

產品碳含量試填工作坊

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METAL INDUSTRIES RESEARCH & DEVELOPMENT CENTRE

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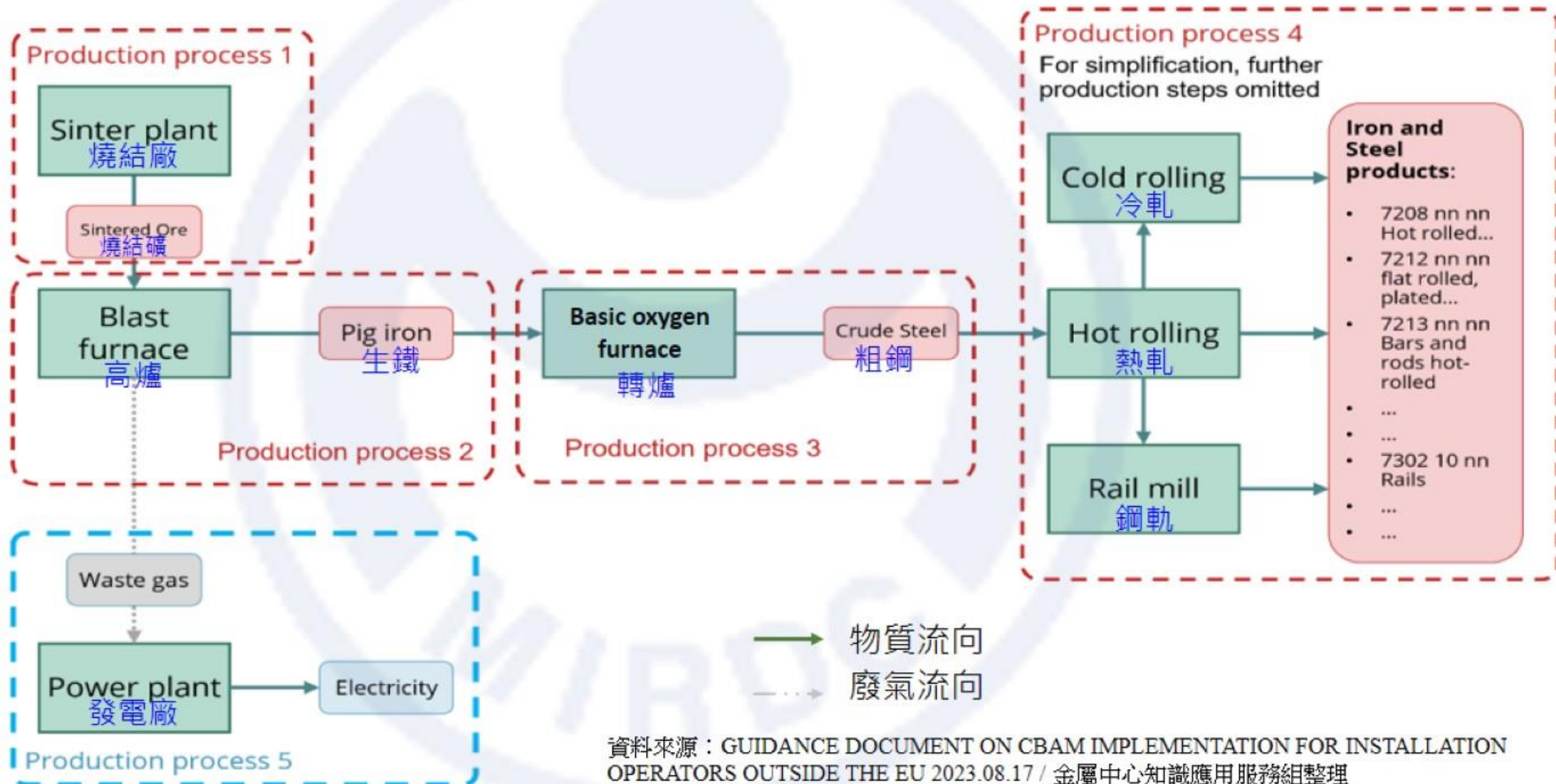


