

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G01 MEASURING (counting [G06M](#)); TESTING (NOTES omitted)

G01M TESTING STATIC OR DYNAMIC BALANCE OF MACHINES OR STRUCTURES; TESTING STRUCTURES OR APPARATUS NOT OTHERWISE PROVIDED FOR {(devices for testing the performance of portable percussive tools with fluid-pressure drive [B25D 9/005](#))}

NOTE

Attention is drawn to the Note following the title of Class [G01](#).

WARNING

The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

[G01M 1/38](#) covered by [G01M 1/14](#) and [G01M 1/30](#) and subgroups

| | | | |
|-------------|---|-------------|---|
| 1/00 | Testing static or dynamic balance of machines or structures (balancing rotary bowls of centrifuges B04B 9/14 ; apparatus characterised by the means for holding wheels or parts thereof B60B 30/00 ; determining the stability factors of ships B63B ; stabilising of aircraft B64C 17/00 ; control systems for balancing automatically in operation G05 ; balancing rotors of dynamo-electric machines H02K 15/16) | 1/24 | . . . Performing balancing on elastic shafts, e.g. for crankshafts |
| 1/02 | . Details of balancing machines or devices | 1/26 | . . . with special adaptations for marking, e.g. by drilling |
| 1/04 | . . Adaptation of bearing support assemblies for receiving the body to be tested {(tyre chucks in general G01M 17/021)} | 1/28 | . . . with special adaptations for determining unbalance of the body <i>in situ</i> , e.g. of vehicle wheels |
| 1/045 | . . . {the body being a vehicle wheel} | 1/30 | . Compensating unbalance (G01M1/38 takes precedence; counterweights F16F 15/28) |
| 1/06 | . . Adaptation of drive assemblies for receiving the body to be tested | 1/32 | . . by adding material to the body to be tested, e.g. by correcting-weights (correcting-weights <i>per se</i> F16F 15/32) |
| 1/08 | . . Instruments for indicating directly the magnitude and phase of the unbalance (measuring electrical variables in general G01R) | 1/323 | . . . {using balancing liquid} |
| 1/10 | . Determining the moment of inertia | 1/326 | . . . {the body being a vehicle wheel} |
| 1/12 | . Static balancing; Determining position of centre of gravity (by determining unbalance G01M 1/14) | 1/34 | . . by removing material from the body to be tested, e.g. from the tread of tyres |
| 1/122 | . . {Determining position of centre of gravity} | 1/36 | . . by adjusting position of masses built-in the body to be tested |
| 1/125 | . . . {of aircraft} | 1/365 | . . . {using balancing liquid} |
| 1/127 | {during the flight} | 3/00 | Investigating fluid-tightness of structures (investigating permeability of porous material, investigating the presence of flaws in general G01N {membrane leak detection in blood dialysis A61M 1/1692 ; detecting infusion flow leakage A61M 5/16831 }) |
| 1/14 | . Determining unbalance (G01M 1/30 takes precedence) | 3/002 | . {by using thermal means} |
| 1/16 | . . by oscillating or rotating the body to be tested | 3/005 | . {using pigs or moles (G01M 3/246 , G01M 3/2823 take precedence)} |
| 1/18 | . . . and running the body down from a speed greater than normal | 3/007 | . {Leak detector calibration, standard leaks (G01M 3/207 takes precedence)} |
| 1/20 | . . . and applying external forces compensating forces due to unbalance | 3/02 | . by using fluid or vacuum |
| 1/22 | . . . and converting vibrations due to unbalance into electric variables (measuring vibrations in general G01H ; microphones or like acoustic electromechanical transducers H04R) | 3/022 | . . {Test plugs for closing off the end of a pipe (means for stopping flow from pipes F16L 55/10)} |
| 1/225 | {for vehicle wheels (<i>in situ</i> G01M 1/28)} | 3/025 | . . {Details with respect to the testing of engines or engine parts} |

