Resilient Flooring & Castor Wheel Assemblies
Easy Rolling Movement Considerations

Introduction
Many types of castors are used on furniture, chairs, and equipment to allow for easy movement over flooring surfaces. This resource provides relevant terms and examples of castor types, as well as selection and maintenance considerations for castors used on resilient flooring. A castor wheel is designed to be attached to the bottom of a larger object, enabling the object to move smoothly across a floor without causing damage to the flooring surface.[1]

Relevant Terms
Below are provided explanations of commonly used terms relevant to the consideration of castor wheel assemblies. These definitions are intended to clarify issues discussed in this resource and may vary from other industry, technical, and/or standard dictionary definitions.

Castor – a free rolling and, in many cases, free spinning wheel (generally undriven) designed to be attached to the bottom of a larger object to enable easy movement across a floor or other hard surface.

Castor Assembly – includes wheel and how the wheel attaches to the larger object.

Free Rolling – capable of moving only in back-and-forth direction.

Free Spinning – capable of moving in 360 degree directionality.

Hardness –a material property that describes a material's tendency to resist localized deformation or indent. Shore A hardness scale is used to measure material hardness using a durometer. Shore A durometers range from 0 to 100 with the higher the durometer value, the harder the material.

Hard wheels – describes wheels generally made from Polyamide (Nylon or other hard plastic) with nominal value of hardness of 95 Shore A or harder.

Soft wheels – describes wheels generally made from Polyurethane or other softer plastic composition with nominal value of hardness of 90 Shore A or softer.

[1] This document is developed for an audience anticipated to be comprised primarily by commercial interior designers, building owners, and facilities department managers (approximately 80%), with additional users anticipated to come from the residential segment.

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Telegraphing – when resilient flooring conforms to the substrate surface and subfloor imperfections including displaced adhesive are visibly distinguishable on the installed flooring surface.

Types of Castors

There are three main types of castors: single solid wheel, double wheels, or single wheel with special configuration (e.g., hospital bed wheels, equipment, and carts). Assembly and mounting of castors may also include a brake system depending on the application of the furniture or equipment. It is recommended to review the flooring type that is being used or specified with the furniture or equipment manufacturer, in addition to the flooring manufacturer, to verify that the correct castor is compatible with the flooring solution. Depending on the application a single castor is usually recommended for resilient flooring and a double castor is typically recommended for carpet.

Photograph 1 and 2: Single Solid Wheel Castor and Assembly with Softer versus Harder Wheel, respectively.

Photograph 3 and 4: Double Solid Wheel Castor and Assembly.

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Photograph 5 and 6: Single Wheel Castor with Special Configuration with Brake for Equipment and Carts.

Use Considerations and Castor Specification

Various characteristics should be considered when castors are specified, including the number and type of castors, whether flooring is existing or is a newly specified product, and required related accessories. The castor selection may differ based on the location and application, such as healthcare versus hospitality, and the flooring manufacturer can provide recommendations for the appropriate type of castor in conjunction with the furniture or equipment manufacturer.

Harder castors can be noisier when rolling across a floor, especially floors with a heavy texture or a rougher surface. If wheels are too soft with a heavy weight load, they can create flat spots on the castors that would impact rolling performance and/or pickup dirt or grit that can embed into the castor and scratch the flooring surface. Castors with a high crown or having a small contact area (low resistance) with the floor surface can leave indentation marks from the heavy point loading. A flatter wheel profile would provide a more evenly distributed load. Wider wheels tend to spread the load out to reduce the wearability issues with resilient floor finishes.

The flooring, the adhesive, and the subfloor type all contribute to installed floor performance. If heavy rolling loads are anticipated and there is a concern about indentation or telegraphing to the flooring surface, a hard set adhesive over concrete subfloor is generally recommended.

Maintenance of Castors

When castors are not free rolling (single direction) or are not able to freely spin (multi-directional), they should be repaired or replaced. Depending on the type of castor and issue involved, this may require simply replacing a wheel; in other cases, the entire castor assembly (which includes how it is mounted) will have to be adjusted or replaced. In many cases when castors are replaced, it is recommended to change the full set to ensure the castors will have the same free rolling or spinning contact with the floor.