四、鋼鐵製品計算範例

備註：前面31頁請參考：「主題2-金屬及金屬製品業產品碳含量計算原則」簡報

鋼鐵製品計算範例

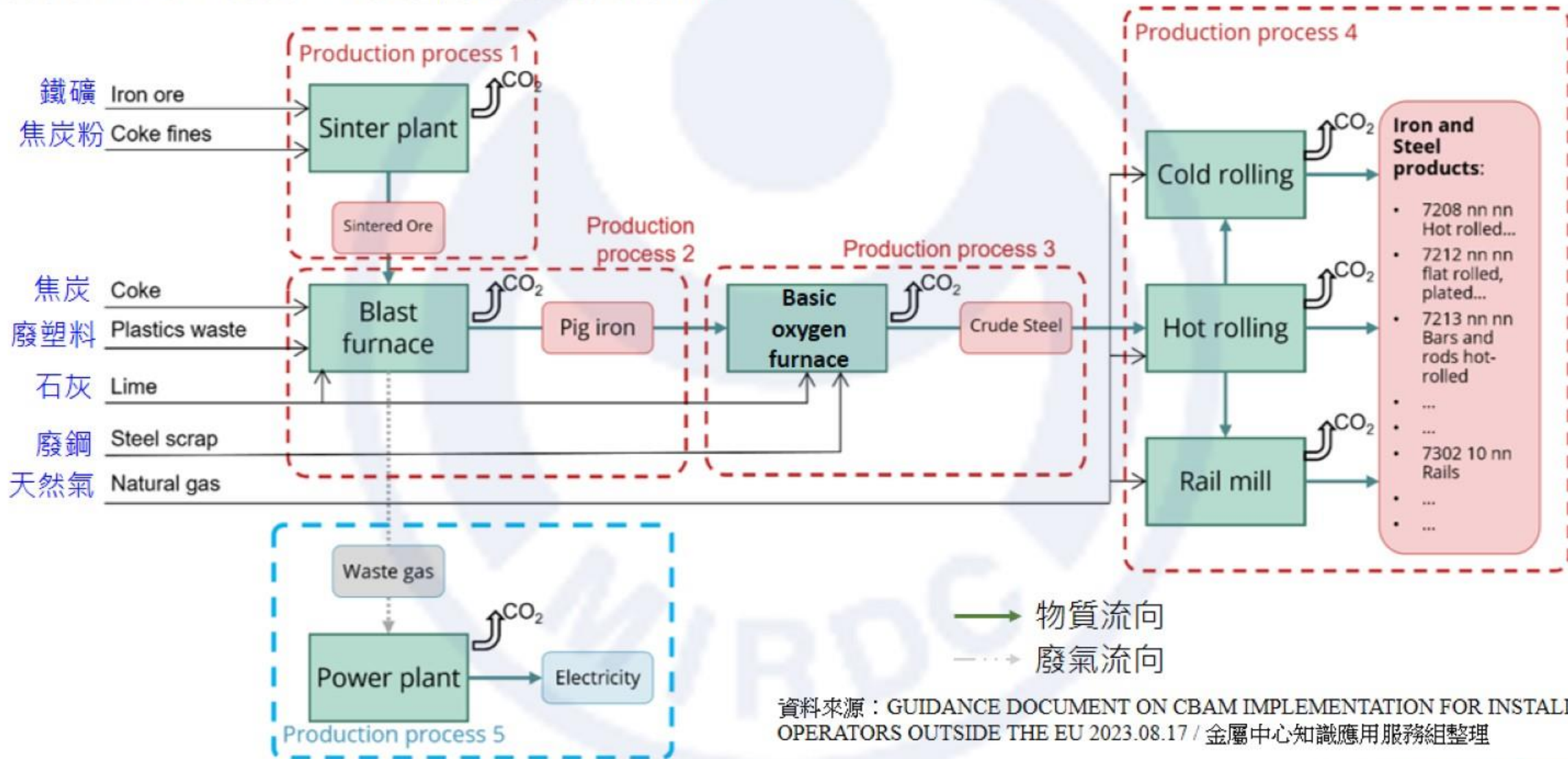
碳鋼高爐生產範例-概述



資料來源：GUIDANCE DOCUMENT ON CBAM IMPLEMENTATION FOR INSTALLATION OPERATORS OUTSIDE THE EU 2023.08.17 / 金屬中心知識應用服務組整理

