Orca™ Series Application Curves

Loaded and Unloaded Simple Harmonic Motion

Version 1

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Introduction

Sinusoidal motion in Orca™ Series motors is limited by induced currents, supply voltage, integrated driver current limits, payload mass, and thermal handling. The following curves are intended to provide a guideline for understanding oscillation capabilities of Orca motors at various frequencies and supply voltages, and when coupled to various loads.

These curves can be used as a general guideline, but they do not consider gravity from vertical mounting, or external dynamic effects like springs and dampers, etc. Specific application curves which include various additional physics may be available for free or as part of a study. Please contact sales@irisdynamics.com with questions and feedback.

Guidance

Travel and Power vs Frequency charts

These curves indicate the max travel and continuous travels given active or passive cooling for various frequencies and at various load masses. Max travel curves have a corresponding power curve which indicates the average power consumption to achieve that motion.

X-Axis

X-axis measures the simple harmonic motion frequency in Hz and has a log base 10 scale.

Y-Axis

Y-axis has two scales – one measures the simple harmonic motion travel range in millimeters, while the other measures average power in Watts. The mm travel scale has a log base 10 scale to more clearly display data while the power scale is linear.

Travel Above the Max Travel Curves

Travel values above the max travel curves are not possible due to driver current limitations or due to the induced currents from high shaft speeds. Increased supply voltage may alleviate limitations due to induced currents, and high(er) performance drivers may be available increase current limitations.

Increasing load mass increases the required driver currents and further constrains travel. Two example masses in addition to unloaded data are illustrated.

Travel Above the Continuous Travel Curves.

Travel values above the continuous travel lines, but below the max travel line are possible for shorter durations. The amount of time that can be spent in this region depends on thermal handling.

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Travel vs Cycle Time charts

Two charts are provided that illustrate the range travel that is available at various cycle times. One chart indicates the maximum travel that can be obtained, assuming the duty cycle is very low – *I.e.* the motion is performed infrequently. The next chart indicates the travel that can be obtained assuming the cycle is repeated indefinitely, and only passive cooling is used.

X-Axis

Measures the cycle time in seconds. The cycle time is the time between when a motion is started at the home position, to the time after the motor extended to the travel distance and then returned to the home position.

Y-Axis

Measures the cycle travel in millimeters. The cycle travel is the furthest extension of the motor, and this occurs at half of the cycle time. Any value in the shaded region of the charts is a valid travel range for a given cycle time.

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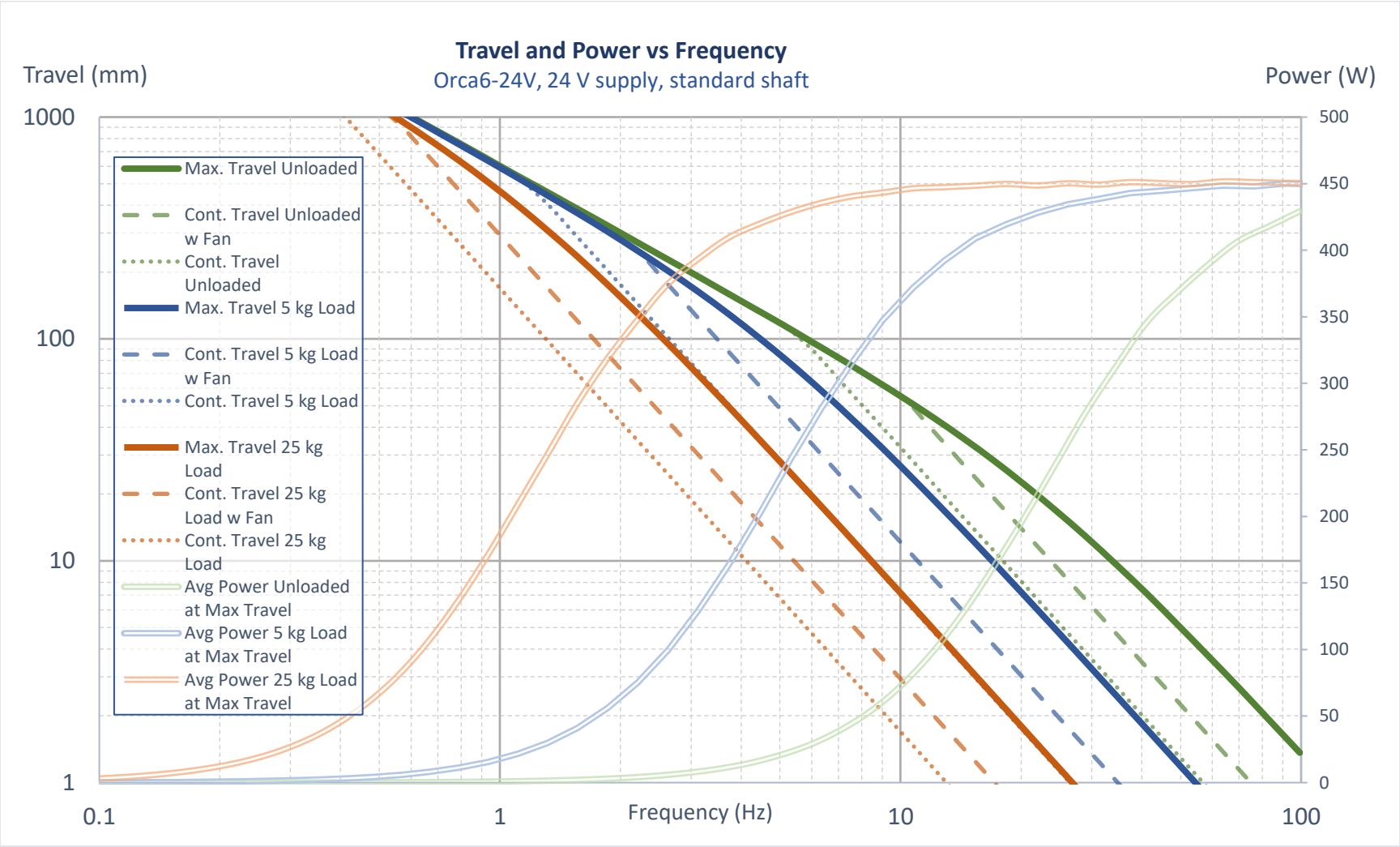
ORCA6-24V, Standard Shaft, 24 V Supply



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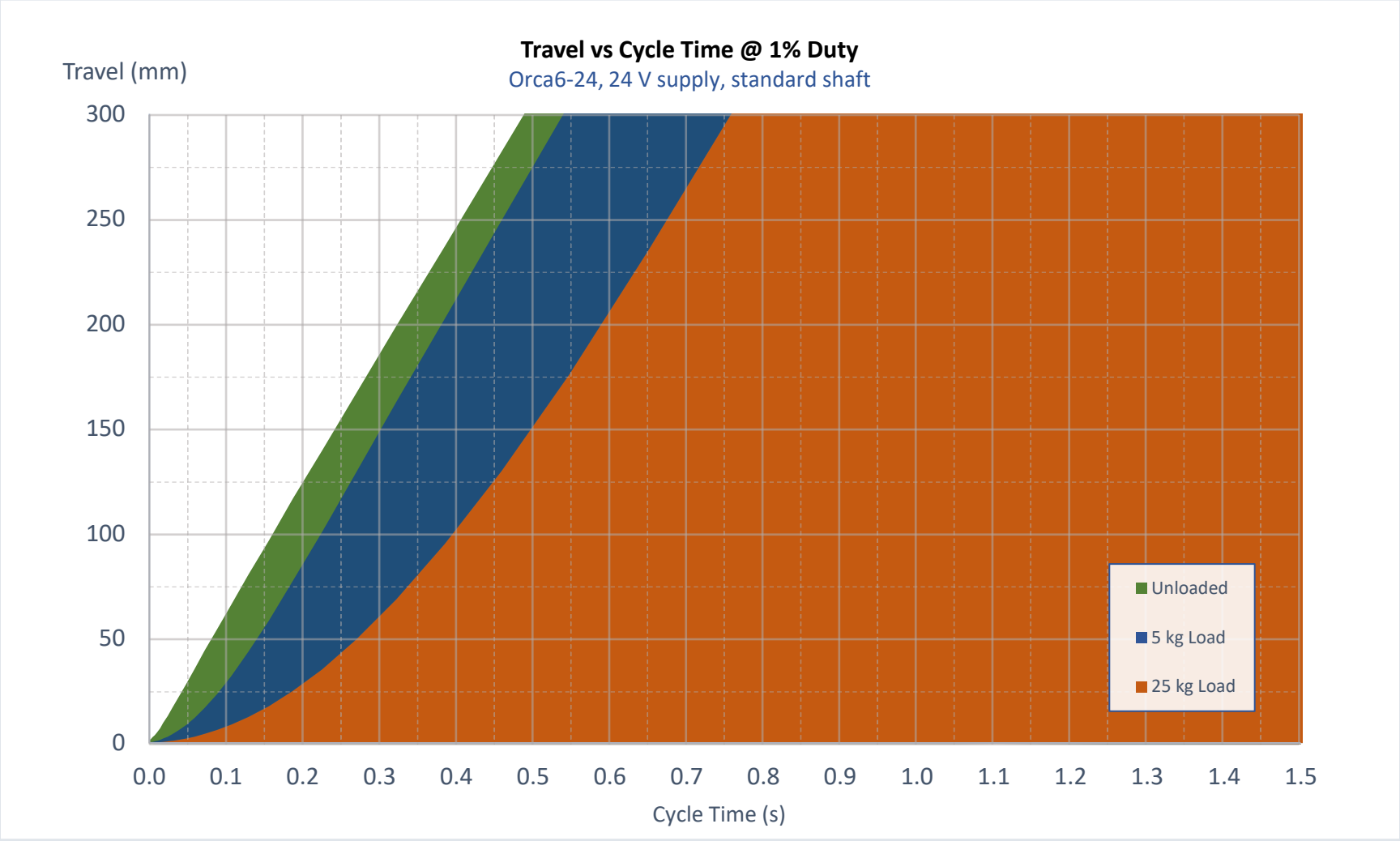

