Токанов М. Д., д. т. н. РФ и РГ, профессор Каракеров А. К. Сравнительный анализ метрополитена Алматы с монорельсовым транспортом Астаны Республики Казахстан

Павлов В.А Павлов В.А. Оценка транспортного спроса к детским кооперативам на примере садоводства «Бирминке» в будний день г. Иркутск

Демченко Р. П. Применение мобильного лазерного сканирования в проектировании железных дорог

Коченев Г. К., Лапшино П. Д., Пшишев Ш. А. Регулирование и управление переходных процессов при параллельной работе солнечных фотоэлектрических систем и сети переменного тока

Конкин И. В., Винченч М. В. "The most significant hot-pump units’ problems analysis and possible ways to solve them under the weather conditions of Northern Kazakhstan"

Сидячева М. В., Попова Т. В., Добрыни М. В. Методика исследования пластинчатого теплообменника аппарата

Магрул Р. И., Миргород А. А. Система розыск проектных ресурсов в бедрениких месторождениях

Корчаго Ю. С., Майданчик П. А. Микропроцессорный прибор для контроля и защиты от витка природного газа

Сивко Д. Ю., Корниенко В. И. Алгоритм управления каналами связи в частотной системе стартерной передачи (СТП)

Кодин Г. Т. Выбор полосового фильтра при разработке анализатора спектра звуковой частоты
The most significant hot-pump units' problems analysis and possible ways to solve them under the weather conditions of Northern Kazakhstan

At the present time heat pump units are becoming more and more popular. The implementation of heat pumps in the energy consumption mix of European countries, China and the U.S. is growing every year. In consequence of that the question of promoting co-efficiency of performance in electric power consumption is hotly discussed.

The following significant problems were observed while analyzing existing heat pump units:

1. A throttling process - working substance undergoes throttling at high temperature, which results in lower specific capacity cycle.
2. The use of ozone-depleting substances - a large number of heat pump units are operating on R22 and R12, banned by Kyoto Protocol.
3. Large temperature difference between the evaporator and condenser is problem related to the climate of North Kazakhstan as a consequence of low freezing temperatures during the winter period.

There are different ways to solve these problems.

The above-mentioned problem of a big temperature difference between the evaporator and condenser is quite typical for the northern region of Kazakhstan. The problem is that the low-grade heat source temperature is quite low (air), while the heating temperature of consuming water has to be rather high (≥ 60 °C), which requires more intensive compression ratio of the working substance. This operation is not compatible with all working substances, which significantly increases the cost of equipment and materials.

The optimal solution to this problem is two-stage compression cycle. Two-stage compression implies usage of two reciprocating compressors, standing in a sequential order, in a cycle. This solution allows achieving the intended temperature difference at the optimum pressure difference before and after using the compressor.

An important disadvantage of heat pump units exploitation is usage of ozone-depleting substances. A prospective solution is usage of natural working substances (carbon dioxide, ammonia, water vapor). However, usage of the substances is possible only on the recently implemented or planned facilities. In units, that are in use at the moment, new interchangeable working substances with similar characteristics to freon can be implemented. One of such substances is the prospective working substance elaborated by DuPont company.