

## Simplifying adhesive decisions for your application

The following questions will help you narrow adhesive choices to two or three possibilities for evaluation.

### Q1 What surfaces are to be bonded?

Understanding surface conditions is the first step to determining how much bonding strength will be needed and which adhesives may work best. For example, is the surface painted and with what kind of paint? If the material is a plastic, what kind? For bare metals, will the surface be clean?

### Q2 What are the general characteristics of the structural adhesive types?

As a rule of thumb, 3M™ Structural Strength Adhesives bond the load-bearing parts of a product with a minimum of 1,000 psi overlap shear strength.

- **Epoxy adhesives** in one and two-part formulations provide the highest strength at elevated temperature and chemical resistance of all 3M adhesives.
- **Acrylic adhesives** bond the widest variety of substrates including hard-to-bond plastics and oily metal. The distinction is high strength bonding without the surface preparation needed for epoxies and urethanes
- **Urethane adhesives** are generally lower cost and cure quickly to an elastic bond in applications requiring flexibility between dissimilar materials. Impact resistance is a distinctive characteristic.
- **Cyanoacrylate adhesives** are high strength liquid formulations known as instant adhesives. On rigid plastic, glass, metal, rubber, and other low porosity substrates, they harden in seconds through reaction with surface moisture.

### Q3 What is the present bonding or joining method?

When the answer provides likes/dislikes and advantages/disadvantages of the current method, it is easier to determine if structural adhesive can improve the end product quality and/or the production process.

### Q4 What is the preferred bonding range?

This is often the biggest clue to help understand which product will work best. Start with worklife – the amount of time you have to apply and reposition – and then ask about time to handling strength and full cure. This could lead to productivity improvements.

### Q5 Can simple surface preparation be included in the production process?

Maximum bond strength and environmental resistance can be easily achieved by cleaning with IPA/water (50:50 mix) and abrading with Scotch-Brite® Surface Conditioning Products if the surface is very smooth.

### Q6 What is the joint design and how will parts fit together?

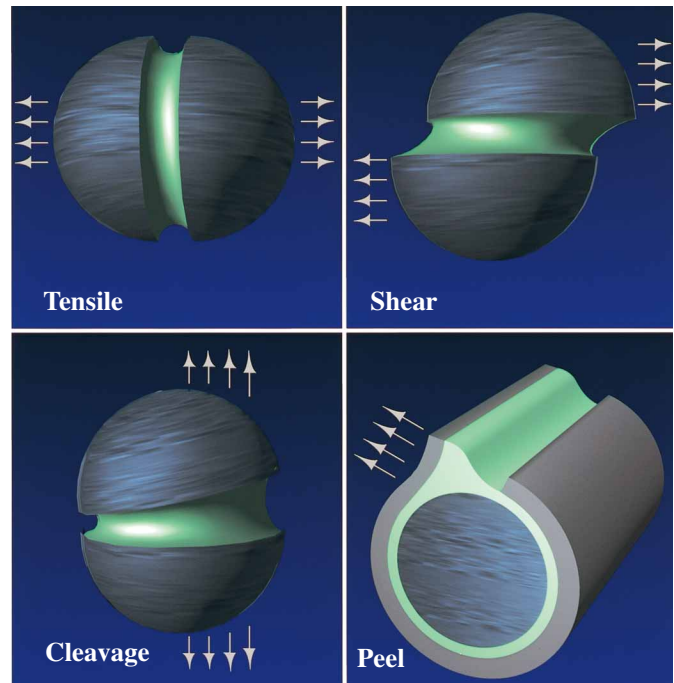
For the best adhesive bond, there should be at least a .003"-.005" gap between the parts for shear and 0.015" - 0.020" for peel. The gap should be as consistent as possible.

### Q7 To what types of environments and stresses will the bond be subjected?

Consider bond line stresses, inside/outside end use, UV exposure, chemical exposure, moisture, and temperature ranges.

Strength can be readily matched to the substrate and stress characteristics to which the bond will be subjected. Most adhesives and tapes perform better when the primary stress is tensile or shear. In most industrial applications, however, a combination of stresses are involved that may include cleavage and peel.

In general, epoxies hold up best to harsh environments.



**Tensile** is pull exerted equally over the entire joint. Pull direction is straight and away from the adhesive bond.

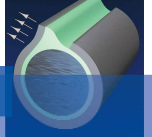
**Shear** is pull directed across the adhesive, forcing the substrates to slide over each other.

