



03

Height Safety
Lifting
Load Control
Safety Management

SpanSet®



SpanSet is here for you:

Switzerland, Australia, Austria, Brazil, China, France, Germany, Hungary, UK, Indonesia, Italy, Poland, Spain, Taiwan, USA.

Contents

Risk Management	5	25mm Light Duty Ratchet Assemblies	36-37	Pretension	88
03.1 Heavy Duty Ratchets	6-13	25mm Light Duty Cambuckle Assemblies	38	Tie Down Angle Effect	89
20040 ABS Endless Ratchet Assemblies	10	03.5 Specialised Restraints	40-49	Dunnage (Packing)	90
20040 ABS Power Assisted Ratchet Assemblies	11	Vehicle Restraints	42	Direct Load Restraint	91
20040 ABS 2 Part Ratchet Assemblies	12	Hammock Lashing	43	Direct Lashing Angles	92-93
20031 ABS Power Assisted Ratchet Assemblies	13	Special Projects	44-47	Selecting Lashing Combinations	94
03.2 50mm High Pretension ABS Assemblies	14-23	03.6 Accessories	48-59	Direct Lashing Examples	95-96
ERGO 2 Part ABS Ratchet Assemblies	18-19	Double-Sided secutex®	50	Combined Tie Down and Direct Restraint	97
ERGO Endless ABS Ratchet Assemblies	20	Clip-On secutex®	52	Friction and Direct Restraint	98
ERGO Power Assisted ABS Web Dog Assemblies	22	LSP-SP1 Protective Sleeving	54	Curtain Sided Vehicles	99
03.3 50mm Medium Duty Ratchets	24-31	sliP Sleeving	56	Rubber Tyre Bounce	100
20020 2 Part ABS Ratchet Assemblies	28	Rigid Edge Protectors	58	Pipe Transport	101
20020 Power Assisted ABS Ratchet Assemblies	29	03.7 Towing and Recovery	60-67	Vertical Rolls, Reels, Coils and Drums	102
1857 Non-ABS Ratchet Assemblies	30	Towing	62-63	Checking the Load	103
03.4 Light Duty Lashing Assemblies	32-39	Bruiser Plus	64	Sharp Edges	104
35mm Light Duty Ratchet Assemblies	34	Bruiser	65	Cut and Abrasion Protection	105
50mm Light Duty Ratchet Assemblies	35	Titan	66	Operating Temperatures	106
		Pink Polyester Tow Slings and 4WD Recovery Kits	67	Atmospheric Effects	107
		03.8 Fall Protection	68-75	The Effects of Various Substances	108
		WebRail	70-71	The Effects of Acids on Polyester	109
		Capcha	72	The Effect of Alkalis and Oxidising Agents on Polyester	110-111
		Stoppa	74-75	The Effects of Chemicals and Solvents on Polyester	112
		03.9 Technical Information	77-117	Lashing Deficiencies	113
		Load Dynamics	78-83	Tensioning Devices	114
		Methods of Load Restraint - Tie Down	84-85	Handling the Load Securing Equipment	115-116
		Basic Material Guidelines	86		
		Maintaining Friction	87		





We Can Manage Your Security

The greatest security does not come about overnight. It is the result of many years' development. SpanSet can look back over 40 years of experience and success. After all, we developed the first car safety belt for Volvo back in the 60s – which today is an indispensable security feature for every car.

We have consistently followed up these security concepts. Nowadays, SpanSet has become the number one for quality and our products are in use around the world. Our customers include companies and organisations who set the highest demands in security, such as automobile and aircraft manufacturers, the chemical, steel and paper industry, energy suppliers, freight companies, fire services, Department of Defence and NATO.

Progress Needs Pacesetters – Such as SpanSet

In addition, SpanSet is an international pacesetter in development: for decades. Each year, we put forward patents and new developments in load security, lifting technology and personal protective equipment.

This is how we can maximise your security, wherever it's needed: with our load security products you will effectively avert risks and accidents and comprehensively meet legal requirements. With the use of SpanSet quality products, you can be assured that you'll be doing the utmost for your transport safety.

Only 100% Quality is Good Enough for Us

How can we actually be sure that our products keep their promises? It's quite simple: we are obsessed with quality.

From material selection to quality testing, from accurate calculations to intelligent use – we provide 100% performance for each phase. We employ technical and legal experts so that only absolutely reliable and practical load security products reach your hands. We develop new products together with universities, end users, military and other institutions.

Our quality management continually tests materials and end products. They are checked continuously in our own laboratory and in external testing programmes. We test the maximum load, strength and durability. For many years we have also been audited by renowned institutions, including NATA, SAI Global and Vetab who regularly certify our products, services and quality management.

Quality does not stop with our straps

Our care for your security extends well beyond the manufacture of reliable lashing straps, net systems and shoring materials. This is why we make sure through our comprehensive service and consultancy that you also have the necessary information to select the right load security equipment. Of course, when it comes to tests, repairs and maintenance work, we'll also be by your side.

As Your Partner, We Have the Same Aims

Our customers are our partners, and we share their aims: more security for individuals and cargo. Within this partnership, we will do everything to support you in your day-to-day endeavours.

SpanSet offers you real partnership

As experts in load security, we actively seek interaction with you and other experienced experts so we can advance together. Through training, seminars and practical product development we can help you to implement load security quickly and easily in everyday life. Tests and proving ground trials with independent institutions also give you an informative edge over others.

You can also contact our technicians and specialists directly if you need a particular design. We manufacture and modify our load security products on request to meet any special requirements you may have.

This partnership helps us both: you prevent accidents, their consequences and subsequent costs. You prevent damage to public and private property, protect resources and people. This will save you expensive fines, court procedures and time-wasting conflicts. You will win the trust of your customers by delivering completely undamaged cargo on time. This also means you will improve your image in the long term compared to your competitors.

03.1



SpanSet®

Heavy Duty Ratchets

20040 ABS Endless Ratchet Assemblies	10
20040 ABS Power Assisted Ratchet Assemblies	11
20040 ABS 2 Part Ratchet Assemblies	12
20031 ABS Power Assisted Ratchet Assemblies	13



03.1 HEAVY DUTY RATCHETS



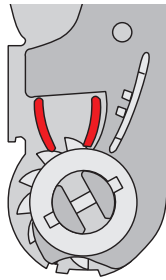
- 20040 ABS Endless Ratchet Assemblies
- 20040 ABS Power Assisted Ratchet Assemblies
- 20040 ABS 2 Part Ratchet Assemblies
- 20031 ABS Power Assisted Ratchet Assemblies

Heavy Duty Ratchets Quickly Secure Even the Heaviest Loads

The heavy duty ratchets from SpanSet are real power packs and don't stop even for the heaviest jobs.

More Tension, Less Effort

The patented double slider even secures in the intermediate stage when tensioning, using the "half tooth". This gives you more tension in smaller steps – and conserves your physical strength.



The Best Quality for a Sense of Security

Even for heavy loads, such as construction equipment or precast concrete parts, it is a matter of controlled load security. Heavy loads do not only have to be secured. It is more a case of a controlled securing procedure from start to finish.

This is why we place great value on the quality of each individual part of our heavy duty ratchets. This extends from the impact-resistant epoxy resin coating of the ratchets to the webbing with optional integrated edge protection, designed for extreme loads.

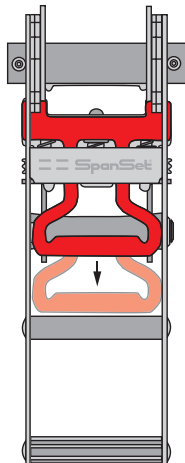


Less dead weight

They are called heavy duty ratchets, but are much lighter than comparable lashing equipment. The ratchet lashing straps have clear advantages over chains or wire ropes when it comes to their dead weight – and are thus much lighter to handle.

Self-Locking Ratchet Lever

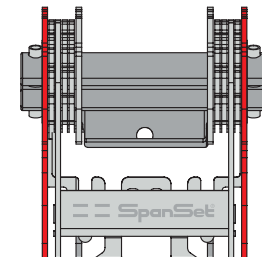
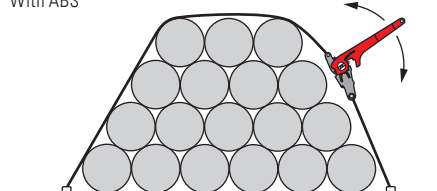
For maximum security when lashing, we developed the self-locking ratchet lever. When lashing, you pull the integrated slider, close the ratchet, and it engages automatically in the locking position. This means that unintentional opening of the ratchet when on the move is effectively impossible.



"Anti-Belt-Slip" Procedure

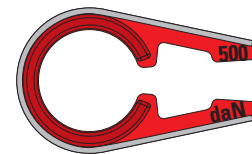
The ratchet is opened, the tension loosens sporadically, and the load gets out of control: anyone who has experienced this knows how important ABS is. It means you have complete control even during release. The ABS system lets you release the pretension force in small steps. This gives you the opportunity to use a fork-lift truck to straighten up any loads that threaten to tip and are leaning into the strap, helping prevent damage and accidents.

With ABS



Reinforced Link

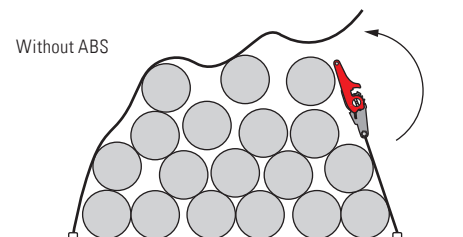
This high-performance ratchet has extra reinforcement thanks to a double link, so that the load is distributed over three points instead of just two. This provides enormous loading capacity and stability.



Tension Force Indicator

The TFI is fitted as standard in this high performance lashing as added security against unintentional over-tensioning, thereby providing optimum tension in proportion to the lashing capacity (LC).

Without ABS



03.1 HEAVY DUTY RATCHETS

20040 ABS Endless Ratchet Assemblies

20040 ABS Power Assisted Ratchet Assemblies

20040 ABS 2 Part

Ratchet Assemblies

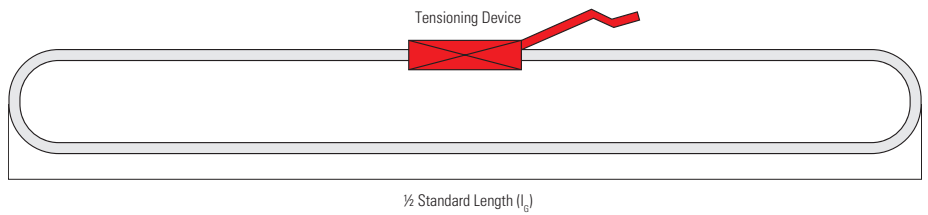
20031 ABS Power Assisted Ratchet Assemblies



20040 ABS Endless Ratchet Assembly

This powerhouse assembly is the first choice for direct lashing applications in general industry and the military. Available in blue or olive drab powder coat.

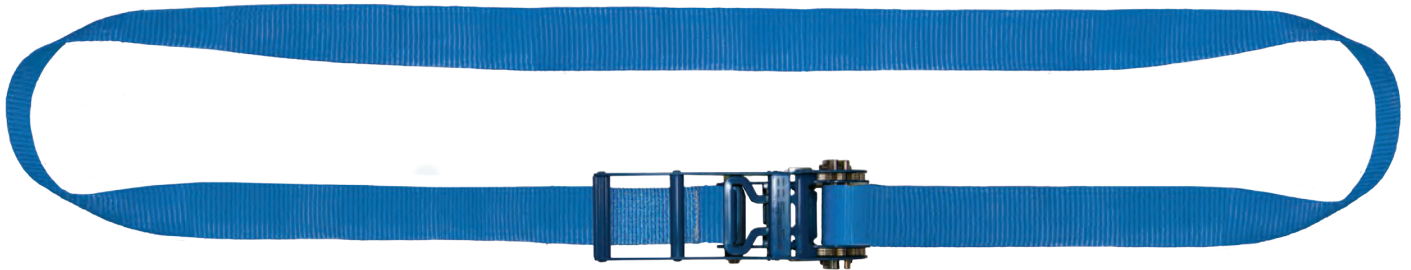
- Low dead weight compared to chains
- ABS system incorporated
- Robust epoxy resin coating.



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20040F00-0-04	Endless ratchet	10,000	75	4.0	800
20040F00-0-09	Endless ratchet	10,000	75	9.0	800

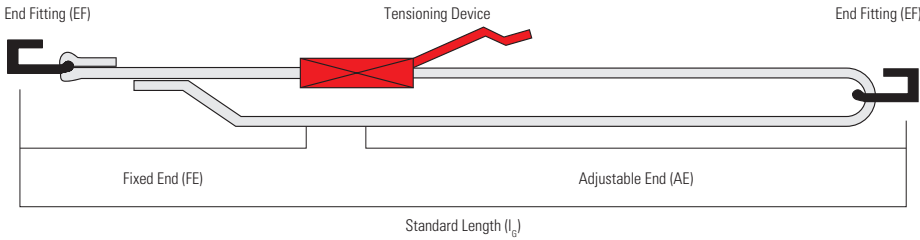
20040F00-0-09



03.1 HEAVY DUTY RATCHETS

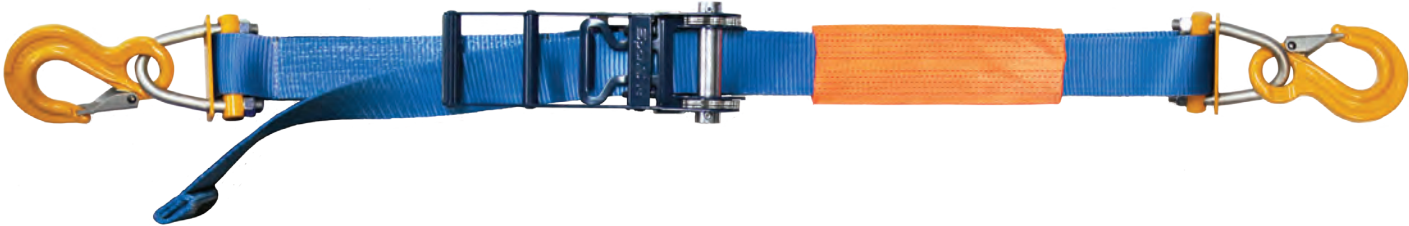
- 20040 ABS Endless Ratchet Assemblies
- 20040 ABS Power Assisted Ratchet Assemblies**
- 20040 ABS 2 Part Ratchet Assemblies
- 20031 ABS Power Assisted Ratchet Assemblies

20040 ABS Power Assisted Ratchet Assembly



Technical Specifications - Power Assisted

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20040F83-1.5	Ratchet assembly fitted with triangle and sling hooks	10,000	75	1.5	800

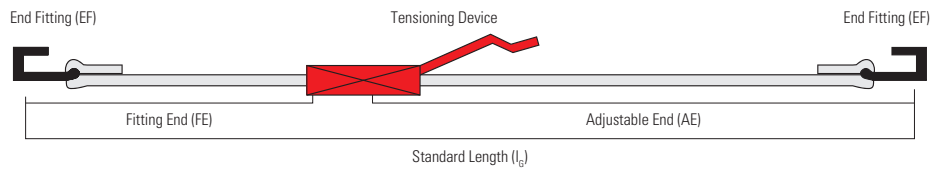


03.1 HEAVY DUTY RATCHETS

- 20040 ABS Endless Ratchet Assemblies
- 20040 ABS Power Assisted Ratchet Assemblies
- 20040 ABS 2 Part Ratchet Assemblies**
- 20031 ABS Power Assisted Ratchet Assemblies



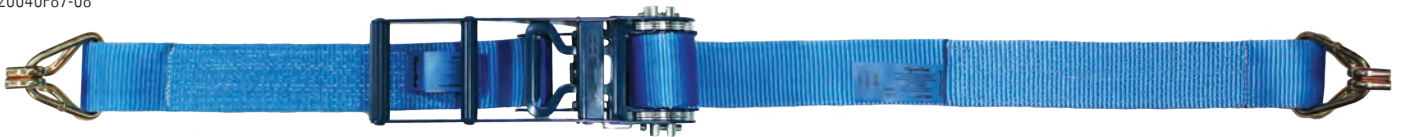
20040 ABS Two Part Ratchet Assemblies



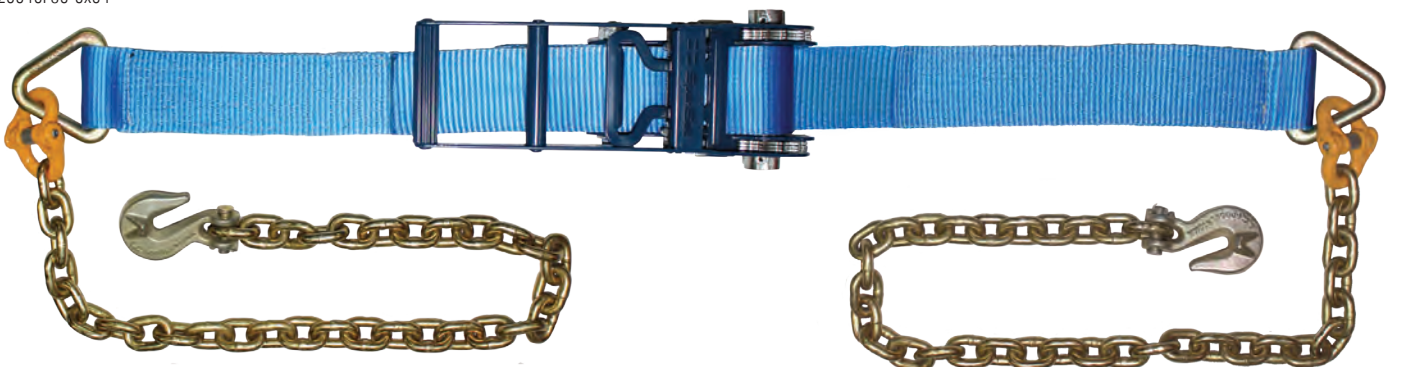
Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20040F87-09	Ratchet assembly fitted with hook and keeper	5,000	75	9.0	400
20040F80-0x04	Ratchet assembly fitted with 10mm chain and grab hook	5,000	75	4.0	400

20040F87-08



20040F80-0x04

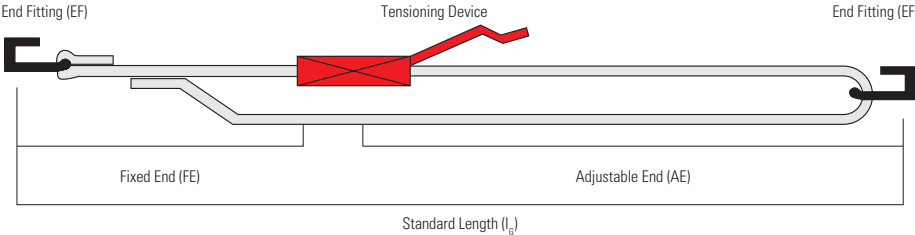


03.1 HEAVY DUTY RATCHETS

- 20040 ABS Endless Ratchet Assemblies
- 20040 ABS Power Assisted Ratchet Assemblies
- 20040 ABS 2 Part Ratchet Assemblies
- 20031 ABS Power Assisted Ratchet Assemblies**



20031 ABS Power Assisted Ratchet Assembly



Technical Specifications - Power Assisted

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20031-1	Ratchet assembly with high performance polyester webbing, fitted with triangle and sling hooks	12,500	75	0.7	400



03.2



LEFT HAND DRIVE

SpanSet®

50mm High Pretension ABS Assemblies

ERGO 2 Part ABS Ratchet Assemblies	18-19
ERGO Endless ABS Ratchet Assemblies	20
ERGO Power Assisted ABS Web Dog Assemblies	22

205·904
AUSTRALIAN DEFENCE FORCE

FAUK



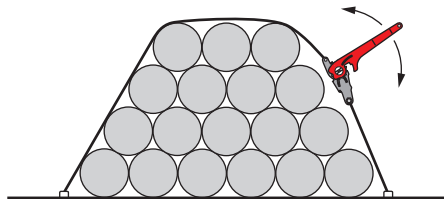
03.2 50MM HIGH PRETENSION ABS ASSEMBLIES

- ERGO 2 Part ABS
 - Ratchet Assemblies
- ERGO Endless ABS
 - Ratchet Assemblies
- ERGO Power Assisted ABS
 - Web Dog Assemblies

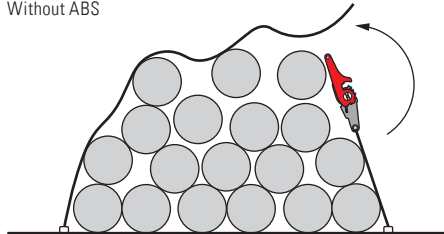


Medium Duty Ratchets Tension Gently, Secure Efficiently

With ABS



Without ABS



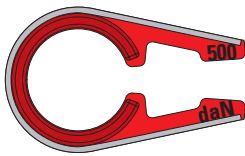
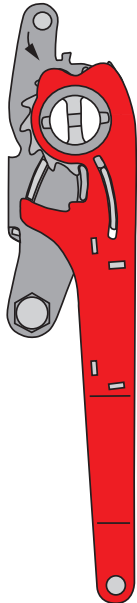
Safety Label On Every Strap

So that you can always check whether the ratchet lashing strap is suitable for the load to be secured, each lashing strap is equipped with a patented safety label that cannot be torn out. The lashing strap may not be used without its label. Our top products have this label fitted as standard. In their well-thought out solutions, our tension ratchets combine the greatest security with economy and efficiency. They make your everyday life that much easier and let you work faster – and therefore more profitably. What more could you want?

For securing heavy loads in day-to-day business, you not only need lashings that you can rely on. You also need a solution that makes your work easier and makes checking security quick and simple. Our ERGO ratchets are your ideal assistant.

Longer Handle, Tensioning That Protects Your Back

The extended handle of the ERGO ratchet makes lashing much easier. You can achieve even high pretensioning forces using much less muscle power. As you always pull ERGO ratchets downwards instead of pushing upwards, they are much gentler on your back. With the extra-long lever, you'll be able to fulfil ergonomic demands to an even higher level.



Tension Force Indicator

With the patented TFI, you can verify the pretension force in the system quickly and easily. When the jaws of the TFI are closed, it indicates the maximum pretensioning force that can be achieved of 750 daN. Intermediate stages can also be read off. It just can't get any easier. And now there is also a TFI with an adapter for the adjustable end.



"Anti-Belt-Slip" Procedure

The ratchet is opened, the tension loosens sporadically, and the load gets out of control: Anyone who has experienced this knows how important ABS is. It means you have complete control even during release. The ABS system lets you release the pretension force in small steps. This gives you the opportunity to use a fork-lift truck to straighten up any loads that threaten to tip and are leaning into the lashing, helping prevent damage and accidents.

03.2 50MM HIGH PRETENSION ABS ASSEMBLIES

ERGO 2 Part ABS

Ratchet Assemblies

ERGO Endless ABS

Ratchet Assemblies

ERGO Power Assisted ABS

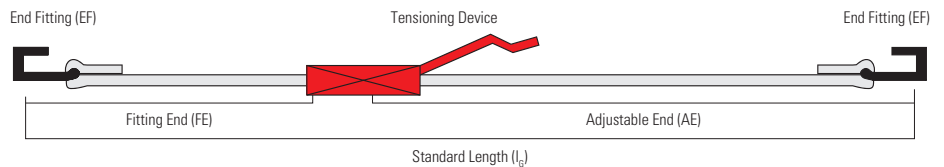
Web Dog Assemblies



ERGO 2 Part ABS Ratchet Assemblies

The highest performing ratchet assembly available is a reverse action type which maximises ergonomic efficiency and utilises an extended handle for greater leverage.

