Safety Breakaway Couplings

Breakaway Couplings are safety components used to prevent one of the most serious safety hazards in the loading process of fluid media: the unwanted and disproportionate tensile load on the fluid transfer hose line; caused, for example, when tankers and trains drive off too soon or by ships drifting.

Such tensile loads can mechanically damage or even destroy both the connection points and the fluid transfer hose line itself, which could even lead to uncontrolled leaks of the media being loaded, resulting in a potential corresponding risk to both people and the environment.

Safety Breakaway Couplings are typically designed with two functions to avoid these risks:

- A defined separating mechanism that triggers sufficiently earlier than the load limit
- A spontaneous automatic shutter for the sectioning points to prevent the media from leaking.

Why use a Safety Breakaway Coupling?

“Passive Safety Shutoff” valve is designed to prevent release of product in the event of pull ways:

- Prevents the uncontrolled release of product without human intervention.
- Shuts off flow in both directions instantly!
- Protects the hose line, plant piping and structures from high pull loads!
- Protects the environment and personnel against emissions of hazardous media!

Advantages at a glance

- Protection against industrial accidents
- Staff protection
- Hose protection
- Protection against damage to the complete transfer system, pipe work, pumps, valves, hose etc.
- Media loss prevention
- Environmental impact protection
- Cost savings
Separation by Force Limitation
RS Safety Breakaway Couplings by NovaFlex® separate the fluid transfer line at a defined tensile load.
This should be selected with a sufficient safety margin below the load limit of the fluid transfer line, such as the maximum tensile load of a hose line. Three calibrated breaking pins, which connect to the coupling halves via a pair of flanges are used as the triggering elements.
The flanged connection has no overlap, so tensile forces acting on the fluid transfer line are directly transmitted to the breaking pins independent of the load angle. If the minimum tensile strength is exceeded, the pins break.
This simultaneously loosens the flanged connection, releasing both coupling halves so that the fluid load line is separated and the valve halves close to shut off the product flow.
The greater the angle to the coupling axis, the greater the load is on one or maximum two pins, so that the planned separation takes place at a lower threshold value.
This function is available without limitation of the load angle, however a pure axial tensile force is to be assumed as a design case on principle. In this case the tensile force is distributed evenly to all three pins so that the threshold for triggering is the highest here. In contrast, with lateral tensile forces, the load is unevenly distributed to the breaking pins.

Closure by Valve Technology
The coupling halves are each equipped with a non-return valve to safely close the sectioning points of the fluid transfer line, i.e. the separated coupling halves when triggered. The two spring-loaded non-return valves brace each other with opposing force in the operating state and keep the valve cross-section open for fluid flow.
This streamlined design ensures maximum flow and low pressure drop. In the case of separation the valve halves close immediately shutting off media flow.

<table>
<thead>
<tr>
<th>ABV-Series Technical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe triggering at angles up to 180°</td>
</tr>
<tr>
<td>High-quality sealing materials</td>
</tr>
<tr>
<td>O-ring: NBR, EPDM, FFKM, FKM</td>
</tr>
<tr>
<td>Threaded seal: PUR, PTFE</td>
</tr>
<tr>
<td>Materials: Stainless steel, Brass, Aluminum, Hastelloy. Other materials on request.</td>
</tr>
<tr>
<td>Small residual amount</td>
</tr>
<tr>
<td>FNPT, Flanged 1” to 4”</td>
</tr>
<tr>
<td>Temperature range up to 300°F, with brass and aluminum up to 140°F</td>
</tr>
<tr>
<td>Pressure range 232psi, aluminum 150psi</td>
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</table>
Emergency Cable Release Breakaway Couplings - ABVS

A safety line should not break. True as a general rule: but sometimes a safety line should cause breakage. This is the principle behind Emergency Cable Release Couplings.

The Safety Cable

Traditional emergency release couplings with shear bolts are not ideal for every application because the strain is transmitted through the hose. With large diameters or high working pressures this can create problems with design or working tolerances. The cable release system can be set to a lower release limit, is more adjustable, and its operation does not depend on an excessive load but rather on a limit of travel.

The Principle of Cable Release

In the example of a loading bay with a hose loading arm, one end of the safety cable is fixed to a suitable point near the end of the hose and the other end to the coupling. Normally the cable, like the hose, is slack, but if unexpected or excessive movement occurs such as in an accidental drive away the cable, which is shorter than the hose it is protecting, becomes taut and actuates the coupling. As soon as the coupling has separated, safety valves in each half close automatically, sealing the open ends so that no product can escape.

