

Aircraft Tow Bars



Manufactured by **Cavotec Fladung**

Aircraft Tow Bars

Who we are

Cavotec is a multi-national group of companies serving the following industries: mining and tunnelling, ports and maritime, steel and aluminium, energy and offshore, airports, general industry and automation. In the early 1960's our main focus was the design and production of motorised cable reels primarily for manufacturers of tower cranes, harbour cranes and mining equipment. Today, Cavotec is connecting mobile equipment around the world in many diverse applications.

Where we are

The Cavotec Group consists of manufacturing "Centres of Excellence" located in France, Germany, Italy, New Zealand, Norway, Sweden, United Kingdom and USA and by 5 local manufacturing units located in Australia, China, Germany, Sweden and the USA. For the distribution of products and providing support to customers Cavotec has 27 sales companies which, together with a network of distributors, serve more than 30 countries in five continents. The ultimate objective is to be perceived as "local everywhere".

How we work

Our aim is to work closely with our customers in order to build long-term partnerships. To achieve this aim we have created a working environment that attracts the best people, encourages them to stay and brings out their best qualities. By producing totally reliable systems and backing them with efficient service, we strive to create true customer satisfaction.



Cavotec Fladung

Established in 1968, the Fladung company has grown into a leader in the field of innovative ground support systems. Starting with the supply of 400Hz technology to airports, the company soon started to expand their range of systems for the airport industry.

In 2003 the company became a member of the Cavotec Group, and started operating as Cavotec Fladung GmbH. Today, the company is seen as one of the leading ground support equipment manufacturers in the world. With an extensive range of underground and above ground supply systems, coupled with innovations like the Power and PCA Caddys, Cavotec Fladung has become a natural choice for airport operators around the world.

Cavotec Group Organisation

As shown here the Cavotec Group is organised to support its customers around the world through its manufacturing units and sales companies.

Each Cavotec manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to Group customers.

Each Cavotec sales company, in the 27 countries where they operate, aims at better serving its local market following the Group philosophy "to be local everywhere".

Manufacturing network

Centres of Excellence

France
Cavotec RMS
Spring Driven Reels

Germany
Cavotec Alfo
Spring Driven Reels
Slipping Columns

Cavotec Fladung
Ground Support Equipment

Italy
Cavotec Specimas
Motorized Cable Reels
Panzerbelt Cable Protection
Slipping Columns

Norway
Cavotec Micro-control
Radio Remote Controls

Sweden
Cavotec Connectors
Electrical Plugs & Sockets

New Zealand
Mooring Systems Ltd
Automated Mooring Systems

United Kingdom
Cavotec Dabico
Ground Support Equipment

USA
Cavotec Dabico
Ground Support Equipment

Local Manufacturing

Australia
Cavotec Australia
Motorized Cable Reels

China
Cavotec China
Product Assembly

Germany
Cavotec Micro-control
Radio Remote Controls

Sweden
Cavotec Sweden
Product Assembly

USA
Cavotec USA
Product Assembly

Group Partners

Belgium
Gantry
Crane Rail Systems

Italy
Brevetti Stendalto
Cable Chains
Prysmian
Flexible Cables
Tratos Cavi
Flexible Cables

Sales network

Cavotec Sales Companies

Cavotec Abu Dhabi	Cavotec France	Cavotec Qatar
Cavotec Australia	Cavotec Germany	Cavotec Russia*
Cavotec Belgium*	Cavotec Hong Kong	Cavotec Singapore
Cavotec BeNeLux	Cavotec India	Cavotec South Africa
Cavotec Brazil*	Cavotec Italy	Cavotec Sweden
Cavotec Canada	Cavotec Korea	Cavotec Turkey
Cavotec Chile	Cavotec Latin America	Cavotec UK & Ireland
Cavotec China	Cavotec Mexico	Cavotec USA
Cavotec Denmark	Cavotec Middle East	
Cavotec Finland	Cavotec Norway	

* Branch Office

Aircraft Tow Bars

STANDARD AND UNIVERSAL TYPE

Specially designed aircraft tow bars have since many years been an integral part of the complete Cavotec Fladung range. Thanks to their innovative design features and high quality, the Cavotec Fladung tow bars are capable of towing all types of aircraft from all major manufacturers such as Boeing, Airbus, Tupolev, Ilushyn, Saab.

The standard available tube lengths are 3.510mm, 4.430mm and 6.885mm. Each can be fitted with optional features such as torsion adapters, shock absorbers and a pivoting towing eye.

