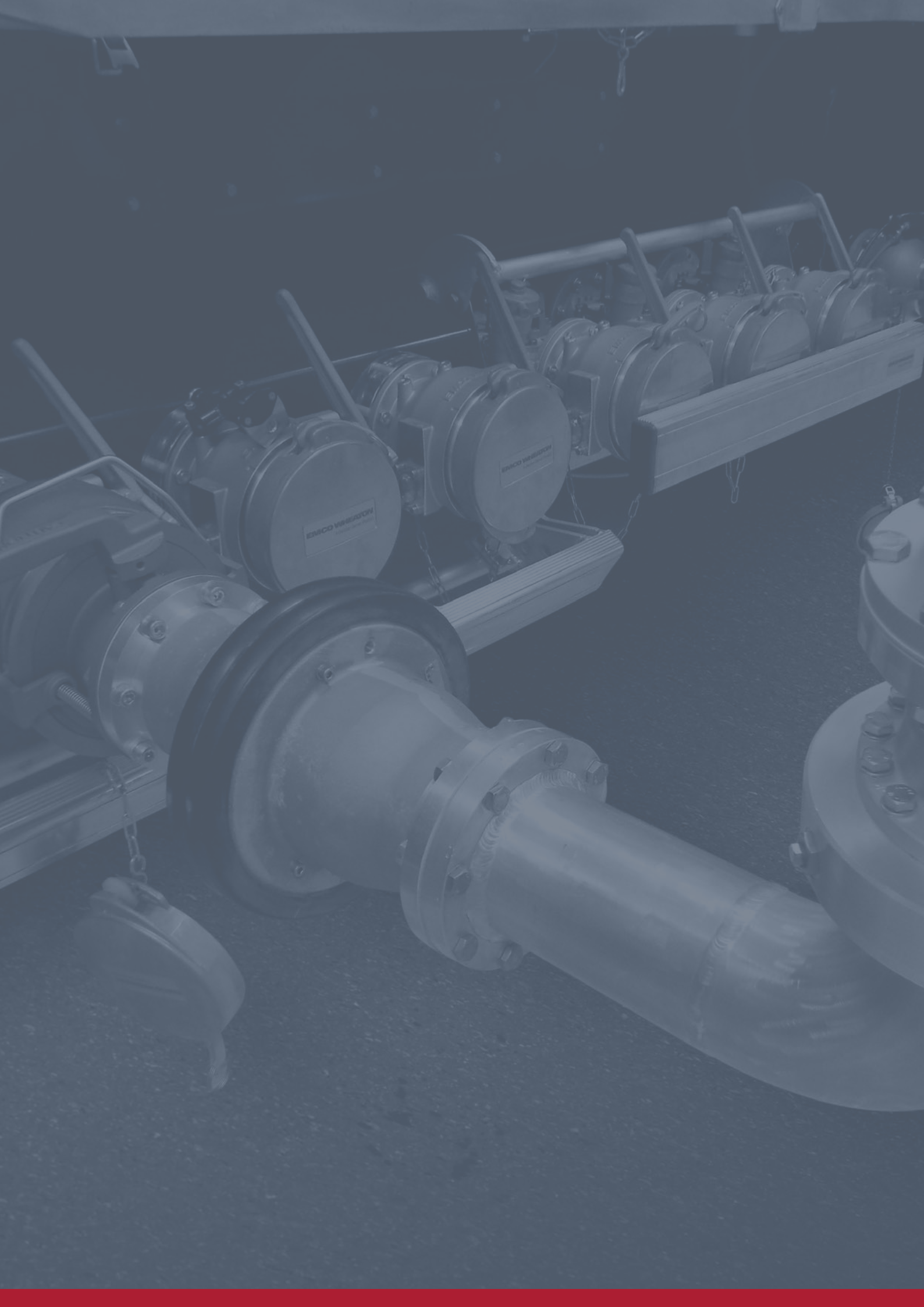
Break-Away **Couplings** Technical Information

TODO

EMCO WHEATON
by Gardner Denver



TODO Break-Away Couplings
quick look

The Emco Wheaton, TODO Break-Away Coupling range is an essential part of the work place safety equation. As well as ensuring the environment is protected from potential hazardous spills, the Break-Away Couplings are designed to prevent pull away/drive away incidents thereby eliminating potential spills. The Break-Away range is suitable for a range of different applications from road tanks to aviation refueling and marine bunkering.

Standard

Designed to eliminate spillage and damage associated with drive and/or pull away incidents when loading/unloading hazardous liquids. Creating a design in weak point. Once disconnected, the valves automatically close limiting spillage, product loss and environmental impact.

Marine

An evolved version of the SS Break-Away, the Marine Break-Away variant shares the same high flow rates but has increased break pin strength, with the addition of load pins to ensure a straight pull durability required for off-shore applications.

Collar Release

The Collar Release Break-Away is specifically designed for loading arm protection, avoiding potentially dangerous pull away situations. The collar release design ensures a safe break point when the predetermined working envelope limit is exceeded. This ensures that there is no over-extension of the loading arm.

Certificates / Approvals

- CE-marked, European directives 97/23/EC.
- Manufactured under EN ISO 9001:2008.
- Certified towards ISO 14001:2004.
- Manufactured towards EN 13480 and EN 13445.

TODO
Break-Away Coupling

The TODO Break-Away Coupling has been designed to eliminate spillage and damage associated with drive away/pull away incidents when loading/unloading hazardous liquids.

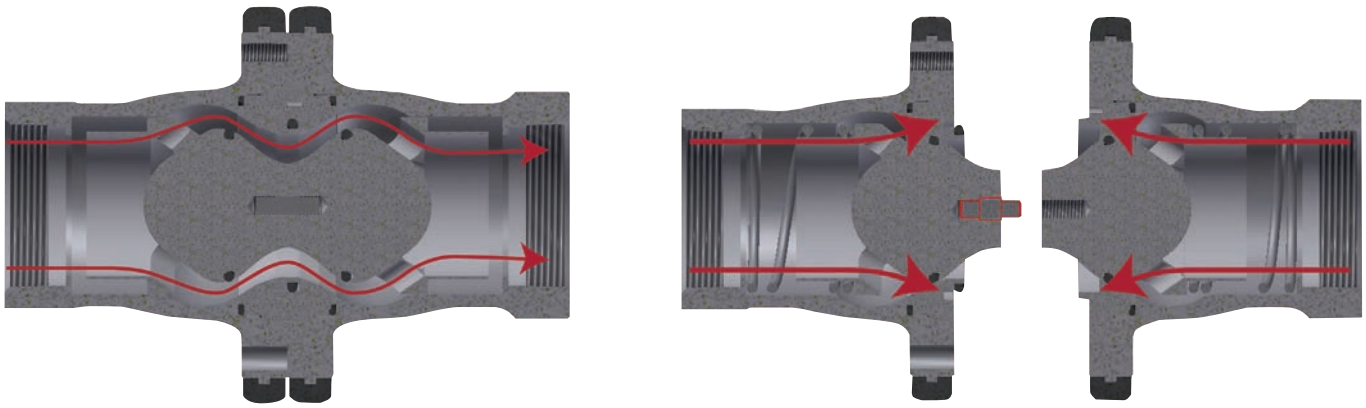
During the design process TODO engineering focused on creating a reliable break point while also ensuring optimized flow through the Break-Away's internal core.