- ERGO pull-down action for tensioning
- ABS systems incorporated
- Robust epoxy resin coating
- Controlled release allowing pretension force to be released in small steps



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20035 D21-06	High pretension ratchet assembly fitted with hooks and Keepers	2500	50	6.0	750
20035 D21-09	High pretension ratchet assembly fitted with hooks and Keepers	2500	50	9.0	750
20035 D21-12	High pretension ratchet assembly fitted with hooks and Keepers	2500	50	12.0	750

20035 D21-09



03.2 50MM HIGH PRETENSION ABS ASSEMBLIES

ERGO 2 Part ABS

Ratchet Assemblies

ERGO Endless ABS

Ratchet Assemblies

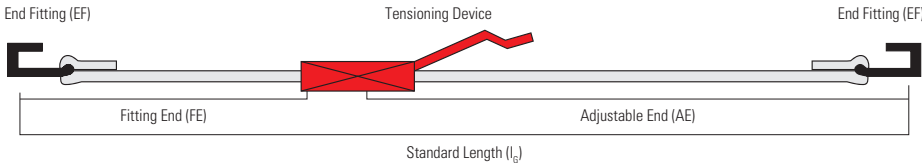
ERGO Power Assisted ABS

Web Dog Assemblies



ERGO 2 Part ABS Ratchet Assemblies

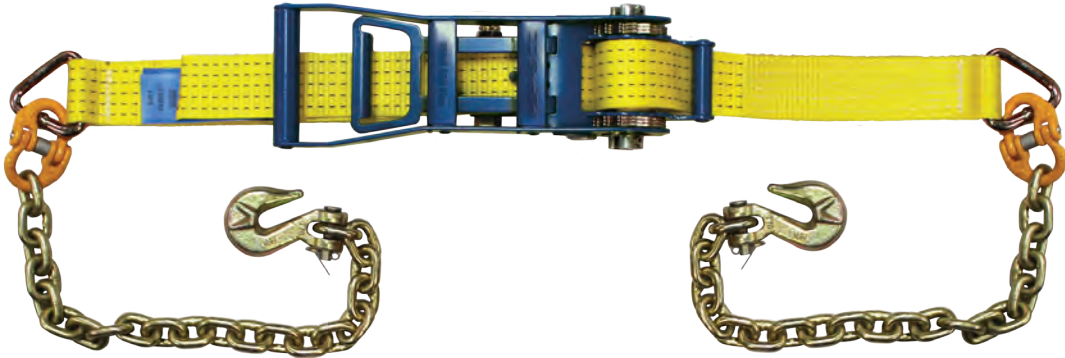
- Self-locking ratchet handle prevents ratchet from jumping out
- Double latch allows for more tension faster
- Constructed from galvanised coated steel so durable for use in all conditions
- Comes with built-in tension force indicator which allows the operator to check the amount of tension force being applied to the load



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20035D60-0x4	High pretension ratchet assembly fitted with G70 chain and 8mm grab hook	2500	50	4.0	750
20035D60-0x6	High pretension ratchet assembly fitted with G70 chain and 8mm grab hook	2500	50	6.0	750

20035D60-0x4



03.2 50MM HIGH PRETENSION ABS ASSEMBLIES

ERGO 2 Part ABS

Ratchet Assemblies

ERGO Endless ABS

Ratchet Assemblies

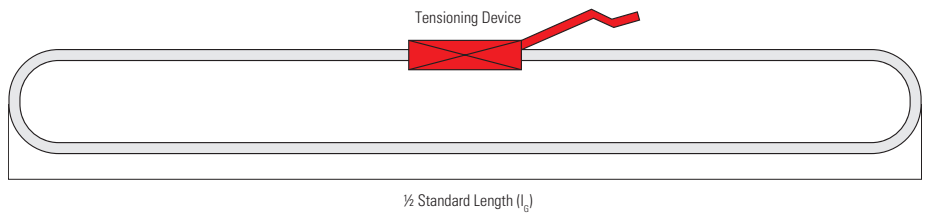
ERGO Power Assisted ABS

Web Dog Assemblies



ERGO Endless ABS Ratchet Assemblies

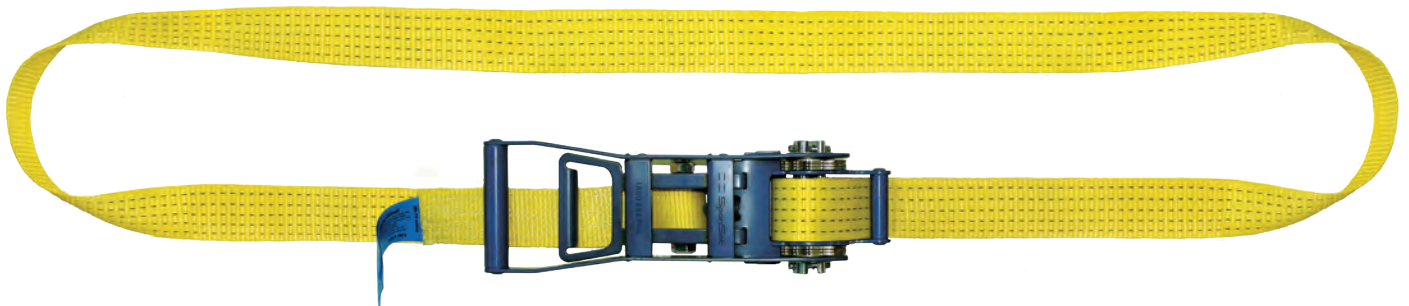
- Extended handle for greater leverage
- Less than 10% stretch under full tension, meaning no unnecessary re-tensioning during operation
- Reverse action ratchet maximises ergonomic efficiency



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20035D00-0x5.0	Endless ratchet assembly	5000	50	5.0	1500
20035D00-0x2.5	Endless ratchet assembly	5000	50	2.5	1500

20035D00-0x2.5





20095100_0x2.5

03.2 50MM HIGH PRETENSION ABS ASSEMBLIES

ERGO 2 Part ABS

Ratchet Assemblies

ERGO Endless ABS

Ratchet Assemblies

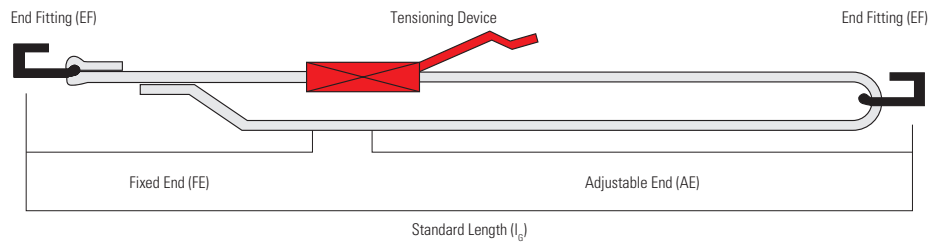
ERGO Power Assisted ABS

Web Dog Assemblies



ERGO Power Assisted ABS Web Dog Assemblies

- Approved for use on Bluescope and OneSteel sites
- No dangerous kick back.



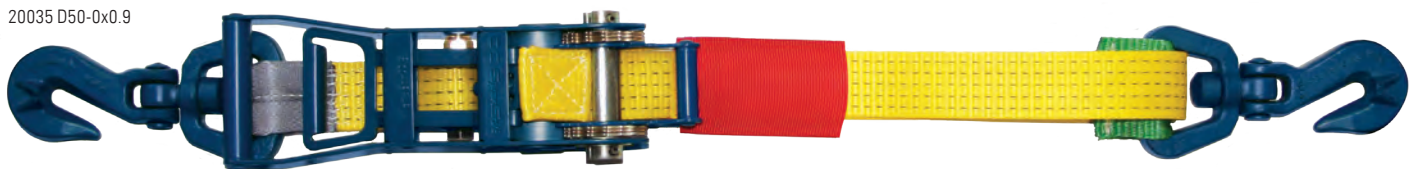
Technical Specifications - Power Assisted

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20035 D7049-0x0.9	8mm Webdog	3800	50	0.9	1500
20035 D50-0x0.9	10mm Webdog	6000	50	0.9	1500

20035 D7049-0x0.9



20035 D50-0x0.9





03.3





SpanSet®

50mm Medium Duty Ratchets

20020 2 Part ABS Ratchet Assemblies	28
20020 Power Assisted ABS Ratchet Assemblies	29
1857 Non-ABS Ratchet Assemblies	30



03.3 50MM MEDIUM DUTY RATCHETS

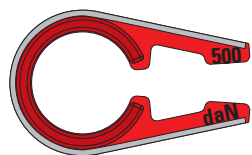
- 20020 2 Part ABS Ratchet Assemblies
 - 20020 Power Assisted ABS Ratchet Assemblies
 - 1857 Non-ABS Ratchet Assemblies
-



Medium and Light Duty Ratchets Tension Gently, Secure Efficiently

For securing heavy loads in day-to-day business, you not only need lashings that you can rely on, you also need a solution that makes your work easier and makes checking security quick and simple. Our Ergo ratchets are your ideal assistant.

you release the pretension force in small steps. This gives you the opportunity to use a fork-lift truck to straighten up any loads that threaten to tip and are leaning into the lashing, helping prevent damage and accidents.



Tension Force Indicator

With the patented TFI, you can verify the pretension force in the system quickly and easily. When the jaws of the TFI are closed, it indicates the maximum pretensioning force that can be achieved of 750 daN. Intermediate stages can also be read off. It just can't get any easier. And now there is also a TFI with an adapter for the adjustable end.

Safety Label On Every Strap

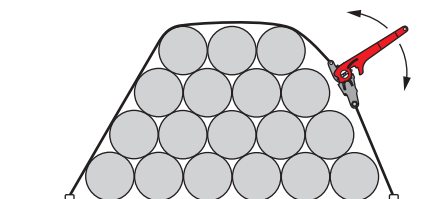
So that you can always check whether the ratchet lashing strap is suitable for the load to be secured, each lashing strap is equipped with a patented safety label that cannot be torn out. The lashing strap may not be used without its label. Our top products have this label fitted as standard. In their well-thought out solutions, our tension ratchets combine the greatest security with economy and efficiency. They make your everyday life that easier and let you work faster – and therefore more profitably. What more could you want?



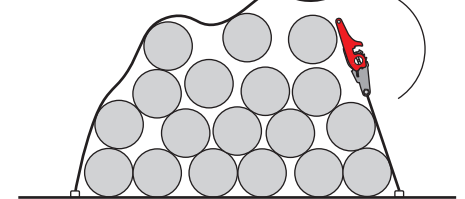
"Anti-Belt-Slip" Procedure

The ratchet is opened, the tension loosens sporadically, and the load gets out of control: Anyone who has experienced this knows how important ABS is. It means you have complete control even during release. The ABS system lets

With ABS



Without ABS



03.3 50MM MEDIUM DUTY RATCHETS

20020 2 Part ABS

Ratchet Assemblies

20020 Power Assisted ABS

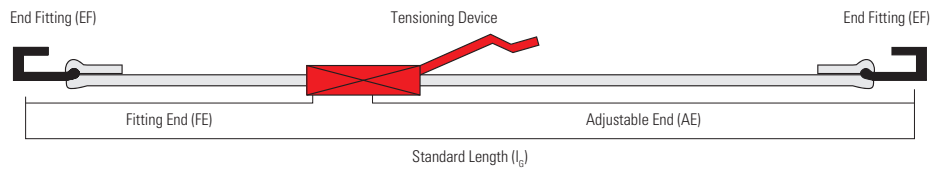
Ratchet Assemblies

1857 Non-ABS

Ratchet Assemblies



20020 2 Part ABS Ratchet Assemblies



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20020D21-06	Ratchet assembly fitted with hooks and keepers	2500	50	6.0	600
20020D21-09	Ratchet assembly fitted with hooks and keepers	2500	50	9.0	600
20020D21-12	Ratchet assembly fitted with hooks and keepers	2500	50	12.0	600

20020D21-09

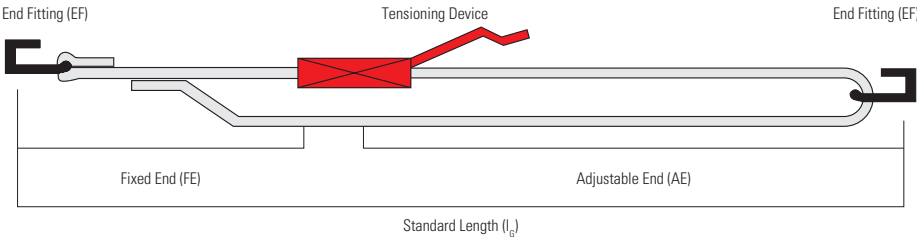


03.3 50MM MEDIUM DUTY RATCHETS

- 20020 2 Part ABS Ratchet Assemblies
- 20020 Power Assisted ABS Ratchet Assemblies**
- 1857 Non-ABS Ratchet Assemblies



20020 Power Assisted ABS Ratchet Assemblies



Technical Specifications - Power Assisted

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20020D4952-1.5	Ratchet assembly fitted with triangles and latch hooks	5000	50	1.5	1200
20020D4952-3.0	Ratchet assembly fitted with triangles and latch hooks	5000	50	1.5	1200



03.3 50MM MEDIUM DUTY RATCHETS

20020 2 Part ABS

Ratchet Assemblies

20020 Power Assisted ABS

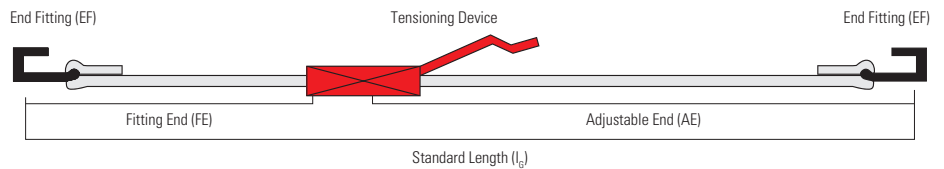
Ratchet Assemblies

1857 Non-ABS

Ratchet Assemblies



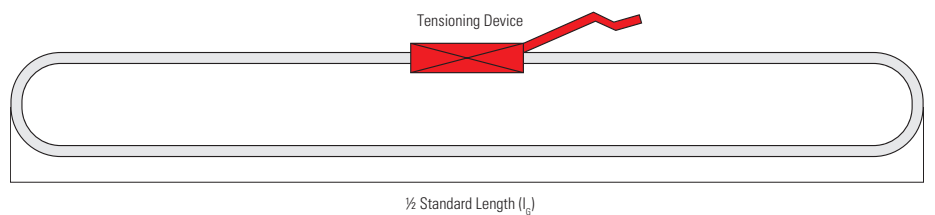
1857 Non ABS Ratchet Assemblies



Technical Specifications - Two Part

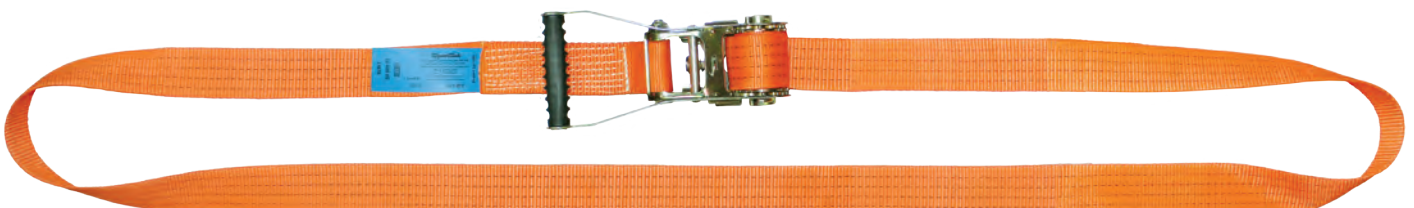
Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
1857 D210-09	Ratchet assembly	2500	50	9.0	350
1857 C20-04	Ratchet assembly	2000	50	4.0	350
1857 C20-09	Ratchet assembly	2000	50	9.0	350

1857 D210-09



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
1857 C00-06	Ratchet assembly	4000	50	6.0	700
1857 C00-09	Ratchet assembly	4000	50	9.0	700





0278-40317
L10.03

03.4





SpanSet®

Light Duty Lashing Assemblies

35mm Light Duty Ratchet Assemblies	34
50mm Light Duty Ratchet Assemblies	35
25mm Light Duty Ratchet Assemblies	36-37
25mm Light Duty Cambuckle Assemblies	38

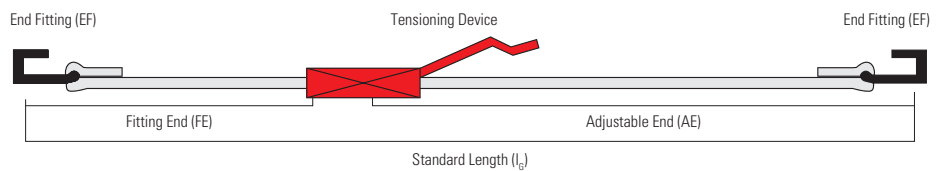
03.4 LIGHT DUTY LASHING ASSEMBLIES

35mm Light Duty Ratchet Assemblies

- 50mm Light Duty Ratchet Assemblies
- 25mm Light Duty Ratchet Assemblies
- 25mm Light Duty Cambuckle Assemblies



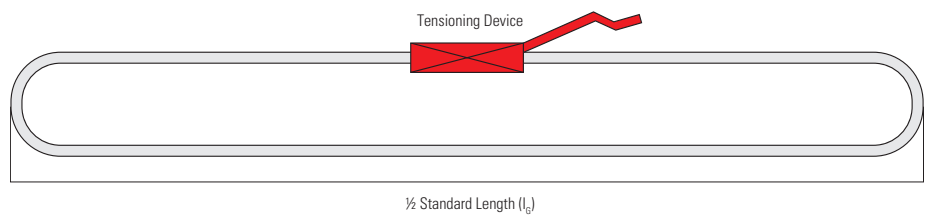
35mm Light Duty Ratchet Assemblies



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
D1 Tradesman	Ratchet assembly with S hooks	500	35	6.0	250
01804B20x06 Contractor	Ratchet assembly with hook and keeper	1000	35	6.0	250

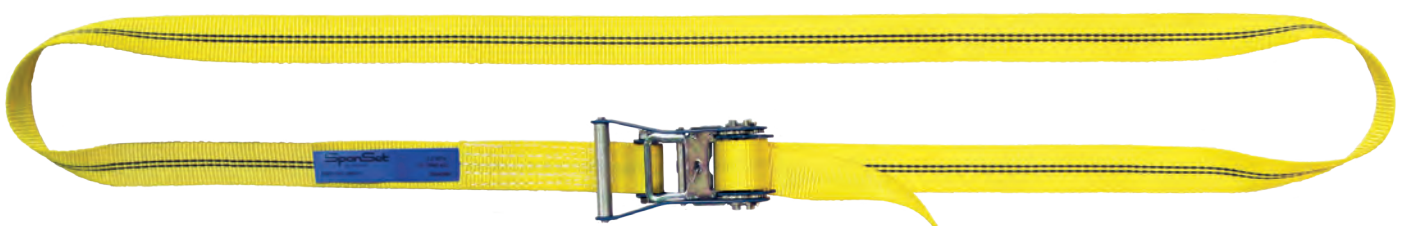
01804B20x06 Contractor



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
1804B00x2.2	Ratchet assembly endless	2000	35	2.2	500

01804B00x2.2



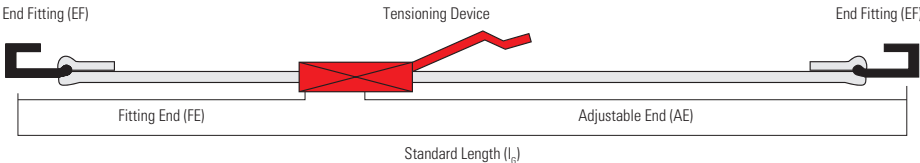
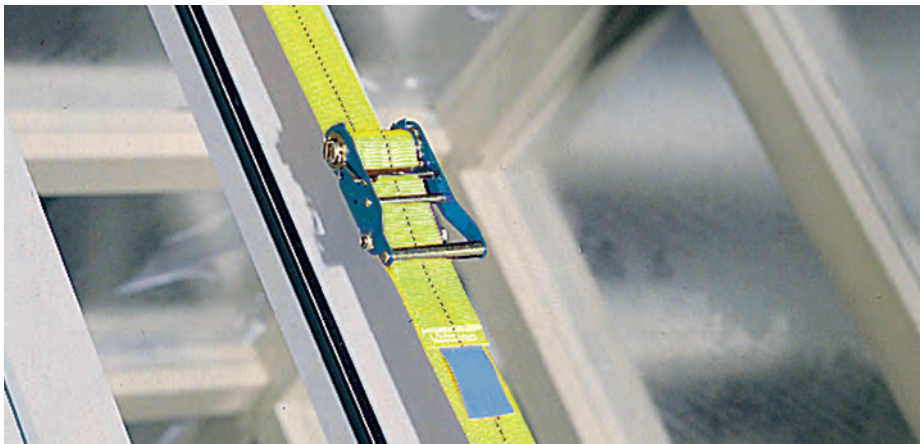
03.4 LIGHT DUTY LASHING ASSEMBLIES

35mm Light Duty
Ratchet Assemblies

**50mm Light Duty
Ratchet Assemblies**

25mm Light Duty
Ratchet Assemblies

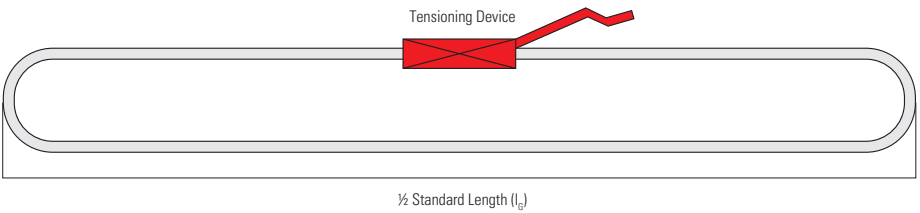
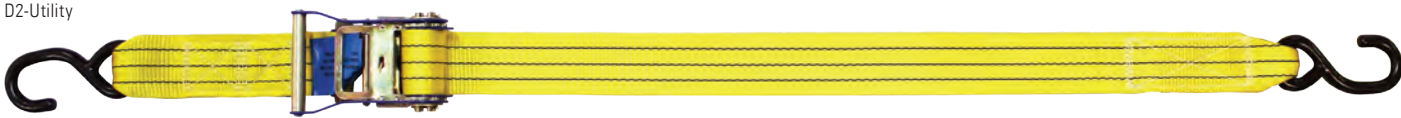
25mm Light Duty
Cambuckle Assemblies



**50mm Light Duty
Ratchet Assemblies**

Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
D2 Utility	Ratchet assembly with S hooks	500	50	6.0	250



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
20011J00-0x06	Ratchet assembly endless	2000	50	6.0	500



03.4 LIGHT DUTY LASHING ASSEMBLIES

35mm Light Duty
Ratchet Assemblies

50mm Light Duty
Ratchet Assemblies

**25mm Light Duty
Ratchet Assemblies**

25mm Light Duty
Cambuckle Assemblies

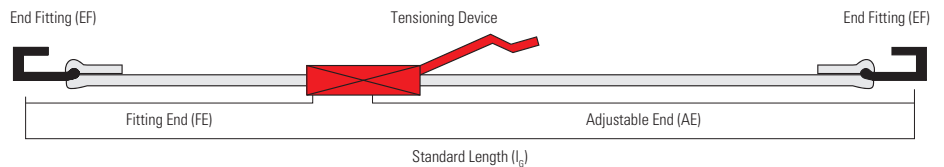


25mm Light Duty Ratchet Assemblies

B1 Weekender

Suitable for surround securing of any load.

- High tenacity UV stabilised webbing
- 25mm webbing
- 4m long.



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
B1 Weekender	Ratchet assembly with S Hooks	250	25	4.0	125
20004A40-0x02	Ratchet assembly with S Hooks	250	25	2.0	125

B1 Weekender



03.4 LIGHT DUTY LASHING ASSEMBLIES

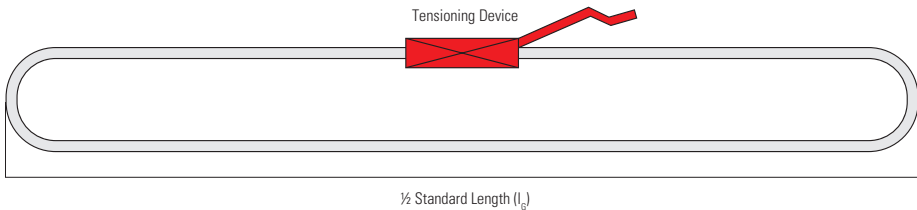
- 35mm Light Duty Ratchet Assemblies
- 50mm Light Duty Ratchet Assemblies
- 25mm Light Duty Ratchet Assemblies**
- 25mm Light Duty Cambuckle Assemblies



25mm Light Duty Ratchet Assemblies

B2 Hobby

- Suitable for surround securing of any load.
- Polyester webbing
- 700kg tensile strength
- 25mm webbing
- 4m long.



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
B2 Hobby	Ratchet assembly endless	700	25	4.0	250
20004A00-0x02	Ratchet assembly endless	700	25	2.0	250

B2 Hobby



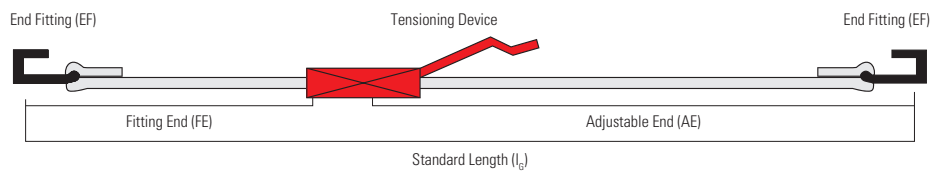
03.4 LIGHT DUTY LASHING ASSEMBLIES

- 35mm Light Duty Ratchet Assemblies
- 50mm Light Duty Ratchet Assemblies
- 25mm Light Duty Ratchet Assemblies

25mm Light Duty Cambuckle Assemblies

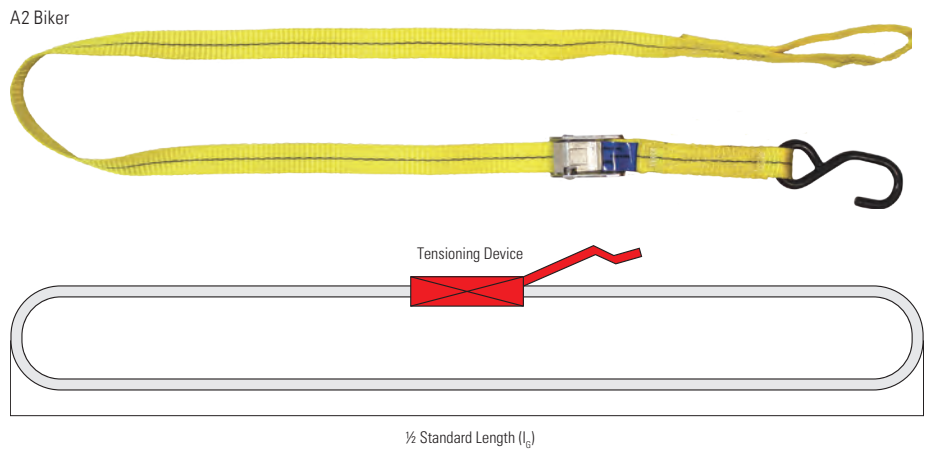


25mm Light Duty Cambuckle Assemblies



Technical Specifications - Two Part

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
A2 Biker 2 Straps	Cambuckle assembly with S Hooks	250	25	1.6	50



Technical Specifications - Endless

Code	Description	Lashing Capacity (kg)	Width (mm)	Length (m)	Pretension (kg)
1151A00-0x4.0	Cambuckle assembly endless	450	25	4.0	100
1154J00-0x0.2	Cambuckle assembly endless	1400	50	12.0	100

1154J00-0x0.2





03.5



Specialised Restraints

Vehicle Restraints

42

Hammock Lashing

43

Special Projects

44-47

03.5 SPECIALISED RESTRAINTS

Vehicle Restraints

Special Projects

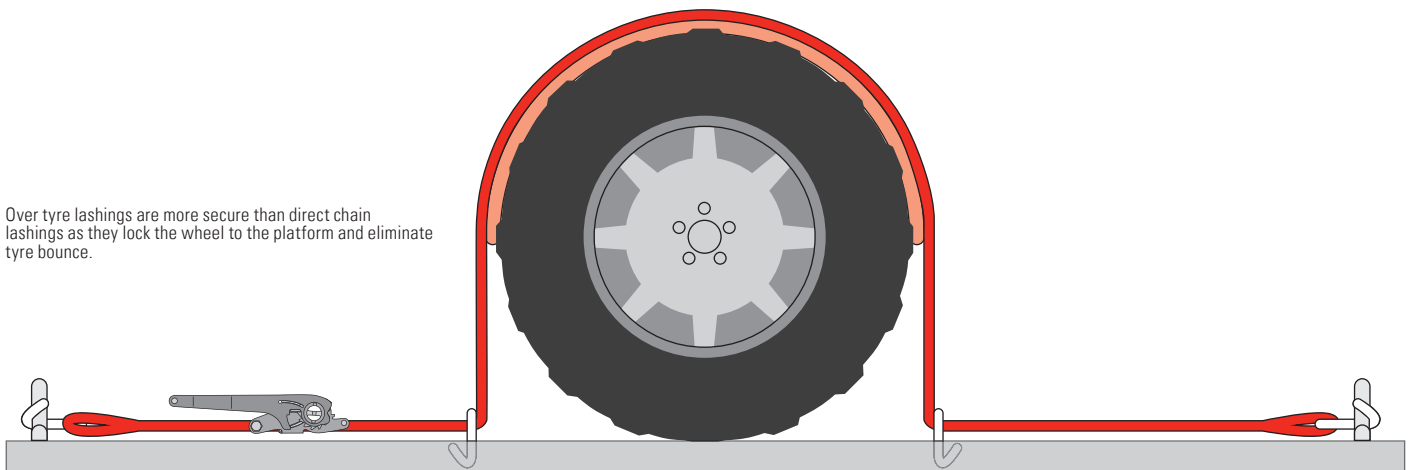


Vehicle Restraints

Vehicle Restraints

Code	Description	Lashing Capacity (kg)	Width	Length
Y702P2122-0x2.8	Over tyre lashing	1500	36mm	2.8
Y702P2122-0x2.4	Over tyre lashing	1500	36mm	2.4
1857 TLS	Around tyre lashing	1500	50mm	NA

Over tyre lashings are more secure than direct chain lashings as they lock the wheel to the platform and eliminate tyre bounce.



