Pinwheel
- Pressure Pump
- Mixing Device
  - Static mixer
  - Air impingement
- Delivery system
  - Spray Gun
- Flushing system



# Static Mixer





# Evolution

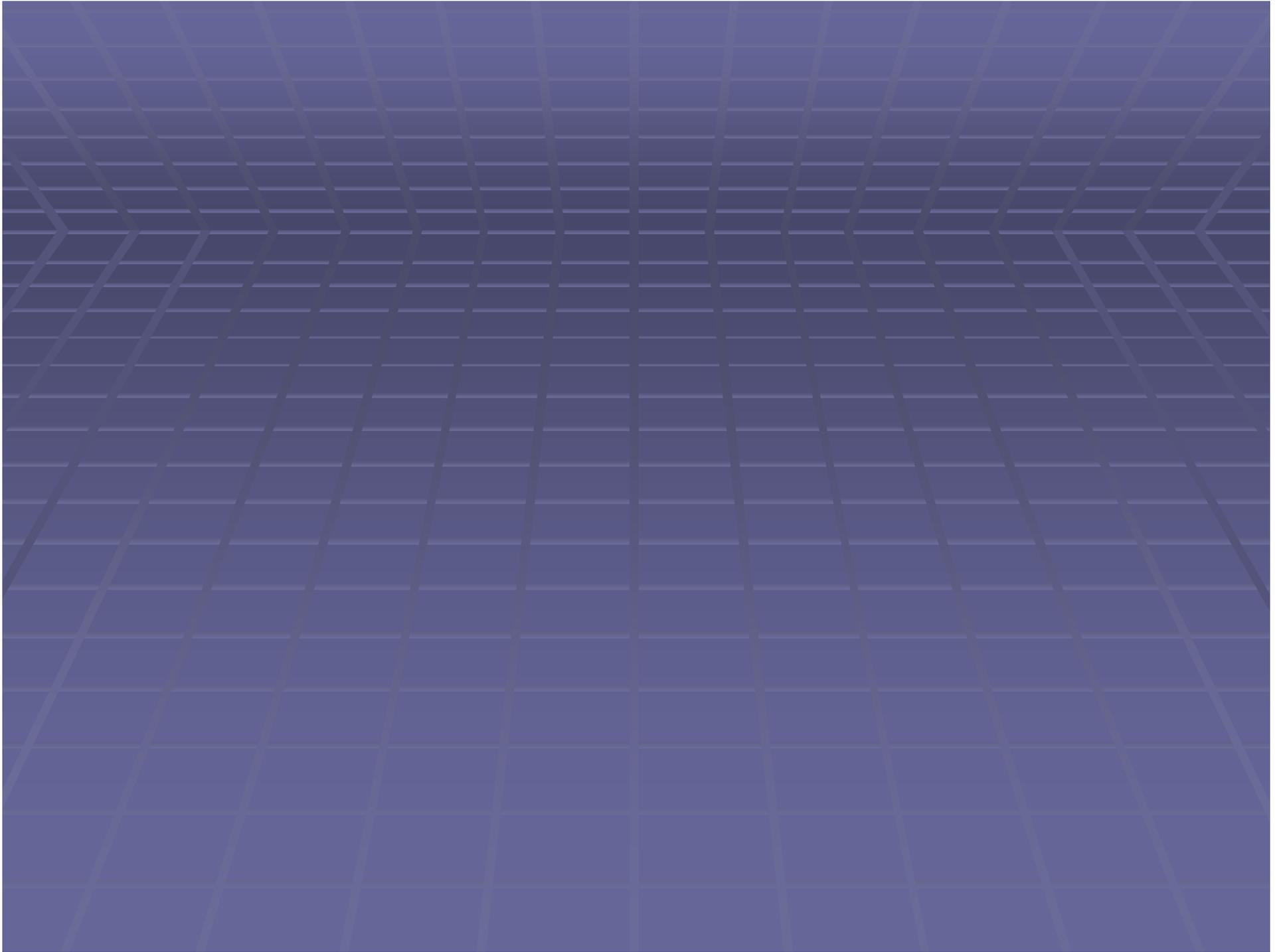
- Size (volume) of lower ends of pump
  - Displacement of each cylinder per component determines mix ratio.
- Fulcrum
- Pinwheel
  - Metering device
- Electronic “Injector”
  - Size and frequency programmed in to computer control.

# Positive Displacement

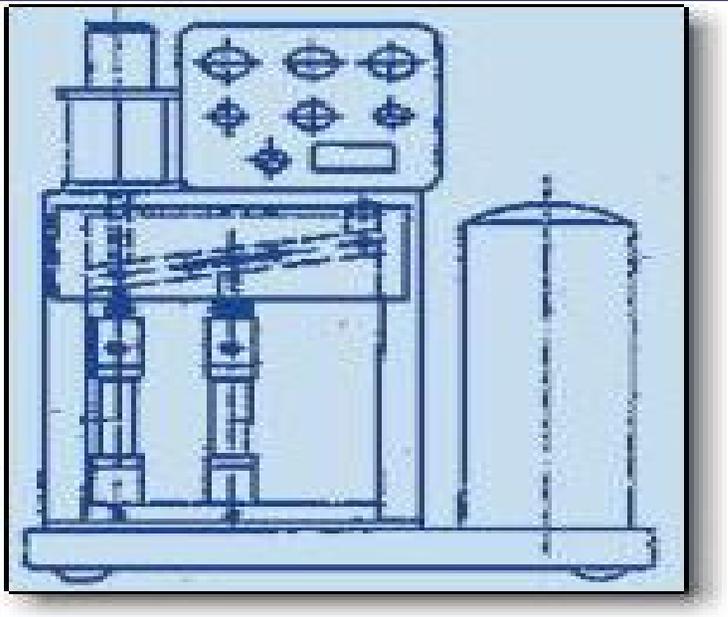


- Fixed Ratio.
- Displacement of cylinders determines ratio.
- Fluid pressure regulators are control.