The internal core design is based on two shielded spring designed pistons. This design achieves extremely high flow rates while retaining the reliability and shut off performance demanded by the market.

The break pins connect 2 identical halves and when separated, trigger the Break-Away activation. The flanged connection has no overlaps so forces placed on the hoses and/or loading arms are directly transmitted to the break pins reducing the risk of damaged equipment during a drive away/pull away incident.

When a break occurs, the pistons release cutting the flow of liquid/ vapour separating the two halves of the Break-Away.

Depending on the application, the Break-Away Coupling range can be pre-configured to "break" when subjected to a specific force and direction.



The benefits of using a TODO Break-Away Coupling

- When used with a hose – less chance of 'spring back' on break causing potential hazard to personnel
- When used with a distribution loading arm – No damage caused to arm should separation occur
- Coupling is protected from damage should separation occur
- Almost zero product loss, protecting revenues
- Almost zero loss, preventing potential environmental damage
- Simple to re-set on site (no need to return to the plant)
- No need for an external power source

Connection type
and working pressure

BA Size/ In	Material	Units	Connection Type							
			NPT	BSP	PN10/16 Flange	PN25/40 Flange	ANSI Class 150	ANSI Class 300	Weld Ends	TTMA Flange
2	Stainless Steel	Bar	40	40	16	40	16	40	40	X
		psi	580	580	232	580	232	580	580	
	Aluminium	Bar	10	10	10	10	10	10	X	X
		psi	145	145	145	145	145	145		
3	Stainless Steel	Bar	40	40	16	40	16	40	40	16
		psi	580	580	232	580	232	580	580	232
	Aluminium	Bar	10	10	10	10	10	10	X	10
		psi	145	145	145	145	145	145		145
4	Stainless Steel	Bar	25	25	16	25	16	25	25	16
		psi	363	363	232	363	232	363	363	232
	Aluminium	Bar	10	10	10	10	10	10	X	10
		psi	145	145	145	145	145	145		145

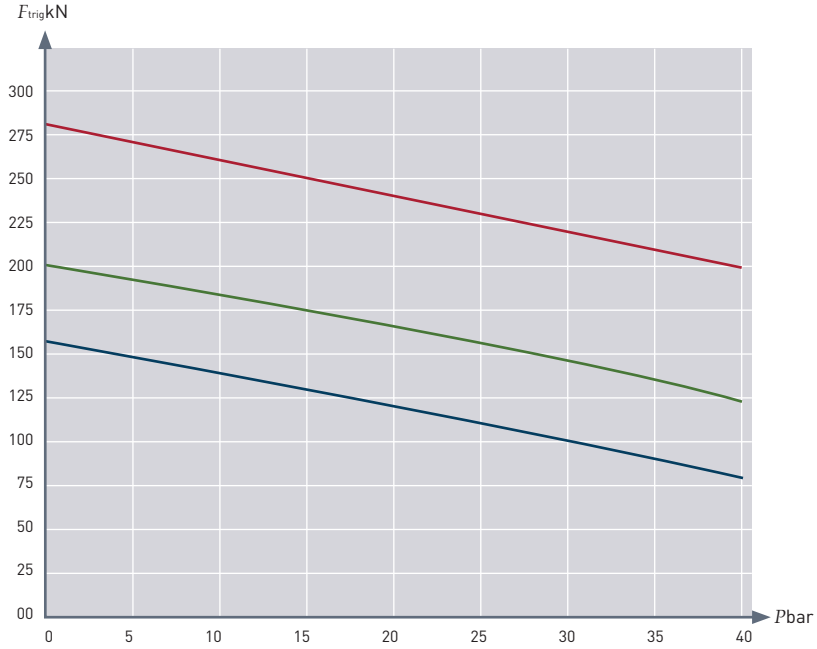
Disconnection
Data

2" (DN50)						
	Al			SS		
Break Pin Size Separation Force (kN)	2.5mm	3.0mm	3.5mm	2.5mm	3.0mm	3.5mm
Unpressurised	15.5	20	28	15.5	20	28
10 bar / 145psi	13.5	18.5	25	13.5	18.5	25
25 bar / 363 psi	X	X	X	11	16	23
30 bar / 435 psi	X	X	X	10	14	22
35 bar / 508 psi	X	X	X	9	13	21
40 bar / 580 psi	X	X	X	8	11.5	19.5

3" (DN80)						
	Al			SS		
Break Pin Size Separation Force (kN)	2.5mm	3.0mm	3.5mm	2.5mm	3.0mm	3.5mm
Unpressurised	13	19.5	27	13	19.5	27
10 bar / 145 psi	7	15	22	7	15	22
25 bar / 363 psi	X	X	X	X	7	15.5
30 bar / 435 psi	X	X	X	X	3.5	13
35 bar / 508 psi	X	X	X	X	1	11
40 bar / 580 psi	X	X	X	X	X	8.5

