CONMET Technology Bulletin



# Wheel End Load Ratings for Hubs Used in Single Tire Applications

Single tires impose different loading conditions on the hub, bearings and axles when compared to normal duals. As a result, the hub load ratings change according to wheel outset. This bulletin details hub load ratings for trailer hubs (SAE N and P type) and drive hubs (SAE R type) with single wheel outsets ranging from 0" to 7". This bulletin is valid for hubs used with drum brakes or disc brakes.

Wheel offset is a term referring to the geometry of the wheel; it can be either outset or inset. Both are calculated as the distance from the centerline of the wheel to the wheel mounting surface. The wheel is outset when the centerline of the wheel is outboard of the wheel mounting surface. The wheel is inset when the centerline of the wheel is inboard of the wheel mounting surface. The hub load ratings calculated here are based on an outset condition only. This outset condition increases the bending moment (load) on the hub and correspondingly lowers the hub rating. Inset wheel conditions are not included.

*MEASURING WHEEL OUTSET (Refer to following figure)*

To determine the outset of a single wheel, measure the wheel width (dimension A). Measure the distance from the outboard wheel edge to the wheel mounting surface (dimension B). Use the formula below to calculate wheel outset (dimension C).

$$B - \frac{A}{2} = C$$

Wheel Outset Formula

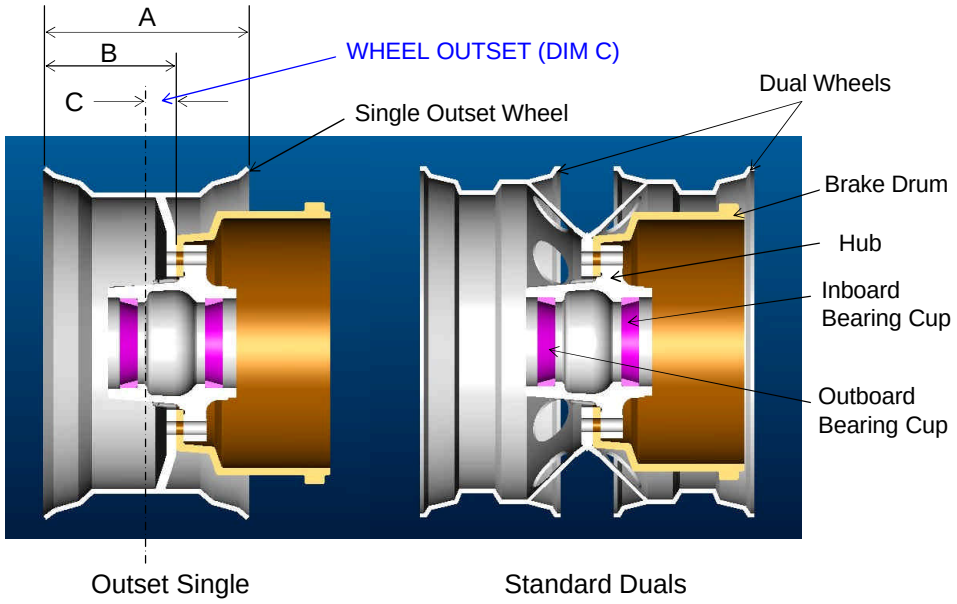

**Table 1** below details the aluminum hub load ratings based on wheel outset and hub type. **Table 2** below details the iron hub load ratings based on wheel outset and hub type.

IMPORTANT: Using outset wheels may decrase the load rating for other components such as axles and bearings. Manufacturers of those components should be consulted for approved load ratings. In many instances, it is the bearing or axle that governs the load rating. The tables below are not governed by only the hub, but also the bearings. Some manufacturers of axles and wheel end components recommend that only the P type spindle be used in conjunction with outset wheels on trailer axles.

Applications of wheel equipment that constitute moving normal tire loads outset or inset relative to normal dual positions typically reduces the design performance of the system. The material within is presented solely as a guide to assure safe load limits of the hub, bearing, and axle system are maintained.

**Table 1.** Aluminum Hub Load Ratings for Wheel Outset Applications

| Wheel Outset (inches) | P Type Trailer Aluminum Hub Load Rating (lb) | N Type Trailer Aluminum Hub Load Rating (lb) | R Type Drive Aluminum Hub Load Rating (lb) |
|---|---|---|---|
| 0” to 1.13” outset | 12,500 | 11,500 | 11,500 |
| 1.14” to 2” outset | 10,100 | 8,900 | 9,500 |
| 2.1” to 3” outset | 8,500 | 7,200 | 7,700 |
| 3.1” to 4” outset | 7,600 | 6,500 | 6,300 |
| 4.1” to 5” outset | 6,700 | 5,700 | 5,600 |
| 5.1” to 6” outset | 6,100 | 5,000 | 5,000 |
| 6.1” to 7” outset | 5,500 | 4,500 | 4,500 |

**Table 2.** Iron Hub Load Ratings for Wheel Outset Applications

| Wheel Outset (inches) | P Type Trailer Iron Hub Load Rating (lb) | N Type Trailer Iron Hub Load Rating (lb) | R Type Drive Iron Hub Load Rating (lb) |
|---|---|---|---|
| 0” to 1.13” outset | 12,500 | 12,500 | 13,000 |
| 1.14” to 2” outset | 10,100 | 8,900 | 10,000 |
| 2.1” to 3” outset | 9,100 | 7,200 | 8,300 |
| 3.1” to 4” outset | 8,300 | 6,500 | 7,300 |
| 4.1” to 5” outset | 7,200 | 5,700 | 6,500 |
| 5.1” to 6” outset | 6,300 | 5,000 | 5,800 |
| 6.1” to 7” outset | 5,500 | 4,500 | 5,300 |