Hammock Lashing

- Effective restraint system that spreads the tension over a broader area
- Avoids damage to vulnerable edges
- Lightweight - less than 3kg
- Exceptionally tough and durable
- Will not rip through
- Easy to deploy from ground level
- Reduces work at height risks
- Can be used with ERGO pull down ratchets
- Minimises manual handling
- Rolls up after use for space saving stowage
- Breathable fabric - eliminates drag
- BS EN 12195-2.



03.5 SPECIALISED RESTRAINTS

Vehicle Restraints Special Projects



Special Projects



Gas cylinder pallet restraints



Wind turbine cradle and restraints



Paper roll restraints



Bearing transport restraints



Navy deck rose fittings and restraints



Custom machinery tie downs



03.5 SPECIALISED RESTRAINTS

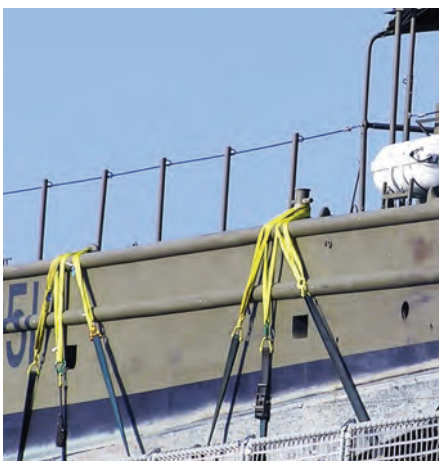
Vehicle Restraints Special Projects



Special Projects



High performance direct lashings for NATO tanks



Round slings used as redirecting anchorages on HMAS Kanimbla



Merlo 4WD forklift combination direct restraint and tie-downs



ASLAV 8WD amphibious vehicle wheel restraints



24 tonne Tadano wheel restraints for ADF



Land Rover restraint inside RAAF Hercules



03.6





SpanSet®

Accessories

Double-Sided secutex®	50
Clip-On secutex®	52
LSP-SP1 Protective Sleeving	54
sliP Sleeving	56
Rigid Edge Protectors	58

03.6 ACCESSORIES

Double-Sided secutex®

Clip-On secutex®

LSP-SP1 Protective Sleeves

slIP Protective Sleevling

Rigid Edge Protectors

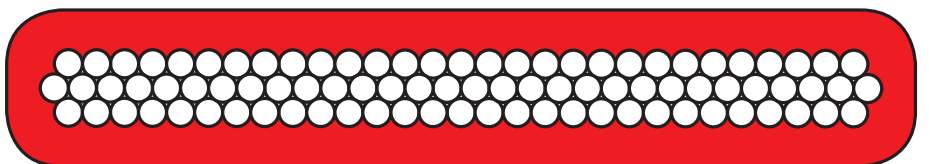
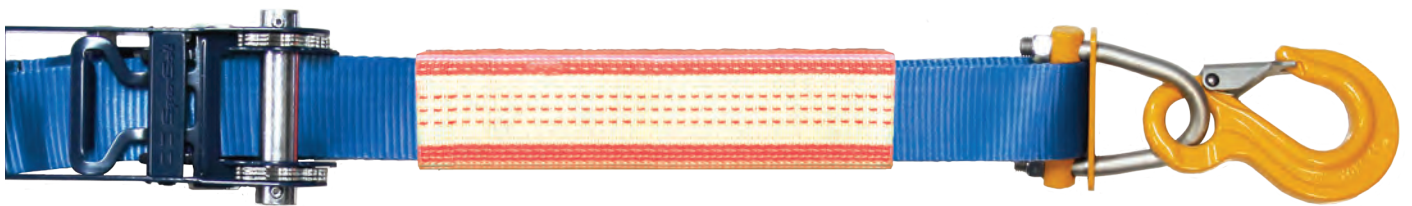


Double-Sided secutex®

- Extreme cut-resistance
- Wear and abrasion resistance
- Smooth goods handling
- Lightweight for excellent handling
- Optimum work safety
- Fully encapsulates the strap with a hard wearing, flexible cut resistant surface on both sides
- Cannot be retrofitted. Cannot be removed therefore high security.

SF-2 - Protective Sleeves

Product Code	Width (mm)	Height (mm)	Weight per running metre (kg)
SF2-50 (suits 50mm webbing)	70	22	1.2
SF2-75 (suits 75mm webbing)	95	22	1.8



SF-2 - Double-sided cut protection sleeve construction for extra load security.

Spain Seal - 50

03.6 ACCESSORIES

Double-Sided secutex®

Clip-On secutex®

LSP-SP1 Protective Sleeves

slIP Sleevling

Rigid Edge Protectors



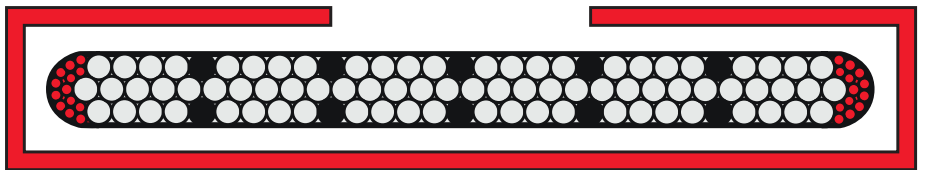
Clip-On secutex®

secutex® is the market leader in coated lifting slings and protective sleeves, and secutex® products are used world-wide.

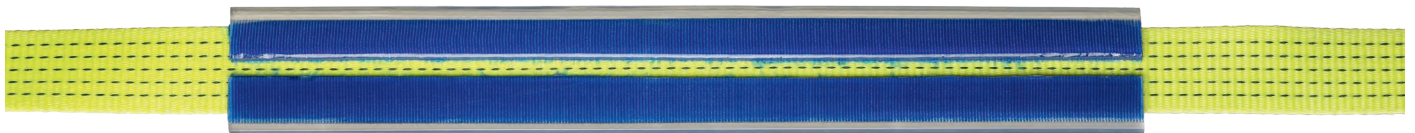
- Clips on to the strap with a hard wearing, flexible cut resistant surface on one side
- Easy to retrofit
- Extreme cut-resistance
- Wear and abrasion resistance
- Smooth goods handling
- Lightweight for excellent handling
- Optimum work safety.

Clip-SC - Protective Sleeve

Product Code	External Width (mm)	Internal Width (mm)	Height (mm)	Weight per running metre (kg)
SC-50	70	50	22	1.1
SC-75	95	75	22	1.6
SC-100	120	100	22	1.8



LSP-SF1 – protective sleeve with thick-walled polyurethane coating for particularly rough areas of application





03.6 ACCESSORIES

Double-Sided secutex®

Clip-On secutex®

LSP-SP1 Protective Sleeves

slIP Protective Sleevings

Rigid Edge Protectors



LSP-SP1 Protective Sleeves

This protective sleeve has an additional robust polyurethane coating on one side, which cushions even the hardest edges.

The polyurethane side is placed against the goods and protects the lashing strap from abrasion and damage.

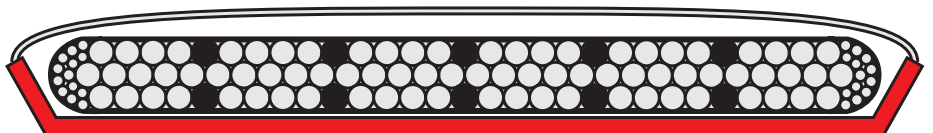
The LSP-SF1 remains on the strap and is simply rolled up with it. You can thus effectively protect webbing up to 75 mm wide from wear and cuts.

The LSP-SF1 has proven itself to be particularly useful for use in transporting precast concrete parts, steel or metal components or similar sharp-edged goods.

LSP-SF1 - Protective Sleeves

Product Code	For use on strap widths up to (mm)	Standard length* (mm)
LSP-SF1 25	25	250
LSP-SF1 35	35	250
LSP-SF1 50	50	250
LSP-SF1 75	75	250

* Other lengths available

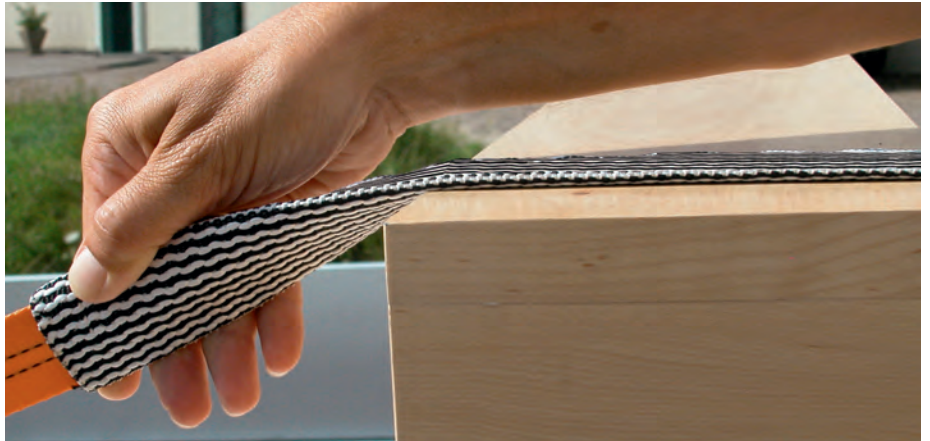


LSP-SF1 – protective sleeve with thick-walled polyurethane coating for particularly rough areas of application



03.6 ACCESSORIES

Double-Sided secutex®
Clip-On secutex®
LSP-SP1 Protective Sleeves
slIP Protective Sleevng
Rigid Edge Protectors



slIP Protective Sleeves

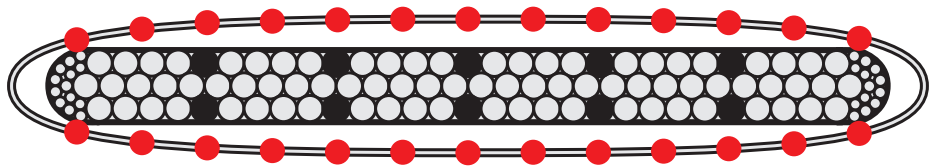
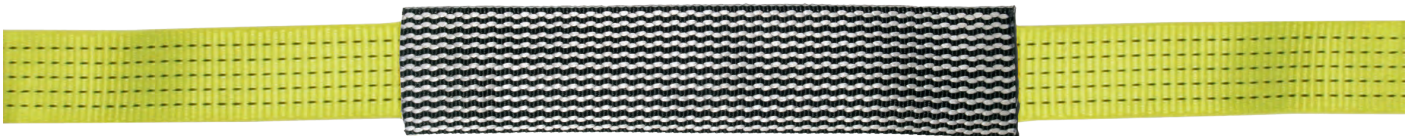
Friction, coarse edges, high lashing capacity - your webbing is affected by these enormous stresses every day. The new slIP (slide protection) protective sleeve permanently protects your lashing straps.

The patented slIPs can be recognized immediately by their striking black and white weave. This also has a dual function: The weave ribs, which run all the way around, are made from high-performance fibres on the inside, which help the webbing slide.

On the outside, the interweaving means that the strap is highly resistant to wear on both sides. This gives you ideal sliding behaviour on all lashing angles and good force transfer when using frictional lashings.

slIP - Protective Sleeves

Product Code	For use on strap widths up to (mm)	Length (mm)
SLIP35	35	250
SLIP50	50	250



slIP – the patented protective sleeve, reinforced with high-performance fibres



03.6 ACCESSORIES

Double-Sided secutex®
 Clip-On secutex®
 LSP-SP1 Protective Sleeves
 slip Sleaving
Rigid Edge Protectors



Rigid Edge Protectors

To prevent your load from transport damage, SpanSet has developed a range of edge protectors for various applications. Intelligent design details make all edge protectors from SpanSet light and easy to use.

EdgePro

The following features make the EdgePro extremely suitable for paper reels or other goods with a curved rim:

- The concave inner edge guide provides even distribution of the lashing force on the edge.
- The integrated webbing holder reliably prevents the webbing from slipping.
- The “bulge” in the EdgePro means that the angle is pulled in to the load and exerts downward pressure.



EdgePro

Palette Protector

Precast concrete parts and paving stones are more fragile during transportation than you would think – particularly their edges. In addition, each load consists of numerous individual bricks or elements. If a standard edge protector is used, the individual brick beneath it will be moved. This is why our Palette Protector is the right partner for you:

- Edge protection with ingenious L-profile for optimum pressure distribution
- Rounded shape protects straps and transported goods

- Ideal for palletised goods with fragile edges, such as clinker bricks, sand-lime bricks and concrete slabs
- Rounded edge allows high pretensioning forces

Unlike similar products, the Palette Protector is made from solid materials and can thus also handle large forces. Palette Protector is therefore ideally equipped for rough, everyday work.

We supply Palette Protector in two standard sizes, which correspond to standard pallet dimensions. Should you need other sizes, these can be made relatively easily. Talk to us about it.



1655

Edge Protection

Product Code	Name	For use with maximum strap width (mm)	Material	Dimensions (mm)
1630	EdgePro	50	PP	145 X 145 X 80
1640	Palette Protector	N/A	PP	1200 x 207 x 165



A close-up, front-facing view of a yellow Mercedes-Benz truck. The truck features a prominent black grille with the Mercedes-Benz logo in the center. Below the grille is a heavy-duty black bumper with two large, clear headlights. A white tow bar is attached to the front of the truck, extending towards the right side of the frame. The truck is parked on a sandy, uneven surface, likely a desert or off-road environment. The overall scene is brightly lit, suggesting a sunny day.

03.7

Towing and Recovery

Towing	62-63
Bruiser Plus	64
Bruiser	65
Titan	66
Pink Polyester Tow Slings and 4WD Recovery Kits	67

03.7 TOWING AND RECOVERY

Towing

Bruiser Plus

Bruiser

Titan

Pink Polyester Tow Slings and
4WD Snatch Straps



Towing

Definitions

Lack of traction only

The wheels of the vehicle remain substantially on the surface of the ground and are unable to gain traction due to the slippery or greasy conditions.

Medium bogging

The wheels of the vehicle are unable to gain traction and have dug in to the ground to about 33% of the wheel diameter.

Severely bogged

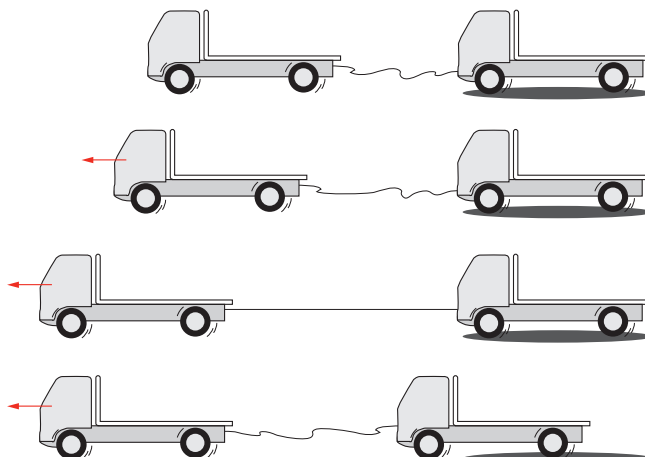
The wheels of the vehicle are unable to gain traction and have buried themselves up to the axles.

Break Strength

The amount of force the strap will resist before breaking.

Tow Strap Calculator for Bogged Vehicles

Break Strength (kg)	Stuck due to lack of traction (kg)	Stuck due to medium bogging (kg)	Stuck due to severe bogging (kg)
4000	8000	4000	2500
8000	16000	8000	5000
10000	20000	10000	6000
20000	40000	20000	12000
30000	60000	30000	18000
40000	80000	40000	24000
50000	100000	50000	30000
60000	120000	60000	36000
80000	160000	80000	48000
100000	200000	100000	60000
	(200%)	(100%)	(60%)



The "Snatch" Method

Snatch Straps Versus Tow Straps

“Snatching” a vehicle is very different from towing a vehicle. When a vehicle is towed the attachment strop is generally static, that is, it has limited stretch and the force is taken up gently and progressively between the tow vehicle and the bogged or incapacitated vehicle.

These straps can be polyester, modified high performance polyester, aramid fibres (as in Kevlar) or high strength polyethylene.

When using a snatch strap, these are usually high stretch nylon. This stretching property allows the strap to store kinetic energy, which is used to pull vehicles from a bog.

After the vehicles are attached, the snatch strap remains slack as the recovering vehicle moves forward at a moderate rate and the strap begins to stretch.

The dynamic force of the moving vehicle and the progressive stretch of the strap will then “snatch” the bogged vehicle out of its entrapment.

Care must be taken when attaching the snatch strap to a suitably sound structural attachment on both vehicles and adequate strength shackles are used, as these can become projectiles should they fail.

- Never try to snatch a vehicle using a tow strap
- Tow straps and snatch straps are not to be used for lifting.



03.7 TOWING AND RECOVERY

Towing

Bruiser Plus

Bruiser

Titan

Pink Polyester Tow Slings and
4WD Snatch Straps



Bruiser Plus

Bruiser Plus Non-Recoil Tow Slings

Many tow slings are made from materials which allow a build up of energy when under tension. If the sling breaks due to overloading, this energy is released suddenly in a whiplash fashion which can be hazardous to personnel in proximity to the towing operation.

Bruiser plus tow slings are manufactured from high tenacity polyester with a unique safety sleeve and retention strap. Should the sling be overloaded the sling will fall immediately to ground and not recoil in a dangerous manner.

The sling is safely retained because the sleeve elasticity is perfectly matched to the sling adding a critical layer of safety to this type of operation.

Bruiser Plus Non Recoil Tow Slings Technical Data

Type and Break Strength (kg)	Eye Length (mm)	Code EWL 6m	Weight (kg)	Code EWL 10m	Weight (kg)	Code EWL 15m	Weight (kg)
Bruiser Plus 10000	300	BPT106	4.5	BPT1010	7.5	BPT105	11.25
Bruiser Plus 20000	400	BPT206	9.0	BPT2010	15.0	BPT2015	22.0
Bruiser Plus 30000	400	BPT306	13.5	BPT3010	22.5	BPT3015	33.75
Bruiser Plus 40000	400	BPT406	18.0	BPT4010	30.0	BPT4015	45.0
Bruiser Plus 50000	500	BPT506	22.5	BPT5010	37.5	BPT5015	56.0
Bruiser Plus 60000	500	BPT606	27.0	BPT6010	45.0	BPT6015	67.5
Bruiser Plus 80000	600	BPT806	36.0	BPT8010	60.0	BPT8015	90.0
Bruiser Plus 100000	600	BPT1006	45.0	BPT10010	75.0	BPT10015	112.0



03.7 TOWING AND RECOVERY

Towing
 Bruiser Plus
Bruiser
 Titan
 Pink Polyester Tow Slings and
 4WD Snatch Straps



Bruiser

Bruiser Polyester Tow Slings

Manufactured from high tenacity polyester, bruiser tow slings offer reliable performance at an economical cost.

Bruiser Tow Slings Technical Data

Type and Break Strength (kg)	Eye Length (mm)	Code EWL 6m	Weight (kg)	Code EWL 10m	Weight (kg)	Code EWL 15m	Weight (kg)
Bruiser 10000	300	BT106	4.4	BT1010	7.4	BT105	11.15
Bruiser 20000	400	BT206	8.8	BT2010	14.8	BT2015	21.8
Bruiser 30000	400	BT306	13.3	BT3010	22.3	BT3015	33.55
Bruiser 40000	400	BT406	17.8	BT4010	29.7	BT4015	44.8
Bruiser 50000	500	BT506	22.2	BT5010	37.2	BT5015	55.7
Bruiser 60000	500	BT606	26.1	BT6010	44.8	BT6015	67.1
Bruiser 80000	600	BT806	35.6	BT8010	59.6	BT8015	89.6
Bruiser 100000	600	BT1006	44.6	BT10010	74.6	BT10015	111.6



03.7 TOWING AND RECOVERY

Towing
Bruiser Plus
Bruiser

Titan

Pink Polyester Tow Slings and
4WD Snatch Straps



Titan

Titan Modified High Performance Polyester Tow Slings

These high performance tow slings are manufactured from our Modified high performance polyester. Twice as strong as traditional polyester also means half the size and weight of standard slings.

Advantages such as easier shackle interface and manual handling benefits make these high performance slings an ideal choice for the safety conscious.

They are encased within a protective sleeve for further durability and are capable of exceptional strength to weight ratio, especially attractive when dealing with high tonnage applications.

Titan Tow Slings Technical Data

Type and Break Strength (kg)	Eye Length (mm)	Code EWL 6m	Weight (kg)	Code EWL 10m	Weight (kg)	Code EWL 15m	Weight (kg)
Titan 20000	200	TT206	4.5	TT2010	7.5	TT2015	11.0
Titan 30000	200	TT306	6.75	TT3010	11.25	TT3015	16.5
Titan 40000	300	TT406	9.0	TT4010	15.0	TT4015	22.0
Titan 50000	300	TT506	11.25	TT5010	18.75	TT5015	27.5
Titan 60000	400	TT606	13.5	TT6010	22.5	TT6015	33.0
Titan 80000	400	TT806	18.0	TT8010	30.0	TT8015	44.0
Titan 100000	400	TT1006	22.5	TT10010	37.5	TT10015	55.0
Titan 150000	500	TT1506	33.75	TT15010	56.0	TT15015	82.5
Titan 200000	500	TT2006	45.0	TT20010	75.0	TT20015	110.0
Titan 300000	600	TT3006	67.5	TT30010	112.0	TT30015	165.0



03.7 TOWING AND RECOVERY

Towing
Bruiser Plus
Bruiser
Titan

Pink Polyester Tow Slings and 4WD Snatch Straps



Pink Polyester Tow Slings and 4WD Snatch Straps

Based on traditional polyester round lifting slings, these are coloured pink to differentiate from the lifting sling colour code standard and to be identified as a tow sling only.



Pink Tow Slings Technical Data

Break Strength (kg)	Thickness Under Load	Width Under Load	Code/Length 2 Metres	Code/Length 5 metres	Code/Length 10 metres	Code/Length 20 metres	Weight Per Metre
7,000	6	45	EP1000x2.0	EP1000x5.0	EP1000x10.0	EP1000x20.0	0.40
14,000	7	48	EP2000x2.0	EP2000x5.0	EP2000x10.0	EP2000x20.0	0.60
21,000	8	60	EP3000x2.0	EP3000x5.0	EP3000x10.0	EP3000x20.0	0.80
35,000	10	75	EP5000x2.0	EP5000x5.0	EP5000x10.0	EP5000x20.0	1.20



4WD Snatch Straps Technical Data

Code	Type	Length (m)	Width (m)	Break Strength (kg)	Stretch (%)
RS9-0x9.0	Standard snatch strap	9.0	60	8,000	20
RS9HD-0x9.0	Heavy duty snatch strap	9.0	60	16,000	20
TTP-0	Tree trunk protector	3.0	75	8,000	10
WS-L10	Winch extension strap	10.0	50	4,000	10
WS-L20	Winch extension strap	20.0	50	4,000	10
WS-L30	Winch extension strap	30.0	50	4,000	10
C2-2-RS9HD-0x9.0	Super heavy duty snatch strap	9.0	120	24,000	20

4WD Snatch Straps

SpanSet nylon recovery straps offer 20% stretch for smooth snatches in four wheel drive situations where winching is not a viable option.

03.8





SpanSet®

Fall Protection

WebRail	70-71
Capcha	72-73
Stoppa	74-75

03.8 FALL PROTECTION

WebRail

Capcha
Stoppa



WebRail

Web Rail by SpanSet is an effective solution to fall protection from the back of heavy vehicles. Featuring our patented Tension Force Indicator and Kevlar® Core webbing, this simple to use system gives significant improvements to current work practices during the loading and unloading/rigging processes.

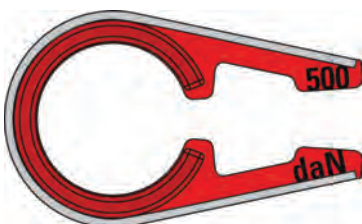
The Tension Force Indicator gives a known and measurable force on the posts and the Kevlar® core inside the webbing minimises stretch and deflection. The whole system can be removed in minutes to facilitate crane and fork access, or can be left in situ if desired.

The kit comes with four straps complete with twisted double action safety hooks, and spare parts and replacement straps are readily available. Posts are not included with the kit, however engineering specifications are available by contacting SpanSet.

Tension Force Indicator (TFI)

The TFI is fitted as standard on this system as added security against unintentional over-tensioning, thereby providing optimum tension for effective fall restraint.

Tension Force Indicator (TFI)



Order Codes

WEBRAIL-KIT-04	Set of 4 x 4m webrail assemblies in kit bag
WEBRAIL-KIT-05	Set of 4 x 5m webrail assemblies in kit bag
WEBRAIL-KIT-06	Set of 4 x 6m webrail assemblies in kit bag
WEBRAIL-KIT-07	Set of 4 x 7m webrail assemblies in kit bag
WEBRAIL-KIT-08	Set of 4 x 8m webrail assemblies in kit bag

Other lengths and replacement straps also available.