- 3/027 . . . {Details with respect to the testing of elastic elements, e.g. gloves, condoms}
- 3/04 . . . by detecting the presence of fluid at the leakage point
- 3/042 . . . {by using materials which expand, contract, disintegrate, or decompose in contact with a fluid ([G01M 3/12](#) takes precedence)}
- 3/045 {with electrical detection means}
- 3/047 {with photo-electrical detection means, e.g. using optical fibres}
- 3/06 . . . by observing bubbles in a liquid pool
- 3/08 for pipes, cables or tubes; for pipe joints or seals; for valves; {for welds}
- 3/081 {for cables}
- 3/083 {for tubes}
- 3/085 {for pipe joints or seals ([G01M 3/088](#) takes precedence)}
- 3/086 {for valves}
- 3/088 {for welds}
- 3/10 for containers, e.g. radiators
- 3/103 {for flexible or elastic containers}
- 3/106 {for radiators}
- 3/12 . . . by observing elastic covers or coatings, e.g. soapy water
- 3/14 for pipes, cables or tubes; for pipe joints or seals; for valves; {for welds; for containers, e.g. radiators}
- 3/141 {for cables}
- 3/142 {for tubes}
- 3/143 {for pipe joints or seals}
- 3/144 {for valves}
- 3/145 {for welds}
- 3/146 {for containers, e.g. radiators}
- 3/147 {for flexible or elastic containers}
- 3/148 {for radiators}
- 3/16 . . . using electric detection means ([G01M 3/06](#), [G01M 3/12](#), [G01M 3/20](#), [G01M 3/24](#), [G01M 3/26](#) take precedence {[G01M 3/045](#) takes precedence})
- 3/165 {by means of cables or similar elongated devices, e.g. tapes ([construction of cables in general H01B](#))}
- 3/18 for pipes, cables or tubes; for pipe joints or seals; for valves; {for welds; for containers, e.g. radiators}
- 3/181 {for cables}
- 3/182 {for tubes}
- 3/183 {for pipe joints or seals}
- 3/184 {for valves}
- 3/185 {for welds}
- 3/186 {for containers, e.g. radiators}
- 3/187 {for flexible or elastic containers}
- 3/188 {for radiators}
- 3/20 . . . using special tracer materials, e.g. dye, fluorescent material, radioactive material
- 3/202 {mass spectrometer detection systems ([mass spectrometers H01J 49/26](#))}
- 3/205 {accessories and associated equipment, pump constructions ([pumps F04](#))}
- 3/207 {calibration arrangements}
- 3/22 for pipes, cables or tubes; for pipe joints or seals; for valves; {for welds; for containers, e.g. radiators}
- 3/221 {for cables}
- 3/222 {for tubes}
- 3/223 {for pipe joints or seals}
- 3/224 {for valves}
- 3/225 {for welds}
- 3/226 {for containers, e.g. radiators}
- 3/227 {for flexible or elastic containers}
- 3/228 {for radiators}
- 3/229 {removably mounted in a test cell ([test cells also in G01M 3/3281 and G01M 3/363](#))}
- 3/24 . . . using infrasonic, sonic, or ultrasonic vibrations
- 3/243 {for pipes}
- 3/246 {using pigs or probes travelling in the pipe}
- 3/26 . . . by measuring rate of loss or gain of fluid, e.g. by pressure-responsive devices, by flow detectors
- 3/28 . . . for pipes, cables or tubes; for pipe joints or seals; for valves {for welds ([not used](#))}
- 3/2807 {for pipes ([G01M 3/2892](#), [G01M 3/30](#) take precedence)}
- 3/2815 {using pressure measurements}
- 3/2823 {using pigs or moles traveling in the pipe}
- 3/283 {for double-walled pipes}
- 3/2838 {for cables ([G01M 3/30](#) takes precedence)}
- 3/2846 {for tubes ([G01M 3/30](#) takes precedence)}
- 3/2853 {for pipe joints or seals ([G01M 3/30](#) takes precedence)}
- 3/2861 {for pipe sections by testing its exterior surface}
- 3/2869 {for seals not incorporated in a pipe joint}
- 3/2876 {for valves ([G01M 3/30](#) takes precedence)}
- 3/2884 {for welds ([G01M 3/30](#) takes precedence)}
- 3/2892 {for underground fuel dispensing systems ([G01M 3/30](#) takes precedence)}
- 3/30 using progressive displacement of one fluid by another
- 3/32 . . . for containers, e.g. radiators
- 3/3209 {Details, e.g. container closure devices}
- 3/3218 {for flexible or elastic containers}
- 3/3227 {for radiators}
- 3/3236 {by monitoring the interior space of the containers}
- 3/3245 {using a level monitoring device ([G01M 3/3272](#) takes precedence)}
- 3/3254 {using a flow detector ([G01M 3/3245](#), [G01M 3/3272](#) take precedence)}
- 3/3263 {using a differential pressure detector ([G01M 3/3245](#), [G01M 3/3272](#) take precedence)}
- 3/3272 {for verifying the internal pressure of closed containers}
- 3/3281 {removably mounted in a test cell}
- 3/329 {for verifying the internal pressure of closed containers}
- 3/34 by testing the possibility of maintaining the vacuum in containers, e.g. in can-testing machines
- 3/36 . . . by detecting change in dimensions of the structure being tested
- 3/363 {the structure being removably mounted in a test cell}

