

Think
twice

A Tradition Of Innovation

BROMMA



Bromma's Tandem Line Are Spreaders Especially Made For Twin-Lifting 40' and 45' Containers.

Container handling is a growth industry, and this represents both opportunity and challenge for today's terminal managers.

Turning higher volume into higher profits isn't automatic. It requires efficiency of operations – the ability to push more boxes, in the same amount of time, through an existing space.

One way to unload mega-ships faster is to increase cycle speed. However, progress in this area has proved difficult. There are significant hurdles to increasing cycle speed – anti-sway issues and driver control issues.

However, other productivity approaches – especially changes in spreader design – have had a dramatic impact on efficiency. Studies indicate that TEU moved per ship-to-shore crane can vary as much as 40% between comparable terminals. The type of spreader used, and the brand of spreader selected, can have a major impact on operating efficiency.

The Bromma Tandem Line of spreaders is a new productivity tool for an industry that's hungry for productivity. Bromma Tandem offers the opportunity to increase the productivity of each lift cycle, due to its ability to twin-lift 40' or 45' containers, or simultaneously lift two or four 20' containers using the Tandem T45 type.

With opportunity always comes challenge. 9,600 TEU ships represent opportunity, but they bring with them this question: can terminals find a way to “rewrite the rules” of ship loading and unloading, so that higher volume will also translate into higher profit, with manageable congestion? Of course this is not a new challenge. For centuries the harbour has been the hub of world trade. Once cargo was unloaded by hand, in a process that might continue for weeks. Today Bromma Tandem is again rewriting the rules of cargo management, by providing a new productivity tool to an industry hungry for productivity.

For terminals moving a significant number of 40' or 45' containers, Bromma Tandem has the potential to significantly boost the efficiency of each lift cycle.

Think Twice As Productive





Bromma's Tandem Line Lifts More, With Greater Flexibility.

Chances are that whatever your container mix is today, it will be somewhat different tomorrow, and that what-ever your container volume is today, it will be some-what greater tomorrow. Bromma Tandem is a spreader solution that helps your terminal in both areas – providing both a productivity boost and an extremely versatile lifting tool.

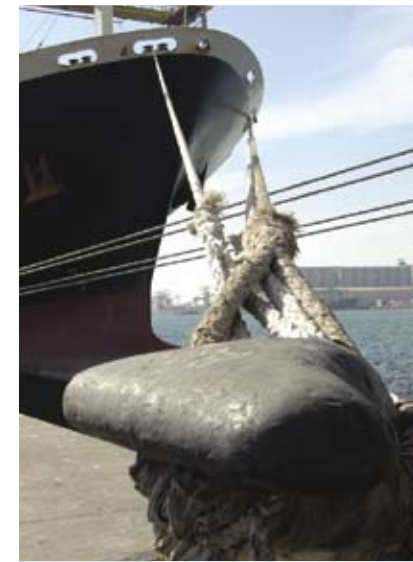
Bromma Tandem can increase productivity when loading and unloading those sections of container ships stacked with 40' containers. It is also ideal for terminals with a high volume of empty containers and cranes with limited lifting capacity. Bromma Tandem has the ability to simultaneously lift up to four 20' containers, or two 40' containers, or two 45' containers, or a single 20' container with a fully loaded 40' container, or many other combinations including hatch covers. It can easily handle container height differences of up to 700 mm, and has an average cycle time of between 60 and 90 seconds.

Moreover, except for lifting capacity, there is no need for a special crane design. With Bromma's pioneering SCS² spreader technology, terminals can swop spreaders between different cranes, and install new spreader models, such as Tandem, without any concern about the interface with other spreader models.

Bromma has a long tradition of innovation. Innovation is linked to a core value at Bromma – to listen to the customer. Yet, while Bromma Tandem is innovative, it is also important to note that it is based on a simple technical approach that features spreader design and technology with proven reliability. Bromma Tandem is not a complicated solution. Except for sufficient lifting capacity, there is no need for a special crane design.

The inherent versatility of Bromma Tandem makes it an ideal choice for terminals that are looking to the horizon and operating with a long-term perspective when making spreader fleet planning decisions.