Kevlar® core webbing



WebRail ratchet with Tension Force Indicator

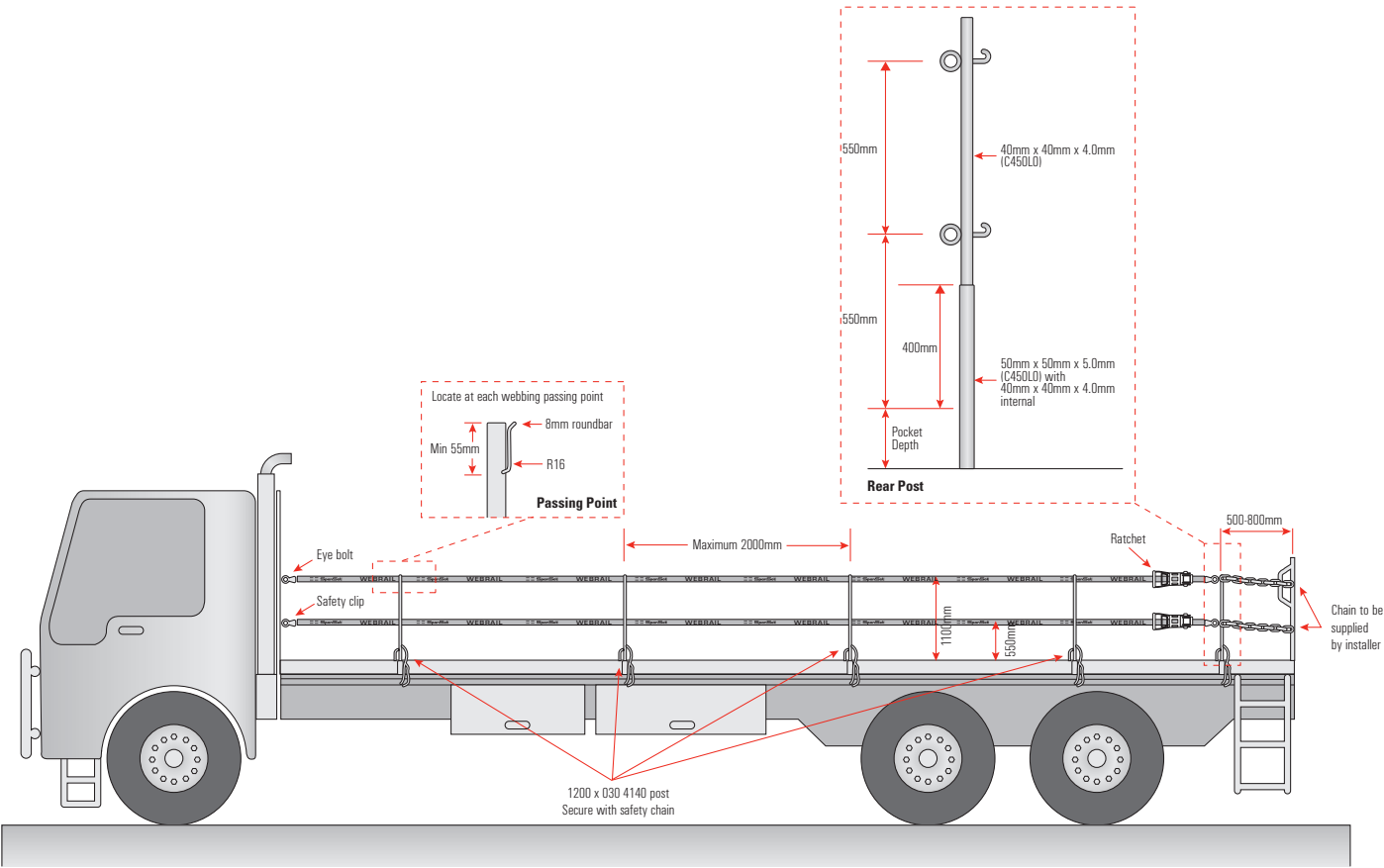


03.8 FALL PROTECTION

WebRail
 Capcha
 Stoppa



WebRail



WebRail Typical Set Up

03.8 FALL PROTECTION

WebRail
Capcha
Stoppa



Capcha

The problems and inherent dangers faced by operators working at height on commercial vehicle trailer beds during loading and unloading operations is fully recognised and well documented as a result of the increasing number of accidents.

The SpanSet Capcha system provides an easy to use solution, helping to reduce the risks posed by falls from vehicle trailers.

The Capcha fall arrest system has been designed for integration with the vehicle body. Capcha allows secure, unrestricted hands free access to the trailer platform. The system can also be used when it is necessary to work at height on the loaded goods.

The Capcha system is ideal for use with most types of curtain-sided and double-deck trailers. The system fits snugly inside the roof of the trailer and does not obstruct loading or unloading operations. It is low maintenance, easy to install and is used in conjunction with the simple to use SpanSet 1100 harness.

The Capcha system can be accessed and easily retrieved from either side of the vehicle. Capcha may be specified as original equipment or can be retrofitted to your fleet. A range of fitting options and installation kits are available to suit most vehicle configurations.

Provides protection from ground level to the trailer and back to the ground.





03.8 FALL PROTECTION

WebRail
Capcha
Stoppa



Stoppa

Stoppa is a personal fall prevention system providing a simple, reliable and cost effective solution to problems associated with access, inspection and maintenance at height on vehicles.

Stoppa starts to protect you from the point when you begin to climb on top of the vehicle - the attachment ring providing a secure handhold as you move from the ladder onto the system. Once attached the Stoppa allows you freedom of access to the top of the vehicle and all the perimeter edges with no risk of falling.

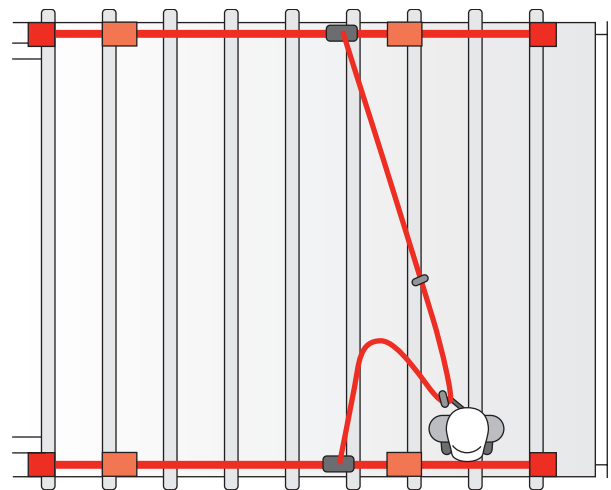
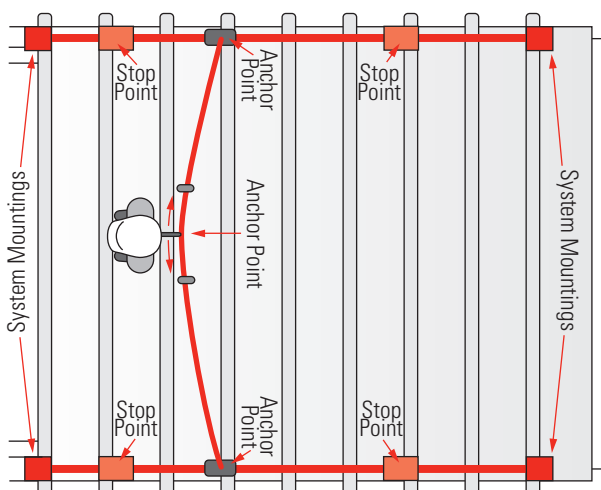
The Stoppa system comes in two parts.

The hardware remains permanently in its operating position on the vehicle stowed ready for next time. It's low profile installation has little or no effect on the overall vehicle height, minimising the potential for impact damage.

The software consists of a lower body harness with swivel connection that can be worn whilst carrying out other duties or stowed safely in the vehicle when not in use.

Typical applications include: - Refuse Collection Vehicles - Road Tankers - Fire and Rescue Vehicles - Containerised Generators and Chiller Units

We recommend that personnel working at height receive training in safe use of the equipment and height safety awareness.

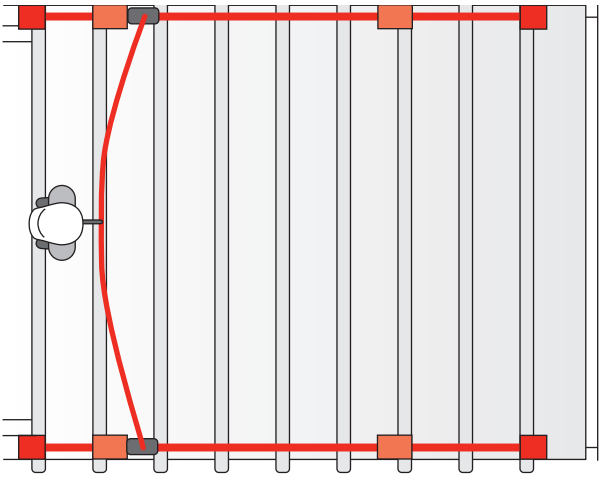
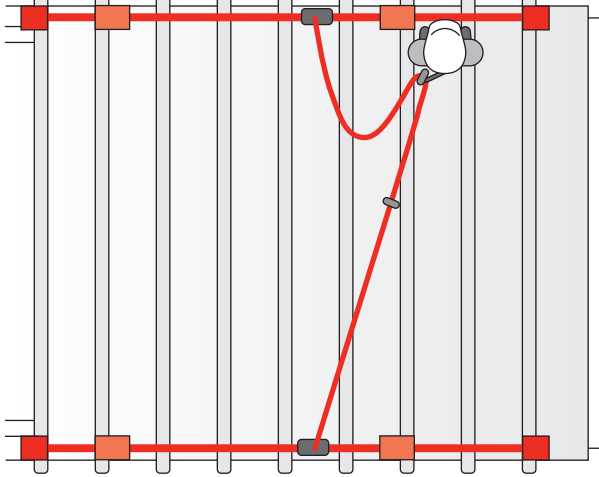
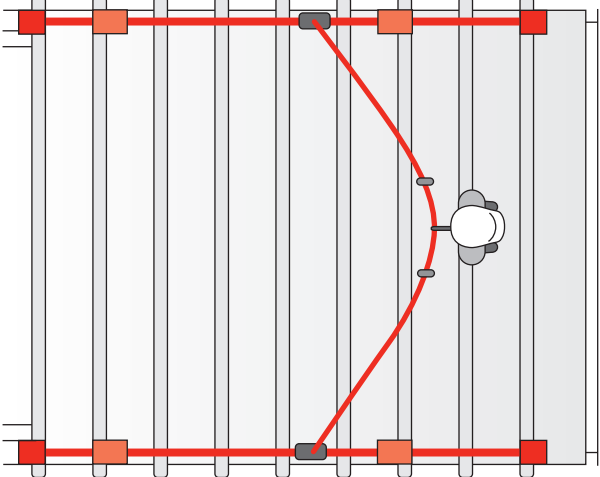


03.8 FALL PROTECTION

WebRail
Capcha
Stoppa



Stoppa



03.9



Technical Information

Load Dynamics	78-83	Pipe Transport	101
Methods of Load Restraint - Tie Down	84-85	Vertical Rolls, Reels, Coils and Drums	102
Basic Material Guidelines	86	Checking the Load	103
Maintaining Friction	87	Sharp Edges	104
Pretension	88	Cut and Abrasion Protection	105
Tie Down Angle Effect	89	Operating Temperatures	106
Dunnage (Packing)	90	Atmospheric Effects	107
Direct Load Restraint	91	The Effects of Various Substances	108
Direct Lashing Angles	92-93	The Effects of Acids on Polyester	109
Selecting Lashing Combinations	94	The Effect of Alkalis and Oxidising Agents on Polyester	110-111
Direct Lashing Examples	95-96	The Effects of Chemicals and Solvents on Polyester	112
Combined Tie Down and Direct Restraint	97	Lashing Deficiencies	113
Friction and Direct Restraint	98	Tensioning Devices	114
Curtain Sided Vehicles	99	Handling the Load Securing Equipment	115-116
Rubber Tyre Bounce	100		

NOTE: The information in this technical chapter is intended as a guide only. For specific lashing and chemical guidance please contact the SpanSet Australia Ltd Technical Department.

03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

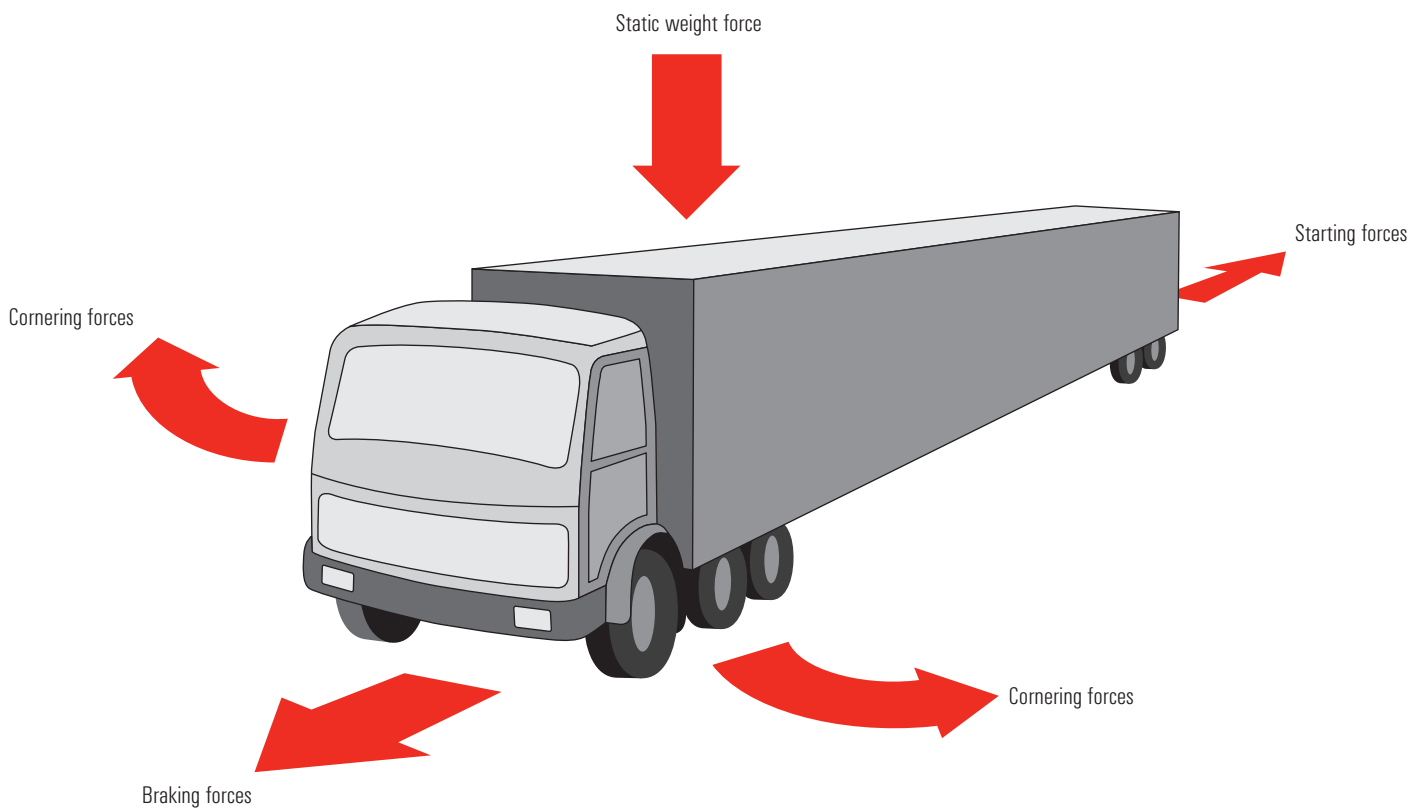
Operating Temperatures



Load Dynamics

These are brought about by changes in speed, direction, braking or road surface conditions. Additionally, cambered and hilly roads as well as airflow can affect the dynamics of the vehicle and its load.

Forces Occurring During Transport Operations



03.9 TECHNICAL INFORMATION

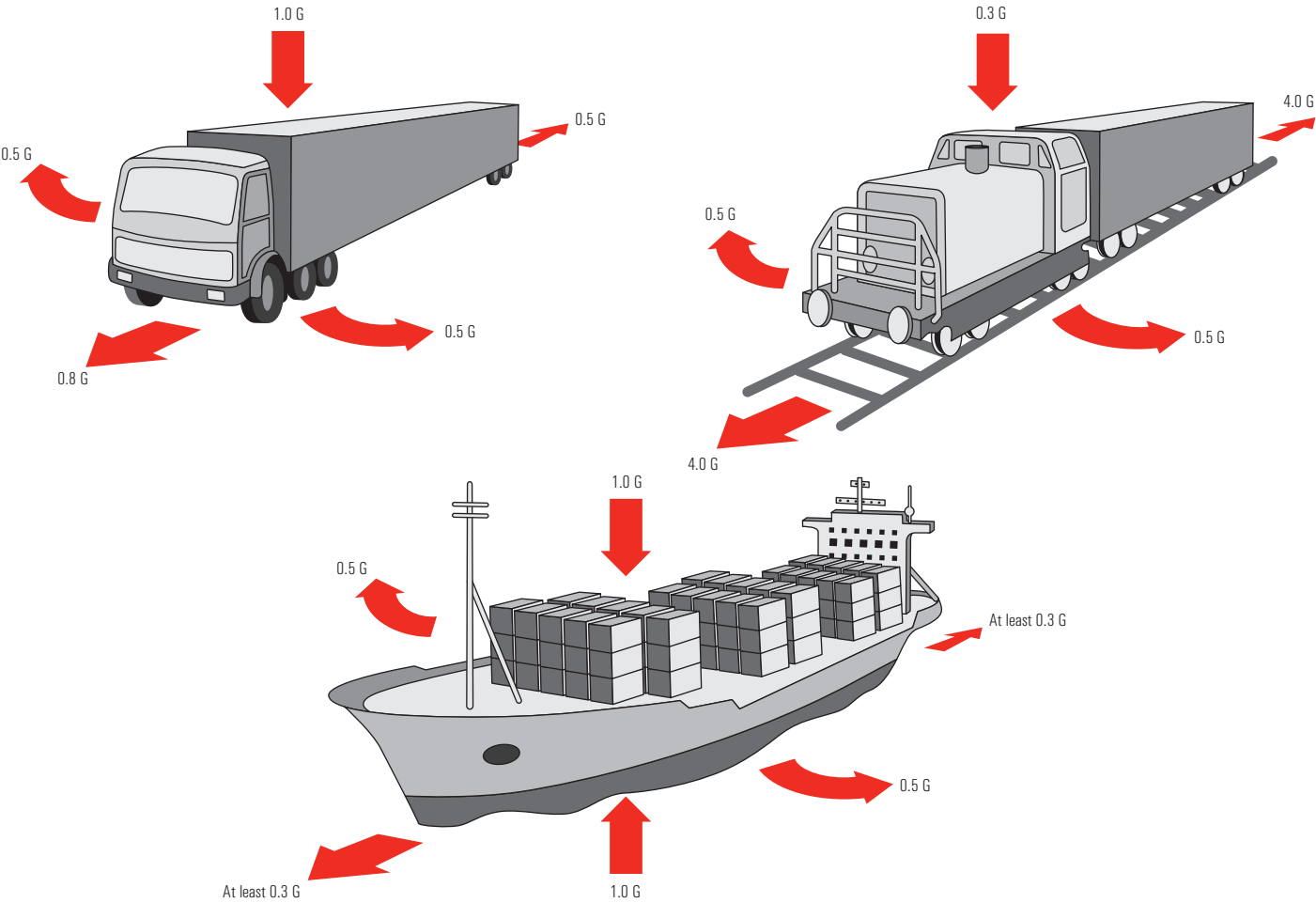
- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment



Load Dynamics

Mass Forces Which Can Have an Effect on the Load in Comparison with the Means of Transport

Different modes of transport have different effects on the load due to varying dynamics. ie A truck will stop much more abruptly than a ship or a train.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

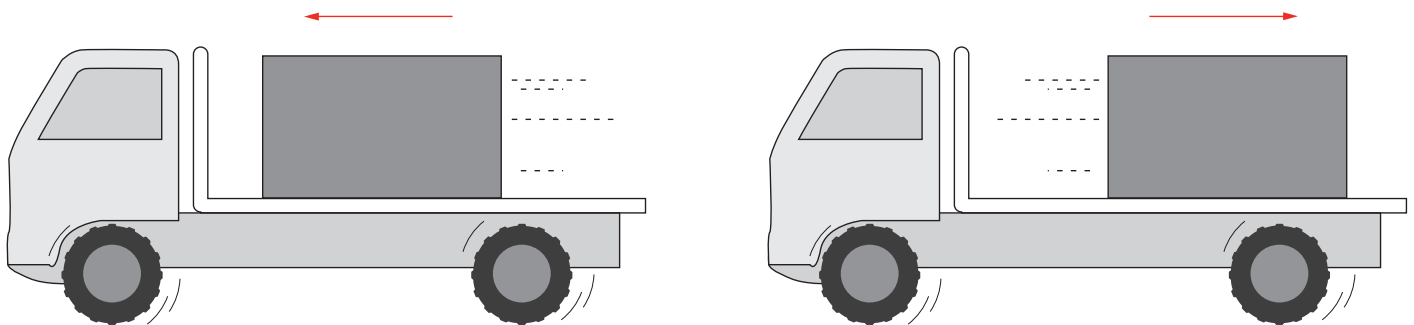
Cut and Abrasion Protection

Operating Temperatures



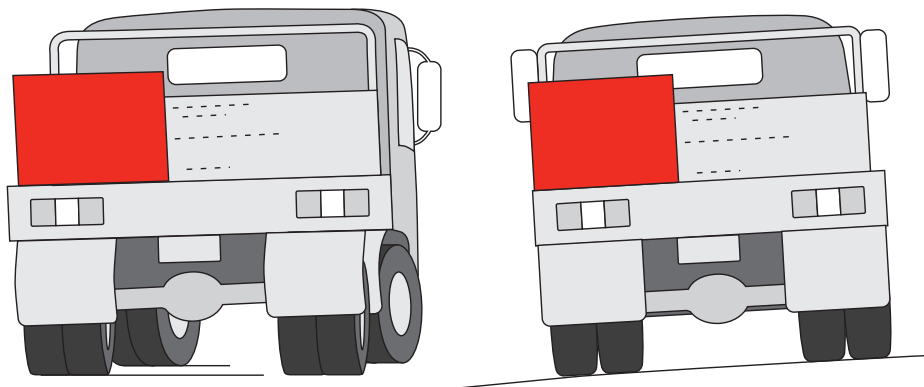
Load Dynamics

When braking or accelerating the load can shift forwards or rearwards.



When cornering, the load can shift sideways with increasing force as the speed increases and the corner gets tighter.

Cambered roads can also have an effect on the load stability.

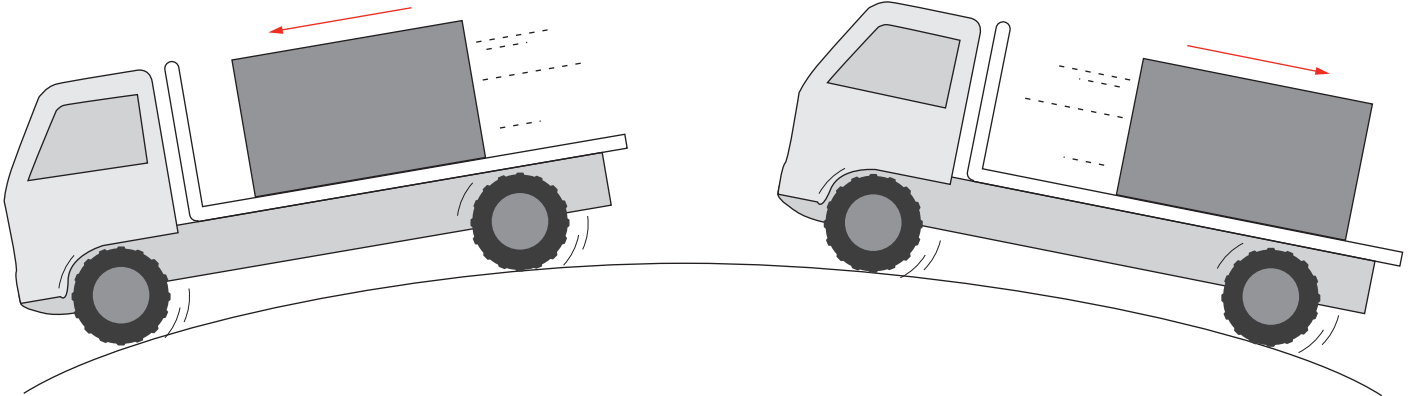




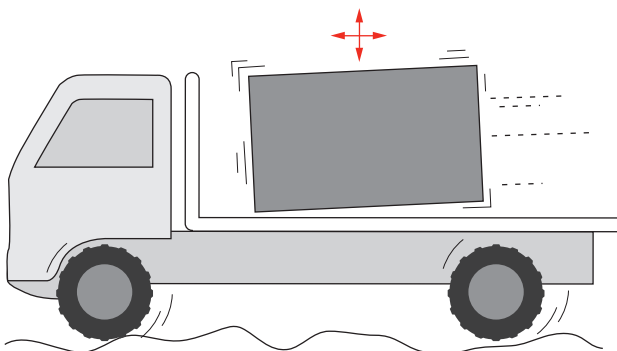
- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment

Load Dynamics

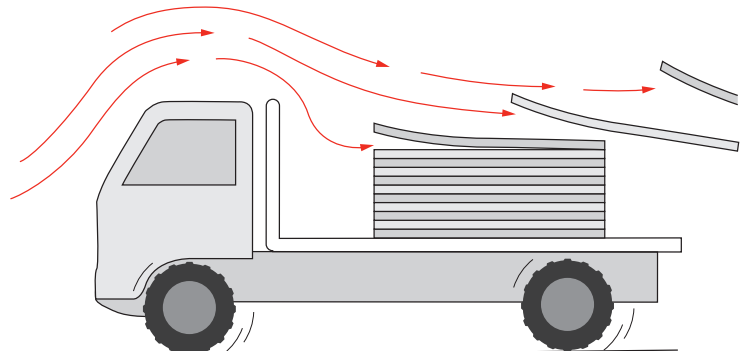
Travelling up and down hilly or undulating terrain can cause the load to move forwards or rearwards.



Rough road surfaces can have a vibratory effect causing loads to settle and bounce.



