A New and Novel Use for Glycerine

GLYCERINE is being effectively employed as a drying agent for illuminating gas at the Colwyn Bay, Wales, gas works.

It is agreed that the ideal drying medium for coal gas is a liquid process which shall be continuous and reasonably automatic. The liquid must be chemically stable, hygroscopic, and it must also be susceptible of reconcentration without loss. In addition the liquid must be reasonable in cost and must be free from all possibility of solidification.

The glycerin experimented with for this purpose, and which has now been installed at the Colwyn Bay gas works, is found to possess the necessary qualities in a remarkable degree. It is extremely hygroscopic, and on exposure to the atmosphere will take up no less than 50 per cent of its weight of water. The boiling-point of the glycerin-water mixture in the reconcentration varies between 80 and 95 degrees C., working at a maximum pressure of 9 inches, which is entirely suitable for the heating of the evaporator by means of the exhaust steam gases from the washer engine. The glycerin gas-drying plant has now been in operation at the Colwyn Bay gas works for three or four months, and is the first plant of its type. It was erected after considerable investigation had been carried out on a laboratory and a commercial scale. The results of these initial experiments prove conclusively the advantages and efficiency of extraction which can be obtained by the use of glycerin as a drying agent, and the results obtained at Colwyn Bay can be claimed to have completely established glycerin as the means of obtaining dry gas.

In this case the plant is located at the outlet of the gasholder and consists of the latest "Standard" square-type rotary washer, fitted with corrugated bundles, and has a capacity of 2,000,000 cubic feet a day. The washer has four bays, is fitted with external overflows, and the glycerin in these bays varies in concentration from 1.2750 to 1.235 specific gravity. The diluted glycerin rapidly overflows from the last bay of the machine to a weak liquor storage tank situated below the ground level. The plant is completed by the automatic evaporator and the necessary two small pumps required by the latter part of the plant.

The weak liquor in the lower tank passes through an automatic feeder into the calandria of the evaporator, when the latter is put into operation, and here the water which is taken up from the gas is evaporated off under a vacuum of 15 inches, supplied by a small air pump driven from the washer countershaft. The necessary heat is supplied by steam at approximately 40 pounds pressure, and is applied to the outer surface of the tubes in the calandria. The water evaporated off is condensed by a jet condenser. The water required for this purpose is supplied from the gasholder, to which it returns, and also in its course passes through a small tubular cooler which is fitted to the side of the washer and cools the concentrated glycerin, which is pumped from the evaporator by a small rotary pump to the concentrated glycerin tank situated on top of the washer. The power required for the air pump and the small rotary pump is only one-half horse-power. The concentrated glycerin tank is fitted with a gauge glass, and the final bay of the washer is equipped with a special hydrometer vessel, so that the addition of glycerin and the maintenance of the glycerin concentration in the washer are under complete control. It is only found necessary to use the evaporator for a few hours every three or four days, and once put into operation, it requires no further attention.

Below are given the results obtained on the plant after it had been in operation a few weeks. It will be noted that the concentration of the glycerin in the dryer is low—namely, 1.2750 (82.7 per cent=s.g. 1,305)—and this necessarily reflects on the percentage reduction in the humidity. It would appear, however, that generally a reduction of 60 per cent in the humidity gives a sufficient lowering of the dewpoint to prevent condensation, and is therefore quite satisfactory for normal working.

The following are the test results at Colwyn Bay:—

Quantity of gas passed per day, 700,000 cubic feet.

Average temperature of gas, 62.5°F.

Concentration of glycerin:—

	S. g. at 50° F.	Glycerin per cent
No. 1 bay	1.2750	75
No. 2 bay	1.2625	72
No. 3 bay	1.235	64
No. 4 bay	1.235	64

Saturation of gas (outlet of dryer), 40.5° humidity.

Reduction of dewpoint of gas, 62.5° to 37°F.