

Hydrofluorocarbon Consumption Survey (HCS) under Statistics Act

Reporting Guide

Table of Contents

1.	List of Applications within the HCS	1
2.	Guide to fill in the HCS data for year prior to the Reporting year	2
3.	Decision tree for HFCs reporting in the HCS	3
4.	Frequently Asked Questions (FAQs)	4
(A)	General questions	4
(B)	Related to inventory	5
(C)	Trading	6
(D)	Charging and Servicing for local use	6
(E)	End-users.....	6
(F)	Business operation related to HFC equipment and storage of HFC	7
(G)	Allocation of Refrigerants (special cases)	8
(H)	Engaging Third Parties.....	8
(I)	Non-Business Operations.....	8
5.	Glossary.....	9
6.	Annex A	11
(A)	List of Pure HFCs	11
(B)	List of HFC blends.....	12

1. List of Applications within the HCS

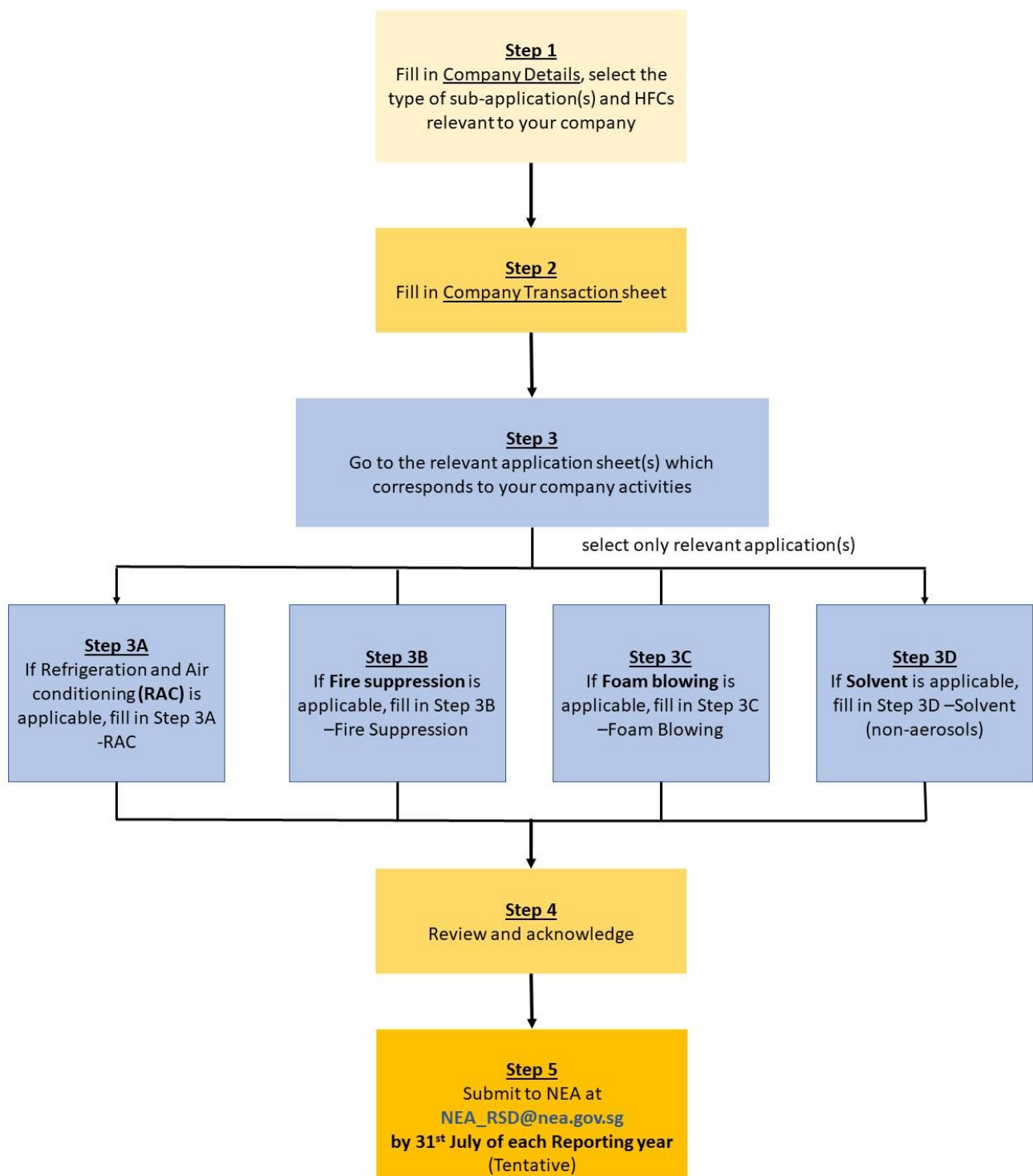
1) Refrigeration and Air Conditioning (RAC)	
Sub-applications	Example
Unitary Air Conditioning	Windows, Single Split, Multi Split, Ducted, Variable Refrigerant Flow (VRF) Units, Portable aircons, domestic heat pumps (e.g., clothes dryer, heating water), packaged air-conditioner, VRF System, Computer room air-conditioning (CRAC)
Mobile Air Conditioning	Cars, Taxis, Light Good Vehicles (LGVs), High Good Vehicles (HGVs), Buses, MRT, vessels/aircraft, Vehicle Battery Thermal Management System (cooling system for electric vehicles)
Chillers	Air Conditioning chillers for space cooling /process cooling (e.g., air-cooled chillers and water-cooled chillers)
