Air Dryer

Although it does not offer as low a dew point as can be obtained with other types, the refrigerant type dryer has been the most popular, as the dew point obtained is acceptable in many general industrial plant air applications. The principle of operation is similar to a domestic refrigerator or home air conditioning system. The compressed air is cooled in an air-to-refrigerant heat exchanger to about 35°F, at which point the condensed moisture is separated and drained off. The air is then reheated in an air-to-air heat exchanger by means of the incoming air, which also is pre-cooled before entering the air-to-refrigerant heat exchanger. This means that the compressed air leaving the dryer has a pressure dew point of 35 to 40°F. A lower dew point is not feasible in this type of dryer as the condensate would freeze at 32°F or lower.

In a non-cycling refrigerant dryer (see below), the refrigerant circulates continuously through the system. This design provides rapid response to changes in operating loads. Since the flow of compressed air will vary and ambient temperatures also vary, a hot gas bypass valve or unloader valve often is used to regulate the flow of the refrigerant and maintain stable operating conditions within the refrigerant system. In most designs, the refrigerant evaporates within the air-to-refrigerant heat exchanger (evaporator) and is condensed after compression by an air-or water-to-refrigerant heat exchanger (condenser).