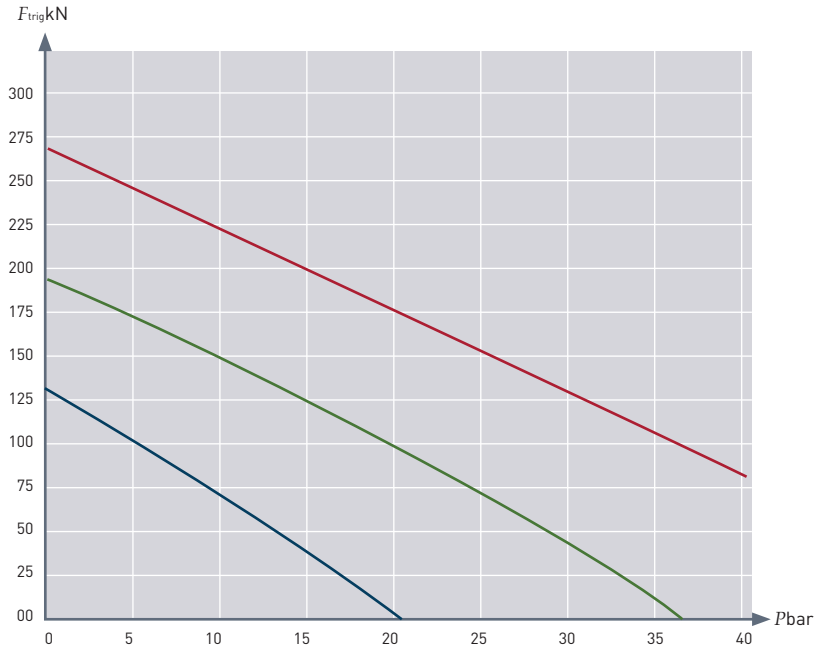
4" (DN100)						
	Al (3-Pin)			SS (5-Pin)		
Break Pin Size Separation Force (kN)	2.5mm	3.0mm	3.5mm	2.5mm	3.0mm	3.5mm
Unpressurised	15.5	22.5	29.5	TBC	TBC	TBC
10 bar / 145 psi	6	12.5	21	TBC	TBC	TBC
25 bar / 363 psi	X	X	X	TBC	TBC	TBC
30 bar / 435 psi	X	X	X	X	X	X
35 bar / 508 psi	X	X	X	X	X	X
40 bar / 580 psi	X	X	X	X	X	X

Break Forces – Straight Pull



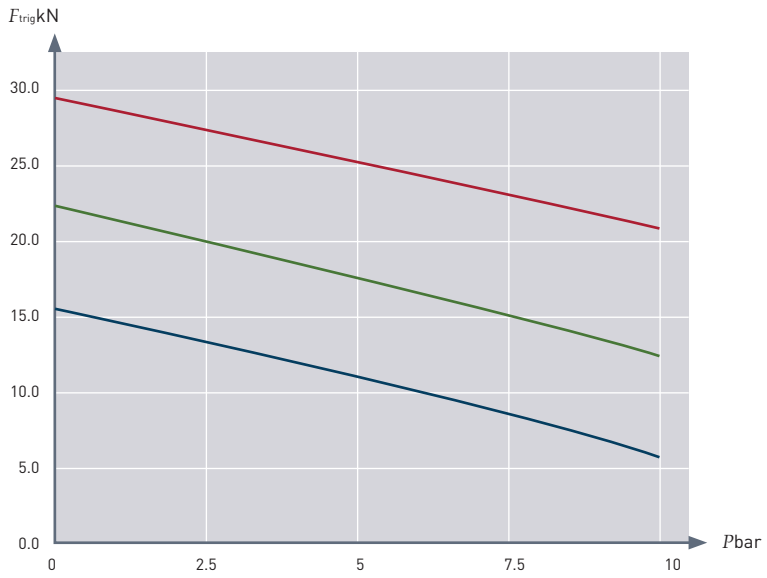
break forces 2" coupling

- 2.5mm pin
- 3.0mm pin
- 3.5mm pin



break forces 3" coupling

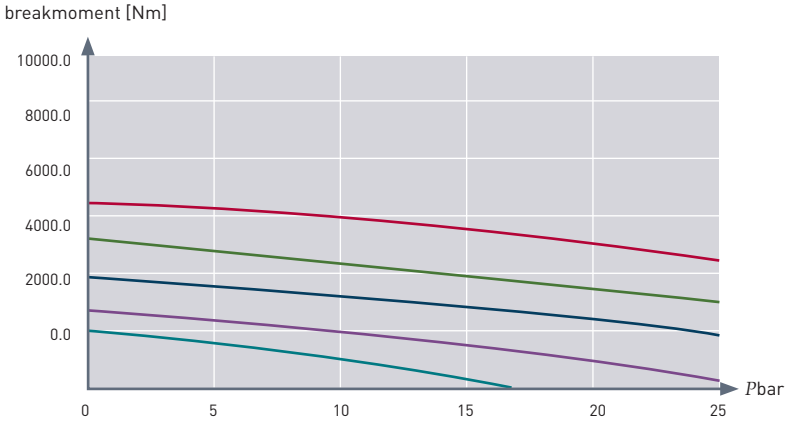
- 2.5mm pin
- 3.0mm pin
- 3.5mm pin



break forces 4" Al coupling

- 2.5mm pin
- 3.0mm pin
- 3.5mm pin

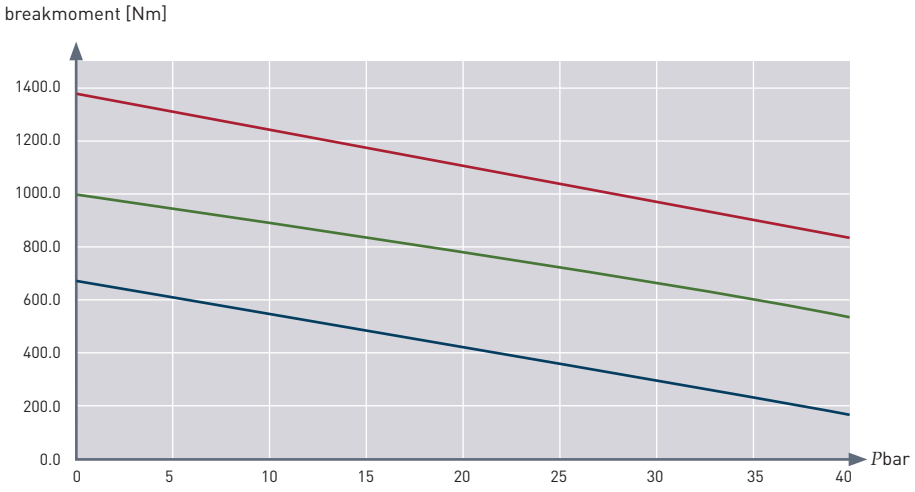
Breaking Moment



4" Break-Away 5 pins

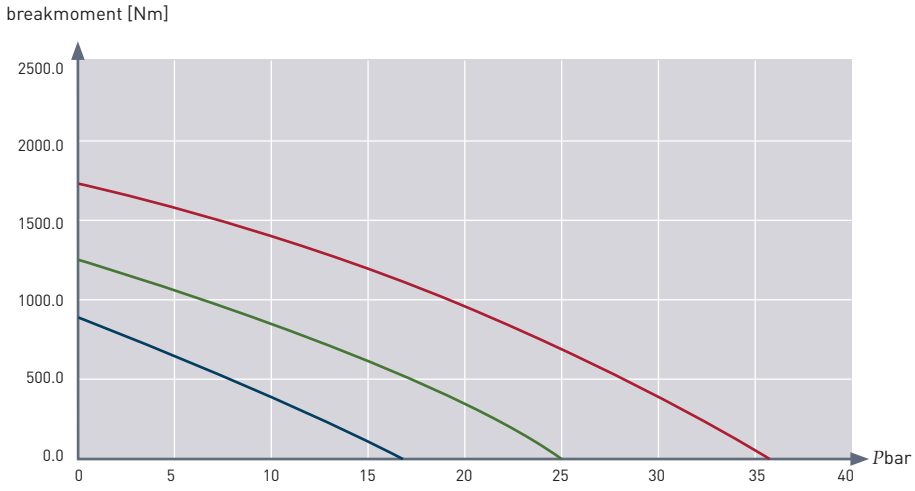
- 4.5mm pin
- 4.0mm pin
- 3.5mm pin
- 3.0mm pin
- 2.5mm pin

