

Bulletin 7120: Universal Grommet



DESCRIPTION

Kirkhill-TA developed the UNIVERSAL GROMMET™ to provide a simple, light-weight, adaptable method of passing tubes, cables, and wires through structure. Kirkhill-TA designed the grommet to be installed without tools, fasteners, or sealants. A single design can compensate for variation in structure thickness, cutout dimensions, and payload location and dimensions. The UNIVERSAL GROMMET™ installs quickly, can be easily removed, and is re-usable. Kirkhill-TA offers designs and materials to meet nearly all aircraft system performance requirements and installation environments including fire and EMI wall closeouts and single side installation access.

BENEFITS

- ▶ Reduces installation costs, replacing multi-piece metal fittings and bracket/clamp/fastener assemblies
- ▶ Eliminates the need for sealants, potting, adhesives, and anti-corrosion coatings
- ▶ Saves weight over more complex, multi-piece assemblies
- ▶ Reduces transmitted noise and vibration
- ▶ Reduces foreign object damage potential since there are no small pieces of hardware
- ▶ Improves maintainability
- ▶ Compensates for assembly tolerance stackup

USES

The world's leading aerospace companies are using the UNIVERSAL GROMMET™ in a wide variety of tube, cable, and wire pass-through applications including: (1) Wing fuel tank ribs, (2) Nacelle fire walls, (3) Military aircraft weapons bays, landing gear bays, EMI walls, fire walls, floor beams, and other containment walls, (4) Wing leading edge slat ribs, (5) Wing trailing edge structure, (6) Fuselage stringers, (7) APU enclosures, (8) Engine core exits, (9) Avionics enclosures.

STANDARD SIZES, MATERIALS, AND CONFIGURATIONS

Kirkhill-TA produces the UNIVERSAL GROMMET™ in a wide variety of sizes and shapes. Circular mounting holes are the most common, but Kirkhill-TA can custom design a grommet to accommodate your structural cutout or design objective. Some common design requests include: (1) Minimum weight and envelope, (2) Sealing against a piece of structure in another plane on one or more sides, (3) Design for ease of installation and removal in difficult to access areas, (4) Design to allow the payload to slide at a certain load, and (5) Design to withstand pressure or fire. The most common elastomer base materials are silicone, fluorosilicone, nitrile butadiene, ethylene propylene, and fluorocarbon. These materials may be augmented with ceramic fabric, metal-filled coatings, Teflon®, and other materials as performance objectives dictate. Please consult your Kirkhill-TA sales representative for more information.

PERFORMANCE PROPERTIES AND TESTING

Performance properties are largely design and application dependent, but below are some typical ranges for certain properties when the UNIVERSAL GROMMET™ is properly fit and installed:

- ▶ Pressure sealing of up to 83-103 kPa (12-15 psi) from either side
- ▶ Pressure blow-out loads of from 172-345kPa (25-50 psi) depending on the direction (net pressures on the flanged side tend to produce higher blow-out loads)
- ▶ Payload sliding loads of from 9-53 N (2-12 lb) for payloads of up to 25mm (1 in) diameter and payload/grommet hole interference of up to 1mm (.039 inch). NOTE: Sliding loads are heavily material, contact area, and surface finish dependent
- ▶ No grommet resonance or adverse effects for vibrations from 10 to 20,000 Hz and acceleration levels to 32 grms
- ▶ Grommet produces a corrosion-free joint when tested in a salt and sulfur dioxide for for 8 days

Kirkhill-TA has an extensive service history and test database on the UNIVERSAL GROMMET™ designs and materials. Consult your Kirkhill-TA sales representative for specific information and test reports.

STANDARD TERMINOLOGY

