bsi.

BSI Webinar

Air Emission and Ozone Depleting Substance Management

Higg Facility Environmental Module

Contents

อธิบายการสร้างและประโยชน์ในการประยุกต์ใช้ air emissions inventory

อธิบายผลกระทบของ (ozone-depleting substances, ODS) ที่เป็นสาเหตุของภาวะโลกร้อน

อธิบายความต้องการของข้อกำหนด Higg Criteria (Did your facility add additional refrigerants to any existing equipment during this reporting year?)

อธิบายการสร้างและประโยชน์ในการประยุกต์ใช้ ODS inventory

อธิบายการคำนวณ Greenhouse Gas Emissions จาก ODS

The Higg FEM Index

Developed by the SAC (Sustainable Apparel Coalition).

A self-assessment tool used by facilities to evaluate environmental performance and practices.

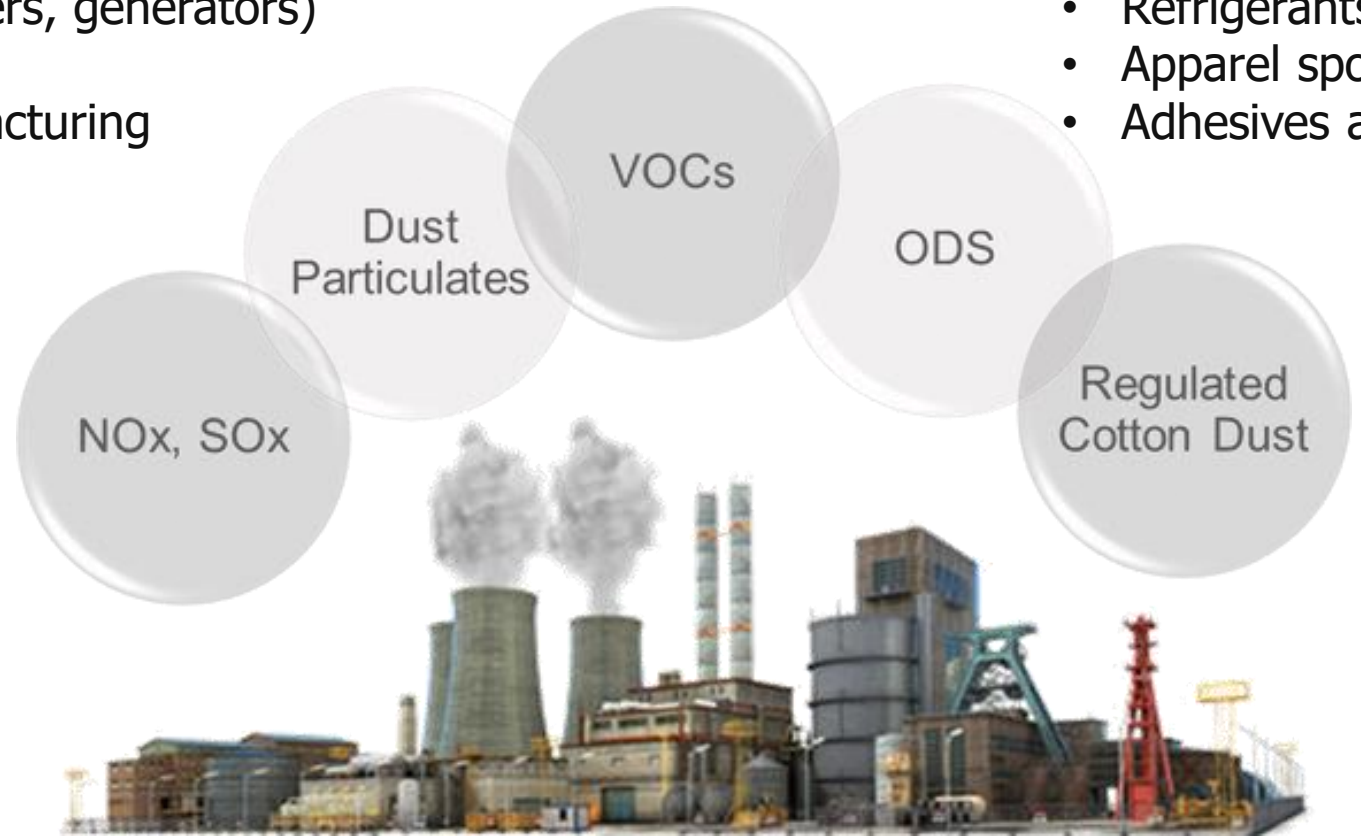
What Does It Measure?

