

# ISO 13271:2012-06 (E)

## Stationary source emissions - Determination of PM10/PM2,5 mass concentration in flue gas - Measurement at higher concentrations by use of virtual impactors

---

<b>Contents</b>		<b>Page</b>
Foreword .....		iv
Introduction .....		v
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	1
4	Symbols and abbreviated terms .....	4
4.1	Symbols .....	4
4.2	Abbreviated terms .....	5
5	Principle .....	6
5.1	General .....	6
5.2	Theory of virtual impactor .....	6
6	Specification of the two-stage virtual impactor .....	8
6.1	General .....	8
6.2	Separation curves .....	8
6.3	Verification of the separation curves .....	9
6.4	Operating conditions .....	9
7	Sampling train .....	12
7.1	Measuring setup .....	12
7.2	Equipment and working materials .....	13
8	Preparation, measurement procedure and post-treatment .....	15
8.1	General .....	15
8.2	Pre-treatment .....	15
8.3	Measurement procedure .....	16
8.4	Weighing procedure .....	17
8.5	Post-sampling treatment of weighed parts .....	18
9	Calculation of the results .....	18
10	Performance characteristics .....	19
10.1	Virtual impactor load .....	19
10.2	Detection limit .....	19
10.3	Measurement uncertainty .....	19
10.4	Particle losses .....	19
11	Test report .....	20
Annex A (informative) Physical property estimation for the calculation of sample volume flow rate .....		21
Annex B (informative) Errors by deviations from isokinetic sampling .....		25
Annex C (informative) Example of a two-stage virtual impactor .....		27

<b>Annex D (informative) Influence of variations in the flue gas temperature and flue gas composition on the Reynolds number .....</b>	<b>31</b>
<b>Annex E (informative) Entry nozzle .....</b>	<b>34</b>
<b>Annex F (informative) Equipment list .....</b>	<b>35</b>
<b>Annex G (normative) Determination of a representative sampling point .....</b>	<b>37</b>
<b>Annex H (informative) Generation of standard aerosol for virtual impactor calibration .....</b>	<b>39</b>
<b>Bibliography .....</b>	<b>40</b>