

09 Abrasion resistance

The surface of floorings is abraded by traffic of walking and cart with casters. Sands brought by shoes from outdoor may also affect. Abrasion will cause not only the damage of flooring, but also bad appearance by the dirt stuck on its surface though it depends on traffic and maintenance.

Abrasion resistance of each vinyl floorings

Product Name		Overall Thickness (mm)	Abraded Depth (mm)	Maximum Limit Number of Walkers (Unit: thousand people)	Evaluation	
Vinyl Sheets	NW	NONWAXLEUM NW (TS7000 series)	2.0	0.05	480	A
		NONWAXLEUM NW (TS5000 series)	2.0	0.03	390	A
		MATURE NW	2.0	0.06	200	B
		DEODORANT NS TOWARE NW	2.0	0.03	100	C
		FLOORLEUM SOILUD NW	2.0	0.05	180	B
		FLOORLEUM LATTICE NW	2.0	0.05	180	B
		FLOORLEUM FLAKE NW	2.0	0.05	180	B
		FLOORLEUM NATTY NW	2.0	0.05	180	B
		SF FLOOR NW	2.8	0.04	160	B
		SF FLOOR NW 3.5MM (made-to-order product)	3.5	0.04	160	B
	HS	HOSPILEUM NW	2.0	0.04	140	B
		FLOORLEUM PLAIN/MARBLE	2.0	0.06	140	B
		ANTIBACTERIAL FLOORLEUM PLAIN/MARBLE	2.0	0.06	140	B
		OPELEUM	2.0	0.04	240	B
		FLOORLEUM RITTI EMOSS	2.0 (salient)	0.04	80	C
		SUPER K SHEET	2.0	0.04	240	B
		SUPER K SHEET EXCELLA	2.0	0.03	310	B
		NS4400 AQUATREAD	2.0	0.03	270	B
		NEW STANLOAD	2.0	0.03	400	A
		NS FLATTY	2.0	0.03	160	B
HS	BATHNA ARTI *1	2.8	0.08	-	-	
	BATHNA FLORE *1	3.5	0.14	-	-	
	BATHNA REALDESIGN *1	4.0	0.08	-	-	
Vinyl Tiles	NW	E-CLEAN PREMIUM NW *2	3.0	Unmeasurable	70	C
		E-CLEAN NONS NW *2	3.0	Unmeasurable	70	C
		E-CLEAN ECONO NW *2	3.0	Unmeasurable	50	D
		ROYAL WOOD/ROYAL STONE	3.0	0.10	70	C
	KT	MATICO V	2.0	0.34	140	B
		FASOL PLUS	3.0	0.37	190	B
	NW	LL FREE 40 NW-EX	4.0	Unmeasurable	50	D
		LL FREE EXCELLA (made-to-order product)	5.0	0.09	120	B
	Others	Linoleum	2.5	0.24	140	B

- FS heterogeneous vinyl sheet
- HS heterogeneous vinyl sheet with foamed layer
- FT heterogeneous vinyl tile
- KT vinyl composition tile
- ROA vinyl loose lay tile

*1 Tested by barefoot walking
 *2 Maximum limit number of walkers is calculated by actual walking test as JIS A 1454 isn't applicable for these products.

[Criteria for Evaluation]

Rank	Result (rev.)	Recommendable Application
A	A - 15,000 ≤	Commercial Use (Heavy duty)
B	B - 5,000 ≤, < 15,000	Commercial Use
C	C - 2,000 ≤, < 5,500	Commercial Use
D	D - < 2,500	Commercial, Residential Use

Wear layer = walkable surface layer of vinyl floorings even after abrasion.

In TOLI standard, wear layer is defined as follows;

- Products with print layer: Until the print layer becomes exposed on the surface
- Products with embossing: As long as embossed part is visible
- Specialty floorings: As long as its specific function remains.

Guidelines for Evaluating the Data;

Bigger number of effective abrasion (rev.) indicates better abrasion resistance. Categorize into A, B, C, and D based on test results.

Abrasion resistance of carpet tiles

	Overall Thickness(mm)	Abraded Weight (mg)	Evaluation	
Carpet Tiles	GA-100	6.5	70.4	a
	GA-3600	6.8	94.2	a
	GA-8900	6.0	35.4	a
	GX-5200 RUSCELLO	7.5	21.9	a
	GX-9300V CORENTE V	6.5	45.2	a
	DC-1100	10.0	54.3	a

*BCF Nylon has good abrasion resistance

[Criteria for Evaluation]

a - < 500mg
b - < 1,500mg
c - < 3,000mg
d - 3,000mg <

Guidelines for Evaluating the Data;

The less abraded weight means the pile is stronger against abrasion.

Test Method;

Abrasion resistance test (JIS A 1454)

Maximum number of revolution = wear layer/abraded depth x 1,000rev.
 Drop the sand on the specimen fixed on the revolving plate. Rotate 1,000 revs with the abrasion of steel plate, steel brush, and tapping machine. Compare the thickness before and after testing.

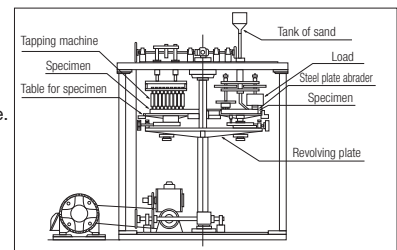
Maximum limit number of walkers (Unit: thousand people)

The average abraded depth of Matico V due to the traffic of 120,000 people is 0.168mm. Calculation method: Divide wear layer of Matico V (overall thickness: 2.0mm) by 0.168, then multiply by 120,000 (people).

$$\text{Maximum limit number of walkers} = \frac{2.0\text{mm (Overall thickness of Matico V)}}{0.168\text{mm (Abraded depth due to the traffic of 120,000 people)}} \times 120 \text{ thousand people} = 1,400 \text{ thousand people}$$

*Calculation method for other products

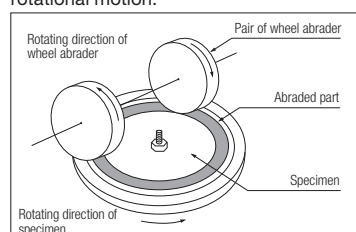
$$\text{Maximum limit number of walkers} = \frac{\text{Abradable layer of the product concerned (thickness)}}{\text{Abraded depth of the product concerned. (by test in accordance with JIS A 1454)}} \times \frac{\text{Test result of Abraded depth of Matico V in accordance with JIS A 1454}}{2.0\text{mm (Overall thickness of Matico V)}} \times 1,400 \text{ thousand people}$$



Test Method;

Abrasion resistance test (JIS L 1021-11)

Put the wheel-shaped abradant with loading on the circular specimen 130mm in diameter and rotate it. Measure the decreased weight by abrasion through rotational motion.



Load: 1kg per each wheel abradant

Number of revolution: 1,000

*All the testing was conducted by TOLI's in-house labs unless otherwise specified. The data shows actual test results, not guaranteed values.