

## SECTION G — PHYSICS

### G01 MEASURING; TESTING

#### G01N INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (measuring or testing processes other than immunoassay, involving enzymes or micro-organisms C12M, C12Q)

##### Note(s)

- In this subclass, the following terms are used with the meanings indicated:
  - "investigating" means testing or determining;
  - "materials" includes solid, liquid or gaseous media, e.g. the atmosphere.
- Attention is drawn to the Notes following the title of class G01.
- Investigating the properties of materials, specially adapted for use in processes covered by subclass B23K, is classified in group B23K 31/12.

##### Subclass index

SAMPLING, PREPARING.....	1/00
INVESTIGATING OR ANALYSING CHARACTERISED BY THE PROPERTY INVESTIGATED	
Mechanical strength; density; flow.....	3/00, 9/00, 11/00
Surface or boundary effects; characteristics of particles, permeability; friction, adhesive force.....	13/00, 15/00, 19/00
Resistance to atmospheric agents.....	17/00
INVESTIGATING OR ANALYSING CHARACTERISED BY THE METHOD USED	
Weighing; measuring pressure or volume of gas; mechanical.....	5/00, 7/00, 19/00
Optical; by microwaves; by radiation.....	21/00, 22/00, 23/00
Magnetic resonance or other spin effects.....	24/00
Thermal; electric, electrochemical, magnetic; sonic.....	25/00, 27/00, 29/00
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OTHER INVESTIGATING OR ANALYSING CHARACTERISED BY THE MATERIAL INVESTIGATED.....	33/00
Immunoassay.....	33/53
AUTOMATIC ANALYSIS.....	35/00
DETAILS NOT COVERED BY THE PRECEDING GROUPS.....	37/00

#### 1/00 Sampling; Preparing specimens for investigation (handling materials for automatic analysis G01N 35/00)

- 1/02 • Devices for withdrawing samples
- 1/04 • • in the solid state, e.g. by cutting
- 1/06 • • • providing a thin slice, e.g. microtome
- 1/08 • • • involving an extracting tool, e.g. core bit
- 1/10 • • in the liquid or fluent state
- 1/12 • • • Dippers; Dredgers [5]
- 1/14 • • • Suction devices, e.g. pumps; Ejector devices
- 1/16 • • • with provision for intake at several levels  
(G01N 1/12, G01N 1/14 take precedence)
- 1/18 • • • with provision for splitting samples into  
portions (G01N 1/12, G01N 1/14 take  
precedence; fraction-collection apparatus for  
chromatography B01D 15/08)
- 1/20 • • • for flowing or falling materials (G01N 1/12,  
G01N 1/14 take precedence)
- 1/22 • • in the gaseous state
- 1/24 • • • Suction devices
- 1/26 • • • with provision for intake from several spaces

- 1/28 • Preparing specimens for investigation (mounting  
specimens on microscopic slides G02B 21/34; means  
for supporting the objects or the materials to be  
analysed in electron microscopes H01J 37/20)

- 1/30 • • Staining; Impregnating
- 1/31 • • • Apparatus therefor [6]
- 1/32 • • Polishing; Etching
- 1/34 • • Purifying; Cleaning
- 1/36 • • Embedding or analogous mounting of samples [6]
- 1/38 • • Diluting, dispersing or mixing samples [6]
- 1/40 • • Concentrating samples [6]
- 1/42 • • Low-temperature sample treatment, e.g.  
cryofixation [6]
- 1/44 • • Sample treatment involving radiation, e.g. heat [6]

#### 3/00 Investigating strength properties of solid materials by application of mechanical stress

##### Note(s)

This group covers the stressing of materials not only below but also beyond the elastic limit, e.g. until breaking occurs.

- 3/02 • Details
- 3/04 • • Chucks

## G01N

- 3/06 • • Special adaptations of indicating or recording means
- 3/08 • by applying steady tensile or compressive forces (G01N 3/28 takes precedence)
- 3/10 • • generated by pneumatic or hydraulic pressure (G01N 3/18 takes precedence)
- 3/12 • • • Pressure-testing
- 3/14 • • generated by dead weight, e.g. pendulum; generated by spring tension (G01N 3/18 takes precedence)
- 3/16 • • applied through gearing (G01N 3/18 takes precedence)
- 3/18 • • Performing tests at high or low temperatures
- 3/20 • by applying steady bending forces (G01N 3/26, G01N 3/28 take precedence)
- 3/22 • by applying steady torsional forces (G01N 3/26, G01N 3/28 take precedence)
- 3/24 • by applying steady shearing forces (G01N 3/26, G01N 3/28 take precedence)
- 3/26 • Investigating twisting or coiling properties
- 3/28 • Investigating ductility, e.g. suitability of sheet metal for deep-drawing or spinning
- 3/30 • by applying a single impulsive force (investigating hardness by performing impressions under impulsive load G01N 3/48)
- 3/303 • • generated only by free-falling weight [7]
- 3/307 • • generated by a compressed or tensile-stressed spring; generated by pneumatic or hydraulic means [7]
- 3/31 • • generated by a rotating fly-wheel [7]
- 3/313 • • generated by explosives [7]
- 3/317 • • generated by electromagnetic means [7]
- 3/32 • by applying repeated or pulsating forces
- 3/34 • • generated by mechanical means, e.g. hammer blows
- 3/36 • • generated by pneumatic or hydraulic means
- 3/38 • • generated by electromagnetic means
- 3/40 • Investigating hardness or rebound hardness
- 3/42 • • by performing impressions under a steady load by indentors, e.g. sphere, pyramid (G01N 3/54 takes precedence)
- 3/44 • • • the indentors being put under a minor load and a subsequent major load, i.e. Rockwell system
- 3/46 • • • the indentors performing a scratching movement
- 3/48 • • by performing impressions under impulsive load by indentors, e.g. falling ball (G01N 3/54 takes precedence)
- 3/50 • • by measuring rolling friction, e.g. by rocking pendulum (G01N 3/54 takes precedence)
- 3/52 • • by measuring extent of rebound of a striking body (G01N 3/54 takes precedence)
- 3/54 • • Performing tests at high or low temperatures
- 3/56 • Investigating resistance to wear or abrasion
- 3/58 • Investigating machinability by cutting tools; Investigating the cutting ability of tools
- 3/60 • Investigating resistance of materials, e.g. refractory materials, to rapid heat changes
- 3/62 • Manufacturing, calibrating, or repairing devices used in investigations covered by the preceding subgroups