- 3/366 . . . {by isolating only a part of the structure being tested}
- 3/38 . by using light ([G01M 3/02](#) takes precedence)
- 3/40 . by using electric means, e.g. by observing electric discharges
- 5/00 Investigating the elasticity of structures, e.g. deflection of bridges, air-craft wings ([G01M 9/00](#) takes precedence; strain gauges [G01B](#))**
 - 5/0008 . {of bridges}
 - 5/0016 . {of aircraft wings or blades}
 - 5/0025 . {of elongated objects, e.g. pipes, masts, towers or railways ([G01M 5/0058](#) takes precedence)}
 - 5/0033 . {by determining damage, crack or wear}
 - 5/0041 . {by determining deflection or stress}
 - 5/005 . . {by means of external apparatus, e.g. test benches or portable test systems}
 - 5/0058 . . . {of elongated objects, e.g. pipes, masts, towers or railways}
 - 5/0066 . {by exciting or detecting vibration or acceleration ([vibration testing of structures \[G01M 7/00\]\(#\)](#))}
 - 5/0075 . {by means of external apparatus, e.g. test benches or portable test systems ([G01M 5/005](#) takes precedence)}
 - 5/0083 . {by measuring variation of impedance, e.g. resistance, capacitance, induction}
 - 5/0091 . {by using electromagnetic excitation or detection}
- 7/00 Vibration-testing of structures; Shock-testing of structures ([G01M 9/00](#) takes precedence ; generating vibrations [B06](#), [G10](#), [H04R](#); vibration measurement [G01H](#); material testing [G01N 3/00](#))**
 - 7/02 . Vibration-testing {by means of a shake table}
 - 7/022 . . {Vibration control arrangements, e.g. for generating random vibrations}
 - 7/025 . . {Measuring arrangements}
 - 7/027 . . {Specimen mounting arrangements, e.g. table head adapters}
 - 7/04 . . Monodirectional test stands
 - 7/045 . . . {in a circular direction}
 - 7/06 . . Multidirectional test stands
 - 7/08 . Shock-testing
- 9/00 Aerodynamic testing; Arrangements in or on wind tunnels (building aspects [Section E](#); investigating properties of materials in general [G01N](#))**
 - 9/02 . Wind tunnels
 - 9/04 . . Details
 - 9/06 . Measuring arrangements specially adapted for aerodynamic testing
 - 9/062 . . {Wind tunnel balances; Holding devices combined with measuring arrangements ([measuring components of force in general \[G01L 5/16\]\(#\)](#))}
 - 9/065 . . {dealing with flow ([measuring volume flow \[G01F\]\(#\)](#); [measuring speed of fluids \[G01P 5/00\]\(#\)](#))}
 - 9/067 . . . {visualisation}
 - 9/08 . Aerodynamic models

