

## GENERAL INFORMATION

Designers need to take a number of different factors into account to achieve the best possible results: a wheel that fully meets the real demands of the workplace drastically reduces overall material handling costs. In order to assess whether a product satisfies the requirements it is essential to examine the following factors in detail: maximum load, floor (condition and type), rolling resistance, speed, temperature and any other working conditions.

### MAXIMUM LOAD

This is the load to be carried plus the weight of the truck or trolley. In the case of a four-wheeled truck or trolley, one can only be sure that three of the wheels will be in contact with ground at any given moment, so the maximum load on each wheel is calculated by dividing the maximum total load by 3, using the following formula:

$$Q = (P_u + P_a) : n$$

where:  $n$  = Minimum number of wheels always in contact with the ground  
 $P_u$  = useful load  
 $P_a$  = weight of truck/trolley  
 $Q$  = Maximum load on each castor (theoretical)

One also needs to take into account the possibility of uneven load distribution by adopting a safety margin that ensures that the effective load never exceeds the theoretical load even in the event of overloads. Select a wheel or castor that has the same or a higher capacity than the maximum theoretical load calculated using the formula above. The actual load capacity of the wheels with PA6 (nylon) hub will be reduced at 50% of the nominal admissible load when used at temperatures above 60°C (140°F).

### FLOOR

It is preferable to choose wheels with an elastic rubber or soft polyurethane tread for floors with a rough surface (grating, porphyry, asphalt, etc.) or which are in poor condition; while wheels with a hard tread can be used on hard and compact floors (cement etc.). Relatively fragile floors (tiles, ceramic etc.) require the use of suitable rubber or polyurethane tyre wheels chosen according to the load being transported and the amount of protection required.

### ROLLING RESISTANCE

The rolling resistance decreases with the increase of the hardness of the tyre and/or diameter of the wheel. The type and condition of the floor also influences the rolling resistance, with the best results being obtained on hard and compact surfaces that are in excellent condition. Smooth running can be improved still further by using wheels with ball bearings instead of the more economical solutions adopting roller or plain bearings. Manually operated trolleys should use large diameter wheels with suitable bearings to avoid excessive operator effort (especially if they have to be moved for some distance) even though it will result in higher load capacity than the maximum load calculated using the system described above.

Rolling resistance is always greater at the start: it can be as high as 60-80% greater after a long stop under load.

### SPEED

The speed at which the truck or trolley moves strongly influences the wheel or castor load capacity. All the values shown in this catalogue are for a maximum speed of 4 km/h and manually propelled applications. Higher speeds will reduce the load capacity, thus making it necessary to choose wheels with a higher load capacity. If the trucks are being moved by mechanical means, it will be necessary to choose an appropriate type of fork assembly (with hardened precision bearings) and ensure that it is positioned for maximum vehicle stability as well as optimum load distribution. Choosing the appropriate swivel assembly will also avoid the shimmy problems encountered at higher speeds.

### TEMPERATURE

For applications at temperatures outside the normal range (+15°C to 28°C) be sure that the chosen wheel or castor can meet the required working conditions. In the case of cold-storage rooms, for example, where the trucks/trolleys are likely to remain stationary for long periods at temperatures as low as -40°C, you will need to use specially lubricated monolithic wheels. Low temperatures can stiffen normal elastomers and damage the bonding of the tyre on the core. In the case of trucks or trolleys which need to stand in ovens for long periods at temperatures from +80°C to +270°C it is necessary to use appropriate wheels or castors suitable for this application.

### ADVERSE CONDITIONS

Holes, tracks, steps, gate guides, unlevelled hoist doors and similar obstacles make it advisable to use elastic rubber or soft polyurethane tyre wheel with the largest possible diameter. Swarf, glass fragments, foundry slag and sundry residues require steel or cast iron wheels or wheels with a polyurethane coatings. If oil, grease, humidity or specific corrosive chemicals are present in the work environment, monolithic nylon or polyurethane coated nylon wheels (for greater protection of the floor and lower noise levels) should be chosen.

The information concerning the resistance of the materials to the most common chemicals have to be considered as indicative only, since the resistance to these chemicals depends from various factors such as their concentration, the temperature, the humidity, the length of contact, etc. The mixture of two or more chemicals may cause different effects from those given for the single substance. If in doubt please contact our technical department.

**The information presented herein is the result of our experience and is provided purely by way of example, such that we decline all responsibility regarding the consequences of its application. Please contact our technical service concerning any special application.**

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