

Fabco® Fastening Systems **Vent-All™ Explosion-Venting Fasteners**

Limit damage to buildings from explosions

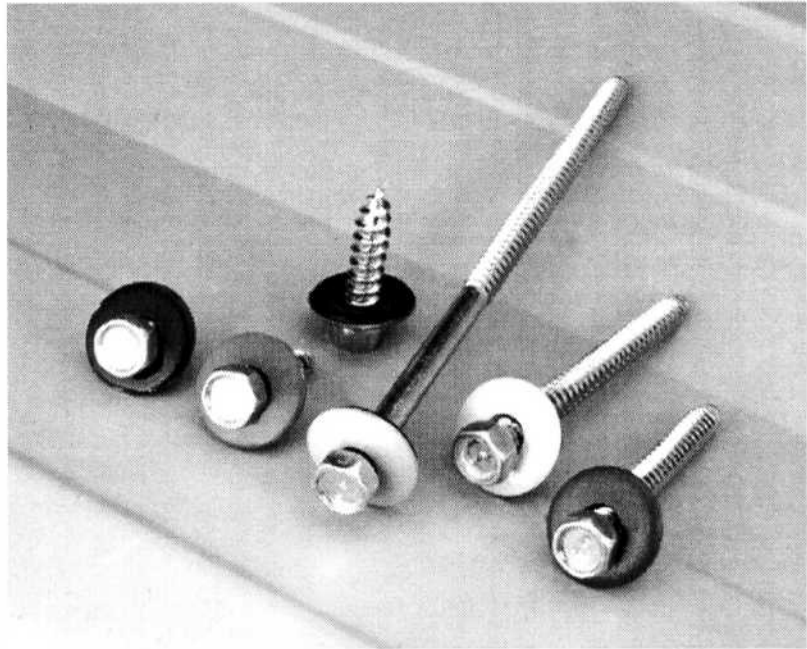
Many industrial and agricultural operations involve highly volatile liquids which are subject to fume emission, or involve dry materials so fine and light they can easily escape into the air. With the presence of these elements, an explosion is an ever-present danger. These solids, gases and vapors can generate shock waves from 35 to 120 psi. Pressures can rise from 200 to 2200 psi per second.

This peril has continued to exist despite precautionary training programs for workers, carefully balanced ventilation systems, and the physical separation of processing stages.

Since these efforts have not completely eliminated the explosion hazard, it is important to design buildings so that if an explosion occurs, injury and building damage can be minimized.

Vent-All™ washers by Fabco Fastening Systems are designed to collapse under the force of an explosion, releasing the metal panel from the structure and allowing the shock waves to escape and dissipate.

Vent-All fasteners have been used successfully in construction for over forty years. Reports show that in those installations where explosions have occurred, the resultant shock waves were vented satisfactorily.



Vent-All explosion-venting fasteners, a series of collapsible washers on stainless steel fasteners, are designed to minimize injury and destruction of property from explosions caused by agricultural or industrial operations.

Features

- ◆ .729" O.D. washer with special aluminum alloy bonded with EPDM or neoprene sealant
- ◆ Stainless steel screw with thread styles as required
- ◆ Washers designed to collapse under force of explosion, allowing panel to separate and vent shock waves

Benefits

- ◆ Maintains standard building integrity
- ◆ Minimizes destruction from explosion by quickly dissipating explosive forces
- ◆ May be used with any sheet or panel, with or without insulation, in field-assembled or shop-assembled walls

CAMCAR TEXTRON
Fabco Fastening Systems

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History

In the early 1950's, Fabco® Fastening Systems initiated experiments in the development of explosion-venting, pressure-release fasteners, based on their experience in designing and marketing fasteners for the metal building industry.

After private tests were made to develop the fastener concept, an initial series of tests was performed by Factory Mutual Research in 1958. These tests showed the merits of the system for venting pressures inside structures.

Research and private testing continued, and finally the product was introduced to the construction industry. Of the many installations on which Vent-All fasteners have been used, a small number of reports were received that explosions had occurred, and that the shock waves had vented satisfactorily.

