



FiberSystems

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*Obtaining Your Best Buy In
Corrosion Resistant Equipment*

03-16-2007

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A Check List For Mission Critical Projects

Most knowledgeable purchasers of FRP composite piping and corrosion resistant equipment make their purchasing decision on other than just price, and price alone. More typical is to make the purchasing decision on a combination of pre-qualification of the total turnkey and engineering support capabilities of the vendor; along with the lowest cost per year of service life.

To help our potential customers evaluate proposals for mission critical projects, we have developed a "checklist" which allows you to evaluate one proposal versus another. A copy of this checklist is attached for your convenience.

For mission critical projects, we recommend a workshop and engineering seminar to discuss ways of reducing the installed cost on specific projects. We invite you, and your engineers, to visit with us here in Dayton.

We know that such workshops are often viewed as "too time consuming". But, when you are spending large sums of money on FRP composite equipment, the extra information and cost savings ideas that can be gained from such seminars can provide great rewards and "peace of mind". We promise to "roll out the red carpet".



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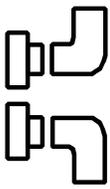
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Check List for Qualifying FRP Composite Manufacturers for Mission Critical Projects

People Resources:	F/S	
How many total on-staff engineers, to support the customer's technical requirements, are available?	14	
As an indication of the ability to provide the customer's requirements for engineered solutions; how many of the on-staff engineers are professional engineers (PE)?	3	
How many total on-staff personnel are AutoCAD literate and available to support and interface with the customer's engineering staff?	10	
Has the composites manufacturer furnished organizational charts and/or tables of people resources available to support the customer?	Yes	
Has the composites manufacturer furnished mini or thumbnail resumes of the key personnel that will be available for and support this project?	Yes	
Does the composites manufacturer have an in-house manufacturing planner - whose primary responsibility to plan and manage the customer's time critical projects?	Yes	
Is that manufacturing planner supported by custom project management and scheduling software; such as Job Boss or Vista?	Yes	
Does this composites manufacturer have an in-house full time Research and Development capability - staffed with experienced R&D personnel devoted to the development of new composites technology and solutions to customer specific composite requirements?	Yes	
Does this composites manufacturer have the in-house ability to design, engineer, and build RTM and VARTM presses, molds, and injection equipment?	Yes	
Manufacturing Technology and Resources:	F/S	
Is the manufacturer a custom composite pipe manufacturer, providing the proven ability of producing an unlimited "Series" of pipe to meet specific service conditions? (For example: a 200 mil corrosion and abrasion resistant liner for severe abrasive service.)	Yes	
How long (number of years) has the composite manufacturer been building polymer based truly abrasion resistant FRP composite pipe?	32 years	
Is the composite manufacturer's polymer abrasion resistant technology backed up by laboratory testing (i.e., Tabor testing)?	Yes	
Does the composite manufacturer's polymer based abrasion resistant pipe use all three of the time proven technologies to increase service life? (i.e., elastomeric toughened resin, synthetic reinforcements, and basalt based abrasion modifiers)	Yes	



