

Table 4.2 Short Comings of Abrasion Tests

Test	ID for	Short name	Abrading medium	Main	Degree	Secondary	Abrasion	Primary problem	Secondary problems
test and				abrasive	of	abrasive	Wear		
type appendix				action	severity	action	Code		
U1	U.1.01	Fwa's cube tumbler	steel drum	impact	severe	rolling & sliding	R2S2I4	severe impact	measures impact resistance
U1	U.1.02	Cantabrian paver tumbler	steel drum	impact	severe	rolling & sliding	R2S2I4	severe impact	measures impact resistance
U2	U.2.01	Abram's tumbling balls	steel balls	impact	severe	rolling & sliding	R2S2I4	severe impact	expensive equipment
U2	U.2.02	PCI TM 7.8	steel balls	impact	severe	rolling & sliding	R1S1I3	severe impact	slow
U2	U.2.03	AS/NZS 4456.9	steel balls	impact	mild	rolling & sliding	R1S1I3		
U2	U.2.04	SABS 541	steel balls	impact	mild	rolling & sliding	R1S1I3	slow	
U2	U.2.05	Impact Box	steel balls	impact	mild	rolling & sliding	R1S1I3	slow	
U2	U.2.06	Horiguchi's bouncing balls	steel balls ¹	impact	mild		R1S1I3	slow	water, odd specimen shape
U2	U.2.07	ASTM C1138	steel balls ¹	impact	mild	sliding & rolling	R1S1I3	slow	water
U2	U.2.08	EN 154 (P.E.I. Test)	steel balls	rolling ²	mild	sliding	R1S1I0	too mild	
U2	U.2.09	DIN 51951	steel balls	rolling	severe		R3S1I2	severe rolling	expensive equipment
U2	U.2.10	Davis' rolling balls	steel balls ¹	rolling	severe		R3S1I2	severe rolling	
U2	U.2.11	Davis modified rolling balls	steel balls ¹	rolling	severe		R3S1I2	severe rolling	
U2	U.2.12	ASTM C779 Proc C	steel balls	rolling	severe	sliding (Heathcote)	R3S1I2	severe rolling	repeatability not good
U2	U.2.13	MA20	steel balls ¹	rolling	severe	sliding (Heathcote)	R3S1I2	severe rolling	repeatability not good
U2	U.2.14	CCA:TM6	steel balls ¹	rolling	severe	sliding (Heathcote)	R3S1I2	severe rolling	repeatability not good
U2	U.2.15	MA20SA	steel balls ¹	rolling	severe	sliding (Heathcote)	R3S1I2	severe rolling	repeatability not good
U2	U.2.16	CMA20	steel balls ¹	rolling	severe	sliding (Heathcote)	R3S1I2	severe rolling	repeatability?
U3	U.3.01	Caterpillar tracks	steel tracks	rolling	severe	sliding (slewing)	R3S3I3	severe rolling	expensive equipment
U3	U.3.02	Chained tyres	chained tyres	rolling	severe	sliding (cutting)	R3S3I3	severe rolling	expensive equipment
U3	U.3.03	Norcem studded tyres	studded tyres	rolling	severe	sliding (cutting)	R3S2I3	severe rolling	expensive equipment
U3	U.3.04	Finnish studded tyres	studded tyres	rolling	severe	sliding (cutting)	R3S2I3	severe rolling	expensive equipment
U3	U.3.05	Japanese studded tyres	studded tyres	rolling	severe	sliding (cutting)	R3S2I3	severe rolling	expensive equipment
U3	U.3.06	ASTM C779 Proc B	dressing wheels	rolling	severe	sliding (cutting)	R3S3I3	severe rolling	
U3	U.3.07	C&CA - dressing wheels	dressing wheels	rolling	severe	sliding (cutting)	R3S3I3	severe rolling	
U3	U.3.08	Smith's dressing wheels	dress wls + fine abras	rolling	severe	sliding (cutting)	R3S3I3	severe rolling	repeatability presumed unknown
U3	U.3.09	ASTM C944	dressing wheels	rolling	severe	sliding (cutting)	R3S3I3	severe rolling	repeatability not good
U4	U.4.01	Finnish steel wheels	steel wheels	rolling	severe	sliding (wheel slip)	R4S3I2	severe rolling	large track diameter
U4	U.4.02	NT BUILD 044	steel wheels	rolling	severe	sliding (wheel slip)	R4S2I2	severe rolling	large track diameter
U4	U.4.03	SP - Swedish steel wheels	steel wheels	rolling	mild	sliding (wheel slip)	R3S3I2	severe rolling	large track diameter
