CARTRDIGE DISPENSING AND STATIC MIXING
LIST OF DO'S AND DON'TS

DO	DON"T
Pre bleed at least 3" of material before using.	Transfer a used mixer to a new cartridge
Even out plungers without mixer attached if drastically off.	Expect the same mixer to give the same results at different temperatures or with a different dispensing rate and pattern
Maintain adequate velocity to avoid poor mix.	Expect a thin wall cartridge to give consistent results in a pulsing situation.
Use a new mixer with every new cartridge.	Expect all products to mix well although their ratio may fit a cartridge.
Store unfilled resins vertically to allowed air to float to nozzle tip.	Expect products to have the same shelf life in a package.
Store filled resins in a cool place on their side to minimize settling and cause fillers to collect on the side.	Don't use a large diameter cartridges in a pulsing mode except in an EZ Mix 750.
Keep cartridge upright when attaching mixer with liquid products, give a small shot of material to partially fill mixer tube before dropping tip lower than gun.	

GUIDELINES FOR DETERMINING APPROPRIATE CARTRIDGES AND STATIC MIXERS FOR DISPENSING APPLICATIONS

STATIC MIXER / CARTRIDGE SELECTION GUIDELINES

FLOW CHARACTERISTICS:
"Shot size / Frequency / Rate"

1) DISPENSING RATE / VELOCITY

Faster ⟷ Slower

Less elements required
Larger diameter required

More elements required
Smaller diameter required

Pneumatic gun
Smaller diameter barrels

Manual gun
Larger diameter barrels

Mixer consideration

- The faster the delivery required - the larger diameter and/or shorter the mixer needed, however, large diameter mixers don't always give an efficient mixing action, so a trade off between dispense rate and mixing effectiveness has to be found. Higher velocity flow mixes within fewer elements, low velocity flow requires more elements.

Cartridge / gun consideration

- Smaller diameter barrels such as TAH And Mix-pak 200 and 150/150 Ratio-Pak give higher effect cartridge pressure. Larger barrels such as Mix-Pak 400 and 300ml and larger Ratio-Paks have less effective dispense pressures.

2) SHOT FREQUENCY

Constant ⟷ Intermittant

Less elements required

More elements required

Thin walled cartridges more acceptable
Larger barrels more acceptable

Thick walled cartridges perform better
Smaller diameter barrels perform better

Mixer consideration

- The more constant the flow – the fewer elements required.

Cartridge consideration

- Larger thin walled cartridges lend themselves to constant non-critical dispensing, such as long beads of adhesive or large castings. Smaller and/or thicker walled cartridges lend themselves to bench top, small shot dispensing.

MATERIAL CHARACTERISTICS:

Thicker ⟷ Thinner

Larger diameter required ⟷ Smaller diameter required

VISCOSITY - The thicker the material - the larger diameter mixer are needed to reduce backpressure, increase flow rate and achieve active mixing. The thinner the material, the smaller diameter mixers give a more thorough mix.

Greater difference ⟷ Less difference

More elements required ⟷ Fewer elements required

VISCOSITY DIFFERENCE - The greater the difference - the more elements required. (*OR-X restrictors can be helpful here when Ratio-Paks are used)

MIX RATIO SPREAD - The wider the ratio - the more elements required. (*OR-3 can be helpful here when Ratio-Paks are used)

TYPE OF DISPENSING GUN / MACHINE

1. MANUAL - First and possibly only choices are the larger diameter mixers with as few elements as possible to reduce backpressure. These guns are more susceptible to pulsing trouble and have limited pressure capability which may preclude practical use of thick products.

2. PNEUMATIC - Full range of mixers available for consideration as they generate higher effective cartridge pressure and produce a more even flow. Using an large thin-walled, unsupported cartridge such as a Ratio-Pak in a pneumatic gun and controlling the air supply to dispense is **NOT recommended** with almost all resin systems as they generate significant lead/lag trouble. Smaller diameter Ratio-Paks sometimes work in a pulsing mode with some products.

