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NATIONAL BUREAU OF QUALITY AND  
TECHNICAL SUPERVISION

## **Real Estate Measurements Code (Partial)**

People's Republic of China National Standards 08/T17986–200; Issued on February 22, 2000; Implemented on August 1, 2000

### **Unit 1. Regulations for Real Estate Surveying**

#### ***1. Scope***

These standards specify the contents of, and basic requirements for, urban real estate surveying and are applicable to the real estate surveying of the built-up areas of cities and designated towns and of industrial and mining enterprises outside the built-up areas as well as adjacent residential areas.

The surveying of real estate in other areas may be conducted with reference to these standards.

#### ***2. Normative References***

The provisions contained in the following standards, by being referenced in these standards, also constitute provisions of these standards.

At the time of publication, the versions indicated were all valid. All standards may be revised, and the parties that use these standards should explore the possibility of using the newest versions of the following standards:

- GB/T2260–1995 People's Republic of China Administrative Region Division Code GB6962–1986

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English translation © 2011 M.E. Sharpe, Inc., from the Chinese text, “Fangchan celiang guifan (bufen). Zhonghua renmin gongheguo guojia biao zhun 08/T17986–200.” Translated by Ted Wang.

- 1:500, 1:1000, 1:2000 Scale Topographic Maps Aerial Photography Specifications GB/T17986. 2–2000
- Unit Two: Real Estate Maps CH1003—1995 Standards for Evaluating Quality of Surveying and Mapping

### **3. Measurement and Calculation of Real Estate Areas**

#### *3.1. Contents of the Measurement and Calculation of Real Estate Areas*

*3.1.1. Area measurement and calculation.* “Area measurement and calculation” refers to the measurement and calculation of horizontal surfaces, of which there are measurements and calculations of housing areas and of land areas. Measurements and calculations of housing area are composed of floor area, common area, property ownership area, and usable area.

*3.1.2. Housing floor area.* “Housing floor area” refers to the horizontal projected areas within the peripheries of all levels above the plinths of the outer walls (columns) and includes balconies, overhanging corridors, basements, outdoor staircases, and enclosed and structurally sound permanent structures 2.20 m or higher.

*3.1.3. Usage area of housing.* “Usage area of housing” refers to all indoor spaces and areas available for use, calculated in accordance with the horizontal projected area within the walls of the houses.

*3.1.4. Property rights area.* “Property rights area” refers to the building area within the housing over which the house owner exercises property rights by law. Property rights area is defined by registrations conducted at the real estate administrative departments of directly administered municipalities, cities, and counties.

*3.1.5. Common area.* “Common area” refers to the floor area that is occupied in common or used in common by all the property rights owners.

*3.1.6. Requirements for area measurement and calculation.* Measurement and calculation of all types of area must be independently conducted twice. The differences must be within specified limits, and the mean figure is to serve as the final result. For measuring distances, tape measures that have been certified by tests or other instruments and tools that are capable of attaining appropriate precision are to be used. Area units are to be denoted in square meters and be measured up to 0.01 m<sup>2</sup>.

#### *3.2. Provisions Relevant to Measurement and Calculation of Real Estate Area*

##### *3.2.1. Range for calculation of total building area.*

1. Calculation of the building area of single-story buildings that are permanent structures is to be based on one floor level; calculation of the area of multistory buildings is to be based on the sum of all floor levels.
2. The mezzanine, interlaying levels, technical levels, staircases, and elevator shafts, the portions of which are 2.20 m or higher, are to be calculated in building area.