Common Sources and Pollutants

- Fabric finishing/printing
- Solvent/adhesive application

- Fuel combustion (boilers, generators)
- Yarn spinning
- Synthetic fiber manufacturing

- Refrigerants (air conditioners, chillers)
- Apparel spot cleaners
- Adhesives and solvents



- Fuel combustion (boilers, generators)

- Spinning
- Weaving

Air Emission Source Types

Point source emissions

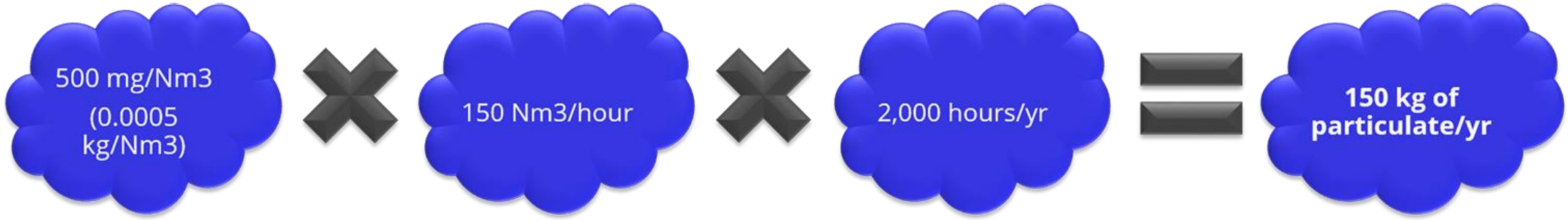
Non-point source or fugitive emissions

Creating Air Emissions Inventory

ID Number	Emission Source	Pollutants Emitted	Annual Emissions	Determined by	Control Devices In Place	Applicable Regulations	Testing Required
PS - 1	500 kW Diesel Power Emergency Generator S/N - 123456	Total Hydrocarbons (THC)	5 tons/year	Engineering Estimates	NA	Technical Memorandum to issue Air Pollution Abatement Notice to control Air Pollution from Stationary Processes	No testing required per regulation as generator run time is less than 200 hours annually.
		NOx	60 tons/year				
		PM2.5	4.2 tons/year				
		CO	13 tons/year				
		SOx	4 tons/year				
PS - 2	125 kW Diesel Power Emergency Generator S/N - 987654	Total Hydrocarbons (THC)	30 kg/year	Engineering Estimates	NA	Technical Memorandum to issue Air Pollution Abatement Notice to control Air Pollution from Stationary Processes	No testing required per regulation as generator run time is less than 200 hours annually.
		NOx	30 kg/year				
		PM2.5	2.4 tons/year				
		CO	9 tons/year				
		SOx	2 tons/year				
PS - 3	Wood Fired Steam Boiler	SO2	10 kg/year	Measured (annually)	NA	ANK-42-00 ON AIR POLLUTION AND NOISE DISTURBANCE CONTROL	Per regulation, stack testing is required on annual basis and must meet emission discharge limits.
		NOx	300 kg/year				
		PM2.5	240kg/year				
		CO	24 kg/year				
		THC	15 kg/year				
PS-4	Laser Cutting Machine Exhaust	PM2.5	0.4 kg/year	Measured (annually)	Baghouse dust collector Model ABC, 800 CFM airflow capacity	Law 20.284 regulates both fixed and mobile sources of air pollution.	Per regulation, stack testing is required on annual basis and must meet emission discharge limits.
		VOCs	150 kg/year				
		Formaldehyde	5 kg/year				

bsi.