**Cleavage** is pull concentrated at one edge of the joint, exerting a prying force on the bond. The other edge of the joint is theoretically under zero stress.

**Peel** is concentrated along a thin line at the edge of the bond where one substrate is flexible. The line is the exact point where an adhesive would separate if the flexible surface were peeled away from its mating surface. Once peeling has begun, the stress line stays out in front of the advancing bond separation.

### Q8 What is the preferred method of application?

Depending on formulation, 3M structural adhesives are available in a variety of cartridge sizes, 5-gallon pails, and 55-gallon drums. You can apply manually or with automated bulk systems.



## 3M™ Scotch-Weld™ Structural Adhesives in Duo-Pak Cartridges and Bulk

| Product (Color)       | Key Features                               | Mix Ratio (Volume) B:A | Approximate Viscosity 75°F (24°C) (cps) | Approximate Mixed Worklife at 75°F (24°C) | Approximate Time to Handling Strength at 75°F (24°C) | Average T-Peel at 75°F (24°C) (piw) | Overlap Shear (psi) |             |              |
|-----------------------|--|------------------------|---|---|--|-------------------------------------|---------------------|-------------|--------------|
|                       |  |                        |   |   |  |                                     | -67°F (-55°C)       | 75°F (24°C) | 180°F (82°C) |
| DP100 (Clear)         | General Purpose Rigid bonds                | 1:1                    | 13,000                                  | 5 minutes                                 | 20 minutes   | 2                                   | 900                 | 1,500       | 300          |
| DP100 Plus (Clear)    | Very flexible Colorless                    | 1:1                    | 8,500                                   | 4 minutes                                 | 20 minutes   | 10                                  | 3,000               | 3,500       | 200          |
| DP100NS (Translucent) | General Purpose Non-sag                    | 1:1                    | 95,000                                  | 5 minutes                                 | 20 minutes   | 2                                   | 900                 | 1,500       | 300          |
| DP100FR (White)       | Flame Retardant UL94 V-0 rating            | 1:1                    | 80,000                                  | 6 minutes                                 | 20 minutes   | 2                                   | 1,250               | 2,200       | 800          |
| DP105 (Clear)         | Very flexible Colorless                    | 1:1                    | 6,500                                   | 5 minutes                                 | 20 minutes   | 35                                  | 3,500               | 2,000       | 150          |
| DP110 (Gray)          | General Purpose Flexible bonds             | 1:1                    | 55,000                                  | 8 minutes                                 | 20 minutes   | 20                                  | 2,700               | 3,500       | 250          |
| DP110 (Translucent)   | General Purpose Flexible bonds             | 1:1                    | 50,000                                  | 8 minutes                                 | 20 minutes   | 20                                  | 2,500               | 2,500       | 200          |
| DP125 (Gray)          | High Performance Very flexible bonds       | 1:1                    | 52,500                                  | 25 minutes                                | 2.5 hours  | 35                                  | 3,400               | 4,300       | 400          |
| DP125 (Translucent)   | High Performance Very flexible bonds       | 1:1                    | 15,000                                  | 25 minutes                                | 2.5 hours  | 35                                  | 4,000               | 2,500       | 150          |
| DP190 (Gray)          | High Performance Flexible bonds            | 1:1                    | 80,000                                  | 90 minutes                                | 10 hours   | 20                                  | 1,500               | 2,500       | 400          |
| DP190 (Translucent)   | High Performance Flexible bonds            | 1:1                    | 10,000                                  | 80 minutes                                | 6 hours  | 20                                  | 3,500               | 1,200       | 150          |
| EC2216* (Gray)        | High Performance Very flexible bonds       | 2:3                    | 80,000                                  | 90 minutes                                | 10 hours   | 25                                  | 3,000               | 3,200       | 400          |
| DP270 (Black, Clear)  | Rigid potting compound Non-corrosive       | 1:1                    | 12,000                                  | 60 minutes                                | 3 hours  | 2                                   | 1,200               | 2,500       | 300          |
| DP420 (Off-White)     | Tough durable bonds High impact resistance | 2:1                    | 30,000                                  | 20 minutes                                | 2 hours  | 50                                  | 4,500               | 4,500       | 450          |
| DP420 (Black)         | Tough durable bonds High impact resistance | 2:1                    | 30,000                                  | 20 minutes                                | 2 hours  | 50                                  | 4,500               | 4,500       | 1,250        |
| DP420NS (Black)       | Tough durable bonds Non-sag                | 2:1                    | 180,000                                 | 20 minutes                                | 2 hours  | 50                                  | 4,500               | 4,500       | 1,250        |
| DP460 (Off-White)     | Tough durable bonds High impact resistance | 2:1                    | 30,000                                  | 60 minutes                                | 4 hours  | 60                                  | 4,500               | 4,500       | 700          |
| DP460NS (Off-White)   | Tough durable bonds Non-sag                | 2:1                    | 125,000                                 | 60 minutes                                | 4 hours  | 60                                  | 4,900               | 4,650       | 1,350        |