Domestic Refrigerators	Household refrigerators (<900L) (Compact, non-compact, built-in), Household wine chillers/Fridge
Commercial Refrigeration	Standalone units: Hermetically sealed equipment (e.g. deep-chest freezers, refrigerated storage cabinet, vending machines), centralised system (e.g. for supermarket), remote condensing unit, Retail food refrigeration (Refrigerated food processing and dispensing equipment, Display Chillers/Fridges/Freezers, Reach-in refrigerator), commercial ice-cream freezers/ice-cream display case/ island freezer, commercial ice making machine, mortuary fridge/refrigerator, commercial wine chillers/coolers ice rinks, bar refrigerators, beverage dispensers/soda fountains, portable freezer, bar line chiller, open showcase chiller, chest freezer, salad bar prep counter chiller, roll-in refrigerated storage cabinets, blast chiller/freezer
Industrial Refrigeration	Condensing units, Centralized systems, Freezers, Industrial Heat pumps, Cooling plants, Laboratory Refrigerators (e.g., cold room, cold storage, industrial ice-maker machines)
Transport Refrigeration	Refrigerated trucks/trailers/vessels/aircrafts, Reefer containers, Refrigerated reefer unit load device (ULD) used in aircraft (indicate in Notes/Comments under (Step 3A) if equipment being serviced would eventually be transported overseas).