Wind forces at high speeds can have an adverse effect on loads, especially light components with large surface areas.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

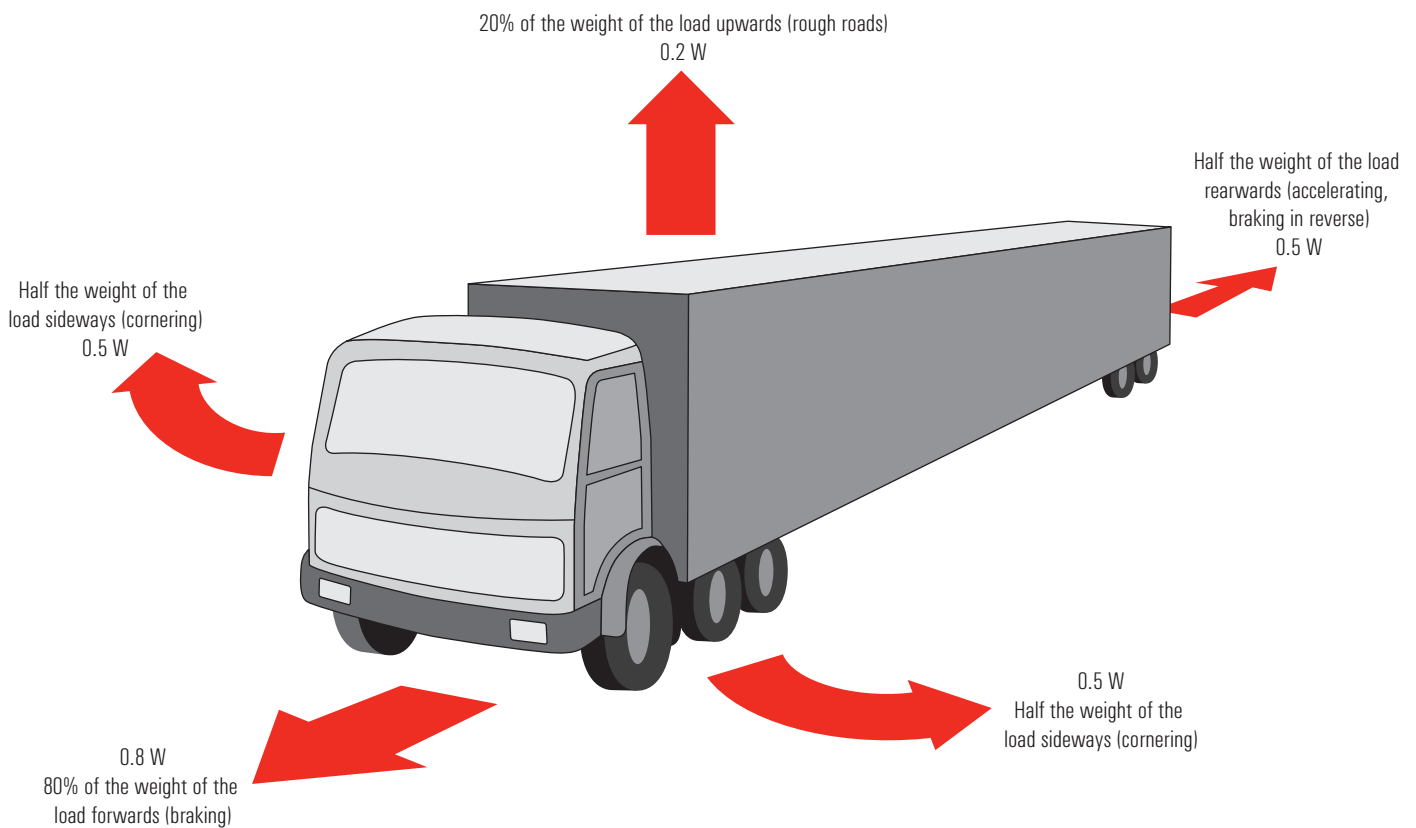
Operating Temperatures



Load Dynamics

The forward restraint will prevent the load shifting on heavy vehicles and the majority of light vehicles in emergency braking situations. Sideways restraint is to avoid the load shifting during cornering or evasive actions and destabilising the heavy vehicle.

Australian Load Restraint Requirements



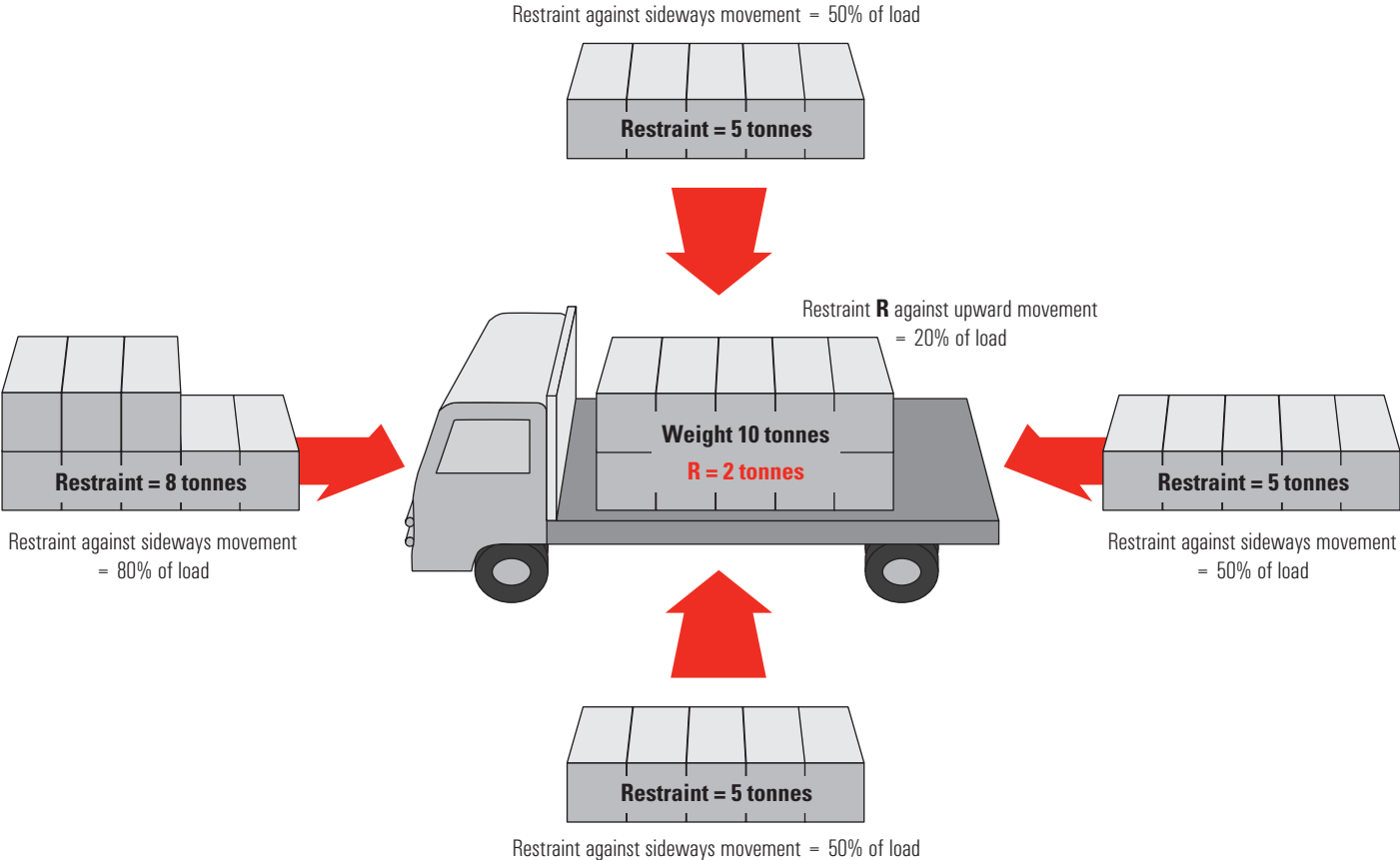
- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment



Load Dynamics

To ensure there is always friction between the load and the deck, a force of 20% of the load must be applied downward by the tensioning of the lashings.

Australian Load Restraint Requirements



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

Operating Temperatures



Methods of Load Restraint – Tie Down

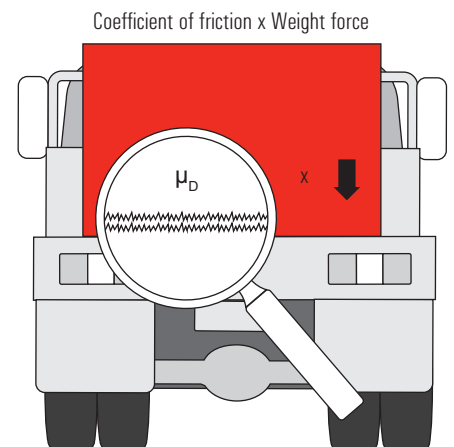
The most common form of restraint is tie down lashing which prevents the load from moving by increasing the friction between the load and the vehicle.

These lashings work like a giant G clamp and also prevent the load from moving upwards. The total friction is achieved by both the weight of the load and the downward force of the tie downs.

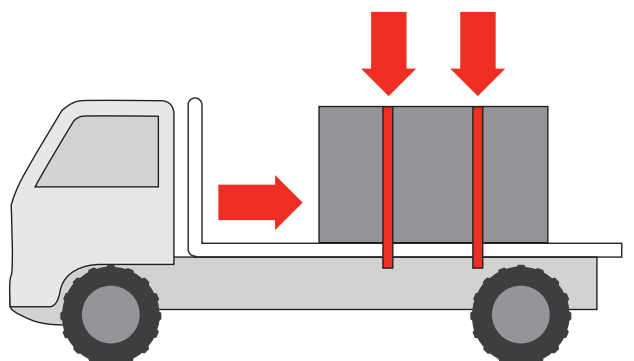
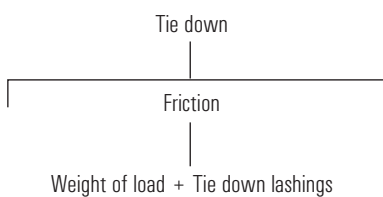
Varying surface conditions can give a different friction performance, ie A "grippy" surface gives a high friction coefficient while a slippery surface gives a low friction coefficient.

If the load is standing on the load floor, a "micro-interlocking" between the surface of the load floor and the surface of the load occurs, which will be stronger, the rougher the surface is.

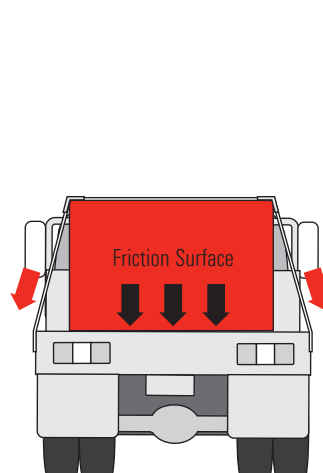
This micro-interlocking characterises the coefficient of kinetic friction



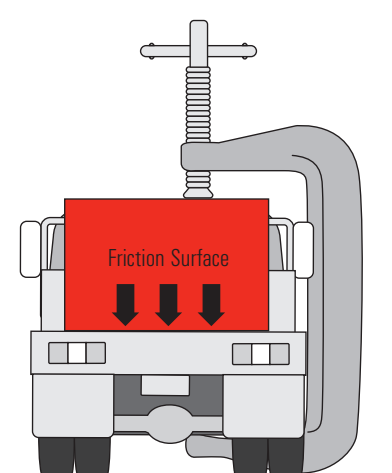
Tie Down Load Restraint

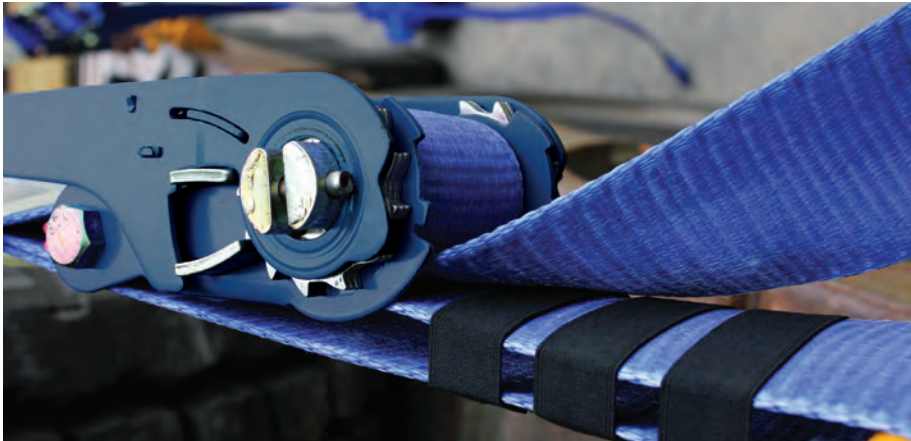


Tie down



Clamping force





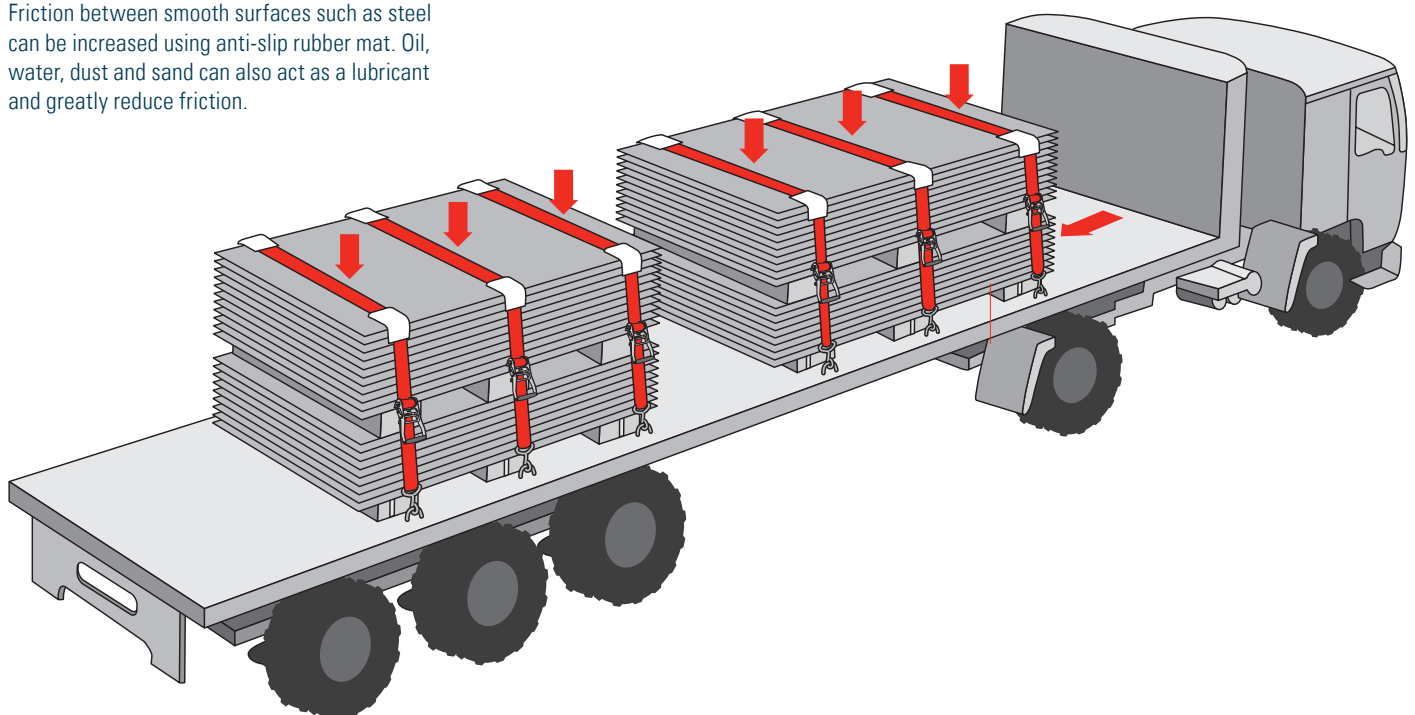
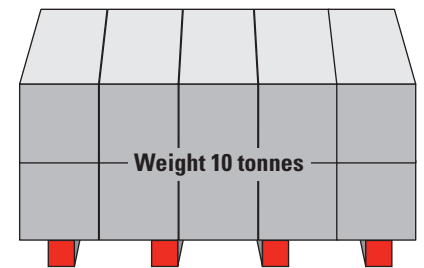
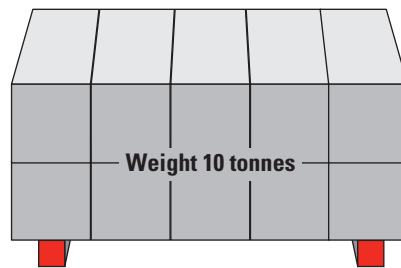
- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment

Methods of Load Restraint – Tie Down

If the load does not shift, it is not the strength of the lashing that determines the holding ability of a tie-down lashing. It is determined by the amount of tension in the lashing from initially operating the ratchet, winch or dog, in conjunction with the amount of friction present. Tie-downs should not be used on slippery loads because too many lashings are needed

Friction cannot be increased by additional surface area. Adding extra timber dunnage as at right achieves exactly the same result.

Friction between smooth surfaces such as steel can be increased using anti-slip rubber mat. Oil, water, dust and sand can also act as a lubricant and greatly reduce friction.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

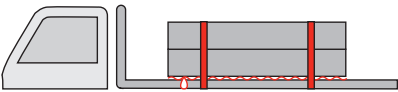
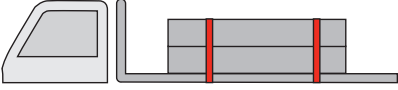
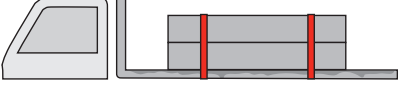
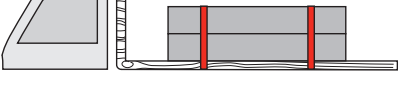
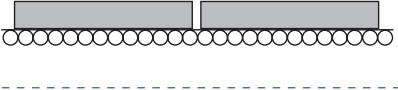
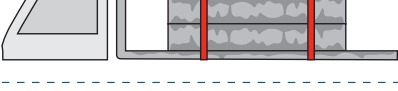
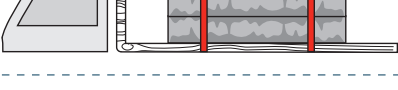

Sharp Edges

Cut and Abrasion Protection

Operating Temperatures



Basic Material Guidelines

	Load	Friction	Typical Friction Coefficient
	Wet or greasy steel on steel	VERY LOW	0.01-0.1
	Smooth steel on smooth steel	LOW	0.1-0.2
	Smooth steel on rusty steel	LOW TO MEDIUM	0.2-0.4
	Smooth steel on timber	MEDIUM	0.3-0.4
	Smooth steel on conveyor belt	MEDIUM	0.3-0.4
	Rusty steel on rusty steel	MEDIUM TO HIGH	0.4-0.7
	Rusty steel on timber	HIGH	0.6-0.7
	Smooth steel on rubber load mat	HIGH	0.6-0.7

03.9 TECHNICAL INFORMATION



- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment

Maintaining Friction

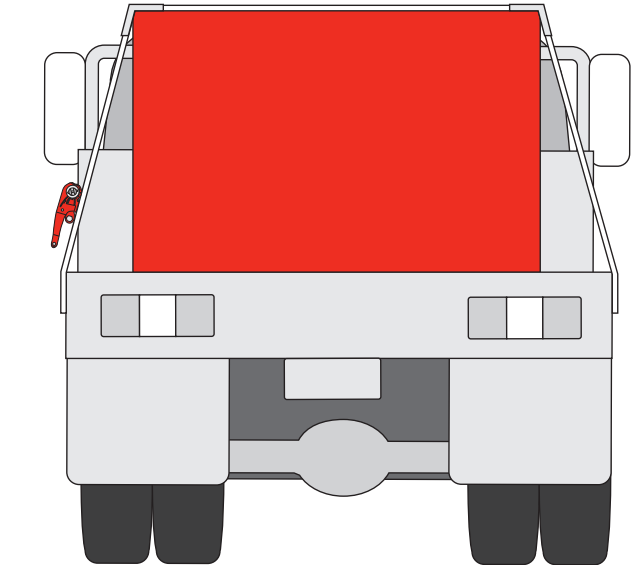
In order to maintain friction force during normal driving, the load must always be in contact with the vehicle with the correct downward lashing force, therefore the tie down lashings must always be tensioned correctly.

The maximum lashing tension is applied to the side of the load where the tensioner is located. The tension on the opposite side can be 50% less due to the snagging and friction of the strap passing over the load.

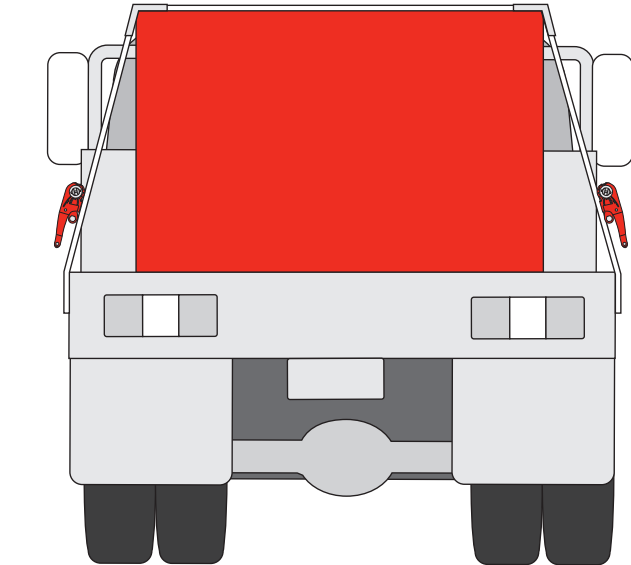
Smooth, rounded corner protectors can minimize this reduction as can specialized sleeves with low internal friction such as Spanset sliP. Alternatively, two tensioners can be used on each lashing.

Note: For calculation purposes the pretension is multiplied 1.5 times on single lashings and 2 times on double sided lashings.

1.5 x Pretension



2 x Pretension



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

Operating Temperatures



Pretension

Lashing Type	Size	Tensioner	Pretension
Rope	10mm	Single hitch	50kg
	12mm	Double hitch	100kg
Webbing Strap	25mm	Hand ratchet	100kg
	35mm	Hand ratchet	250kg
	50mm	Truck winch	300kg
	50mm	Hand ratchet (push up)	300kg
	50mm 20020	Hand Ratchet (push up)	600kg
	50mm 20035 ERGO	Ratchet (pull down)	750kg
Chain	7mm and over	Dog	750kg
		Turnbuckle	1000kg
Web Dog	8mm	Hand ratchet (pull down)	1500kg

Example

10,000kg load, smooth steel on timber, friction coefficient (μ) 0.4 = $10,000 \text{ kg} \times 0.4 = 4,000 \text{ kg}$ of friction force

Forward restraint requirement (0.8) 8,000kg minus 4,000kg friction force from weight of load leaves 4,000kg clamping force required

Standard 50mm ratchet pretension $300\text{kg} \times 1.5 = 450\text{kg}$ (9 required)

20020 ratchet pretension $500 \times 1.5 = 750\text{kg}$ (6 required)

20035 ratchet pretension $750 \times 1.5 = 1120\text{kg}$ (4 required)

Note: Values are multiplied by 1.5 for LC calculations as pretension is applied to 2 sides of the load, minus the friction derating caused by the edges of the load. If using tensioners on both sides or SpanSet SliP sleeves multiply by 2.0.

03.9 TECHNICAL INFORMATION



Atmospheric Effects
 The Effects of Various Substances
 The Effects of Acids on Polyester
 The Effect of Alkalis and Oxidising Agents on Polyester
 The Effects of Chemicals and Solvents on Polyester
 Lashing Deficiencies
 Tensioning Devices
 Handling the Load Securing Equipment

Tie Down Angle Effect






A tie down is not 100% effective unless it is vertical or at 90° to the deck. If the angle is less than 90° (most loads!) its effectiveness is reduced and this must be reflected in the load restraint calculations.

Tie downs are most efficient if they are vertical and tensioned correctly.

The less the angle, or closer to horizontal, the less clamping force is applied to the load which means more lashings are required to achieve the required force.

Example

If a ratchet/strap combination is tensioned to 750kg but only at an angle of 15° then it is only applying a clamping force of 187.5kg or 25% on one side of the load. Therefore it would take 4 straps to apply the full 750kg of force. Hence the term "angle effect".

	Approximate angle degree	Tie down angle effect	Tie down effectiveness
	60	0.85	85%
	45	0.70	70%
	90	1.00	100%
	30	0.50	50%
	15	0.25	25%

03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

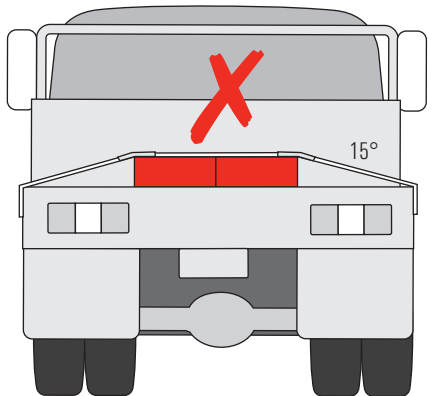
Cut and Abrasion Protection

Operating Temperatures



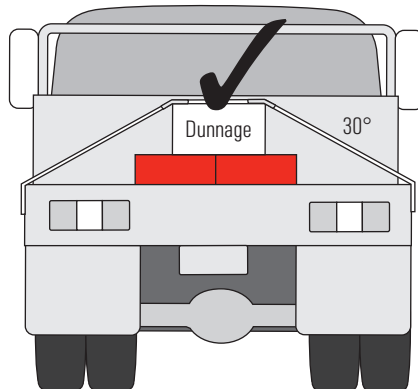
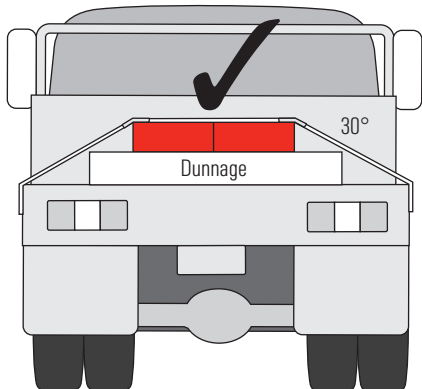
Dunnage (Packing)

Many loads are too low for tie-down lashings to be fully effective.



Low tie down angle (not recommended)

Dunnage (packing) can be used to lift the load height and increase the effective angle.



For easy tie down calculations refer to our Lashing Controller App for Apple and Android.