Note: The technical information and data on these pages should be considered representative or typical only and should not be used for specification purposes.

\* Available in Duo-Pak Cartridges only.

Duo-Pak Cartridges continued on next page.



3M™ Scotch-Weld™ Epoxy Adhesive DP420 bonds the stainless steel shaft into the stainless steel head of a golf club with handling strength in two hours.



3M™ Scotch-Weld™ Low Odor Acrylic Adhesive DP810 requires minimal surface preparation for bonding metal hinges into awning frames.



3M™ Scotch-Weld™ Structural Adhesive EC2216 bonds honeycomb to aluminum for common applications in aerospace and transportation.

# Product UPC List

| Product             | Size  | UPC  | Stock #  |
|---------------------|---|--|--|
| DP100 Clear         | 50ml<br>200ml<br>400ml  | 00-021200-22648-9<br>00-021200-87260-0<br>00-021200-87261-7                      | 62-3575-1435-5<br>62-3575-3830-5<br>62-3575-3530-1                   |
| 100 Clear           | 5 gallon pail B<br>5 gallon pail A  | 00-021200-82344-2<br>00-021200-82345-9   | 62-3575-8531-4<br>62-3675-8531-2                                     |
| DP100 Plus Clear    | 50ml<br>200ml<br>400ml  | 00-021200-87195-5<br>00-021200-87266-2<br>00-021200-87267-9                      | 62-3272-1435-9<br>62-3272-3830-9<br>62-3272-3530-5                   |
| 100 Plus Clear      | 5 gallon pail B<br>5 gallon pail A  | 00-021200-87197-9<br>00-021200-87198-6   | 62-3272-8530-0<br>62-3372-8530-8                                     |
| DP100FR Off-White   | 50ml<br>200ml<br>400ml  | 00-048011-56742-6<br>00-048011-56744-0<br>00-048011-56743-3                      | 62-3531-1435-8<br>62-3531-3830-8<br>62-3531-3530-4                   |
| 100FR Off-White     | 5 gallon pail B<br>5 gallon pail A  | 00-048011-57229-1<br>00-048011-57230-7   | 62-3531-8530-9<br>62-3631-8530-7                                     |
| DP100NS Translucent | 50ml<br>200ml<br>400ml  | 00-021200-82255-1<br>00-021200-87264-8<br>00-021200-87265-5                      | 62-3265-1435-3<br>62-3265-3830-3<br>62-3265-3530-9                   |
| 100NS Translucent   | 5 gallon pail B<br>5 gallon pail A  | 00-021200-82256-8<br>00-021200-82257-5   | 62-3265-8530-4<br>62-3365-8530-2                                     |
| DP105 Clear         | 50ml<br>200ml<br>400ml  | 00-021200-87203-7<br>00-021200-87270-9<br>00-021200-87271-6                      | 62-3287-1435-7<br>62-3287-3830-7<br>62-3287-3530-3                   |
| 105 Clear           | 5 gallon pail B<br>5 gallon pail A  | 00-021200-87205-1<br>00-021200-87206-8   | 62-3287-8530-8<br>62-3387-8530-6                                     |
| DP110 Gray          | 50ml<br>200ml<br>400ml  | 00-021200-82470-8<br>00-021200-87274-7<br>00-021200-87275-4                      | 62-3533-1434-7<br>62-3533-3830-4<br>62-3533-3530-0                   |
| 110 Gray            | 5 gallon pail B<br>5 gallon pail A  | 00-021200-82471-5<br>00-021200-82472-2   | 62-3533-8531-3<br>62-3633-8531-1                                     |
| DP110 Translucent   | 50ml<br>200ml<br>400ml  | 00-021200-82465-4<br>00-021200-87846-6<br>00-021200-87847-3                      | 62-3563-1434-4<br>62-3563-3830-1<br>62-3563-3530-7                   |
| 110 Translucent     | 5 gallon pail B<br>5 gallon pail A  | 00-021200-82466-1<br>00-021200-82467-8   | 62-3563-8531-0<br>62-3663-8531-8                                     |
| DP125 Gray          | 50ml<br>200ml<br>400ml  | 00-021200-87215-0<br>00-021200-87844-2<br>00-021200-87845-9                      | 62-3293-1435-5<br>62-3293-3830-5<br>62-3293-3530-1                   |
| 125 Gray            | 5 gallon pail B<br>5 gallon pail A  | 00-021200-87217-4<br>00-021200-87218-1   | 62-3293-8530-6<br>62-3393-8530-4                                     |
| DP125 Translucent   | 50ml<br>200ml<br>400ml  | 00-021200-87211-2<br>00-021200-87842-8<br>00-021200-87843-5                      | 62-3291-1435-9<br>62-3291-3830-9<br>62-3291-3530-5                   |
| DP190 Gray          | 50ml<br>200ml<br>400ml  | 00-021200-22647-2<br>00-021200-87840-4<br>00-021200-87841-1                      | 62-3553-1435-2<br>62-3553-3830-2<br>62-3553-3530-8                   |
| DP190 Translucent   | 50ml<br>200ml<br>400ml  | 00-021200-87219-8<br>00-021200-87838-1<br>00-021200-87839-8                      | 62-3286-1435-9<br>62-3286-3830-9<br>62-3286-3530-5                   |
| DP270 Black         | 50ml<br>200ml<br>400ml  | 00-021200-82262-9<br>00-021200-87836-7<br>00-021200-87837-4                      | 62-3266-1435-1<br>62-3266-3830-1<br>62-3266-3530-7                   |
| 270 Black           | Gallon Kit<br>5 gallon pail B<br>5 gallon pail A                          | 00-021200-82263-6<br>00-021200-82264-3<br>00-021200-82265-0                      | 62-3266-7430-6<br>62-3266-8530-2<br>62-3366-8530-0                   |
| DP270 Clear         | 50ml<br>200ml<br>400ml  | 00-021200-82248-3<br>00-021200-87834-3<br>00-021200-87835-0                      | 62-3262-1435-0<br>62-3262-3830-0<br>62-3262-3530-6                   |
| 270 Clear           | 5 gallon pail B<br>5 gallon pail A  | 00-021200-82250-6<br>00-021200-82251-3   | 62-3262-8530-1<br>62-3362-8530-9                                     |
| DP420 Black         | 37ml<br>200ml<br>400ml  | 00-021200-41528-9<br>00-021200-41530-2<br>00-021200-41529-6                      | 62-2778-1435-6<br>62-2778-3830-6<br>62-2778-3530-2                   |
| 420 Black           | 5 gallon pail B<br>5 gallon pail A<br>5 gallon drum B<br>55 gallon drum A | 00-021200-41531-9<br>00-021200-41532-6<br>00-021200-41533-3<br>00-021200-41534-0 | 62-2778-8530-7<br>62-2878-8530-5<br>62-2778-9530-6<br>62-2878-9530-4 |