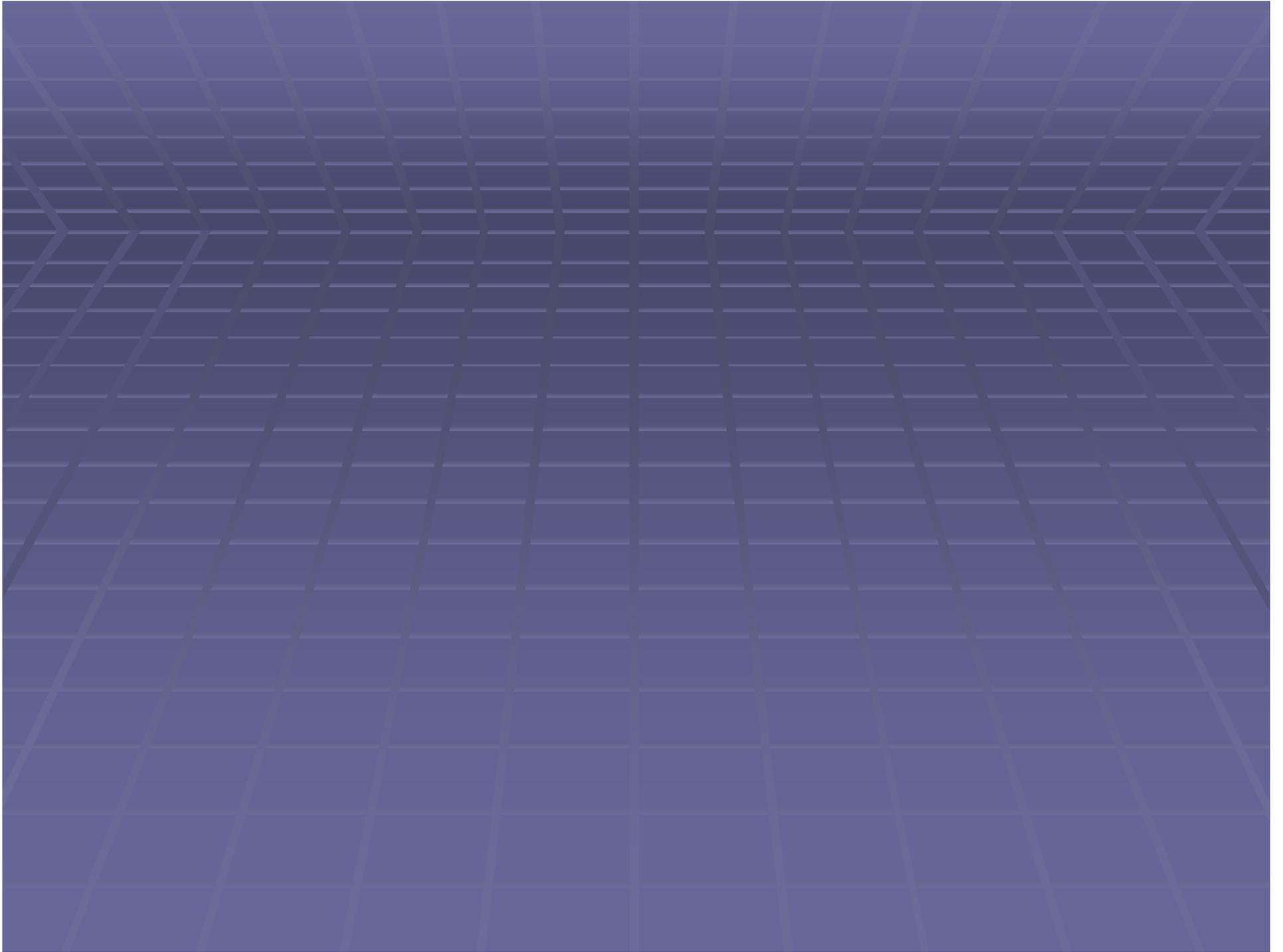


# Fulcrum Type



- Variable Ratio
- Fixed Displacement cylinders.
- Moving the fulcrum adjusts length of stroke.
- Ratio is Full Stroke: Partial Stroke





# Evolution of Mix Ratio Control

- Pressure regulator
  - Assumes that pressure will dictate material flow.
- Mechanical stroke counter
  - Assumes that correct number of pump cycles will dictate material flow.
- Pinwheel with locked mix ratio and warning /shut down device
  - Measures flow
- Computer controlled injector
  - Micro-metering
  - Accurate to 0.1%

# Benefits of Plural Component Spray

- **Minimize waste**
  - Only use what has been mixed.
  - Allows for use in drums or totes, reducing empty waste cans and buckets.
- **Ensure proper mix ratio**
  - Greatly reduce the chance for operator error.
- **Availability to heat material**
  - Reduce viscosity with heat instead of solvent
  - Add BTU's not VOC's
  - Allows use of "solventless" coatings, no solvent entrapment issues.
- **Safety**
  - Heated high viscosity materials are sprayed at lower pressure.
  - Less handling and exposure to potentially dangerous chemicals.



# In Summary

- Some materials require Plural Component Spray Equipment.
- Equipment can lead to efficiencies.
- Materials can help reduce environmental issues such as VOC and HAPS.
- Safety concerns can be reduced.
- Modern equipment is better suited to “on-ratio” performance.

