90.15 - Surveying (including photogrammetrical surveying), hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances, excluding compasses; rangefinders.

9015.10 - Rangefinders

9015.20 - Theodolites and tachymeters (tacheometers)

9015.30 - Levels

9015.40 - Photogrammetrical surveying instruments and appliances

9015.80 - Other instruments and appliances

9015.90 - Parts and accessories

(I) INSTRUMENTS AND APPLIANCES USED IN GEODESY, TOPOGRAPHY, SURVEYING OR LEVELLING

These are generally intended for use in the field, for example, in cartography (land or hydrographic maps); in the preparation of plans; for triangulation measurements; for calculating the area of a piece of land; in determining heights above or below some horizontal reference level; and for all similar measurements in constructional work (building roads, dams, bridges, etc.), in mining, in military operations, etc.

This group includes :

(1) Optical or opto-electronic **theodolites** (vernier reading, microscope, suspended (wall-stand type), universal, mining, etc., types), optical or opto-electronic **tachymeters (tacheometers)** (theodolites incorporating a rangefinder), **transits, gyrotheodolites, compass-clinometers, sighting clinometers** for use in survey or artillery, etc.

(2) **Optical levels** (spirit, autoset, telescopic, collimator, laser, etc.), generally used mounted on a tripod.

(3) **Alidades** (whether or not with a telescope), **optical squares** and cross-staffs (whether or not with prisms) and **pantometers** (with or without sighting telescope), **clinometers** (with a collimator or sighting telescope), used to determine gradients and inclines, **mining dials**, graphometers, heliostats for trigonometrical survey, etc.

(4) **Plane tables, land chains and other special measures for surveying** (including band-measures specialised thereto, winch-type measures for mine-shafts, etc.), pickets or ranging poles, whether or not graduated (of metal, wood, etc.), levelling staves (self-reading, telescopic, folding, etc.), electromagnetic distance measuring equipment (EDM) reflector prisms and poles.

This heading **does not cover** :

(a) Global positioning system (GPS) receivers (**heading 85.26**).

(b) Measuring instruments consisting of a steel band, waterproof tape, etc., and similar unspecified devices for taking linear measurements (**heading 90.17**).

(c) Revolution counters, mileometers and the like (**heading 90.29**).

(d) Levels (air bubble type, etc.) used in building or constructional work (e.g., by masons, carpenters or mechanics), and plumb-lines (**heading 90.31**).

(II) PHOTOGRAMMETRICAL INSTRUMENTS AND APPLIANCES

These are mainly used for plotting topographic, archaeologic, etc., maps, but they are also used for other purposes (e.g., study of tides, ground-swells, etc.). The maps, etc., are plotted from photographs or digital images taken from two different viewpoints a known distance apart, which must then be "restituted" (to obtain accurate information in respect of the shape, size and co-ordinates of objects in the image or photograph).

This apparatus consists essentially of :

(1) **The "erecting" apparatus** consisting mainly of a projector (with a light source), a negative-carrier, an objective and a projection table. This apparatus enables the scale to be changed, and it can also photographically correct negatives of aerial photographs which, in practice, contain errors in perspective, etc., due to variations in the terrain.

(2) **Restitution apparatus** (stereoplotting apparatus or photogoniometers) also called stereotopographs, stereoplanigraphs, "autographs", stereoplotters, stereocomparators, etc. These are complex apparatus used to plot the planigraphic details and contour lines constituting a map or plan, this operation generally being done continuously and without separate calculation.

(3) **Co-ordinatographs** of the type used with restitution apparatus; these bear the map on which the pencil controlled by the stereotopograph or the stereoplanigraph traces its indications.

(4) **Analytical stereomeasuring systems** which consist of an optomechanical apparatus, operated photogrammetrically, and a programmed calculator. These systems are used for visual or analytical interpretation of photographic or digital images.

But the heading **excludes** aerial survey photographic cameras (**heading 90.06**), and co-ordinatographs not designed for photogrammetric uses (**heading 90.17**).

(III) HYDROGRAPHIC INSTRUMENTS

Hydrography is the scientific description and plotting of water courses, depths, tide levels, etc. The majority of the instruments used for such purposes are, therefore, covered by the previous paragraphs.

(IV) OCEANOGRAPHIC OR HYDROLOGICAL INSTRUMENTS

(1) **Special level recorders**, for recording fluctuations in the level of lakes or rivers; they consist essentially of a float and recorder.

(2) **Bucket-wheel current meters and hydrometric paddle-wheels**, for measuring the speed of currents in rivers, canals, etc.

