

Class Rules regarding refrigerants used for AC and Provision Plants

	LRS			GL		DNV			ABS			BV		RINA		IMO
	General	Basic Environmental Protection EP	EP, Supplementary Character "R"	General	GL EP (Environmental Passport)	General	Class notation "CLEAN"	Class notation "CLEAN DESIGN"	General	ES (Environmental Safety)	ES 2020	General	CLEANSHIP (AWT SUPER)	General	RINA, Green Star Design (Clean Air & Clean Sea)	
Max ODP	According to IMO (see left column)	Free of CFC	(ODP) = 0	Safety refrigerants of group 1 or class L respectively according to DIN 8960 have to be used exclusively. National and international regulations for the protection of the ozone layer are to be considered. Approved by the Naval Authority. 2) CFC Halon Prohibition Regulation 3) IMO Resolution A.719 (17)	GL EP (Environmental Passport) The use of ozone-depleting refrigerants is not allowed, exception will be made to the HCFCs in existing ships until January 1st, 2020. Arrangements shall be made to prevent the release of any substantial quantity of the refrigerant.		Refrigerants allowed: HFC, NH3 or CO2, HFC with ODP = 0	The refrigerant shall be either a natural refrigerant (e.g. NH3 or CO2), or alternatively an HFC with ODP = 0	Refrigerants other than those mentioned in the Rules may be used, provided they are considered to be adequate for use in shipboard applications in accordance with national or international standards, international treaties adopted by the government(s) and the flag states or other similar legislation laid down by the flag state.	ODP = 0, exception to HCFC until 2020	Same as ES	The use of the following refrigerants is not allowed for shipboard installations: Methyl chloride R11, R170 (Ethane) Ethylene Other substances with lower explosion limit in air of > 3.5%.	"CLEANSHIP (AWT SUPER)" The use of halogenated substances as refrigerant is prohibited, with the exception of hydrochlorofluorocarbons (HCFCs), which are permitted until 1 January 2020.		The use of halogenated substances (e.g. Halon and CFC) as refrigerant or fire-fighting means is prohibited, with the exception of hydrochlorofluorocarbons (HCFCs), which are permitted until 1 January 2020	MARPOL ANNEX VI, Regulation 12(2): New installations which contain ozone depleting substances shall be prohibited on all ships, except that new installations containing hydrochlorofluorocarbons (HCFCs) are permitted until 1 January 2020
Max GWP	None	Free of CFC	1950		GWP<3800		GWP < 3500. ----- As an alternative to GWP < 3500 documented equivalent TEWI may be accepted.	GWP < 1890 ----- As an alternative to GWP < 1 890 documented equivalent TEWI may be accepted.	None	2000	GWP > 2000 are accepted until 2020		Refrigerants having a Global Warming Potential (GWP) exceeding 3000 are not permitted.		GWP < 2000. When this is not possible due to assessed technical reasons (documented in a technical report), 2000 < GWP < 4000, however leak rate has to be reduced proportionally(see below)	
Man-In-Room-Alarm									None						Apr/2001, art.44: Visual and Audible alarm for all refrigerated chambers, report to bridge	
Recovery unit (emptying unit)	None	Recovery units are to be provided to evacuate a system either into the existing liquid receiver or into cylinders dedicated for this purpose. The number of cylinders is to be sufficient to contain the complete charge between points of isolation in the system			Additionally, recovery units shall be provided to evacuate residual quantities from a refrigeration system either into the liquid receiver or into gas cylinders dedicated to this purpose. Recovery units may be permanently installed or of a mobile type.				None		Emptying unit is required				No specific requirements	
Receiver for emptying (integral or external)	None	For the purposes of refrigerant recovery, the compressors are to be capable of evacuating a system charge into a liquid receiver. Additionally, recovery units are to be provided to evacuate a system either into the existing liquid receiver or into cylinders dedicated for this purpose. The number of cylinders is to be sufficient to contain the complete charge between points of isolation in the system.			For the purpose of refrigerant recovery, at least one refrigerant compressor of each system shall be capable of evacuating the system into a liquid receiver or gas cylinders dedicated to this purpose. The capacity of the refrigerant receiver or the gas cylinders shall not be less than a full charge of the largest refrigerant system. Additionally, recovery units shall be provided to evacuate residual quantities from a refrigeration system either into the liquid receiver or into gas cylinders dedicated to this purpose. Recovery units may be permanently installed or of a mobile type.				None		For the refrigerant recovery, compressors are to be capable of evacuating a system charge into a liquid receiver. Additionally, recovery units are to be provided to evacuate a system either into the existing liquid receiver or into empty gas cylinders provided for this purpose.				No specific requirements	
Leak detection (periodic or continuously)	None	Leakage detection system for monitoring continuously the spaces into which the refrigerant could be leak shall be provided, alarm to permanently manned station (300 ppm for HFC)			Periodic leak-detection procedures shall be established to minimize refrigerant leakage						Leak detection system for continuous detection, alarm to a manned station (e.i. wheel house or ECR)				No specific requirements	
Refrigerant leakage	None	System design, operation & maintenance to minimise refrigerant gas leakage. Max allowable leakage 10%			Refrigerant recovery; at least one refrigerant compressor of each system shall be capable of evacuating the system into a liquid receiver or gas cylinders dedicated to this purpose. The capacity of the refrigerant receiver or the gas cylinders shall not be less than a full charge of the largest refrigerant system.										Annual refrigerant leakage is to be less than 10% of the total refrigerant charge of each system. When 2000 ≤ GWP < 4000, the refrigerant leakage is to be less than % of the total refrigerant charge of each system.	
Exceptions		These requirements do not apply to the domestic stand-alone refrigerators used in galleys, pantries, bars and crew accommodation.					The emission criteria for refrigerants apply to cargo refrigeration plants, centralised air conditioning and refrigeration systems onboard all ships. Domestic type stand-alone air conditioning units and refrigerators are not covered.				Stand alone air-conditioners and refrigerators are not subject to ES rules.		The requirements apply to the ship centralized refrigerating plants, centralized air conditioning plants. They do not apply to the refrigeration facilities intended for the storage of the galley supplies and to the air conditioning plants for limited parts of the ship, such as the control rooms and the wheelhouse.		They do not apply to domestic type stand-alone refrigerators and air conditioning units.	