- 10/00 Hydrodynamic testing; Arrangements in or on ship-testing tanks or water tunnels (building aspects [Section E](#); investigating properties of materials in general [G01N](#); {methods for designing, building, maintaining, converting, refitting, repairing or determining properties of vessels, not otherwise provided for and using towing tanks or model basins for designing [B63B 9/02](#); for determining vessel properties with respect to stability or balance [B63B 9/08](#); apparatus for indicating vessel attitude, e.g. inclination or duration of roll [B63B 39/00](#))}**
- 11/00 Testing of optical apparatus; Testing structures by optical methods not otherwise provided for**
 - 11/005 . {Testing of reflective surfaces, e.g. mirrors}
 - 11/02 . Testing of optical properties {of lenses}
 - 11/0207 . . {Details of measuring devices}
 - 11/0214 . . . {Details of devices holding the object to be tested}
 - 11/0221 . . {by determining the optical axis or position of lenses}
 - 11/0228 . . {by measuring refractive power}
 - 11/0235 . . . {by measuring multiple properties of lenses, automatic lens meters}
 - 11/0242 . . {by measuring geometrical properties or aberrations}
 - 11/025 . . . {by determining the shape of the object to be tested ([measuring contours or curvatures by optical means \[G01B 11/24\]\(#\)](#))}
 - 11/0257 . . . {by analyzing the image formed by the object to be tested}
 - 11/0264 {by using targets or reference patterns}
 - 11/0271 . . . {by using interferometric methods}
 - 11/0278 . . . {Detecting defects of the object to be tested, e.g. scratches or dust ([investigating the presence of flaws or contamination on materials by optical means \[G01N 21/88\]\(#\)](#))}
 - 11/0285 . . {by measuring material or chromatic transmission properties ([G01M 11/0292](#) takes precedence)}
 - 11/0292 . . {of objectives by measuring the optical modulation transfer function ([photometry \[G01J\]\(#\)](#))}
 - 11/04 . . Optical benches
 - 11/06 . . Testing of alignment of vehicle head-light devices
 - 11/061 . . . {Details of the mechanical construction of the light measuring system ([G01M 11/064](#) takes precedence)}
 - 11/062 . . . {using an indicator mounted on the head-light}
 - 11/064 . . . {by using camera or other imaging system for the light analysis}
 - 11/065 {details about the image analysis}
 - 11/067 . . . {Details of the vehicle positioning system, e.g. by using a laser}
 - 11/068 . . . {with part of the measurements done from inside the vehicle}
 - 11/08 . Testing of mechanical properties {([G01M 11/005](#) takes precedence)}
 - 11/081 . . {by using a contact-less detection method, i.e. with a camera}
 - 11/083 . . {by using an optical fiber in contact with the device under test [DUT]}
 - 11/085 . . . {the optical fiber being on or near the surface of the DUT}
 - 11/086 . . . {Details about the embedment of the optical fiber within the DUT}