3. Passages through housing, lobbies, and main halls of buildings are to be considered one floor level for calculating property area. Entrance halls and corridors within main halls 2.20 m or more are to be calculated according to their horizontal projected areas.
4. The areas of staircases and elevator shafts (scenic elevators), service lifts, garbage chutes, and piping conduits are to be calculated in accordance with the areas of natural floor levels in the housing.
5. The areas of staircases, boiler rooms, elevator machine rooms, and ramp structures, the portions of which are 2.20 m or higher, on the rooftops of buildings that are permanent structures 2.20 m higher, are to be calculated by their peripheral horizontal projected areas.
6. The areas of overhanging corridors and completely enclosed balconies are to be calculated according to their peripheral horizontal projected areas.
7. Outdoor covered stairs of a permanent nature are to be calculated according to their horizontal projected areas at each floor level.
- 1.<sup>1</sup> The areas of columned corridors connected to housing and of columned and covered corridors between two rooms are both to be calculated according to the horizontal areas on the periphery of their columns.
2. The areas of permanent and elevated walkways between two rooms are to be calculated according to their peripheral horizontal projected areas.
3. The areas of basements and semibasements that are 2.20 m or higher and their corresponding entrances and exits are to be calculated according to the peripheral horizontal projected areas of their outside walls (but not including light wells, moisture-proofing layers, and protective walls).
4. The areas of porches and storm porches with columns or envelope structures are to be calculated according to the horizontal projected areas peripheral to their columns or protective structures.
5. The areas within glass curtain walls that serve as the exterior of housing are to be calculated according to their peripheral horizontal projected areas.
6. Permanent structures with columns such as garages and goods sheds are to be calculated according to the peripheral horizontal projected areas of their columns.
7. The areas of houses that are built against hillsides, partially elevated by stilts, and have protective structures around them are to be calculated according to the peripheral horizontal area of any portion that is higher than 2.20 m.
8. Where houses have expansion joints, the expansions joints are to be calculated as housing areas if these connect with the interior of the houses.

### *3.2.2. Range for calculating one-half of housing area.*

1. The areas of a covered but noncolumned corridor that connects with housing

are to be calculated as half of the peripheral horizontal projected area of the corridor's envelope structure.

2. The area of a porch, garage, or goods shed with independent columns or a single row of columns that is categorized as a permanent structure is to be calculated as half of its covered horizontal projected area.
3. The area of a nonenclosed balcony or overhanging corridor is to be calculated as one half of the peripheral horizontal projected area of its envelope structure.
4. The area of a noncovered outdoor stairway is to be calculated as half of its horizontal projected area at each floor level.
5. The area of a covered but nonenclosed permanent overhead corridor (bridge way) is to be calculated as one half of its peripheral horizontal projected area.

### 3.2.3. *The scope of where floor area is not calculated.*

1. mezzanines, interlaying levels, and technical levels that are less than 2.20 m and basements and semibasements that are less than 2.20 m high;
2. components, accessories, decorative columns, decorative glass walls, stacks, plinths, steps, column-free awnings, and other objects that protrude from the walls of housing;
3. uncovered elevated walkways between houses;
4. the rooftops and cantilever platforms of buildings, gardens, and swimming pools on rooftops;
5. operating platforms and loading platforms of buildings and platforms between buildings for placing boxes and canisters;
6. the areas below overhangs and arcades that are used as roads and passageways for traffic;
7. housing that makes use of bridges, overhead causeways, and flyovers as roofing;
8. mobile housing, temporary housing, and simple makeshift housing;
9. independent chimneys, pavilions, towers, tanks, pools, and underground civil air defense trunk and branch passages; and
10. expansion joints between housing that do not connect with the interiors of housing.

## 3.3. *Measurement and Calculation of Land Area*

3.3.1. *The scope of measurement and calculation of land area.* Land area is measured in terms of *qiu*<sup>2</sup> units and includes the measurement and calculation of land area occupied by the building, other usable land, and other types of land.

The following types of land are not included in the land area:

1. alleys, pathways, and open spaces, the ownership of which is not clear;
2. road, streets, lanes, and other public lands under the jurisdiction of municipal governance;
3. publicly used riverbeds, ditches, and sewers;
4. land that has been requisitioned or apportioned or that belongs within the scope of original records of real estate licensing, and that planning departments have approved for the needs of municipal construction; and
5. other areas that are not recorded for land use in accordance with regulations.

The methods of measuring and calculating land area are as follows: The methods that may be employed for measuring and calculating land area include analysis and calculation by means of coordinates, on-site measurement and calculation, and graphical calculation.

### 3.4. Area Measurement Methods and Accuracy Requirements

#### 3.4.1. Coordinate analysis method.

1. Area calculations based on data from boundary point coordinate results tables and using the following formula:

$$InS = Xi(Yi + 1j = Yi - 1) \quad (18)$$

$$2i = 1 \text{ or } 1nS = Yi(Xi - 1j = Xi + 1) \quad (19)$$

$$2i = 1,$$

where:

$S$  = area,  $m^2$ ;

$Xi$  = vertical coordinate of the boundary points, m;

$Yi$  = horizontal coordinate of the boundary points, m;

$n$  = the number of boundary points,  $i$  = serial number of boundary points, compiled in clockwise order.

