

# ISO 27548:2024-07 (E)

## Additive manufacturing of plastics - Environment, health, and safety - Test method for determination of particle and chemical emission rates from desktop material extrusion 3D printer

---

<b>Contents</b>		<b>Page</b>
	<b>Foreword</b> .....	<b>iv</b>
	<b>Introduction</b> .....	<b>v</b>
<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>2</b>
<b>4</b>	<b>Abbreviated terms and symbols</b> .....	<b>4</b>
	4.1 Abbreviated terms.....	4
	4.2 Symbols.....	4
<b>5</b>	<b>Method overview</b> .....	<b>5</b>
<b>6</b>	<b>Requirements of the instrument for measurement</b> .....	<b>5</b>
	6.1 General.....	5
	6.1.1 Emission test chamber (ETC).....	5
	6.1.2 Instruments for chemical analyses.....	5
	6.1.3 Aerosol instruments.....	6
	6.2 General requirements of desktop MEX-TRB/P machine and test specimen.....	6
	6.2.1 Desktop MEX-TRB/P machine.....	6
	6.2.2 Filament.....	6
	6.2.3 Test specimen.....	7
<b>7</b>	<b>ETC conditions and test procedures</b> .....	<b>7</b>
	7.1 ETC general conditions.....	7
	7.2 ETC background concentration.....	8
	7.3 Preparation of ETC and desktop 3D printer.....	8
	7.4 Pre-extruding phase.....	9
	7.5 Extruding phase.....	9
	7.6 Post-extruding phase.....	9
	7.7 Sampling for particles and chemical substances.....	9
	7.7.1 Particles.....	9
	7.7.2 Chemical substances.....	9
	7.8 Measurement process.....	10
<b>8</b>	<b>Calculation of emission rate</b> .....	<b>11</b>
	8.1 Calculation of emission rate of particles.....	11
	8.2 Calculation of volatile organic compounds emission rate.....	13
<b>9</b>	<b>Test report</b> .....	<b>14</b>
	9.1 Data on test condition and method.....	14
	9.2 Data on filament and desktop 3D printer.....	15
	9.3 Description on standard test specimen.....	16
	9.4 Information about test laboratory.....	16
	9.5 Results.....	16
	<b>Annex A (normative) Standard operating condition of a desktop 3D printer</b> .....	<b>17</b>
	<b>Annex B (normative) Test specimen</b> .....	<b>18</b>
	<b>Annex C (informative) Examples of the particle and chemical emission rates</b> .....	<b>22</b>
	<b>Bibliography</b> .....	<b>25</b>