

Solitaire® (Heraeus Kulzer, Inc.) (Project 98-23) (01/99)

Solitaire® is a visible-light cured, highly-filled resin composite (66% wt, 90% vol) developed to be used for posterior restorations. A number of problems have been associated with using resin composite for posterior restorations, including staining, marginal ditching, post operative sensitivity, increased wear compared to metallic restorations, and difficulties in obtaining adequate interproximal contacts. In an effort to overcome these problems, particularly the latter two, Heraeus Kulzer has introduced Solitaire®.



Solitaire® is described by the manufacturer as a polyglas® posterior resin. It contains a proprietary porous filler particle (2 to 20 µm diameter) which purportedly allows the resin matrix to penetrate and interlock into the particle. The rough surface (described as "poly-globular" by the manufacturer) of the particle allows for interparticle interlocking which provides resistance to slumping and condensability characteristics similar to those of amalgam. In addition, the highly-filled nature of this resin composite ostensibly enhances both its handling and wear characteristics. Heraeus Kulzer claims that Solitaire® releases fluoride.

To use the product, normal posterior composite preparation, wedging, and matrix application procedures are followed. After application of the Solid Bond dentin bonding system, Solitaire® is placed, condensed, and light cured in two-millimeter increments. The company has recently reaffirmed its recommendation for the two-millimeter curing depth, however it has also said that if the dentist uses a curing light with an irradiance of at least 1050 mW/cm², greater depth of cure will be achieved. The purported depth of cure will vary depending on the shade, but ranges from a low of 3.7 mm (shade A30) to a high of 6.2 mm (incisal shade). Interestingly, the company's caution against using increments greater than two millimeters is not because of concerns regarding inadequate cure but rather because of stresses on enamel walls that may occur during bulk curing. After composite placement and curing, normal finishing and polishing procedures are utilized.

Manufacturer:

Heraeus Kulzer, Inc.
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Suggested Retail Price:

\$391.00 Solitaire® Assortment Kit

- six 3-g syringes (one each of shades A10,20,30; B20,30; incisal)
- two 2.5-mL syringes of Estick etchant
- one 4-mL bottle of Solid Bond P (primer)
- two 2-mL bottles of Solid Bond S (sealant)
- brush handle, disposable brushes & tips

\$325.15 Solitaire® PLT (Pre-Loaded Tips) Assortment Kit

- thirty-six 0.25-g pre-loaded tips (six each of shades A10,20,30; B20,30; incisal)
- two 2.5-mL syringes of Estick etchant
- one 4-mL bottle of Solid Bond P (primer)
- two 2-mL bottles of Solid Bond S (sealant)
- brush handle, disposable brushes & tips
- Centrix Nu-Gun

\$64.35 3-g syringe refill/twelve 0.25-g refill pre-loaded tips

Government Price:

\$220.90 Solitaire[®] Assortment Kit (contents as listed above)

\$182.83 Solitaire[®] PLT Assortment Kit (contents as listed above)

\$36.30 3-g syringe refill/twelve 0.25-g refill pre-loaded tips

ADVANTAGES:

- + Complete, well-organized packaging.
- + Contains complete dentin bonding agent system.
- + Contains well-illustrated, laminated, graphics card.
- + Judged by some evaluators to be less adherent to instruments than other composites.
- + Judged by some evaluators to be more condensible than some composites.
- + Judged by some evaluators to resist slumping following placement.
- + Purports fluoride release.

DISADVANTAGES:

- Material Safety Data Sheet (MSDS) must be requested separately.
- Low surface hardness.
- Less radiopaque than enamel; does not meet manufacturer's claim.
- Inadequate cure in bulk (e.g. 5 mm or greater with shades A10, A20).
- Very high clinical wear reported.
- Most evaluators felt claim of "amalgam-like condensibility" was not warranted.
- Judged by some evaluators to be less viscous than other composites.
- More expensive than many other resin composites.

SUMMARY AND CONCLUSIONS:

Solitaire[®] comes in a well-organized package that includes a nicely illustrated, laminated, graphics card that evaluators thought offered good-to-excellent readability, technique description, and amount of detail. The Solitaire[®] Assortment kit is also very complete and includes a dentin bonding system. Evaluators thought the six shades in the kit offered appropriate esthetics, although some added the proviso that the esthetics would not be adequate for anterior restorations. In addition, most found Solitaire[®] to be less adherent to instruments during placement than other resin composites. While most users thought that Solitaire[®] was more viscous than other composites they had used, 36% found that it was no more so, or even less viscous than other materials they were currently using. Evaluators were overwhelmingly (91%) in agreement that Solitaire[®] retained its shape after being placed, which was particularly useful in placing and maintaining occlusal anatomy in the final composite increment prior to light curing. Laboratory results showed that Solitaire[®] had low surface hardness; in fact it is one of the least hard resin-containing restorative materials that DIS has tested. This may help to explain in part one clinical trial which has reported very high wear in just a six-month period (Flessa et al, J Dent Res 1998;77:237, abstract #1051). Radiopacity of Solitaire[®] is also a concern, in that DIS testing revealed it to be significantly less radiopaque than enamel, a criterion considered important in aiding in the diagnosis of recurrent caries. In addition, the radiopacity of Solitaire[®] was found to be 100% the equivalent thickness of aluminum. This is considerably below the company's claim of 150%. Another concern is that while the company recommends placing and curing Solitaire[®] in two-millimeter increments, it also states that practitioners can use bulk placement and curing if so desired. DIS testing reveals inadequate cure at the bottom of the company's recommended thickness for bulk-cured specimens. Evaluators overwhelmingly considered the company's claim of "amalgam-like condensibility" to be inaccurate. Price comparison shows that Solitaire[®] is considerably more expensive than many competitors' resin composites. **Solitaire[®]** is rated **Marginal** for use by the federal dental services.

UPDATE Since this evaluation was completed, Heraeus Kulzer has discontinued Solitaire[®] and replaced it with Solitaire[®] 2. The company claims that the new version has improved physical and mechanical properties.