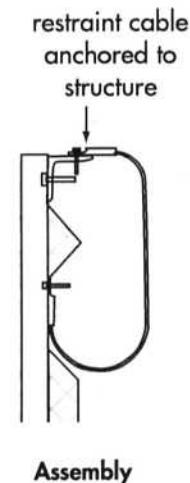
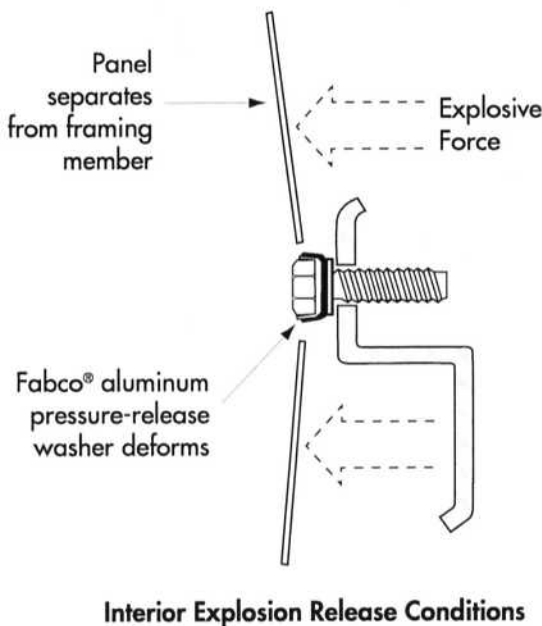
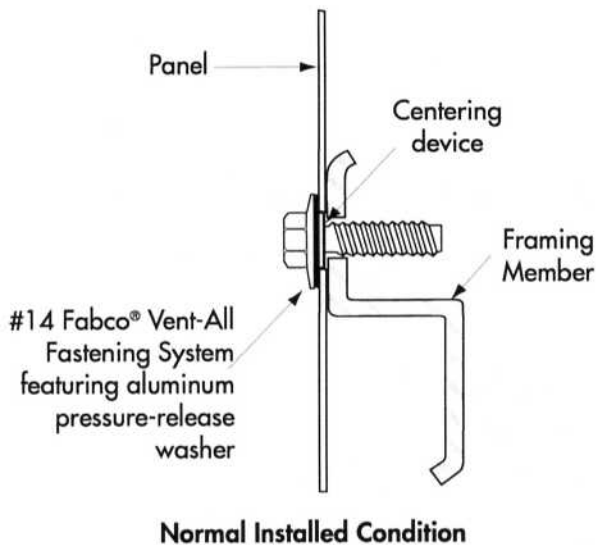
Designing with Vent-All Fasteners

The five styles of Vent-All washers are each engineered to meet a specific range of release values. It is imperative that the correct assortment of fasteners is used to meet the specific requirements of your application.

Fabco application specialists will work with your designers to specify the optimal number, placement and type of Vent-All fasteners to be used on your project.

Washer Designation	Color Code	Release Value per Fastener
EXA-74	Green	70#
EXA-76	Blue	110#
EXA-79	Tan	175#
EXA-84	Light Green	435#
EXA-19	Light Blue	885#

These are the average release pressures for each washer.



It is suggested that all sheets or panels be provided with restraint cables, about three feet long, anchored to the structure to prevent sheets from becoming flying projectiles.

Applications

The illustrations on this page are provided only to give an overview of the design process. Fabco® application specialists will work with your designers to specify the optimal number, placement and type of Vent-All™ fasteners to be used on your project.

Basic Design Guidelines

It is most desirable to vent shock waves through sidewalls of a structure. Venting through metal roofs can be troublesome because of movement due to expansion and contraction from temperature changes. Built-up roofs also present problems; use of rigid insulation, felts, and ballast would tend to delay venting.

Generally, for each Vent-All fastener, a hole is drilled into the panels and framing; then the hole in the top panel is enlarged to 1/2" diameter. It is necessary to install one centering device per fastener to prevent sagging of the panel.

EXTREME CARE MUST BE EXERCISED WHEN INSTALLING VENT-ALL FASTENERS. It is recommended that all Vent-All fasteners be driven using a hand, speed wrench or a ratchet wrench to insure there will be no distortion or damage to the release washer.

SAMPLE CALCULATION

Desired Pressure Release: 25 #/F²

Area to be vented: 3'0" X 16'3" = 48.75 F²

Sidelap Fastening: Approx. 18" on center

Working with your designers, the pressure load for each girt would be calculated by a Fabco application specialist so that the proper number and type of Vent-All fasteners would be selected.

