LOAD RESTRAINT GUIDE

2018

NTC AUSTRALIA

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Load Restraint Guide 2018

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Level 3, 600 Bourke Street

Melbourne VIC 3000

Phone: (03) 9236 5000

Email: enquiries@ntc.gov.au

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PIPES, TUBES, RODS AND BARS

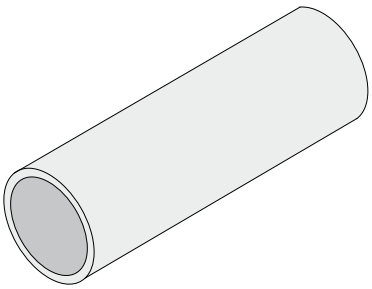
Round pipes, tubes, rods and bars are manufactured in various forms and lengths – including metal and plastic in long lengths and reinforced concrete in short lengths.

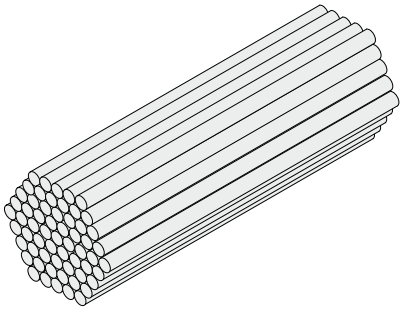
These types of items can roll around if not restrained properly. Metal and plastic are also low-friction materials that make these load items more slippery than items made of high-friction materials. These load items need to be restrained using specific methods to limit their movement sufficiently.

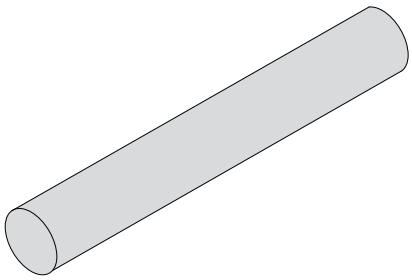
This guide provides general tips to apply to all round lengths. Extra guidance is also provided for pipes on scalloped dunnage, cradled pipes, loose lengths between stanchions, pipes on flat dunnage, unitised bundles, mixed loads of bundled items, long-length items and short-length items. Pipes and other round items may fall into more than one of the specific categories outlined above. Make sure you review the appropriate checklist(s) for your load.

The checklists below set out how you can meet the Performance Standards when restraining pipes, tubes, rods and bars. They are a guide only. You can restrain using other methods. It is recommended that an engineer certifies alternative methods.

Diagrams are indicative only. For more information on restraint equipment see Vehicles and equipment. To work out how many lashings to use, see the worked examples (in Working out load restraint) and Technical advice.







GENERAL TIPS FOR ALL ROUND LENGTHS

- Check the number and type of lashings are appropriate for the size of the load.
- Check all items are restrained to prevent any items sliding out of the pack – *Figure 109*.
- Restrain loose pipes individually if the external lashings do not effectively clamp all pipes.
  - ⚠ Tie down lashings may not provide sufficient sideways restraint for loose pipes loaded on dunnage or nested – *Figure 110.*
- Restrain loose pipes sideways with suitably engineered stanchions.
- Use interlayer packing material (such as timber or rubber matting) to increase friction between individual sections.
  - ⚠ Items with smooth surfaces (low friction) are difficult to restrain using tie-down.
- Protect spigoted, socketed, threaded, bevelled or flanged ends using a suitable packing material.
- When tying down fragile loads, use webbing lashings or appropriate protectors if using ropes or chains, to prevent load damage.
  - ⚠ Soft or crushable loads can be damaged by restraint equipment – particularly chains – *Figure 111*.