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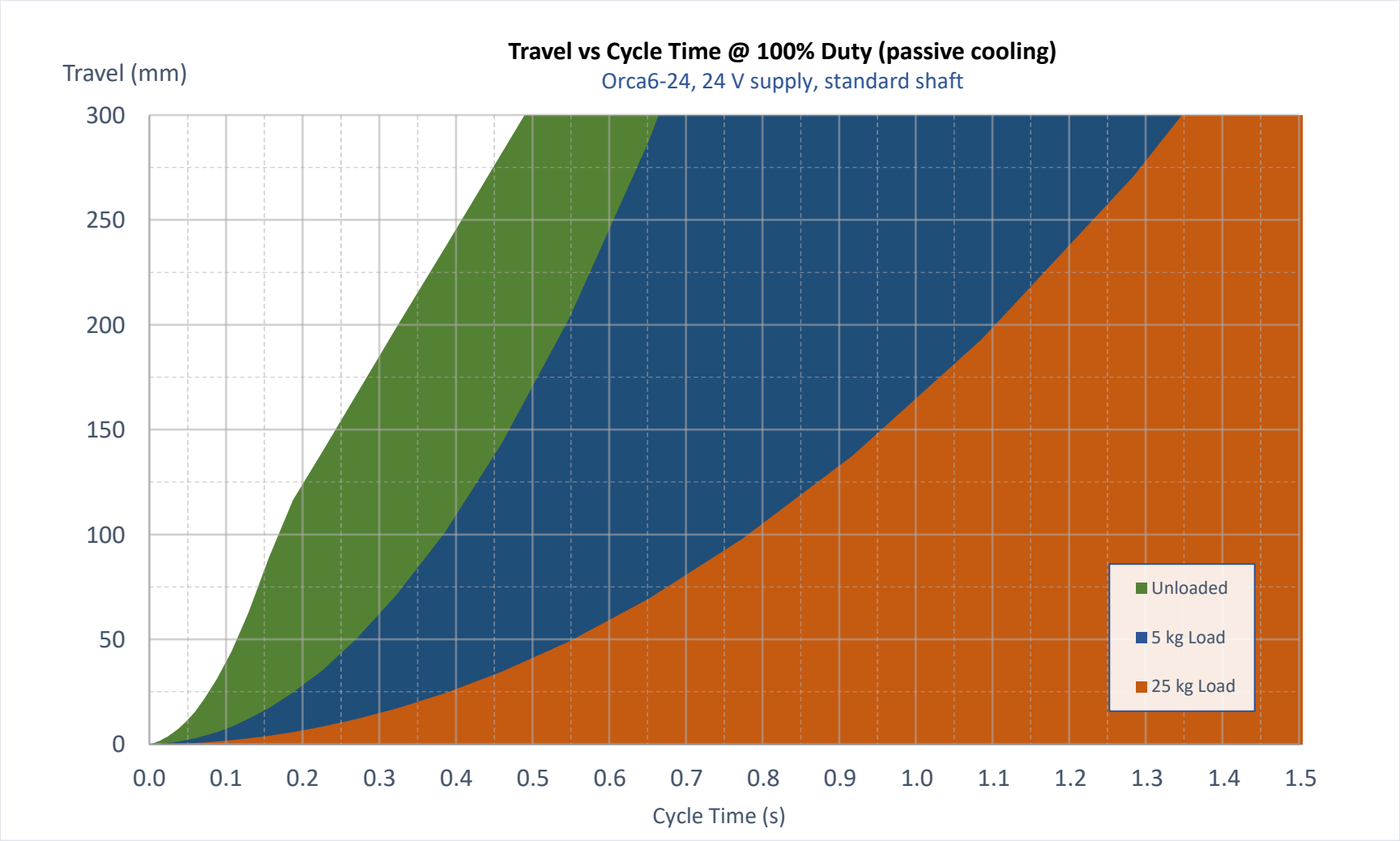

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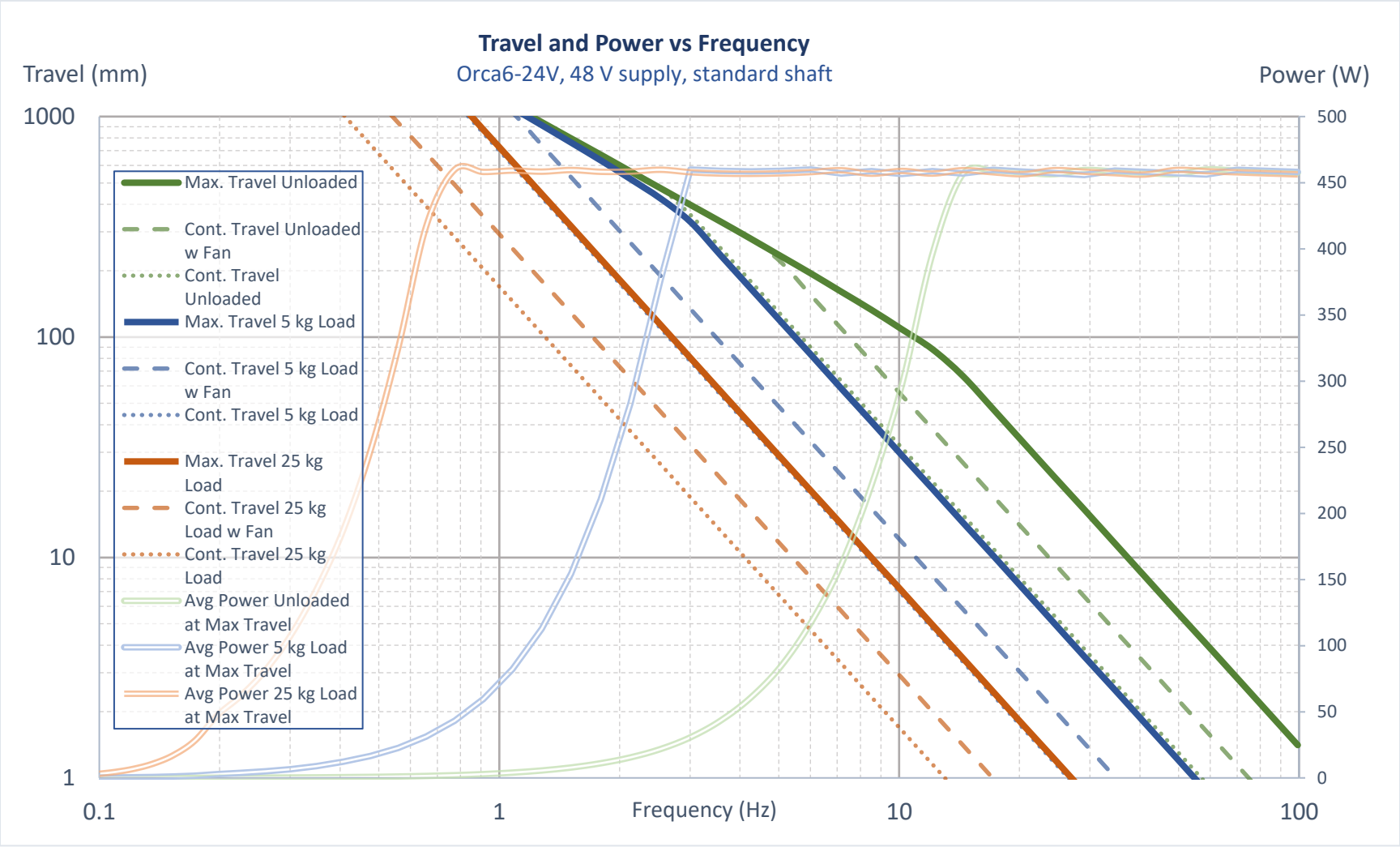