EXAMPLE ONLY; NOT TO BE USED FOR DESIGN

Girt A: 0.5 X 3'9" X 3'0" = 5.6F²

Required release: (25#/F²) x 5.6F²= **140.62#**

Using 2 EXA-74 fasteners will provide **140#**

Girt B: 0.5 X (3'9" + 5'0") X 3'0" = 13.12F²

Required release: (25#/F²) x 13.12F²= **328.12#**

Using 3 EXA-76 fasteners will provide **330#**

Girt C: 0.5 X (5'0" + 7'6") X 3'0" = 18.75F²

Required release: (25#/F²) x 18.75F²= **468.75#**

Using 1 EXA-76 fastener and 2 EXA-79 fasteners will provide **460#**

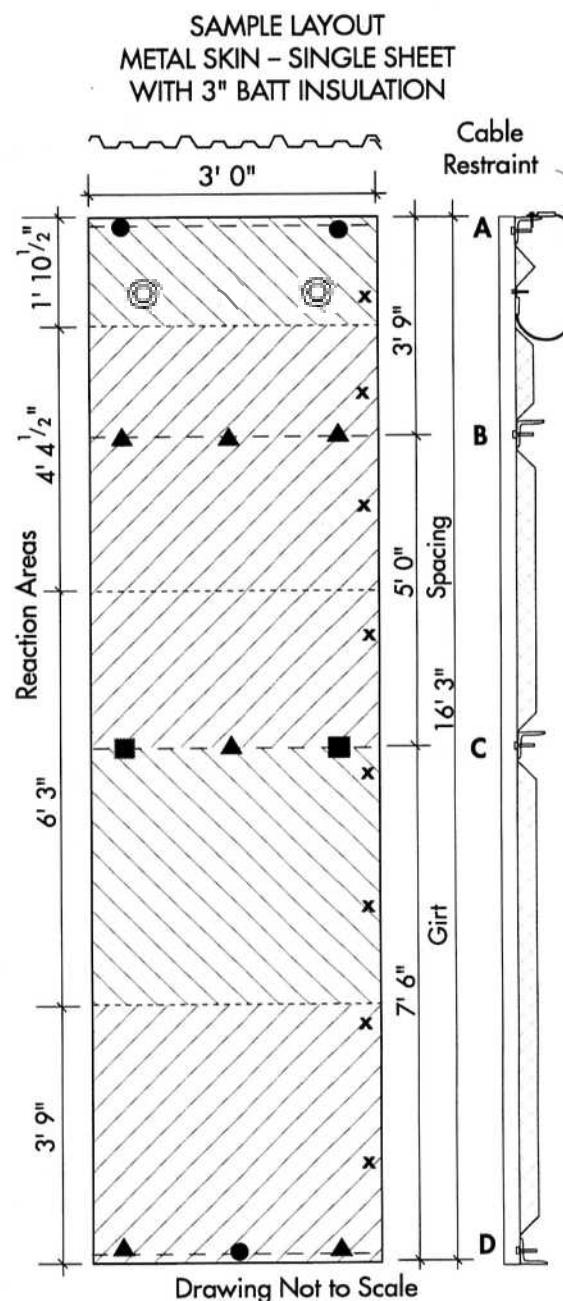
Girt D: 0.5 X 7'6" X 3'0" = 11.25F²

Required release: (25#/F²) x 11.25F²= **281.25#**

Using 1 EXA-74 fastener and 2 EXA-76 fasteners will provide **290#**

Total Provided Panel Release: 1220#

1220# ÷ 48.75SF = 25 #/F²



- Fastener: EXA-74 (70# R.V.)
- ▲ Fastener: EXA-76 (110# R.V.)
- Fastener: EXA-79 (175# R.V.)
- x Fastener: EXA-74 (70# R.V.) (for sidelap fastening)
- ◎ Restraint cable attachment point

Fastener layout should be reviewed with a Fabco application specialist to ensure proper venting function.

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Suggested Specification

A suggested short form specification follows:

Explosion release panels where shown on drawings shall consist of metal panels fastened to building structurals using Fabco Vent-All™ fasteners consisting of 1/4" diameter stainless steel screws and special alloy aluminum and vulcanized neoprene or EPDM explosion venting washers to provide panel release of approximately _____PSF. Fastener type and spacing shall be as recommended by Fabco Fastening Systems. All fasteners are to be Factory Mutual tested and approved. Supplier to furnish report number and date of Factory Mutual Research Report.

All panels are to be secured to building framing with restraint cables approximately 3'0" long to prevent panels from becoming flying projectiles.

Warranty

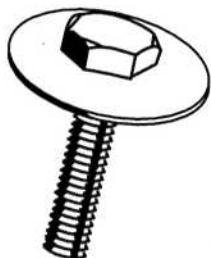
This is the WARRANTY which appears on the reverse side of our QUOTATION, ACKNOWLEDGMENT, and INVOICE copies:

WARRANTY: Seller warrants that goods shipped against this order will conform to specifications and drawings submitted and that such goods will be manufactured and inspected according to generally accepted applicable practices of companies manufacturing industrial fasteners. THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Seller's obligation under this warranty shall be limited to the repair or rework of the goods supplied or the replacement thereof, at Seller's option, and in no case is to exceed the invoice value of said goods. Under no circumstances will Seller be liable for incidental or consequential damages or for damages incurred by the buyer or subsequent user in repairing or replacing defective goods or if goods covered by this warranty are reworked or subjected to any type of additional processing.

This warranty is void if Seller is not notified in writing of any rejections or defects within 90 days after receipt of the material by customer.

FOR PRESSURE RELIEVING FASTENERS: Seller, in addition to the general warranties above, warrants that the fasteners furnished for explosion-prone locations are Factory Mutual approved as described in FM Report J.I. OPOH2.AC, said warranty to remain in effect if and only if such fasteners are installed in accordance with all instruction sheets furnished by Seller.



**For more information
or design assistance,
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