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Does the composites manufacturer have the proven in-house experience and know how to build and provide the superior filament wound flanges and fittings through 42" diameter?	Yes	
Does this composite manufacturer build "one piece" FRP composite fittings for a full range of pipe sizes?	Yes	
What is the smallest size FRP composite pipe and duct that this manufacturer builds?	3/8"	
What is the current largest size FRP composite pipe and duct that this manufacturer is "tooled up" to build in-house?	162"	
To support customer specific pipe and duct sizes; can, and has, this composite manufacturer built in-house special diameters and sizes of fittings?	Yes	
How many different sizes of pipe and duct does this composites manufacturer have mandrels for?	155+	
Does this fabricator have the in-house ability to make their own tooling and fixtures to support on a timely basis customer needs for: Special angle elbows, special laterals, reducing fittings, true wyes, spacer flanges, special diameter one piece reducing flanges, etc.? (Ask to see their machine shops.)	Yes	
To support requirements for custom and close tolerance FRP composite equipment does this composites manufacturer have in-house capability of machining large diameter and long lengths of composite piping and equipment?	Yes	
What is the maximum diameter part that can be machined?	92"	
What is the maximum length part that can be machined?	30 ft.	
Does this composites manufacturer have in-house proven resin transfer molding (RTM) and Vacuum Assisted RTM (VARTM) capability and experience - for providing custom solutions for molded corrosion resistant equipment - in part sizes of 40 feet and larger?	Yes	
Does this composites manufacturer make in-house their own FRP composite threaded, bulkhead, and Victaulic fittings and adapters in all sizes 3/8" through 12"?	Yes	
Are those threaded fittings all of the superior filament wound FRP composite construction (as opposed to gunk molded fittings)?	Yes	
Does this composites manufacturer have the in-house machining capability to make filament wound male NPT tapered threads, straight threads, API threads, etc.?	Yes	
Does this composites manufacturer make in-house (in the U.S.) Metric pipe fittings and flanges - including DIN, British, and JIS standards - to support maintenance and replacement requirements for imported process equipment (pumps, filters, systems); and for equipment being built for export?	Yes	
Does this composites manufacturer have experience in producing piping systems with an external corrosion and abrasion resistant barrier; and can they provide samples of this technology?	Yes	



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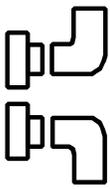
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For special site requirements (limited space or headroom, buried cover restrictions, etc.) does this composites manufacturer make filament wound elliptical pipe and duct; and have available flat bottom filament wound pipe arch?	Yes	
Does this composites manufacturer make rectangular FRP composite duct, fittings, round to rectangular transitions, etc.	Yes	
Are round and rectangular FRP composite ducts, fittings, and accessories built in full compliance with SMACNA Standards for Thermoset Duct?	Yes	
Manufacturing Resources - Factory Fabricated Isometric Spools:	F/S	
Does this composite manufacturer have "in-house" capabilities for building and fabricating isometric spools and assemblies?	Yes	
Is this in-house isometric spool capability supported with experienced and trained pipe layout fitters and laminators?	Yes	
Or, does the manufacturer "sub-out" the manufacturing of this isometric piping assemblies to sub-contractors over which they have no direct ownership control over manufacturing methods, quality, and scheduling?	No	
To support customer's orders and to provide backup capability, how many total separate facilities and locations exist?	7	
To support customer's orders, what is the total square feet of space available in all facilities?	193,900	
How many square feet, in-house, are directly available by this composites manufacturer for the layout, jigging, and assembly of isometric spool assemblies?	67,000+	
If this manufacturer uses sub-contractors for manufacturing isometric spool assemblies, how big (total square feet) are their fabrication shops; and what portion in square feet is available for building isometric spool assemblies?	All in house	
Can this composite manufacturer provide in-house union assembly of isometric spools and assemblies (i.e., UA Plumber and Pipe Fitters labels and SWICA HVAC and fume ducting labels.)	Yes	
How many plant locations are available from this composites manufacturer for building custom FRP pipe, piping components, and isometric assemblies?	5	
Resin and Composites Technology Resources:	F/S	
For those service applications that require the "something different", how many different resin and laminate systems does this manufacturer have experience with?	100+	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using isophthalic polyester resins ?	Yes	



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Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using terephthalic polyester resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using bisphenol polyester resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using epoxy vinylester resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using high temperature and high performance novolac epoxy vinylester resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using furan resins (for applications requiring solvent resistance, low smoke, and high temperatures)?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using phenolic resins (for applications requiring outstanding fire retardancy, excellent low smoke ratings, and low smoke toxicity)?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using amine cured bis-A epoxy resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using high temperature and high performance novolac epoxy resins (temperatures to 400° F)?	Yes	
Does this composites manufacturer have proven technology and experience in building highly corrosion resistant equipment using phenol novolac epoxy resins ?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using urethane resins (for applications requiring toughness, high impact, and good abrasion resistance)?	Yes	
Does this composites manufacturer have proven technology and experience in building FRP composite equipment using hybrid urethane/vinylester resins (for corrosion resistant and high impact applications)?	Yes	
Does this composites manufacturer have proven technology and experience in building FRP armored PVC and CPVC pipe, fittings, and flanges (for sodium hypochlorite and chlorine service, and for high pressure (500 psi) applications)?	Yes	
Does this composites manufacturer have proven technology and experience in building corrosion resistant equipment using polysiloxane resins (for high temperature (600° F) applications and demanding service environments)?	Yes	