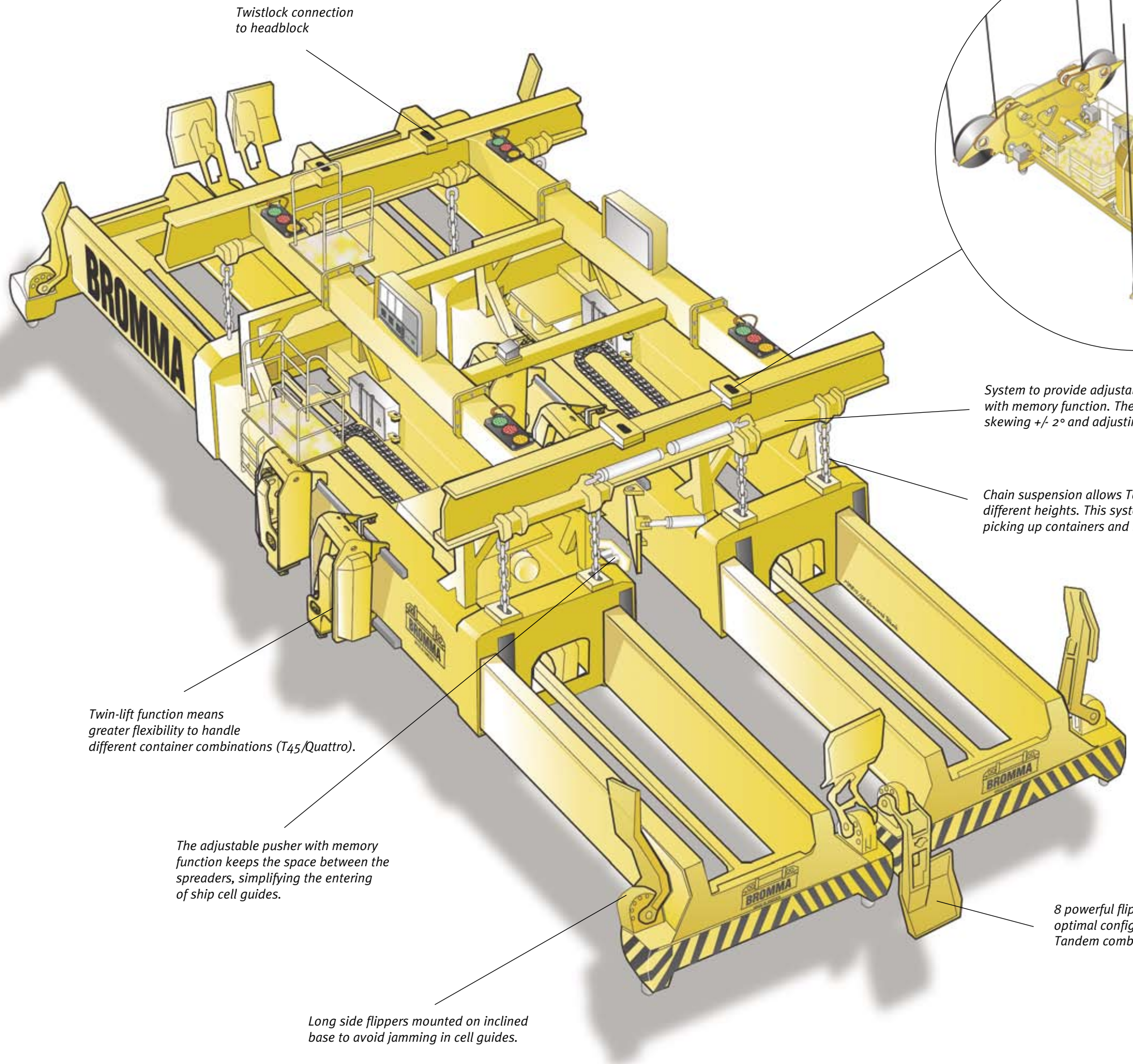
Think Twice As Versatile



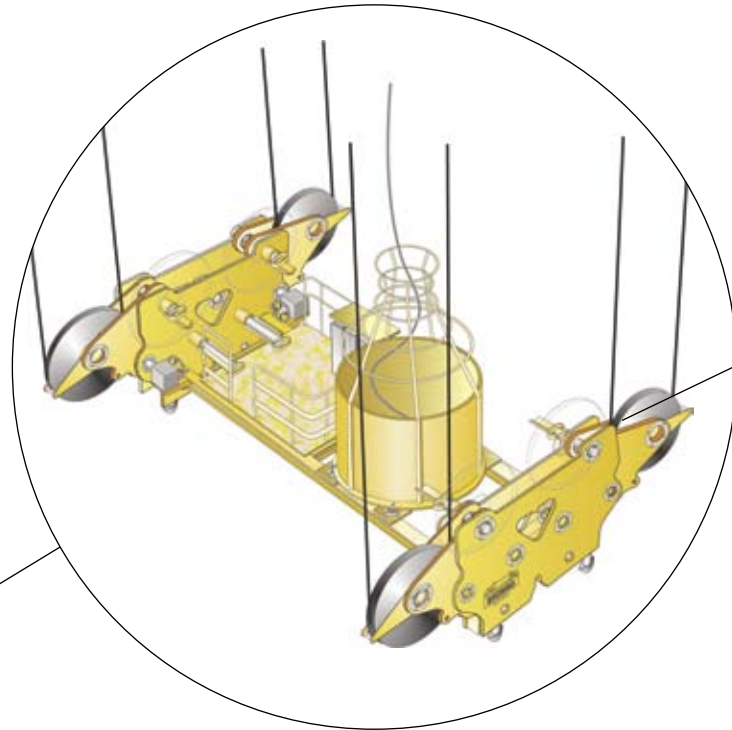
33	Land spreader Unlocked left lamp	Spare	41
34	Land spreader Unlocked left lamp	Spare	42
35	Land spreader Unlocked left lamp	Spare	43
36	Land spreader Unlocked right lamp	Spare	44
37	Land spreader Unlocked right lamp	Spare	45
38	Land spreader Unlocked right lamp	Spare	46
39	Spare	-SS1 Spreader stop	47
40	Spare	Spare	48



Tandem™ T45



Twistlock connection to headblock



Tandem™ Headblock
Headblock with adjustable pulley wheel distance keeps gravity point between pulley wheels center in Tandem mode. When operating with standard spreader, the pulley wheels will be retracted to normal headblock width.