Calculating Mass Pollutant Discharge



Measured Particulate Emission Concentration

Measured Air Flow of Emission Source

Operating Time

Mass Pollutant Discharges

In some cases, air flow data can be obtained from manufacturers specifications.

Common Air Pollution Control Technologies

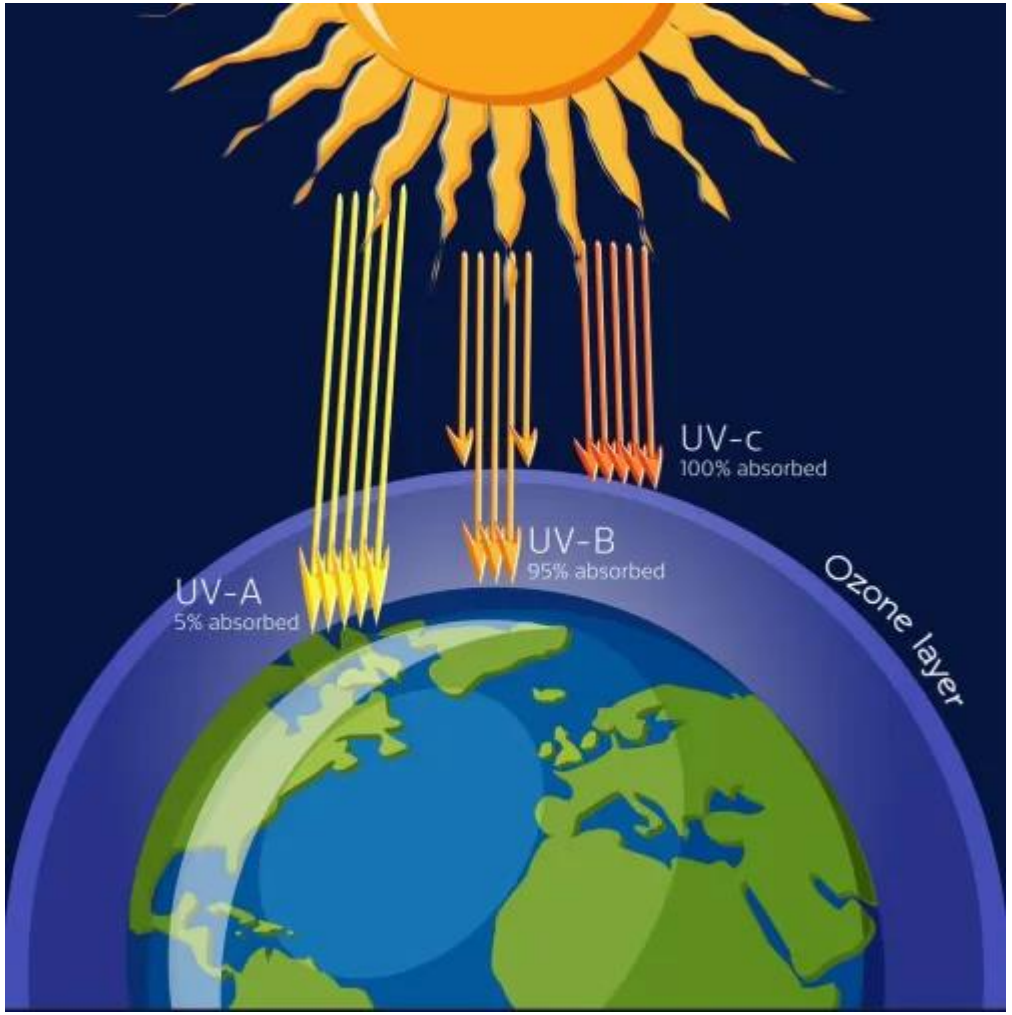
Electrostatic Precipitator (ESP)