(3) **Swell or tide recorders**.

Industrial instruments based on the same working principles as the instruments described in paragraphs (IV) (1) and (2) above (e.g., liquid level indicators, flow meters, etc.) are, however, **excluded** (**heading 90.26**).

(V) METEOROLOGICAL INSTRUMENTS

It should be noted that this group **does not cover** thermometers, barometers, hygrometers and psychrometers, nor combinations of such instruments (**heading 90.25**).

The group does, however, include the following :

(1) **Wind direction indicators**, whether or not fitted with dials.

(2) **Anemometers**, i.e., meteorological instruments for measuring wind speed. One type consists of a rotor carrying three cup-shaped blades mounted on a vertical axis, readings being obtained by a counter. The other most common type consists of a kind of weather vane fitted with a tube in which the wind pressure is measured by a differential pressure gauge graduated in speed units. The group also covers **anemometers** in which a generator produces a fluctuating voltage which is then indicated on a voltmeter calibrated in wind speed.

It should be noted that special types of anemometers, for measuring the speed of air currents in mines, tunnels, chimneys, furnaces or other air passages, consisting essentially of a special type of fan and a dial, are **excluded** (**heading 90.26**).

(3) **Evaporation meters** (Piche, evaporation balance types, etc.).

(4) **Sunshine recorders** (glass sphere, sensitised paper types, etc.).

(5) **Nephoscopes**, for indicating the speed and direction of movement of clouds.

(6) **Ceilometers**, for determining the height of the cloud ceiling above the earth by indicating the angular elevation of a spot of light formed where a strong beam of light meets the cloud so that the height may be computed automatically by triangulation.

(7) **Visibility meters**, for measuring meteorological visibility or the capability of air to transmit light.

(8) **Rain gauges and indicators**, for measuring rainfall in a particular place. The simplest type consists of a funnel of known diameter fixed to a receptacle to collect the rain which is then measured in a calibrated tube.

(9) **Actinometers, solarimeters and pyrheliometers**, for measuring the intensity of solar rays or the total radiation received from the sky.

It should, however, be noted that the heading **excludes** simple or combined thermometers used for the same purpose (**heading 90.25**).

(10) **Aerological sounding apparatus** (radio-sonde or radio-wind apparatus) for suspending from a balloon or parachute. Such apparatus consist of instruments (thermometer, barometer and hygrometer) for high altitude research work, combined with a wireless transmitter enabling the instrument readings to be automatically recorded on the ground. When separately presented, the balloons and parachutes are **excluded** (**Chapter 88**).

(11) **Theodolites** for recording successive positions of sounding balloons.

(VI) GEOPHYSICAL INSTRUMENTS

Many geophysical instruments are **excluded**, for example, gas, sludge or soil analysis apparatus, photoelectric fluorometers and fluoroscopes (instruments using ultra-violet light to detect or identify numerous substances) (**heading 90.27**); electric or electronic measuring instruments (e.g., instruments for measuring resistivity, radioactivity counters, thermocouple instruments) (**heading 90.30**), etc.

The following remain in this heading :

(1) **Seismometers and seismographs**, for recording the time, duration and intensity of movements of a point on the earth's crust, and seismometers and seismographs used both for recording the various phenomena occurring during earthquakes, and in prospecting for mineral oil. In these instruments the seismic waves set up by an earthquake, or by the firing of an explosive charge, are converted into electric impulses.

(2) **Magnetic or gravimetric geophysical instruments used in prospecting for ores, oil, etc**. These highly sensitive instruments include magnetic balances, magnetometers, magnetic theodolites and gravimeters, torsion balances.

(3) **Electronic magnetic gradiometers** (also known as "proton magnetometers") which measure the gradient of the earth's magnetic field.

(4) **Circumferential acoustic scanning tools** which create a "picture" of a borehole by measuring the acoustic travel time of an ultrasonic signal emitted from a rotating transducer in the head of the tool.

(5) **Apparatus for measuring the inclination of a borehole**.

(VII) RANGEFINDERS

This group covers all types of optical or opto-electronic rangefinders for determining the distance between the instrument and a given object. They are used in surveying, photography and cinematography, by the armed forces, etc.

PARTS AND ACCESSORIES

Subject to the provisions of Notes 1 and 2 to this Chapter (see the General Explanatory Note), this heading also covers parts and accessories of the goods of this heading. Such parts and accessories include arrows for land chains.

On the other hand, monopods, bipods, tripods and similar articles, even though specially designed for instruments or appliances of this heading, are **excluded** (**heading 96.20**).