System to provide adjustable distance between spreaders and containers with memory function. The four wagons can be moved individually to allow skewing +/- 2° and adjusting the gravity point should this be needed.

Chain suspension allows Tandem to handle containers of different heights. This system also achieves flexibility when picking up containers and landing on terminal chassis.

Twin-lift function means greater flexibility to handle different container combinations (T45/Quattro).

The adjustable pusher with memory function keeps the space between the spreaders, simplifying the entering of ship cell guides.

Long side flippers mounted on inclined base to avoid jamming in cell guides.

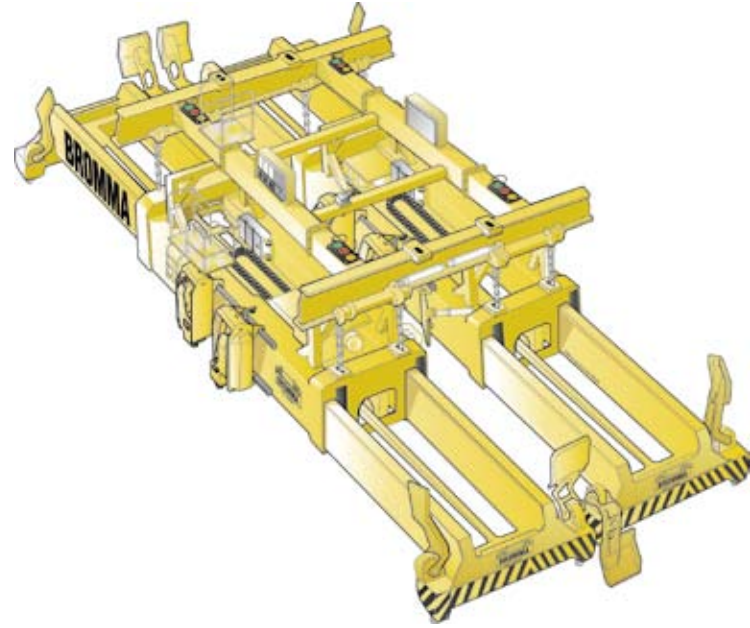
8 powerful flippers with large scoops in optimal configuration to handle different Tandem combinations efficiently.