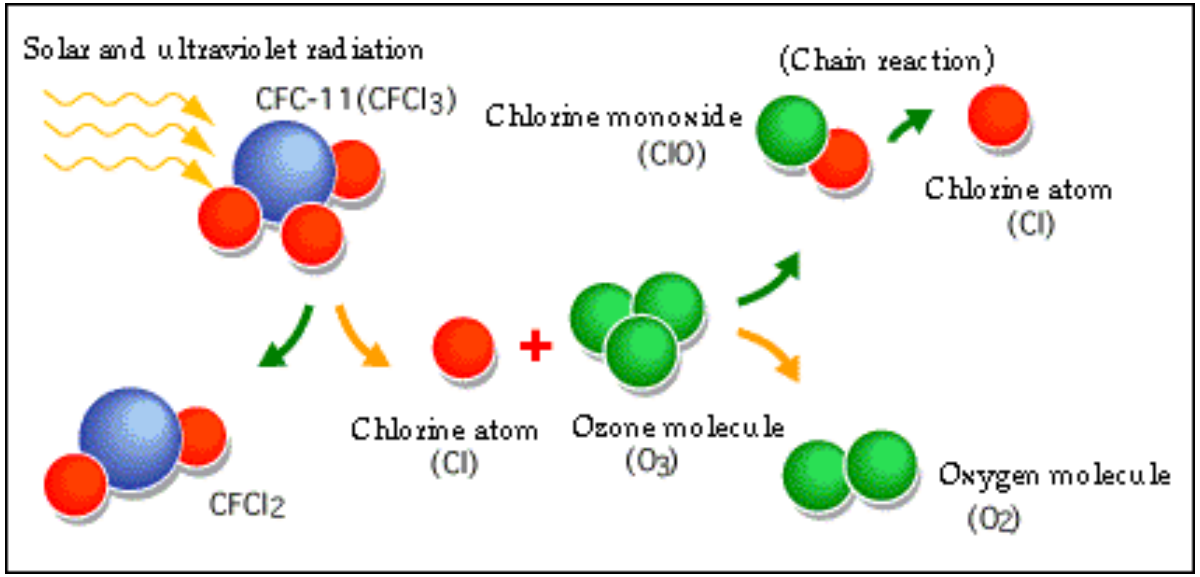
Baghouse

Wet scrubbers

Activated carbon adsorption

Ozone Depletion from Refrigerants and Other Sources





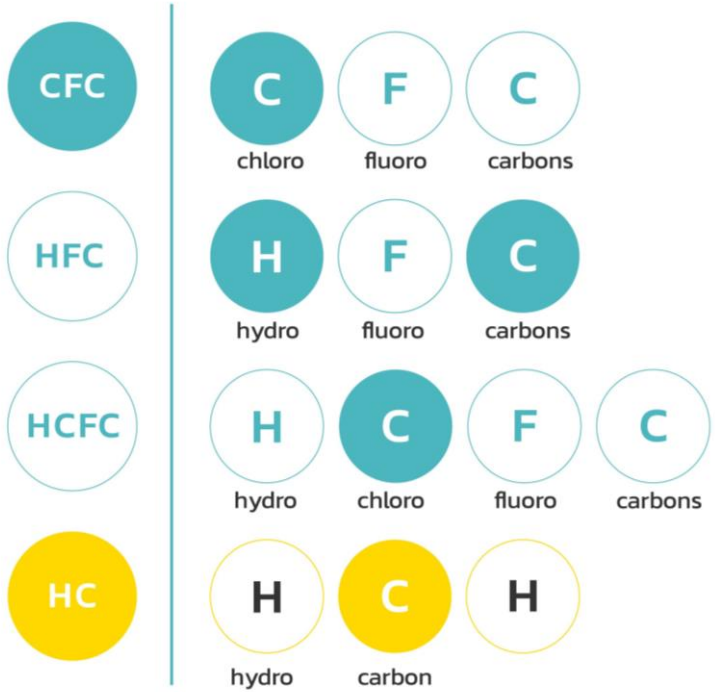
Ozone Depleting Substances (ODS) are substances that damage the earth's ozone layer and can contribute to global warming.