The towing tube

The main part of any aircraft tow bar is the towing tube. Cavotec Fladung tow bars all feature either a special aluminium or steel tube. Each individual

tow bar is specifically designed for a certain type of aircraft and is therefore capable of towing any load related to that individual aircraft. The tube comes equipped with handles on both ends and a towing eye with a 76mm diameter (NATO towing eye).

Undercarriage and hydraulics

The tow bar undercarriage consists of a rectangular tube construction and comes equipped with an optional swing axle and two tyres. Each tow bar can be adjusted in height through an hydraulic handpump, allowing it to be raised towards the nosewheel hook-up point. Remember that when connected to the aircraft the tow bar must be lowered to the correct transport height. The lowering speed is adjustable through a valve mounted on the tow bar.

The drawing on the next page show the default undercarriage and hydraulics configurations of both the standard and universal tow bars.

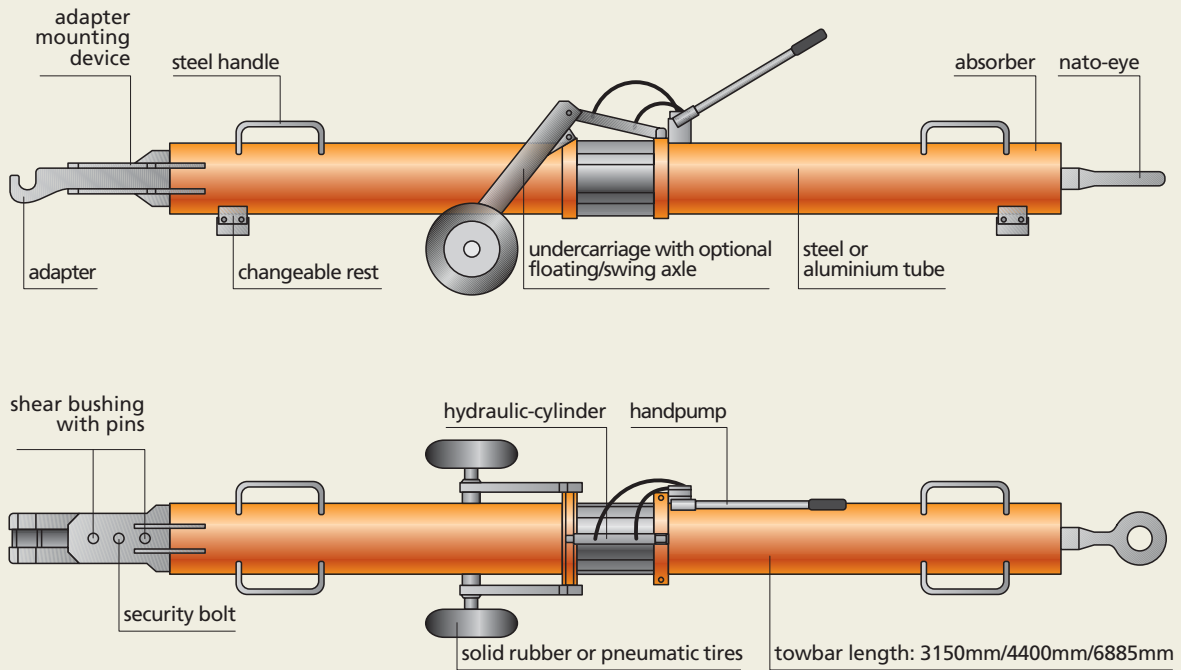
Handling extra-long tow bars

It is possible that a situation occurs where the distance between the tow bar adapter head and floor is too low. This can be due to, for instance, the extra length of the tow bar or height of the coupling on the towing truck. As this situation occurs when the tow bar is in its lowered position, the tow bar has to be transported in the raised (upper) position. To ensure a safe operation however, the tow bar must only be raised sufficiently to obtain enough space between the adaptor and tarmac apron.