A Tradition Of Innovation



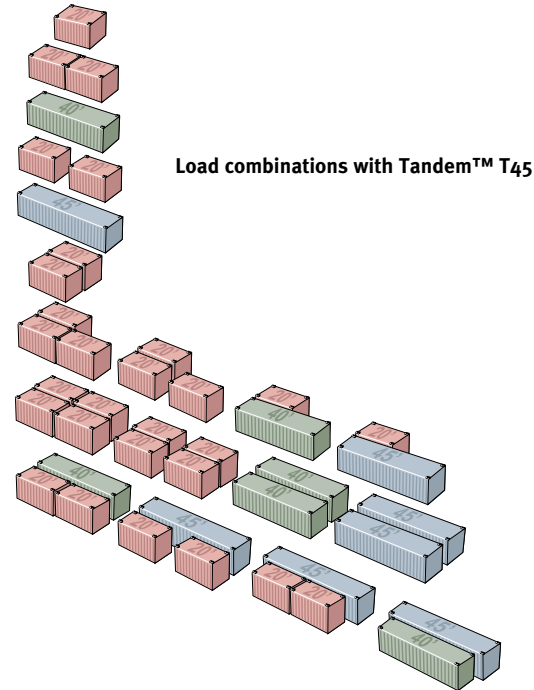
Tandem™ T45

The Bromma Tandem Separating T45 spreader offers terminals both the highest level of productivity and the highest level of versatility available today in ship-to-shore container handling. For industry-leading terminals that seek to “turn” container ships as rapidly as possible, the Tandem Separating T45 spreader offers dynamic and unmatched loading and unloading capacity. The Tandem T45 has the capacity and the flexibility to handle all possible combinations of 20 foot, 40 foot, and 45 foot containers both quickly and efficiently. It can also handle four 20 foot containers simultaneously and separate the two 20 foot containers longitudinally between 0 and 1,5 metres. The Tandem Separating T45 Spreader promises to push productivity per crane lift cycle “to the edge” and greatly improve the overall efficiency with which a container ship may be loaded or unloaded.



Of course, to take full advantage of the lifting capacity of the Tandem T45 will require a higher-capacity container crane. The estimated Tandem T45 spreader weight is 31 tonne, and with spreader capacity of 65x2 tonne [Bromma standard], customers will need a crane capacity of 165 tonne in the ropes. This will most likely prove unrealistic. As such, most customers will rate 20 foot containers to a maximum of 20-25 tonne, thereby resulting in a required crane capacity of 115-135 tonne in the ropes.

While capable of enormously productive lifting cycles, the Tandem T45 can be expected to pose no problems in 40 feet cell guides, as the spreader will use the entire cell space.



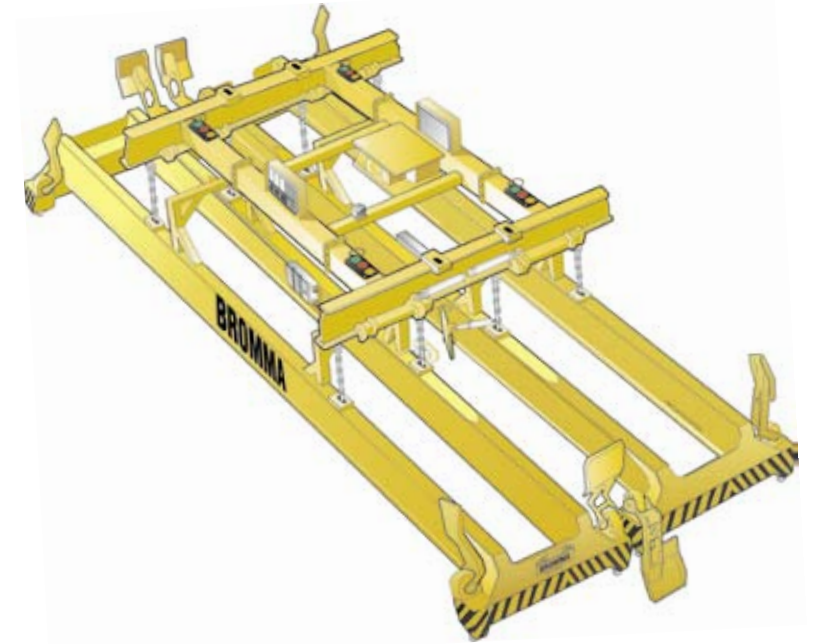
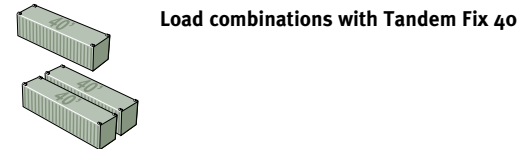
Tandem™ Fix 40

