

FRP Arch Cover Standard Specification

1. General Information

The main cover segments of Arch Covers shall be self-supporting and the additional sections shall be joined with a weather tight seal.

- Access hatches and accessories provided as needed shall be of similar integrated FRP material.
- Distinct panels and beams can be used with backing of 316 stainless steel supports if needed when the clearance below the cover is not an apprehension.
- Structural members shall rest on the chamber wall, when the clearance below the cover is an apprehension.

Following standards shall apply to the FRP covers as follow in this specification:

- Minimum Design Loads for Buildings and Other Structures: ANSI/ASCE 7-98
- Standard Recommended Practice for Classifying Visual Defects in Glass Reinforced Laminates: ANSI/AWWA-F102-91

2. Physical properties

Property at 70F°	Amount	Test Method
Ultimate Tensile Strength	26,500 psi	ASTM D-638
Tensile Modulus	1.5 x 10 ⁶ psi	ASTM D 638
Flexural Strength	30,000 psi	ASTM D 790
Flexural Modulus	1.5 x 10 ⁶ psi	ASTM D 790
Punch Shear	23,000 psi	ASTM D-732
Barcol Hardness	40-50	ASTM D 2583
Glass Content	45%	ASTM D 2584

Table 1: Minimum Physical Properties

3. Design Criteria

The additional supports are being required at times by the hatches and/or openings. Except in these cases, the horizontal loads shall be contained by panel sections only.

The Arch covers will be designed under ANSI/ASCE 7-98:

- Live load: 40 PSF (maximum)
- Wind load: 100 MPH (maximum)
- Snow load: The value of the snow load shall be as calculated in accordance with ANSI/ASCE 7-98 for the designated area.
- Seismic zone requirements per ANSI/ASCE 7-98 for the designated area.
- Design safety factor of 5:1 for allowable stresses shall be met for all load combinations.
- Over an ambient air temperature range of -30 to 120F, the proper provisions for thermal expansions and contractions shall be incorporated in the installation of these Arch Covers.

4. Materials

Materials for the FRP Arch covers shall be chosen accordingly to the function and service specified. The raw materials shall be new and shall exist in their precise standards in the usage. Not any of the material shall be used in the construction which the engineer rejects. Approval for incorporation into the project will be made only after the review of shop drawings and specifications.

The EdgengArch covers are made out of a resin which shall be a corrosion resistant polyester. Ultraviolet-light inhibitors shall be added to the laminate to prevent degradation due to sun light.

5. General Requirements

FRP High strength material shall be used to develop all structural components. Cut edges or drilled holes shall be sealed with paraffinated resin solution. A non-skid surface shall be supplied that is comprised of aliphatic acrylic polyurethane non-skid coating with UV protection. Gasketing for panel joints shall be EPDM sponge. If required on the contract drawings access hatches and accessories shall be provided on cover segments.

6. Submittals

The final project approval will be made after all the drawings, specifications and data are reviewed precisely. The shop drawings shall be drawn of the required projects according to all the dimensions, anchor locations and the location area dimensions.

Specifications for the relevant project in all areas of components shall be provided. Details of the major fabricated components showing the arrangement of components and labeled with component sizes and materials of construction shall be submitted.

Structural calculations for all components shall be submitted. Manufacturer's commended procedures for job site storage of equipment, handling, and erection shall be submitted.

The fabricator shall supply any and all analyses relevant to the composite design as a part of the shop drawings. To the sections where the conventional methods are not being applied, the standard strengths of materials and finite element analysis of each section should be included in the calculations. Furthermore, for the calculated loads, a complete laminate analysis shall be submitted identifying the various factors of safety for the proposed laminate schedule. The

evaluation of deflection and stresses on panel sections under uniform loading shall incorporate numerical analysis calculations.

7. Quality Assurance

A. Qualifications:

- Five years successful experience in fabricating FRP Arch cover systems would be the minimum requirement for the manufacturer.
- FRP Arch cover manufacturer shall retain a registered professional engineer legally qualified to practice in same state as the Site.
- Responsibilities include:
 - FRP Arch cover system performance and design criteria stated in the Contract Documents shall be reviewed.
 - Written requests should be prepared for clarifications or interpretations of performance or design criteria for submittal to engineer or contractor.
 - Preparation of design calculations verifying compliance of FRP Arch
 - Cover system with requirements of the Contract Documents should be supervised.
 - Signing and sealing all calculations.
 - Design of FRP Arch cover system was performed in accordance with performance and design criteria stated in the Contract Documents should be certified
- Installer Qualifications
 - Retain a single installer trained and with record of successful experience in installing FRP Arch cover systems.
 - Installer shall have record of successfully installing FRP cover systems in accordance with recommendations and requirements of manufacturer, or shall provide evidence of being acceptable to the manufacturer.
 - Installer shall employ only tradesmen with specific skill and successful experience in the type of Work required.
 - When requested by the engineer, submit name and qualifications of installer with the following information for at least three successful, completed projects:
 - Names and telephone numbers of owner and architect or engineer responsible for each project.
 - Approximate contract cost of the FRP cover systems for which installer was responsible.

B. System Manufacture

1. EDGENG

2. If Contractor wished to furnish an alternate system manufacturer, Contractor shall first make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by Engineer in evaluating the proposed substitute.

C. Source Quality Control:

1. Obtain all products included in this Section regardless of component manufacturer, from a single cover system manufacturer.
2. FRP cover system manufacturer shall prepare all Shop Drawings and other submittals (except for delegated design submittals, when professional engineer is retained by other than cover manufacturer) for all components furnished under this Section.
3. Components shall be specifically constructed for specified service conditions and shall be integrated into overall assembly by FRP cover manufacturer.

8. Warranty

From date of shipment of the fabricated Arch cover for materials and workmanship minimum of one (1) year after installation with a maximum of eighteen (18) months would be the general warranty for these FRP Arch cover systems.

The contractor shall be responsible for verifying all field dimensions to develop and approve shop drawings.

9. Fabrication

Adequate drainage of water from cover shall be provided. A minimum of ¼" rise over 1' length shall be required for this purpose.

All field measurements with the approved Arch cover fabrication drawing shall be confirmed by the contractor before fabrication is initiated.

All hardware shall be 316 Stainless Steel materials.

10. Shop Assembly

A minimum of three (3) equal cover segments to a full scale layout to insure proper fit and assembly shall be pre-assembled by the contractor. If cover consists of less than (3) equal segments, the manufacturer shall pre-assemble the cover in its entirety for proper fit.

Fiberglass cutouts from cover segments shall be identified and shipped with cover. Cutouts will be used by the engineer to determine proper thickness, glass content and laminate sequence. (Hand lay-up only)