Breaking Moment (continued)



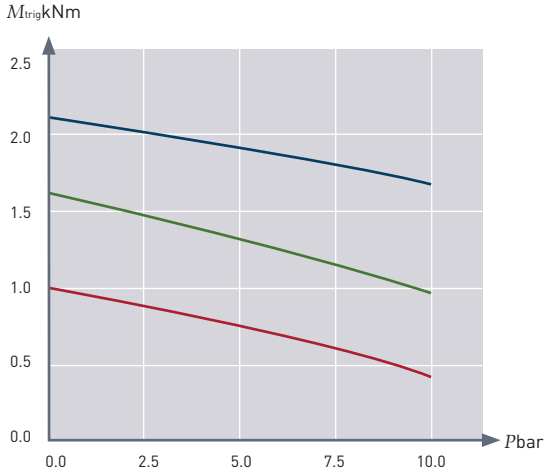
2" Break-Away

- 3.5mm pin
- 3.0mm pin
- 2.5mm pin



3" Break-Away

- 3.5mm pin
- 3.0mm pin
- 2.5mm pin

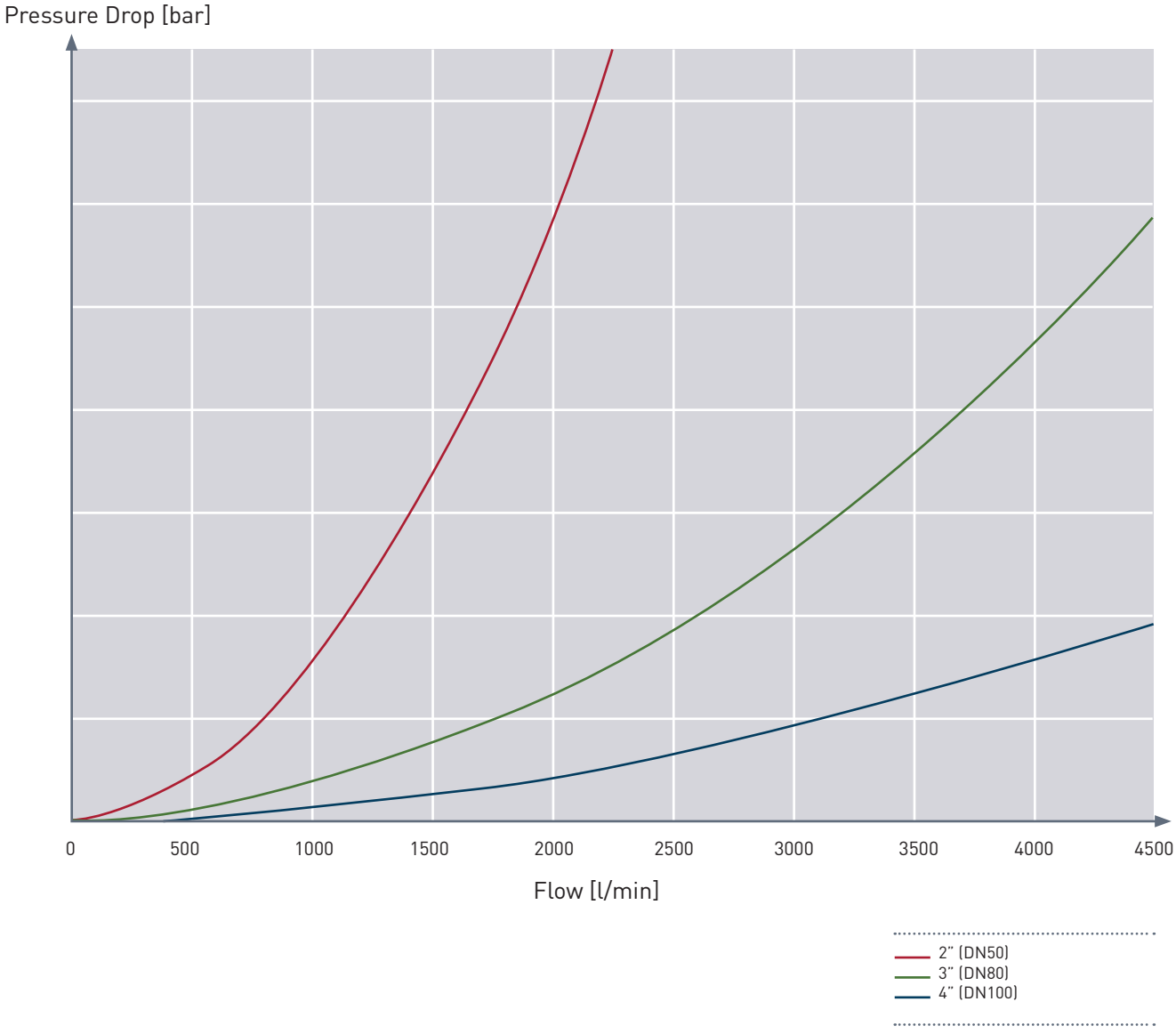


4" Al Break-Away 3 pins

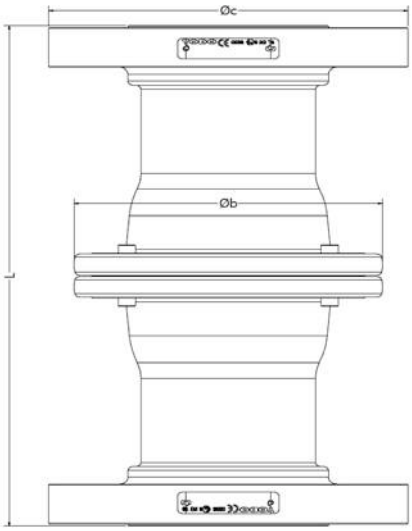
- 2.5mm pin
- 3.0mm pin
- 3.5mm pin

Flow Capacity

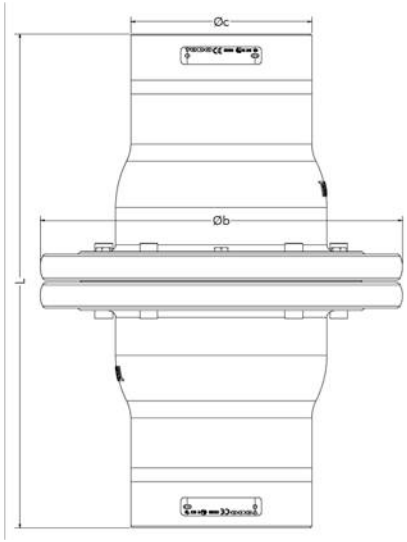
TODO Safety Break-Away Couplings offer exceptionally high flow capacity for their size.