The Bromma Tandem Fixed-Length spreader is an ideal choice for customers who are interested in gaining the added productivity of twin-40 foot container handling, but who are somewhat restricted in their choices by cranes with limited lifting capacity. A container terminal with a high percentage of 40 foot containers will gain an immediate boost to its lift cycle productivity by transitioning from single-lift 40 foot container handling to a Tandem Fixed-Length spreader.

In addition to its ability to be installed on container cranes with limited lifting capacity, the Bromma Tandem Fixed-Length Spreader is also, from a design standpoint, the simplest Tandem model available today. It uses Bromma spreader design and technology that has been proven to be reliable over many years and

literally millions of lift cycles. This spreader has also proven its merits for some time during active service in Europe, where it has been operating under a crane with an out-reach of 56 metres and a lifting capacity of 77 tonne in the ropes.

Customers should keep in mind that the operating limitation of the Tandem Fixed-Length spreader is that it needs to be switched-out in the event that 20' or 45' containers need to be lifted. Spreader change-out can be made relatively quickly, with proper mechanical and electrical interfaces, but the periodic need for any spreader change-out will of course place a limitation on overall production. This is why the Tandem Fixed-Length spreader is best suited for terminals where ships tend to be stacked with a high percentage of 40' containers.



Tandem™ 40/Tandem™ 45

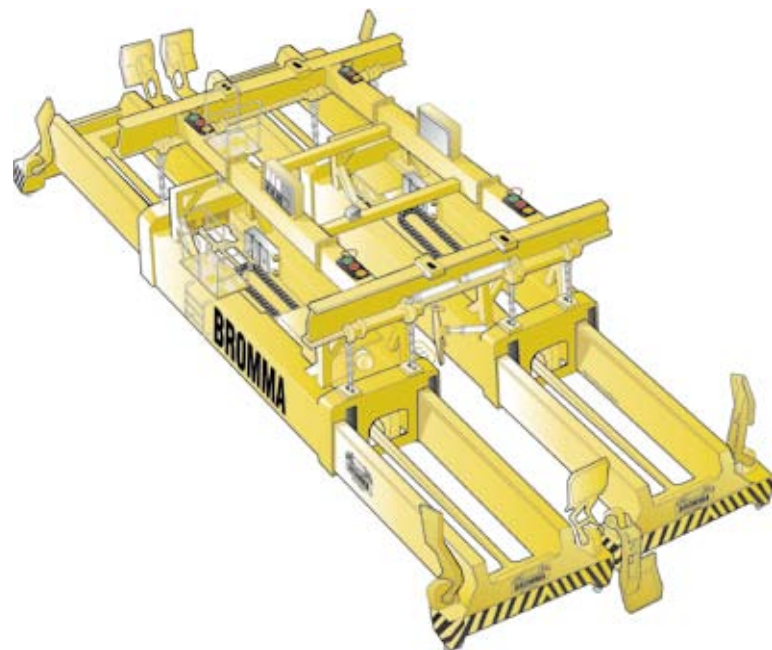
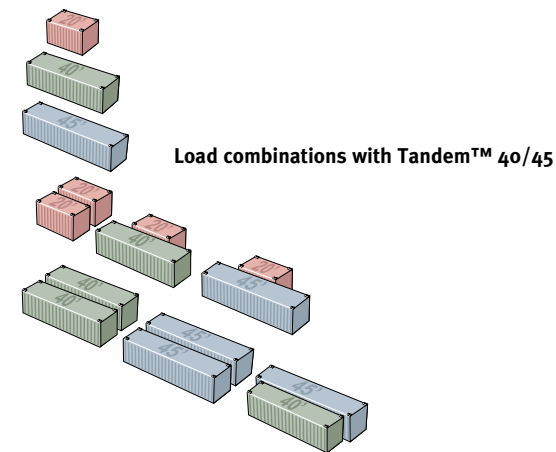
The Bromma Tandem Telescopic 40/45' spreader has a great advantage in versatility, since it can handle all container sizes [20 foot, 40 foot and 45 foot]. This spreader will “twin-lift” 20 foot, 40 foot or 45 foot containers side by side in Tandem mode, without the need, as in the fixed-length version, for periodic change-out. As such, the telescopic Tandem delivers high productivity per lift cycle with no potential “downside” in terms of downtime created by change-outs.