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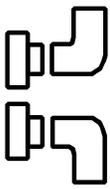
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Systems and Turn Key Capabilities:	F/S	
Can the FRP composite pipe manufacturer provide "in-house" a turn key project package, including the design and manufacturing of the all-critical pipe supports?	Yes	
Can this manufacturer provide a "one-stop-shop" for FRP composite corrosion resistant equipment and services - to include FRP pipe, tanks, duct, stacks, stack liners, valves and dampers, field services, etc.?	Yes	
Can this composites manufacturer supply in-house one stop sourcing of FRP composites, steel, and alloy process equipment?	Yes	
Does the composites manufacturer have the in-house ability to provide AutoCAD 3-D isometric spool and assembly drawings; using software such as AutoCAD Mechanical and Inventor?	Yes	
Does the composites manufacturer have project planning software - such as Microsoft's Project?	Yes	
How many knowledgeable and experienced people does the composite manufacturer have in that project management software?	5	
Does this composite manufacturer have the proven in-house ability to build complex systems and skid mounted packages - including agitated reactors?	Yes	
Field Service and Support Capabilities:	F/S	
Does the composites manufacturer have an experienced and knowledgeable full time field service organization to support their customers? (Not just a corporate wide "trainer", and territory sales people that double as "trainers".)	Yes	
In the last year, how many total service technicians and journeymen has this composite manufacturer "fielded" in support of customers' field service requirements?	49	
When required, can this composites manufacturer provide their own union journeymen for job site training, supervision, and/or hands-on installation of FRP composite equipment, piping, and duct?	Yes	
Does this composites manufacturer have in place and implemented safety training for their field technicians and journeymen - including: OSHA's 40 hour Hazwopper classes; 8 hour annual OSHA Hazwopper updates; Confined Space Entry training; Fork Lift training; Fall Prevention training; Site Specific training, etc.?	Yes	
For customer reliance and "peace of mind" are the manufacturer's factory and field laminators trained, tested, and certified for making butt, tee, and lateral over-weld joints?	Yes	
To support customer field service requirements, does this composites manufacturer have their own fleet of field service vehicles, job site vans and tool trailers, job site office trailers, etc.?	Yes	



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To support customer field service requirements, does this composites manufacturer have their own fleet of job site man-lifts and articulated JLG man-lifts?	Yes	
Order Specific and Project Support Resources:	F/S	
Has this composites manufacturer shown a commitment and ability to deliver on time Emergency Service Production (ESP) requirements?	Yes	
Is this composites manufacturer willing (and have the ability) to provide a Project Manager for the duration of any project? Multiple simultaneous projects?	Yes	
Does the composites manufacturer have a written Quality Assurance (QA) program - and the people to implement Quality Control (QC) - for custom manufactured composite products, equipment, and isometric assemblies? (Note: The requirements, resources, scheduling, and reporting required to support QA and QC in a commodity FRP shop that is building a very limited line of repetitive products is entirely different than for a custom FRP composite manufacturing plant - where you are building different specially engineered products and assemblies every day.)	Yes	
Are customers and end users supported by a nationwide team of professional and experienced representatives (not just distributor order takers)?	Yes	
Is this composites manufacturer "Large Enough to Serve"; but yet also "Small Enough to Care"?	Yes	
Will the project business be a large enough part of this composite manufacturer's annual volume - that the order or project will get the full attention and importance required?	Yes	
Does this composites manufacturer have their own "fleet" vehicles and drivers to provide customers "right now" delivery of time critical (ESP) shipments?	Yes	
Innovation, Technical Support, and Ability to Provide the "Tough Ones":	F/S	
Does this composites manufacturer have the in-house ability to engineer, design, manufacture, and assemble field filament winding equipment - for winding tanks, vessels, JBR shells, stacks, duct, stack liners, etc. in sizes up to 98+ feet in diameter?	Yes	
Can this fabricator provide end user customers and contractors, in conjunction with colleges and not-for-profit organizations, certified hands-on courses and workshop training in FRP composites and field winding and lay-up techniques?	Yes	
To support both product development and the qualification, testing, and certification of laminators; does this composites manufacturer have in-house equipment and a certified testing program to hydrotest FRP composite pipe and equipment at pressures up to 8,000 psi?	Yes	
Does this composites manufacturer have the equipment in-house and know how to factory and field apply Glass Flake composite linings?	Yes	