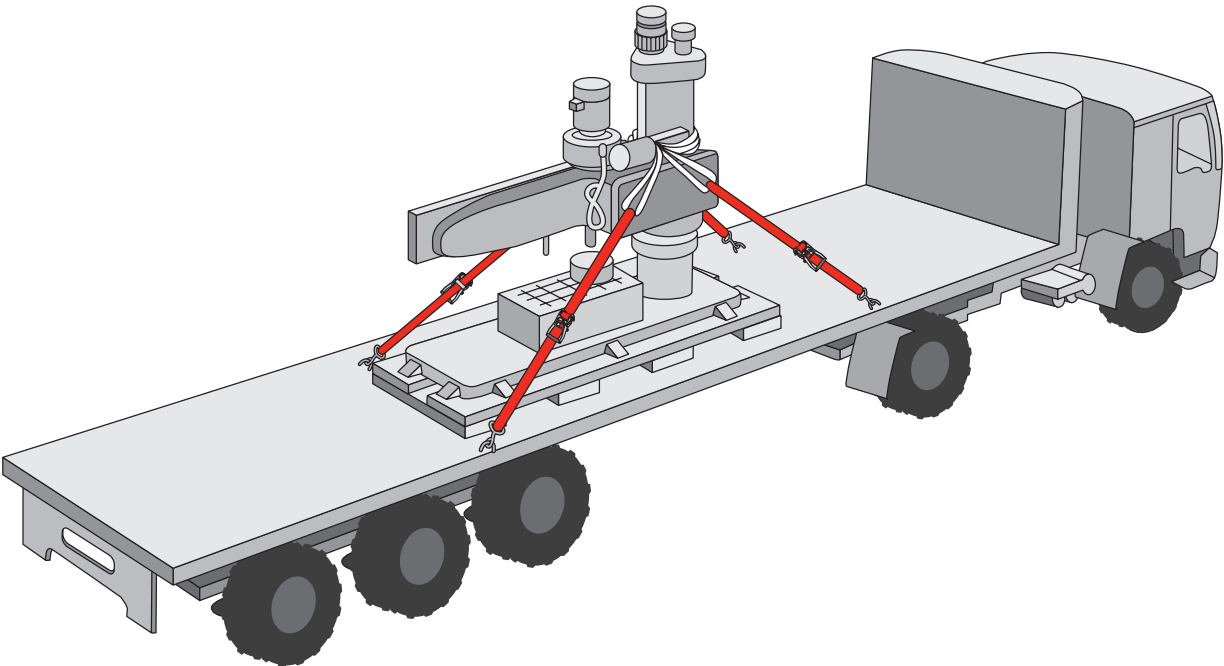
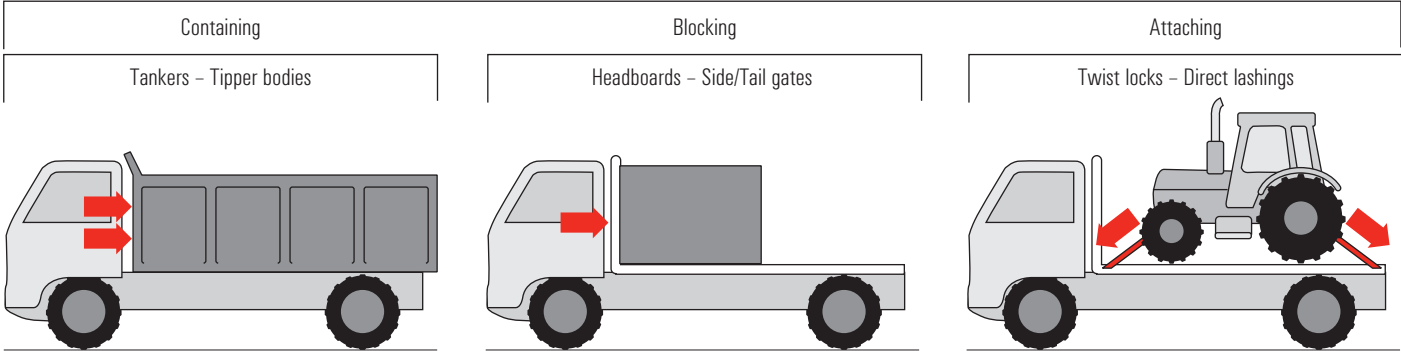
03.9 TECHNICAL INFORMATION

- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment



Direct Load Restraint

Direct restraint



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

Operating Temperatures



Direct Lashing Angles

Direct lashing relies on the strength of the assembly to restrain the load, as opposed to friction to clamp the load.

The lashing is at its most efficient in a straight line but needs to be de-rated when angles are introduced (most loads).

To determine the effectiveness of a lashing in relation to its applied angles, use the following calculations.

For Lashing L1

Angle effect (E1) Forwards = Distance (F1) ÷ Length of lashing (L1)
= % of lashing assembly capacity.

Angle effect (E1) Sideways = Distance (S1) ÷ Length of Lashing (L1).

Example of 2500kg Assembly

Angle effect (E1) Forwards
= Distance (1.0) ÷ Length of Lashing (1.5)
= .666% of lashing assembly capacity
ie Each 2500kg assembly is reduced to 1665kg LC

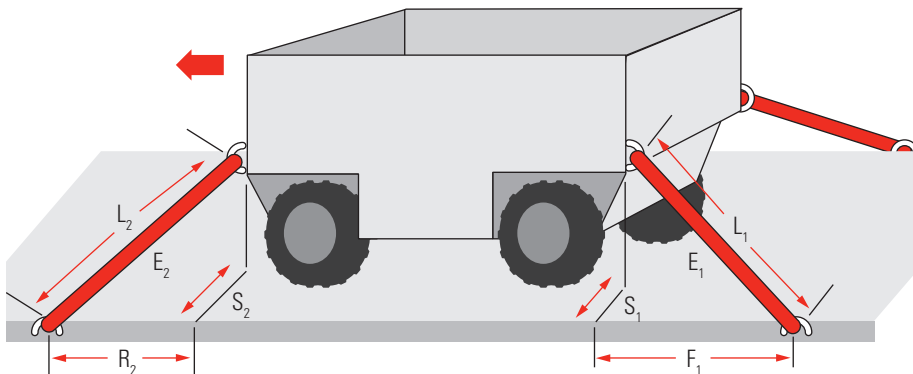
Angle effect (E1) Sideways
= Distance (0.5) ÷ Length of lashing (1.5)
= .333% of lashing assembly capacity
ie Each 2500kg assembly is reduced to 825kg LC

For Lashing L2

Angle effect (E2) Rearwards = Distance (R2) ÷ Length of Lashing (L2)

Angle effect (E2) Forwards = Distance (S2) ÷ Length of Lashing (L2)

For easy direct lashing calculations refer to our Lashing Controller App for Apple and Android

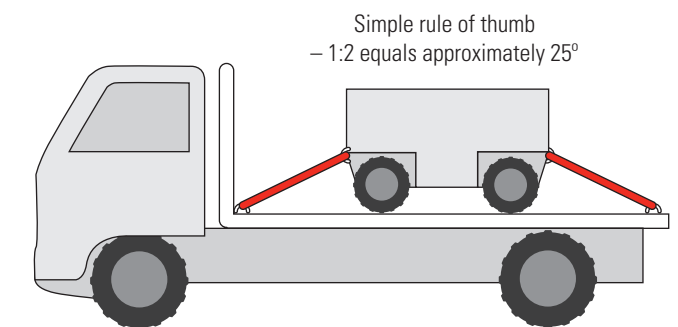
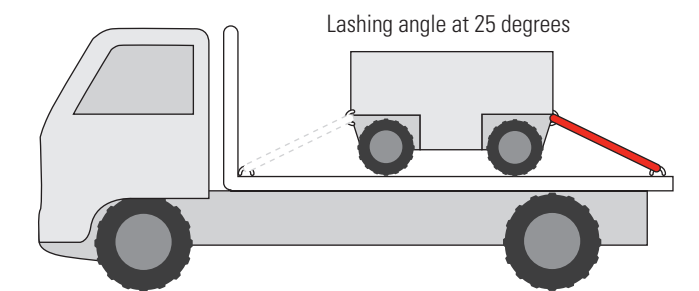
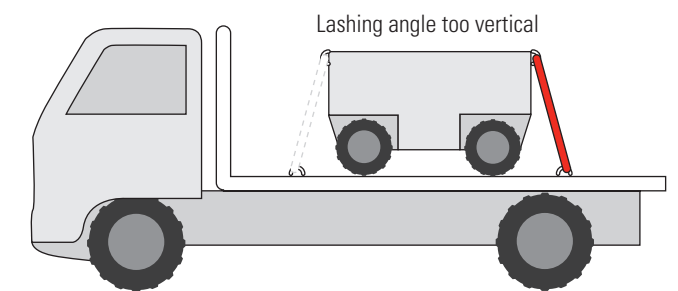


03.9 TECHNICAL INFORMATION



Atmospheric Effects
The Effects of Various Substances
The Effects of Acids on Polyester
The Effect of Alkalis and Oxidising Agents on Polyester
The Effects of Chemicals and Solvents on Polyester
Lashing Deficiencies
Tensioning Devices
Handling the Load Securing Equipment

Direct Lashing Angles



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

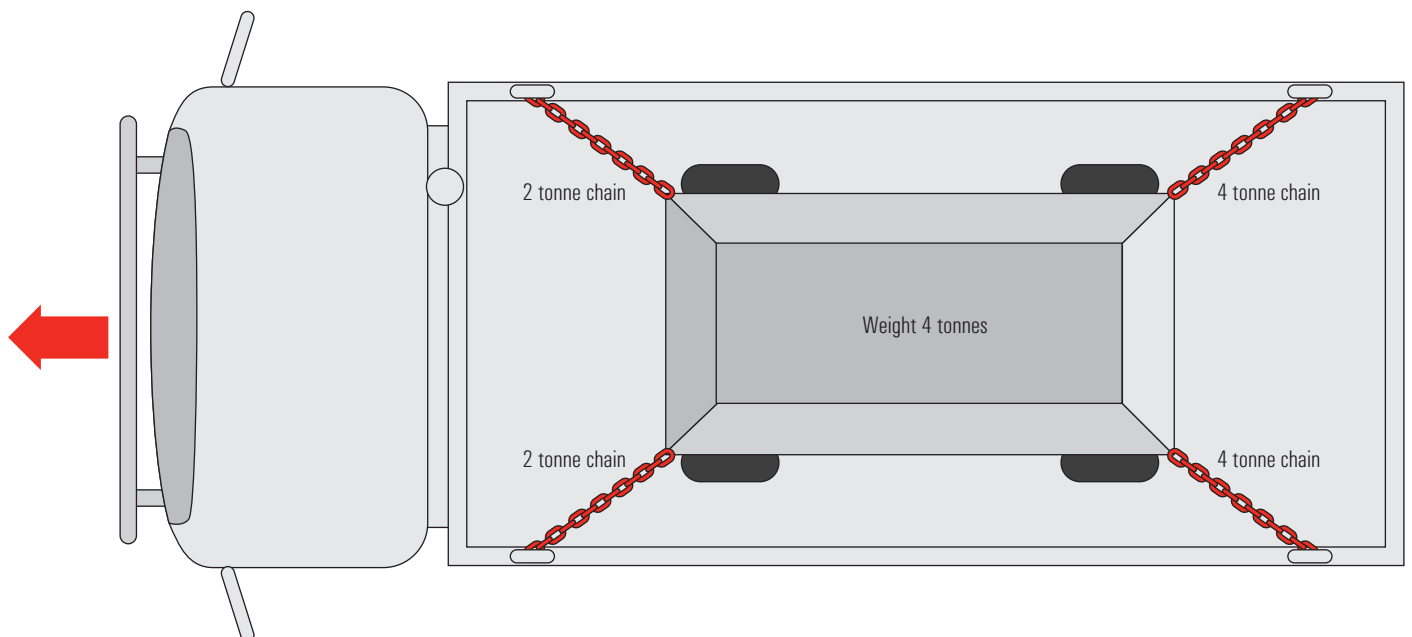
Operating Temperatures



Selecting Lashing Combinations

A simple rule is to select lashings whose combined lashing capacity is:

- In the forwards direction - twice the weight of the load
- In the sideways direction - the weights of the load
- In the rearward direction - the weight of the load.

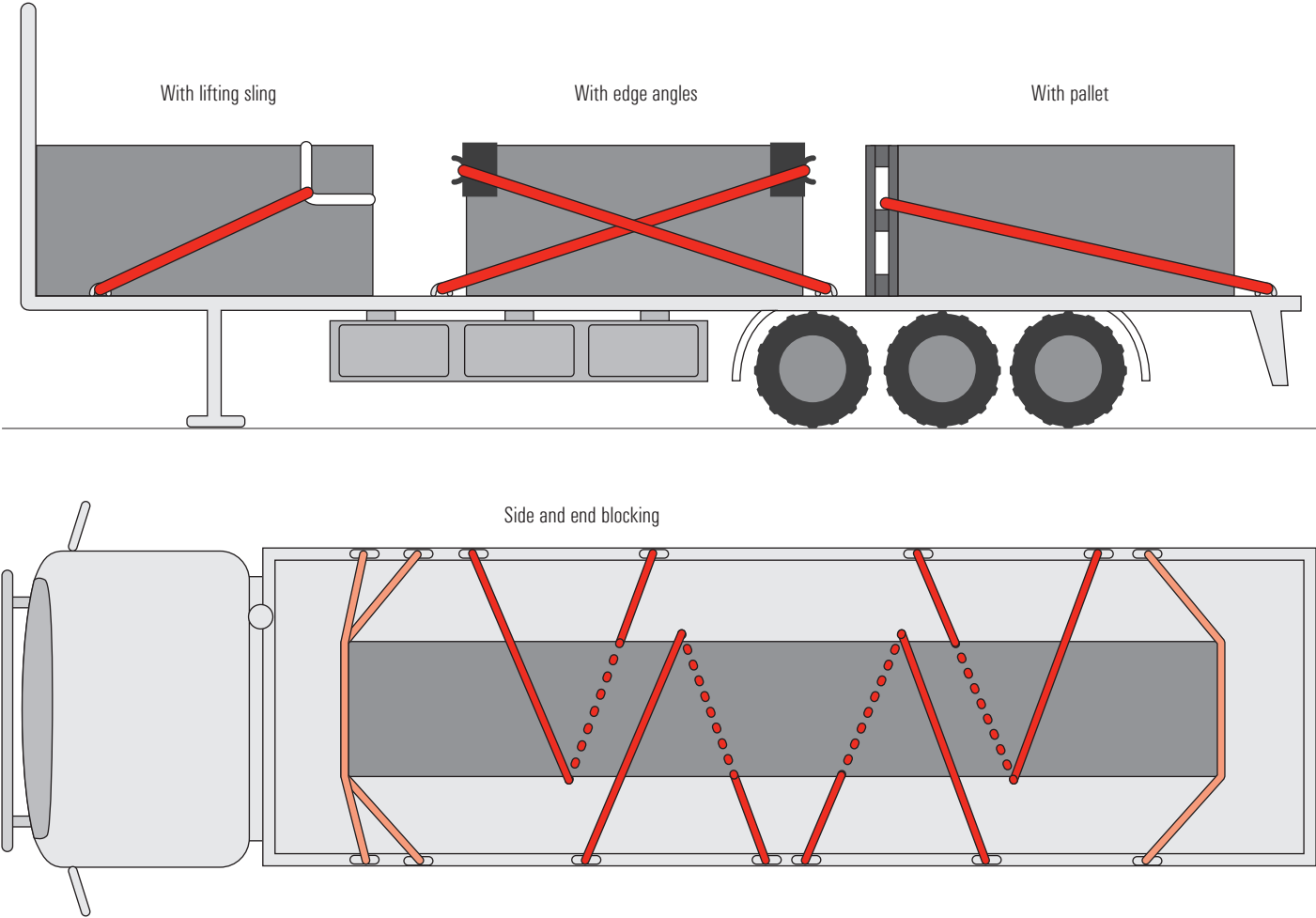


03.9 TECHNICAL INFORMATION



- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment

Direct Lashing Examples



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

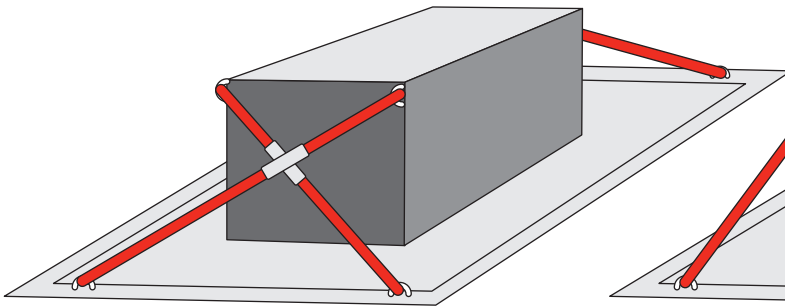
Cut and Abrasion Protection

Operating Temperatures

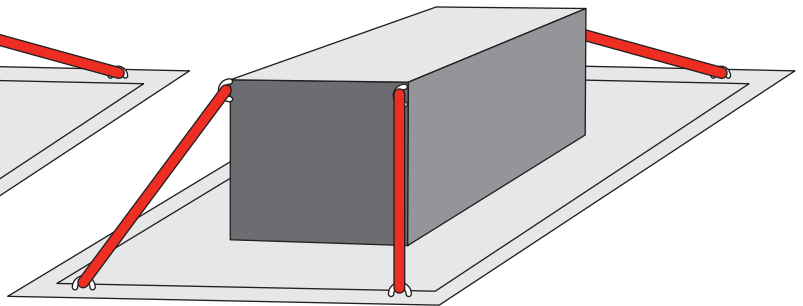


Direct Lashing Examples

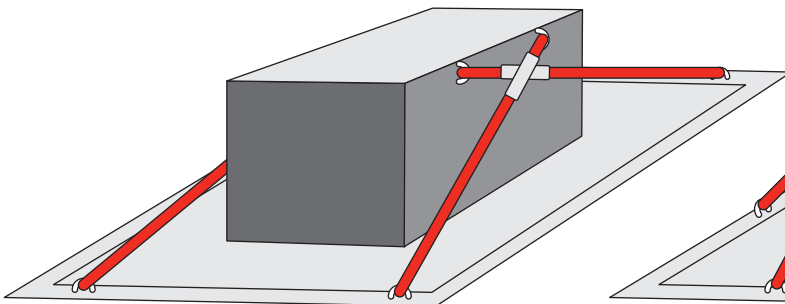
Possibility 1



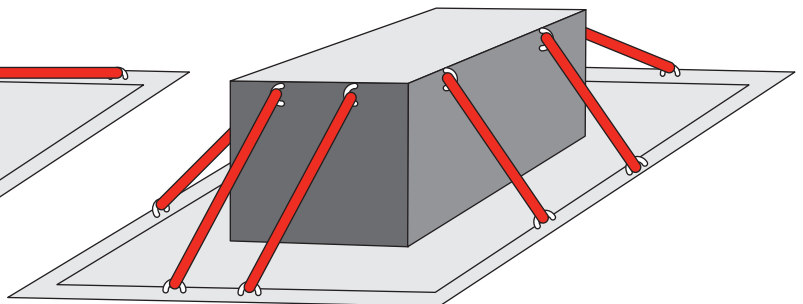
Possibility 2



Possibility 3



Possibility 4



Note: Where straps cross each other, ensure abrasion protection is in place.

03.9 TECHNICAL INFORMATION



Atmospheric Effects

The Effects of Various Substances

The Effects of Acids on Polyester

The Effect of Alkalis and Oxidising

Agents on Polyester

The Effects of Chemicals and Solvents
on Polyester

Lashing Deficiencies

Tensioning Devices

Handling the Load Securing Equipment

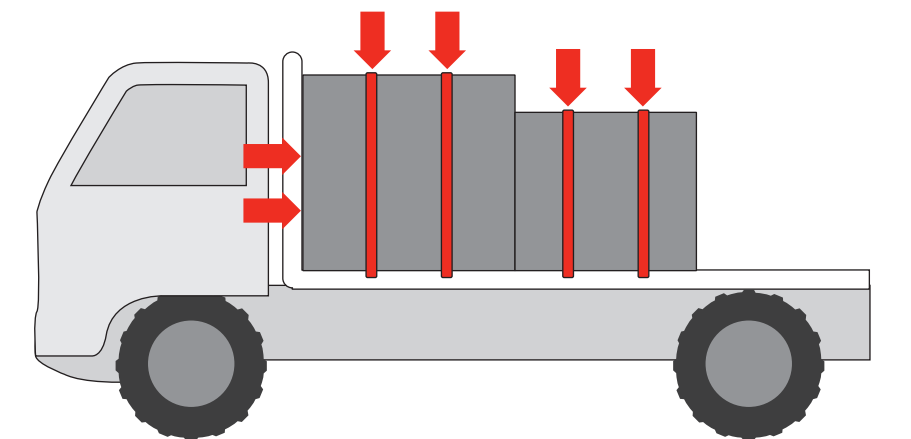
Combined Tie Down and Direct Restraint

Combined tie-down and direct restraint uses both friction and direct restraint. Figure illustrates load restraint provided by:

- Friction force from the weight of the load; and
- Friction force from tie-down lashings; and
- Blocking (the front part of the load is blocked by the headboard and the rear part of the load is then blocked by the front part).

The load is prevented from moving forwards by a combination of friction force from the weight of the load and the lashing tension, and also blocking against the headboard.

The load is prevented from moving rearwards and sideways only by friction. The load is prevented from moving upwards by the lashings.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

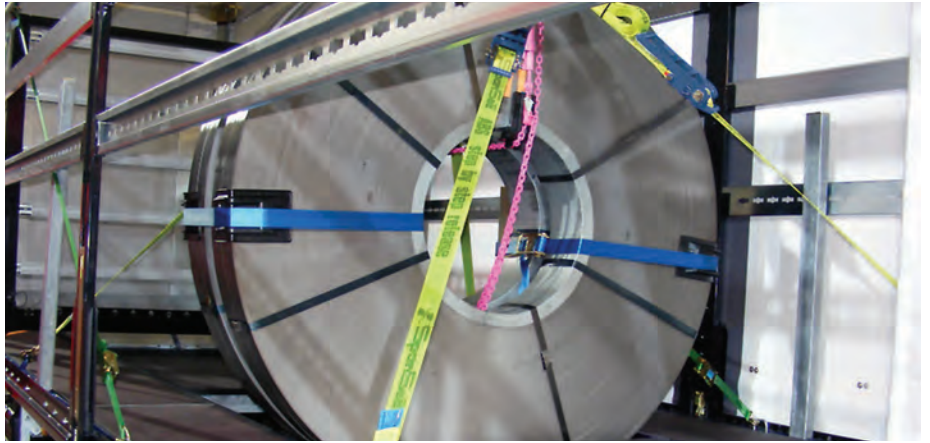
Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

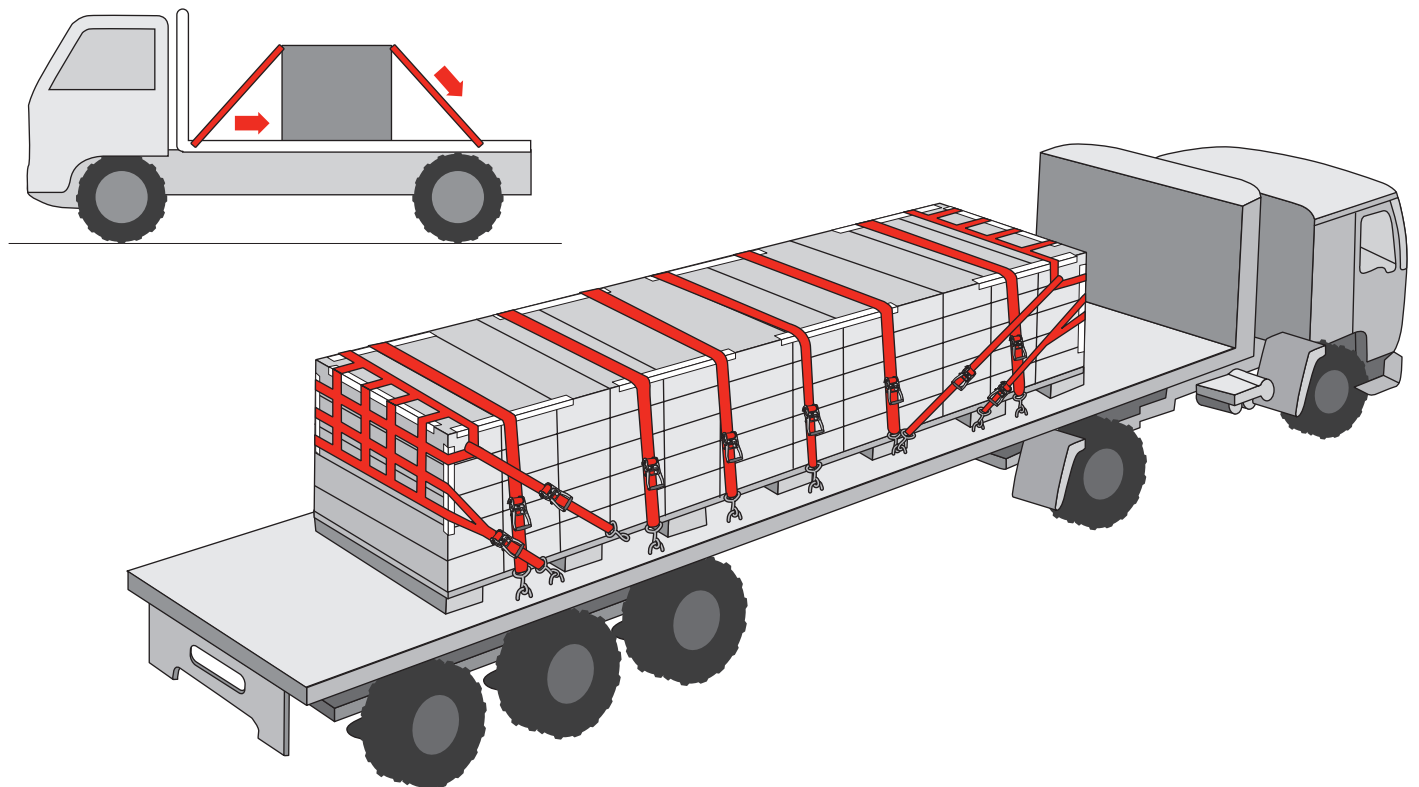
Operating Temperatures



Friction and Direct Restraint

Figure illustrates load restraint provided by:

- Friction force from the weight of the load, plus
- Friction force from the downward force from the lashings, plus
- Direct restraint from lashings that are attached to the load.



