

Two-component adhesive cartridge systems

There are four major cartridge system design styles in the marketplace today. Craig Blum, business manager - adhesive packaging systems, TAH Industries, explains some of the advantages and disadvantages.

Until the invention of two-component cartridge systems users of two-part adhesives and sealants had few choices in terms of packaging and application systems. High-volume users who used material in one designated location might have been served reasonably well with expensive meter mix equipment - still a viable option today for large-scale dispensing applications such as automated assembly lines.



Manual mixing is slow and imprecise.

However, for the majority of those who used two-component adhesives at remote job sites or in small volumes not suitable for meter mix systems, the only available options were buckets, cans, tubs, and tubes that required manual pouring, squeezing, weighing, and mixing. While many still use these manual systems most have found that two-component cartridges are significantly more convenient and economical after considering the following factors:

- Labour involved in manually pouring, squeezing, weighing, mixing, and clean-up.
- Reliability from one mix to another - how to control accurately and consistently each amount and avoid under-mixing and over-mixing.
- Waste of unused material.

- Disposal of unused material.
- Health risks from direct contact with material.
- Exact placement of material.

Coaxial

The most mature cartridge design contains one component surrounded by another, i.e., two cylinders, one within the other. These are available in volumes ranging from 75ml to 380ml and in ratios of 1:1, 2:1, 4:1, and 10:1. They require a special dispensing gun made just for this style of cartridge, although some of the smaller 75ml and 150ml versions can be dispensed using a special screw adaptor or a caulking gun using another special adaptor. The contents are mixed on demand using a static mix nozzle so that when users are finished with the application and material still remains they can simply throw away the static mixer and reseal the cartridge for future use.

Side-by-side

Currently the most widely-used design



Side-by-side cartridges.



Coaxial, side-by-side (as above), and barrier/injection systems require specialised dispensing guns.

consists of two side-by-side cylinders that are snapped together or moulded in one piece. There is a much greater range of volumes and ratios for this type of cartridge. They are available in unit dose or small syringe configurations ranging from 1ml to 30ml - these syringes usually are dispensed using a hand-held plunger. The larger sizes range from 50ml to 1500ml. There are many ratios available: 1:1, 2:1, 4:1, and 10:1 being the most popular.

As with the coaxials, larger side-by-side cartridges require a special dispensing gun that can be used only with a specific cartridge size and ratio, although some dispenser models allow for quick changeability from one ratio to another within the same volume size cartridge. The contents, as with the coaxial, are mixed on-demand using a static mix nozzle; they can be resealed for future use.

Barrier or injection-style kits

These are fairly specialised cartridges and the oldest technology in the group. They are ideal for non-standard ratios that are not readily available in other cartridge systems - 1.3:1, 7:1, etc. Due to the design of these kits the ratio options are almost limitless; volumes range from 30ml to 600ml.

The barrier style is used with ratios

between 1:1 and 10:1; the injection style with ratios greater than 10:1. As with the coaxial and side-by-side cartridges these kits require a special dispensing gun with a cartridge retainer to fit the particular size and ratio cartridge. However, these same

dispensers also can be used with many of the single-component materials that are available in many of these same-size cartridges.

Unlike the coaxial and side-by-side cartridges these systems are not mixed as they are dispensed - there is no static mixer used. The user must break the barrier or inject the second component, then pump back and forth several times for between 30 seconds

and 60 seconds to mix the materials properly - this can be done manually, semi-automatically, or automatically. The inherent disadvantages of this system are that it is very easy to under-mix or over-mix the components, and all of the contents of the cartridge must be used within the gel time of the material or they will be wasted.

Universal cartridge system

This is a fairly new technology that involves dispensing a two-component material in a cartridge that fits into standard, professional grade, one-tenth gallon (310ml) caulking guns.

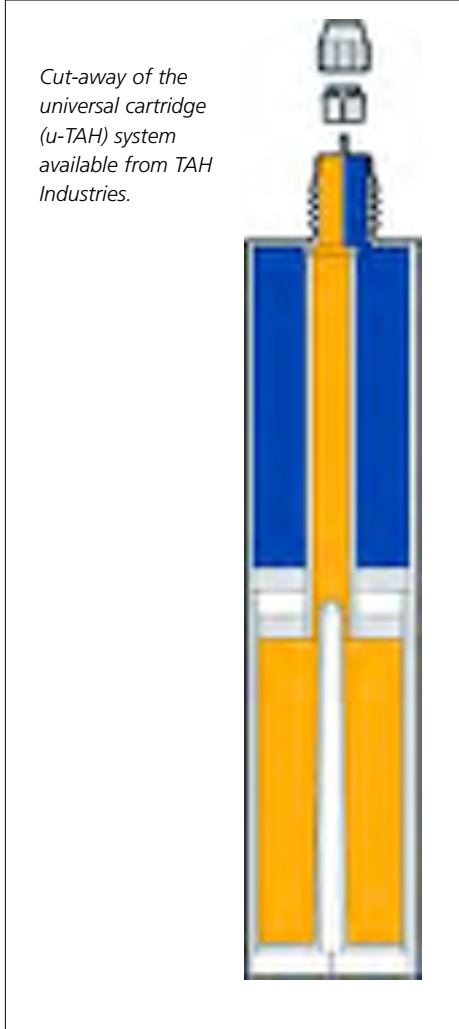
The key to these systems is that they do not require a specialised dispenser that can only be used with a specific cartridge size and ratio. The same tool can be used to dis-

pense two-component and single-component adhesives and sealants. The universal cartridge is available in 1:1, 2:1, and 10:1 ratios, all of which fit into a standard caulking gun. As with the coaxial and side-by-side cartridges, the contents are mixed on-demand using a static mix nozzle, and can be re-sealed for future use.

Conclusion

It is important to research and evaluate all options before making a final decision on a cartridge system. There are only a few cartridge manufacturers worldwide and, because some manufacture more than one of these options, they can be a good source of information to help make an educated decision.

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