

Methods for determining the physico-chemical properties under REACH 1/2

Physico-chemical properties	Methods for determining the properties	International and national standards		
Melting/freezing point	Capillary methods	– Melting point devices with liquid bath	JIS ¹ K 0064	OECD³ Guidelines for the Testing of Chemicals – Method 102 <i>Melting Point/Melting Range</i> Regulation (EC) No 440/2008⁴ – Test A1 <i>Melting/freezing Point</i>
		– Melting point devices with metal block	ISO ² 1218 (E)	
		– Photocell detection		
	Hot stages and freezing methods	– Kofler hot bar	ANSI/ASTM ⁵ D 3451-76	
		– Melt microscope	DIN ⁶ 53736	
		– Meniscus method	ISO 1218 (E)	
– Freezing point methods		BS ⁷ 4695:1980		
Thermal analysis	– Differential Thermal Analysis	ASTM E 537-76		
	– Differential Scanning Calorimetry	ASTM E 537-76		
Pour point	– Pour point	ASTM D 97-66		
Boiling point	– Ebulliometer		ASTM D 1120-72	OECD Guidelines for the Testing of Chemicals – Method 103 <i>Boiling Point</i> Regulation (EC) No 440/2008 – Test A2 <i>Boiling Temperature</i>
	– Dynamic method			
	– Distillation process		ISO R 918, DIN 53171, BS 4591/71	
	– According to Siwoloboff		JIS K 0064	
	– Photocell detection			
	– Differential thermal analysis		ASTM E 537-76	
	– Differential scanning calorimetry		ASTM E 537-76	
Relative density	– Hydrometer			OECD Guidelines for the Testing of Chemicals – Method 109 <i>Density of Liquids and Solids</i> Regulation (EC) No 440/2008 – Test A3 <i>Relative Density</i>
	– Hydrostatic balance			
	– Immersion ball			
	– Pycnometer			
	– Air comparison pycnometer			
– Oscillating densitimeter				
Vapour pressure	– Isotenoscope		ASTM D 2879-86	OECD Guidelines for the Testing of Chemicals – Method 104 <i>Vapour Pressure</i> Regulation (EC) No 440/2008 – Test A4 <i>Vapour Pressure</i>
	– Dynamic			
	– Static			
	– Vapour pressure balance (effusion methods)			
	– Gas saturation			
– Spinning rotor				
Surface tension			ISO 304:1985, BS EN 14370:2004, ASTM D 1331	OECD Guidelines for the Testing of Chemicals – Method 115 <i>Surface Tension of Aqueous Solutions</i> Regulation (EC) No 440/2008 – Test A5 <i>Surface Tension</i>
Water solubility	– Column elution method – Flash method			OECD Guidelines for the Testing of Chemicals – Method 105 <i>Water Solubility</i> Regulation (EC) No 440/2008 – Test A6 <i>Water Solubility</i>
Partition coefficient n-octanol/water (K_{ow})	– Shake Flash Method – Generator Column Method – Slow-stirring Method – HPLC Method			OECD Guidelines for the Testing of Chemicals – Method 107 <i>Partition Coefficient: Shake Flask Method</i> – Method 123 <i>Partition Coefficient: Slow-Stirring Method</i> – Method 117 <i>Partition Coefficient: HPLC Method</i> Regulation (EC) No 440/2008 – Test A8 <i>Partition Coefficient</i>
Flash point	Equilibrium methods		ISO 1516, ISO 1523, ISO 3679, ISO 3680	Regulation (EC) No 440/2008 – Test A9 <i>Flash-Point</i>
	Non-equilibrium methods	– Abel apparatus	BS 2000 part 170, NF M 07-011, NF T 66-009	
		– Abel-Pensky apparatus	EN 57, DIN 51755 part 1, DIN 51755 part 2, NF M 07-036	
		– Pensky-Martens apparatus	ASTM D 93, BS 2000-34, DIN 51758, EN 11, ISO 2719, NF M 07-019	
		– Setafash apparatus	ASTM D 3278	
– Tag apparatus	ASTM D 56			

1. JIS: Japanese Industrial Standards. 2. ISO: International Organization for Standardization. 3. OECD: Organisation for Economic Co-operation and Development. 4. Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council. Regulation at last modified by regulation (EC) No 761/2009. 5. ASTM: American Society for Testing Materials. 6. DIN: Deutsches Institut für Normung. 7. BS: British Standards.