**5/00 Analysing materials by weighing, e.g. weighing small particles separated from a gas or liquid (G01N 9/00 takes precedence)**

- 5/02 • by absorbing or adsorbing components of a material and determining change of weight of the adsorbent, e.g. determining moisture content
- 5/04 • by removing a component, e.g. by evaporation, and weighing the remainder

**7/00 Analysing materials by measuring the pressure or volume of a gas or vapour**

- 7/02 • by absorption, adsorption, or combustion of components and measurement of the change in pressure or volume of the remainder
- 7/04 • • by absorption or adsorption alone
- 7/06 • • by combustion alone
- 7/08 • • by combustion followed by absorption or adsorption of the combustion products
- 7/10 • by allowing diffusion of components through a porous wall and measuring a pressure or volume difference
- 7/12 • • the diffusion being followed by combustion or catalytic oxidation
- 7/14 • by allowing the material to emit a gas or vapour, e.g. water vapour, and measuring a pressure or volume difference
- 7/16 • • by heating the material
- 7/18 • • by allowing the material to react
- 7/20 • • • the reaction being fermentation
- 7/22 • • • of dough

**9/00 Investigating density or specific gravity of materials; Analysing materials by determining density or specific gravity**

- 9/02 • by measuring weight of a known volume
- 9/04 • • of fluids
- 9/06 • • • with continuous circulation through a pivotally-supported member
- 9/08 • by measuring buoyant force of solid materials by weighing both in air and in a liquid
- 9/10 • by observing bodies wholly or partially immersed in fluid materials
- 9/12 • • by observing the depth of immersion of the bodies, e.g. hydrometers
- 9/14 • • • the body being built into a container
- 9/16 • • • the body being pivoted
- 9/18 • • • Special adaptations for indicating, recording, or control
- 9/20 • • by balancing the weight of the bodies
- 9/22 • • • with continuous circulation of the fluid
- 9/24 • by observing the transmission of wave or particle radiation through the material
- 9/26 • by measuring pressure differences
- 9/28 • • by measuring the blowing pressure of gas bubbles escaping from nozzles at different depths in a liquid
- 9/30 • by using centrifugal effects
- 9/32 • by using flow properties of fluids, e.g. flow through tubes or apertures
- 9/34 • • by using elements moving through the fluid, e.g. vane
- 9/36 • Analysing materials by measuring the density or specific gravity, e.g. determining quantity of moisture (methods of measurement G01N 9/02-G01N 9/32)

**11/00 Investigating flow properties of materials, e.g. viscosity, plasticity; Analysing materials by determining flow properties**

- 11/02 • by measuring flow of the material
- 11/04 • • through a restricted passage, e.g. tube, aperture

