architectural projection

accuracy grade

- clearness
- plan, section, elevation
- Elevation oblique + Plan oblique
- paraline projection + Perspective projection


oblique projection - axonometry

- The parallel rays of projection appear angular from above on object and image plane.
- The size of the picture is independent from the distance of the object to the image plane.
- This projection method can be a replacement of an accurate perspective.
- Axonometries are quick and easy to construct, they are consistent with perspectives from an endless distance.

Source: Thomae. Perspektive und Axonometrie. 2001 page 9

Oblique projection - axonometry

Elevation oblique

Plan Oblique

Plan oblique projection - axonometry

Axonometric drawings - better

- When circular elements exist on floor plan, it is usually easier to use axonometric drawings. In Axonometric drawings, the horizontal circles remain as true circles

Source: F. Ching, Architectural graphics pg 10
**Axonometric drawings for multistory**

- Multistory buildings can be represented with a number of plans to reveal subsequent floor levels.

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**Axonometric drawings w/ tonal value**

- Tonal value can be added to axonometric drawings to enhance the 3D quality.

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**Axonometric drawings w/ tonal value**

- Horizontal & vertical planes in axonometric drawings can be hatched with different pattern / tones.

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**Exercise 1**

Attention: the axonometry of the example on this page is only for your reference, because this example was sketched in 45-45.

60-30 axonometric:

1. Use a A3 tracing paper, draw a horizontal line near the bottom of the paper (about 2 cm from the edge).
2. Use a compass to set another 2 lines forming the 60-30 degree sandwiching the 90 degree in between for placing the plan.
3. Put the plan (1:100) under the tracing paper fitting into that 90 degree area.
4. Trace the floor plan onto the tracing paper.
5. Start drawing the vertical lines - all perpendicular to the tracing edge.
6. Measure the height of walls, doors and other vertical elements and represent them correctly on the vertical lines on the axonometric drawings.
7. Repeat it until all elements are depicted.
**Plan oblique - axonometry**

**Exercise 1**

**Isometric drawings**

**Orthographic projection**

**Isometric drawings**

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**Orthographic projection**

The vertical rays of projection encounter vertical on the image plane.
All lines and areas appear parallel to the image plane.
The size of the picture is independent from the distance of the object to the image plane.

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**Isometric drawings**

**Line weight for isometric drawings**

**Hierarchy of lines:**
- Profile of total field of each floor level
- Horizontal cut-lines
- Profile lines of individual elements (edge against space)
- Transits in form (corners)
- Material texture
- Vertical (light or dashed) lines to reinforce vertical relationships of structure, circulation, form

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**Source:** Weston, Key buildings of the twentieth century: plans, sections and elevations. 2004

**Source:** Browning, the principles of architectural drafting. A sourcebook of techniques and graphic standards. 1996 page 39

**Source:** Ching, Architectural graphics. 2003 page 115

**Source:** Thomae, Perspektive und Axonometrie. 2001 page 9

**Source:** Yanes, Domingues, Freehand drawing for architects and interior designers. 2005 page 60
**Isometric drawings**

**Expanded isometry**

- Isometric can also be used to illustrate vertical relationships in multistory buildings
- The building is expanded along Z-axis

Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 78

**Isometric drawings**

**Isometric drawings w/ tonal value**

- Horizontal planes in isometric drawings can be hatched with pattern / tones to reinforce the contrast between the vertical and horizontal planes/ elements

Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 78

**Isometric drawings**

**Isometric drawings w/ shades and shadows**

- Isometric are often used to create volumetric study or massing concept study

Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 78
Isometric drawings

Circle & curvilinear lines in paraline drawings

Axonometric drawings are also named plan oblique or elevation oblique. The true plan (either the floor plan or the elevation) is used to construct the axonometric drawings, type 45-45 emphasis more on the horizontal view, type 30-60 emphasis more on the vertical view.

Isometric drawings are constructed with a distorted plan as well as distorted elevations, all surfaces have equal emphasis.

Computer-supported isometry and axonometry

Orientation with support of a test object (ArchiCAD 5.0)

Choice of predefined oblique projections (ArchiCAD 5.0)

Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 80

Bird's eye axonometry or down-view axonometry

Source: Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 103

Worm's eye axonometry or up-view axonometry


Cut-away-axonometry

Source: Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 111
**Isometric drawing**  
**Exercise 2**

Attention: the example on this page is only for your reference, because this example was sketched as axonometry.

1. Use a A3 tracing paper, draw a horizontal line near the bottom of the paper (about 2 cm from the edge)
2. Use a compass to set another 2 lines forming the 30-30 degree sandwiching the 120 degree in between for redrawing the plan into this distorted shape
3. Measure from the plan (1:100) the horizontal dimensions of building elements and draw them along x and y axis of the isometric drawing, the complete floor area should be represented filling up the 120 degree on the tracing paper
4. Continue depicting plan elements onto the tracing paper
5. Start drawing the vertical lines – all perpendicular to the tracing edge
6. Measure the height of walls, doors and other vertical elements and represent them correctly on the vertical lines on the isometric drawings
7. Repeat it until all elements are depicted

Source: Weston. Key buildings of the twentieth century: plans, sections and elevations. 2004

**bibliography**

- Browning Hugh C. the principles of architectural drafting. A sourcebook of techniques and graphic standards. New York 1996
- Yanes, Magali Delagado; Domingues, Ernest Redondo. Freehand drawing for architects and interior designers. New York 2005