



## HARD SURFACE FLOORING POLICY

### **Declaration Provision:**

Article 25.3 of the Kirkland Central Condominium Declaration provides that an owner “. . . **may not change** the flooring from carpeting to hard surface flooring in a portion of the Unit that is over another Unit **without the prior written approval of the Board and the Owner of the Unit below**, which approval may not be unreasonably withheld.” The Article further provides that the Board “. . . may require a report from an acoustical engineer, the use of an acoustical mat or insulation under the flooring of the unit and/or maintenance of carpeting over specified areas of the Unit.”

### **Introduction:**

Impact noise is produced when the building structure is directly or indirectly impacted. Sound energy passes through the building structure and creates (re-radiates) noise in the nearby units. Examples of impact noise are footfalls, particularly on hard floors, banging doors and scraping furniture. This document provides a standard which the Board shall review all new floor systems in the Kirkland Central Condominium, and to which all Owners in the building must adhere.

### **Policy Purpose:**

Establish a policy that allows owners to install flooring of their choice, so long as (1) odors produced during the installation process will not unreasonably impact other residents and (2) the completed installation functions in a manner that does not exceed the objective noise transmission standards set out in this Policy.

### **Definitions:**

Impact Insulation Class To evaluate how well a floor insulates against structure borne (or impact) noise. ASTM E1007-04 denotes that a test should be performed using a tapping machine on the floor surface being evaluated. The machine consists of a motor which drives a shaft with cams that alternately release cylindrical hammers on the test surface at a carefully controlled distance (40 mm). Both the hammer weight and rate of dropping is standardized for all tapping machines designed for this test.

Testing can take place in the laboratory with careful isolation of the floor system under test or in the field in the installed condition. The test consists of operating the tapping machine in 4 orientations on the test floor and taking noise measurements in the room directly below the floor and machine. A suitable space and time average is obtained for each tapping machine position and the results are averaged to determine a single receiving room noise

level. All noise levels are recorded in the sixteen 1/3 Octave Bands from 100 Hz to 3,150 Hz.

The resulting noise spectrum in the receiving room is then compared to a family of standard curves and a curve fit is made to determine a single rating number uniquely associated with the best fit curve. This rating is the Impact Insulation Class or IIC. The lower the noise level in the receiving room, the higher the IIC rating.

When this test is done in the field and not a laboratory, it is called FIIC (Field Impact Insulation Class). Often the FIIC of a floor system is lower than the corresponding IIC because of noise traveling through weak points in the installed floor system. This flanking noise acts to increase the noise level in the receiving room and thus decreases the FIIC rating of the floor.

IIC (or FIIC) does not evaluate impact sounds that occur below 100 Hz. These low frequency sounds are often associated with the deflection of floor joists that have large spans between supports. The sounds have little relation to the specific floor surface type (wood, tile, etc.). A typical range of IIC values is given in the table below.

**Table 1: FIIC Rating and Corresponding Performance**

	<b>Performance</b>
Less than 45	<b>Poor</b> Footfall noise is clearly audible and objectionable
45 to 50	<b>Minimal</b> Footfall noise is easily audible and mildly objectionable
50 to 55	<b>Above Average</b> Footfall noise is slightly audible and typically not objectionable
55 to 60	<b>Very Good</b> Footfall noise is barely audible
60 +	<b>Excellent</b>

The International Building Code (IBC Chapter 12, Section 1207) recommends a minimum Impact Insulation Class (IIC) rating of 50, as tested in an acoustical laboratory, and minimum Field Impact Insulation Class (FIIC) rating of 45. This criterion is also consistent with the Uniform Building Code requirements. The code requirements represent a minimum standard of quality.

Decibel (dB) The unit of measure of sound. Decibels are logarithmic, equal to ten times the log ration of the sound pressure level divided by a reference pressure of twenty micro-Pascals.

Hz. Cycle per second.

One-Third Octave Band. A grouping of frequencies, the width of which is one-third of an octave band.

Flanking Noise. Noise that enters into a residence through walls or other paths, but not the floor separating the residences.

**Policy Benefits:**

- Homeowners retain freedom to choose what flooring to install in their homes.
- Homeowners retain a reasonable measure of peace and quiet when their upstairs neighbor installs new flooring.
- The acoustical integrity of the building is retained into the future, even though flooring within the building has changed through unit remodels.

**Scope:**

This Policy applies to any proposed change of flooring from carpeting to Hard Surface Flooring in any Residential Unit at Kirkland Central. No Owner shall install Hard Surface Flooring in place of carpeting in a Residential Unit without the prior written approval of the Board and of the Owner of the Unit located directly beneath the applicant's Unit. An Owner installing Hard Surface Flooring in place of carpeting shall demonstrate that the completed installation will meet the requirements of this Policy.