11/06	• • • by timing the outflow of a known quantity		
11/08	• • • by measuring pressure required to produce a known flow		
11/10	• by moving a body within the material		
11/12	• • by measuring rising or falling speed of the body; by measuring penetration of wedged gauges (G01N 11/16 takes precedence)		
11/14	• • by using rotary bodies, e.g. vane (G01N 11/16 takes precedence)		
11/16	• • by measuring damping effect upon oscillatory body		
<b>13/00</b>	<b>Investigating surface or boundary effects, e.g. wetting power; Investigating diffusion effects; Analysing materials by determining surface, boundary, or diffusion effects</b> (scanning-probe techniques or apparatus G01Q) [1, 7]		
13/02	• Investigating surface tension of liquids		
13/04	• Investigating osmotic effects		
<b>15/00</b>	<b>Investigating characteristics of particles; Investigating permeability, pore-volume or surface-area of porous materials</b> (identification of micro-organisms C12Q) [4]		
15/02	• Investigating particle size or size distribution (G01N 15/04, G01N 15/10 take precedence; by measuring osmotic pressure G01N 7/10) [4]		
15/04	• Investigating sedimentation of particle suspensions		
15/05	• • in blood [4]		
15/06	• Investigating concentration of particle suspensions (G01N 15/04, G01N 15/10 take precedence; by weighing G01N 5/00) [3]		
15/08	• Investigating permeability, pore volume, or surface area of porous materials		
15/10	• Investigating individual particles [4]		
15/12	• • Coulter-counters [4]		
15/14	• • Electro-optical investigation [4]		
<b>17/00</b>	<b>Investigating resistance of materials to the weather, to corrosion, or to light</b>		
17/02	• Electrochemical measuring systems for weathering, corrosion or corrosion-protection measurement (G01N 17/04 takes precedence) [5]		
17/04	• Corrosion probes [5]		
<b>19/00</b>	<b>Investigating materials by mechanical methods</b> (G01N 3/00-G01N 17/00 take precedence)		
19/02	• Measuring coefficient of friction between materials		
19/04	• Measuring adhesive force between materials, e.g. of sealing tape, of coating		
19/06	• Investigating by removing material, e.g. spark-testing		
19/08	• Detecting presence of flaws or irregularities		
19/10	• Measuring moisture content, e.g. by measuring change in length of hygroscopic filament; Hygrometers		
<b>21/00</b>	<b>Investigating or analysing materials by the use of optical means, i.e. using infra-red, visible, or ultra-violet light</b> (G01N 3/00-G01N 19/00 take precedence)		
		<b>Note(s)</b>	This group <u>does not cover</u> the investigation of spectral properties of light <u>per se</u> , or measurements of the properties of materials where spectral properties of light are sensed and primary emphasis is placed on creating, detecting or analysing the spectrum providing that the properties of the materials to be investigated are of minor importance ( <u>see</u> also Note (4) after the title of class G01). Those subjects are covered by group G01J 3/00.
		21/01	• Arrangements or apparatus for facilitating the optical investigation [3]
		21/03	• • Cuvette constructions [3]
		21/05	• • • Flow-through cuvettes (G01N 21/09 takes precedence) [3]
		21/07	• • • Centrifugal type cuvettes (G01N 21/09 takes precedence) [3]
		21/09	• • • adapted to resist hostile environments or corrosive or abrasive materials [3]
		21/11	• • Filling or emptying of cuvettes [3]
		21/13	• • Moving of cuvettes or solid samples to or from the investigating station [3]
		21/15	• • Preventing contamination of the components of the optical system or obstruction of the light path [3]
		21/17	• Systems in which incident light is modified in accordance with the properties of the material investigated (where the material investigated is optically excited causing a change in wavelength of the incident light G01N 21/63) [3]
		21/19	• • Dichroism [3]
		21/21	• • Polarisation-affecting properties (G01N 21/19 takes precedence) [3]
		21/23	• • • Bi-refringence [3]
		21/25	• • Colour; Spectral properties, i.e. comparison of effect of material on the light at two or more different wavelengths or wavelength bands [3]
		21/27	• • • using photo-electric detection (G01N 21/31 takes precedence) [3]
		21/29	• • • using visual detection (G01N 21/31 takes precedence) [3]
		21/31	• • • Investigating relative effect of material at wavelengths characteristic of specific elements or molecules, e.g. atomic absorption spectrometry [3]
		21/33	• • • using ultra-violet light (G01N 21/39 takes precedence) [3]
		21/35	• • • using infra-red light (G01N 21/39 takes precedence) [3]
		21/37	• • • • using pneumatic detection [3]
		21/39	• • • • using tunable lasers [3]
		21/41	• • Refractivity; Phase-affecting properties, e.g. optical path length (G01N 21/21 takes precedence) [3]
		21/43	• • • by measuring critical angle [3]
		21/45	• • • using interferometric methods; using Schlieren methods [3]
		21/47	• • Scattering, i.e. diffuse reflection (G01N 21/25, G01N 21/41 take precedence) [3]
		21/49	• • • within a body or fluid [3]
		21/51	• • • inside a container, e.g. in an ampoule (G01N 21/53 takes precedence) [3]
		21/53	• • • within a flowing fluid, e.g. smoke [3]
		21/55	• • Specular reflectivity [3]
		21/57	• • Measuring gloss [3]
		21/59	• • Transmissivity (G01N 21/25 takes precedence) [3]

