ℹ This document describes:
- How to verify the wheel alignment
- How to correct toe-in or toe-out misalignment using the **axle bushing method** on Motion Composites **rigid wheelchairs**
- How check for other alignment problems

Note that the wheel alignment method using the axle bushing as explained in this document is **valid only for wheelchairs with a camber angle**. **0° camber angle rear wheels cannot be aligned**. There is no other way to align the wheels. If you cannot achieve alignment using this method, check section "**Alignment problem checks**" below.

Please, also refer to the other documents of the series available at motioncomposites.com (Support and Education/ How-to documents):
- Camber, rear wheel parallelism, toe-in, toe-out, and how to verify alignment (MC-MTKG-WI-0001)
- Perform rear wheel alignment on Motion Composites folding wheelchairs (MC-MTKG-WI-0002)
- **Perform rear wheel alignment on Motion Composites rigid wheelchairs** (MC-MTKG-WI-0003) (this document)
- Rear wheel camber parts and hardware for folding and rigid wheelchairs (MC-MTKG-INF-0001)
- Changing camber angle on folding wheelchairs (MC-MTKG-WI-0004)
- Changing camber angle on rigid wheelchairs (MC-MTKG-WI-0005)

| Wheelchair models:	Tool(s) required:
- APEX C (Carbon) - APEX A (Aluminium) - APEX P (Pediatric)	- Measuring tape - Marker pen or masking tape - Torque wrench 4 mm hexagonal key (Allen key) 5/8'' flat wrench - Worktable or a flat and even surface - Wheelchair support or any kind of object to hold the wheelchair

VERIFY THE WHEEL ALIGNMENT

- Please refer to the document "**Camber, rear wheel parallelism, toe-in, toe-out, and alignment** (MC-MTKG-WI-0001)" for detailed instructions on how to verify the wheel alignment.
  - For pneumatic tires, make sure that the air pressure is at the recommended value.
  - Place the wheelchair on a flat and even surface.
  - Block the wheels on both sides.
  - Ensure the axle bushings are the same length on both sides.
  - Ensure the camber tube is symmetrically positioned.
  - **Do not use the wheel lock system because it can affect the wheel alignment**.

- Measure the front (D1) and rear (D2) distances between wheels at the centre of the wheels (not an APEX represented).

- Front and back measured distances must be the same **within ¼.'' (6 mm)**
  - If the front measure (D1) is smaller than the back measure (D2), it is a **toe-in** situation, and the **wheels must be aligned.**
  - If the front measure (D1) is greater than the back measure (D2), it is a **toe-out** situation, and the **wheels must be aligned.**
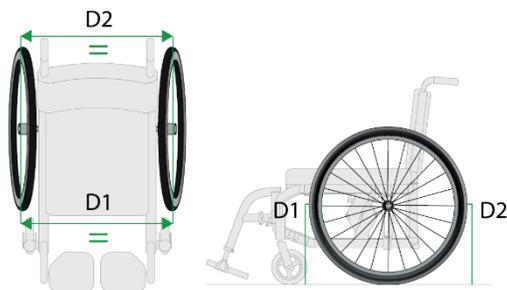
- On both sides, measure the distance between the inner edge of the tire and the side of the frame at the front to help determine which wheel may require adjustment.
- The measured distances must be the same **within 1/8'' (3 mm)**. If the difference is greater than that it means that the **wheels are not parallel** with the **centre line and alignment must be performed.**
- If the difference of distances measured is large, you may need to align both wheels.
  - In this case we recommended you first position the axle bushing a zero (or initial) position with the flat edges of the axle bushing parallel to the vertical axis (see next page).
  - Most of the time, it is the easiest and fastest way align the wheels properly when they are very misaligned.