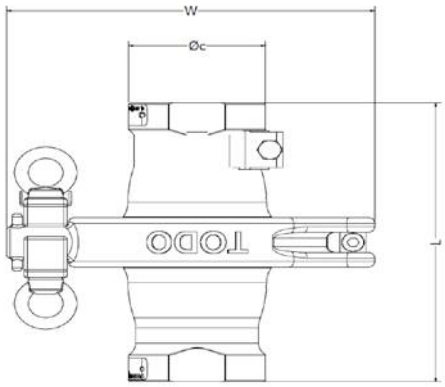
Weights
and dimensions



Standard flanged Break-Away



Standard threaded Break-Away



Collar Release Break-Away

Part Number	Mass (kg)	L /mm	Øc / mm	Øb / mm	W / mm	Mass (lb)	L /in	Øc /in	Øb /in	-W / in-
TBA20-AEAE_-1107	2.2	196	79	138	-	4.9	7.72	3.11	5.43	-
TBA20-BEBE_-1107	2.2	194	79	138	-	4.9	7.64	3.11	5.43	-
TBA20-AEAE_-4407	6.6	196	79	138	-	14.6	7.72	3.11	5.43	-
TBA20-BEBE_-4407	6.6	194	79	138	-	14.6	7.64	3.11	5.43	-
TBA20-CECE_-4407	9.6	200	165	138	-	21.2	7.87	6.5	5.43	-
TBA20-DEDE_-4407	10.7	204	165	138	-	23.6	8.03	6.5	5.43	-
TBA20-EEEE_-4407	9.6	202	152	138	-	21.2	7.95	5.98	5.43	-
TBA20-FEFE_-4407	10.7	204	165	138	-	23.6	8.03	6.5	5.43	-
TBA20-GEGE_-4407	6.0	194	60	138	-	13.2	7.64	3.26	5.43	-
TBA30-AGAG_-1107	5.2	290	115	180	-	11.5	11.42	4.53	7.09	-

Part Number	Mass (kg)	L /mm	Øc / mm	Øb / mm	W / mm	Mass (lb)	L /in	Øc /in	Øb /in	-W / in-
TBA30-BGBG_-1107	5.2	271	115	180	-	11.5	10.67	4.53	7.09	-
TBA30-AGAG_-4407	12.1	290	114	180	-	26.7	11.42	4.49	7.09	-
TBA30-BGBG_-4407	12.1	271	114	180	-	26.7	10.67	4.49	7.09	-
TBA30-CGCG_-4407	18.4	271	200	180	-	40.6	10.67	7.87	7.09	-
TBA30-DGDG_-4407	20.1	279	200	180	-	44.3	10.98	7.87	7.09	-
TBA30-EGEG_-4407	18.4	283	190	180	-	40.6	11.14	7.48	7.09	-
TBA30-FGFG_-4407	20.1	360	210	180	-	44.3	14.17	8.27	7.09	-
TBA30-GGGG_-4407	11.8	271	89	180	-	26.0	10.67	3.50	7.09	-
TBA40-AHAH_-1107	11.0	416	145	264	-	24.3	16.38	5.71	10.39	-
TBA40-BHBH_-1107	11.0	400	145	264	-	24.3	15.75	5.71	10.39	-
TBA40-HHHH_-1107	11.8	358	168	264	-	26.0	14.09	6.61	10.39	-
TBA40-AHAH_-4407	31.7	416	145	264	-	69.9	16.38	5.71	10.39	-
TBA40-BHBH_-4407	31.7	400	145	264	-	69.9	15.75	5.71	10.39	-
TBA40-CHCH_-4407	41.2	362	220	264	-	90.8	14.25	8.66	10.39	-
TBA40-DHDH_-4407	42.5	364	235	264	-	93.7	14.33	9.25	10.39	-
TBA40-EHEH_-4407	41.2	367	229	264	-	90.8	14.45	9.02	10.39	-
TBA40-FHFH_-4407	42.5	383	254	264	-	93.7	15.08	10.00	10.39	-
TBA40-GHGH_-4407	30.0	400	114	264	-	66.1	15.75	4.49	10.39	-
BCR20-AEAE-4407	9.2	196	79	-	213	20.3	7.72	3.11	-	8.39
BCR20-BEBE-4407	9.2	196	79	-	213	20.3	7.72	3.11	-	8.39
BCR20-GEGE-4407	9.0	196	60	-	213	19.8	7.72	2.36	-	8.39
BCR30-AGAG-4407	15.5	290	115	-	263	34.2	11.42	4.53	-	10.35
BCR30-BGBG-4407	15.5	290	115	-	263	34.2	11.42	4.53	-	10.35
BCR30-GGGG-4407	15.1	290	89	-	263	33.3	11.42	3.50	-	10.35
TMB40-AHAH_-4407	32.1	416	145	264	-	70.8	16.38	5.71	10.39	-
TMB40-BHBH_-4407	32.1	400	145	264	-	70.8	15.75	5.71	10.39	-
TMB40-CHCH_-4407	36.7	362	220	264	-	80.9	14.25	8.66	10.39	-
TMB40-DHDH_-4407	38.8	364	235	264	-	85.5	14.33	9.25	10.39	-
TMB40-EHEH_-4407	37.4	367	229	264	-	82.5	14.45	9.02	10.39	-
TMB40-FHFH_-4407	43.8	383	254	264	-	96.6	15.08	10.00	10.39	-
TMB40-GHGH_-4407	29.3	400	114	264	-	64.6	15.75	4.49	10.39	-

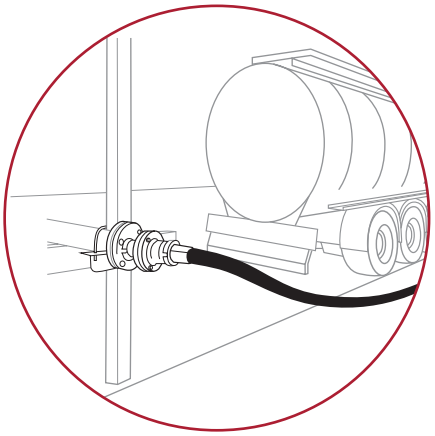
TODO Standard
Break-Away Coupling

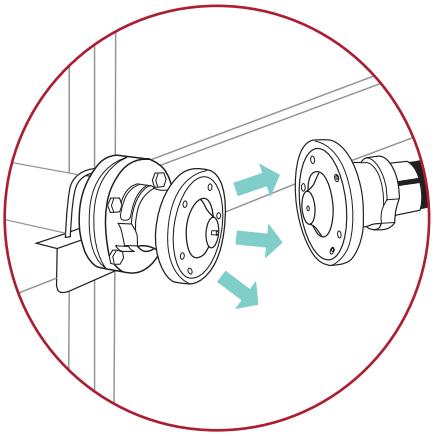
The Standard Break-Away Coupling can be used to prevent the loss of virtually any liquid/ vapour, and is used globally in a range of applications.