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- 21/61 • • • Non-dispersive gas analysers [3]
- 21/62 • Systems in which the material investigated is excited whereby it emits light or causes a change in wavelength of the incident light [3]
- 21/63 • • optically excited [3]
- 21/64 • • • Fluorescence; Phosphorescence [3]
- 21/65 • • • Raman scattering [3]
- 21/66 • • electrically excited, e.g. electroluminescence [3]
- 21/67 • • • using electric arcs or discharges [3]
- 21/68 • • • using high frequency electric fields [3]
- 21/69 • • • specially adapted for fluids [3]
- 21/70 • • mechanically excited, e.g. triboluminescence [3]
- 21/71 • • thermally excited [3]
- 21/72 • • • using flame burners [3]
- 21/73 • • • using plasma burners or torches [3]
- 21/74 • • • using flameless atomising, e.g. graphite furnaces [3]
- 21/75 • Systems in which material is subjected to a chemical reaction, the progress or the result of the reaction being investigated (systems in which material is burnt in a flame or plasma G01N 21/72, G01N 21/73) [3]
- 21/76 • • Chemiluminescence; Bioluminescence [3]
- 21/77 • • by observing the effect on a chemical indicator [3]
- 21/78 • • • producing a change of colour [3]
- 21/79 • • • • Photometric titration [3]
- 21/80 • • • • Indicating pH value [3]
- 21/81 • • • • Indicating humidity [3]
- 21/82 • • • producing a precipitate or turbidity [3]
- 21/83 • • • • Turbidimetric titration [3]
- 21/84 • Systems specially adapted for particular applications [3]
- 21/85 • • Investigating moving fluids or granular solids [3]
- 21/86 • • Investigating moving sheets (G01N 21/89 takes precedence) [3]
- 21/87 • • Investigating jewels (G01N 21/88 takes precedence) [3]
- 21/88 • • Investigating the presence of flaws, defects or contamination [3]
- 21/89 • • • in moving material, e.g. paper, textiles (G01N 21/90, G01N 21/91, G01N 21/94 take precedence) [3, 7]
- 21/892 • • • • characterised by the flaw, defect or object feature examined [7]
- 21/894 • • • • • Pinholes [7]
- 21/896 • • • • • Optical defects in or on transparent materials, e.g. distortion, surface flaws [7]
- 21/898 • • • • • Irregularities in textured or patterned surfaces, e.g. textiles, wood [7]
- 21/90 • • • in a container or its contents (G01N 21/91 takes precedence) [3]
- 21/91 • • • using penetration of dyes, e.g. fluorescent ink [3]
- 21/93 • • • Detection standards; Calibrating [7]
- 21/94 • • • Investigating contamination, e.g. dust (G01N 21/85 takes precedence) [7]
- 21/95 • • • characterised by the material or shape of the object to be examined (G01N 21/89-G01N 21/91, G01N 21/94 take precedence) [7]
- 21/952 • • • • Inspecting the exterior surface of cylindrical bodies or wires (G01N 21/956 takes precedence) [7]
- 21/954 • • • • Inspecting the inner surface of hollow bodies, e.g. bores [7]
- 21/956 • • • • Inspecting patterns on the surface of objects [7]
- 21/958 • • • • Inspecting transparent materials [7]
- 22/00 **Investigating or analysing materials by the use of microwaves** (G01N 3/00-G01N 17/00, G01N 24/00 take precedence) [3]
- 22/02 • Investigating the presence of flaws [3]
- 22/04 • Investigating moisture content [3]
- 23/00 **Investigating or analysing materials by the use of wave or particle radiation not covered by group G01N 21/00 or G01N 22/00, e.g. X-rays, neutrons** (G01N 3/00-G01N 17/00 take precedence)
- 23/02 • by transmitting the radiation through the material
- 23/04 • • and forming a picture
- 23/05 • • • using neutrons [3]
- 23/06 • • and measuring the absorption
- 23/08 • • • using electric detection means
- 23/083 • • • • the radiation being X-rays (G01N 23/10-G01N 23/18 take precedence) [5]
- 23/087 • • • • • using polyenergetic X-rays [5]
- 23/09 • • • • the radiation being neutrons [3]
- 23/10 • • • • the material being confined in a container (G01N 23/09 takes precedence) [3]
- 23/12 • • • • the material being a flowing fluid or a flowing granular solid (G01N 23/09 takes precedence) [3]
- 23/14 • • • • • specially adapted for controlling or monitoring operations or for signalling
- 23/16 • • • • the material being a moving sheet (G01N 23/09, G01N 23/18 take precedence) [3]
- 23/18 • • • • Investigating the presence of flaws or inclusions (G01N 23/09 takes precedence) [3, 5]
- 23/20 • by using diffraction of the radiation, e.g. for investigating crystal structure; by using reflection of the radiation
- 23/201 • • by measuring small-angle scattering [2]
- 23/202 • • • using neutrons [3]
- 23/203 • • by measuring back scattering [2]
- 23/204 • • • using neutrons [3]
- 23/205 • • by means of diffraction cameras (G01N 23/201 takes precedence) [2]
- 23/206 • • • the radiation being neutrons [3]
- 23/207 • • by means of diffractometry using detectors, e.g. using an analysing crystal or a crystal to be analysed in a central position and one or more displaceable detectors in circumferential positions (G01N 23/201 takes precedence) [2]
- 23/22 • by measuring secondary emission [2]
- 23/221 • • by activation analysis [2]
- 23/222 • • • using neutrons [3]
- 23/223 • • by irradiating the sample with X-rays and by measuring X-ray fluorescence [2]
- 23/225 • • using electron or ion microprobe [2]
- 23/227 • • by measuring photoelectric effect, e.g. Auger electrons [2]
- 24/00 **Investigating or analysing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects** [3, 4, 5]
- 24/08 • by using nuclear magnetic resonance (G01N 24/12 takes precedence) [3]
- 24/10 • by using electron paramagnetic resonance (G01N 24/12 takes precedence) [3]
- 24/12 • by using double resonance [3]
- 24/14 • by using cyclotron resonance [3]