Blue indicates non-stocked items

| Product                    | Size   | UPC  | Stock #  |
|----------------------------|--|--|--|
| DP420 Off-White            | 37ml<br>200ml<br>400ml   | 00-021200-82236-0<br>00-021200-87832-9<br>00-021200-87833-6                      | 62-3280-1435-2<br>62-3280-3830-2<br>62-3280-3530-8                   |
| 420 Off-White              | 5 gallon pail B<br>5 gallon pail A   | 00-021200-82238-4<br>00-021200-82239-1   | 62-3280-8530-3<br>62-3380-8530-1                                     |
| DP420NS Black              | 37ml<br>200ml  | 00-021200-39285-6<br>00-021200-39286-3   | 62-3299-1435-2<br>62-3299-3832-8                                     |
| 420NS Black                | 5 gallon pail B<br>5 gallon pail A<br>55 gallon drum B<br>55 gallon drum A | 00-021200-56587-8<br>00-021200-31309-7<br>00-048011-58132-3<br>00-048011-58133-0 | 62-3299-8535-2<br>62-3399-8530-1<br>62-3299-9530-2<br>62-3399-9530-0 |
| DP460 Off-White            | 37ml<br>200ml<br>400ml   | 00-021200-82225-4<br>00-021200-87830-5<br>00-021200-87831-2                      | 62-3593-1435-8<br>62-3593-3830-8<br>62-3593-3530-4                   |
| 460 Off-White              | Quart Kit<br>5 gallon pail B<br>5 gallon pail A                            | 00-021200-82226-1<br>00-021200-82227-8<br>00-021200-82228-5                      | 62-3593-6430-4<br>62-3593-8530-9<br>62-3693-8530-7                   |
| DP460NS Off-White          | 37ml<br>200ml<br>400ml   | 00-021200-43670-3<br>00-021200-43671-0<br>00-021200-43672-7                      | 62-2792-1435-7<br>62-2792-3830-7<br>62-2792-3530-3                   |
| 460NS Off-White            | 5 gallon pail B<br>5 gallon pail A   | 00-021200-43673-4<br>00-021200-43674-1   | 62-2792-8530-8<br>62-2892-8530-6                                     |
| DP600 Gray / Self-Leveling | 50ml<br>12 oz  | 00-021200-56602-8<br>00-021200-56599-1   | 62-2649-5030-4<br>62-2649-1230-4*                                    |
| 600 Concrete Repair        | 8.4 oz   | 00-021200-96596-8  | 62-2649-1233-8   |
| 600 Gray / Self-Leveling   | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96574-6<br>00-021200-96575-3<br>00-021200-96576-0<br>00-021200-96577-7 | 62-2649-8535-9<br>62-2749-8535-7<br>62-2649-9535-8<br>62-2749-9535-6 |
| DP600NS Gray               | 50ml<br>12 oz  | 00-021200-56603-5<br>00-021200-56606-6   | 62-2652-1230-8<br>62-2652-5030-8*                                    |
| 600NS Gray                 | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96578-4<br>00-021200-96579-1<br>00-021200-96580-7<br>00-021200-96581-4 | 62-2652-8535-3<br>62-2752-8535-1<br>62-2652-9535-2<br>62-2752-9535-0 |
| DP601 Gray                 | 50ml<br>12 oz  | 00-021200-96410-7<br>00-021200-96411-4   | 62-2649-5031-2<br>62-2649-1232-0                                     |
| 601 Gray                   | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96451-0<br>00-021200-96452-7<br>00-021200-96507-4<br>00-021200-96508-1 | 62-2649-8530-0<br>62-2749-8530-8<br>62-2649-9530-9<br>62-2749-9530-7 |