Figure 109 Smaller pipe will be clamped once lashing is tensioned

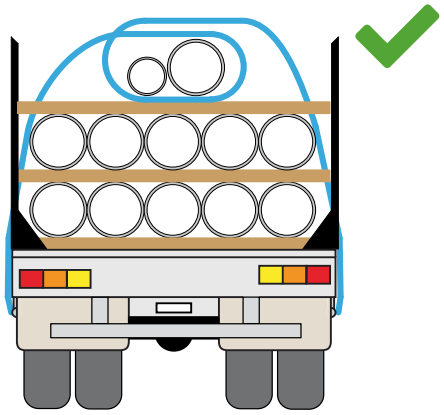


Figure 110 Limited clamping on the centre pipe

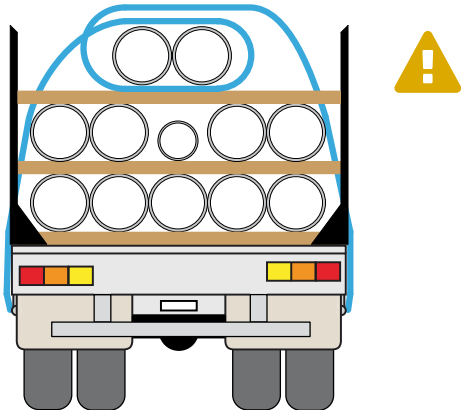
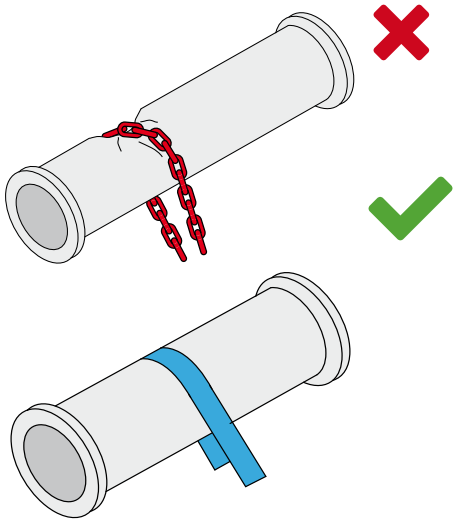


Figure 111 Fragile freight



PIPES ON SCALLOPED DUNNAGE

- Use scalloped dunnage, unitised bundles or containers if transporting large quantities regularly; this can reduce transport costs, product damage and loading/unloading time.
- Use dunnage that is scalloped top and bottom to prevent pipes rolling during transport and loading/unloading – *Figure 112*.
  - ⚠ Pipes can roll sideways if the scallops are not deep enough – *Figure 113*.
  - ⚠ Side pins, posts or stanchions may be required to prevent lengths rolling during loading/unloading – *Figure 114*.
- Use stanchions that are suitably engineered to withstand impacts from loading and unloading equipment in addition to restraining the load.
- ℹ Loads on scalloped dunnage that are sufficiently tied down to resist sideways forces do not require stanchions for sideways restraint during transport – *Figure 115*.
- Load a maximum of two pipes on the top layer unless the load is blocked forwards and rearwards – *Figure 116*.

Figure 112 Scalloped dunnage

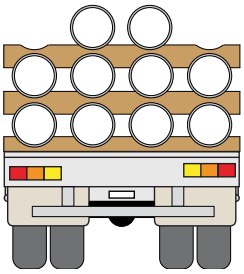


Figure 113 Scallops not deep enough

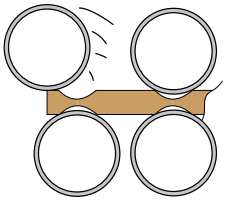


Figure 114 Side posts for loading/unloading

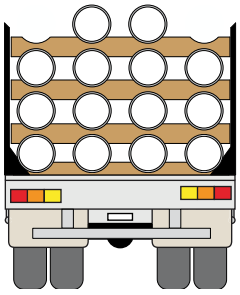


Figure 115 Crowned load

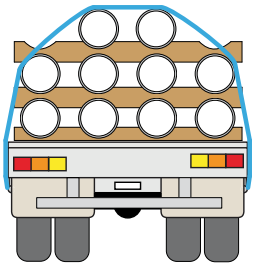
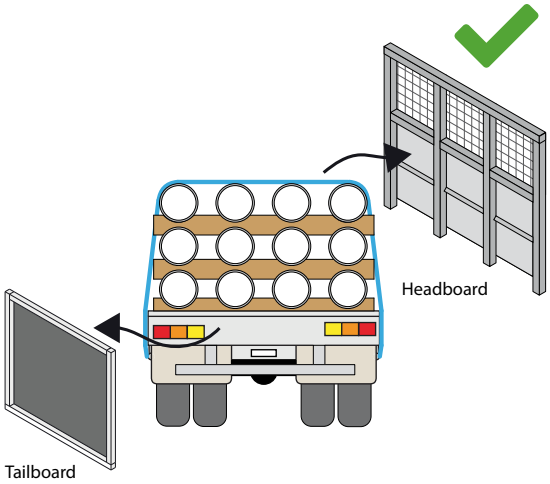


Figure 116 Flat load with blocking

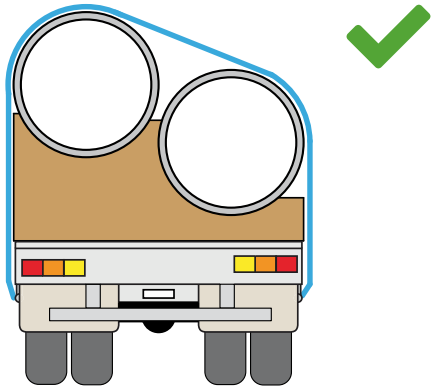


More than two pipes can be loaded on top when blocking is used

CRADLED PIPES

- Tie down large diameter pipes on specially fabricated cradles or racks to prevent rolling and to distribute the weight evenly over the vehicle – *Figure 117*.
- Pipe cradles and racks may need to be secured independently of the load because the tie-down lashings may not prevent the rack toppling.
- To determine the dimensions of scallops and cradles see Chocks, cradles and A-frames.
- Reduce cornering speeds when transporting high-centre-of-mass loads.
- Loads with a high centre of mass are less stable and more prone to causing vehicle rollover.

