

For example: Steam at 100 lbs. gauge pressure has a sensible, or a heat that can be measured by a thermometer of 323.7 degrees, and just so long as the steam remains in contact with the water from which it was evaporated, any additional heat would only evaporate more water at the same temperature. If, however, we conduct the steam to a separate vessel and add heat to it, then it becomes superheated steam and will not increase in pressure. It does increase in volume, and is, in fact, a perfect gas and so follows the laws of gases. This is one point wherein it is better than dry saturated steam, and is to a large extent the advantage of its use.

The benefits of superheated steam have been known for many years. During the period from 1850 to 1860, Mr. Isherwood, Chief Engineer of the American Navy, conducted some tests and reported that a considerable saving could be made by adding from 100 to 200 degrees of superheat. He also reported that it was not practical on account of the difficulty in lubricating pistons, valves and packings under such high temperatures. At that early date we used animal and vegetable oils to lubricate all valves and pistons, these oils were not suitable to use in temperatures above 350 degrees. Very little progress was made in the use of superheated steam until natural or mineral oils were in use.

In Germany, no steam plant is now considered up to date unless superheated steam is used. The economy of it runs from 10 to 30 per cent. demonstrated by thorough tests, the accuracy of which have been checked by years of operation.

This steam is used sometimes at a temperature of 800 degrees, but in all cases where the temperature is over 500 to 600 degrees specially designed engines and valves are used.

To obtain superheated steam, the saturated steam after leaving the boiler is passed through a superheater, consisting of a series of tubes, placed in the path of the heated gases, where the temperature is greater than that of the intended heat of the superheated steam. The temperature of these gases should be several hundred degrees higher than the superheated steam so that the transfer of heat will be very rapid, thereby keeping the heating surface down to a minimum and reducing the size of the apparatus down so that it can be set without seriously blocking the combustion spaces. In all cases where the heat from the passing gases is used, the superheater is placed in the boiler setting in such a position as to secure heat from the passing gases, shortly after they leave the fire and before their temperature is much decreased by contact with the boiler heating surface. In some cases the superheater is operated by a separate fire, when it must have a setting of its own. This is often more advantageous because