

# Don K. Mukai

## MECHANICAL ENGINEER

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**Mrs. Paola Recendez**  
S. Bravo Systems, Inc.  
2929 Vail Ave.  
Commerce, CA 90040

**Re: Specification approved by a state registered professional engineer**  
CCR Title 23, Division 3, Chapter 16, Article 3, Section 2631(d)

**This letter is for an engineering specification review and approval of a secondary containment system component which is not an integral part of primary containment for an underground fuel tank storage system in California. The authority for this approval comes from the California Code of Regulations (CCR) Title 23, Division 3, Chapter 16, Article 3, Section 2631(d).**

I have examined and reviewed the following specifications on the Bravo FPE-Series fiberglass entry fittings:

- 1) UL Certifications Directory MH26018 for Vipel F-764 and F-774 resins
- 2) AOC Vipel Product Selection Guide & Corrosion Resistance Guide
- 3) Bravo datasheets F-Series-SW-10A, F-Series-DW-10A
- 4) Bravo Installation Manuals ii-F-SERIES-TS-11A, ii-F-SERIES-TS-D-11A, ii-F-SERIES-SS-09B, ii-F-SERIES-TS-ADJ-INSERT, ii-F-SERIES-1X-SS-11A, ii-F-SERIES-1X-SS-D-11A, ii-SANDKIT-11B
- 5) Bravo Systems Third Party document 3RP-F-Series
- 6) Bravo Systems UL Approval document CUL-FSeries
- 7) Bravo material compatibility letters Sumps\_AlternativeFuels\_R1 and Fittings\_AlternativeFuels\_R1
- 8) Bravo ADHESIVE-EPOXY-KIT and ADHESIVE-RETROFIT-EPOXY-KIT products
- 9) Bravo ADHESIVE-PE-KIT product
- 10) Smith Bulletin D4025, D4010 and B2102
- 11) Ameron PSX-20 Adhesive Kit - Bondstrand Product Data FP698B

This system provides for penetration of a flexible pipe with a linear polyethylene exterior through a single wall or double wall fiberglass containment sump wall. This product maintains the integrity of a single walled containment sump by being permanently bonded to the fiberglass sump wall with fiberglass epoxies. The double wall variant of this system maintains the integrity of both the primary and secondary wall including the integrity of the interstice by means of the same permanent bond. The piping is permanently sealed to the FPE-Series fitting by way of adhesive injection similar to that of the parent F-Series entry fittings. The adhesive required for the injection process is specifically for bonding polyethylene materials.

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For the purposes of this review, I have:

- 1) Reviewed the construction and installation procedures for the single wall and double wall FPE-Series fiberglass entry fittings for polyethylene exterior pipe.
- 2) Reviewed Bravo test procedures and results for the PE adhesive injection which included: thrust testing, torsion testing and full submersion testing to gauge fuel resistance.
- 3) Reviewed materials used to construct the secondary containment system for sufficient thickness, density and corrosion resistance to prevent structural weakening or damage to the secondary containment system as a result of contact with hazardous substances contained in common fuels.

Upon review of the manufacturing procedures, the employment of the materials used in the Bravo Systems FPE-Series and FPE-Series-D product lines and the manufacturer's installation guidelines, it is my conclusion that sound design and engineering of this product for use with fiberglass single wall and double walled containment structures and the aforementioned pipe type will meet or exceed the secondary containment requirements for corrosion resistance and material compatibility of all motor vehicle fuels, alternative fuels or their additives currently used by petroleum marketers today. I approve the above engineering specifications for the following Bravo FPE-Series fittings:

**FPE-Series SingleWall Fiberglass entry fittings for flat sump walls:**

F-40-PE, F-50-PE, F-63-PE, F-75-PE, F-90-PE, F-110-PE, F-125-PE, F-160-PE

**FPE-Series SingleWall Fiberglass entry fittings for curved (round) sump walls:**

F-40-PE-RND, F-50-PE-RND, F-63-PE-RND, F-75-PE-RND, F-90-PE-RND, F-110-PE-RND, F-125-PE-RND, F-160-PE-RND


**FPE-Series DoubleWall Fiberglass entry fittings for flat sump walls:**

F-40-PE-D, F-50-PE-D, F-63-PE-D, F-75-PE-D, F-90-PE-D, F-110-PE-D, F-125-PE-D, F-160-PE-D

**FPE-Series DoubleWall Fiberglass entry fittings for curved (round) sump walls:**

F-40-PE-D-RND, F-50-PE-D-RND, F-63-PE-D-RND, F-75-PE-D-RND, F-90-PE-D-RND, F-110-PE-D-RND, F-125-PE-D-RND, F-160-PE-D-RND

Please contact me with any questions at 800-282-7286.

Sincerely,  
  
Don K. Mukai  
Mechanical Engineer