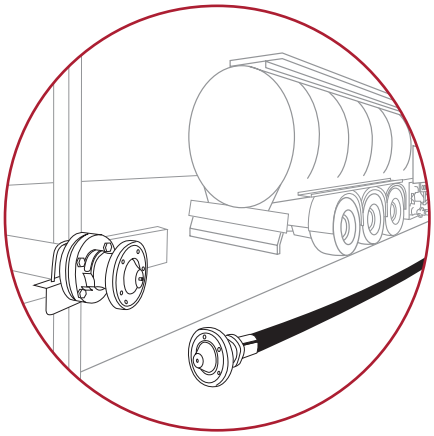
With thousands of variants possible through the use of different body materials, connection types and seal options, the TODO Standard Break-Away responds to the needs of thousands of clients around the world.

The benefits of using a Standard Break-Away Coupling

- High flow rate/low pressure drop
- Encapsulated shear bolts
- Operates independently of shut off safety systems and does not require an external power source
- Will release at any angle of pull
- Easy to re-set on site
- By specifying body materials, seals and connections, the Standard Break-Away can be used in countless applications



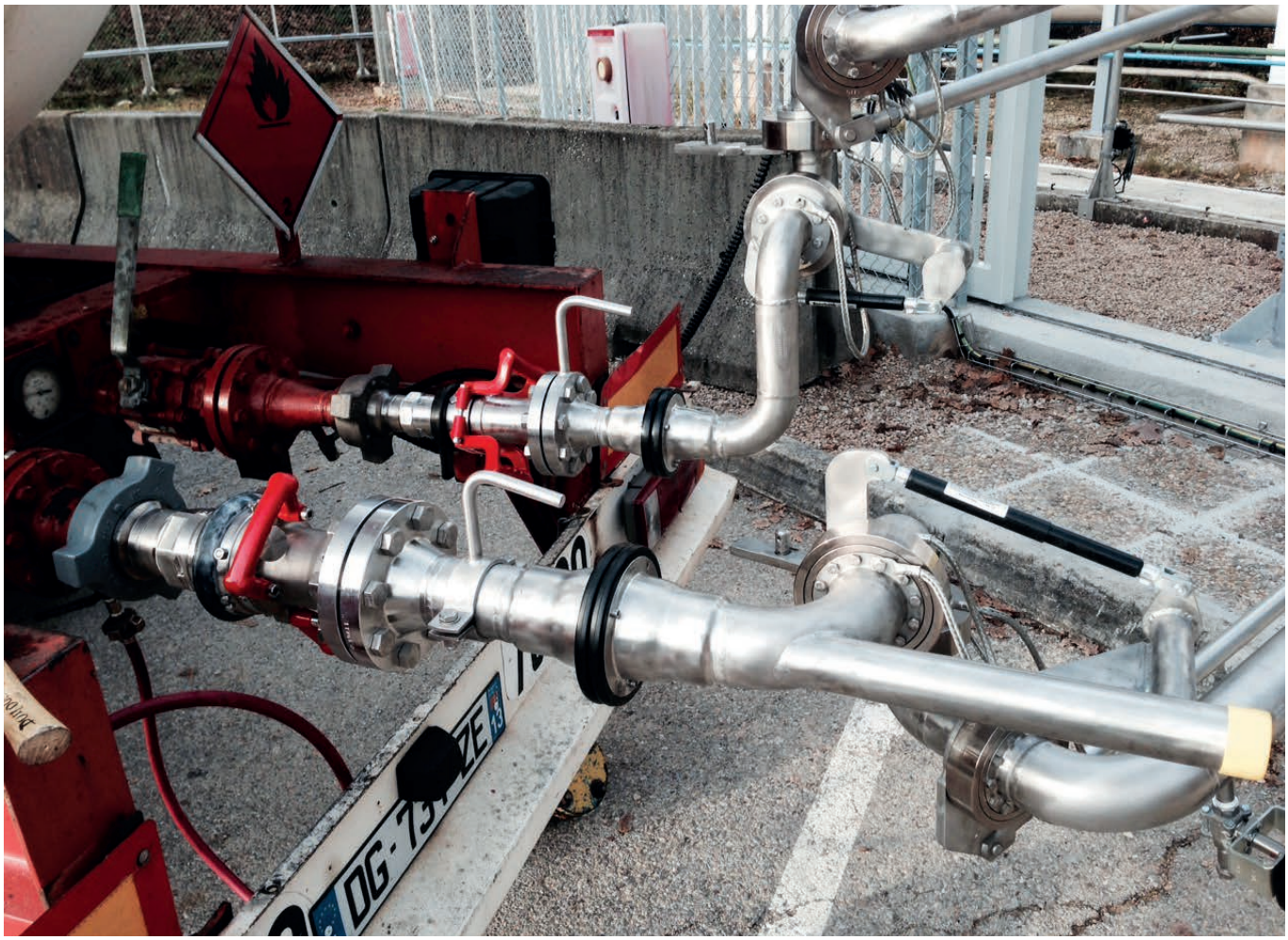




Technical Data

Sizes:	2” (DN50) - 4” (DN100).
Materials:	Stainless Steel, Aluminium.
Seals:	FKM (Viton®) as standard. Others available on request.
Temperature:	-20°C (-4°F) – +80°C (176°F) (572°F) depending on application) Based on standard seal.
Working pressure:	Up to 40 bar. Each coupling half when divided: 40 bar.
Test pressure:	Up to 60 bar each coupling half.
Possible break angle:	0-90°, all directions.
End connections:	BSP- and NPT-threads, flanges. Variants available on request.

Reset kits available. Viton® is a registered trademarks of DuPont Performance Elastomers.



TODO TTMA Flange
Break-Away Coupling

Emco Wheaton has introduced a new 4" Aluminum TODO Break-Away Coupling, incorporating TTMA (Tank Truck Manufacturers Association) flanges, for bottom hose loading arms.