U4	U.4.04	Ahlers' steel wheels	steel wheels	rolling	mild	sliding (wheel slip)	R2S2I2	superceded by U.4.06	large track diameter
U4	U.4.05	Fruchtbaum's steel wheels	steel wheels	rolling	mild	sliding (wheel slip)	R2S2I2	superceded by U.4.06	large track diameter
U4	U.4.06	C&CA - steel wheels	steel wheels	rolling	mild	sliding (wheel slip)	R2S2I2		large track diameter
U4	U.4.07	Wastlund's steel wheels	steel wheels	rolling	mild	sliding (wheel slip)	R2S1I2	expensive equipment	large track diameter
U5	U.5.01	Dorry Hardness	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.02	DIN52108	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.03	NBN269	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.04	UNE7015	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.05	SI 6	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.06	BS 812 : Part113	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.07	NBN B15-233	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.08	NEN 2874	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.09	ONORM 3232	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	expensive equipment
U5	U.5.10	FBPM	fine abrasive	rolling	mild	sliding	R1S1I0	can't measure aggr/paste bond	
U5	U.5.11	NF P98-303	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	
U5	U.5.12	PREN 1338	fine abrasive	sliding	mild	rolling	R2S2I0	can't measure aggr/paste bond	
U5	U.5.13	Schuman's revolving discs	fine abrasive	sliding	mild	rolling	R2S2I0		large track diameter
U5	U.5.14	Scripture's revolving discs	fine abrasive	sliding	mild	rolling	R2S2I0		large track diameter
U5	U.5.15	ASTM C779 ProcA	fine abrasive	sliding	mild	rolling	R2S2I0		large track diameter
U5	U.5.16	PCI TM 7.11 (Grit)	fine abrasive	sliding	mild	rolling	R0S2I0	can't measure aggr/paste bond	
U5	U.5.17	Reciprocating pan	fine abrasive	sliding	mild	rolling	R2S2I0		outdated test
U5	U.5.18	Drum Sander	fine abrasive	impact	severe	sliding	R1S3I4	severe impact	
U5	U.5.19	NEN 7000	fine abrasive	impact	mild	sliding (cutting)	R0S2I3	aggregate does not contribute	
U5	U.5.20	Ruemelin's shotblast	fine abrasive	impact	mild	sliding (cutting)	R0S2I3	aggregate does not contribute	
U5	U.5.21	ASTM C418	fine abrasive	impact	mild	sliding (cutting)	R0S2I3	aggregate does not contribute	
U5	U.5.22	Water Sandblast	fine abrasive ¹	impact	mild	sliding (cutting)	R0S2I3	aggregate does not contribute	
U6	U.6.01	C&CA - steel pads	steel pads	sliding	mild	rolling	R1S2I0	too mild	large track diameter
U6	U.6.02	PCI TM 7.11 (wirebrush)	wire bristles	sliding	mild	(cutting)	R0S2I1	aggregate does not contribute	
U6	U.6.03	NEN 7000 (wirebrush)	wire bristles	sliding	mild	(cutting)	R0S2I1	aggregate does not contribute	expensive equipment
U6	U.6.04	Diamond tip scratcher	diamond scratcher	sliding	severe ³	(cutting)	R3S3I0	skill and interpretation required	
U6	U.6.05	Mohs scratch hardness	mineral scratchers	sliding	severe ³	(cutting)	R3S3I0	skill and interpretation required	abrasives difficult to obtain
U7	U.7.01	BRE screed tester	steel hammer	impact	severe ⁴		R0S0I4	only for screeds	
U7	U.7.02	Rebound hammer	steel hammer	impact	severe ⁵		R0S0I3	repeatability poor	
U8	U.8.01	ISAT	water	NDT		na	R0S0I0	aggregate does not contribute	
U8	U.8.02	ISAT	water	NDT		na	R0S0I0	aggregate does not contribute	
U8	U.8.03	UPV	sound	NDT		na	R0S0I0	measures core qualities	