2. Errors in area are calculated with the following formula:

$$1nms = \pm mj8D2i - 1, i + li = 1 \quad (20)$$

where:

$ms$  = error in area,  $m^2$ ;

$mj$  = error in the point position specified in the corresponding grade point, m;

$Di - 1, I + 1j$  = diagonal lines/length in polygon, m.

### 3.4.2. Method for onsite distance measurements.

1. The area of a regular shape may be calculated on the basis of on-site measurements of the length of its sides; the area of an irregular shape is calculated by splitting it up into simple geometrical shapes and then calculating their respective areas.
2. Errors in area are calculated by means of the provisions in 3.2.6. The accuracy range is to be determined by the real estate administrative departments of each city in accordance with actual local circumstances.

3.4.3. *Method of interpretation.* For calculating area on maps, such methods as the planimeter method and the geometrical method may be used. All areas on the maps are to be calculated independently twice. The differences of the two area calculations may not exceed the stipulations of the following formula:

$$\Delta S = \pm 0.0003MS \quad (21)$$

Where:

$\Delta S$  = comparative difference of two area measurements, m<sup>2</sup>;

$S$  = the area measured and calculated, m<sup>2</sup>;

$M$  = the map scale denominator.

When using the graphic method to calculate area, the map area must be no less than 5 cm<sup>2</sup>. The distances on the maps are to be measured to 0.2 mm.

## 4. Changes in Measurements

### 4.1. General Provisions

4.1.1. *Changes in classification of measurements.* These comprise two types: Measurements for changes in current state and measurements for changes in ownership.

#### 4.1.2. Contents of measurements for changes in current state.

1. new housing constructions, demolitions, reconstructions, expansions, and changes in building structure and number of floors;
2. damages to and losses of housing, including from complete or partial demolitions, collapses, and conflagrations;
3. changes to outer walls, palings, fences, barbed wire fences, and other envelope structures and ancillary housing facilities;
4. widening of and alterations to roads, plazas, and riverbeds and changes to the boundaries of rivers, lakes, ditches, and ponds;
5. changes in place names and doorplate numbering; and
6. increases and reductions in the classified areas of housing and the land used for them.

## **Appendix B (Suggested Appendix) Floor Area and Apportionment of Common Area for Housing**

### ***B1. Measurement and Calculation of the Floor Areas of Complete Suites of Housing***

*B1.1. Floor area of complete sets of housing.* The floor area of complete suites of housing is composed of three parts: area used for housing space within the suites, the wall area, and the floor areas of balconies within the suites.

*B1.2. Use area within housing suites.* Use areas within suites of housing consist of the areas of usable space within the suites of housing and are calculated as horizontal projected areas according to the following stipulations:

1. The use area within housing suite is to be composed of the total areas of bedrooms, living rooms, hallways, passages, kitchens, bathrooms, storerooms, and wall closets in the suite.
2. The sum total of stairway areas at each floor level within housing suites is to be listed in the use area.
3. Chimneys, ventilation conduits, and piping wells within the housing suites that are not included in the structural area are to be listed under use area.
4. The thickness of interior wall surface decorations is to be listed under use area.

*B1.3. Area of walls within a housing suite.* The wall area within a housing suite consists of the area taken up by the protective walls that surround interior use space, load-bearing walls, or other load-bearing or supportive structures within the suites of housing. Among these, the partitioning wall between each housing suite, the partitioning walls between housing suites and public construction spaces, outer walls (including gables), and other commonly owned walls are to be listed under the wall surfaces within the suites approximating one half of their horizontal projected surfaces. Self-owned walls within housing suites are to, in accordance with their horizontal projected areas, be listed entirely as wall surfaces within housing suites.

*B1.4. The floor area of balconies within housing suites is to be calculated according to the stipulations in paragraph 8.2.* The floor areas of all balconies within housing suites are to be calculated according to the horizontal projected areas between the balcony peripheries and the outer walls of the housing. The floor areas of enclosed balconies are to be calculated as their entire horizontal projected area, and those of nonenclosed balconies are to be calculated as half of their horizontal projected area.

