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Simple But Powerful Centrifugal Chillers

By Thomas Yoon

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Centrifugal chillers are used for cooling large buildings in a centralized air conditioning system. There are other types of chillers using screw compressors and reciprocating compressors. These are usually smaller in size. Today's topic is about centrifugal chillers – the ultimate choice for any air conditioning installations higher than 500 RT (refrigeration tons)

Basically, centrifugal chillers use centrifugal fans to move the refrigerant within the chiller circuit. As with any refrigeration circuit, there must be a compressor, a condenser, an expansion device, and the evaporator.

In the case of the centrifugal chiller, the fan is the compressor. Rotating at very high speeds, it is capable of pressurizing the refrigerant gas so as to increase its temperature. Because the pressure is so dependent on the efficiency of the impeller of the compressor, the impeller is very carefully designed to match the system.

The clearances between the impeller and the housing at the mouth ring (impeller suction) are made very small so as to reduce leaks back to the discharge.

Usually inlet vanes that throttle the gas control the flow of the gas, and thus the chiller load. The expansion of the liquid to gas is usually made through a fixed orifice.

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The lubrication of the shaft bearings must be done within the chiller itself. Oil passages and shaft driven pumps (with motor driven pumps at startup) is made for lubrication.

The oil will find their way to the condenser and has to be extracted back to the lubrication system. Usually there will be an eductor system to suck back the oil to the oil sump.

Centrifugal chillers are usually designed for low–pressure refrigerant like R–123a.

These chillers sometimes surge when running, and they are very sensitive to sudden changes in loads. Therefore modern centrifugal chillers make use of electronic microprocessors to control the various parameters and timing in order to run smoothly.

Indeed, when everything is perfect, the centrifugal chiller is capable of extremely smooth operation.

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Many years of working experience in Marine, Facilities, Construction has given the author material for writing e–books and articles related to engineering, and management.

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Juicer Comparisons: Manual Or Electric?

By Herbert Romaro

A juicer is conical–shaped kitchen utensil used for squeezing, or extracting, juice from various foods, especially fruits and vegetables, for the purpose of drinking or adding flavor to other foods. The juicer is simple to use, but, because of the possible dangers involved, should be handled with care, caution,

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and know-how.

Two kinds of juicers exist—a manual, or hand-operated, version and an electric version.

Manual/Hand-Held Juicer

Juicing consists of placing fruit wedges or vegetable slices cut side-down in the center of the juicer and then pressing down to squeeze the food and moving it back and forth so the juice will run out of the rind and away from the pulp. The pulp and seeds are collected along the edges of the juicer, and the rind is then discarded.

Electric Juicer

Electric juicers mechanically extract juice from fruits, vegetables, herbs, etc. Proper operation consists of placing the article of food within and pressing the button. The juicer then automatically squeezes juice out of the food. Because of its mechanical nature, electrical juicers are far more dangerous than manual ones, and so it is important that users be taught how to properly use them.

Two kinds of electric juicers are on the market:

Centrifugal juicers—these consist of a blade and sieve to separate juice and pulp from rinds or outer shells or casings. Centrifugal juicers cannot break fibres in food, so their use is limited.

Masticating juicers—these 'chew' up the entire piece of food before, or in order to, squeeze juice from the inside. When the food becomes mangled, the juice naturally flows out. Masticating juicers can break fibres in food, so they have a much wider use than centrifugal juicers.

By the way, electric juicers and blenders are different in function and purpose. Electric (masticating) juicers are able to separate juice from fibres, whereas blenders, like centrifugal and manual juicers, cannot.

The theory is that since fast-moving mechanical parts of an electric juicer blow air into the food, causing greater and quicker oxidation to important nutrients, electric juicers, especially those having variable speeds, are considered to be of higher quality than manual juicers. This has not been proven, although it is a common belief.

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