**25/00 Investigating or analysing materials by the use of thermal means** (G01N 3/00-G01N 23/00 take precedence)

- 25/02 • by investigating changes of state or changes of phase; by investigating sintering
- 25/04 • • of melting point; of freezing point; of softening point
- 25/06 • • • Analysis by measuring change of freezing point
- 25/08 • • of boiling point
- 25/10 • • • Analysis by measuring change of boiling point
- 25/12 • • of critical point; of other phase change
- 25/14 • by using distillation, extraction, sublimation, condensation, freezing, or crystallisation (G01N 25/02 takes precedence)
- 25/16 • by investigating thermal coefficient of expansion
- 25/18 • by investigating thermal conductivity (by calorimetry G01N 25/20; by measuring change of resistance of an electrically-heated body G01N 27/18)
- 25/20 • by investigating the development of heat, i.e. calorimetry, e.g. by measuring specific heat, by measuring thermal conductivity
- 25/22 • • on combustion or catalytic oxidation, e.g. of components of gas mixtures
- 25/24 • • • using combustion tubes, e.g. for micro-analysis
- 25/26 • • • using combustion with oxygen under pressure, e.g. in bomb calorimeter
- 25/28 • • • the rise in temperature of the gases resulting from combustion being measured directly
- 25/30 • • • • using electric temperature-responsive elements
- 25/32 • • • • • using thermoelectric elements
- 25/34 • • • • using mechanical temperature-responsive elements, e.g. bimetallic
- 25/36 • • • • • for investigating the composition of gas mixtures
- 25/38 • • • • using the melting or combustion of a solid
- 25/40 • • • the heat developed being transferred to a flowing fluid
- 25/42 • • • • continuously
- 25/44 • • • the heat developed being transferred to a fixed quantity of fluid
- 25/46 • • • • for investigating the composition of gas mixtures
- 25/48 • • on solution, sorption, or a chemical reaction not involving combustion or catalytic oxidation
- 25/50 • by investigating flash-point; by investigating explosibility
- 25/52 • • by determining flash-point of liquids
- 25/54 • • by determining explosibility
- 25/56 • by investigating moisture content
- 25/58 • • by measuring changes of properties of the material due to heat, cold, or expansion
- 25/60 • • • for determining the wetness of steam
- 25/62 • • by psychrometric means, e.g. wet-and-dry-bulb thermometers
- 25/64 • • • using electric temperature-responsive elements
- 25/66 • • by investigating dew-point
- 25/68 • • • by varying the temperature of a condensing surface
- 25/70 • • • by varying the temperature of the material, e.g. by compression, by expansion
- 25/72 • Investigating presence of flaws

**27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means**

(G01N 3/00-G01N 25/00 take precedence; measurement or testing of electric or magnetic variables or of electric or magnetic properties of materials G01R)

- 27/02 • by investigating impedance
- 27/04 • • by investigating resistance
- 27/06 • • • of a liquid (involving electrolysis G01N 27/26)
- 27/07 • • • • Construction of measuring vessels; Electrodes therefor [2]
- 27/08 • • • • which is flowing continuously
- 27/10 • • • • • Investigation or analysis specially adapted for controlling or monitoring operations or for signalling
- 27/12 • • • of a solid body in dependence upon absorption of a fluid; of a solid body in dependence upon reaction with a fluid
- 27/14 • • • of an electrically-heated body in dependence upon change of temperature
- 27/16 • • • • caused by burning or catalytic oxidation of surrounding material to be tested, e.g. of gas
- 27/18 • • • • caused by changes in the thermal conductivity of a surrounding material to be tested (G01N 27/20 takes precedence)
- 27/20 • • • Investigating the presence of flaws
- 27/22 • • by investigating capacitance
- 27/24 • • • Investigating the presence of flaws
- 27/26 • by investigating electrochemical variables; by using electrolysis or electrophoresis [5]
- 27/27 • • Association of two or more measuring systems or cells, each measuring a different parameter, where the measurement results may be either used independently, the systems or cells being physically associated, or combined to produce a value for a further parameter [5]
- 27/28 • • Electrolytic cell components
- 27/30 • • • Electrodes, e.g. test electrodes; Half-cells (G01N 27/414 takes precedence) [5]
- 27/31 • • • • Half-cells with permeable membranes, e.g. semi-porous or perm-selective membranes [5]
- 27/32 • • • • Calomel electrodes
- 27/327 • • • • Biochemical electrodes [5]
- 27/333 • • • • Ion-selective electrodes or membranes (glass electrodes G01N 27/36) [5]
- 27/34 • • • • Dropping-mercury electrodes
- 27/36 • • • • Glass electrodes
- 27/38 • • • • Cleaning of electrodes
- 27/40 • • • Semi-permeable membranes or partitions
- 27/401 • • • Salt-bridge leaks; Liquid junctions [5]
- 27/403 • • • Cells and electrode assemblies [5]
- 27/404 • • • • Cells with anode, cathode and cell electrolyte on the same side of a permeable membrane which separates them from the sample fluid [5]
- 27/406 • • • • Cells and probes with solid electrolytes [5]
- 27/407 • • • • for investigating or analysing gases [5]
- 27/409 • • • • • Oxygen concentration cells [5]
- 27/41 • • • • • Oxygen pumping cells [5]
- 27/411 • • • • • for investigating or analysing of liquid metals [5]
- 27/413 • • • Concentration cells using liquid electrolytes [5]
- 27/414 • • • Ion-sensitive or chemical field-effect transistors, i.e. ISFETS or CHEMFETS [5]
- 27/416 • • • Systems (G01N 27/27 takes precedence) [5]
- 27/417 • • • using cells and probes with solid electrolytes [5]