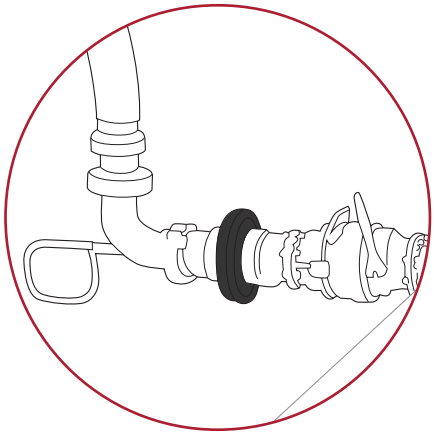
The addition of the 4" TTMA TODO Break-Away to the loading and unloading operation of road tankers gives operators peace of mind knowing that if a drive-away incident occurs, the Break-Away will disconnect and minimize product lost to virtually zero.

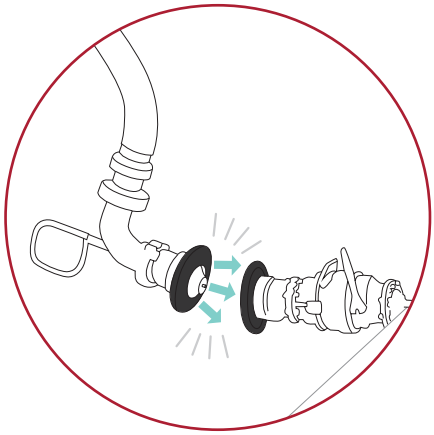
The addition of the Break-Away will eliminate damage to the API coupling and loading arm and the Break-Away can be reset onsite with an easy to install kit, thereby eliminating potential downtime.

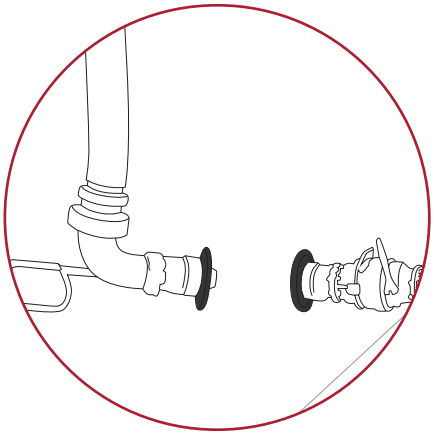
The addition of the flange to the Break-Away allows our current customers to retrofit the Break-Away to their current bottom hose loading applications, which incorporate equipment such as the API coupling and the outbound swivel which also have a TTMA flange fitted.

The benefits of using a TTMA Flange Break-Away Coupling

- High flow rate/low pressure drop
- Encapsulated shear bolts
- Operates independently of shut off safety systems and does not require an external power source
- Will release at any angle of pull
- Marine and Collar Release versions available
- Easy to re-set on site
- Designed to retrofit to any bottom hose loading arm using TTMA flanges
- Easy to retrofit with minor adjustments to the spring cylinder







TODO Collar Release
Break-Away Coupling

The Collar Release Break-Away is specifically designed for loading arm protection. The collar release design ensures a safe break point when a predetermined working envelope limit is exceeded via the use of a specific length of cable which is attached to the loading arm. This ensures that there is no overextension of the loading arm.

The encapsulated shear bolts of the Standard Break-Away have been replaced with a collar, which holds the two halves of the Break-Away together. When the loading arm reaches its maximum desired extension, a cable connected to the loading arm pulls on the collar bolt, snapping the shear pin, allowing the collar to release and the two halves of the Break-Away to separate.

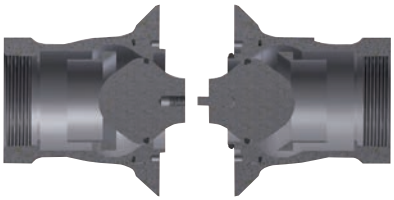
After release, the collar components are restrained by the cable to the fixed end so they do not fall to the ground, reducing the chance of a spark and allowing their use in ATEX areas.

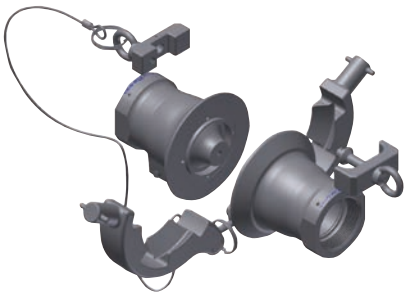
The only part that needs replacing after a separation event is the shear pin, which can be performed easily on site. If servicing of the Break-Away halves is required, it is possible to disassemble the collar mechanism without the need to replace the shear pin.

The benefits of using a Collar Release Break-Away Coupling

- High flow rate/low pressure drop
- Operates independently of shut off safety systems and does not require an external power source
- Easy to re-set on site
- Safe for use in ATEX areas due to 'attached' collars
- Protects loading arm from experiencing too much force
- Operator can control forces permitted on loading arm
- Simple to reset onsite

Cross Section and Separated Diagrams

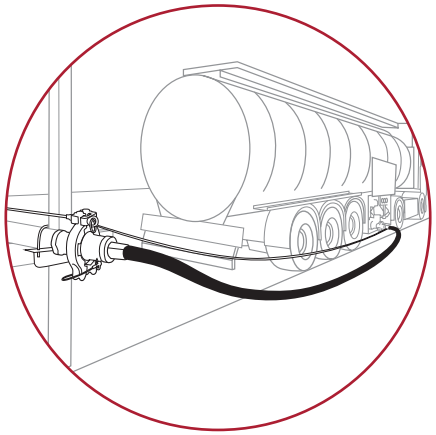


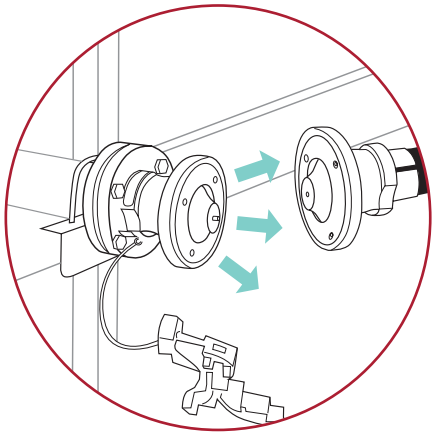


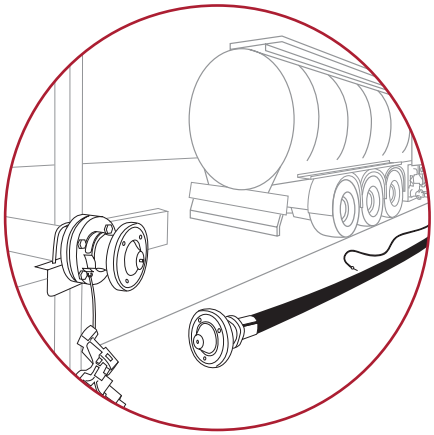
Technical Data

Sizes:	2" (DN50) - 3" (DN80)
Materials:	Stainless steel.
Seals:	FKM (Viton®) as standard. Others available on request.
Temperature:	-20°C (-4°F) – +80°C (176°F) (572°F) depending on application) Based on standard seal.
Working pressure:	Up to 40 bar.
End connections:	NPT / BSP / Weld Ends.