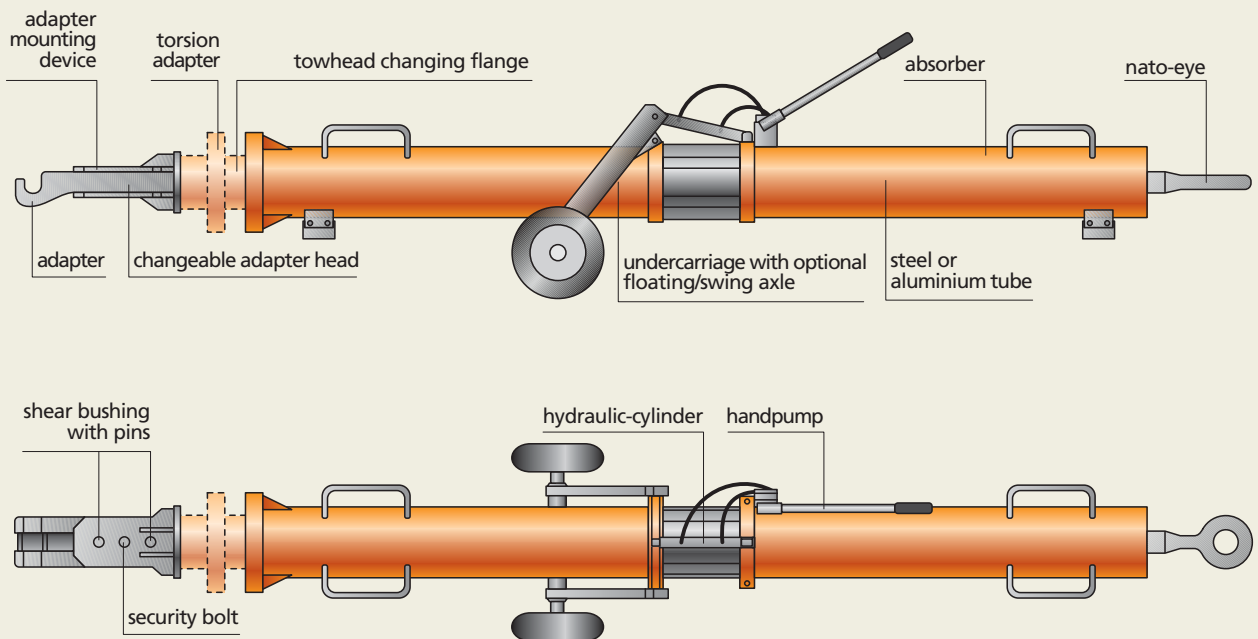


A Cavotec Fladung tow bar in action.

Standard Tow Bar



Universal Tow Bar



Tow bar adapters

A very important part of each tow bar is the adapter head, as it provides the actual connection between tow-truck and aircraft. The adapter is a hand operated locking device fitted with aircraft specific claws that interlock with the towing device at the nosewheel.

The transfer of force and pressure from the tow bar to the adapter head goes through two specially designed shear bolts. These bolts are constructed in such a way that when too much force is exerted on the connection they will break away, preventing further damage to the nosewheel.

To ensure that the adapter head cannot be pulled out of the flange, it is fitted with an additional screw that remains in place even after the shear bolts have been broken. The shear bolts must be tightened using a torque wrench and according to the specified amount of torque.

Adapter optionals

The Cavotec Fladung tow bars and adapter heads can be fitted with a number of optional devices. For the adapter head the most important optional is the "Turning Device for Adapter". This device allows the adapter head to be turned 15° degrees in both directions providing unprecedented flexibility while maintaining a completely safe operating environment.