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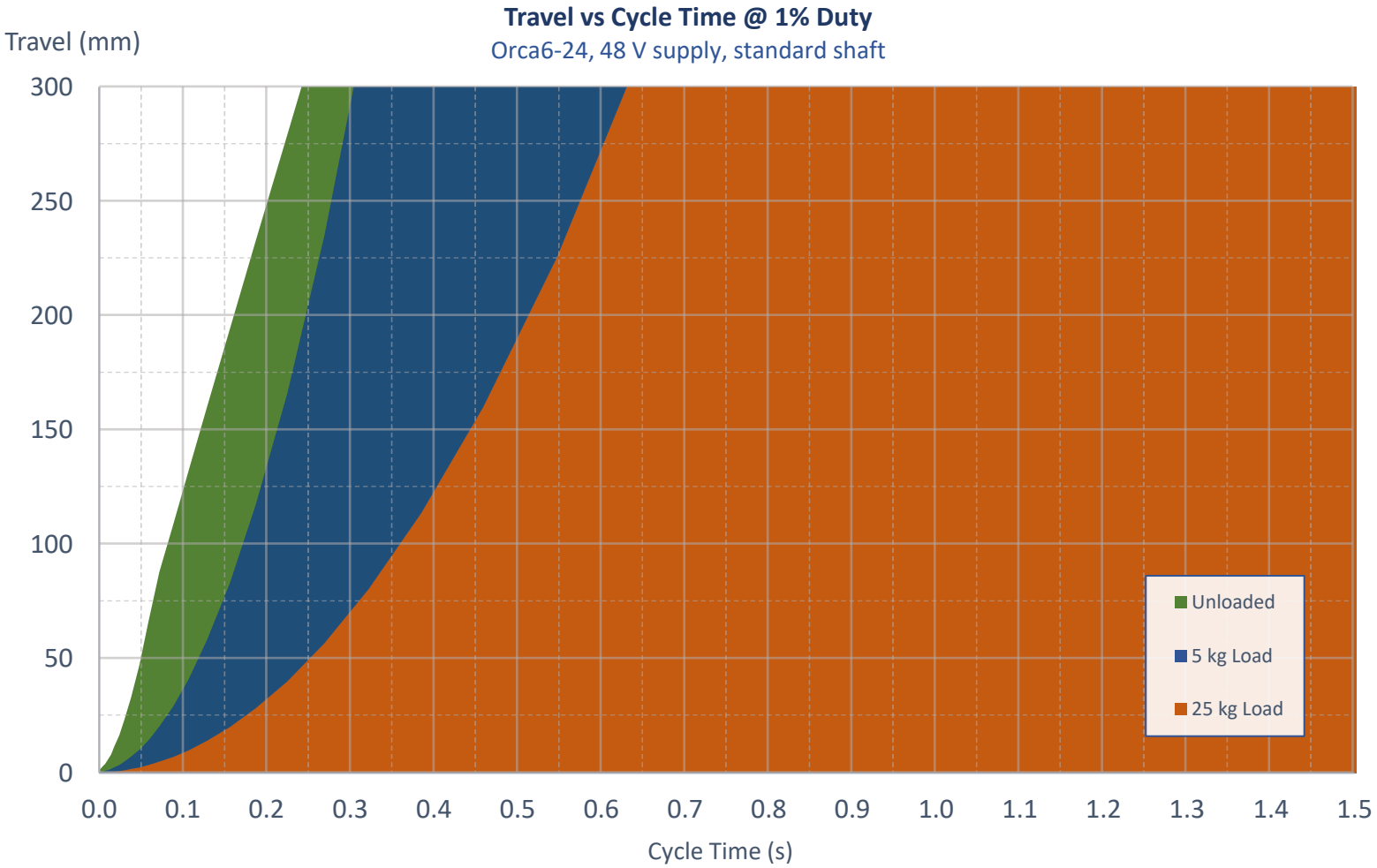

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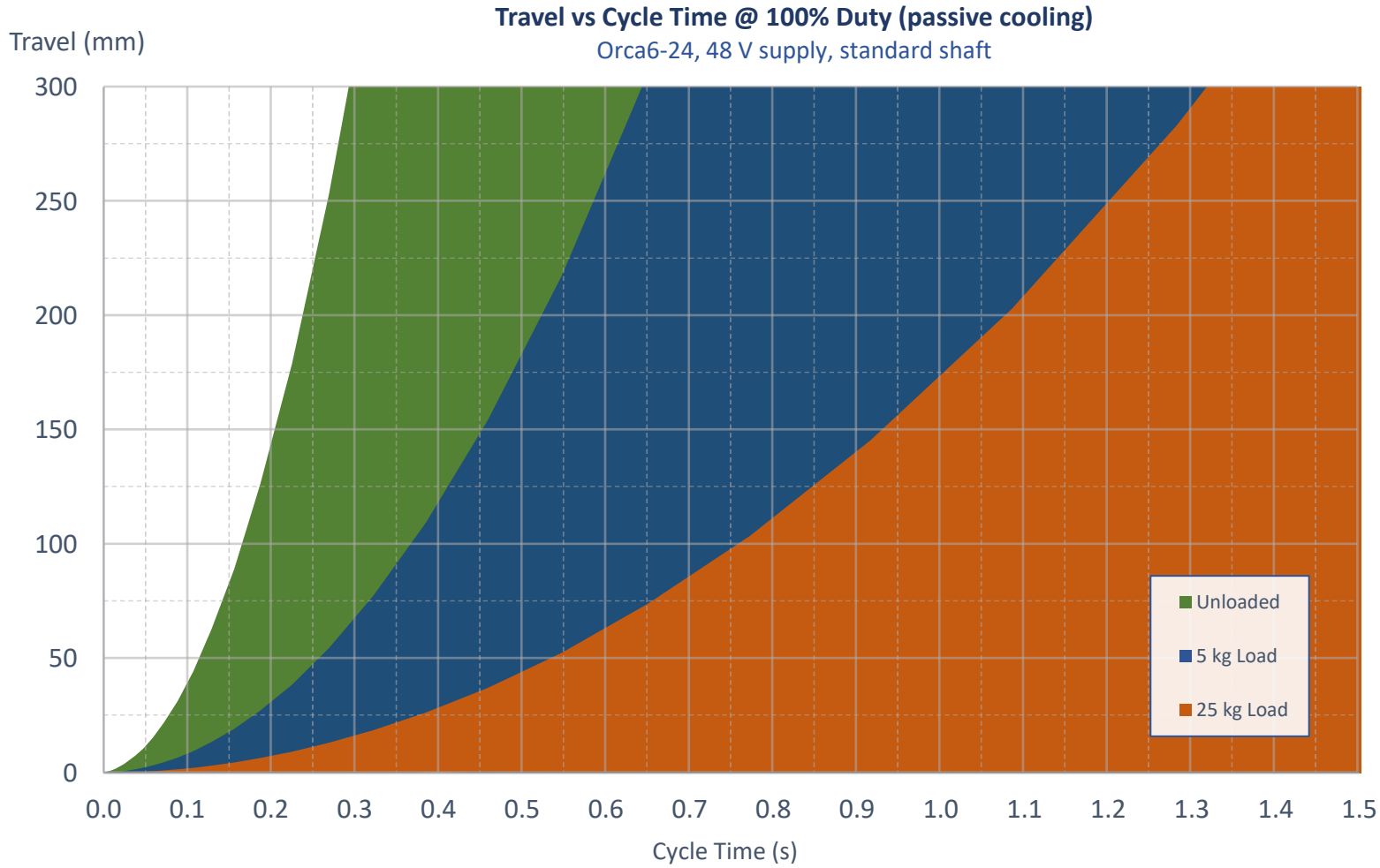