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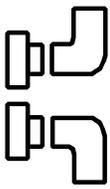
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Does the composites manufacturer recognize the importance to the end user of properly preparing pipe ends for field bonding and joining - by manufacturing in-house a complete line of easy to use (idiot proof) pipe end preparation tools (shavers)?	Yes	
Does this composites manufacturer provide a complete line of bell (socket) and spigot structural joints through 36" diameter - including bells to match the joint design and tapers of all the U.S. commodity pipe manufacturers?	Yes	
Can this composites manufacturer supply a broad line of mechanical piping joints - including bell and gasketed joints, double gasketed joints, locking key joints, pipe for Victaulic couplings (and the couplings), pipe for Dresser couplings, pipe for TeeKay couplings (and the couplings), etc.?	Yes	
Does the FRP composites manufacturer have the demonstrated ability to provide innovative solutions to the customer's specific corrosion resistant equipment requirements? Is innovation more than just a slogan?	Yes	
When FRP composite customers (including other FRP manufacturers) have requirements for the "tough ones", do they come to this composites manufacturer?	Yes	
Corporate Philosophy and Organization:	F/S	
Is the corporate philosophy to manufacture and provide engineered solutions to meet specific customer needs - in lieu of building limited commodity products; that may or may not meet the job site service requirements?	Yes	
Corporate Stability: How many owners and changes in management in the last 10 years? The last 30 years?	None	
How many layers of corporate management exist between access to the very top corporate owners?	2	
Has this composites manufacturer shown a commitment to grow with the market demands for corrosion resistant FRP composites for the Power Industry - adding people resources to support that expanding capability?	Yes	
Has this composites manufacturer recognized the important of the "Power Industry" and its unique requirements by appointing a corporate manager to head up a team devoted exclusively to supporting applications, end users, and engineering consultants for this demanding market?	Yes	
Has this composites manufacturer recognized the importance of the "Water and Waste Treatment Market" and its unique requirements by appointing a corporate manager to head up a team devoted to supporting applications, end users, and engineering consultants for this growing market for tanks, pipe, and fume duct?	Yes	
How many support and manufacturing people have been added in the last year to support growth?	11	
How many people have been "down sized", let go, and cut out of engineering and management in the last 10 years by this composites manufacturer?	None	



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What was the total number of employees of this plant 10 years ago?	30+/-	
What is the total employment today available to support customers? (High)	121	
Are the resources of this composites manufacturer supported by local advanced technical, engineering, R&D, and prototyping capabilities? (i.e., a National Composites Center (NCC), University Research Institute and Engineering Departments specializing in composites research (University of Dayton Research Institute, Wright State University), and Federal Government research programs in composites (Wright Patterson Air Force Base).)	Yes	
Can the manufacturer show a sufficient number of case histories of abrasion lined pipe and spooling sold into the FGD piping market?	Yes	
Can the manufacturer show a sufficient number of case histories to reflect a strong presence in the water and wastewater treatment market?	Yes	