Aircraft type	Tube ø mm	Length incl. adapter mm	Carriage size mm	Wheel size mm	Weight kg
A300/310	159	5430	470 – 680	405	258
A300/600	159	5330	470 – 680	405	258
A318/319/320/321	159	5450	400 – 600	250	282
A330	159	5430	470 – 680	405	248
A340/200-400	159	4230	400 – 600	250	270
A340/500-600	159	4230	400 – 600	250	295
A380	220	4400	500 – 650	405	529
AN12	159	5200	350 – 480	405	345
AN24	159	3920	275 – 400	250	215
AN26/30/32	159	4565	400 – 600	250	215
ATR42/72	102	4400	250 – 430	250	188
B707/A300	159	5150	470 – 850	405	225
B727	159	5010	300 – 480	405	225
B737/100	159	5200	275 – 400	250	203
B737/200-800	159	5450	275 – 400	250	209
B747	159	4800	350 – 480	405	280
B757	159	5450	350 – 480	405	273
B767	159	5450	350 – 480	405	270
B777	159	5450	350 – 480	405	285
BAE125/HS125	102	4000	250 – 430	250	191
BAE146/HS146/AVRO RJ85/RJ100	102	4100	250 – 430	250	223
Bombardier BD-700 Global Express	102	4300	250 – 430	250	260
Challenger CL600	102	3970	250 – 430	250	203
C130/L382	159	4140	400 – 600	250	241
CRJ 100/200	159	4300	275 – 400	250	239
CRJ 700/900	159	4300	275 – 400	250	183
Dash 7/8/8-400	159	4100	275 – 400	250	221
DC8	159	4980	350 – 480	405	230
DC9/MD80-83/87/88/90/B717	102	4300	250 – 430	250	215
DC10/L-1011/MD11	159	4230	350 – 480	405	268
EMB120/135/145	102	4000	360 – 630	250	210
EMB170/175/190/195/ERJ190/195	159	4100	275 – 400	250	198
F27	159	4060	400 – 770	250	200
F28	102	4000	250 – 430	250	226
F50	159	4100	470 – 850	405	213
F70/F100	159	5300	470 – 850	405	228
Falcon 10/20/100/200	102	4120	250 – 430	250	211
Falcon 50/90/900	102	4120	250 – 430	250	211
Falcon 2000	102	4120	250 – 430	250	211
Gulfstream II – IV	102	4300	250 – 430	250	215
IL18	159	5220	470 – 850	405	215
IL62	159	5400	470 – 850	405	265
IL76 (long)	159	7500	470 – 850	405	330
IL86	159	5300	470 – 850	405	250
Lockheed L-188 Elektra/P-3C	102	5200	440 – 700	405	189
Saab2000/340/SF340	159	4400	275 – 400	250	235
TU134	159	4100	275 – 400	250	200
TU154	159	5280	400 – 770	250	225
TU204/TU214	159	5450	470 – 680	405	258
YAK40	159	5400	470 – 850	405	220
YAK42	159	5350	400 – 770	250	230

This page provides an overview of the different adapter-heads supplied by Cavotec Fladung. Please contact your local Cavotec company for more information concerning the complete range.



A300-310



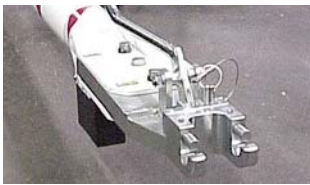
A320



A330



A340



ATR42



B707-A300



B737-100



B737-200-800



B747



B757



B767



B777



BAC1 11



BAE146



C130



CRJ100



DASH8



DC9



DO328



F50



IL18



IL76



L188

Mini Tow Bar

The Cavotec Fladung mini-tow bar is specially designed for towing small aircraft with a maximum of 2000 kg nosewheel weight (or 15% maximum takeoff weight). It features a steel tube mounted with a special height adjustable drawbar eye, an undercarriage with soft tyres and an overall length of only 3.800mm.

Operating this tow bar is simple as the nose wheel support-shell is lifted and lowered by hydraulic cylinders operated either by handpumps, or by the oil pump on the aircraft. The lowering speed can be set over a one-way restrictor with a built-in rope winch, enabling easy placement of the nose wheel into the support-shell.



This tow bar is specially designed for towing small aircraft with upto 2000kg nose wheel weight.



A Cavotec Fladung tow bar connected to a tow truck at Frankfurt Airport, Germany.

From:	
Date:	Inquiry No
Person in charge:	

To:

Questionnaire

- | | |
|---|---|
| <input type="checkbox"/> Floating axle | <input type="checkbox"/> Adapter torsion |
| <input type="checkbox"/> Shock absorber | <input type="checkbox"/> Full rubber tyres |
| <input type="checkbox"/> Pivoting towing eye NATO | <input type="checkbox"/> Pnematic tyres |
| <input type="checkbox"/> Steel towing eye | <input type="checkbox"/> Paint: Skydrol resistant
Standard white (RAL9010) |
| <input type="checkbox"/> Stiff axle | <input type="checkbox"/> Paint: single color (RAL |

- | | |
|--|--|
| <input type="checkbox"/> Standard Tow Bar | <input type="checkbox"/> Mini Tow Bar |
| <input type="checkbox"/> Universal Tow Bar | <input type="checkbox"/> for max. 1.000 Kg |
| Aircraft Type | <input type="checkbox"/> for max. 2.000 Kg |
| | Aircraft type |

Steel tube (standard version) length
welded handles one/two on either side

Aluminium tube length
Screwed on handles one/two on either side

Number of additional shear pins required.....

Tow Bar configuration

Aircraft manufacturers often use completely different configurations to connect to tow bars. These variations are not limited to just the manufacturers but also to each different type of aircraft, even if they are from the same company.