This spreader is also based on proven Bromma spreader design, as it uses the Bromma SSX40/45 spreader as its standard base. Spreader capacity is 70 tonne under the spreader. If a terminal plans to utilize the full 70 tonne capacity under the spreader, crane capacity will need to be approximately 100 tonne in the ropes. As such, the telescopic Tandem can be used without restriction on many last-gene-

ration container cranes in service today. Customers who handle very few 45' containers may wish to consider the 40' version of the telescopic Tandem. This will save approximately 2 tonne in spreader weight.

Customers with a high number of empty 40' containers may want to give special consideration to the productivity advantages of the telescopic Tandem. One Bromma customer in Asia with a significant number of empties in its container mix will use the telescopic twin-40/45 Tandem under a crane with 75 tonne capacity under the headblock.

When selecting the telescopic Tandem, customers should be aware that when handling twin-20's side-by-side in 40 and 45 ft. cell guides they can only use the support at one end of the cell guides.



Tandem™ Quattro

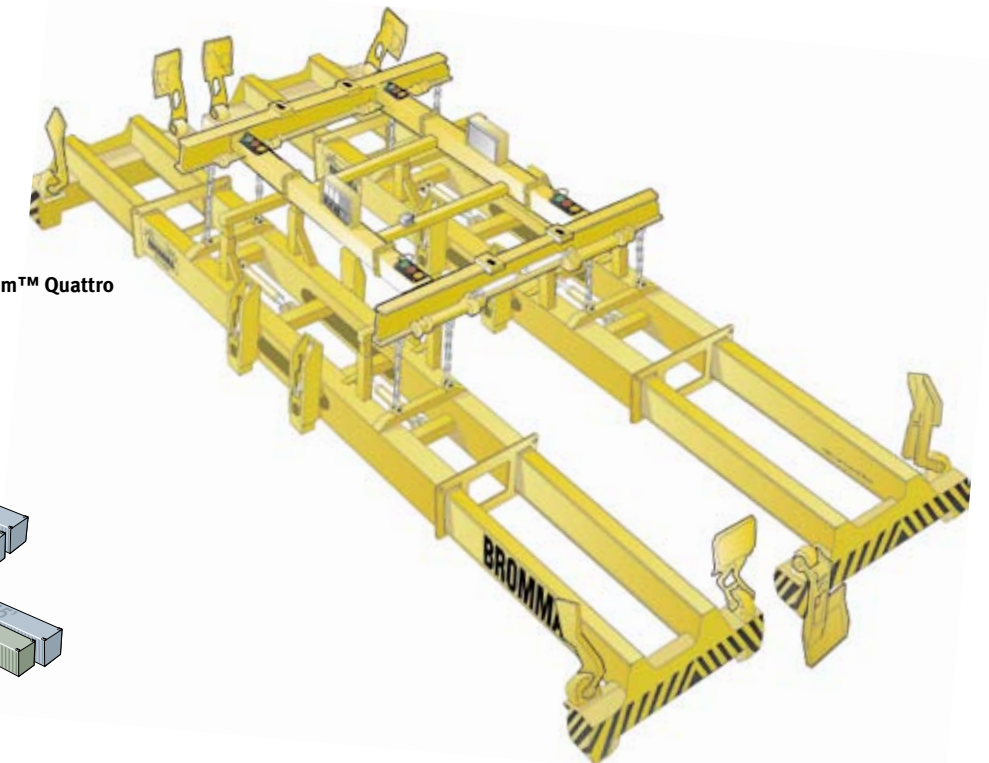
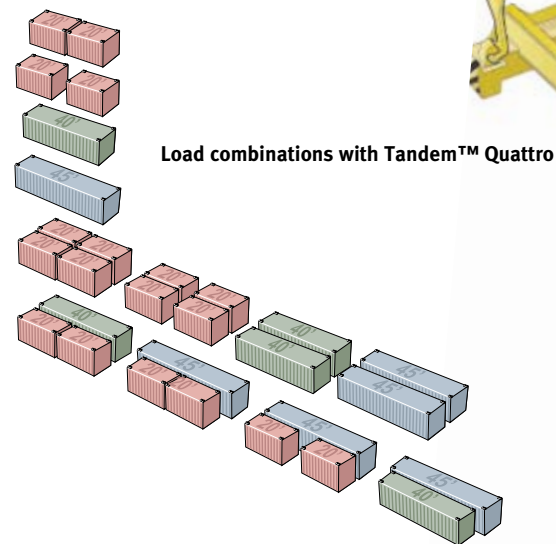
The Bromma Tandem Quattro offers nearly the same capacity and flexibility as the Tandem T45, including the ability to handle four 20 foot containers at a time – two 20 foot containers under each spreader – but it does so with a lower spreader weight.