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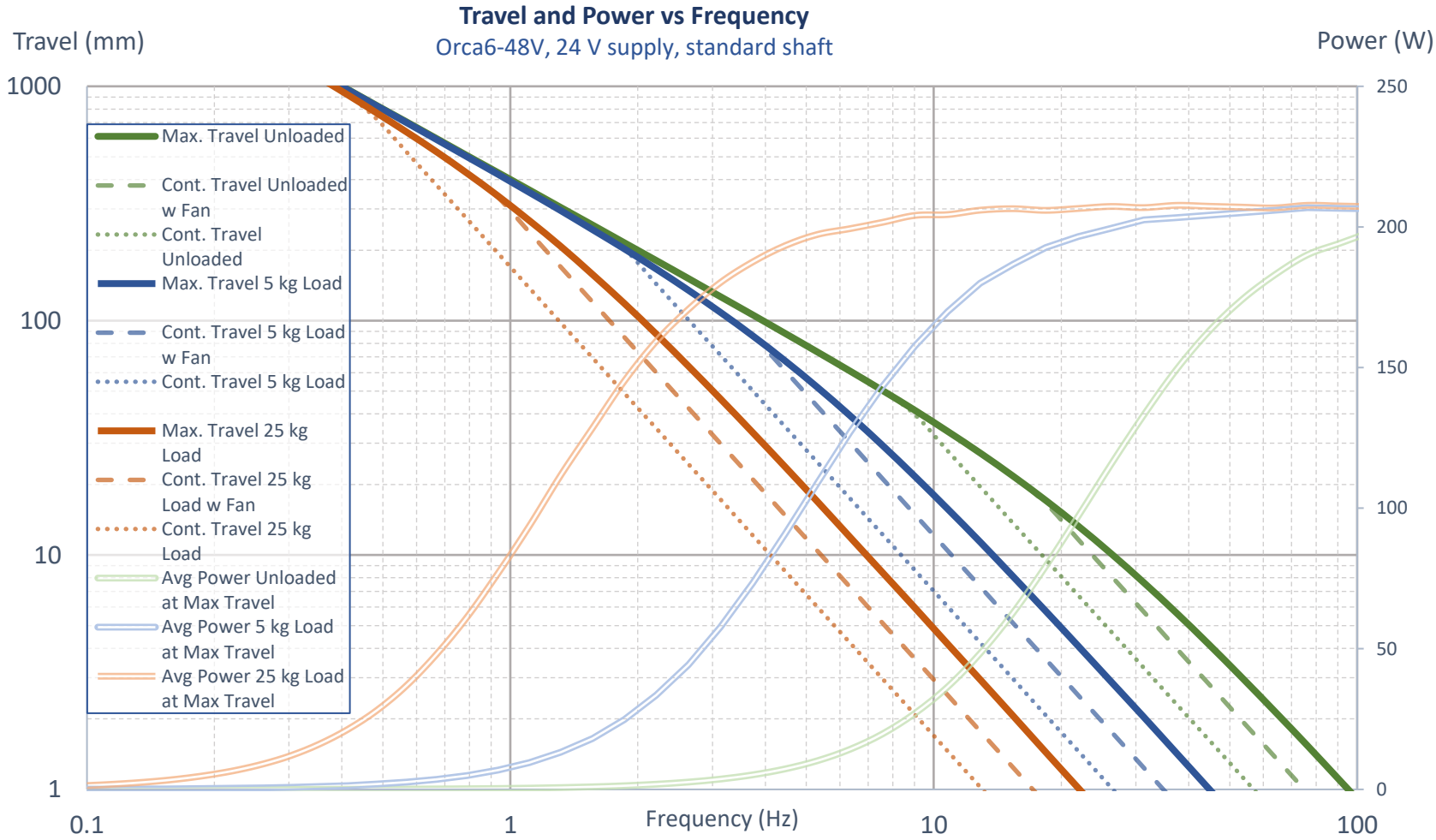

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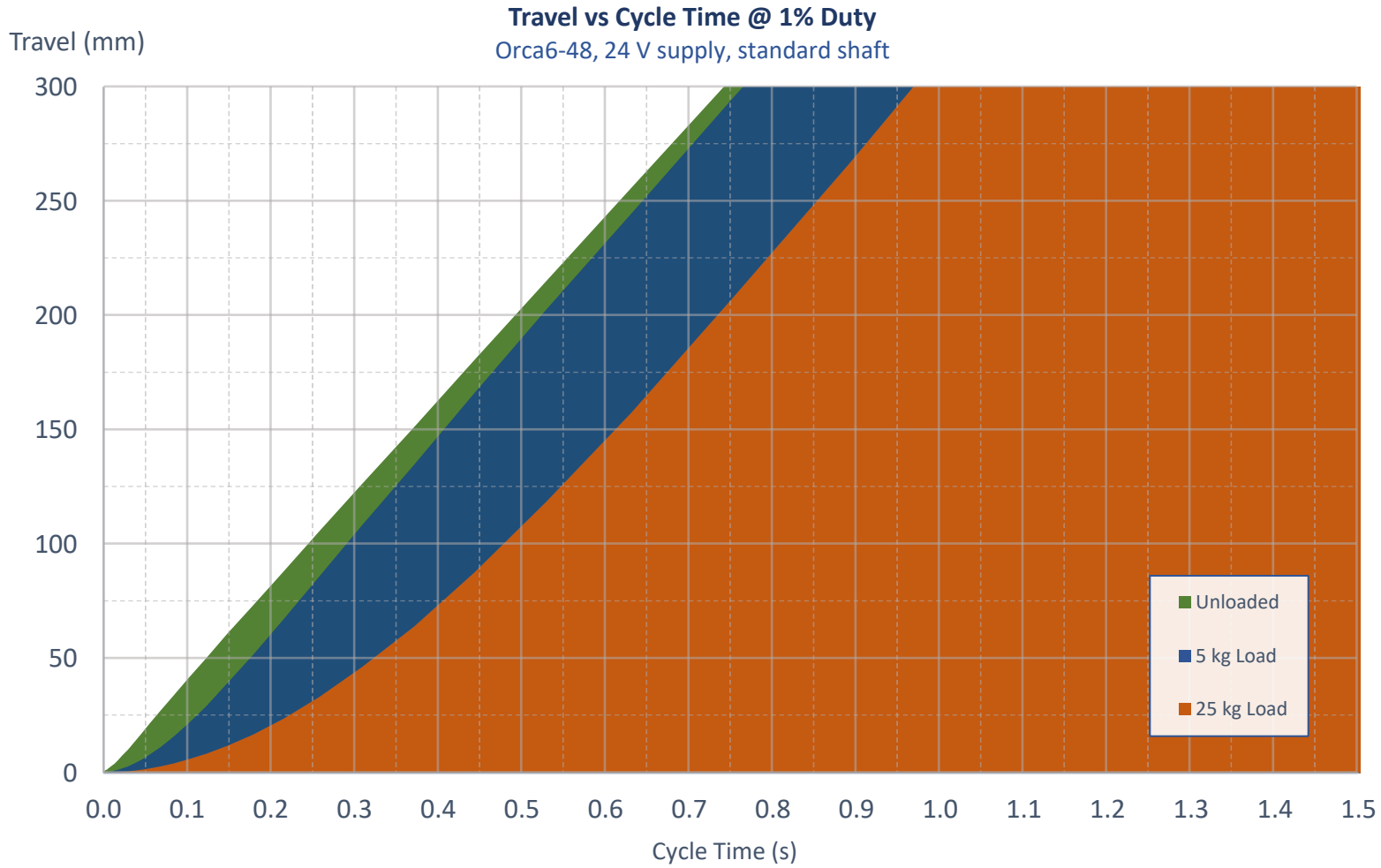

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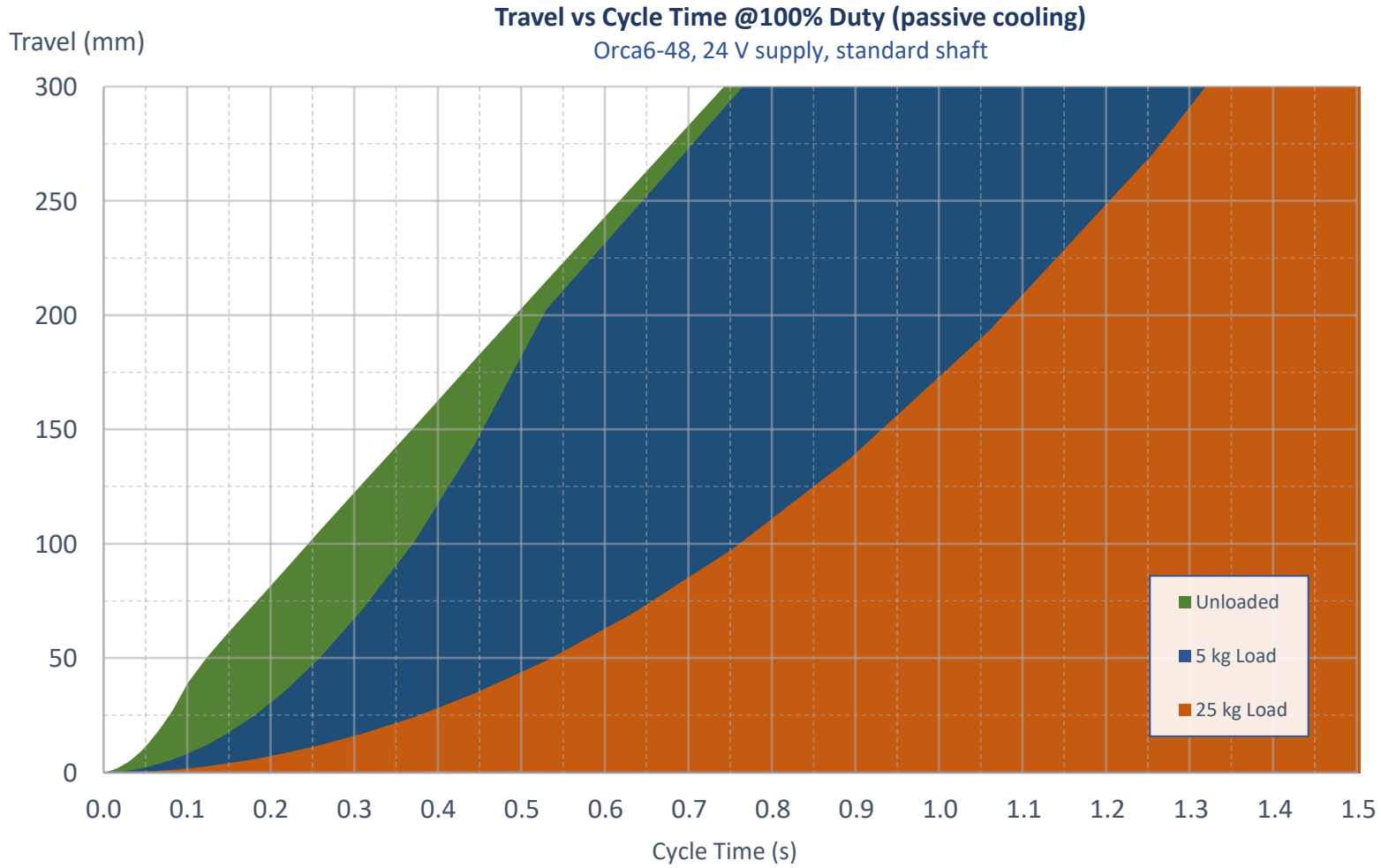

