

# ISO/TR 21555:2019-08 (E)

## Paints and varnishes - Overview of test methods on hardness and wear resistance of coatings

---

<b>Contents</b>		<b>Page</b>
Foreword .....		iv
Introduction .....		v
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>1</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>1</b>
<b>4</b>	<b>Hardness tests .....</b>	<b>2</b>
4.1	Indentation tests with resting indenter .....	2
4.1.1	Indentation test with Buchholz indenter .....	2
4.1.2	Indentation test with Knoop indenter .....	5
4.1.3	Indentation test with Pfund indenter .....	6
4.1.4	Indentation test with Vickers indenter .....	8
4.2	Indentation tests with oscillating indenter .....	10
4.2.1	Oscillation damping test with König pendulum .....	10
4.2.2	Oscillation damping test with Persoz pendulum .....	11
4.2.3	Oscillation damping test with rocker .....	13
<b>5</b>	<b>Wear resistance tests .....</b>	<b>14</b>
5.1	Single-scratch tests .....	14
5.1.1	Scratch test with pencils .....	14
5.1.2	Scratch test with ball stylus 1 .....	17
5.1.3	Scratch test with ball stylus 2 .....	20
5.1.4	Scratch test with conical stylus 3 .....	22
5.1.5	Scratch test with conical stylus 4 .....	25
5.1.6	Scratch test with conical stylus 5 .....	28
5.1.7	Scratch test with conical stylus 6 .....	31
5.1.8	Scratch test with disc-shaped stylus .....	33
5.1.9	Scratch test with U-shaped stylus .....	37
5.2	Multiple scratch tests .....	39
5.2.1	Multiple scratch test with locked abrasive wheel .....	39
5.2.2	Multiple scratch test with abrasive cylinder .....	40
5.2.3	Multiple scratch test with rotating abrasive wheels .....	42
5.2.4	Multiple scratch test with rotating brush .....	43
5.3	Dry abrasion tests .....	45
5.3.1	Abrasion test with locked abrasive wheel .....	45
5.3.2	Abrasion test with rotating abrasive wheels 1 .....	47
5.3.3	Abrasion test with abrasive wheels 2 .....	48
5.3.4	Abrasion test with rotating abrasive wheels 3 .....	50
5.3.5	Abrasion test with rotating abrasive wheels 4 .....	51
5.4	Wet abrasion tests .....	53
5.4.1	Scrub test with brush .....	53
5.4.2	Scrub test with non-woven web 1 .....	55
5.4.3	Scrub test with non-woven web 2 .....	57
5.5	Falling-sand tests .....	60
5.5.1	Falling-sand test with corundum granulate .....	60
5.5.2	Falling-sand test with quartz sand .....	62
Annex A (informative) Overview on test methods on hardness and wear resistance of coatings .....		64
Bibliography .....		69