CEN4415
PROCESS DESIGN I

Design of Heat Exchangers

HEAT EXCHANGERS

In heat exchanger design calculations, the appropriate ***heat transfer coefficients*** must be determined.

These coefficients can be calculated based on past experience or with the help of empirical (experimental) and theoretical equations developed previously.

Heat exchangers are classified according to their **functions** and **types**.

CLASSIFICATION ACCORDING TO THEIR FUNCTIONS

#	Heat Exchanger
1	Cooler
2	Chiller
3	Condenser
	Partial Condenser
	Final Condenser

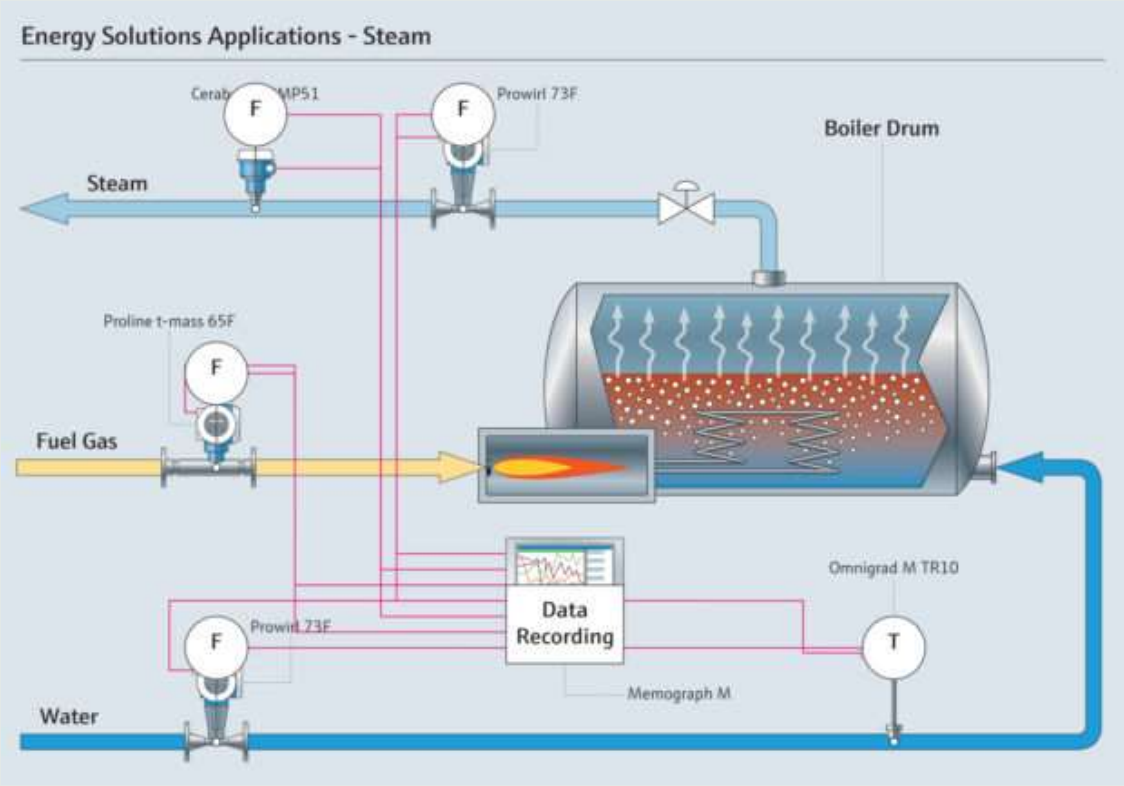
#	Heat Exchanger
4	Heater
5	Reboiler
	Thermosiphon Reboiler
	Forced-circulation reboiler
6	Steam Generator
	Superheater
	Vaporizer, Evaporator
	Waste-heat Boiler

Table 2— some common replacement alternative refrigerants.

Replacement Refrigerants for Ozone-Depleting Substances

Common Service uses	Ozone-depleting substance	Alternatives	Trade names	Manufacturers or distributors**
Chillers	R-11	HCFC-123	SUVA-123 Gentron 123 Forane 123 R-123	DuPont Allied Signal Elf Atochem others
	R-12	HFC-134a	SUVA-134a Gentron 134a Forane 134a KLEA 134a R-134a	DuPont Allied Signal Elf Atochem ICI Americas others
Freezers	R-12	R-401B	SUVA MP-66	DuPont
Refrigerators	R-12	Blends	Cool EZ RB-276	Quaker State
Reach-in coolers	R-12	R-401A	SUVA MP-39	DuPont
Window air-conditioning	R-22	HCFC-22	R-22	others
Central air-conditioning	R-22 R-22	HCFC-22 R-407C	R-22 SUVA 9000	others DuPont

Steam Generator



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