Advanced Process Integration

DELIVERING CUTTING-EDGE TECHNOLOGY

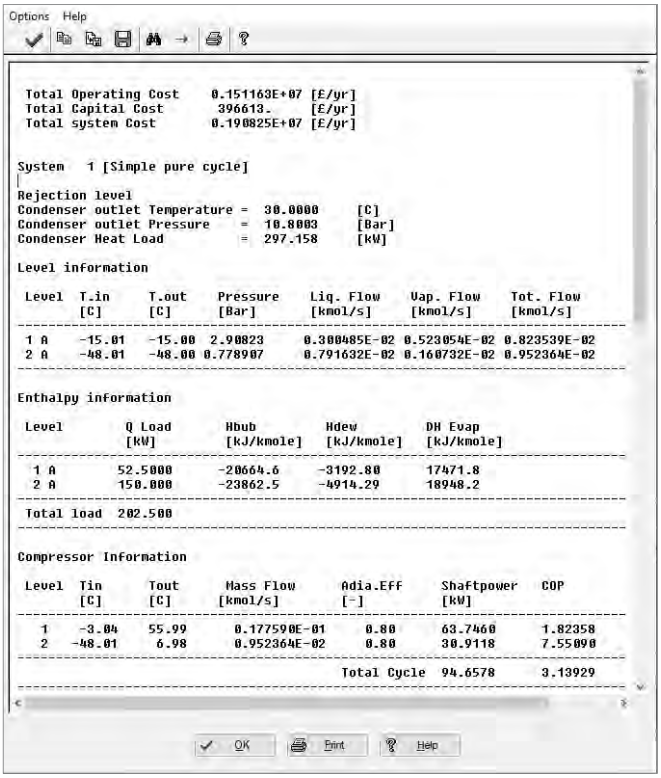
CRYO-net
Data Sheet

CRYO-net is the software package used for the design of low temperature (sub-ambient) processes.

Low temperature processes require heat rejection to refrigeration systems. The result is that the operating costs for such processes are usually dominated by the cost of power to run the refrigeration system. For large-scale systems, multiple levels of refrigeration, cascaded systems and mixed refrigerants are used. Such complex refrigeration systems can be analysed using CRYO-net. Cascade and mixed refrigerant systems can be analysed. For mixed refrigerants, CRYO-net can be used to optimise refrigerant composition.

Targeting Low Temperature Systems

CRYO-net can target minimum shaftwork for simple and complex refrigeration cycles. Targets are based on rigorous thermodynamic calculations and have high accuracy when compared with rigorous simulation.



Refrigeration systems report

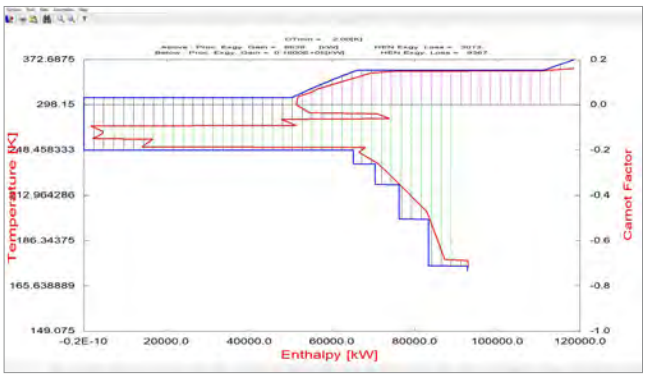
Optimisation of Refrigeration Levels

When using multiple refrigeration levels, there are usually trade-offs between the temperature of the levels and their load. As the temperature of each level is adjusted it not only affects its own work requirement, but that of the other levels also. Multiple levels of refrigeration must be optimised simultaneously. CRYO-net allows this to be done based on its high accuracy work predictions.

Simulation of Refrigeration Systems

CRYO-net allows simulation of simple and complex refrigeration systems. These may have multiple heat levels and multiple compressors. The refrigerant heat loads and temperature levels can be optimised relative to the background process to minimise work requirement.

CRYO-net can optimise the composition of mixed refrigerants to minimise work requirements. This is achieved by optimising the composition of the refrigerant to match the cooling profile.



Representation of work losses

Graphical Representation

CRYO-net allows visual representation of the work losses in refrigeration cycles. All aspects of the losses can be represented, including both mechanical and thermal losses. This provides the designer with insights that could not be obtained otherwise

CRYO-net can be used for:

- Understanding complex refrigeration systems
- Targeting minimum work for a low temperature cooling duties
- Optimising the number and temperatures of refrigeration levels
- Targeting minimum work for cascade refrigeration systems
- Targeting minimum work for mixed refrigerant systems
- Determining the optimum composition for mixed refrigeration systems

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Combining industry expertise with optimization tools we can help you to:

- Achieve operational excellence
- Minimise energy and utility use
- Accelerate energy transition
- Reduce fuel & CO2 emissions
- Make better economic decisions
- Increase efficiencies

Graphical Network Interface

Interaction with the network structure is through an interactive graphical editor. This editor allows easy modification of the network by using a series of graphical tools. Simulation For the given network structure the program will calculate the intermediate network temperatures and heat exchanger performances. The program has various simulation modes which are dependent on the data specified and the options selected. Heat exchangers can be specified by either heat duty or heat transfer area.

Automatic Design of New Heat Exchanger Networks

New design is carried out automatically, but within a framework where the designer keeps full control over network complexity. Automatic design can create structures, which involve impractical arrangements of stream splitting which the designer must then evolve to a practical design. HEAT-net allows the designer to keep full control over the complexity of stream splitting arrangements.