Figure 117 Cradled pipes



LOOSE LENGTHS BETWEEN STANCHIONS

- Use suitably engineered stanchions that can restrain the whole load sideways – *Figure 118*.
- Restrain every pipe in the load with a minimum of two stanchions on each side of the load.
- Check the pipes extend at least 300 mm beyond the outer stanchions in the forward and rearward directions – *Figure 119*.
- Place longer lengths towards the outside of the stack and shorter lengths in the centre.
- Don't extend the top pipes more than half their height above the top of the stanchion.
- Block loads forwards and rearwards because clamping may not be effective for all pipes – *Figure 120*.

Figure 118 Trailer with stanchions

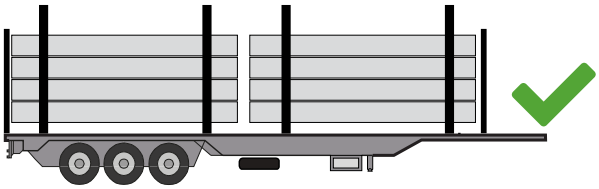


Figure 119 Minimum engagement

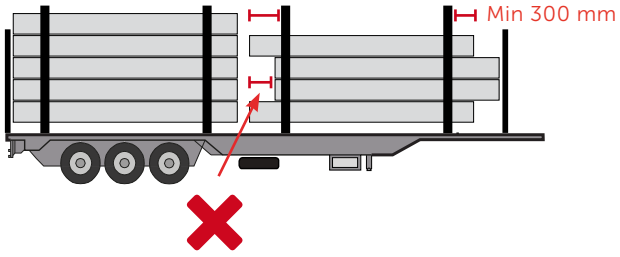
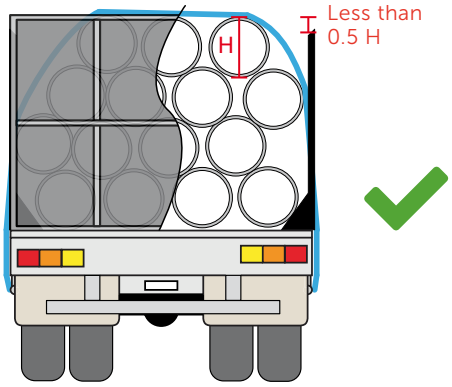


Figure 120 Blocking



Load blocked, top lengths less than 0.5 H above stanchions

PIPES ON FLAT DUNNAGE

- Check stanchions used with tie-down lashings are suitably engineered to accept sideways forces.
- Crown the load (i.e. ensure there are no gaps in the top layer), and check all pipes are clamped by tie-down lashings – *Figure 121.*
  - ⚠ If crowning is not used, some pipes on the top layer may be unrestrained – *Figure 122*.
- Loads contained sideways should be blocked forwards and rearwards.
  - ⚠ If loads are unblocked forwards and rearwards, apply belly-wrapped *Figure 123*, opposed loops *Figure 124* or load-choked *Figure 125* lashings.
  - ⚠ Friction between the pipes should be high if pipes are not blocked forwards and rearwards.

Figure 121 Crowned load

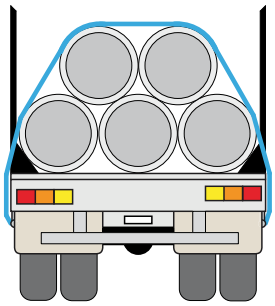


Figure 122 Flat-topped load

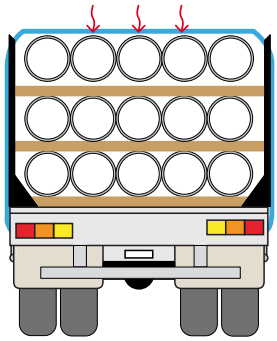


Figure 123 Belly-wrapped load

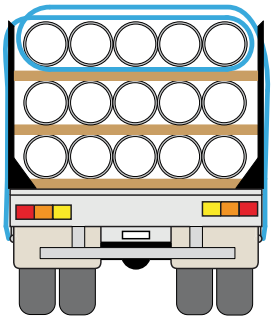


Figure 124 Opposed loops

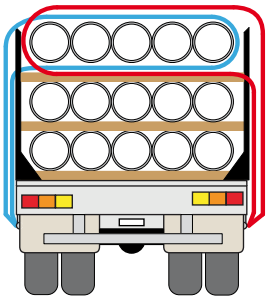


Figure 125 Load choked