Advantages at a Glance

- Safe release at angles up to 90°
- No force applied to the hose
- Not affected by lateral forces
- Self-lubricating moving parts
- Compact size
- High quality with TÜV approved materials
- Complies to WHG §19
- Complies to ATEX Zone 1
- Complies to BAM

Separation Without Use of Shear Pins

Even a small force on the safety cable of the ABV-S coupling is sufficient to actuate it, and for larger diameter hoses the ABVF-S couplings do the same job. If the coupling separates no parts have to be replaced: the ABV-S is simply reassembled on the spot and is ready for action again.

Safety Breakaway couplings with Emergency Release Cables increase safety at work. The ABV-S is designed for threaded connectors from 2” to 4” and the ABVF-S for flange connectors from 6” to 10”. [The F stands for flange connectors to DIN 2633 PN 16/ANSI 150]. Both couplings are approved by the German State Department for Material Research (BAM) and comply to §19 of the water protection regulations and ATEX-Zone 1. The couplings also have full CRN certification.
Marine Safety Breakaway Couplings - In Hose Applications

Spills over water are the most costly to remediate. Marine hose string Safety Breakaway Couplings act as a passive shutoff designed to specifically protect a hose string. Should a hose string be subjected to excess force for any reason, the breakaway separates stopping flow in both directions.

Marine Hose String Breakaway

These new breakaway couplings are designed for marine/offshore applications, where the breakaway coupling is mounted between two hose lines. The couplings are proven to be stable against shear forces due to the cylindrical overlap between two bodies.

Advantages at a Glance

- Very stable against shear forces
- ABML: Low pressure drop due to specially designed valves
- Fewer parts for safe handling and easy maintenance
- Minimum leakage quantities due to quick-closing valves
- Multi-directional flow
- No welding in the design, so no weak points
- Safe activation through straight pull
- Worlds highest flow rates available

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Width</td>
<td>2” to 6” (others upon request)</td>
</tr>
<tr>
<td>Nominal Pressure</td>
<td>230 psi PN 16 (others on request)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°F to 160°F</td>
</tr>
<tr>
<td>Material</td>
<td>1.4571 AISI 316Ti, seals upon request</td>
</tr>
<tr>
<td>Connection ends</td>
<td>Threads: BSP or NPT, Flanges: EN1092, ASA 16.5 150psi or 300psi</td>
</tr>
</tbody>
</table>
ABVL Series - High Flow
ABVL Series is designed to prevent industrial accidents.
For applications that require maximum flow, the ABVL style is the desired choice.
ABVL protects the hose or flanged systems such as pipes from high burdens, even in cases of non-axial burdens that reduce the breakaway force of a hose. After the separation, the valves close and prevent the medium from escaping from the hose and tube side, and in this way protect both people and the environment. The separation occurs in a controlled fashion via the specially designed breaking pins integrated into the breakaway coupling.

<table>
<thead>
<tr>
<th>Flow - GPM</th>
<th>ABV</th>
<th>ABVL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>112 GPM</td>
<td>450 GPM</td>
</tr>
<tr>
<td>3”</td>
<td>282 GPM</td>
<td>1000 GPM</td>
</tr>
<tr>
<td>4”</td>
<td>383 GPM</td>
<td>1400 GPM</td>
</tr>
</tbody>
</table>

Advantages at a Glance
Suitable for all loading processes between stationary and mobile unit
Applicable for all fluids (liquids and gases), also for those with high viscosity.
Especially in loading processes in which the safety of a breakaway coupling must not have any influence on the pressure loss or the flow-through capacity
High savings potential in power consumption and time in comparison to standard breakaway couplings

It is impossible to test all NovaFlex® products under all conditions to which they might be subjected in the field. It is therefore the buyer/or end users’ responsibility to test all products that duplicate service conditions prior to installation. Due to continuous improvements, technical data is subject to change without notice.
ABV series before emergency separation

Approvals/Certificates

CRN - Canada

Approved acc. to WHG §19, by DIBT (German Institute for Building Technology)

ATEX Zone 1 approved

TA Luft (German Clean Air Act) approved

After testing by BAM (Federal Institute for Materials Research and Testing)

EC type examination