2) Fire Suppression	
Sub-applications	Example
Fire Suppression Systems (Portable/Streaming)	Fire extinguishers
Fire Suppression Systems (Fixed/Flooding)	Total Gas Flooding System (e.g., FM200 systems, FE36 systems)

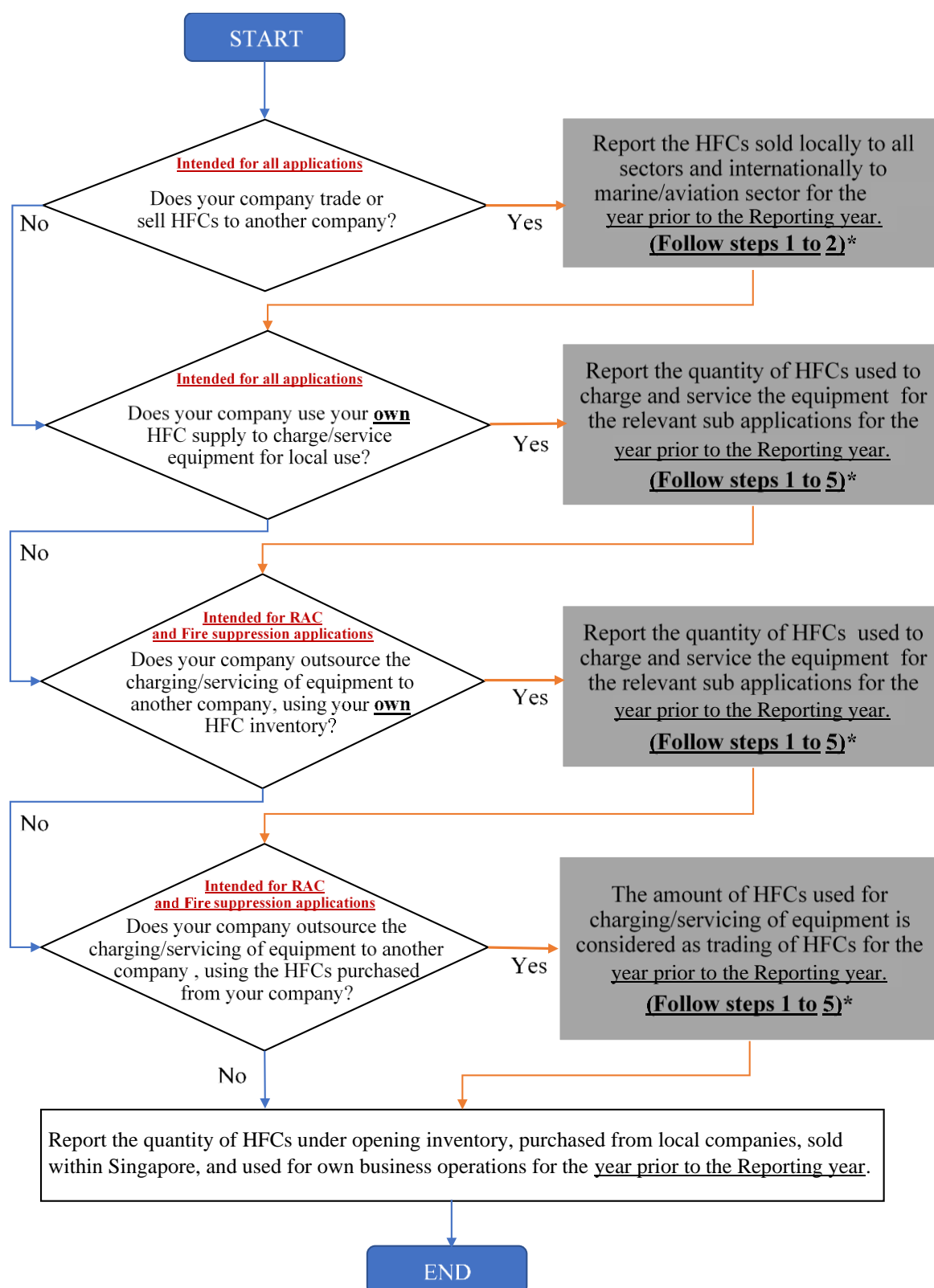
3) Foam blowing	
Sub-applications	Example
Open Cell Foams	Polyurethane (PU) Flexible, PU Moulded, PU Integral Skin, PU One Component
Closed Cell Foams	PU Panel, PU Appliance, PU Injected, PU Block, PU Continuous Laminate, PU Spray, PU Pipe-in-pipe, Extruded Polystyrene (XPS), Phenolic Block, Phenolic Laminate

4) Solvents	
Sub-application	Example
Solvents (non-aerosols)	Precision cleaning, Electronics cleaning, Metal cleaning, Deposition

2. Guide to fill in the HCS data for year prior to the Reporting year



3. Decision tree for HFCs reporting in the HCS



4. Frequently Asked Questions (FAQs)

(A) General questions

Q1. Do we need to submit supporting documents with the HCS data?

Response. Supporting documents are not required to be submitted along with the HCS. However, random checks may be conducted for verification of data.