### ***B2. Formulas for Handling and Sharing Commonly Owned and Common-Use Areas***

*B2.1. Contents of commonly owned and common-use areas.* Commonly owned and common-use areas include commonly owned housing floor areas and commonly used housing use areas.

*B2.2. Principles for handling commonly owned and common-use areas.*

1. Where the parties with property rights have legal documents or agreements for the division of rights, implementation is to proceed in accordance with the documents or agreements.
2. Where there are no documents or agreements for the division of property rights, apportionment may be conducted in proportion to the floor areas of the relevant housing.

*B2.3. Formula for calculating the proportionate apportioning of commonly owned and common-use areas.* Apportionment of commonly owned and common-use areas in accordance with the relevant floor areas is to be calculated by means of the following formula:

$$\delta Si = K \cdot Si \quad \Sigma \delta Si K = \Sigma Si, \text{ where}$$

$K$  is the apportionment coefficient for the areas;

$Si$  is the floor area that all units share, m<sup>2</sup>;

$\delta Si$  is the area apportioned to all units that participate in the apportionment, m<sup>2</sup>;

$\Sigma \delta Si$  is the total amount of the apportionment area that needs to be apportioned, m<sup>2</sup>; and

$\Sigma Si$  is the floor area of all units that take part in the apportionment, m<sup>2</sup>.

**B3. Apportionment of Commonly Owned Floor Area**

*B3.1. Contents of commonly owned floor areas.* The contents of commonly owned floor area includes the following: elevator shafts, piping conduits, staircases, garbage chutes, transformer rooms, public lobbies, hallways, basements, guard duty rooms, and the floor areas of all common-use rooms and management-use rooms for the entire building, the areas of which are to be calculated according to their horizontal projected areas. Commonly owned floor areas also include partitioning walls between the housing suites and public constructions as well as the floor areas of half of the horizontal projected areas of external walls (including gables). Independently used basements, vehicle sheds, garages, guard rooms, management-use rooms that serve multiple buildings, and basements used as civil air defense installations are not listed as commonly owned floor areas.

*B3.2. Method of calculating commonly owned floor areas.* The commonly owned floor area of an entire building consists of the entire building's floor area, less the floor areas within each housing suite in the entire building and less the floor areas of independently used basements, vehicle sheds, garages, guard rooms, management-use rooms that serve multiple buildings, and basements used as civil air defense installations.

*B3.3. Method for the apportionment of commonly owned floor areas.*

1. The method for apportioning commonly owned floor areas in residential buildings: The apportionment area of commonly owned floor areas to be apportioned to each



housing suite in residential buildings as individual buildings is to be determined on the basis of the floor area within each housing suite, calculated in accordance with the method and calculation formula set forth in B2.

2. The method for apportioning commonly owned floor area in commercial-residential buildings: First, based on the floor areas used respectively for residential and commercial functions, the commonly owned floor areas in the building as a whole are apportioned as two parts, i.e., the floor areas in the entire building apportioned to and received by the residential sections, and the floor areas in the entire building apportioned to and received by the commercial sections. Next, the residential and commercial sections are to each conduct apportionments of the areas apportioned to them. The residential sections are to, on the basis of the whole building's commonly owned floor areas apportioned to them plus the residential sections' own commonly owned areas, and in line with the method and formula presented in B2, calculate and devise plans for the area apportioned to each housing suite. The commercial sections are to, on the basis of the whole building's commonly owned floor areas apportioned to them, plus their own commonly owned areas, apportion these to each floor level in accordance with the proportion of construction space in the housing suites on each floor. This will figure as part of the commonly owned floor area of each floor and will be added into the commonly owned floor area of each floor to obtain the floor's total commonly owned floor area. This will then be proportionately apportioned to the various suites of rooms on the floor on the basis of the floor area within each set, and thereby obtain the commonly owned area apportioned to and obtained by each suite of rooms.
3. Method of apportioning commonly owned floor area in multifunctional integrated buildings: The apportionment of commonly owned construction space in multifunctional integrated buildings is to be conducted in accordance with their respective functions and with reference to the method of calculating apportionments of commercial-residential buildings.

## Notes

1. The sequence begins again at "1." in the original.
2. *Qiu* is the character on the form next to the blank where the calculation for area is written.

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