

IESL TECHNICAL BULLETIN

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This is yet another bulletin to share information with all of you regarding “**Alternative to the use of Mild Steel and Mild Steel Rubber-lined pressure vessels**” in plant being serviced by IESL.

MS & MSR/L Vessels:

IESL gets orders from its customers for vessels to replace existing ones which need replacement due to corrosion, failure of rubber lining where repair/rectification is no more possible. IESL usually gets such orders along with orders for MS or MSR/L frontal piping as well as interconnecting piping.

For many years supplies of such vessels and piping have been delayed beyond the standard or committed delivery periods. This has invariably resulted in loss of customers who stop doing business with IESL due to their extreme dissatisfaction with us over inordinate delays. Another manifestation of such dissatisfaction is the customer changing terms of payment for IESL forcing us to give credit which creates new problems(large collectibles and shortage of working capital as a result).

The price of steel has been rising steadily and will continue to do so. Cost of power, consumables used in steel fabrication, labour costs etc too have been rising along with the cost of steel.

Fabrication of MS and/or MSR/L pressure vessels involve two or more parties. First is the party that spins or presses the dished ends, the party that does the fabrication using the dishes and finally, the rubber liner who does the final lining of the internal surface of the vessel with natural rubber. Similarly, fabrication of MS & MSR/L piping involves at least two parties, the fabricator and the rubber liner. Whether the pressure vessel is a lined or unlined one, it can take anywhere between two to eight weeks to make a vessel at the very least and the market just does not accept such long delivery lead times.

The answer to the situation is the FRP pressure vessel, the use of which was pioneered by IEI from 1995 onwards and is now very widespread. Although FRP pressure vessels were costlier than MS and somewhat costlier than MSR/L vessels, the continuous increase in the costs of inputs mentioned above have substantially narrowed the price differences, making FRP an attractive alternative to Steel vessels. Fast moving sizes of vessels of FRP are usually available ex stock, with larger sizes, deliveries are not more than a week. Switching over to FRP vessels is the answer to IESL’s ongoing problems with MS & MSR/L pressure vessels.

Advantages of FRP over Mild Steel:

Mechanical Advantages	Chemical Advantages
1. High Strength to Weight ratio	1. Excellent Water Resistance
2. Extremely resilient and tough	2. Resistant to weathering and UV-exposure
3. Good electrical and Thermal Insulation properties	3. Resistant to marine environment

4. Fire retardant (If required)	4. Resistant to wide range of chemicals
5. Considerable design versatility	5. Can be coloured to give maintenance free finish
6. Molding size virtually unlimited	6. Non- magnetic
7. Wide range of manufacturing technique	7. Transparent/ Translucent (If required)

Additional features of FRP over Mild Steel:

Use of Chemical Resistant glass	Use of Gel coat	Use of Top-coat
1. Prevent reinforcement from exposure to environment	1. Prevents pin hole formation and keeps the surface smooth and dirt free	1. UV stabilized coat- Protects the FRP component from outdoor weathering
2. Provide Resin-rich surface on composite	2. Provide Resin-rich surface on composites	2. Special Top- coat resin: Ensures complete cure even in presence of air
3. Improves appearance of composites by masking fiber pattern	3. Does not sag or run downward when applied on vertical surfaces	

WHAT IS FRP?

FRP is “Fiber Reinforced Plastic”. The fibers used in the FRP vessel making industry are made of the same raw material used in making glass (FRP is sometimes referred to as GRP, i.e. Glass Reinforced Plastic). The glass fibers are made in the form of mats or as “rovings” (threads of glass fiber). These are laminated using resins. One of the largest manufacturers of FRP vessels in the world is Pentair (earlier called Structurals). They have a big presence in India with a factory in Goa. There are many others in the world including a couple of Indian companies.

FRP vessels with diameters up to 300 mm are made using glass fiber mats laminated with resins in an extremely sophisticated method. Vessels of larger diameters are made using LDPE or similar plastic rotationally moulded vessels over which glass rovings are wound using CNC machines so that the vessel is light and with design pressures up to 10 kg/cm² or more.

FRP vessels are the way to go for IESL for the following reasons:

1. They are highly corrosion resistant.(no lining or external painting).
2. They are almost totally maintenance free (No worries about lining failure or contamination of resins or water passing through them).
3. Light and easy to handle.
4. They require only a firm, level floor capable of bearing their working weight (No elaborate foundations, no grouting or foundation bolts).
5. They are available with attractive colours and with different types of finish. Also available with a range of operating pressures (3.5Kg/cm² onwards).
6. Frontal piping for these can be made with PVC pipes which only need to be ‘cut and pasted’ at site.

7. Inter connecting piping can also be made at site using PVC and requires no drawings.
A chart is attached showing dimensions and resin holding capacities of the commonly used sizes in India.
Switch to FRP and win back lost customers. Contact Tech-Services for any guidance and help required to select the vessels.

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