



Aalto-yliopisto
Insinöörityöiden
korkeakoulu

EEN-E4004 Fundamentals of HVAC Design

Lecture 3.4.2019

Preliminary Design Phase / Task 5

M.Sc Juho Lepistö

M.Sc Vikke Niskanen

Task 5

- Preliminary design phase
 - Site plan
 - Water and sewer design
 - Heating design
 - Ventilation design
 - Section drawings
 - System description
- Goal of this lecture: to go through all design work that is done in task 5 and cover all contents of design work

System description

- System description is a document where the designer describes:
 - what systems are selected into the project and reasoning for these choices
 - Main materials for systems and installation principles
 - Main hvac equipment (eg. Heating production machinery, AHUs etc)
 - Powers, flow rates etc. of main systems
 - Design criteria for main systems
- In the task the system description is done using Building 90 –classification system

Site plan

- Design work has to present the following things:
 - Connection points (domestic water, sewer, storm water)
 - Water pipe and sewer pipe routes outside
 - Pipe materials and sizes.
 - Sewer falls
 - Outside gullys (location on site and detail drawings)
 - Gullys for drainpipes (marked ST in 1.floor layout)
 - Connection gully to substructure draining
 - Outside parts of chosen heating system (district heating pipes, geothermal well etc.)

Water and sewer design

- Design work has to present the following things:
 - Location of water and sewer fixtures and connection pipe sizes
 - Floor drains (types and placement)
 - Location of water meter and hot water production unit
 - Sewer routes, materials, falls, location of sewer ventilation pipe
 - Water pipes installation principles, pipe routes and materials
 - Hidden or visible connection pipes
 - Location of manifolds and main pipe routes
 - Pipe insulations
 - Hot water circulation pipe route

Heating design

- Design work has to present the following things:
 - Heat distribution methods, materials and power dimensioning
 - Floor heating, (division of circuits, powers of circuits, location of manifolds)
 - Radiators, (powers, sizes, types and locations of radiators)
 - Preliminary placements for room temperature sensors/thermostats
 - Main pipe routing and pipe materials
 - Insulations
 - Placement of heat production unit

Ventilation design

- Design work has to present the following things:
 - Duct routes and installation principles (attic or near ceiling on the 1. floor)
 - Air devices and their air flows
 - Duct insulation principles
 - AHU and it's installation principles (attic or in technical room)
 - Principles of outdoor and exhaust air, air devices regarding them
 - Kitchen hood (with own roof fan or connected to AHU)
 - Silencers
 - Radon extract and fan
 - Replacement air for fireplace

Section drawing

- Design work has to present the following things:
 - Duct routes and installation principles (attic or near ceiling on the 1. floor)
 - Heating pipes and installation principles (near ceiling on the 1. floor or inside the floor slab)
 - Water pipes and sewers and installation principles (near ceiling on the 1. floor or inside the floor slab or under the floor slab)

Documents to be made in task 5

- System description
- Ventilation level drawing
- Water and sewer level drawing
- Heating level drawing
- Section drawing
- Site plan

We highly recommend to draw the drafts by hand on printed paper and scan the drawings

CAD drawings are not accepted

How the course continues

- Tasks 1 ... 5 deadline on Sunday 14.4.2019 at 23.59
 - Completion of the tasks are mandatory to complete the course
- Individual feedback and evaluation on tasks is given on lecture 17.4.2019 klo 16.15-20
- Introduction to MagiCAD design program is given on the lecture on 17.4.2019 after feedback and evaluation on tasks
- First MagiCAD practise is on 24.4.2019 from 16.15-18 at R001/Y338
- Vikke is on vacation from wed 3.4. ... su 14.4., please contact Juho for advise on the tasks if needed