Q2. Are there any exceptions/exemption for companies who do not trade/utilize large quantity of HFCs?

Response. There is no exception or minimum threshold of HFCs to be reported by companies. As such, your company will be required to submit the HCS.

Q3. As NEA will also require suppliers to submit relevant information of the quantity of HFCs traded to local companies, does my company need to verify with my supplier that the quantity reported matches?

Response. Your company will only need to report the total quantity of HFCs purchased or utilized for charging or servicing of equipment in the reporting year, e.g., if the Reporting year is 2023, the quantity reported would be for 2022. Small discrepancy in the data will be acceptable.

Q4. What are the gases included in the HCS?

Response. For this study, the gases involved are all HFCs and its blends. Please refer to the list of HFC and its blends in the Annex (pages 14-15). Do note that the list may not be exhaustive. You may wish to check with NEA for further clarifications.

Q5. My company maintains HFCs transaction records based on number of cylinders/drums/cans. How does my company report the quantity of HFCs (in kilograms) in the HCS?

Response. We understand that HFCs are transacted in cylinder/drum/can. Due to various storage capacities of containment, the HCS is carried out using the base unit of HFCs in kilograms. To compute the equivalent quantity of HFCs in kilograms, companies can make use of the tare weight printed on each cylinder/drum/can and subtract it from the net weight of the cylinder/drum/can.

Q6. Is this HCS a yearly exercise or one-time submission?

Response. If a company is listed as a FPOS company for each year, the company will be required to submit the required data based on the submission date indicated in the requisition email (around late July/August every year). This will be a yearly exercise carried out under the Statistics Act.

Q7. What is the difference between the HCS and HFC emissions reporting for the Emissions Report under the Carbon Pricing Act (CPA) submitted to NEA annually?

Response. Under CPA, we noted that companies would have to report the use of HFC in integrated circuit or semiconductor production, solvents and refrigeration and air-conditioning (RAC) equipment.

The HCS, conducted under Statistics Act, has a wider coverage, that is, it includes companies that are not under CPA. It also requires data at sub-application level. E.g., for the use of HFC in RAC equipment, data will be disaggregated further into unitary air conditioning, mobile air conditioning, chillers etc.

Q8. Do we need to declare our HFC usage if our supplier/servicing company is already declaring their HFC use in our company?

Response. If you and your supplier have received the HCS, this will mean that both companies fall under the First-point-of-sales (FPOS). Refer to the Glossary on page 12 on the definition of FPOS. As such, both will be required to fill the HCS and submit accordingly. As we do foresee that double counting might be an issue, methodologies have been put in place to reduce such double counting.

Q9. Is this survey compulsory?

Response. This survey is conducted under the Statistics Act (Chapter 317) that requires all sampled companies to provide the necessary information for the survey. The Statistics Act also protects the confidentiality of your completed return. As your inputs are important to us, we seek your cooperation to participate in the Survey.

Q10. Who should my company contact to seek clarifications pertaining to the HCS?

Response. Your company can contact NEA-RSD via email (NEA_RSD@nea.gov.sg) or by replying to the email which your company has received the invitation to participate in this HCS. If you have specific questions on the data confidentiality, please approach NEA-RSD correspondence.

(B) Related to inventory

Q11. What is the start date, end date and reporting period for trading, utilization and purchased of HFCs? In addition, do companies report the quantity of HFCs based on per transaction or annual transaction?

Response. For this survey, your company needs to report the annual quantity of HFCs transacted (i.e., trading, purchase and utilization) for the year prior to the Reporting year i.e., all HFCs transacted between 1st Jan to 31st Dec. For HFC traded/purchased, it should be based on the delivery date. Do note that a single submission from a company is preferred. We do NOT encourage multiple submissions from various departments within the same company.

Q12. My company does not have the closing inventory of HFCs by calendar year as it is only available at the end of each financial year (for example in the month of April). How should my company report in the HCS?

