

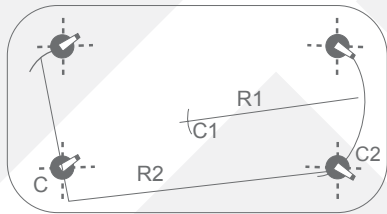
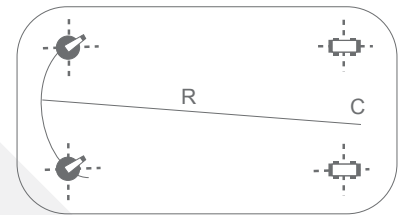
13.0 Castors

13.1 Examples of Possible Castor Arrangements

2 Swivel Castors and 2 Fixed Castors

Providing good load capacity and manoeuvrability, this arrangement ensures accurate steering even on long straight runs, making it the most practical arrangement for industrial use. Any trolley with this castor arrangement should be pushed with the fixed castors leading

Maximum loading =  $\frac{\text{Gross Load}}{3}$   
for each castor



4 Swivel Castors

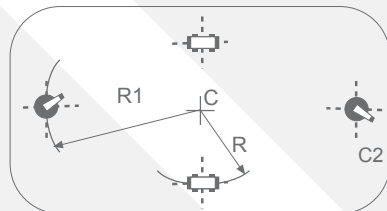
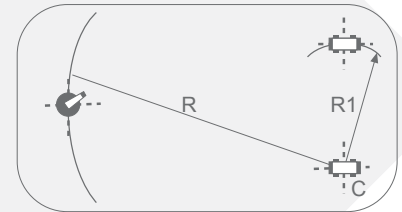
As this arrangement gives good load capacity with exceptional manoeuvrability, it is suitable for winding runs and where sideways action is required. It is not recommended for straight runs or ramps, as it may be hard to guide, especially over bumpy terrain and when heavily loaded. However, equipping two castors with directional locks makes this arrangement very versatile and suitable for long straight runs.

Maximum loading =  $\frac{\text{Gross Load}}{3}$   
for each castor

1 Swivel Castor and 2 Fixed Castors

This arrangement provides an economical solution for lightly loaded trolleys requiring good manoeuvrability. The trolley must be reasonably small in size and any load must be evenly distributed to ensure stability.

maximum loading for each castor =  $\frac{\text{Gross Load}}{2.5}$



2 SWIVEL Castors and 2 Fixed Castors centrally pivoting

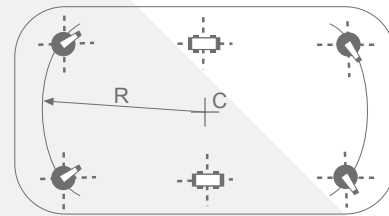
Ideal for confined spaces this arrangement provides good load capacity with excellent manoeuvrability. The fixed castors can be replaced by an 'A' series axle assembly and wheels which pivot the trolley centrally. In this case, 25mm of packing is necessary above the two fixed castors (wheels) to give alternating load support. However if the trolley is tipped or the load is not evenly distributed the swivel castors are subjected to shock loads.

The entire load rests on the two central, fixed castors/wheels

Maximum loading for each wheel/castor =  $\frac{\text{Gross Load}}{2}$

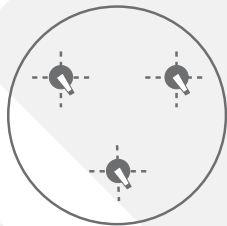


4 Swivel Castors and 2 Fixed Castors centrally pivoting  
 This arrangement provides an extremely high load capacity, with great manoeuvrability and stability. This is ideal for very long trolleys destined to carry heavy loads. The fixed castors can be replaced by wheels mounted onto a central 'A' series axle. The units base must be robust and the swivel castors are mounted to allow the trolley to pivot on the central wheels. Therefore, 25mm of packaging is required above the two fixed castors(wheels) to give alternating load support, depending on which pair of wheels is in contact with the floor. The entire load rests on 2 central, fixed castors/wheels.



Please note that the swivel castors are subjected to shock loads if the trolley is tipped or the load is not evenly distributed.

$$\text{Maximum loading for each wheel/castor} = \frac{\text{Gross Load}}{2}$$



3 Swivel Castors  
 This provides good load capacity with excellent manoeuvrability, However equipment with this arrangement will be difficult to guide on straight runs particularly over uneven ground

This arrangement is ideal for barrel dollies and small portable machines.

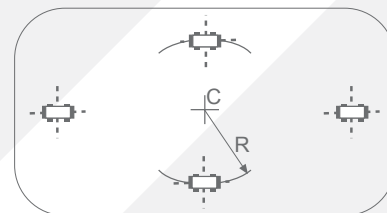
$$\text{Maximum loading for each wheel} = \frac{\text{Gross Load}}{2.5}$$

13.1

13.1.1

**2 Fixed Castors centrally pivoting**

Suitable for moderate loads and long, straight runs with occasional changes in direction. The two central fixed castors can be replaced by wheels mounted onto a central 'A' series axle. The two end castors are mounted as to pivot the trolley centrally, 25mm of parking is necessary above the central castors (wheels) to give alternating load support. However if the trolley is tipped or the load is not evenly distributed, the end castors are subject to shock loads. The entire load rests on the 2 central, fixed castors/wheels.



$$\text{Maximum loading for each wheel/castor} = \frac{\text{Gross Load}}{2}$$

13.1.2 Correct alignment of castors

- 1) Fixed and directional lock swivel castors - the mounting holes in the top plates are clearance holes and it is essential to align the castors to sign the castors correctly before the bolts are finally tightened.
- 2) Swivel castors - It is essential they are mounted with the swivel axis vertical

13.1.3 IMPORTANT NOTE The formulae above for the maximum loading for each castor is for an equally distributed load.

13.2 Load rating

13.2.1 Limitations to stand maximum load rating for each model number:-

- a) Untyred wheels - refer to design data para 2.0
- b) rubber tyred wheels - refer to design data para 3.0
- c) Polyurethane tyred wheels - refer to design data para 4.0



13.2.2 Floor Conditions

The stated maximum load rating for each model assumes that the floor is reasonably level and free from cracks, obstructions, guide rails, gullies etc.

If any of the above are present on the operating environment then a castor with a load rating several times greater than calculated must be used. In addition the wheel diameter must be large enough to easily manoeuvre over cracks, ridges and other obstructions.



13.3 Manual Propulsion

The generally accepted effort an average human is capable of exerting is:

- a) 18 kg f for moving from a standing start
- b) 12 kg f for a short distance once in motion
- c) 6 kg f for longer distances on travel

For inertial and rolling resistance, refer to design data para 8.0 and for fraction design para 9.0

13.4 Power Towing

Pressed steel castors are designed specifically for manual propulsion, the OZ, WG, P, X and Y series castors are designed for power towing when wheels are fitted with taper roller bearings.

Obstructions such as kerbs and gullies and even relatively small steps, can exert enormous impact loads which can damage a castor. Steps such as lit sills, drains covers and joins in concrete slabs, present a particular problem if they are not approached squarely and at low speeds. Approaching such obstacles obliquely makes the castor turn at right angles to the obstruction instead of turning in such a way that can climb over it, this damages the castor.

Towing trailers in train increases the problem as only one castor may have to withstand the force generated by the mass of the whole train including the tractor.

When towing trailers in train the diagram below illustrates the position of the pin couplings relative to the rear fixed castor to ensure the weight of the trailer and its contents are evenly distributed between the front swivel castors and rear fixed castors as well as ensuring good tracking.

