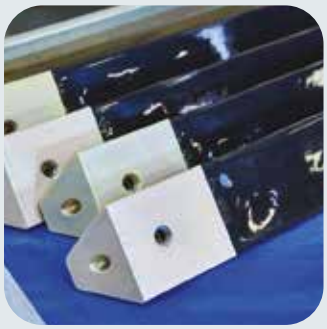
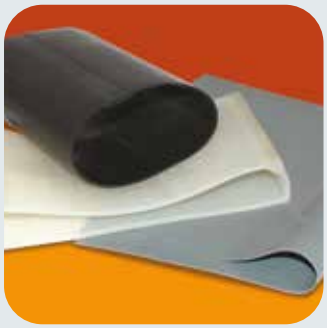
RUBBERCRAFT

# Elastomeric Bladders for Composite Fabrication

## Applications - advanced lightweight composite structures

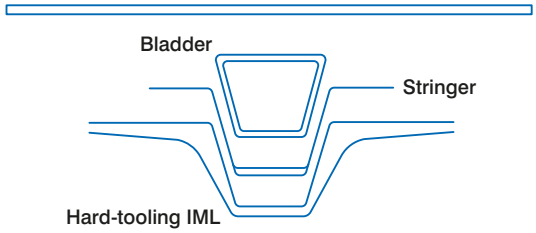
Our elastomeric bladders are used to form complex, integrated composite structures - typically where hollow structures require the use of trapped tooling that must be removed following cure. Rubbercraft's composite tooling products are widely used on both commercial and military aircraft for the construction of CFRP structures like Fuselages, Nacelles, Empennages, Ducts, Plenums, and Stringers. When compared with mandrels, bladders are typically used with a positive gas pressure inside the bladder relative to the composite to assist in the consolidation process.

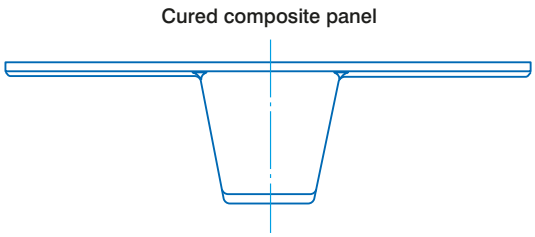




- Composite aircraft fuselages
- Nose cone, tail and rudder structures
- Wing, aileron, flaperon and flaps
- Winglet and horizontal stabilizers
- Fancowl doors

Rubbercraft's products are fabricated from specifically formulated compounds tailored to exact requirements and are chosen by global composite manufacturers for whom performance and reliability are key.

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To view our extensive range of capabilities:
**www.rubbercraft.com**

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# Elastomeric Bladders for Composite Fabrication

## Advantages – durable and flexible for optimum performance

When a durable yet flexible performance is required, Rubbercraft bladders can deliver.

Designed specifically to our customer's specifications to conform to contours and curvatures while maintaining tolerances and surface quality requirements. Rubbercraft bladders can save time and money in most IML and OML molding applications.

Bladders can be easily removed for reuse; the elastomeric material of the bladder expands as it is heated up and inflated, and then deflates and shrinks when the part is cured and cooled, giving precise consolidation where required and easy removal when it is time to demold.

Rubbercraft has a wide variety of elastomers to choose from including more than 2,000 different elastomer formulations that are prepared in-house including Viton, Butyl, EPDM, and Silicon based formulations capable of withstanding repeated autoclave cycles at 190C/350F and pressures of 620 kPa/90 psi. Some elastomeric tooling has been used for up to 50 autoclave cycles by some of Rubbercraft's customers.

## Custom designed - to offer a wide range of options

Bladders are custom designed for each application for the desired composite geometry, the selected cure conditions, and other specific customer requirements. Materials with various; durometer,Coefficient of Thermal Expansion (CTE) and other mechanical properties may be selected based on the specific application.

Fluorinated polymer barrier layers are typically bonded onto the surface of the bladders to assist removal. Bladders can be designed to have bonded elastomeric end caps or metal end fittings. The metal end fittings typically have vent holes or gas connections for atmospheric equalization to the bladder during cure to provide the correct expansion and pressure during processing and curing and to facilitate bladder extraction.

Bladders with internal vent layers are available that effectively counter any permeability of the elastomeric materials at elevated temperatures and mitigate small damages to the bladder body.

Generic cross sections are available upon request for manufacturing trials and prototyping exercises. Custom designed elastomeric vacuum bags can be paired with the bladders to reduce consumable cost and improve surface marking and witnessing on the laminate surface.

Whatever the requirement or application, customers can count on Rubbercraft's absolute attention to detail and commitment to a quality product, on time and on budget.

***Rubbercraft – advancing existing products and introducing new elastomeric solutions***

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