3. DTI EZ-MIX 750 – Micro processor controlled, programmable dispensing machine utilizing an enclosed clamshell cartridge cradle for all combinations of Ratio-Paks up to 750ml or Mix-Pak 400’s utilizing a pinch value on a dispensing tube for accurate bench top potting / dispensing. Patented design overcomes many of the limitations and troubles of hand held cartridge dispensing. Changeover of cartridges requires a few minutes.

TYPE OF CARTRIDGE STYLE

Mix-Pak and TAH cartridges are thicker walled which are more resistant to lead/lag flow problems which occurs as the walls expand and contract during a pulsing dispensing situation. The smaller diameter Ratio-Pak and Systems II cartridges (50 to 150ml) show improved performance in this same manner relative to the larger 300 and 750ml sizes.

STANDARD CARTRIDGE STORAGE, SETUP AND USE PRACTICES

1) Store filled products on their side in a cool place to reduce filler settling, store unfilled, liquid products vertically to allow air to migrate to the tip. Bring to room temperature or other optimized temperature prior to use.

2) Orient cartridge tip up when attaching static mixer and/or retaining nut, place in gun and dispense a small amount of material vertically into mixer.

3) Lower gun and dispense about 3-6” (or until mix appears uniform) of material on scrap surface.

4) Maintain adequate velocity to achieve complete and thorough mixing.

5) **DO NOT TRANSFER USED MIXER TO NEW CARTRIDGE**. Always use a new mixer with a new cartridge.
6) Leave static mixer on cartridge when done to cure and then remove and clean orifice, or remove immediately and clean orifice and replace tip caps.

* ORIFICE RESTRICTORS FROM PLAS-PAK FOR RATIO-PAKS

PART NUMBERS
OR-1 (3/16" by 3/16")
OR-2 (1/16" by 1/16")
OR-3 (1/16" by 3/16")
OR-4 (Star slit)

These orifice restrictors fit over the openings previously plugged by the tip caps. They help achieve a better mix and other operational benefits through several means.

1) The have a divider plate separating the orifices and hence the material up to the point at which it meets the second mixing element, (the first must be removed manually)

2) They reduce cross-over from side to side due to material viscosity / compressibility / ratio differences by equalizing the pressure drop at the introduction to the mixer.

3) They increase turbulence at the first elements giving a more thorough mix to start possibly reducing the number of elements required.

4) They contain low viscosity material in the cartridge preventing gravity run on throughout the mixer. (Helpful in the EZ-Mix 750)

TROUBLE SHOOTING GUIDE

SIGNS / SYMPTOMS OF POOR MIX AND PROBABLE CAUSES

SYMPTOM	PROBABLE CAUSE
- TACKY SPOTS	A sign of insufficient mix. Mixer may be have too few elements Velocity maybe too slow Lead / lag problems due to cartridge wall swelling / relaxing; difference in compressibility of A/B; or wide mix ratio. Lead / lag upon start-up Lead / lag from transfer of dirty mixer Low velocity top-off of partially filled parts
- SOFT AREA	Material is most likely off ratio, but still adequately mixed. May be a start up / pre-bleed issue or a lead/lag problem due to pulsing of cartridge. If in the middle of cartridge it may be caused by a air pocket/ void if product is a paste. Carried to extreme it becomes tacky
- MINOR COLOR STREAKS	Mix barely good enough to give complete cure and normal properties but some pigment systems require a bit more mixing to give homogeneous color. Going to a slightly longer mixer or increased velocity could correct.
- GREASY MOTTLED SURFACE	Condition of poor mix by any reason. With epoxies it is usually the hardener slightly separating or floating over the resin and reacting with moisture in the air giving a greasy surface.
- -TOTALLY LIQUID SURFACE	Extremely poor mix where hardener can almost be scraped off surface. Make sure all elements are in mix tube, orifices are clear, good velocity is being achieved . Thin materials can "side-wall" - flow around elements without mixing instead of through them if velocity is not sufficient.