| DP601NS Gray               | 50ml<br>12 oz  | 00-021200-96407-7<br>00-021200-96408-4   | 62-2652-5031-6<br>62-2652-1231-6                                     |
| 601NS Gray                 | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96453-4<br>00-021200-96454-1<br>00-021200-96509-8<br>00-021200-96510-4 | 62-2652-8530-4<br>62-2752-8530-2<br>62-2652-9530-3<br>62-2752-9530-1 |
| DP604NS Black              | 50ml<br>12 oz  | 00-021200-96412-1<br>00-021200-56598-4   | 62-2648-5030-6<br>62-2648-1230-6                                     |
| 604NS Black                | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96461-9<br>00-021200-96462-6<br>00-021200-96531-9<br>00-021200-96532-6 | 62-2648-8530-2<br>62-2748-8530-0<br>62-2648-9530-1<br>62-2748-9530-9 |
| DP605NS Off-White          | 50ml<br>200ml<br>400ml   | 00-021200-82252-0<br>00-021200-87853-4<br>00-021200-87854-1                      | 62-3592-1435-0<br>62-3592-3830-0<br>62-3592-3530-6                   |
| 605NS Off-White            | 5 gallon pail B<br>5 gallon pail A   | 00-021200-82253-7<br>00-021200-82254-4   | 62-3592-8530-1<br>62-3692-8530-9                                     |
| DP608 Black                | 50ml<br>12 oz  | 00-021200-96418-3<br>00-021200-56607-3   | 62-3268-5030-2<br>62-3268-1231-0                                     |
| 608 Black                  | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96513-5<br>00-021200-96514-2<br>00-021200-96515-9<br>00-021200-96516-6 | 62-3268-8530-8<br>62-3368-8530-6<br>62-3268-9530-7<br>62-3368-9530-5 |
| DP620NS Black              | 50ml<br>12 oz  | 00-021200-96416-9<br>00-021200-56685-1   | 62-2645-5030-2<br>62-2645-1232-8                                     |
| 620NS Black                | 5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A | 00-021200-96449-7<br>00-021200-96450-3<br>00-021200-96505-0<br>00-021200-96506-7 | 62-2645-8530-8<br>62-2745-8530-6<br>62-2645-9530-7<br>62-2745-9530-5 |
| DP640 Brown                | 50ml<br>200ml<br>400ml   | 00-021200-89543-2<br>00-021200-89545-6<br>00-021200-89544-9                      | 62-3549-1435-0<br>62-3549-3830-0<br>62-3549-3530-6                   |
| DP805 Yellow               | 50ml<br>200ml<br>400ml   | 00-021200-83758-6<br>00-021200-87828-2<br>00-021200-87829-9                      | 62-3288-1435-5<br>62-3288-3830-5<br>62-3288-3530-1                   |
| 805 Yellow                 | 5 gallon pail B<br>5 gallon pail A   | 00-021200-87233-4<br>00-021200-87234-1   | 62-3288-8530-6<br>62-3388-8530-4                                     |
| DP810 Tan                  | 50ml<br>200ml<br>400ml   | 00-021200-31310-3<br>00-021200-31311-0<br>00-021200-31312-7                      | 62-3298-1435-4<br>62-3298-3830-4<br>62-3298-3530-0                   |
| 810 Tan                    | 20 liter pail B<br>20 liter pail A   | 00-021200-45230-7<br>00-021200-45233-8   | 62-3298-8730-1<br>62-3398-8730-9                                     |
| DP810 Black                | 50ml   | 00-021200-49077-4  | 62-2788-1435-5   |