- 27/419 • • • • Measuring voltages or currents with a combination of oxygen pumping cells and oxygen concentration cells [5]
- 27/42 • • • Measuring deposition or liberation of materials from an electrolyte; Coulometry, i.e. measuring coulomb-equivalent of material in an electrolyte [5]
- 27/44 • • • • using electrolysis to generate a reagent, e.g. for titration [5]
- 27/447 • • • • using electrophoresis [5]
- 27/453 • • • • Cells therefor [5]
- 27/48 • • • • using polarography, i.e. measuring changes in current under a slowly-varying voltage
- 27/49 • • • • Systems involving the determination of the current at a single specific value, or small range of values, of applied voltage for producing selective measurement of one or more particular ionic species [5]
- 27/60 • by investigating electrostatic variables
- 27/61 • • Investigating the presence of flaws [3]
- 27/62 • by investigating the ionisation of gases; by investigating electric discharges, e.g. emission of cathode
- 27/64 • • • using wave or particle radiation to ionise a gas, e.g. in an ionisation chamber
- 27/66 • • • • and measuring current or voltage
- 27/68 • • • using electric discharge to ionise a gas
- 27/70 • • • • and measuring current or voltage
- 27/72 • by investigating magnetic variables
- 27/74 • • • of fluids (G01N 24/00 takes precedence)
- 27/76 • • • • by investigating susceptibility
- 27/80 • • • for investigating mechanical hardness, e.g. by investigating saturation or remanence of ferromagnetic material
- 27/82 • • • for investigating the presence of flaws
- 27/83 • • • • by investigating stray magnetic fields [3]
- 27/84 • • • • • by applying magnetic powder or magnetic ink [3]
- 27/85 • • • • • using magnetographic methods [3]
- 27/87 • • • • • using probes [3]
- 27/90 • • • • using eddy currents [3]
- 27/92 • by investigating breakdown voltage (G01N 27/60, G01N 27/62 take precedence) [3]

**29/00 Investigating or analysing materials by the use of ultrasonic, sonic or infrasonic waves; Visualisation of the interior of objects by transmitting ultrasonic or sonic waves through the object (G01N 3/00-G01N 27/00 take precedence) [4]**

- 29/02 • Analysing fluids (using acoustic emission techniques G01N 29/14) [5, 2006.01]
- 29/024 • • by measuring propagation velocity or propagation time of acoustic waves [2006.01]
- 29/028 • • by measuring mechanical or acoustic impedance [2006.01]
- 29/032 • • by measuring attenuation of acoustic waves [2006.01]
- 29/036 • • by measuring frequency or resonance of acoustic waves [2006.01]
- 29/04 • Analysing solids (using acoustic emission techniques G01N 29/14) [4, 5, 2006.01]
- 29/06 • • Visualisation of the interior, e.g. acoustic microscopy [4, 2006.01]
- 29/07 • • by measuring propagation velocity or propagation time of acoustic waves [2006.01]
- 29/09 • • by measuring mechanical or acoustic impedance [2006.01]

- 29/11 • • • by measuring attenuation of acoustic waves [2006.01]
- 29/12 • • • by measuring frequency or resonance of acoustic waves [5, 2006.01]
- 29/14 • • using acoustic emission techniques [5, 2006.01]
- 29/22 • • Details [5]
- 29/24 • • • Probes [5]
- 29/26 • • • Arrangements for orientation or scanning [5]
- 29/265 • • • • by moving the sensor relative to a stationary material [2006.01]
- 29/27 • • • • by moving the material relative to a stationary sensor [2006.01]
- 29/275 • • • • by moving both the sensor and the material [2006.01]
- 29/28 • • • providing acoustic coupling [5]
- 29/30 • • • Arrangements for calibrating or comparing, e.g. with standard objects [2006.01]
- 29/32 • • • Arrangements for suppressing undesired influences, e.g. temperature or pressure variations [2006.01]
- 29/34 • • Generating the ultrasonic, sonic or infrasonic waves [2006.01]
- 29/36 • • Detecting the response signal [2006.01]
- 29/38 • • • by time filtering, e.g. using time gates [2006.01]
- 29/40 • • • by amplitude filtering, e.g. by applying a threshold [2006.01]
- 29/42 • • • by frequency filtering [2006.01]
- 29/44 • • Processing the detected response signal [2006.01]
- 29/46 • • • by spectral analysis, e.g. Fourier analysis [2006.01]
- 29/48 • • • by amplitude comparison [2006.01]
- 29/50 • • • using auto-correlation techniques or cross-correlation techniques [2006.01]
- 29/52 • • • using inversion methods other than spectral analysis, e.g. conjugated gradient inversion [2006.01]

**30/00 Investigating or analysing materials by separation into components using adsorption, absorption or similar phenomena or using ion-exchange, e.g. chromatography (G01N 3/00-G01N 29/00 take precedence) [4]**

- 30/02 • Column chromatography [4]

**Note(s)**

In this group, the following term is used with the meaning indicated:

- "conditioning" means the adjustment or control of environmental parameters, e.g. temperature or pressure.
- 30/04 • • Preparation or injection of sample to be analysed [4]
- 30/06 • • • Preparation [4]
- 30/08 • • • • using an enricher [4]
- 30/10 • • • • using a splitter [4]
- 30/12 • • • • by evaporation [4]
- 30/14 • • • • by elimination of some components [4]
- 30/16 • • • • Injection (G01N 30/24 takes precedence) [4]
- 30/18 • • • • using a septum or microsyringe [4]
- 30/20 • • • • using a sampling valve [4]
- 30/22 • • • • in high pressure liquid systems [4]
- 30/24 • • • • Automatic injection systems [4]
- 30/26 • • • Conditioning of the fluid carrier; Flow patterns [4]
- 30/28 • • • • Control of physical parameters of the fluid carrier [4]
- 30/30 • • • • of temperature [4]