Response. Please note that closing inventory is auto populated i.e., respondent need not input any values there. Please provide us with the best possible estimate of opening inventory, purchase from local companies, and sales within Singapore. In event, if the company has information on closing inventory, please check to see if it is near to the estimated (auto populated) closing inventory. The respondent may use the Notes/Comments to indicate any comments (if any).

Q13. The auto-calculated closing inventory values differs from the company actual inventory. However, the difference may be due to leakages when my company carry out charging of HFCs into smaller tanks and/or due to faulty valves. My company doesn't maintain records of amount of HFC leaked, how do we account for the difference?

Response. We understand that during transferring of HFCs into different containment (e.g., charging into smaller tanks), leaks may occur, likewise, for faulty valves there may be unintentional leak to the environment. To estimate the amount leaked, a simple way to calculate would be to subtract the quantity of HFC sold in disposable cans or containers from the quantity of HFC purchased, that is,

$$\text{Amount loss due to leakage} = \text{HFC purchased (in kg)} - \text{HFC sold in disposable cans/containers}$$

This can be reported under the Notes/Comments column in the Company Transaction worksheet and attributed to the difference in the auto-populated closing inventory and actual closing inventory for the company for the year prior to the Reporting year.

Q14. What should we report for the opening inventory of the Reporting year?

Response. It will be the balance from the closing inventory on 31 Dec of the prior year.

(C) Trading

Q15. My company purchased HFCs and did not use it for charging or servicing. We only traded HFCs with other companies. Where does my company report the data?

Response. As shown in “[Decision tree for HFCs reporting in the HCS](#)”, if your company only trades HFCs with other companies, your company is required to report for the quantity traded for the year prior to the Reporting year, the **quantity traded** by following steps 1 to 5 illustrated in “[Guide to fill the HCS](#)”.

Q 16. Do we need to declare any trading outside of Singapore if the product was supplied and filled outside of Singapore and delivered to sites outside of Singapore? i.e. order product from Country A for sale to Country B with Singapore being the trading office.

Response. If HFCs trading occurs outside Singapore, you do not need to report since the refrigerant gas is not emitted/used in Singapore.

Q17. My company purchase HFCs locally and supply to the ocean-going vessel (usually within that day itself the vessel will depart from Singapore port), is there a need to declare?

Response. Yes, local purchase of HFCs to sell to ocean-going vessel in Singapore port will be reportable. You will need to declare under the “Sold to marine ocean-going vessels” column in the “Company Transaction” sheet of the HCS.

(D) Charging and Servicing for local use

Q18. My company uses HFCs to charge/service equipment. However, these HFCs are not immediately emitted to the environment. How does my company report the quantity of HFCs emitted in the Reporting year?

Response. As shown in “[Decision tree for HFCs reporting in the HCS](#)”, if your company uses your own HFCs supply to charge/service equipment, your company is required to report for the quantity used to charge/service equipment for the year prior to the Reporting year, the quantity of HFCs used to charge/service equipment under the relevant sub-application by following steps 1 to 5 illustrated in “[Guide to fill the HCS](#)”.

(E) End-users

Q19. My company deals with Foams/Solvents (non-aerosols)/, where charging/servicing of equipment is not carried out. How does my company report the HFCs consumptions in the HCS for the above applications/sub-applications?

Response. We understand that the above applications do not involve charging/servicing of equipment using HFCs. In the HCS your company is required to report the quantity of HFCs utilized in Foams/Solvents (non-aerosols) applications.

Q20. My company is not a trader/licensee/installer/manufacture/supplier. My company is just an end user. Is my company supposed to fill in the HCS?

Response. The records show that your company has purchased HFC or HFC blends in the Reporting year. Please check with the relevant departments within the company and/or with your supplier and fill in the relevant details in the HCS.

Q21. My company uses HFCs for testing purposes (i.e., leak testing, durability test etc.) and the end product manufactured in Singapore does not contain HFCs. Is my company required to report the quantity of HFCs utilized for testing purposes? If yes, how does my company report the quantity in the HCS?