\*Large Buy

Blue indicates non-stocked items

| Product                              | Size   |
|--------------------------------------|--|
| DP810NS Tan                          | 50ml<br>200ml<br>400ml   |
| 810NS Tan                            | 20 liter pail B<br>20 liter pail A   |
| DP820 Yellow                         | 50ml<br>200ml<br>400ml   |
| 1386 Cream                           | 1 quart<br>5 gallon pail   |
| 1469 Cream                           | 1 quart<br>5 gallon pail   |
| 1751 Gray                            | 2 Oz tube kit<br>pint kit<br>quart kit<br>gallon kit<br>5 gallon pail B<br>5 gallon pail A   |
| 1838 Green                           | 2 Oz tube kit<br>pint kit<br>quart kit<br>gallon kit<br>5 gallon pail B<br>5 gallon pail A   |
| 1838 Tan                             | quart kit<br>5 gallon pail B<br>5 gallon pail A  |
| 1838L Translucent                    | 2 Oz tube kit<br>quart kit<br>5 gallon pail B<br>5 gallon pail A   |
| 2158 Gray                            | pint kit<br>quart kit<br>gallon kit<br>5 gallon pail B<br>5 gallon pail A  |
| 2214 Gray / Regular                  | 6 Oz cartridge<br>1 quart<br>5 gallon pail   |
| 2214 Gray / Hi-Density               | 6 Oz cartridge<br>5 gallon pail  |
| 2214 Gray / Hi-Temp New Formula      | 6 Oz cartridge<br>5 gallon pail  |
| 2214 Gray / Hi-Temp Original Formula | 6 Oz cartridge   |
| 2214 Cream / Non Metallic            | 2 Oz tube<br>6 Oz cartridge  |
| 2216 Gray                            | 2 Oz tube kit<br>pint kit<br>quart kit<br>gallon kit<br>5 gallon pail B<br>5 gallon pail A<br>50 gallon drum B<br>50 gallon drum A |
| 2216 Tan / Non-Sag                   | 5 gallon pail B<br>5 gallon pail A   |
| EC2216 Gray (Duo-Pak)                | 43ml   |
| 2290 Amber                           | gallon container<br>5 gallon pail<br>54 gallon drum  |
| 3501 Gray                            | 2 Oz tube kit<br>pint kit<br>gallon kit  |
| 3532 Brown                           | 2 Oz kit<br>quart kit<br>5 gallon pail B<br>5 gallon pail A  |
| 3535 Off-White                       | 2 Oz kit<br>quart kit  |
| 3549 Brown                           | 2 Oz kit<br>quart kit<br>5 gallon pail B<br>5 gallon pail A  |
| 3901 Red                             | 1/2 pint   |