- 30/32 • • • • of pressure or speed (G01N 30/36 takes precedence) [4]
- 30/34 • • • • of fluid composition, e.g. gradient (G01N 30/36 takes precedence) [4]
- 30/36 • • • • in high pressure liquid systems [4]
- 30/38 • • • • Flow patterns [4]
- 30/40 • • • • using back flushing [4]
- 30/42 • • • • using counter-current [4]
- 30/44 • • • • using recycling of the fraction to be distributed [4]
- 30/46 • • • • using more than one column [4]
- 30/50 • • Conditioning of the sorbent material or stationary liquid [4]
- 30/52 • • • Physical parameters [4]
- 30/54 • • • Temperature [4]
- 30/56 • • • Packing methods or coating methods [4]
- 30/58 • • • the sorbent moving as a whole [4]
- 30/60 • • Construction of the column [4]
- 30/62 • • Detectors specially adapted therefor [4]
- 30/64 • • • Electrical detectors [4]
- 30/66 • • • • Thermal conductivity detectors [4]
- 30/68 • • • • Flame ionisation detectors [4]
- 30/70 • • • • Electron capture detectors (G01N 30/68 takes precedence) [4]
- 30/72 • • • Mass spectrometers [4]
- 30/74 • • • Optical detectors [4]
- 30/76 • • • Acoustical detectors [4]
- 30/78 • • • using more than one detector [4]
- 30/80 • • Fraction collectors [4]
- 30/82 • • • Automatic means therefor [4]
- 30/84 • • Preparation of the fraction to be distributed [4]
- 30/86 • • Signal analysis [4]
- 30/88 • • Integrated analysis systems specially adapted therefor, not covered by a single one of groups G01N 30/04-G01N 30/86 [4]
- 30/89 • Inverse chromatography, i.e. with the analyte in stationary phase [2006.01]
- 30/90 • Plate chromatography, e.g. thin layer or paper chromatography [4]
- 30/91 • • Application of the sample [4]
- 30/92 • • Construction of the plate [4]
- 30/93 • • • Application of the sorbent layer [4]
- 30/94 • • Development [4]
- 30/95 • • Detectors specially adapted therefor; Signal analysis [4]
- 30/96 • using ion-exchange (G01N 30/02, G01N 30/90 take precedence) [4]

**31/00 Investigating or analysing non-biological materials by the use of the chemical methods specified in the subgroups; Apparatus specially adapted for such methods [4]**

**Note(s)**

The observation of the progress of the reactions covered by groups G01N 31/02-G01N 31/22 by any of the methods specified in groups G01N 3/00-G01N 29/00, if this observation is of major importance, is classified in the relevant group covering the method.

- 31/02 • using precipitation
- 31/10 • using catalysis
- 31/12 • using combustion (G01N 25/20 takes precedence)
- 31/16 • using titration
- 31/18 • • Burettes specially adapted for titration
- 31/20 • using micro-analysis, e.g. drop reaction

- 31/22 • using chemical indicators (G01N 31/02 takes precedence)

**33/00 Investigating or analysing materials by specific methods not covered by groups G01N 1/00-G01N 31/00**

- 33/02 • Food
- 33/03 • • Edible oils or edible fats [4]
- 33/04 • • Dairy products
- 33/06 • • • Determining fat content, e.g. by butyrometer
- 33/08 • • Eggs, e.g. by candling
- 33/10 • • Starch-containing substances, e.g. dough
- 33/12 • • Meat; fish
- 33/14 • • Beverages
- 33/15 • Medicinal preparations [3]
- 33/18 • Water
- 33/20 • Metals
- 33/22 • Fuels; explosives
- 33/24 • Earth materials (G01N 33/42 takes precedence)
- 33/26 • Oils; viscous liquids; paints; inks (G01N 33/22 takes precedence)
- 33/28 • • Oils (edible oils or edible fats G01N 33/03) [4]
- 33/30 • • • for lubricating properties
- 33/32 • • Paints; inks
- 33/34 • Paper
- 33/36 • Textiles
- 33/38 • Concrete; lime; mortar; gypsum; bricks; ceramics; glass
- 33/40 • Grinding-materials
- 33/42 • Road-making materials (G01N 33/38 takes precedence)
- 33/44 • Resins; plastics; rubber; leather
- 33/46 • Wood
- 33/48 • Biological material, e.g. blood, urine (G01N 33/02, G01N 33/26, G01N 33/44, G01N 33/46 take precedence); Haemocytometers (counting blood corpuscles distributed over a surface by scanning the surface G06M 11/02) [3, 4]
- 33/483 • • Physical analysis of biological material [4]
- 33/487 • • • of liquid biological material [4]
- 33/49 • • • • blood [4]
- 33/493 • • • • urine [4]
- 33/497 • • • of gaseous biological material, e.g. breath [4]
- 33/50 • • Chemical analysis of biological material, e.g. blood, urine; Testing involving biospecific ligand binding methods; Immunological testing (measuring or testing processes other than immunological involving enzymes or micro-organisms, compositions or test papers therefor; processes of forming such compositions, condition responsive control in microbiological or enzymological processes C12Q) [3]

**Note(s)**

In this group, the following expression is used with the meaning indicated:

- "involving", when used in relation to a material, includes the testing for the material as well as employing the material as a determinant or reactant in a test for a different material.

