

Things To Keep In Mind When You Design Your Flexiride® Equipped Trailer

- The load distribution between the hitch and the running gear is determined by placement of the axles in relation to the trailer's center of gravity.
- The hitch weight for conventional, bumper type hitches is usually 10% to 14% of the gross weight of the vehicle. The remaining 86 to 90% of the load will be carried on the running gear, so make sure that the axles, wheels and tires are properly matched and have sufficient capacity rating to support this load.
- Excessive frame flexure can affect ride if the natural frequency of the vehicle's structure matches the frequency of the suspension. Once the flex of the frame is in phase with the suspension's vertical movement, the dynamic load input to the suspension will cause it to deflect more than it would under static load conditions. This greater loading of the suspension results in greater rebound which causes greater frame flexing. Now the larger degree of frame flexure is imposed on the suspension which causes an even greater vertical travel, and so on. If this condition exists, damage to the vehicle's structure will occur. Either the structure should be stiffened or the suspension characteristics should be altered to prevent this 'in phase' behavior.
- Trailers equipped with Flexiride® axles must be towed in a level attitude to insure even loading of the axles. Out-of-level towing results in higher loads being imposed on the axle at the low portion of the frame and less load on the axle(s) at the high end. This uneven load distribution may cause excessive stress concentrations on the frame structure. Uneven loading of non-equalized suspensions can also affect the ride characteristics by altering the natural frequency of the structure.
- The wheel and tire diameter should be large enough to provide sufficient ground clearance when used with Flexiride® axles, which have drop spindles. Insufficient clearance may result in the axle components dragging the ground in the event of a flat tire.
- When designing the attachment system for Flexiride® axles on aluminum trailer frames, it is important to understand the compressive stresses imposed by the fasteners against the aluminum surfaces. Yielding in these areas can lead to loosening of the axles and could result in fatigue failure of the axle bracket and tube structure and/or the frame members. If non-metallic materials are to be used between the mating surfaces to prevent galvanic corrosion, the designer must consider the stability of these materials under the high clamp loads. Extrusion of these materials under load may also lead to loosening of the axle attachment.
- Fender clearance: Allow 3" over the tire at full load to avoid interference upon dynamic load.
- Wide-spread Flexiride® axles will be subjected to higher stresses at the bracket/tube interfaces as a result of frame racking. Racking occurs when the vehicle travels over uneven surfaces and the loads imposed at each wheel are substantially different. If the torsional stiffness of the vehicle structure is relatively low, the areas where the cross members are joined to the main

frame rails and the axle bracket/tube welds must withstand the twisting that occurs in these critical regions. Excessive flexing may result in fatigue failures. To reduce the potential for problems due to racking, position the axles closer together.

➤ How to calculate your Flexiride® axle capacity:

1. Determine the Gross Vehicle Weight (GVW)

When building a trailer, the total Gross Vehicle Weight (GVW) must be determined in order to select the right axle or axles for the application. GVW includes the weight of the empty trailer and the weight of the intended cargo.

Example: 2,000 lb. empty trailer weight + 8,000 lbs. cargo = GVW of 10,000 lbs.

2. How Many Axles?

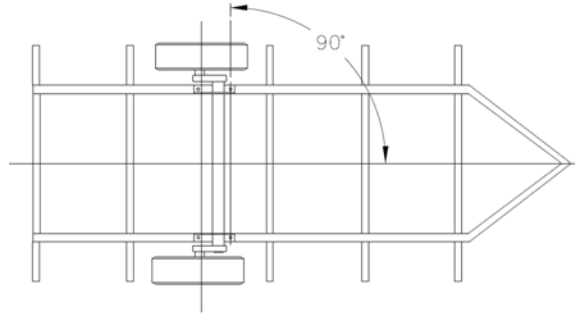
After determining the GVW, the number and capacity of the axles must be selected. Keep in mind that a 1.25 coefficient for covering the dynamic load is necessary to be applied to the static GVW load.

Example: if you want 10,000 lb. GVW and want tandem axles, the minimum required capacity is 6,250 lb. per axle.

3. Find the Flexiride® size available matching the application

Example: For the minimum required capacity of 6,250 lb. per axle, the immediate matching Flexiride® size available will be 7,000 lbs.

- Flexiride® axles should not be used in situations requiring more than two axles. These axles are non-equalized and may experience momentary overload when traversing uneven operating surfaces such as driveway entries or speed bumps. Flexiride® axles can take this momentary overload in a tandem set, however it is not reasonable to expect one axle to carry the load of three or more axles even in a momentary situation.
- Flexiride® axle ride performance is at its best when the torsion arm is at or nearest to horizontal when the vehicle is at its rated load. This is due to the geometric relationship of the arm to the direction of loading. Torsion arms operating above the horizontal tend to exhibit a stiffer ride. As an example, for a 3500 lb. wheel load acting perpendicular to a 4.5" long arm, the torque input to the suspension system is 15,750 inch*pounds. For the same wheel load imposed on a 4.5" long arm at 45°, the torque input to the suspension drops to 11,135 inch*pounds. (Torque=4.5*(.707)*3000, since the sine of 45° is .707).
- Flexiride® axles should be specified in such a way that will position the vertical section of their mounting brackets directly under the most rigid section of the frame members. This will help to ensure proper support of the axle brackets. This is even more critical when Flexiride® half-axles are used, since they do not benefit from the added rigidity of the axle tube acting as an extra cross-member.
- To insure proper tracking, the axle must be placed on the frame perpendicular to the centerline of the trailer. The accuracy must be within ± one half degree. For multiple axle applications, each axle must be parallel with the others within one sixteenth of an inch when measured at the wheel centers.



NOTE: When laying out the position for the axle(s), measuring from the front cross member should only be done if the cross member has been checked for squareness to the frame centerline. Any error in the cross member will be transferred to the axle and can result in poor tracking and excessive tire wear.