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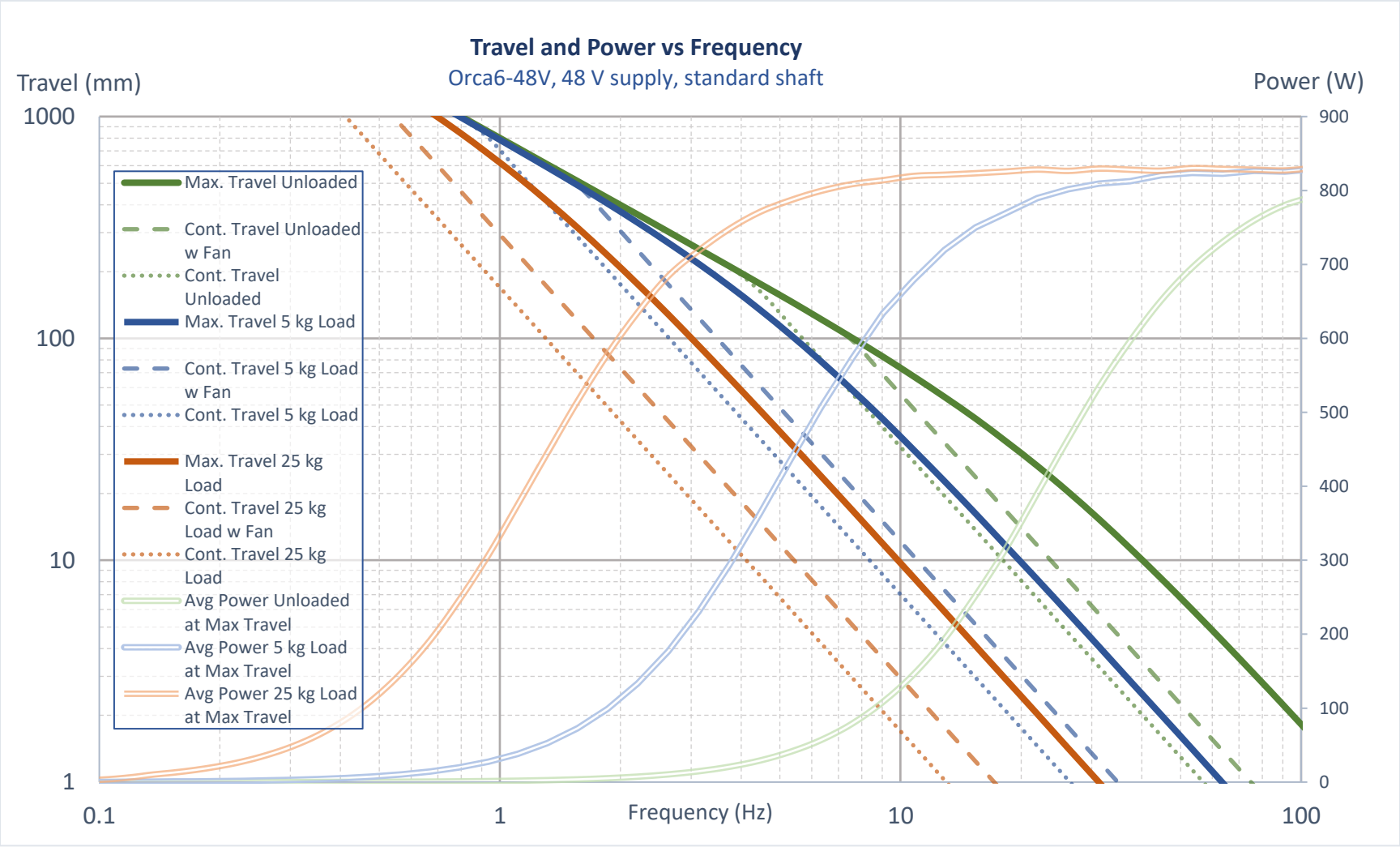

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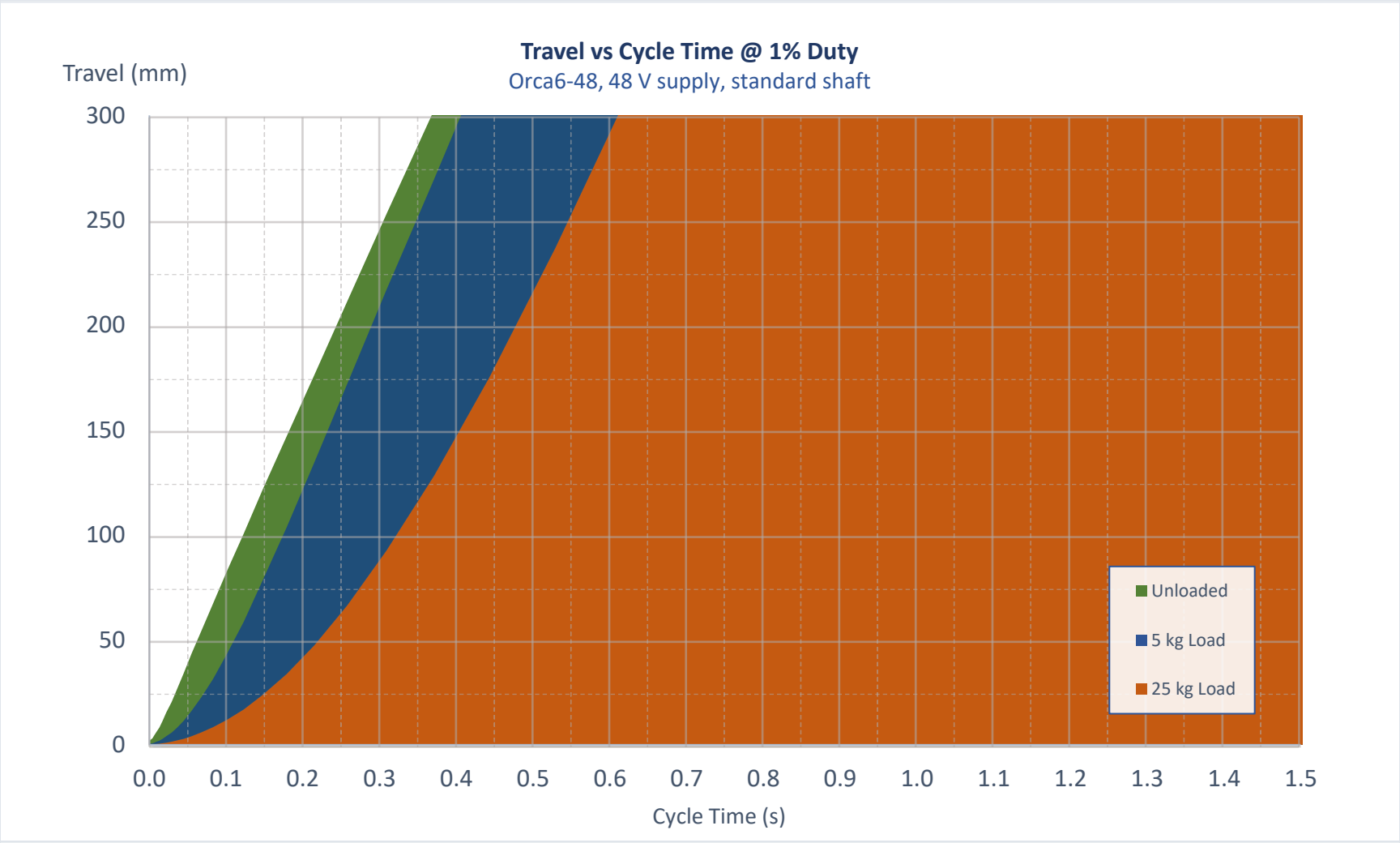