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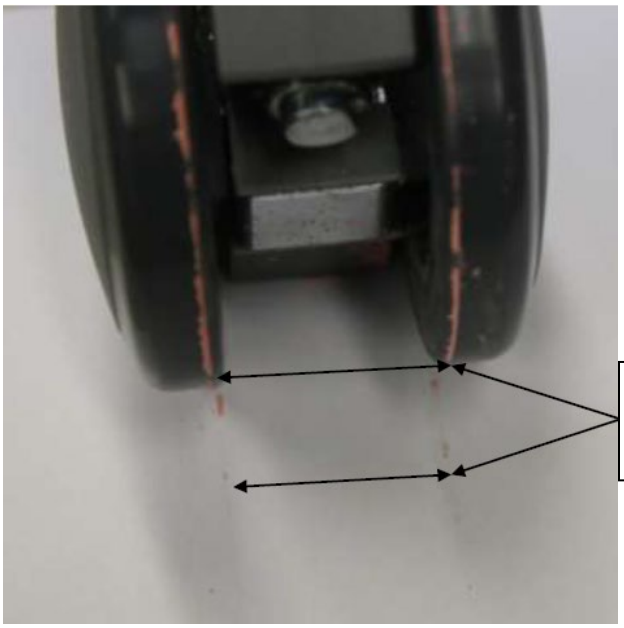
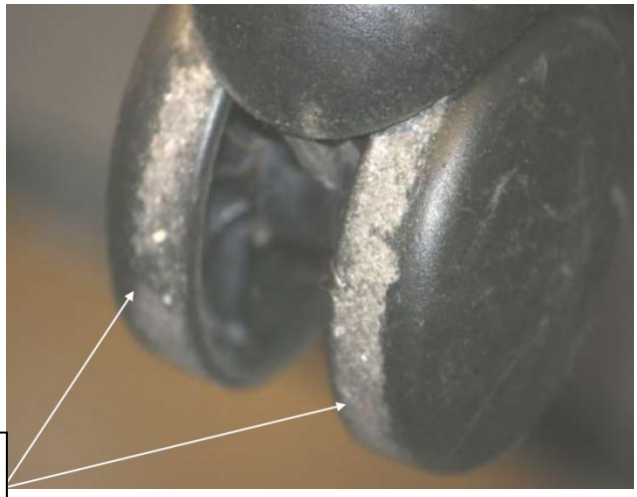
Photograph 7 and 8: Dirt and grit on castors can limit movement and damage flooring.



Photograph 9: Example of worn castor that does not have even contact across flooring surface. Photo used with permission from FloorConsult, LLC.



Photograph 10: Example of dirt and grit embedded into hard castors. Photo used with permission from FloorConsult, LLC.

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Use of Floor Protection Mats

Use of protective mats recommended for resilient flooring specifically for under desks or work surfaces can provide supplemental protection against flooring surface and castor damage due to heavy localized rolling load movement. Thickness of flexible mats and the weight of the rolling load will determine the amount of protection needed. Thicker and more rigid mats offer better protection from rolling indentation marks and scratching. Therefore, matching the flooring manufacturer recommendation with the application would support the appropriate mat selection to the level of protection required.

Photograph 11: Example of Caster [SIC] Wheel Floor Tester. Photo used with permission and courtesy of SAGEOS www.gcttg.com and available at https://gcttg.com/en/caster-wheel-floor-tester/ (accessed on March 22, 2024).

Simulated Castor Chair Test

There is a test method for simulating the movement of castors on resilient flooring, ISO 4918 Resilient, textile and laminate floor coverings: Castor chair test that simulates rolling action and loads over flooring. The test method was developed as a quality assessment for flooring exposed to repeated rolling chair movement. This test includes three castor wheels, where the wheels spin and rotate, a 196 pound assembly weight is utilized, and samples are evaluated based on revolutions until apparent damage or specified cycles are completed without damage. There are two types of wheels utilized for testing: 1) hard wheels made from Polyamide (Nylon) with a nominal hardness of 95 Shore A used primarily for Carpet, and 2) soft wheels made from Polyurethane with a nominal hardness of 90 Shore A utilized primarily for resilient flooring.

Recommendations and Conclusions

When moving heavy objects, such as furniture, appliances, etc., even if they have castors, it is recommended to use protective runner boards or other means of protection to avoid marring, scratching, or indenting a finished resilient floor. Use of recommended protective chair mats can provide supplemental protection against dulling, scratching, and indentation of resilient flooring where there is high localized use of castors. It is important to replace castor wheels that will not freely roll or spin for normal operation. If hard castors show signs of damage, deep gouges, or chips out of the wheel, replace the castors. If soft castors exhibit a non-round, flat profile or have embedded dirt or grit in the wheel, it is also recommended to replace the castors.

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For more information on resilient floor covering and additional resources, please visit the RFCI Resource Hub.

Resources
ISO 4918 Resilient, textile and laminate floor coverings: Castor chair test

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