Response. Yes, as per IPCC guidelines, companies are required to report the quantity of HFCs utilized for testing purposes. Thus, your company can report the quantity of HFCs utilized for testing under “[Quantity of HFC used for Servicing Equipment](#)” column for relevant application(s)/sub-application(s) in the HCS.

(F) Business operation related to HFC equipment and storage of HFC

Q22. My company has purchased equipment(s) (example chiller(s), fire extinguisher(s), etc.) from overseas/local company that contain HFCs. Does my company need to report HFC pre-charged in these imported equipment?

Response. Your company does not need to report the pre-charged HFC in the equipment. However, your company is required to report the quantity of HFCs used for (a) Charging/Service of these equipment for local use; and (b) quantity of HFC used for Charging new equipment for re-export (if applicable).

Q23. My company's main business is to provide storage facility for pharmaceutical products and household products, and we are not manufacturing any solvents (non-aerosols) containing HFCs. Is my company required to fill the HCS? If yes, how does my company report the quantity in the HCS?

Response. We note that the main business for your company is to provide storage facility for pharmaceutical products and household products. Although you are not manufacturing any solvents (non-aerosols) containing HFCs, your company may be using HFCs to service equipment for cooling of your storage facilities. Therefore, any consumption of HFCs in your company will be required to be reported in the HCS under "Quantity of HFC used for Servicing Equipment" column for relevant application(s)/sub-application(s) in the HCS

Q24. Our company purchase HFC through local supplier and charge it into new equipment before exporting to other countries for commissioning, do we still need to declare this HFC use?

Response. Yes, under "(Step 3) RAC" sheet in the HCS, select the correct sub-application and indicate the quantity of HFC used to charge into equipment under the "Charging of new equipment for re-export" column.

Q25. For storage of refrigerant in warehouse for exporting purposes, would it be reportable?

Response. No, storage of refrigerant for export purposes are not reportable.

Q26. My company conduct charging/servicing of RAC equipment and/or fire suppression system. Do I need to report HFC that has been recovered and charged back to the same equipment/system?

Response.

Scenario that **does not** require reporting of HFC:

1) HFC that is recovered/recycled while servicing a fire suppression system and charged was subsequently charged back into the same system.

Scenarios that require reporting of HFC:

1) Recovered/recycled gas is extracted from a decommissioned system and used to service another existing system where gas has been emitted to the environment, then it would be required to be reported under servicing equipment for local use.

2) Recovered/recycled gas is extracted from a decommissioned system and charged into a new system, the HFC would be required to be reported under charging new equipment for local use.

(G) Allocation of Refrigerants (special cases)

Q27. Should the reporting of cold rooms be reported under industrial or commercial refrigeration if it is located behind a supermarket?

Response.

For cold room in supermarkets, it should be reported under commercial refrigeration.

Q28. My company sell and service commercial wine chillers/cold rooms in warehouses. Should it be reported under commercial or industrial refrigeration?

Response.

It should be reported under industrial refrigeration.

(H) Engaging Third Parties

Q29. My company engages a third party to do the servicing (i.e. top-up of existing equipment)/charging of new equipment. Is my company supposed to fill in the HCS?

Response. There could be three plausible scenarios to this, as follows:

Scenario 1 - Third party uses your company HFCs inventory (e.g. servicing contract only provides service and does not supply HFCs)
You will need to fill in the relevant details in the HCS including details on **servicing/charging of equipment**.

Scenario 2 – Third party purchases HFCs from your company and uses it to conduct servicing/ charging (e.g. you are a supplier and your company sub-contract the works of servicing to your customer)
You will need to report the HFC purchased by the third party in the HCS under **trading**.

Scenario 3 - Third party uses purchased HFCs from local suppliers and NOT your company (e.g. a servicing contract that include both servicing and supply of HFCs)
You do NOT need to fill in in the relevant details in the HCS pertaining to the specific servicing activities.

(I) Non-Business Operations

Q30. If a facility or an equipment utilizing HFCs (e.g., vending machines) is under my company infrastructure, but is neither a part of my company business operations nor my company owns the facility or the equipment, is my company supposed to report the quantity of HFCs for that particular facility or equipment?