Methods for determining the physico-chemical properties under REACH 2/2

Physico-chemical properties	Methods for determining the properties	International and national standards	
Flammability		Pyrophoricity UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – For liquids: test N3 Part III, sub-section 33.3.1.5 – For solids: test N2 Part III, sub-section 33.3.1.4 Regulation (EC) No 440/2008 – Test A13 <i>Pyrophoric Properties of Solids and Liquids</i>	
		Flammability on contact with water UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – Test N5 Part III, sub-section 33.4.1.4 Regulation (EC) No 440/2008 – Test A12 <i>Flammability (contact with water)</i>	
		Flammability Regulation (EC) No 440/2008 – Test A11 <i>Flammability (gases)</i> – Test A10 <i>Flammability (solids)</i> UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – For solids: test N1, sub-section 33.2.1.4 Others tests for gases ISO 10156 Part 1, CEN ⁸ 1839, ASTM E 681	
Explosivity		UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – Test Series 1 to 8 Part I Regulation (EC) No 440/2008 test A14 <i>Explosive properties</i>	
Self-ignition temperature		Regulation (EC) No 440/2008 – Test A15 <i>Auto-ignition Temperature (liquids and gases)</i> – Test A16 <i>Relative Self-Ignition Temperature for Solids</i> UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – For solids: test N4, Part III, sub-section 33.4.1.6 Others tests for gazes & liquids IEC ⁹ 79-4, DIN 51794, ASTM E 659-78, BS 4056, NF T 20-037	
Oxidising properties		UN Recommendations on the Transport of Dangerous Good, Manual of Tests and Criteria – For solids: test O1, Part III, sub-section 34.4.1 – For liquids: test O2, Part III, sub-section 34.4.2 Regulation (EC) No 440/2008 – Test A17 <i>Oxidising Properties (solids)</i> – Test A21 <i>Oxidising Properties (liquids)</i> Test for gases ISO 10156	
Granulometry	Particle size distribution – Microscopic examination – Sieving – Sedimentation (gravitational settling) – Electrical Sensing Zone method – Phase Doppler Anemometry – Determination of fibre length and diameter distributions	CEN (1993). EN 481 document <i>Workplace atmospheres - Size fraction definitions for measurement of airborne particles</i>	OECD Guidelines for the Testing of Chemicals – Method 110 <i>Particle Size Distribution/Fibre Length and Diameter Distributions</i> Regulation (EC) No 440/2008 – Test A22 <i>Length weighted geometric mean diameter of fibres</i>
	Airborne dispersed particles – Cascade impaction – Laser scattering/diffraction – Rotating drum method (EN 15051) – Continuous drop method (EN 15051)	CEN (2006). EN 15051 document <i>Workplace atmospheres - Measurement of the dustiness of bulk materials - Requirements and reference test methods</i>	
	Inhalable fractions – Air jet sieve – Cyclons – Elutriation		
Dissociation constant	– Titration method – Spectrophotometric method – Conductometric method		OECD Guidelines for the Testing of Chemicals – Method 112 <i>Dissociation Constants in Water</i>
Viscosity	– Capillary viscometer	ISO 3104	OECD Guidelines for the Testing of Chemicals – Method 114 <i>Viscosity of Liquids</i>
	– Flow cup	ISO 3105	
	– Rotational viscometer	ISO 3218.2	
	– Rolling ball viscometer	DIN 53105	
	– Drawing ball viscometer	DIN 52007 part 2	

8. CEN : European Committee for Standardization. 9. IEC : International Electrotechnical Commission.