The Tandem Quattro spreader also offers another advantage: the capability to do side shift on individual spreaders, which is useful when the chassis or containers on the ground are not fully lined up in the longitudinal direction.

As the tandem Quattro will never telescope into 20 ft., the main frame of the

individual Tandem spreaders are longer than on a standard telescopic spreader. The limitation on the Tandem Quattro is that it cannot lift a single 20 foot container alone. As a result, if a 20 foot container is positioned so that it can only be handled by itself, the Tandem Quattro will need to be changed-out for another spreader that can perform this single-lift.

Due to this limitation, the Tandem Quattro is especially well-suited for container terminals that have a high percentage of 40' and 45' containers, and a low percentage of 20' containers that are located in such a way that they need to be load-ed/unloaded in single lift mode.



Tandem™ Headblock

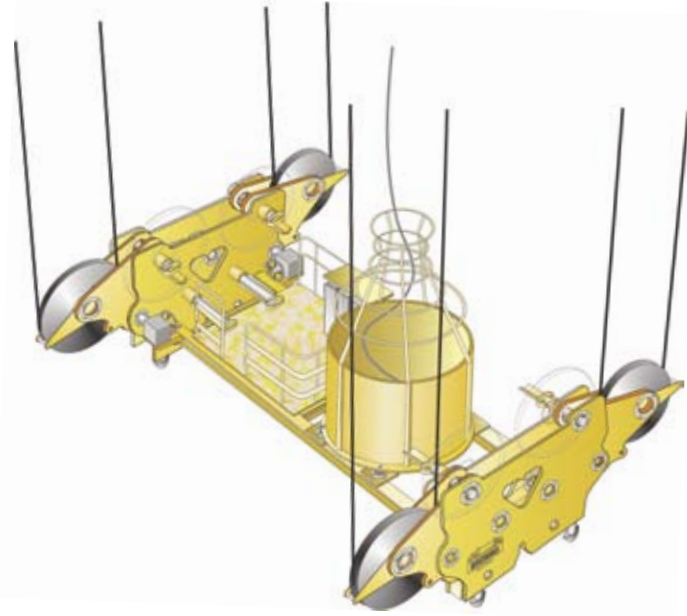
For efficient handling of any of the Bromma Tandem spreaders, the Tandem headblock is required.

The Tandem headblock features pulley wheels which are adjustable from standard [750-1000 mm] up to 2,6 metres. This means that the total gravity point always stays between the pulley wheels centres [when handling in single lift mode or when handling one fully laden container and one empty container].

When it comes to headblock design, a mechanical and electrical quick change arrangement between spreader and crane headblock is important, with preference for fully automatic twistlocks. Bromma can also provide a fully automatic electrical plug/socket interface.

On the Bromma Tandem headblock, pulley wheel adjustment can either be made manually or automatically. Automatic adjustment is generally to be preferred.

In addition to supplying a new crane headblock, Bromma will also offer to modify the existing crane electrical interface and communication system to enable the handling of Tandem spreaders.