Response. Your company is not required to fill in relevant details for utilization of HFCs for such facilities or equipment which is neither a part of your company business operations nor does your company own the facility or equipment.

5. Glossary

Charging	Quantity of HFCs used to fill HFC gas into a new equipment before the equipment is used.
Closing inventory	Quantity of HFCs remaining as on 31st Dec of every calendar year
Equipment	Equipment refers to the different products found within the HFCs sub-applications that utilizes HFCs. Example includes air-conditioners/refrigerator in household, industry, supermarket, and offices, as well as fire suppression system, mobile air-conditioning in vehicle etc.
First Point of Sales (FPOS)	FPOS are the companies who have purchased HFCs from the Licensee for trading and/or utilization.
HFCs blends	This refers to a refrigerant consisting of a mixture of two or more different chemical compounds, of which at least one compound is an HFC. HFCs blends are also included in this HCS.
HFCs sub-application	Sub-application is defined as the sub class of the HFCs application. For example, domestic refrigeration is one of the sub-applications under Refrigeration and air conditioning.
Hydrofluorocarbons (HFCs)	Hydrofluorocarbons is a group of organic compounds that consist of mainly hydrogen, carbon, and fluorine elements.
International	Outside Singapore territory.
IPCC Guidelines	Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines are used, in this case, for the calculation of HFC emissions.
Licensee	Licensees are the companies that are licensed to import and export the regulated HFCs.
Local company	Company operating in Singapore and dealing with HFCs for local utilization and trading Overseas.
Net annual quantity	Total quantity of new HFCs reported for the Reporting year. The purchase of fresh/reclaimed HFCs are considered as new HFCs. However, it does not include recycled HFCs recovered from the recovery unit after servicing.
Overseas company	Company operating outside Singapore and trading HFCs with companies in Singapore.
Pre-charged Equipment	Purchase of equipment already containing HFCs, for example fire extinguishers, domestic refrigerators etc.
Purchase	HFCs bought from other company (local) for trading and/or utilization.
Reclamation	This refers to the re-processing and upgrading of a recovered controlled substance through such mechanisms as filtering, drying, distillation and chemical treatment in order to restore the substance to a specific standard of performance such as AHRI-700 standards. It often involves processing “off-site” at a central facility. For such reclaimed HFCs, it would be considered as new HFCs.
Recovery	This refers to the collection and storage of controlled substances from machinery, equipment, containment vessels, etc., during servicing or prior to disposal. If the HFCs is recharged back into equipment, it would not be considered as a new HFC.
Recycling	This refers to the re-use of a recovered controlled substance following a basic cleaning process such as filtering and drying to reduce contaminants in the used refrigerants. For refrigerants, recycling normally involves recharging back into the equipment and this often

	occurs “on-site”. As such, it would <u>not</u> be considered as a new HFC. For example, such recycled HFCs are usually used in car workshops.
Servicing	Quantity of HFCs used to top up existing equipment partially or fully which has experienced loss of HFC gas due to fugitive emissions, i.e., leaks from fittings, joints, shaft seals, etc. or use of equipment such as during a fire incident.
Supply	Quantity of HFCs from inventory or direct HFCs purchase from supplier, without any service provided by the supplier.
Tare weight	Tare weight is the weight of the empty container.
Traded	An activity that involves both purchasing and/or selling of HFCs to other (local/overseas) company.
Transaction	Transaction refers to HFCs utilized and traded as a part of company’s inventory.
Utilization	Utilization refers to the quantity of HFCs used for company operations. This covers the charging/servicing of equipment.