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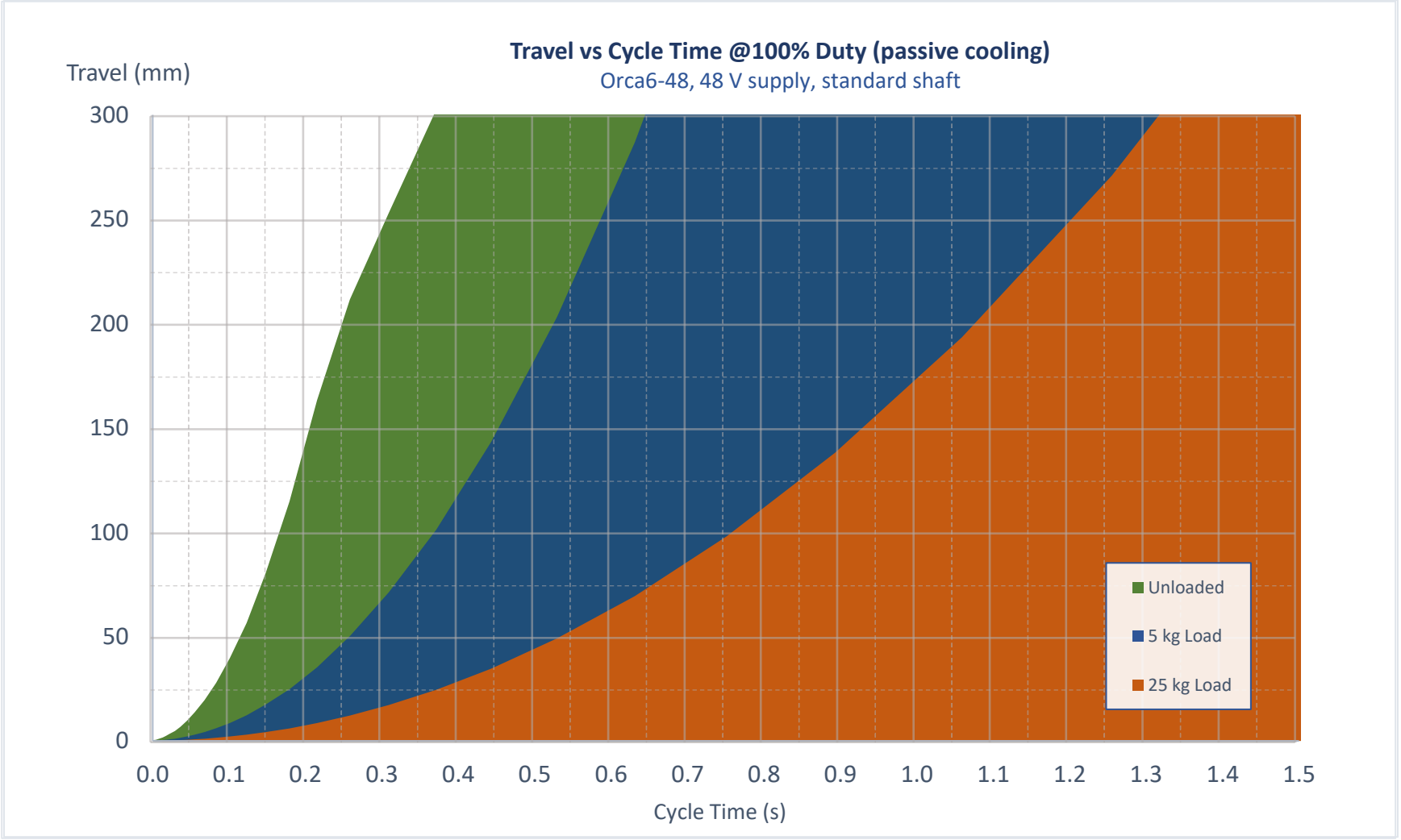

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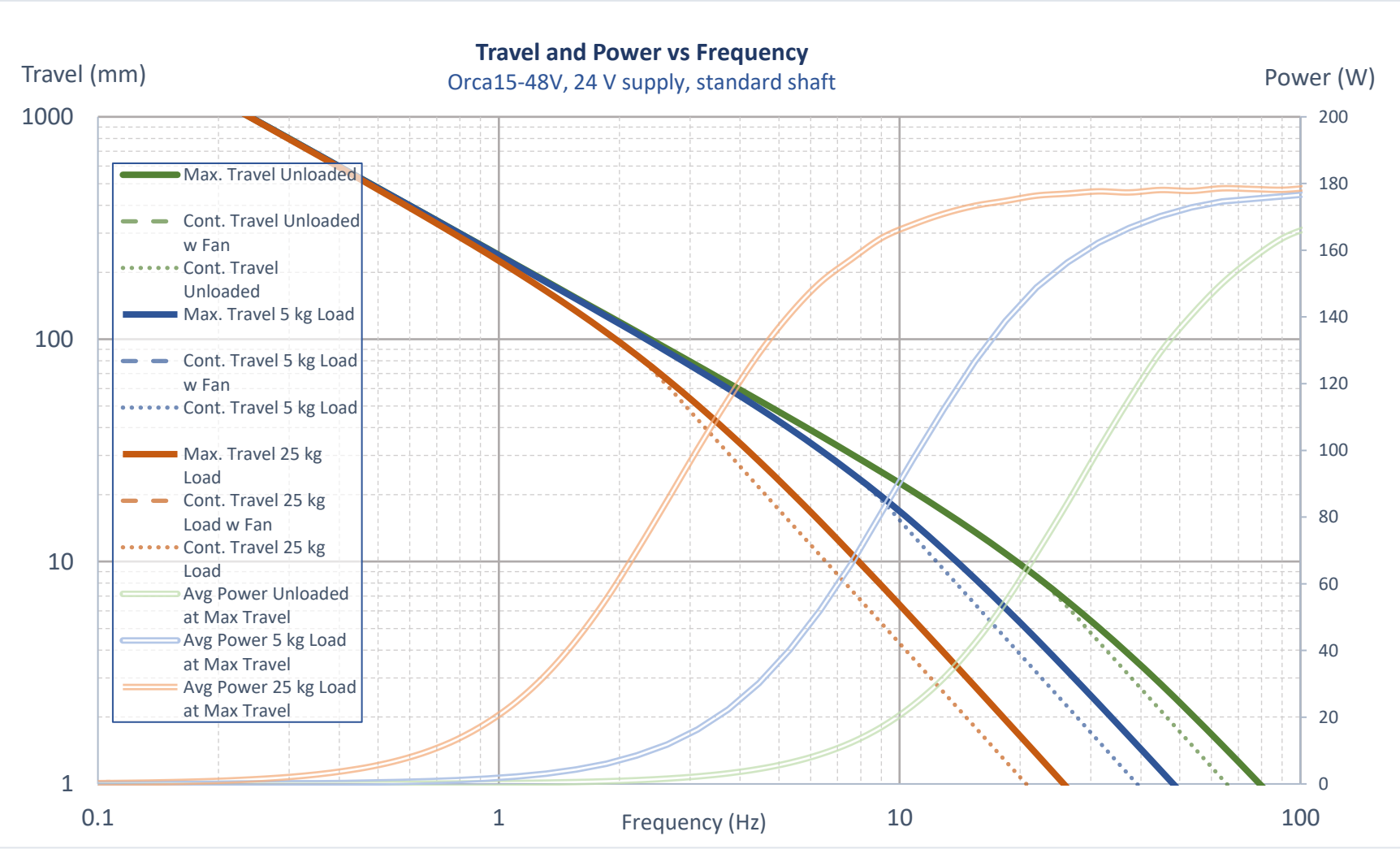