This is why Cavotec Fladung has a very comprehensive range of tow bars. Ranging from the special mini tow bar to the larger standard and universal tow bars. To further increase the versatility of the range most tow bars can be fitted with different adapter-heads. These adapter-heads are specifically designed for a certain type of aircraft and ensure a safe connection when towing.

For more information on all the different tow bar and adapter-head possibilities please contact your local Cavotec company.



Tow Bar fitted with the adapter-head for DC8 aircraft.



A Boeing 747 adapter-head fitted on a steel tube with floating axle.



An adapter-head for the Airbus 330 mounted on a standard tow bar.



Tow Bar fitted with the adapter-head for IL62 aircraft.



Tow Bar fitted with the adapter-head for an IL76/86 type aircraft.



This adapter-head can be used for different aircraft such as Tu154, IL96 and BAE 146.

At work around the world

Cavotec Fladung is a global leader in the supply of specialised ground support equipment.

A full range of underground and above ground supply systems coupled with innovations such as the Power and PCA Caddy's, make Cavotec Fladung the obvious choice for airport operators around the world.

For more information concerning the range of ground support equipment please contact your local Cavotec company or visit www.cavotec.com.



A hangar solution in action at Atitech, Italy.



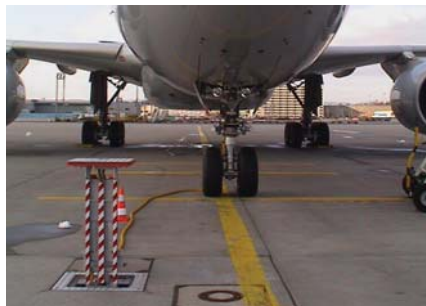
Dual coils mounted under a passenger bridge.



Cavotec Caddy at work at FRAport, Germany.



Specialised cable coils at Nice Airport.



400Hz pop up system in action.



Scissor system FRAport, Germany.

Head Office

Cavotec MSL Holdings Ltd.

Cavotec MSL is listed on the **NZX** 

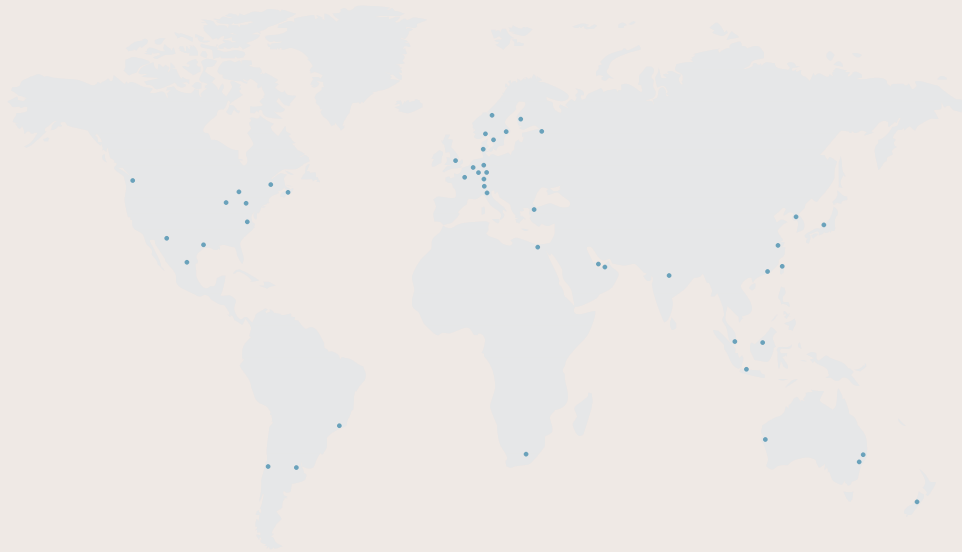
Corporate Office

Cavotec (Swiss) SA

Via Serafino Balestra 27
CH-6900 Lugano, Switzerland

We are present in

Abu Dahbi	Korea
Argentina	Luxemburg
Australia	Malaysia
Belgium	Mexico
Brazil	The Netherlands
Canada	New Zealand
Chile	Norway
China	Russia
Denmark	Saudi Arabia
Egypt	Singapore
Finland	South Africa
France	Sweden
Germany	Switzerland
Hong Kong	Taiwan
India	Turkey
Indonesia	Qatar
Ireland	U.A.E.
Italy	U.K.
Japan	U.S.A.



For more information please visit our website www.cavotec.com
or contact us directly at info@cavotec.com