



## Hysopt private tender description

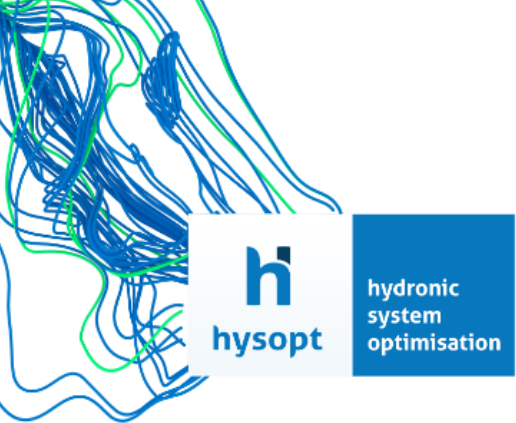
### **A. Hydraulic concept optimisation**

The total energy consumption of the installation and the thermal comfort achieved strongly rely on the hydraulic design and the control strategy of the production, distribution and emittance of cooling and heating. In order to achieve an optimal hydraulic configuration with the best suited control strategy, the system performances must be quantified in the design phase using dynamic system simulation.

The following checks, calculations and simulation results must be presented with the Hysopt software:

- System check: compatibility analysis of the hydraulic configuration and hydraulic circuits to detect any missing or redundant hydraulic components.
- Calculation of design flow rates and temperature regimes propagated throughout the entire installation, taking the energy and mass balances in all pipework nodes into account.
- Pipework sizing with regard to the maximum velocities or specific pressure drop. The sizing of pipework must take the density and viscosity of the medium into account.
- The average annual production efficiency from all cold and heat/cooling production assets (boiler, heat pump, CHP, chillers...) whereby the simulations take into account the constantly changing system variables (flow rate, temperatures), the hydraulic concept, and the hydraulic configuration and its impact on the production efficiency.
- The thermal pipework losses and the average annual thermal distribution efficiency.
- The dynamic simulated energy consumption of the pumps taking into account the variable pump pressure, flow rate and pump efficiency.
- The average annual system efficiency in which the above efficiencies are aggregated.
- Load duration curves for the individual heating and cooling production assets and their production share.

The designer/consultant presents at least three alternative and distinct system variants to the client in accordance with the above indicators. The designer makes the calculation model of the preferred hydraulic concept available for the client and employers representatives for further component optimisation after approval from the client.



**B. Hydraulic component optimisation**

In order to achieve optimal system performances, all hydraulic components must be carefully and correctly sized and selected in a mutually optimal combination. The selection of all pumps, control valves and balancing valves must be made with the help of the Hysopt software using iterative optimisation whereby:

- a minimum pump head is achieved
- the desired valve authorities are respected
- the balancing valves and their pre-settings are calculated in order to achieve an optimal hydraulic balance and to accelerate the commissioning process

Based on this software, a calculation note must be proposed that states:

- Kvs values for all control valves
- Kv values for all balancing valves, including pre-settings
- Flow rates and pump heads for all pumps
- The actual (calculated) valve authorities versus the minimum desired valve authority
- The actual (calculated) flow rates versus the design flow rates for all thermal end units and production assets.
- Control characteristics for all control valves within the plantrooms, behaviour between the valve position and the controlled variable (flow rate, temperature)
- Simulated pump energy consumption based on the selected hydraulic components

The final as-built calculation model (P&ID digital twin) is made available to the client, contractor or operator upon completion of the implementation for provisional acceptance.

To implement in the scope of works:

Post	Unit price	Total
hydraulic component optimisation using Hysopt software	€5/kW full load design capacity	€_xxxx