MODULE	**INDUSTRIAL PROCESSES**		
SUBMODULE	**METAL PRODUCTION**		
WORKSHEET	**2-11**		
SHEET	**4 OF 11 FERROALLOYS - TIER 1b - CO_2 EMISSIONS**		
	STEP 4		
A Amount of Ferroalloy Produced (t)	B Emission Factor (t CO_2/t ferroalloy produced)	C CO_2 Emitted (t)	D CO_2 Emitted (Gg)
		C = (A x B)	D = C/10^3

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	METAL PRODUCTION
WORKSHEET	2-11
SHEET	5 OF 11 ALUMINIUM - TIER 1b - CO_2 EMISSIONS

STEP 5			
A Amount of Aluminium Produced (t)	B Emission Factor (t CO_2/t aluminium produced)	C CO_2 Emitted (t)	D CO_2 Emitted (Gg)
		C = (A x B)	$D = C/10^3$

MODULE	INDUSTRIAL PROCESS
SUBMODULE	METAL PRODUCTION
WORKSHEET	2-11
SHEET	6 OF 11 ALUMINIUM - TIER 1b - CF_4 EMISSIONS

STEP 6								
A Type of cell	B Amount of Aluminium Produced (tonnes)	C Equation Constant CF_4	D Average Fraction of Pot Gas During Anode Effects	E Current Efficiency (fraction)	F Number of Anode Effects Per Day	G Anode Effect Duration (minutes)	H CF_4 Emitted (kg)	I CF_4 Emitted (Gg)
		1.698					H = (B x C x D x E x F x G)	$I = H/10^6$

MODULE	INDUSTRIAL PROCESS
SUBMODULE	METAL PRODUCTION
WORKSHEET	2-11
SHEET	7 OF 11 ALUMINIUM - TIER 1b - C_2F_6 EMISSIONS

STEP 7								
A Type of cell	B Amount of Aluminium Produced (tonnes)	C Equation Constant C_2F_6	D Average Fraction of Pot Gas During Anode Effects	E Current Efficiency (fraction)	F Number of Anode Effects per Day	G Anode Effect Duration (minutes)	H C_2F_6 Emitted (kg)	I C_2F_6 Emitted (Gg)
		0.1698					H = (B x C x D x E x F x G)	$I = H/10^6$

MODULE	INDUSTRIAL PROCESSES		
SUBMODULE	METAL PRODUCTION		
WORKSHEET	2-11		
SHEET	8 OF 11 ALUMINIUM - TIER 1c - CF_4 EMISSIONS		
STEP 8			
A Amount of Aluminium Produced (t)	B Emission Factor (kg CF_4/t aluminium produced)	C CF_4 Emitted (kg)	D CF_4 Emitted (Gg)
		C = (A x B)	D = C/10^6

MODULE	INDUSTRIAL PROCESSES	
SUBMODULE	METAL PRODUCTION	
WORKSHEET	2-11	
SHEET	9 OF 11 ALUMINIUM - TIER 1c - C_2F_6 EMISSIONS	
STEP 9		
A Total CF_4 Emissions (Gg)	B C_2F_6 Emission Factor (C_2F_6/CF_4)	C C_2F_6 Emitted (Gg)
	0.1	C = (A x B)

MODULE	INDUSTRIAL PROCESSES		
SUBMODULE	METAL PRODUCTION -		
WORKSHEET	2-11		
SHEET	10 OF 11 ALUMINIUM - NO_x, CO, SO_2 EMISSIONS		
STEP 10			
A Amount of Aluminium Produced (t)	B Emission Factor (kg gas/t aluminium produced)	C Pollutant Emitted (kg)	D Pollutant Emitted (Gg)
		C = (A x B)	D = C/10^6
	NO_x		*NO_x*
	CO		*CO*
	SO_2		*SO_2*

MODULE	**INDUSTRIAL PROCESSES**	
SUBMODULE	**METAL PRODUCTION**	
WORKSHEET	**2-11**	
SHEET	**11 OF 11 SF_6 USED IN ALUMINIUM AND MAGNESIUM FOUNDRIES - SF_6 EMISSIONS**	
STEP 11		
A Consumption of SF_6 (t)	B SF_6 Emitted (t)	C SF_6 Emitted (Gg)
	B = A	$C = B/10^3$

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	PULP AND PAPER INDUSTRIES			
WORKSHEET	2-12			
SHEET	1 OF 2 NO_x, NMVOC AND CO EMISSIONS			
STEP 1				
Pulp Process Type	A Quantity of Air Dried Pulp Produced (t)	B Emission Factor (kg gas /t air dried pulp produced)	C Pollutant Emitted (kg)	D Pollutant Emitted (Gg)
			C = (A x B)	D = C/10^6
Kraft		*NO_x*		*NO_x*
Kraft		*NMVOC*		*NMVOC*
Kraft		*CO*		*CO*