- 11/088 . . {of optical fibres; Mechanical features associated with the optical testing of optical fibres ([material testing in general G01N](#))}
- 11/30 . {Testing of optical devices, constituted by fibre optics or optical waveguides (measuring a given physical parameter of optical fibres, [see the relevant subclasses, e.g. G01B, G01N](#); equipment for monitoring, testing or fault measuring in optical transmission systems [H04B 10/07](#))}
- 11/31 . . {with a light emitter and a light receiver being disposed at the same side of a fibre or waveguide end-face, e.g. reflectometers}
- 11/3109 . . . {Reflectometers detecting the back-scattered light in the time-domain, e.g. OTDR}
- 11/3118 {using coded light-pulse sequences}
- 11/3127 {using multiple or wavelength variable input source}
- 11/3136 {for testing of multiple fibers}
- 11/3145 {Details of the optoelectronics or data analysis}
- 11/3154 {Details of the opto-mechanical connection, e.g. connector or repeater}
- 11/3163 {by measuring dispersion}
- 11/3172 . . . {Reflectometers detecting the back-scattered light in the frequency-domain, e.g. OFDR, FMCW, heterodyne detection}
- 11/3181 . . . {Reflectometers dealing with polarisation}
- 11/319 . . . {Reflectometers using stimulated back-scatter, e.g. Raman or fibre amplifiers}
- 11/33 . . {with a light emitter being disposed at one fibre or waveguide end-face, and a light receiver at the other end-face}
- 11/331 . . . {by using interferometer}
- 11/332 . . . {using discrete input signals ([G01M 11/333 takes precedence](#))}
- 11/333 . . . {using modulated input signals}
- 11/334 {with light chopping means}
- 11/335 . . . {using two or more input wavelengths}
- 11/336 . . . {by measuring polarization mode dispersion [PMD]}
- 11/337 . . . {by measuring polarization dependent loss [PDL]}
- 11/338 . . . {by measuring dispersion other than PMD, e.g. chromatic dispersion}
- 11/35 . . {in which light is transversely coupled into or out of the fibre or waveguide, e.g. using integrating spheres ([G01M 11/31 takes precedence](#))}
- 11/37 . . {in which light is projected perpendicularly to the axis of the fibre or waveguide for monitoring a section thereof}
- 11/39 . . {in which light is projected from both sides of the fiber or waveguide end-face}
- 13/00 Testing of machine parts (investigating the cutting power of tools, [G01N](#), e.g. [G01N 3/58](#))**
- 13/005 . {Testing of sealing rings}
- 13/02 . Testing of gearing or of transmission mechanisms ([measuring efficiency G01L](#))
- 13/021 . . {of gearings}
- 13/022 . . {of power-transmitting couplings or clutches}
- 13/023 . . {of power-transmitting endless elements, e.g. belts, chains}
- 13/025 . . {Test-benches using a rotational drive and loading means; Load/drive simulation}

- 13/026 . . . {of the mechanical closed-loop type}
- 13/027 . . {Test-benches using force applying means, e.g. loading of drive shafts along several directions}
- 13/028 . . {Acoustic or vibration analysis}
- 13/04 . Testing of bearings
- 13/045 . . {by acoustic or vibration analysis}

15/00 Testing of engines

NOTE

Informative note

References listed below indicate IPC places which could also be of interest when carrying out a search in respect of the subject matter covered by the preceding group:

Measurement of mechanical vibrations in general [G01H](#)

Analysing gases in general [G01N](#)

Arrangements for testing electrical properties;

Arrangements for locating electric faults;

Arrangements for electrical testing characterised by what is being tested not provided for elsewhere [G01R 31/00](#).

- 15/02 . Details or accessories of testing apparatus
- 15/04 . Testing of internal-combustion engines, e.g. diagnostic testing of piston engines

NOTES

1. Informative note

References listed below indicate IPC places which could also be of interest when carrying out a search in respect of the subject matter covered by the preceding group:

Monitoring or diagnostic devices for exhaust-gas treatment apparatus [F01N 11/00](#)

Indicating or supervising devices of internal-combustion engines [F02B 77/08](#)

Running in of internal-combustion engines [F02B 79/00](#)

Controlling combustion engines [F02D](#)

Apparatus for testing, tuning or synchronising carburettors, e.g. carburettor flow stands [F02M 19/01](#)

Testing fuel-injection apparatus [F02M 65/00](#)

Testing internal-combustion engine ignition, e.g. timing [F02P 17/00](#)

Devices for determining the value of power, e.g. by measuring and simultaneously multiplying the values of torque and revolutions per unit of time, by multiplying the values of tractive or propulsive force and velocity [G01L 3/24](#)

Determining the characteristic of torque in relation to revolutions per unit of time [G01L 5/26](#)

Devices for detecting or indicating knocks in internal-combustion engines [G01L 23/22](#)

Devices for measuring pressure in inlet or exhaust ducts of internal combustion engines [G01L 23/24](#)

Means for indicating positions of pistons or cranks of internal-combustion engines by measuring pressure [G01L 23/30](#).