Interpreting Higg Criteria:

Did your facility add additional refrigerants to any existing equipment in the reporting year?

- Indicates the system has a leak.
- Enter quantitative data that shows how much refrigerant(s) your facility emitted in the reporting year.
- Identify what refrigerants are being used, where they are being used in your factory, and how much are potentially being emitted to the atmosphere.
- Prevent leaks via a regular maintenance program for ODS containing equipment.
- Implement a plan to phase out ODS used on-site

Refrigerant Types



- Chlorofluorocarbons (CFCs) = R11, R12 & R115
- Hydrofluorocarbon (HFCs) = R32, R125, R134a, R404A, A407C, R410A, R507A & R508B
- Hydrochlorofluorocarbons (HCFCs) = R22, R123 & R124
- Hydrocarbon (HC) = R290

Refrigerant Blends

Table 2: GWPs for Refrigerant Blends

ASHRAE #	Blend Composition	GWP*
R-401A	53% HCFC-22 , 34% HCFC-124 , 13% HFC-152a	16
R-401B	61% HCFC-22 , 28% HCFC-124 , 11% HFC-152a	14
R-401C	33% HCFC-22 , 52% HCFC-124 , 15% HFC-152a	19
R-402A	38% HCFC-22 , 6% HFC-125 , 2% propane	2,100
R-402B	6% HCFC-22 , 38% HFC-125 , 2% propane	1,330
R-403B	56% HCFC-22 , 39% PFC-218 , 5% propane	3,444
R-404A	44% HFC-125 , 4% HFC-134a , 52% HFC 143a	3,922
R-406A	55% HCFC-22 , 41% HCFC-142b , 4% isobutane	0
R-407A	20% HFC-32 , 40% HFC-125 , 40% HFC-134a	2,107
R-407B	10% HFC-32 , 70% HFC-125 , 20% HFC-134a	2,804
R-407C	23% HFC-32 , 25% HFC-125 , 52% HFC-134a	1,774
R-407D	15% HFC-32 , 15% HFC-125 , 70% HFC-134a	1,627
R-407E	25% HFC-32 , 15% HFC-125 , 60% HFC-134a	1,552
R-408A	47% HCFC-22 , 7% HFC-125 , 46% HFC 143a	2,301
R-409A	60% HCFC-22 , 25% HCFC-124 , 15% HCFC-142b	0
R-410A	50% HFC-32 , 50% HFC-125	2,088

ODP ≠ 0

ODP = 0

bsi.

Description of ODP and GWP

Refrigerant	Group	Atmospheric Life	ODP	GWP	Safety Classification
R11	CFC	130	1	4000	A1
R12	CFC	130	1	8500	A1
R22	HCFC	15	0.05	1500	A1
R134a	HFC	16	0	1300	A1
R404a	HFC	16	0	3260	A1
R410a	HFC	16	0	1720	A1
R507	HFC	130	1	3300	A1
R717	NH3	-	0	0	B1
R744	CO2	-	0	1	A1
R290	HC	< 1	0	8	A3
R600a	HC	< 1	0	8	A3