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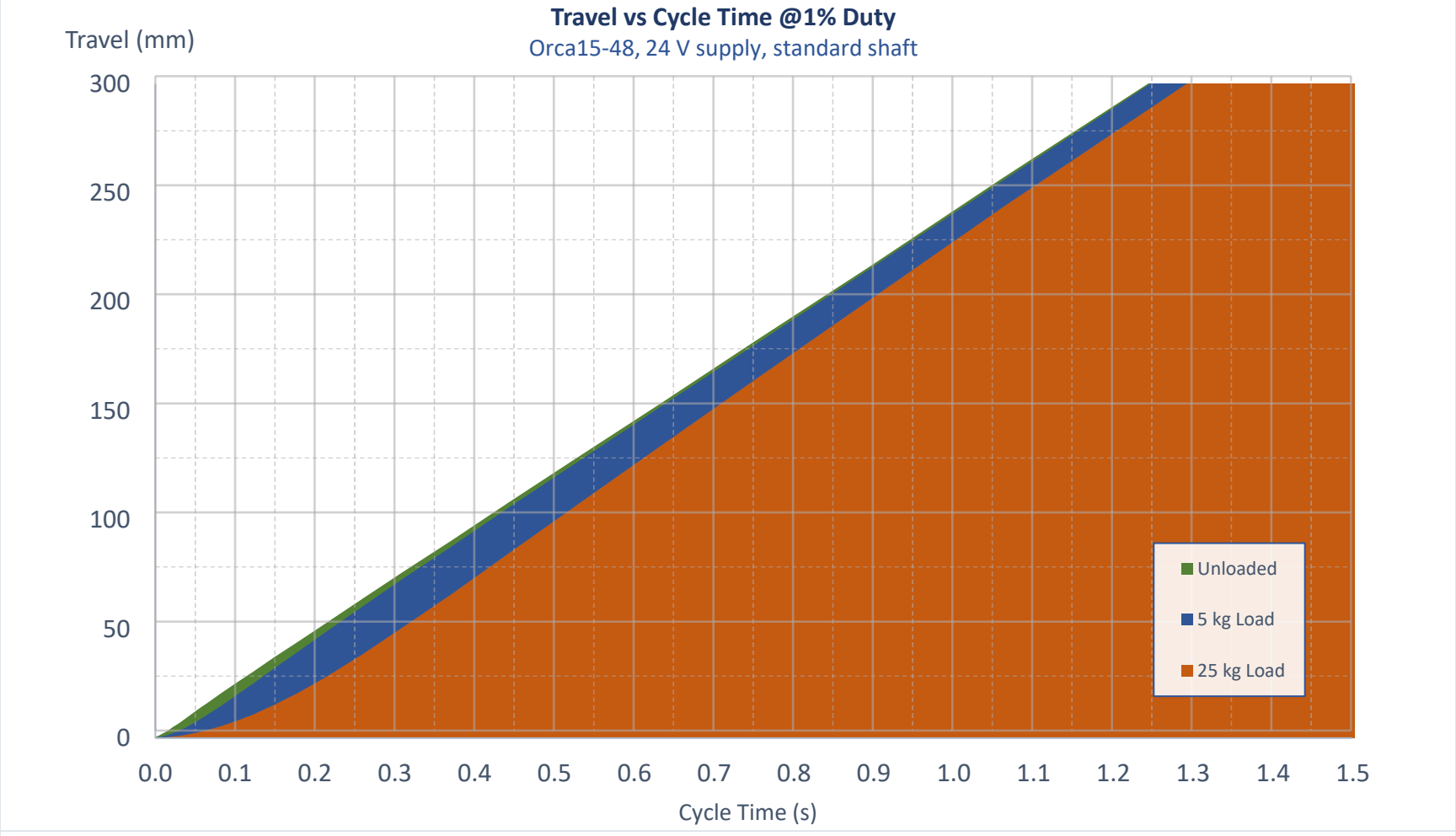

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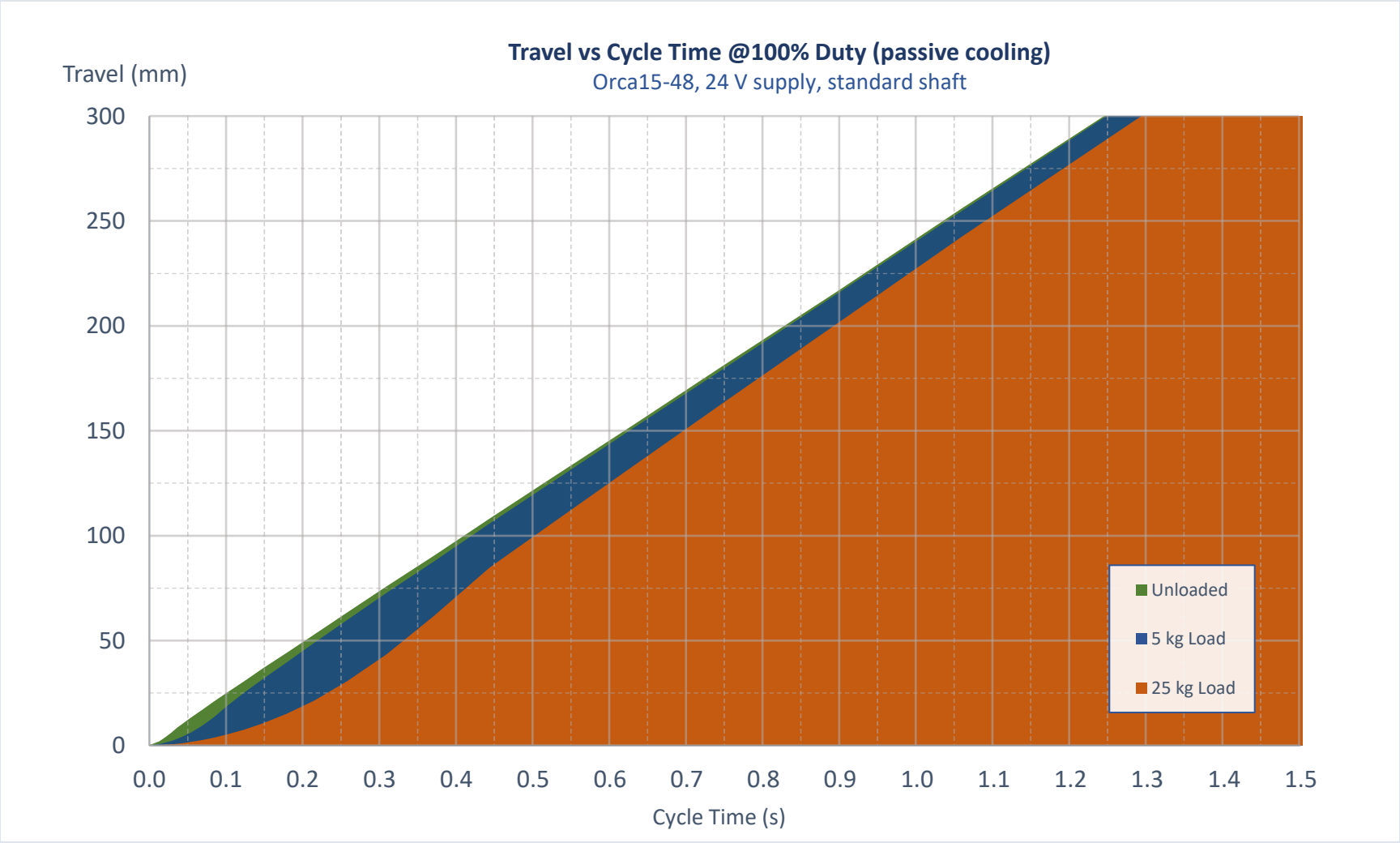

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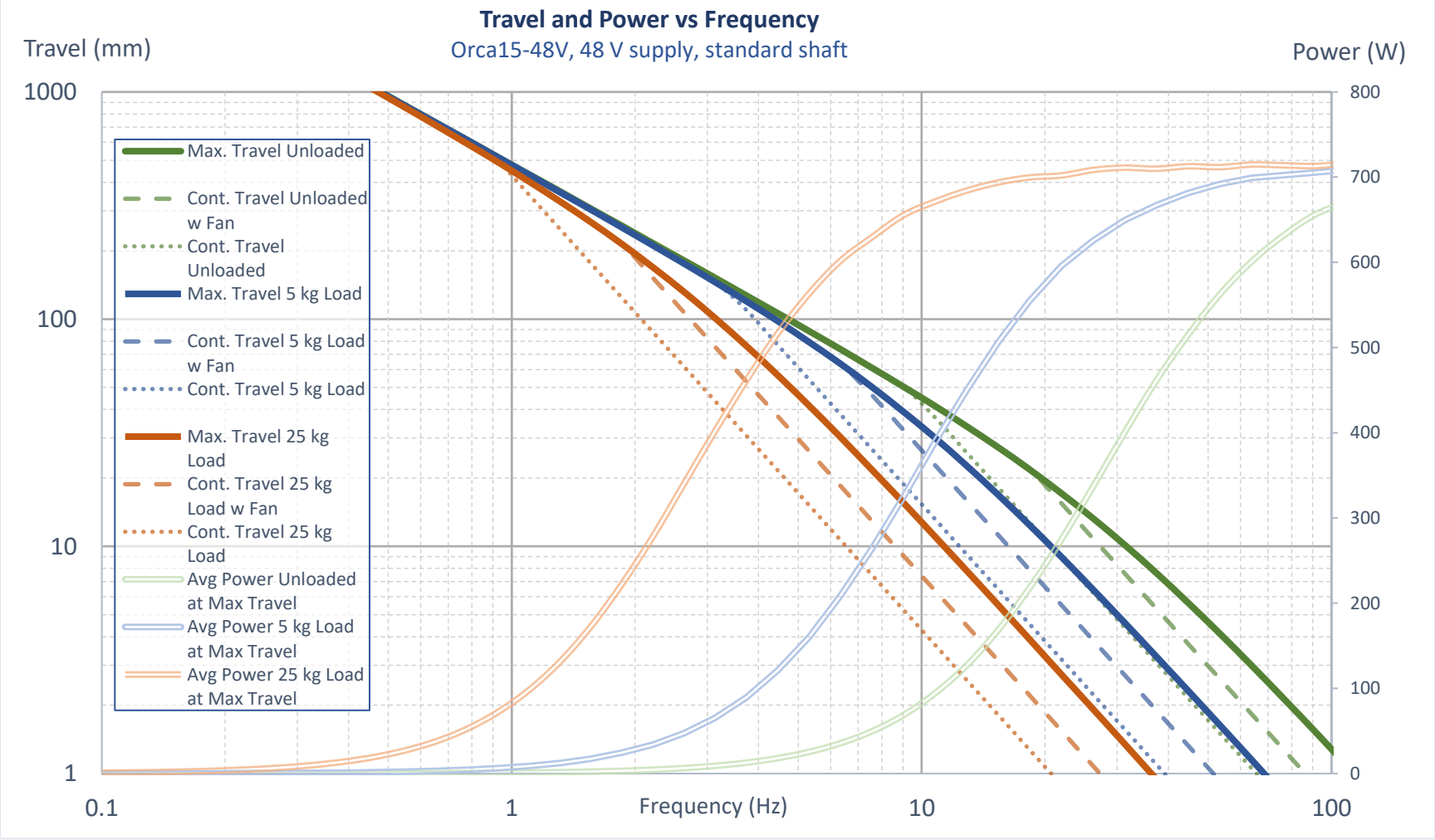