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	PULP AND PAPER INDUSTRIES			
WORKSHEET	2-12			
SHEET	2 OF 2 SO_2 EMISSIONS			
STEP 2				
Pulp Process Type	A Quantity of Air Dried Pulp Produced (t)	B Emission Factor (kg SO_2/t air dried pulp produced)	C SO_2 Emitted (kg)	D SO_2 Emitted (Gg)
			C = (A x B)	D = C/10^6
Kraft				
Acid Sulphite				
			Total (Gg):	

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	FOOD AND DRINK			
WORKSHEET	2-13			
SHEET	1 OF 2 ALCOHOLIC BEVERAGE PRODUCTION - NMVOC EMISSIONS			
	STEP 1			
Alcoholic Beverage Type	A Quantity of Alcoholic Beverage Produced (hl)	B Emission Factor (kg NMVOC/hL beverage produced)	C NMVOC Emitted (kg)	D NMVOC Emitted (Gg)
			C = (A x B)	D = C/10^6
			Total (Gg):	

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	FOOD AND DRINK			
WORKSHEET	2-13			
SHEET	2 OF 2 BREAD AND OTHER FOOD PRODUCTION - NMVOC EMISSIONS			
	STEP 2			
Food Production Type	A Quantity of Food Produced (t)	B Emission Factor (kg NMVOC/t food processed)	C NMVOC Emitted (kg)	D NMVOC Emitted (Gg)
			C = (A x B)	D = C/10^6
			Total (Gg):	

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	PRODUCTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE			
WORKSHEET	2-14			
SHEET	1 OF 2 BY-PRODUCTS - HFCS AND PFCS EMISSIONS			
STEP 1				
Type of Halocarbon	A Quantity of Halocarbon Produced (t)	B Emission Factor (kg halocarbon by-product per tonne halocarbon produced)	C Halocarbon Emitted (kg)	D Halocarbon Emitted (Gg)
			C = (A x B)	$D = C/10^6$

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	PRODUCTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE			
WORKSHEET	2-14			
SHEET	2 OF 2 FUGITIVE EMISSIONS - HFCS AND PFCS EMISSIONS			
STEP 2				
Type of Halocarbon	A Quantity of Halocarbon Produced (t)	B Emission Factor (kg halocarbon lost per tonne halocarbon produced)	C Halocarbon Emitted (kg)	D Halocarbon Emitted (Gg)
			C = (A x B)	$D = C/10^6$

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE			
WORKSHEET	2-15			
SHEET	1 OF 13 - TIER 1a AND TIER 1b - BULK HALOCARBONS EMISSIONS			
HALOCARBON NAME				
STEP 1				
A Quantity of Halocarbon Produced (t)	B Quantity of Halocarbon Imported in Bulk (t)	C Quantity of Halocarbon Exported in Bulk (t)	D Quantity of Halocarbon Destroyed (t)	E Potential Bulk Halocarbon Emission (t)
				E = A + B - C - D

MODULE	INDUSTRIAL PROCESSES			
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE			
WORKSHEET	2-15			
SHEET	2 OF 13 - TIER 1b ONLY - PRODUCT CONTAINING HALOCARBONS			
HALOCARBON NAME				
STEP 2				
Type of Product	F Number of Units Imported (+) or Exported (-)	G Quantity of Material per Unit (kg)	H Fraction of Halocarbon in Material (%/100)	I Potential Product Halocarbon Emissions (t)
				$I = F \times G \times H/10^3$
			Total (Gg):	

MODULE	INDUSTRIAL PROCESSES		
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE - TIER 1a AND TIER 1b - SUMMARY OF HALOCARBONS EMISSIONS		
WORKSHEET	2-15		
SHEET	3 OF 13		
HALOCARBON NAME			
STEP 3			
J Potential Bulk Halocarbon Emissions (t)	K Potential Product Halocarbon Emissions (t)	L Total Potential Halocarbon Emission (t)	M Total Potential Halocarbon Emissions (Gg)
J= E from Step 1	K= I from Step 2	L = J + K	$M = M/10^3$

MODULE	INDUSTRIAL PROCESSES		
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE		
REFRIGERATION TYPE			
HALOCARBON NAME			
WORKSHEET	2-15		
SHEET	4 OF 13 REFRIGERATION ASSEMBLY - TIER 2 - HFCS AND PFCS EMISSIONS		
STEP 4			
A Amount of HFC/PFC Charged into New Systems in Year t ($E_{charged}(t)$) (t)	B Assembly Losses (k) (%)	C Halocarbon Emitted (t)	D Halocarbon Emitted (Gg)
		C= (A x B)	$D = C/10^3$

ODULE	**INDUSTRIAL PROCESSES**
SUBMODULE	**CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE**
REFRIGERATION TYPE	
HALOCARBON NAME	
WORKSHEET	**2-15**
SHEET	**5 OF 13 REFRIGERATION OPERATION - TIER 2 - HFCS AND PFCS EMISSIONS**

STEP 5			
E Amount of HFC/PFC Stocked in Existing Systems in Year t ($E_{stock\ (t)}$) (t)	F Annual Leakage Rate (x) (%)	G Halocarbon Emitted (t)	H Halocarbon Emitted (Gg)
		G = E x F/100	$H = G/10^3$