**Note(s)**

In groups G01N 33/52-G01N 33/98, in the absence of an indication to the contrary, classification is made in the last appropriate place.

- 33/52 • • • Use of compounds or compositions for colorimetric, spectrophotometric or fluorometric investigation, e.g. use of reagent paper [3]
- 33/53 • • • Immunoassay; Biospecific binding assay; Materials therefor [4]
- 33/531 • • • • Production of immunochemical test materials [4]
- 33/532 • • • • • Production of labelled immunochemicals [4]
- 33/533 • • • • • • with fluorescent label [4]
- 33/534 • • • • • • with radioactive label [4]
- 33/535 • • • • • • with enzyme label [4]
- 33/536 • • • • • with immune complex formed in liquid phase [4]
- 33/537 • • • • • with separation of immune complex from unbound antigen or antibody [4]
- 33/538 • • • • • • by sorbent column, particles or resin strip [4]
- 33/539 • • • • • • involving precipitating reagent [4]
- 33/541 • • • • • • • Double or second antibody [4]
- 33/542 • • • • • • with steric inhibition or signal modification, e.g. fluorescent quenching [4]
- 33/543 • • • • • with an insoluble carrier for immobilising immunochemicals [4]
- 33/544 • • • • • • the carrier being organic [4]
- 33/545 • • • • • • Synthetic resin [4]
- 33/546 • • • • • • • as water suspendable particles [4]
- 33/547 • • • • • • • with antigen or antibody attached to the carrier *via* a bridging agent [4]
- 33/548 • • • • • • Carbohydrates, e.g. dextran [4]
- 33/549 • • • • • • with antigen or antibody entrapped within the carrier [4]
- 33/551 • • • • • • the carrier being inorganic [4]
- 33/552 • • • • • • Glass or silica [4]
- 33/553 • • • • • • Metal or metal coated [4]
- 33/554 • • • • • • the carrier being a biological cell or cell fragment, e.g. bacteria, yeast cells [4]
- 33/555 • • • • • • Red blood cell [4]
- 33/556 • • • • • • • Fixed or stabilised red blood cell [4]
- 33/557 • • • • • using kinetic measurement, i.e. time rate of progress of an antigen-antibody interaction [4]
- 33/558 • • • • • using diffusion or migration of antigen or antibody [4]
- 33/559 • • • • • • through a gel, e.g. Ouchterlony technique [4]
- 33/561 • • • • • Immuno-electrophoresis [4]
- 33/563 • • • • • involving antibody fragments [4]
- 33/564 • • • • • for pre-existing immune complex or autoimmune disease [4]
- 33/566 • • • • • using specific carrier or receptor proteins as ligand binding reagent [4]
- 33/567 • • • • • • utilising isolate of tissue or organ as binding agent [4]
- 33/569 • • • • • for micro-organisms, e.g. protozoa, bacteria, viruses [4]
- 33/571 • • • • • • for venereal disease, e.g. syphilis, gonorrhoea, herpes [4]
- 33/573 • • • • • for enzymes or isoenzymes [4]
- 33/574 • • • • • for cancer [4]
- 33/576 • • • • • for hepatitis [4]
- 33/577 • • • • • involving monoclonal antibodies [4]
- 33/579 • • • • • involving limulus lysate [4]
- 33/58 • • • • • involving labelled substances (G01N 33/53 takes precedence) [3]
- 33/60 • • • • • involving radioactive labelled substances [3]
- 33/62 • • • • • involving urea [3]
- 33/64 • • • • • involving ketones [3]
- 33/66 • • • • • involving blood sugars, e.g. galactose [3]
- 33/68 • • • • • involving proteins, peptides or amino acids [3]
- 33/70 • • • • • involving creatine or creatinine [3]
- 33/72 • • • • • involving blood pigments, e.g. hemoglobin, bilirubin [3]
- 33/74 • • • • • involving hormones [3]
- 33/76 • • • • • • Human chorionic gonadotropin [3]
- 33/78 • • • • • • Thyroid gland hormones [3]
- 33/80 • • • • • involving blood groups or blood types [3]
- 33/82 • • • • • involving vitamins [3]
- 33/84 • • • • • involving inorganic compounds or pH [3]
- 33/86 • • • • • involving blood coagulating time [3]
- 33/88 • • • • • involving prostaglandins [3]
- 33/90 • • • • • involving iron binding capacity of blood [3]
- 33/92 • • • • • involving lipids, e.g. cholesterol [3]
- 33/94 • • • • • involving narcotics [3]
- 33/96 • • • • • involving blood or serum control standard [3]
- 33/98 • • • • • involving alcohol, e.g. ethanol in breath [4]
- 35/00 Automatic analysis not limited to methods or materials provided for in any single one of groups G01N 1/00-G01N 33/00; Handling materials therefor [3]**
- 35/02 • • • using a plurality of sample containers moved by a conveyer system past one or more treatment or analysis stations [3]
- 35/04 • • • Details of the conveyer system [3]
- 35/08 • • • using a stream of discrete samples flowing along a tube system, e.g. flow injection analysis [3]
- 35/10 • • • Devices for transferring samples to, in, or from, the analysis apparatus, e.g. suction devices, injection devices [6]
- 37/00 Details not covered by any other group of this subclass [3]**