6. Annex A

(A) List of Pure HFCs

Acronym, Common Name or Chemical Name	Chemical Formula
HFC-23	CHF_3
HFC-32	CH_2F_2
HFC-41	CH_3F
HFC-125	CHF_2CF_3
HFC-134	CHF_2CHF_2
HFC-134a	CH_2FCF_3
HFC-143	CH_2FCHF_2
HFC-143a	CH_3CF_3
HFC-152	$\text{CH}_2\text{FCH}_2\text{F}$
HFC-152a	CH_3CHF_2
HFC-161	$\text{CH}_3\text{CH}_2\text{F}$
HFC-227ca	$\text{CF}_3\text{CF}_2\text{CHF}_2$
HFC-227ea	$\text{CF}_3\text{CHFCF}_3$
HFC-236cb	$\text{CH}_2\text{FCF}_2\text{CF}_3$
HFC-236ea	$\text{CHF}_2\text{CHFCH}_2\text{CF}_3$
HFC-236fa	$\text{CF}_3\text{CH}_2\text{CF}_3$
HFC-245ca	$\text{CH}_2\text{FCF}_2\text{CHF}_2$
HFC-245cb	$\text{CF}_3\text{CF}_2\text{CH}_3$
HFC-245ea	$\text{CHF}_2\text{CHFCHF}_2$
HFC-245eb	$\text{CH}_2\text{FCHFCH}_2\text{CF}_3$
HFC-245fa	$\text{CHF}_2\text{CH}_2\text{CF}_3$
HFC-263fb	$\text{CH}_3\text{CH}_2\text{CF}_3$
HFC-272ca	$\text{CH}_3\text{CF}_2\text{CH}_3$
HFC-329p	$\text{CHF}_2\text{CF}_2\text{CF}_2\text{CH}_3$
HFC-365mfc	$\text{CH}_3\text{CF}_2\text{CH}_2\text{CF}_3$
HFC-43-10mee	$\text{CH}_3\text{CHFCH}_2\text{CHFCH}_2\text{CF}_3$
HFC-1132a	$\text{CH}_2=\text{CF}_2$
HFC-1141	$\text{CH}_2=\text{CHF}$
(Z)-HFC-1225ye	$\text{CF}_3\text{CF}=\text{CHF}(\text{Z})$
(Z)-HFC-1336	$\text{CF}_3\text{CH}=\text{CHCF}_3(\text{Z})$
HFC-1243zf	$\text{CF}_3\text{CH}=\text{CH}_2$
HFC-1345zfc	$\text{C}_2\text{F}_5\text{CH}=\text{CH}_2$
3,3,4,4,5,5,6,6,6-Nonafluorohex-1-ene	$\text{C}_4\text{F}_9\text{CH}=\text{CH}_2$
3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooct-1-ene	$\text{C}_6\text{F}_{13}\text{CH}=\text{CH}_2$

(B) List of HFC blends

HFC Blends (R-number)			
R-401A	R-416A	R-444B	R-465A
R-401B	R-417A	R-445A	R-500
R-401C	R-417B	R-446A	R-501
R-402A	R-417C	R-446B	R-502
R-402B	R-418A	R-447B	R-503
R-403A	R-419A	R-448A	R-504
R-403B	R-419B	R-449A	R-505
R-404A	R-420A	R-449B	R-506
R-405A	R-421A	R-449C	R-507A
R-406A	R-421B	R-450A	R-508A
R-407A	R-422A	R-451A	R-508B
R-407B	R-422B	R-451B	R-509A
R-407C	R-422C	R-452A	R-512A
R-407D	R-422D	R-452B	R-513A
R-407E	R-422E	R-452C	R-513B
R-407F	R-423A	R-453A	R-515A
R-407G	R-424A	R-454A	R-516A
R-407H	R-425A	R-454B	
R-407I	R-426A	R-454C	
R-408A	R-427A	R-455A	
R-409A	R-428A	R-456A	
R-409B	R-429A	R-457A	
R-410A	R-430A	R-458A	
R-410B	R-431A	R-459A	
R-411A	R-434A	R-459B	
R-411B	R-435A	R-460A	
R-412A	R-437A	R-460B	
R-413A	R-438A	R-460C	
R-414A	R-439A	R-461A	
R-414B	R-440A	R-462A	
R-415A	R-442A	R-463A	
R-415B	R-444A	R-464A	

*Please note that the list is non-exhaustive.