G01M

G01M 15/04
(continued)

2. Group [G01M 15/05](#) takes precedence over groups [G01M 15/042](#) and [G01M 15/06](#) - [G01M 15/12](#).

- 15/042 . . {by monitoring a single specific parameter not covered by groups [G01M 15/06](#) - [G01M 15/12](#)}
- 15/044 . . . {by monitoring power, e.g. by operating the engine with one of the ignitions interrupted; by using acceleration tests}
- 15/046 . . . {by monitoring revolutions (for detecting misfire [G01M 15/11](#))}
- 15/048 . . . {by monitoring temperature}
- 15/05 . . by combined monitoring of two or more different engine parameters
- 15/06 . . by monitoring positions of pistons or cranks
- 15/08 . . by monitoring pressure in cylinders
- 15/09 . . by monitoring pressure in fluid ducts, e.g. in lubrication or cooling parts
- 15/10 . . by monitoring exhaust gases {or combustion flame (analyses of gases *per se* [G01N](#))}
- 15/102 . . . {by monitoring exhaust gases}
- 15/104 {using oxygen or lambda-sensors (testing catalytic converters [F01N 3/18](#), [F01N 11/007](#))}
- 15/106 {using pressure sensors}
- 15/108 {using optical methods}
- 15/11 . . by detecting misfire
- 15/12 . . by monitoring vibrations
- 15/14 . Testing of gas-turbine plants or jet-propulsion plants

NOTE

Informative note

References listed below indicate IPC places which could also be of interest when carrying out a search in respect of the subject matter covered by the preceding group:

Rocket-engine plants characterised by specially adapted arrangements for testing or measuring [F02K 9/96](#).

- 17/00** **Testing of vehicles** ([G01M 15/00](#) takes precedence; testing fluid tightness [G01M 3/00](#); testing elastic properties of bodies or chassis, e.g. torsion testing [G01M 5/00](#); testing alignment of vehicle head-lighting devices [G01M 11/06](#); {testing brakes [G01L 5/28](#)})

- 17/007 . of wheeled or endless-tracked vehicles ([G01M 17/08](#) takes precedence)
- 17/0072 . . {the wheels of the vehicle co-operating with rotatable rolls ([G01M 17/022](#), [G01M 17/045](#), [G01M 17/065](#) take precedence)}
- 17/0074 . . . {Details, e.g. roller construction, vehicle restraining devices}
- 17/0076 . . . {for two-wheeled vehicles}
- 17/0078 . . {Shock-testing of vehicles (shock-testing of structures in general [G01M 7/08](#), [G01N 3/30](#))}
- 17/013 . . of wheels
- 17/02 . . of tyres
- 17/021 . . . {Tyre supporting devices, e.g. chucks (for balancing [G01M 1/04](#))}
- 17/022 . . . {the tyre co-operates with rotatable rolls}
- 17/024 {combined with tyre surface correcting or marking means (compensating unbalance [G01M 1/30](#); marking location of unbalance [G01M 1/26](#))}

- 17/025 . . . {using infrasonic, sonic or ultrasonic vibrations (for material testing in general [G01N 29/00](#))}
- 17/027 . . . {using light, e.g. infra-red, ultra-violet, holographic techniques (for material testing in general [G01N 21/00](#))}
- 17/028 . . . {using X-rays (for material testing in general [G01N 23/00](#))}
- 17/03 . . of endless-tracks
- 17/04 . . of suspension or of damping
- 17/045 . . . {the vehicle wheels co-operating with rotatable rollers}
- 17/06 . . of steering behaviour; of rolling behaviour (measuring steering angles [G01B](#); measuring steering forces [G01L](#))
- 17/065 . . . {the vehicle wheels co-operating with rotatable rolls}
- 17/08 . of railway vehicles
- 17/10 . . of suspensions, axles or wheels

99/00 Subject matter not provided for in other groups of this subclass

- 99/001 . {Testing of furniture, e.g. seats or mattresses}
- 99/002 . {Thermal testing (flaw detection [G01N 25/72](#))}
- 99/004 . {Testing the effects of speed or acceleration}
- 99/005 . {Testing of complete machines, e.g. washing-machines or mobile phones (testing of machine parts [G01M 13/00](#); testing of electric apparatus or components [G01R 31/02](#))}

NOTE

This group covers mechanical testing of complete machines

- 99/007 . {by applying a load, e.g. for resistance or wear testing ([G01M 99/001](#) takes precedence; testing the elasticity of structures [G01M 5/00](#))}
- 99/008 . {by doing functionality tests}