Viton® is a registered trademarks of DuPont Performance Elastomers.







TODO Marine
Break-Away Coupling

The 4" Stainless Steel Marine Break-Away design is an evolved version of the 4" Break-Away. This Marine Break-Away shares the same high flow rates but has increased durability required for off shore applications.

The introduction of five evenly spaced 16mm load pins guarantees that the Break-Away is limited to a straight pull disconnection only, as required by the industry. Load pins have also been introduced into the design to ensure the Break-Away Coupling can handle the extreme weights it may be subjected to.

Tests have been performed with more than one and a half tons of bending load, under which the Break-Away performed flawlessly.

The benefits of using a Marine Break-Away Coupling

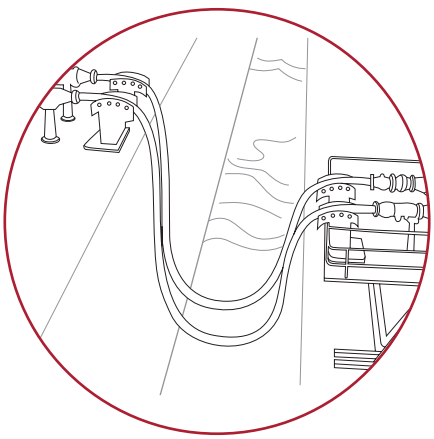
- High flow rate/low pressure drop
- Designed to resist forces acting perpendicularly to the line of flow
- Operates independently of shut off safety systems and does not require an external power source
- Easy to re-set on site
- Load pins allow the Break-Away Coupling to withstand extreme heavy loads

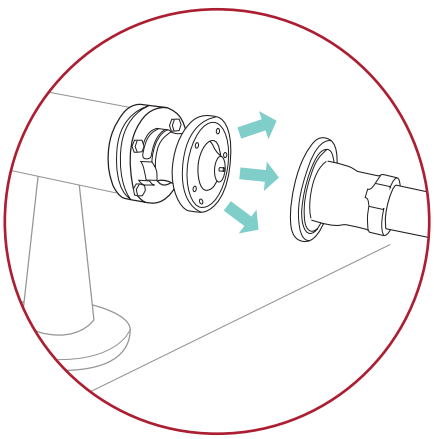
Separated Diagrams

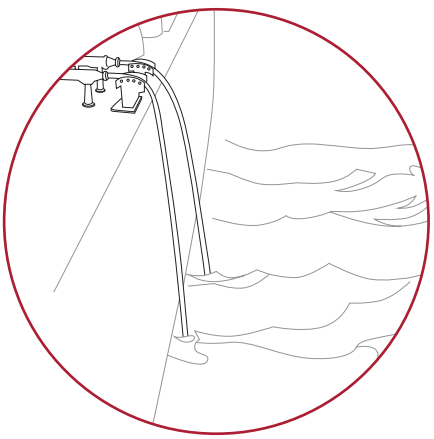
Technical Data

Sizes:	4" (DN100)
Materials:	Stainless steel.
Seals:	FKM (Viton®) as standard. Others available on request.
Temperature:	-20°C (-4°F) – +80°C (176°F) (572°F) depending on application)
Working pressure:	Up to 25 bar.
Possible break angle:	Designed for straight-pull disconnect only. Application – Marine Hoses.
End connections:	BSP – and NPT-threads, flanges. Variants available on request.

Reset kits available. Viton® is a registered trademarks of DuPont Performance Elastomers.







Part Numbers creation

The below part number guide outlines how to create the correct part number of the specific Break-Away Coupling you require. For more information contact your sales representative.

Field 1	Field 2	-	Field 3	Field 4	Field 5	Field 6	Field 7	-	Field 8	Field 9	Field 10
TBA	20	-	A	E	A	E	X	-	4	4	07

Field 1	Product category
TBA	Safety Break-Away
TMB	Marine Break-Away
BCR	Collar Release

Field 2	Unit size
10	1 inch
20	2 inch
30	3 inch
40	4 inch

Field 4	Connection Size - Male End
A	0.5 inch
B	0.75 inch
C	1 inch
D	1.5 inch
E	2 inch
F	2.5 inch
G	3 inch
H	4 inch
J	6 inch

Field 6	Connection Size - Female End
A	0.5 inch
B	0.75 inch
C	1 inch
D	1.5 inch
E	2 inch
F	2.5 inch
G	3 inch
H	4 inch
J	6 inch

Field 3	Connection Type - Male End
A	NPT
B	BSPP
C	Flange PN 10/16
D	Flange PN 25/40
E	Flange ASA Class 150
F	Flange ASA Class 300
G	Welded End
H	Flange TTMA

Field 5	Connection Type - Female End
A	NPT
B	BSPP
C	Flange PN 10/16
D	Flange PN 25/40
E	Flange ASA Class 150
F	Flange ASA Class 300
G	Welded End
H	Flange TTMA

Field 7	Break Pin size
T	1.5mm
U	2.0mm
V	2.5mm
W	3.0mm
X	3.5mm
Y	4.0mm
Z	4.5mm

Field 8	Male Body Material
As standard	

Field 9	Female Body Material
As standard	

Field 10	Seal Material
As standard	

Please consider the below notes when creating your part number

Application Sheet Critical Questions

First, identify the type of Break-Away required

1. Pipe/Hose Bore Size – Use this to identify Field 2 – Unit Size
2. Inlet/Outlet Connections Required – Use this to identify fields 3-6
3. Max, Min and Ave. Transfer Pressure – Use this to identify fields 7 & 8 using the 'Max WP' and 'Separation' tabs

NOTE: Pay close attention to the connection type to ensure pressure rating is not exceeded

NOTE: Field 7 is excluded for Collar Release Break-Aways

4. Media to be Transferred – Use this to identify Field 10

Example

Customer requires a Safety Break-Away

1. 2"
2. NPT both sides
3. 25 bar
4. Petroleum

Part Number Generated:

TBA20-AEAEW-4407

This is a 2" Safety Break-Away, NPT connections both sides, 3.0mm pins, Stainless Steel with Viton seals

When selecting a break pin size, it is important to ensure that the customer is satisfied that the separation force is correct for their application.

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