

FLOOR SYSTEM PERFORMANCE

Technical Bulletin Dindas I-Joist® Series



It is always a good idea to consider any floor system's performance (i.e., Vibration, bounce, etc.). There are no accurate industry standard guidelines for I-Joists, but several practical aids are helpful. Some are design aids, some are installation aids, and some are retrofit aids. They are offered as tools to help you minimise floor performance complaints but cannot be guaranteed to eliminate all floor performance problems.

Begin by using the concepts of fundamental natural frequency and damping when designing floor systems. The Fundamental Natural Frequency

(FNF) measures how the floor vibrates when you walk on it and is measured in cycles per second (measured by Hertz or Hz).

Damping measures how quickly a floor stops vibrating and is expressed as a percentage between 1% and 100% (most residential floors have a damping range between 5%-25% damping).

Our bodies are susceptible to vibrations below 9 Hz so the ideal floor would have a high FNF with high damping. However, most floor problems combine a low FNF (below 9 Hz) and low damping (around 5%). The following list will help you determine the effect of different parameters on floor performance.

The combination and interaction of these parameters determine how the floor 'feels'.

DESIGN PARAMETERS	EFFECT ON FNF	EFFECT ON DAMPING
<ul style="list-style-type: none"> Longer Spans 	Significantly lowers	Little or no effect
<ul style="list-style-type: none"> Higher 'L over' deflection limit (L/480 vs. L/360) 	Significantly increases	Little or no effect
<ul style="list-style-type: none"> Using an absolute upper limit on live load deflection (Usually between 8mm to 12mm max) 	Significantly increases	Little or no effect
<ul style="list-style-type: none"> Using deeper I-Joists 	Increases	Little or no effect
<ul style="list-style-type: none"> Reduced Joist on-centre (o.c) spacing 	Increases	Little or no effect
<ul style="list-style-type: none"> Adding perpendicular load bearing partition walls 	Little or no effect	Significantly increases
<ul style="list-style-type: none"> Increasing the overall weight of the floor 	Significantly lowers	Significantly increases
INSTALLATION PARAMETERS	EFFECT ON FNF	EFFECT ON DAMPING
<ul style="list-style-type: none"> Unlevel bearings (walls, beams & hangers) 	Significantly lowers	Significantly lowers
<ul style="list-style-type: none"> Longer Spans 	Significantly increases	Significantly increases
<ul style="list-style-type: none"> Longer Spans 	Increases	Increases
<ul style="list-style-type: none"> Longer Spans 	Increases	Increases
<ul style="list-style-type: none"> Longer Spans 	Increases	Increases
RETROFIT PARAMETERS	EFFECT ON FNF	EFFECT ON DAMPING
<ul style="list-style-type: none"> Longer Spans 	Little or no effect	Increases
<ul style="list-style-type: none"> Longer Spans 	Little or no effect	Increases
<ul style="list-style-type: none"> 90x45 strong back on I-Joist bottom (perpendicular) (vertical 90x45 nailed to side of flat 90x45) 	Increases	Significantly increases

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