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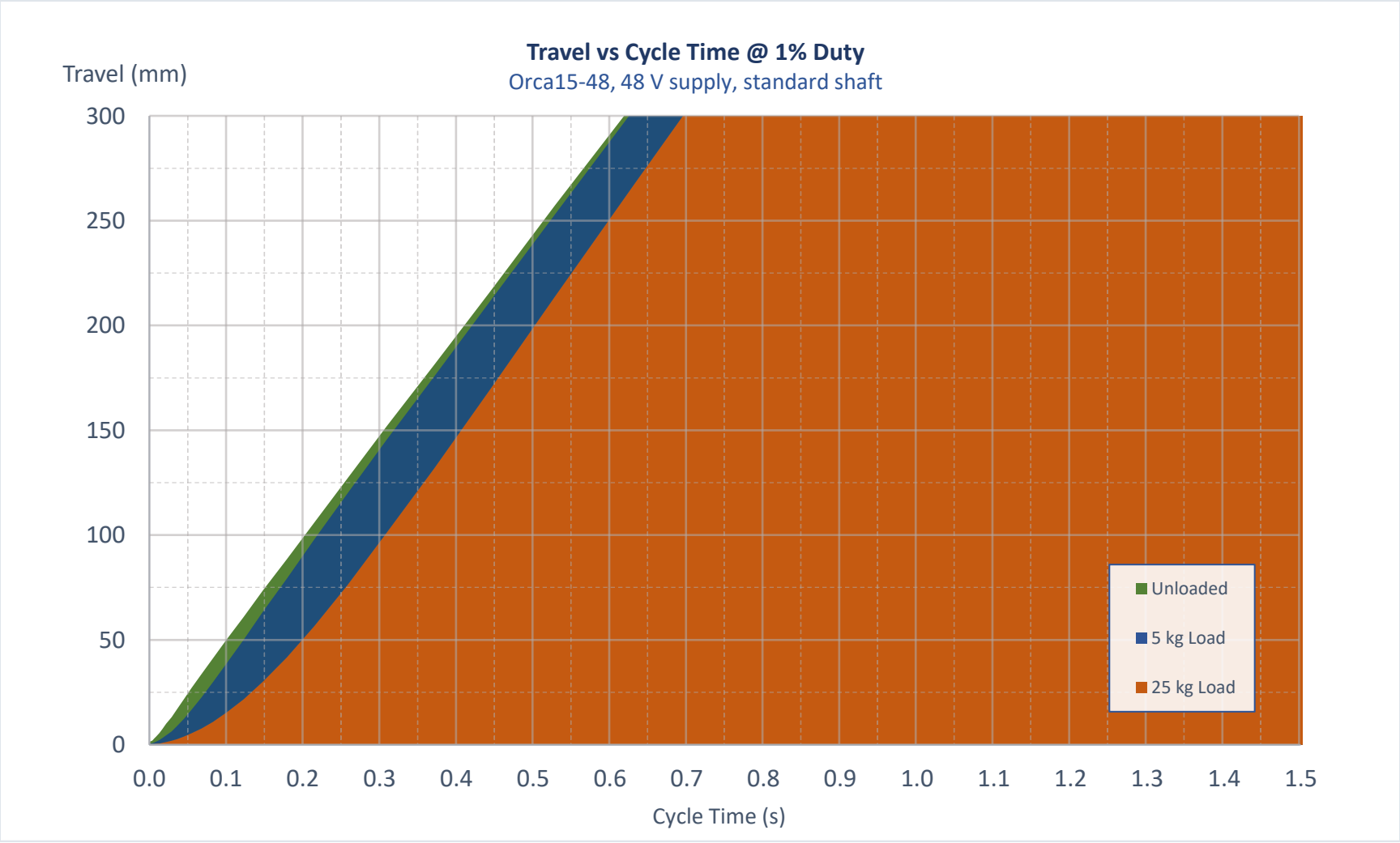

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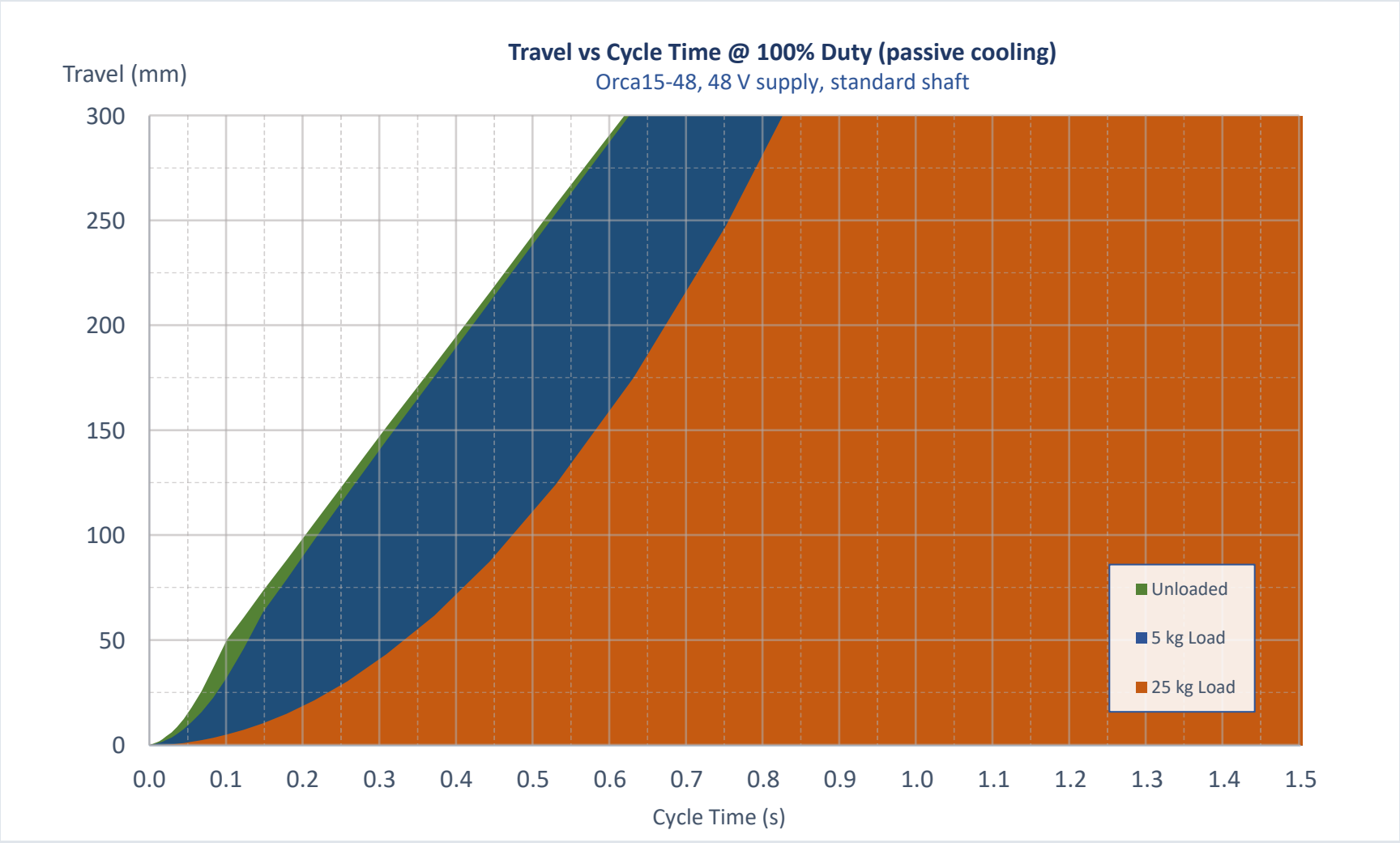

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REVISION HISTORY

Version	Date	Author	Reason
1	Sept 2022	kh	Initial

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