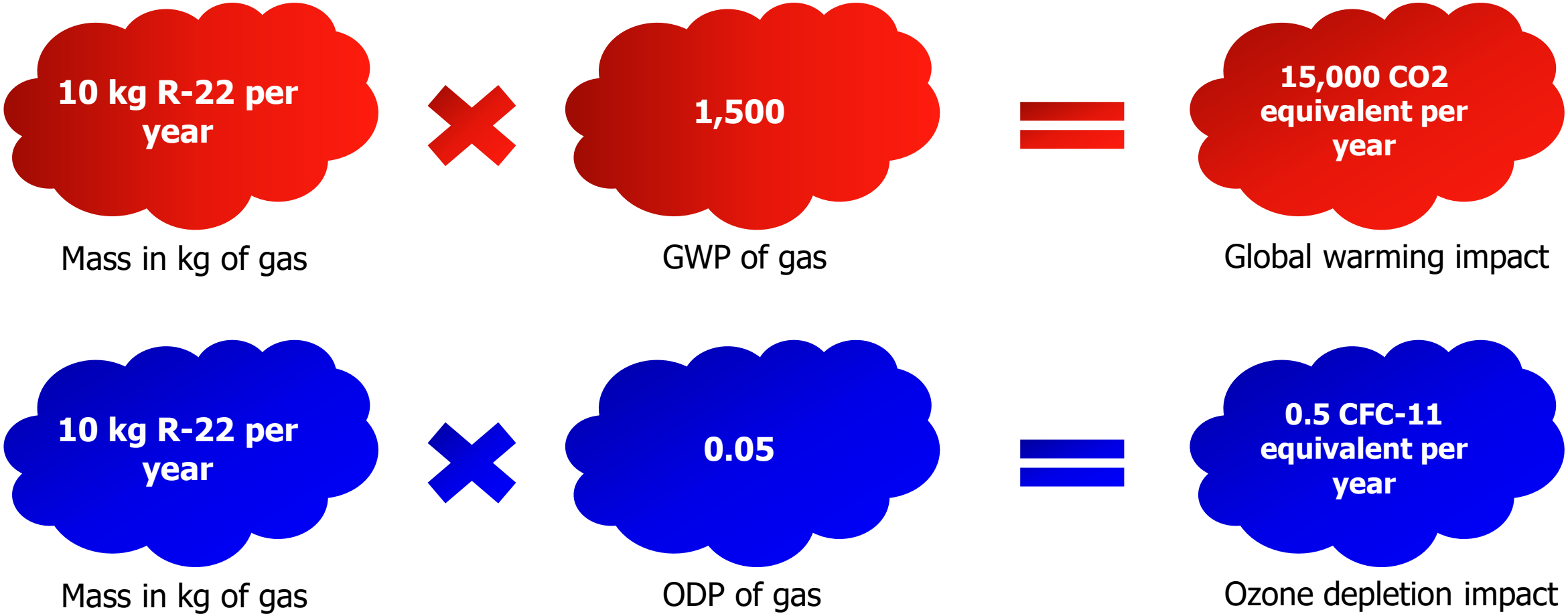
- The ozone depletion potential (ODP) of a chemical compound is the relative amount of degradation to the ozone layer it can cause, with trichlorofluoromethane (R-11 or CFC-11) being fixed at an ODP of 1.0.
- The Global Warming Potential (GWP) of a refrigerant is its global warming impact relative to the impact of the same quantity of carbon dioxide over a 100-year period.

Creating an ODS Inventory

Equipment Inventory Number	Area	Equipment Name	Model	Number of Units	Type of Refrigerant	Refrigerant Charge (kg)	Annual Leakage Rate (% of initial charge/yr)	GWP of Refrigerant	Operation Emissions (tonnes of CO2 equivalent / yr)
Office/Admin Area									
1A	Main Reception	LG Air conditioner	LG-123	1	R-22	0.48	0.5	1500	0.007
2A	Office 1	LG Air conditioner	LG-321	1	R-22	0.62	0.5	1500	0.004
3A	Office 2	LG Air conditioner	LG-456	1	R-22	3.8	0.5	1500	0.029
4A	Sample Room	Hitachi Air conditioner	H-1234	2	R-22	0.67	0.5	1500	0.01

