

Article 9 Table 6

The Best Available Techniques Which Shall Be Applied in Processing Techniques for Gas Industry

Energy users in the gas industry shall comply with the contents of the Best Available Techniques below.

Item	Description
1. High-efficiency motors can be used in the process	Air compressors of main processes are required to adopt a synchronous electric motor or a high-efficiency motor equivalent to IE3/IE4 classes.
2. Advanced energy-saving equipment can be applied	There is some available equipment can be used to reduce energy consumption as follows: (1) High-performance air compressors for process. (2) Distillation columns with high-performance internal devices, and heat exchangers with high heat transfer capability and low loss of pressure.
3. Pump energy-saving techniques can be applied	There are some available measures as follows: (1) Adopt pumps with appropriate performance according to the needs of the process. (2) When multiple pumps are running in parallel, the number of operations pumps can be adjusted according to the output demand appropriately. Pumps' idling or backflow of fluids should be avoided. (3) The pump uses a variable frequency (VFD) drive motor, and the variable frequency is optimized and controlled according to the output demand. (4) The determine number of start-up and the sequence of start-up or shutdown machines is based on the operating conditions and the applying of advanced process control system or integrative pump management system.
4. The excess cold energy in the process can be recovered	There are some available measures as follows: The installation of heat exchanger to recover gas products and cold energy from expel gas to improve energy efficiency.
5. The pressure energy in the process can be recovered	Before the tail gas of manufacturing process is discharged, the expansion machine is used instead of the pressure reducing valve,

	and the expansion energy can be utilized to drive the generator to generate electricity or drive the compressor, so as to save energy consumption and improve energy efficiency.
6. Multiple processing systems can be designed	Adjusting the operation of equipment's loading to accommodate the production demand, so as to improve equipment's energy efficiency.
7. With program facilities as close to the user as possible, gaseous products can directly supplied with pressure and temperature required by the user	<p>(1) The planned facilities are right to the user end, and the finished products are gaseous, that can be transported through pipelines so to reduce the energy consumption of producing or storing liquid finished products.</p> <p>(2) Responding to the pressure drop caused by friction loss and the cost of pipeline installation, the transportation of finished product through pipeline should adapt a pipe with the most appropriate diameter.</p>
8. Optimized thermal insulation capability of liquid product storage tanks	<p>There are some available measures as follows:</p> <p>(1) Use appropriate cold insulation materials and insulation facilities to minimize loss of storage's liquid products through evaporation.</p> <p>(2) The evaporation rate of BOG (Boil-Off Gas) per day shall be kept under design value</p> <p>(3) When liquid products in the storage tank evaporate, the volatiles are recycled and reused.</p>
9. Filling and shipping of liquid products	Take advantage of the pressure or gravity originate from the products storage tank to fill tankers so as to save energy consumption.

<p>10. Advanced energy-saving techniques can be applied</p>	<p>There are some available techniques can reduce overall production energy consumption and relatively increase productivity as follows:</p> <ol style="list-style-type: none"> (1) Adapt advanced air separation process technology to improve the air extraction rate (e.g., selection and thermal integration of the segmented pressure of the distillation column, etc.) or make plans related to energy-saving and standby modes. (2) Energy-efficient distillation separation towers, small temperature differences and multi-products flow heat exchangers, pressure energy recovery design and other related designs may be evaluated. (3) Additional energy consumption or loss caused by unwanted pressurization/decompression or heating/cooling shall be reduced.
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