MODULE	**INDUSTRIAL PROCESSES**
SUBMODULE	**CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE**
REFRIGERATION TYPE	
HALOCARBON NAME	
WORKSHEET	**2-15**
SHEET	**6 OF 13 REFRIGERATION DISPOSAL - TIER 2 - HFCS AND PFCS EMISSIONS**

STEP 6					
I Amount of HFC/PFC Charged into New Systems in Year t-n ($Ei_{charge\ (t-n)}$) (t)	J Average Equipment Lifetime (n) (years)	K Amount of HFC/PFC in Systems at Time of Disposal in Per Cent of Original Charge (y) (%)	L Amount of HFC/PFC Recovered in Per Cent of Actual Charge (z) (%)	M Halocarbon Emitted (t)	N Halocarbon Emitted (Gg)
				M = I x [K/100] x [(100 - L)/100]	$N = M/10^3$

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
REFRIGERATION TYPE	
HALOCARBON NAME	
WORKSHEET	2-15
SHEET	7 OF 13 REFRIGERATION SUMMARY - TIER 2 - HFCS AND PFCS EMISSIONS

STEP 7			
O Assembly (Gg)	P Operation (Gg)	Q Disposal (Gg)	R Total Halocarbon Emissions (Gg)
O = D (from Step 4)	P = H (from Step 5)	Q = N (from Step 6)	R =(O+P+Q)

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
WORKSHEET	2-15
SHEET	8 OF 13 FOAM PRODUCTS - TIER 2 - HFCS AND PFCS EMISSIONS

STEP 8						
Foam Type	A Quantity of HFC/PFC Used (t)	B Quantity of HFC/PFC in Use (t)	C Fraction Loss during Production (%/100)	D Fraction Loss during Use (%/100)	E HFC/PFC Emitted (t)	F HFC/PFC Emitted (Gg)
					E = (A x C) + (B x D)	$F = E/10^3$
Open		NA		NA		
Closed						
NA= Not Applicable					**Total (Gg):**	

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
WORKSHEET	2-15
SHEET	9 OF 13 FIRE EXTINGUISHERS - TIER 2 - HFCS, PFCS AND SF_6 EMISSIONS

STEP 9				
Extinguisher Type	A Total Quantity of HFC/PFC/SF_6 Used in New Extinguishers (t)	B Fractional Loss Factor (%/100)	C HFC/PFC/SF_6 Emitted (t)	D HFC/PFC/SF_6 Emitted (Gg)
			C = (A x B)	$D = C/10^3$
Portable				
Fixed				
			Total (Gg):	

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
WORKSHEET	2-15
SHEET	10 OF 13 - TIER 2 - AEROSOLS - HFCS AND PFCS EMISSIONS

STEP 10				
A Use of HFCs/PFCs for Aerosols in Inventory Year (t)	B Use of HFCs/ PFCs for Aerosols in Prior Year (t)	C Loss of Current Year's Use	D Emission of HFCs/PFCs from Aerosols (t)	E Emission of HFCs/PFCs from Aerosols (Gg)
			D = (A x C) + B (1 - C)	$E = D/10^3$

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
WORKSHEET	2-15
SHEET	11 OF 13 SOLVENTS - TIER 2 - HFCS AND PFCS EMISSIONS

STEP 11				
A Use of HFCs/PFCs for Solvents in Inventory Year (t)	B Use of HFCs/ PFCs for Solvents in Prior Year (t)	C Loss of Current Year's Use	D Emission of HFCs/PFCs from Solvents (t)	E Emission of HFCs/PFCs from Solvents (Gg)
			D = (A x C) + B (1 - C)	$E = D/10^3$

MODULE	INDUSTRIAL PROCESSES
SUBMODULE	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE
WORKSHEET	2-15
SHEET	12 OF 13 OTHER APPLICATIONS - TIER 2 - HFCS AND PFCS EMISSIONS

STEP 12				
A Use of HFCs/PFCs for Other Applications in Inventory Year (t)	B Use of HFCs/ PFCs for Other Applications in Prior Year (t)	C Loss of Current Year's Use	D Emission of HFCs/PFCs from Other Applications (t)	E Emission of HFCs/PFCs from Other Applications (Gg)
			D = (A x C) + B (1 - C)	$E = D/10^3$

MODULE	**INDUSTRIAL PROCESSES**
SUBMODULE	**CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE**
WORKSHEET	**2-15**
SHEET	**13 OF 13 SF_6 EMISSIONS**

STEP 13					
A Quantity of SF_6 in Use in Inventory Year (t)	B Loss Factor for SF_6 in Use (%/100)	C Quantity of SF_6 in Use 30 Years Prior to the Inventory Year (t)	D Fraction Remaining in SF_6 Equipment at Time of Disposal (%/100)	E SF_6 Emitted (t)	F SF_6 Emitted (Gg)
				$E = (A \times B) + (C \times D)$	$F = E/10^3$