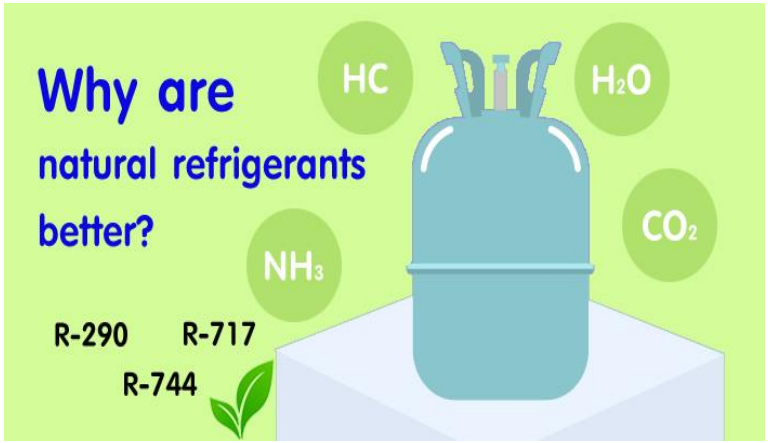
- The source of ODS (i.e. where is is used).
- The name of the ODS (i.e. R-22, R-134a).
- How much is consumed/released from the site.

Calculating Greenhouse Gas Emissions and Ozone Depletion from ODS

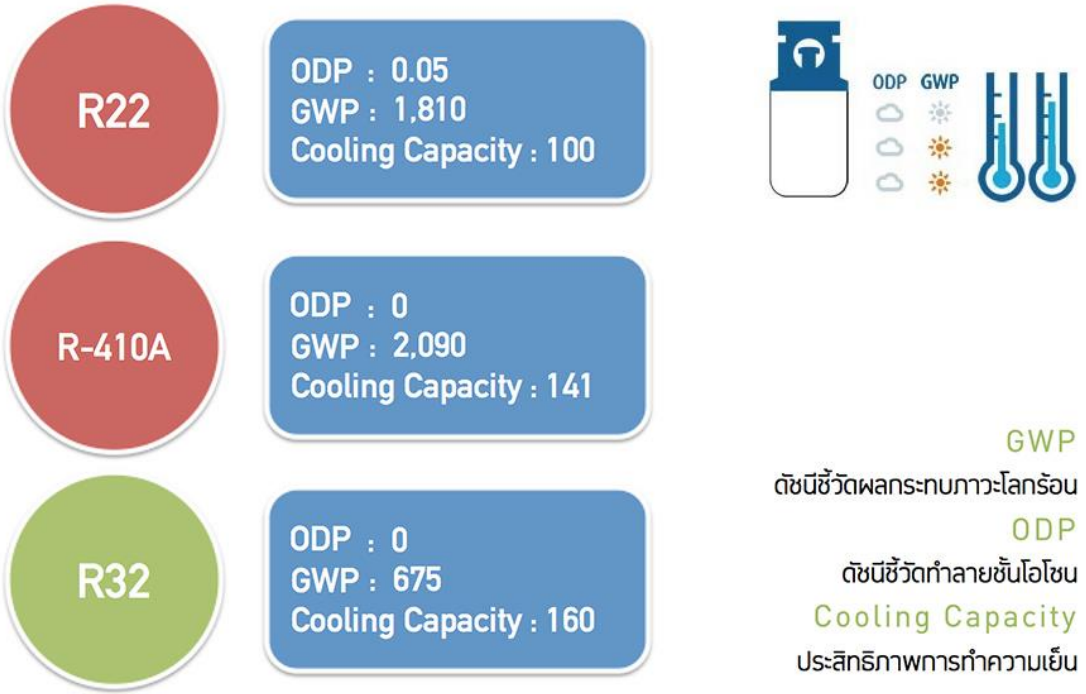


ODS Management and Improvement

Maintenance and PM



Phase out ODS used on-site



Higg FEM Verification and Training Services by BSI

1. Train Introduction to Higg Facility Environmental Module
2. Higg General FEM Verifier (All questions)
3. Higg Chemical Specialist FEM Verifier (chemical management level 2 & 3)

Questions

Contact us

www.bsigroup.com/th-TH/

BSI Thailand

@bsithailand

Tel: 02 294 4889-92 Email: infothai@bsigroup.com