# PERFORM REAR WHEEL ALIGNMENT ON MOTION COMPOSITES RIGID WHEELCHAIRS

CORRECT TOE-IN AND TOE-OUT

- Remove a wheel and put a support or something under the frame.
- Using a **4 mm hexagonal key** (Allen key), **loosen** the **screw** retaining the axle bushing on the clamp.
- Using the same hex key, loosen the **2 screws** of the **anti-tipper clamps**, if any.
- Use a **5/8'' flat wrench** to **turn the axle bushing** <u>slightly</u> in a direction or another to adjust the alignment (toe-in or toe-out) of the wheel.
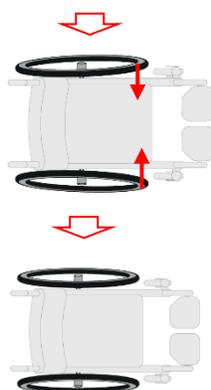
Screw
(7 Nm)
Axle bushing
(2°, 4°, 6° or 8°)
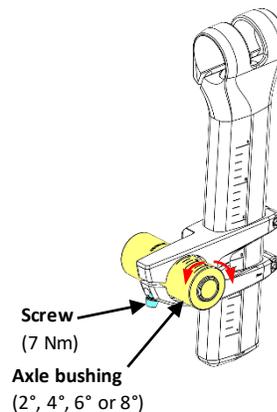
- To correct **toe-out** situation:
  - Turn the **bottom** of the **axle bushing** (the thickest wall) toward the **rear** of the chair **on both sides**.
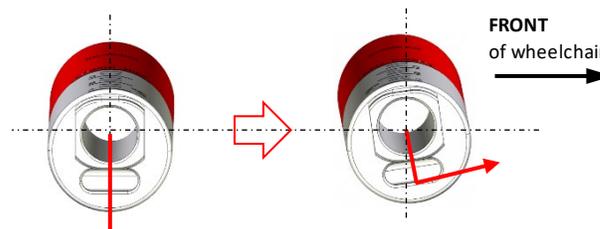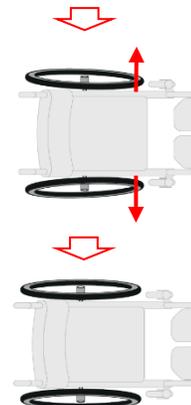 - This is "**closing**" the wheel **toward the inside**, correcting the toe-out.
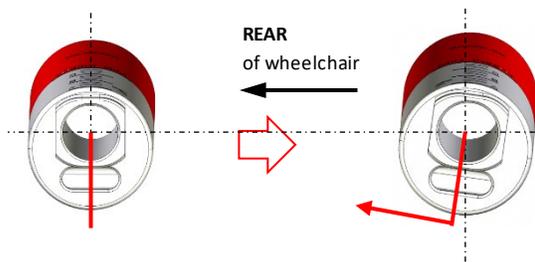
- To correct **toe-in** situation:
  - Turn the **bottom** of the **axle bushing** (the thickest wall) toward the **front** of the chair **on both sides**.
  - This is "**opening**" the wheel **toward the outside**, correcting the toe-in.

REAR
of wheelchair

FRONT
of wheelchair

Zero position or
initial position

Zero position or
initial position

- Reinstall the wheel on the chair.
- **Recheck** the **tire-to-frame distance** and continue adjustment until both sides are equal.
  - To achieve a **proper alignment**, you may have to perform this adjustment on **both wheels**.
- **Remeasure** the **wheel-to-wheel distances** in front and in **back** at **wheels middle height**.
- If the difference between the two measurements is less than ¼'' (6 mm), the wheels are aligned.
  - If not, **repeat the process** until the **measurements** in the **front** and **back** are **equal**, and the **measurements between** the **tire** and **frame** are **equal** on **both sides** of the chair.
- Once the wheel alignment is complete, **tighten the screws** at **7 Nm**.

ALIGNMENT PROBLEMS CHECKS

If the wheelchair has **0° camber angle** or **you cannot achieve the rear wheel alignment** on a wheelchair with camber angles with the method described in this document, **check the following points** because the root cause of the suspected misalignment may not be the wheel alignment :

- First, make sure that tire pressure (on pneumatic tires) is at recommended value
- Verify the axle screw tightness and torque
- Check for rear wheels shaking and wobbling
- Check for tire or rim deformation
- Check axle damages
- Verify the rear wheel mounting tube straightness
- Inspect the frame for any deformation or breaks