03.9 TECHNICAL INFORMATION

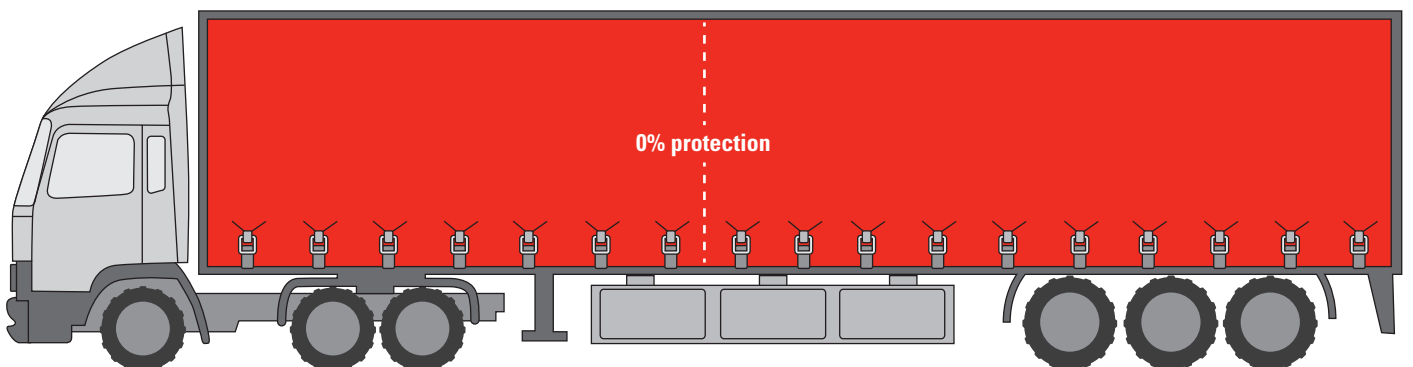
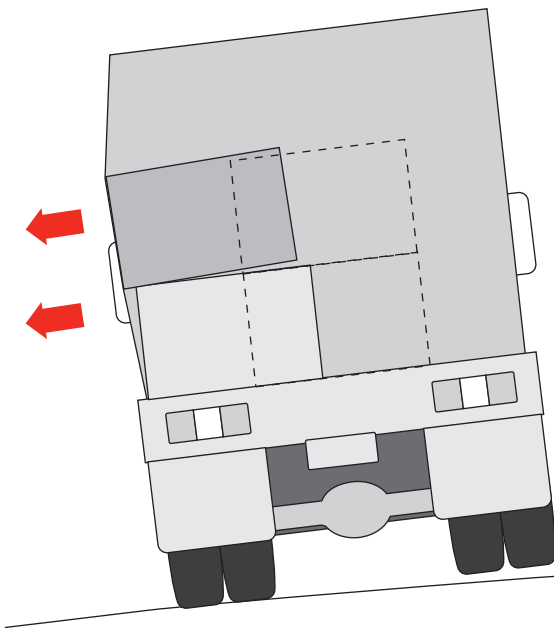


Atmospheric Effects
The Effects of Various Substances
The Effects of Acids on Polyester
The Effect of Alkalis and Oxidising Agents on Polyester
The Effects of Chemicals and Solvents on Polyester
Lashing Deficiencies
Tensioning Devices
Handling the Load Securing Equipment

Curtain Sided Vehicles

Curtain sides are used primarily for protection from the elements and are a safer alternative to tarpaulins.

These curtains are not considered primary load restraints. Despite many of the fastening straps being rated, they do not prevent the internal load from shifting and destabilising the vehicle and potentially leading to an accident.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

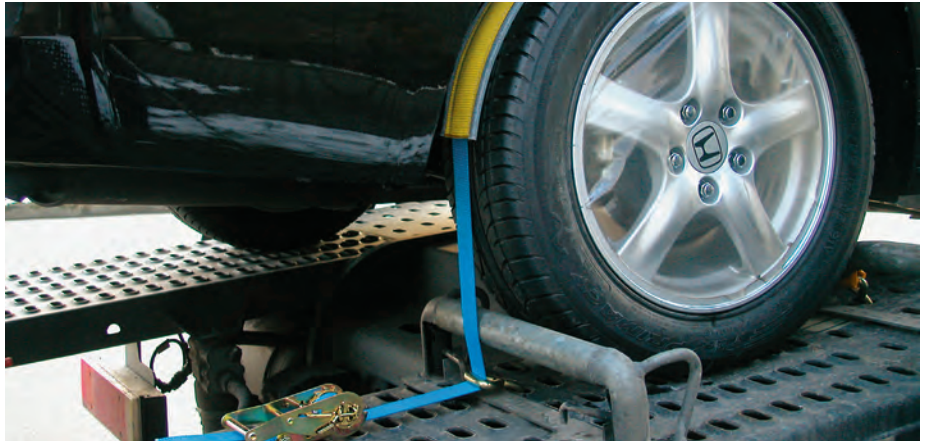
Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

Cut and Abrasion Protection

Operating Temperatures



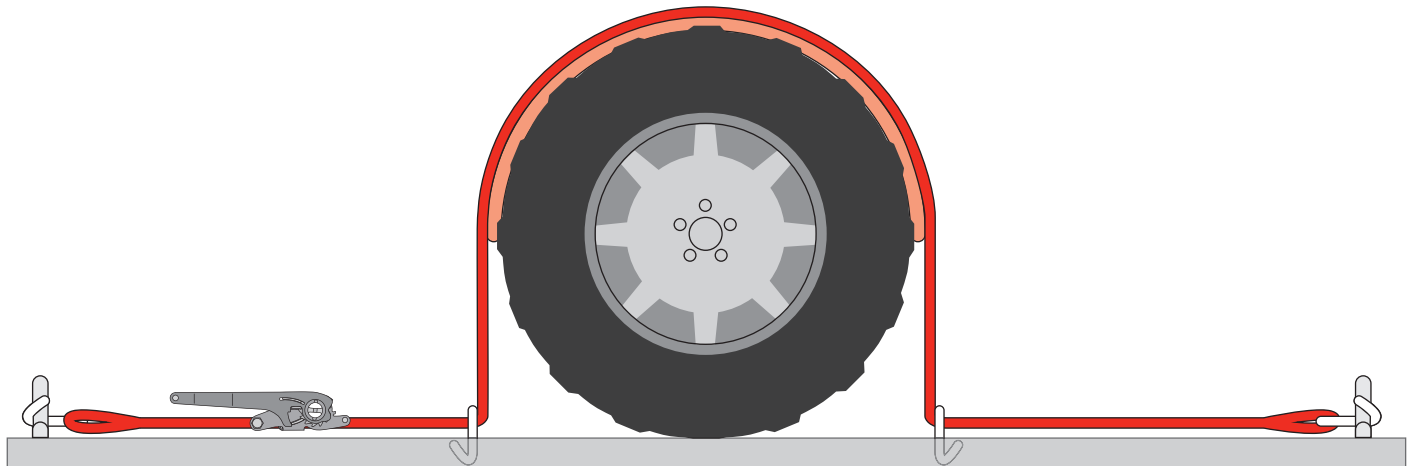
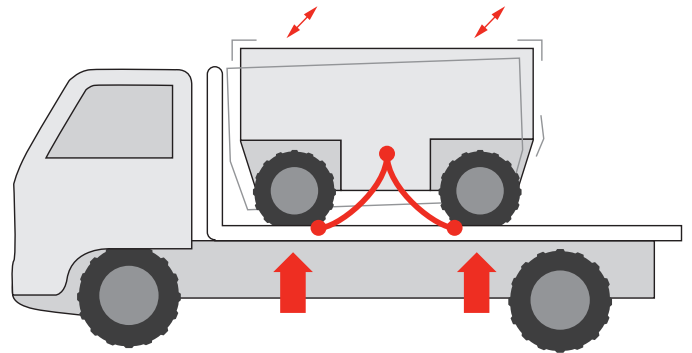
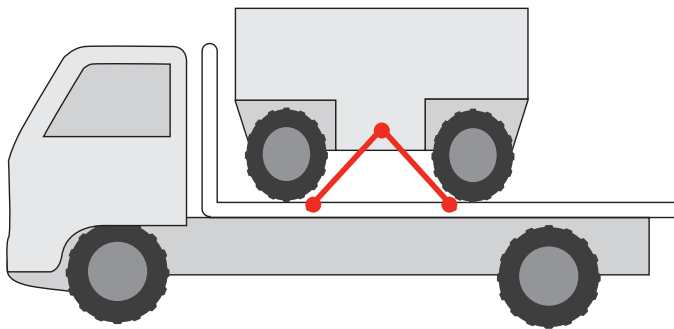
Rubber Tyre Bounce

During braking, pneumatic rubber tyred equipment can pull down and compress the tyres causing the load to bounce repeatedly, leading to wear in chains and lashing points.

In extreme circumstances the chains can become slack in the compression process and the grab hook can release from the chain especially on rough roads.

Direct lashings should be angled at no more than 25° to the horizontal or use and over the tyre, in line lashing.

Over tyre lashings eliminate these issues.



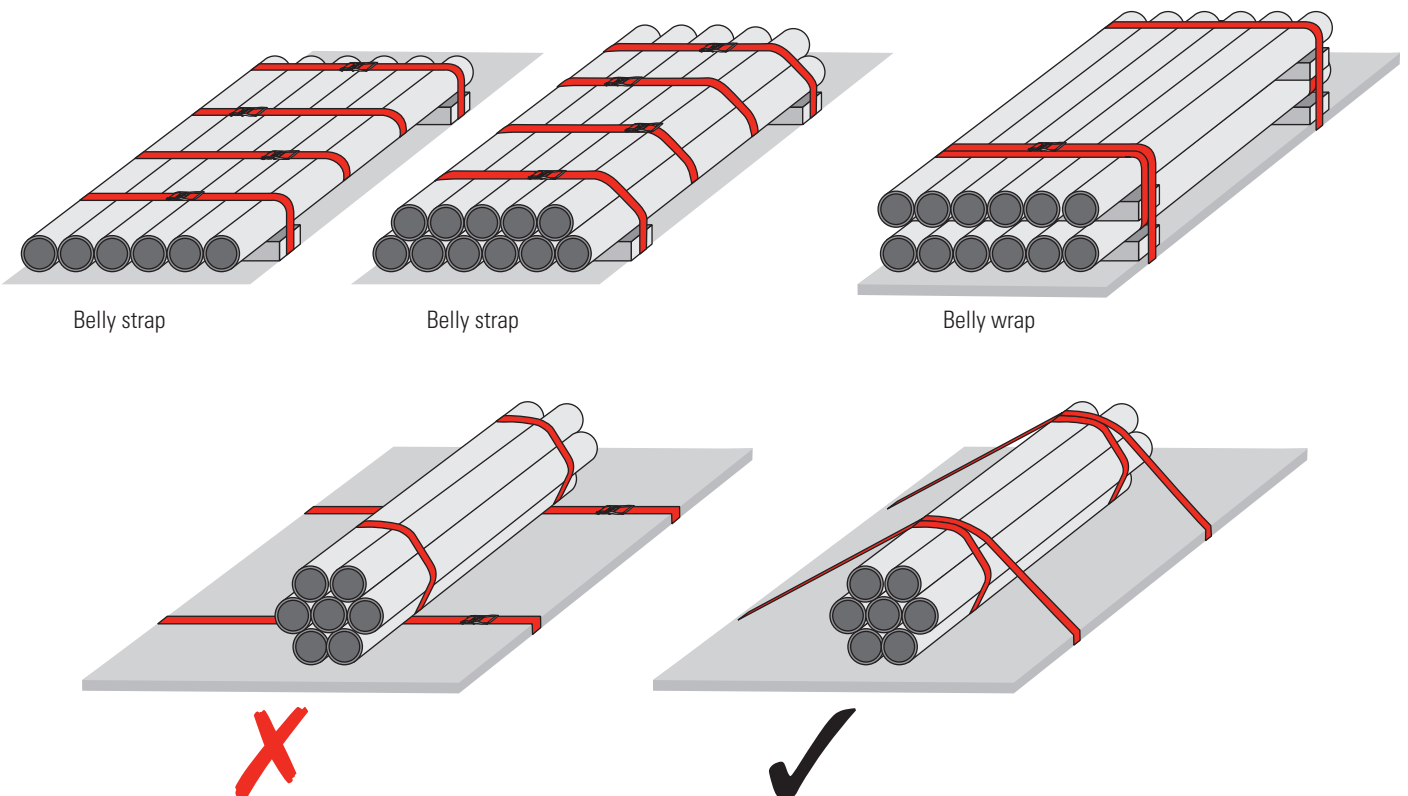


Atmospheric Effects
The Effects of Various Substances
The Effects of Acids on Polyester
The Effect of Alkalis and Oxidising Agents on Polyester
The Effects of Chemicals and Solvents on Polyester
Lashing Deficiencies
Tensioning Devices
Handling the Load Securing Equipment

Pipe Transport

Bundling or unitising is an effective way of preventing pipes, bars and billets from rolling. This can be done by belly strapping or belly wrapping the lashings around the products.

This is not suitable for slippery, soft or crushable products.



03.9 TECHNICAL INFORMATION

Load Dynamics

Tie Down Restraint

Direct Load Restraint

Curtain Sided Vehicles

Rubber Tyre Bounce

Pipe Transport

Vertical Rolls, Reels, Coils and Drums

Checking the Load

Sharp Edges

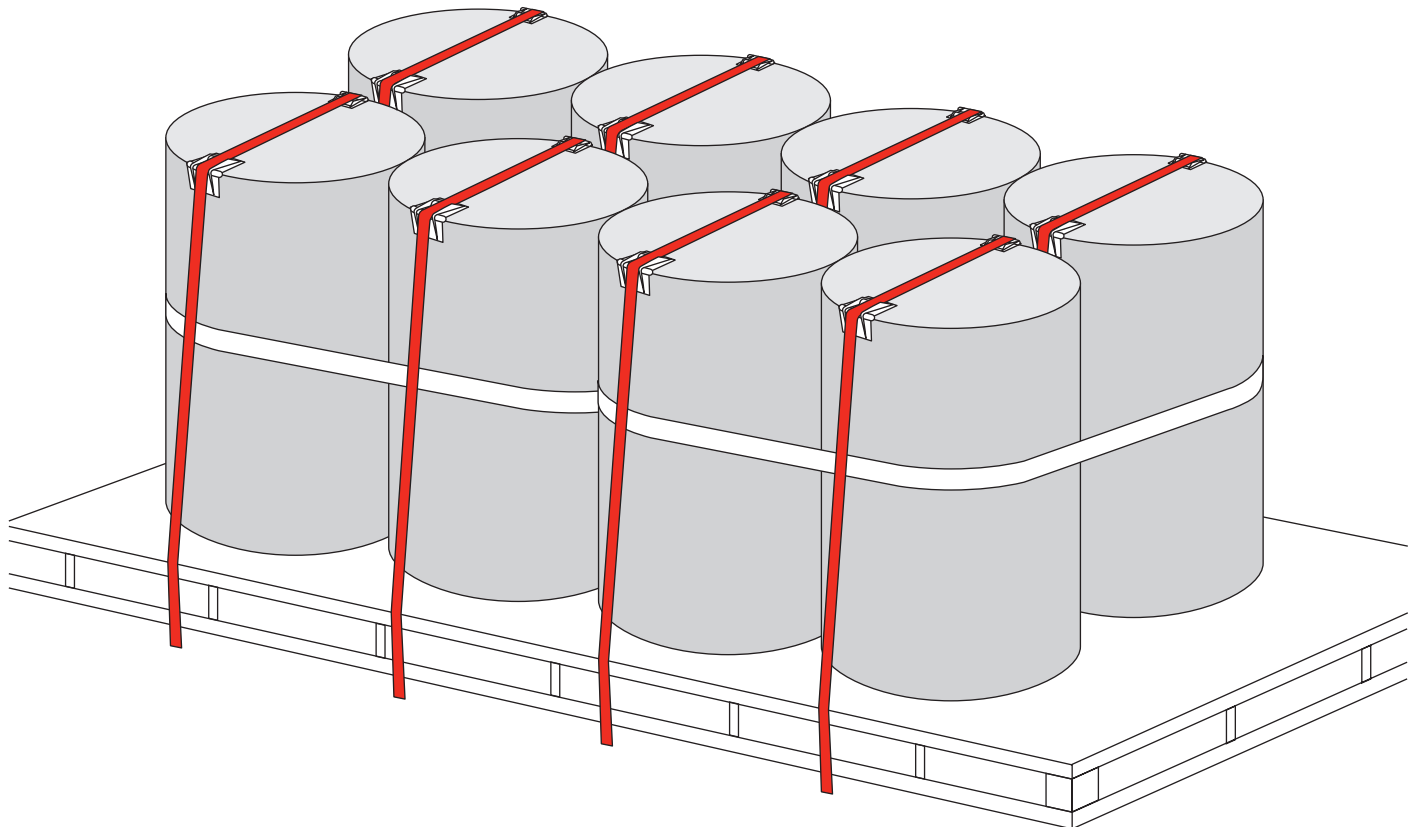
Cut and Abrasion Protection

Operating Temperatures

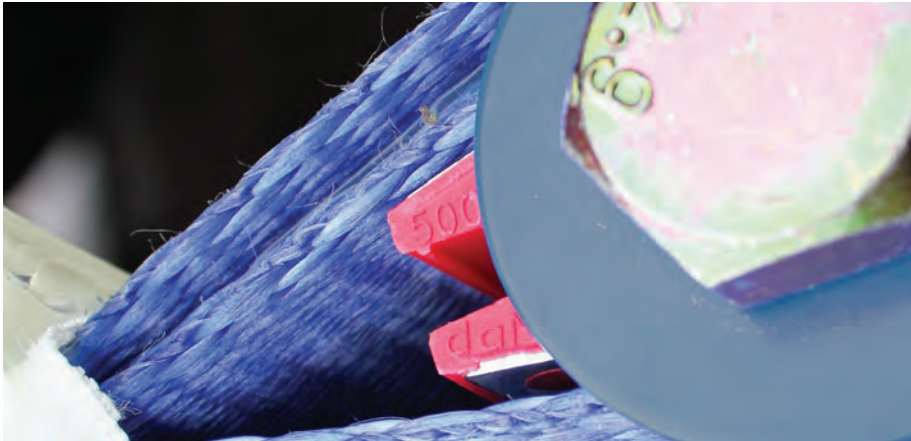


Vertical Rolls, Reels, Coils and Drums

Rolls reels, coils and drums must be lashed to the deck and blocked to prevent forward movement or otherwise completely contained. If they are not bundled or unitised on a pallet or stored in a suitable container, each item should be individually lashed.



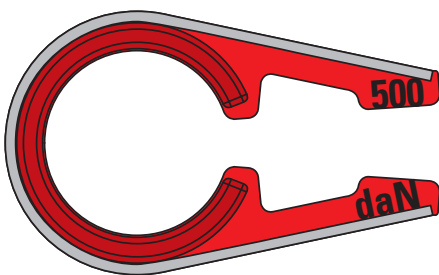
- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment



Checking the Load

Some loads can settle and shift during the journey causing the lashings to lose tension, causing objects to fall off. The driver must regularly check their loads and restraints to ensure the load is secure and cannot fall off. The type of load and the road conditions will determine the frequency of these checks.

A critical aspect of these precautions is the actual ability to check the amount of tension in each strap. All SpanSet 50mm and 75mm premium ratchets come fitted with tension force indicators (TFI) allowing the tension to be checked at a glance.

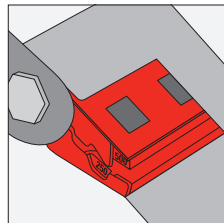


TFI - Tension Force Indicator

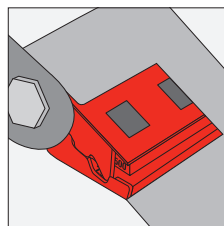
ERGO ABS lashing straps are fitted with the TFI, Tension Force Indicator, as standard. The TFI indicates the attained pretension force which you can read off either on the left side (250daN and 500 daN), or on the right side (750 daN).

Knowledge of the actual tension force allows precise securing of the cargo. The required number of lashing straps can then be determined and the labour time calculated.

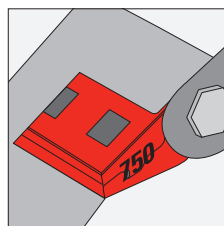
Reading off the Initial Tension Force with the TFI



250 daN tension force: The first tooth starts to overlap the recessed indicator range of 250 daN.



500 daN tension force: The second tooth starts to overlap the outside indicator range.



750 daN tension force: The two halves are pressed together (positive engagement).



03.9 TECHNICAL INFORMATION

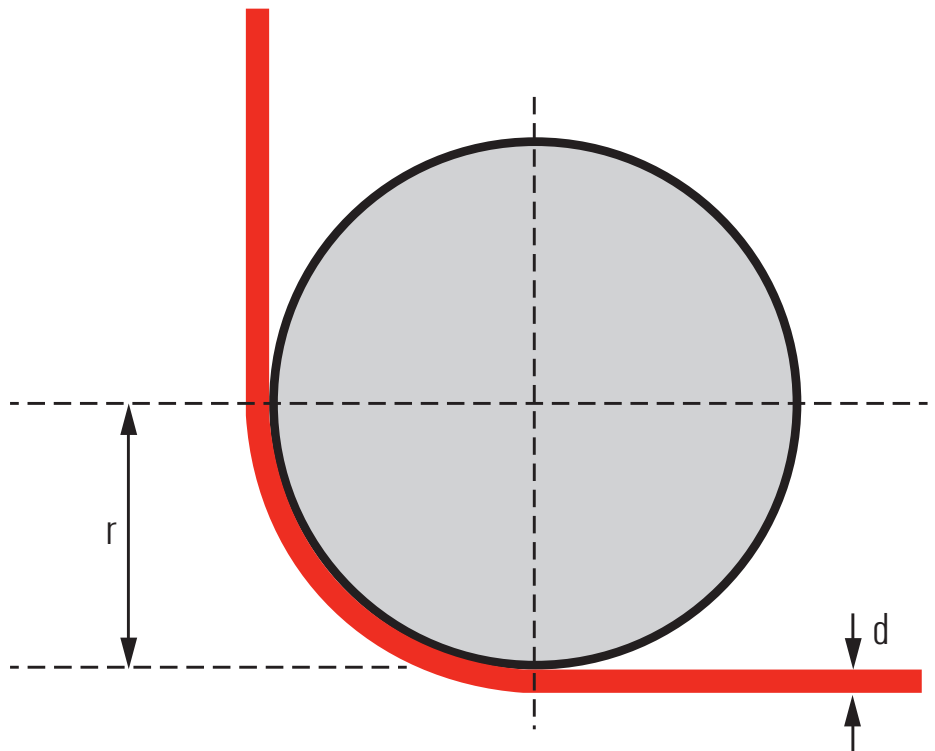
Load Dynamics
Tie Down Restraint
Direct Load Restraint
Curtain Sided Vehicles
Rubber Tyre Bounce
Pipe Transport
Vertical Rolls, Reels, Coils and Drums
Checking the Load
Sharp Edges
Cut and Abrasion Protection
Operating Temperatures



Sharp Edges

Definition of Sharp Edges Relating to Synthetic Lashings Around Loads

If the radius (r) of the edge of the fitting is the same or less than the compressed thickness (d) of the lashing strap. A fitting with insufficient diameter such as a shackle pin is still considered a sharp edge.



03.9 TECHNICAL INFORMATION



Atmospheric Effects
 The Effects of Various Substances
 The Effects of Acids on Polyester
 The Effect of Alkalis and Oxidising Agents on Polyester
 The Effects of Chemicals and Solvents on Polyester
 Lashing Deficiencies
 Tensioning Devices
 Handling the Load Securing Equipment

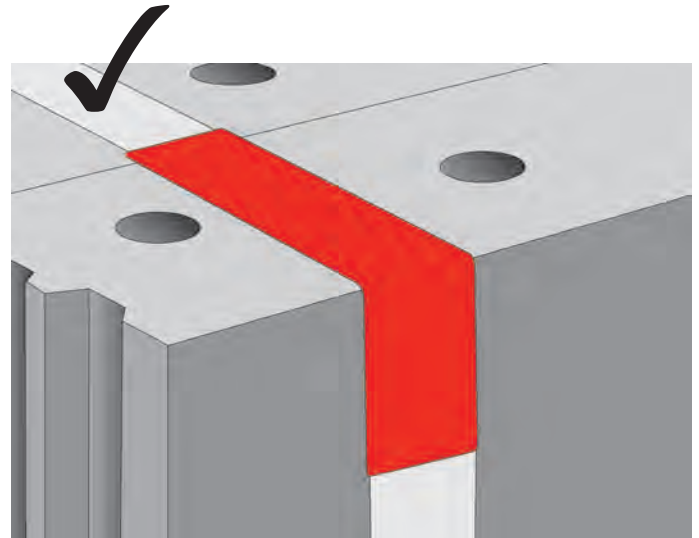
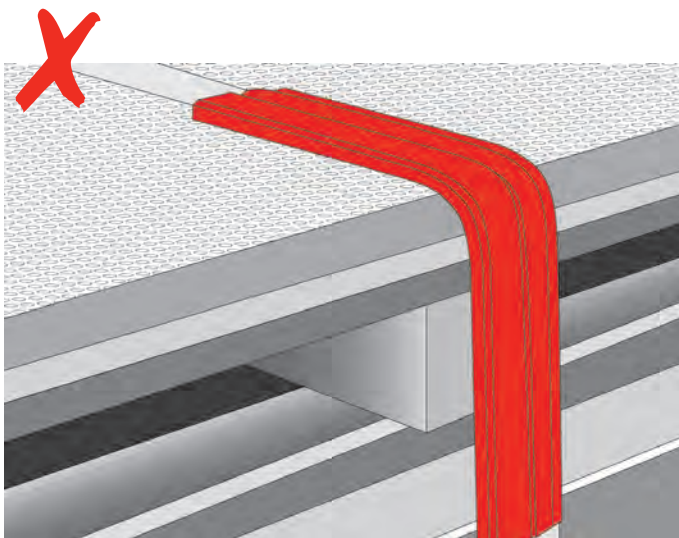
Cut and Abrasion Protection

Sleeve Cut/Abrasion Protection

	Cut Protection	Abrasion	Oil/Grease/Fuel
Webbing	No	Yes	Yes
PVC Hose	No	Yes	Yes
Leather	No	Yes	Yes
secutex® Polyurethane	Yes	Yes	Yes

Protection of lashing from sharp edges is critical and a sharp edge does not have to be a razor-like contact point. The use of protective sleeves can safeguard against cutting and prolong the life of lashing.

It is important to note that protective sleeves fall into two categories – cut protection and abrasion protection.

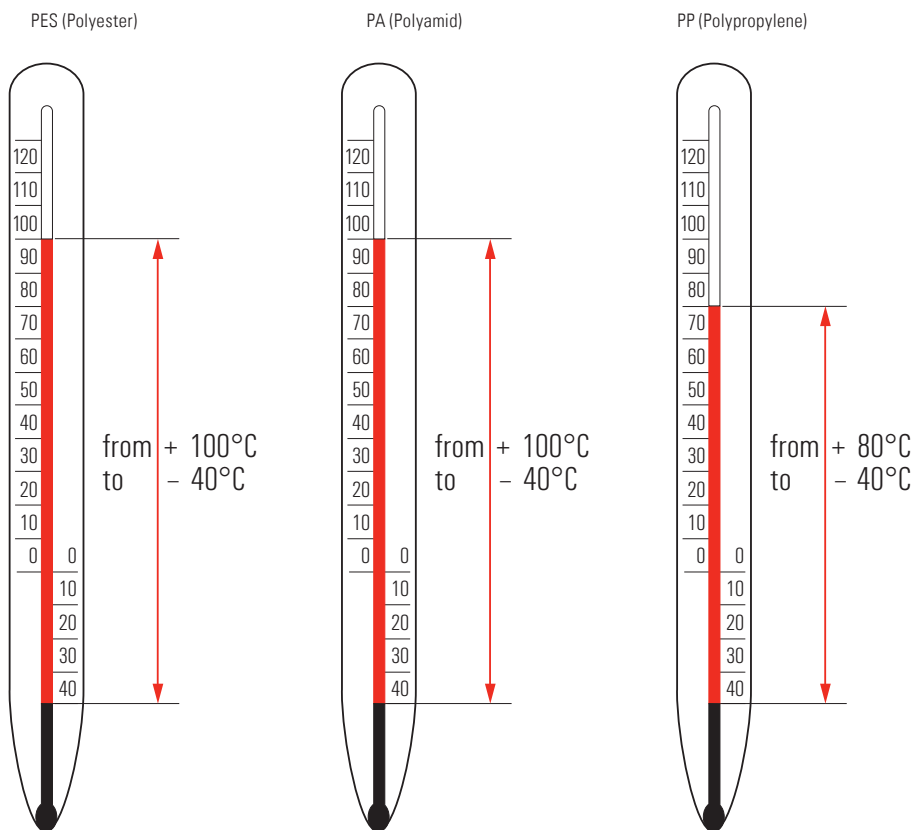


03.9 TECHNICAL INFORMATION

Load Dynamics
Tie Down Restraint
Direct Load Restraint
Curtain Sided Vehicles
Rubber Tyre Bounce
Pipe Transport
Vertical Rolls, Reels, Coils and Drums
Checking the Load
Sharp Edges
Cut and Abrasion Protection
Operating Temperatures



Operating Temperatures and Atmospheric Effects



Resistance to Ultra-Violet

In its level of resistance to sunlight (measured as a percentage of the original tensile strength), polyester may be regarded as a highly-resistant fibre.