**Objective Standard:**

Installation of Hard Surface Flooring in place of carpeting in a Residential Unit must be completed to achieve a Field Impact Insulation Class (FIIC) rating of 55 or higher for all separating floor-ceiling assemblies between Units in all areas of the Unit where carpeting is replaced by Hard Surface Flooring.

**“Hard Surface Flooring”:**

The words “Hard Surface Flooring” include without limitation wood, stone, tile, granite, cement, laminate, vinyl or linoleum. The manner of affixing material to the ground, such as nailing, floating or cementing, does not change classification of material as Hard Surface Flooring. Uncertainty about whether a particular material is “Hard Surface Flooring” should be resolved in a way that advances the value preserving purposes of this Policy. For example, a non-carpet material can be considered Hard Surface Flooring where the materials behave like other Hard Surface Flooring materials in terms of the material's sound conducting qualities.

**Use of Materials Requiring Application of a “Finish”:**

Use of pre-finished materials is preferred over use of materials that require a finishing application. Application of finishing substances can cause odors that unreasonably impact other Owners. If an applicant requests Board approval of flooring material that requires one or more finishing applications, the applicant shall demonstrate to the Board's satisfaction that (a) application of the finish is not likely to unreasonably impact other Owners and that (b) applicant will fund the full temporary relocation expenses of all Owners who are unreasonably impacted by the application of the finish.

**Impact Insulation Requirements:**

1. An Owner will, at their own expense, perform a pre-installation acoustical test on the Unit. This acoustical test must measure the FIIC of the carpeted floor, the FIIC of the bare subfloor and the FIIC of the proposed underlayment and hard surface

flooring in the Unit where hard surface flooring will be installed. These test results must be submitted with the application. Floor assemblies must meet a field performance of not less than FIIC 55 for all hard surface floors.

2. Following Hard Surface Flooring installation, the owner will, at their expense, engage a Board-approved Acoustic Consultant to conduct acoustic tests to verify that the installation is compliant with the established criteria. A Board Approved Acoustic Consultant is any consultant that is a member in good standing of the National Council of Acoustical Consultants.
3. The tests will be performed according to ASTM E1007-04 standard, between the newly installed hard flooring of the modified unit and the room directly beneath. The Board will approve the test plan and may witness the tests. The testing firm will submit a copy of the test results to the Board for Board approval.
4. If the test fails, the owner is responsible to correct the installation deficiencies and retest at their expense.
5. The Board can act to assure compliance after the installation time period is exceeded. The owner can request an extension, if good faith efforts to complete a compliant floor installation are in evidence.

**Construction Examples:**

Generally, the laboratory performance of a floor underlayment will be 3 to 5 IIC points better than the field performance.

Floor underlayments that have demonstrated field performance equal to or better than that required for compliance are as follows:

- ½” Cork
- CeraZorb
- Dura-Son
- 10 mm Regupol QT
- ½” Kinetics SR Floorboard

Materials must be installed according to manufacturer’s instructions. Isolate any contact between the edges of the flooring and adjacent walls, cabinets or appliances using either the underlayment material or ¼” thick Dow Corning Ethafoam 222. Leave a 1/32” gap between the flooring and any baseboard trim.

Some of the most common mistakes made in floor installations are as follows:

1. Attaching the flooring through the resilient underlayment to the concrete floor.
2. Allowing the edges of the floor to touch adjacent walls, cabinets, or fixtures, thereby short-circuiting the resilient material.

3. Allowing the baseboard trim to touch the hard flooring, which also causes a short circuit via its attachment to the wall.
4. Using different adhesives than those recommended by the manufacturer.

**Testing:**

The completed installation shall achieve a FIIC performance rating of 55 or higher. *See "Objective Standard" above.*

- This performance must be achieved in accordance with the American Society for Testing and Materials (ASTM) E492-90(1996)e1 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine (hereinafter referred to as "Applicable Testing Procedures" or "Procedures") performed and documented by an independent acoustical testing company qualified to perform the Applicable Testing Procedures (hereinafter referred to as a "Qualified Acoustical Consultant"). *(Note: See Facility Manager for a list of Qualified Acoustical Consultants for purposes of conducting this acoustical testing.)*
- The applicant who had the flooring installed bears the burden of establishing to the Board's satisfaction that the completed installation meets or exceeds the FIIC 55 or higher performance standard this Policy established. (The Board may, in its sole discretion, allow a variance of not more than 3dB in test results, in order to account for any testing anomalies.)

Adopted by the Board on \_\_\_\_\_.

Signature \_\_\_\_\_  
(Board President)