Technical specifications

	Tandem™ T45	Tandem™ Fix 40	Tandem™ 40/45	Tandem™ Quattro
Load capacity under spreader	2x51 tonne 4x32,5 tonne	2x35 tonne	2x41 tonne	2x51 tonne 4x32,5 tonne
Spreader tare weight	31 tonne	16 tonne	23,2/25 tonne	24 tonne
Total spreader height	2900 mm	2400 mm	2800/2900 mm	2900 mm
Tandem separating	1000 mm in 10 seconds	1000 mm in 10 seconds	1000 mm in 10 seconds	1000 mm in 10 seconds
Container height difference	2' 660 mm (standard)	2' 660 mm (standard)	2' 660 mm (standard)	2' 660 mm (standard)
Skewing	+/- 2°	+/- 2°	+/- 2°	+/- 2°
Skewing speed	1° in 2 seconds	1° in 2 seconds	1° in 2 seconds	1° in 2 seconds
Twin separating speed	Approx. 16 sec			
Twinlift unit up/down	Approx. 8 sec			
Flipper Arm speed	180° in 3-5 seconds	180° in 3-5 seconds	180° in 3-5 seconds	180° in 3-5 seconds
Twistlock	ISO floating	ISO floating	ISO floating	ISO floating
Twistlock rotation	90° in approx. 1 second	90° in approx. 1 second	90° in approx. 1 second	90° in approx. 1 second
Working pressure	100/160 bar	140 bar	140 bar	140 bar
Electric				
Total power consumption	15 kW	7,5 kW	15 kW	15 kW
Control				
Control voltage	24 VDC	24 VDC	24 VDC	24 VDC
Control system	SCS²	SCS²	SCS²	SCS²
Corrosion protection				
Blast cleaning to	SA2,5 – ISO 8501:1	SA2,5 – ISO 8501:1	SA2,5 – ISO 8501:1	SA2,5 – ISO 8501:1
Interzinc 72	50 my	50 my	50 my	50 my
Intercure 429	70 my	70 my	70 my	70 my
Interfine 629 HS	40 my	40 my	40 my	40 my
Interfine 629 HS	40 my	40 my	40 my	40 my
Min. coating thickness	total 200 my	200 my	total 200 my	total 200 my

	Tandem™ Headblock
Load capacity under headblock	71 tonne (For Tandem 45)
Headblock tare weight	5 tonne (For Tandem 45)
Dimensions	
Height	3800 mm
Length	5500 mm
Width in single lift mode	2100 mm
Width in twin lift mode	3700 mm
Connection to spreader	Twistlock (Recommended)
Pulley wheel distance min/max	Approx 5 min manually operated. Approx 1 min fully automatic.
Corrosion protection	
Blast cleaning to	SA2,5 – ISO 8501:1
Interzinc 72	50 my
Intercure 429	70 my
Interfine 629 HS	40 my
Interfine 629 HS	40 my
Min. coating thickness	total 200 my

You Never Walk Alone

Bromma's Tandem Line is not only twice the spreader. It's also backed by twice the support.

While you can try to copy a spreader, it's really impossible to copy a company. Welding steel is one thing; shaping a strong, customer-friendly culture that pursues excellence in all things is something else.

Bromma is a Scandinavian company – serious about its products, serious about its commitments. You know what you get with Bromma. Further, the benefits of choosing Bromma – Bromma the product plus Bromma the company – can have a very direct impact on the bottom line. In the end, spreader performance is directly correlated with terminal profitability – higher productivity and higher reliability lead to higher profits. Which is why the ultimate question isn't what a spreader initially costs – it's what a spreader earns over its lifetime.

This is why the choice of a spreader – and especially the choice of a next-generation spreader – is also the choice of a company.

Bromma Tandem is backed by unmatched after-sales support: a global and highly experienced spreader technician team; generous spreader training programs; major investment in spare parts inventory; and a culture committed to fixing problems. At Bromma, spreaders are our only business. Focus is a good thing for most companies. It is easier to be the best at one thing than at many things. At Bromma this focus on spreaders has produced a single-minded company dedicated to long-term customer support.

You can try to copy a spreader, but you can't copy a company. Bromma Tandem: twice the performance, backed by twice the company.

Think Twice The Support



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