Calculated on the basis of units of weight it has a considerably higher original strength than natural fibres, and since it is, generally speaking, more resistant to degradation by the action of steam, chemicals and micro-organisms, one finds in practice that polyester will give greater service life than many other fibres.

When exposed to ultra-violet behind glass, polyester exhibits a considerably higher resistance and is better than the majority of other fibres.

SpanSet ultra-violet stabilised polyester retained more than 95% of its strength after six months continuous exposure in the sunshine of Florida.



Atmospheric Effects

- The Effects of Various Substances
 - The Effects of Acids on Polyester
 - The Effect of Alkalis and Oxidising Agents on Polyester
 - The Effects of Chemicals and Solvents on Polyester
 - Lashing Deficiencies
 - Tensioning Devices
 - Handling the Load Securing Equipment
-

Atmospheric Effects

- The loss of strength is proportional to the duration of treatment
- Strength is lost at a rate of 0.12% per hour at 100°C or approximately 20% per week
- The level of reduction in strength increases or decreases by a factor of 1.082 per °C of temperature. This is equivalent to 1.082¹⁰ or 2.2 times per 10°C.

By applying these general principles it will enable an estimate to be made in the reduction of strength resulting from exposure to water or saturated steam for a measured period of time. For example, there is a reduction in the strength of $10 \times 0.12 \times 2.2$ or approximately 62% on exposure to saturated steam at a temperature of 150°C for 10 hours. In a similar way, a period of 5 hours spent in water at 94°C causes a reduction in strength of $5 \times 0.1211.08255$, or about 0.4%.

These examples should only be regarded as a general indication, since pre-treatment of a fibre may further alter the physical properties.

The Effect of Humidity

The normal moisture content of polyester is very low, whilst for nylon it is considerably higher.

As a result of the extremely low absorption of moisture by polyester its physical properties such as strength, elasticity and modulus vary only slightly in moist or dry conditions below 70°C.

On the other hand, nylon loses about 10-20% of its strength when wet accompanied by a change in the load/extension curve. After drying, the strength is, of course, regained.

The Effect of Water and Steam

The effect of steam on polyester is to cause hydrolytic breakdown with a consequent reduction in the mechanical properties of the fibres. The extent is dependent upon temperature and the duration of exposure.

In spite of polyester being a hydrophobic fibre, its attack by the moisture is a process which does not simply occur on the surface and this breakdown is believed to be the result of the shortening of the molecular chains throughout the fibre.

Unsaturated water vapour at temperatures in excess of 100°C occurs in some important areas of application, eg In the filtration of dust from gases, and it is necessary to be familiar with the effect of various levels of saturation and the incidence of related loss.

The table on page 108 shows the weekly (168 hours) percentage reduction in strength when polyester is exposed to a moist atmosphere at different levels of saturation ranging from 10 to 100% relative humidity.

Reduction in the strength of more than 100% is unrealistic, but these values have been included since they illustrate the deterioration at different levels of temperature and humidity and, therefore, may be used for estimating the damage which may occur in periods of less than one week.

The loss of strength in water is extraordinarily slow at normal temperatures. At 70°C it is barely noticeable after four weeks. The speed of deterioration increases with the temperature, and at 100°C the reduction of mechanical properties is significant in the long term, eg About 60% of the tensile strength is lost after three weeks' continuous immersion in boiling water.

Water saturated steam at 100°C causes the same strength loss and there is nothing to suggest that water in liquid form would have a different effect.

Sometimes tensile strength is not the only significant property, it is nevertheless the very factor which determines the length of service, and is a useful measurement of the changes occurring which provide a convenient yardstick for checking the durability of the fibre. The effect of water or saturate steam on polyester may be summarised as follows:

03.9 TECHNICAL INFORMATION

Load Dynamics
Tie Down Restraint
Direct Load Restraint
Curtain Sided Vehicles
Rubber Tyre Bounce
Pipe Transport
Vertical Rolls, Reels, Coils and Drums
Checking the Load
Sharp Edges
Cut and Abrasion Protection
Operating Temperatures



The Effects of Various Substances

Perspiration

Neither acidic nor alkaline synthetic perspiration formulations have any effect on the strength of polyester or nylon.

Cooling Agents

Dichloro-difluor-methane (Arcton 6 or Freon 12) and monochloro-trifluor-methane (Arcton 4 or Freon 22) are commonly used in refrigeration plant. Immersion for six months in these substances has a scarcely noticeable effect on the strength of polyester within the temperature range - 20°C to + 20°C, although some swelling does occur in the latter substance.

Attack by Micro-organisms and insects

Since neither polyester nor nylon are digestible as an animal feedstuff, their resistance to bacteria, fungi, termites, silver fish, moth larvae, etc, is excellent. It should be remembered, however, that certain fungi and bacteria are capable of growth even on the very small amounts of impurities which may be found on the surface of the fibres which make up the yarns and fabrics.

Although this has no effect whatsoever on the tensile strength of the material, it is nevertheless possible for the substances produced by these organisms to give rise to discolouration of the polyester sling.

Dimethyl Phthalate

Although dimethyl phthalate quickly dissolves polyester at boiling point, this substance has little effect at ambient temperatures. Total immersion for one month at 30°C does not bring about any reduction in strength.

Phenols

The number of substances capable of dissolving polyester at ambient or moderate temperatures are limited, the only class of chemicals capable of this are the phenols. The majority of phenols either cause polyester to swell or cause dissolution, depending on the level of concentration and the temperature.

At normal temperatures, there is good resistance to the dilute forms of phenols, such as wood tar-derived creosote which may contain up to 20% of phenol substances. Polyester fibre which was stored in creosote at 30°C for six months exhibited an insignificant reduction in strength. At 50°C the loss is still less than 10%, but increases to 25-50% at 70°C.

Thus at normal temperatures, creosote impregnation should not cause serious damage to polyester. The phenols, in particular carboic acid, metacresole and creosolic acid, are solvents of nylon. In low concentrations in water, their effect is usually slight, although a certain amount of shrinkage of the nylon yarn does occur.

Hydrocarbons

Fuel at Room Temperature

Substance	Residual strength in % after exposure for 28 weeks	
Petroleum	100	100
Regular Petrol	100	100
Premium Petrol	100	100
Diesel Oil	100	100
Benzene	100	100
Jet Fuel JP1	100	100
Jet Fuel JP4	100	100
Iso-Octane	100	100

Atmospheric Effects

The Effects of Various Substances
The Effects of Acids on Polyester

The Effect of Alkalis and Oxidising Agents on Polyester

The Effects of Chemicals and Solvents on Polyester

Lashing Deficiencies

Tensioning Devices

Handling the Load Securing Equipment



The Effects of Acids on Polyester

Inorganic and Organic Acids

Certain chlorine-containing organic acids have the effect of dissolving Polyester. Mono-, di- and trichloroacetic acid dissolve all polyesters at temperatures in excess of their fusion points, respectively 63°, 10° and 55°. The solution occurs rapidly at 100°C and in the case of dichloroacetic acid, this occurs even at normal room temperature.

The acidic hydrolysis of polyester is not a surface reaction, but continues to act upon the molecules throughout the entire fibre. It is followed by a reduction in the strength of the fibre and of the strain as well as in the Index of Viscosity (IV).

The reduction in the strength of the fibre varies widely depending upon the nature, the concentration and the temperature of the acid.

The Effects of Inorganic and Organic Acids

Substance	Temp C°	Breaking Strength						
		10%	20%	30%	40%	50%	60%	70%
Nitric Acid	20	100	100	100	99	97	96	
	60	96	89	66	30	0		
	pH 0.5	75	70	50	0			
	100	60	0					
Sulphuric Acid	20	100	100	100	100	100	100	100
	50	100	100	100	100	100	97	92
	pH 0.5	75	100	100	98	90	72	0
	100	99	96	81	42			

Substance	Temp C°	Concentration (%) of				
		2.5	5	10	20	30
Hydrochloric Acid	20	100	100	100	100	100
	50	100	100	100	98	78
	pH 0.5	75	100	100	98	66
	100	100	91	54	5	0

Substance	Temp C°	Concentration (%) of				
		10	20	30	50	70
Formic Acid	20	100	100	100	100	100
	50	100	100	100	100	100
pH 1.6	70	100	100	100	100	100

The Effects of Acids on Polyester

03.9 TECHNICAL INFORMATION

Load Dynamics
Tie Down Restraint
Direct Load Restraint
Curtain Sided Vehicles
Rubber Tyre Bounce
Pipe Transport
Vertical Rolls, Reels, Coils and Drums
Checking the Load
Sharp Edges
Cut and Abrasion Protection
Operating Temperatures



The Effects of Alkalis and Oxidising Agents on Polyester

The Effect of Oxidising and Reducing Agents

Polyester fibre has a very high resistance to oxidising and reducing agents and the fibre will withstand stronger bleaching processes than those normally used for textile fibres. Polyester products may be exposed without harm to any of the common bleaching agents, including those based upon hypochlorite, chlorite, hydrogen peroxide, the per-salts and reducing sulphur compounds.

The Effect of Alkalis

Alkalis, acids or simply water can all cause the hydrolysis of a polyester such as, for example, polyethyleneterephthalate, but the cause of the reaction and its effect on the fibre is not the same in each case.

The effect of alkalis in an aqueous solution, with the exception of ammonia and its derivatives, is quite different, producing the progressive dissolution of the fibre, whilst water, acids, ammonia and its derivatives, eg Quaternary ammonium bases and amines break down the fibre without dissolving it.

Calcium Hydroxide (Lime)

In spite of the fact that it is possible to obtain only weak solutions of lime, its effect still seems to be 13 times more rapid than that of caustic soda under similar conditions, its effect on polyester is considerable and the loss of strength is significant.

Sodium Hyperchlorite

The resistance of polyester to sodium hyperchlorite under the conditions to which textiles are normally exposed to it, is excellent.

Sodium Chlorite

Boiling for one hour in a 0.2% solution of sodium chlorite at pH 2-3 has no effect on the tensile strength of polyester.

Sodium Hydrosulphite

Those reducing agents which are normally used in textile processes have no noticeable effect on polyester. Treatment for 72 hours at 80°C in a saturated solution of sodium hydrosulphite causes no reduction in the strength of the fibre.

Potassium Dichromate

Polyester which has been treated for 3 days at 80°C in a saturated solution of potassium dichromate to which has been added 1% (weight/volume) of sulphuric acid exhibits a very insignificant change in its properties, the loss of strength being, for example, less than 5%.



- Atmospheric Effects
- The Effects of Various Substances
- The Effects of Acids on Polyester
- The Effect of Alkalis and Oxidising Agents on Polyester**
- The Effects of Chemicals and Solvents on Polyester
- Lashing Deficiencies
- Tensioning Devices
- Handling the Load Securing Equipment

The Effects of Alkalis and Oxidising Agents on Polyester

The Effects of Alkalis

Substance	Time in Hours	Temp C°	Residual strength in % at a concentration of		
			1%	3%	5%
			pH 12.7	pH 12.6	pH12.5
Caustic Soda	50	20	98	94	80
	50	50	93	91	71
NaOH	50	75	85	52	12
	50	100	62	-	-

Substance	Time in Hours	Temp C°	Concentration (%) of					
			1	2.5	5	10	20	25
Ammonia	50	20	100	100	100	100	100	100
HNO3	50	50	100	100	98	95	60	55
	50	75	100	70	0	50	0	0

Substance	pH	Residual strength in % after 1-12 months at room temperature			
		1	3	6	12
Concentrated Ammonia 20%	13.4	0	3	0	0
Calcium Hydroxide 50%	12.4	92	64	29	0
Potash-Lye Concentrated 40%	14.0	0	0	0	0
Soda Lye 0.1%	12.1	100	100	100	94
Soda Lye 15%	12.1	0	0	0	0
Soda Lye Concentrated 30%	11.2	0	0	0	0

03.9 TECHNICAL INFORMATION

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The Effects of Chemicals and Solvents on Polyester

Chemicals

Danger Classes

- 0 Solvents, Salts, Artificial Fertilizers
- 1 Inorganic Acids
- 2 Alkalis

The danger classes have the following significance:

- 0 Has no effect on polyester at temperatures below 50°C.
- 1 May be used in combination with polyester in regulated forms at temperatures below 30°C, during a maximum continuous period of use of 2 days. Where this continuous period of use is less than two days, higher concentrations of the acids and/or higher temperatures can be tolerated, since the degradation formula for the polyester may be written as:

Concentration x time x temperature
 = resistance to degradation.

- 2 May not be used in combination with polyester.

Phenols in concentrations above 20% and above ambient temperature will dissolve polyester. This also applies to Hexylamine. However, the salt, Ammonium Sulphide, is an exception, since it is highly destructive to polyester.

Organic acids such as common acetic acid, for example, do have an effect on polyester, although it is negligible. The exception is mono-di and trichloroacetic acid.

Polyester tolerates Sodium Carbonate.

Organic Solvents

Both nylon and polyester fibres exhibit a high level of resistance to the majority of common organic solvents. Examples of these, including those which are normally used for dry-cleaning, are as follows: acetone, dioxane, ether, methanol, ethanol, benzene, toluene, xylene, petroleum ether, methylene chloride, chloroform, carbon tetrachloride, perchloroethylene and trichloroethylene.

At room temperature, these have an insignificant effect on the strength of either polyester or nylon. Immersion for six months in methanol at 30°C results in very little reduction in strength, whilst the reduction at 50°C is 15%.

Nylon is capable of reacting with methanol under acidic conditions to give a weaker, more elastic yarn with a considerable increase in the diameter of the filament.

Neither nylon nor polyester should be heated for long periods in alcohol or in other compounds of esters, since this will cause an exchange of esters which will break down the polymer.

Residual Strength of Polyester with Organic Solvents

Substance	Temp °C	Residual strength in % after 7 days
Amyl Acetate	60	100
Benzaldehyde	60	100
Butyl Alcohol	60	100
Chloramine	60	100
Chloroform	60	100
Dimethyl Sulphoxide	60	100
Epichlorhydrin	60	100
Formaldehyde	60	97
Formamide	60	100
Freon 11	20/40	100
Freon 12	20/40	100
Freon 22	20/40	100
Fuel Oil	100	100
Hexylamine	60	0
Motor Oil	60	100
Styrene	60	100
Powdered Carbon Tetrachloride	60	100
Trichloroethylene	60	100
Xylene	60	100

Atmospheric Effects

The Effects of Various Substances

The Effects of Acids on Polyester

The Effect of Alkalis and Oxidising

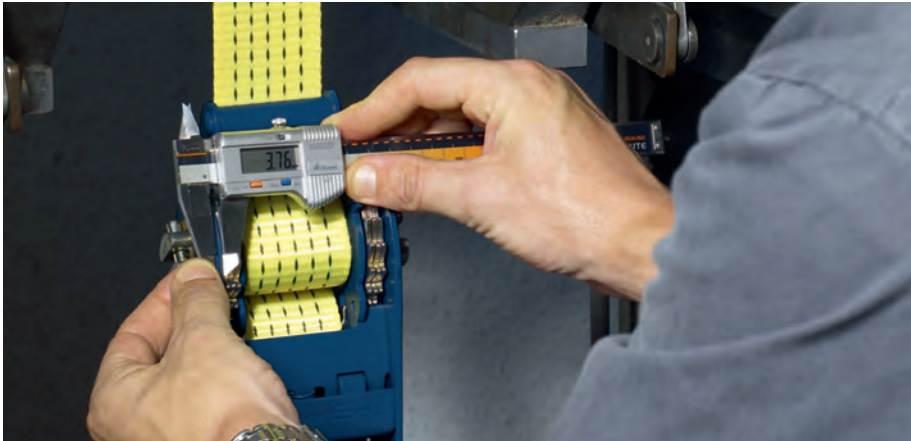
Agents on Polyester

The Effects of Chemicals and Solvents on Polyester

Lashing Deficiencies

Tensioning Devices

Handling the Load Securing Equipment



Lashing Deficiencies

Lashing straps should no longer be used if the following deficiencies are present:

Webbing

- Incisions greater than 10 % at the web edge or excessive wear, since repair is then no longer possible
- Damage to the seams
- Deformation from heat
- Contact with aggressive substances, if not expressly approved by the manufacturer
- Illegible data on the label.
- Missing label. Use only load-securing equipment bearing a label
- Unidentified lashing equipment with illegible or missing labels must be withdrawn from use.



More than 10% cut in webbing



Worn and illegible label



Chemical burns from acid

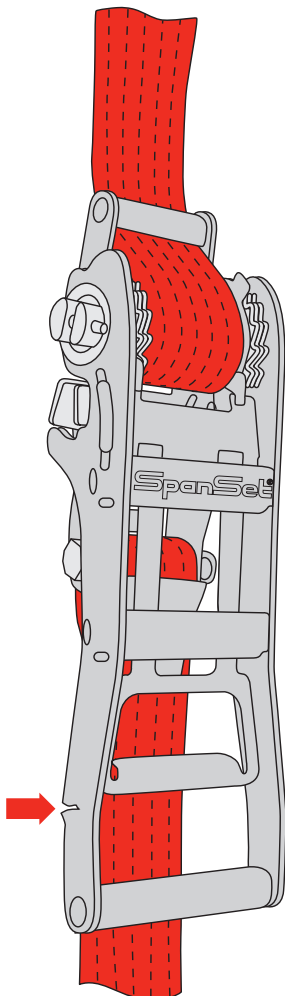
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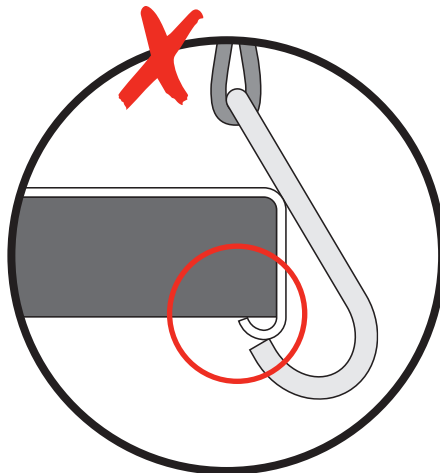
Tensioning Devices

Deformation of the tensioning element at the slotted shaft or of the locking slider, wear of the sprockets or broken ratchet handle.

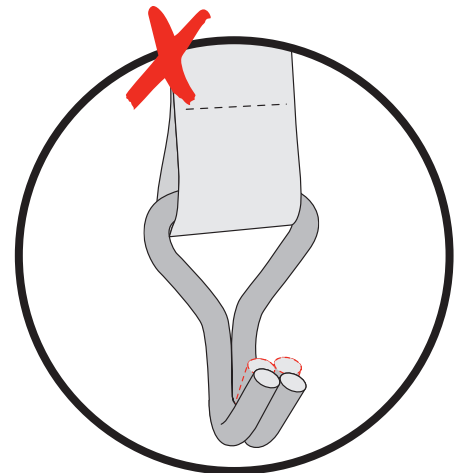


Connection elements

- Widening of the hook by more than 5%
- Cracks
- Fractures
- Considerable corrosion
- Permanent deformation. Lashing hooks must not be loaded at their tips unless the hooks are specially designed for this purpose, otherwise the lashing equipment will no longer be functional.



Don't mount loads on the hook point



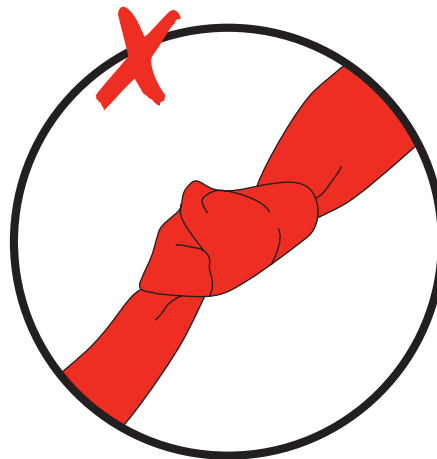
Don't use bent end fittings - remove from service



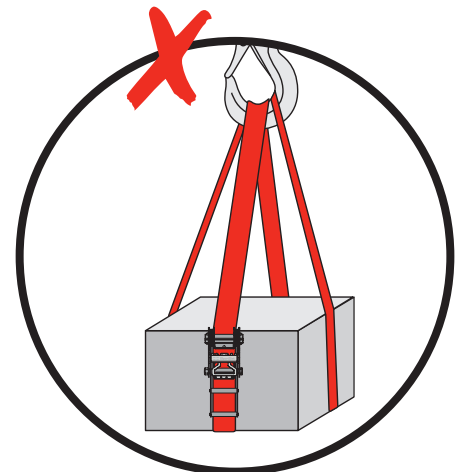
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Handling the Load Securing Equipment

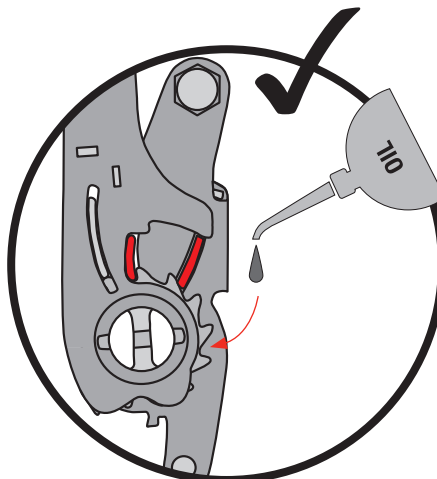
- The lashing strap should only be used by suitably trained personnel.
- Wash in a mild detergent and allow to dry naturally.
- Tensioning devices should be regularly cleaned and lightly lubricated in the vicinity of the sprockets (be sure not to lubricate the places to which the belt is applied; the belt can otherwise slip through and release the load).
- Lashing equipment must not be overloaded, since overloading will lead to breakage of or damage to the lashing equipment.
- Do not use lashing equipment for lifting purposes, as it is not designed for this use.
- Never knot lashing equipment, since considerable loss in strength can result.



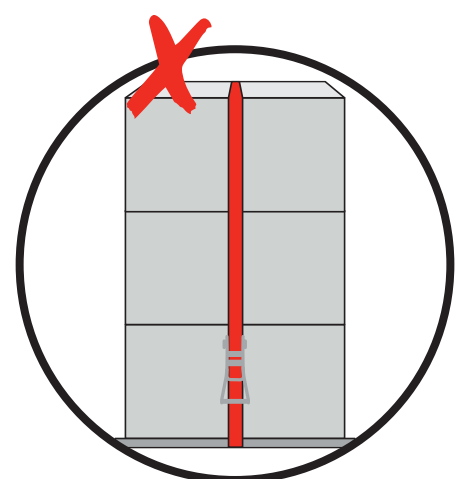
Don't tie knots in lashing webbing



Don't use lashing for lifting purposes. Use a sling.



Clean and lubricate the tensioner sprockets



Don't overload lashing

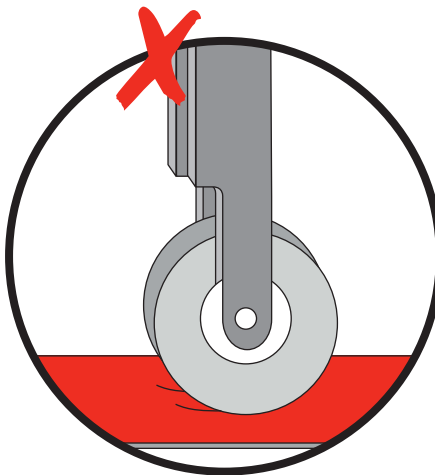
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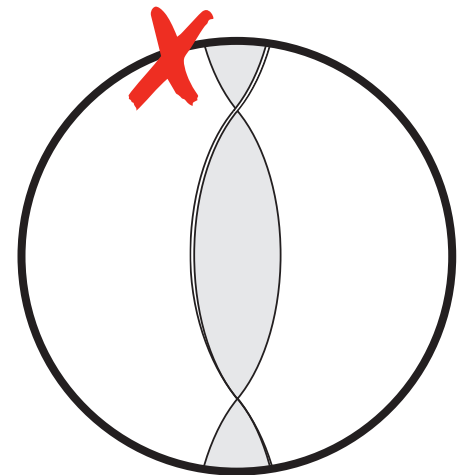


Handling the Load Securing Equipment

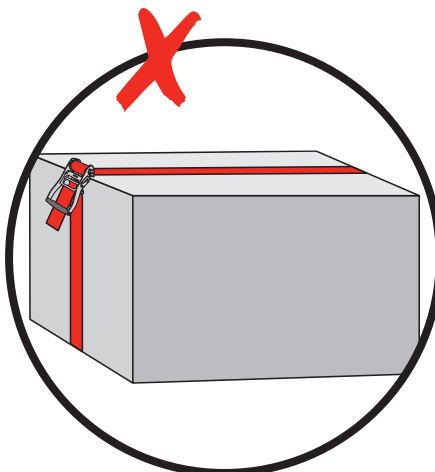
- Do not crush or run over lashing equipment. This can result in considerable loss of strength
- Use only lashing equipment that is not twisted when tensioning
- To avoid stress on tensioning devices and fasteners, do not lay them across edges, otherwise they may fracture. Tensioning devices operating according to the winding principle must not be subjected to less than 1.5 or more than 3 turns of the clamping device (webbing) since with less than 1.5 turns the belt can slip through and with more than 3 turns crushing of the belt begins. In both cases, it is no longer guaranteed that it works.



Don't run over lashing



Don't twist the lashing



Don't lash over edges

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