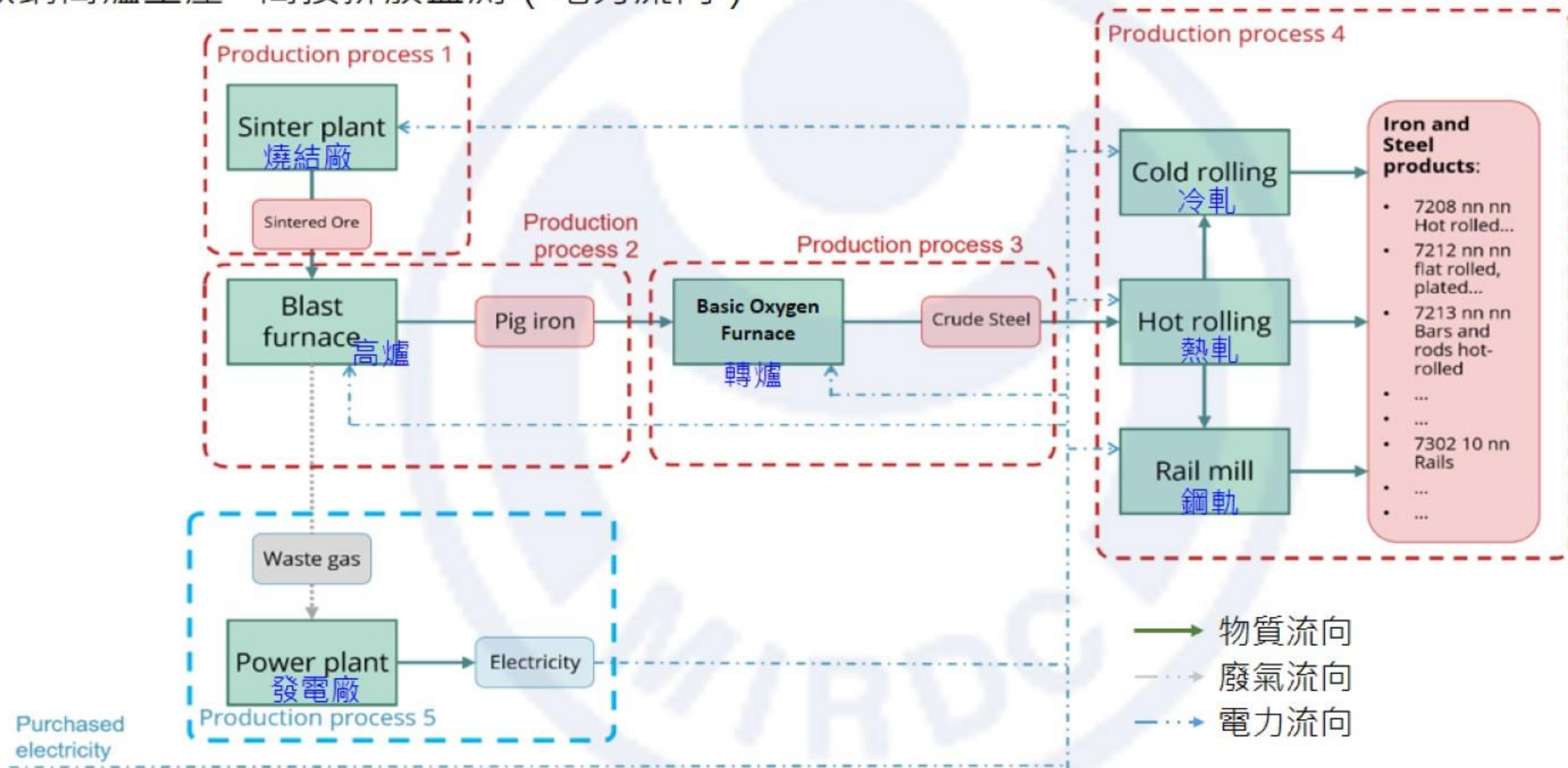
鋼鐵製品計算範例

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鋼鐵製品計算範例

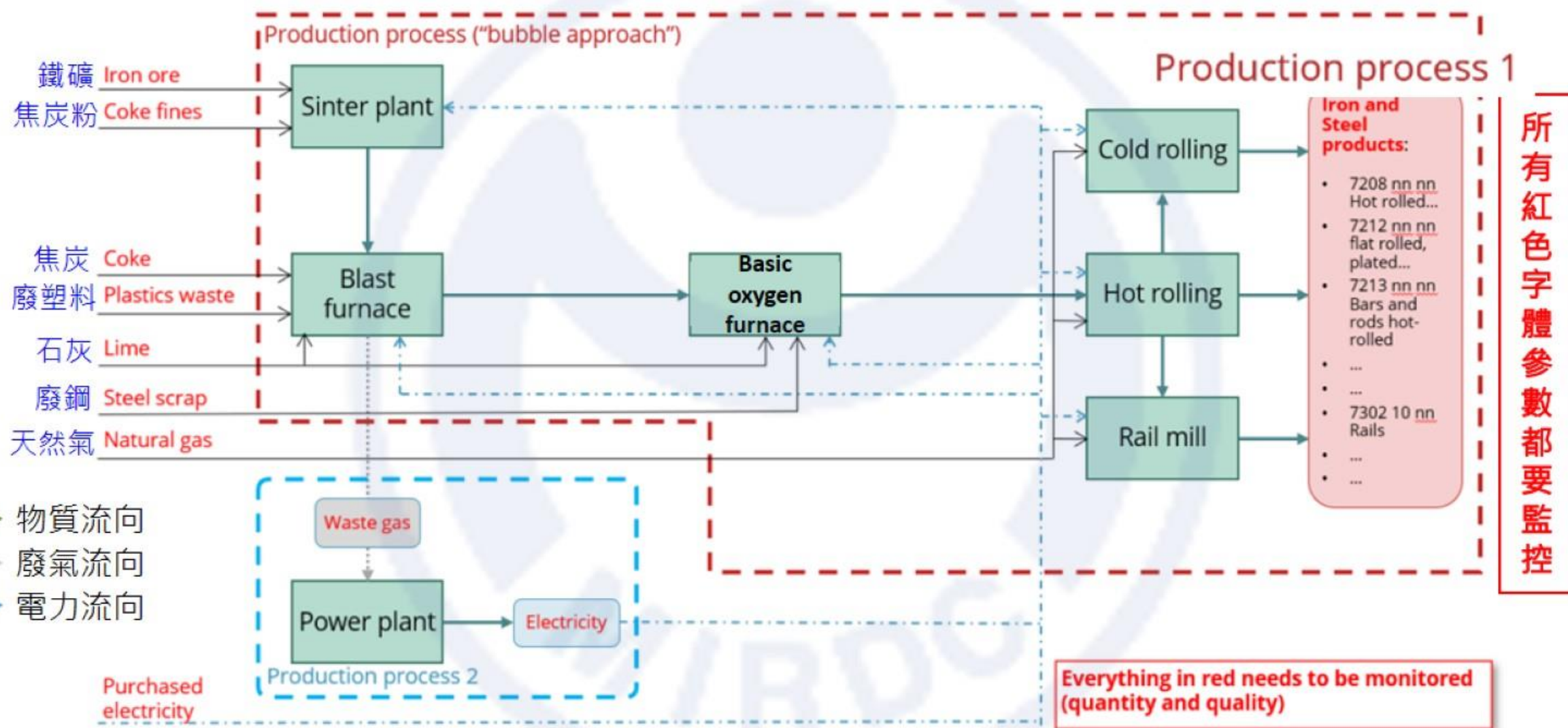
碳鋼高爐生產- 間接排放監測 (電力流向)



資料來源：GUIDANCE DOCUMENT ON CBAM IMPLEMENTATION FOR INSTALLATION OPERATORS OUTSIDE THE EU 2023.08.17 / 金屬中心知識應用服務組整理

鋼鐵製品計算範例

碳鋼高爐生產- 完整監控方法



資料來源：GUIDANCE DOCUMENT ON CBAM IMPLEMENTATION FOR INSTALLATION
OPERATORS OUTSIDE THE EU 2023.08.17 / 金屬中心知識應用服務組整理

鋼鐵製品計算範例

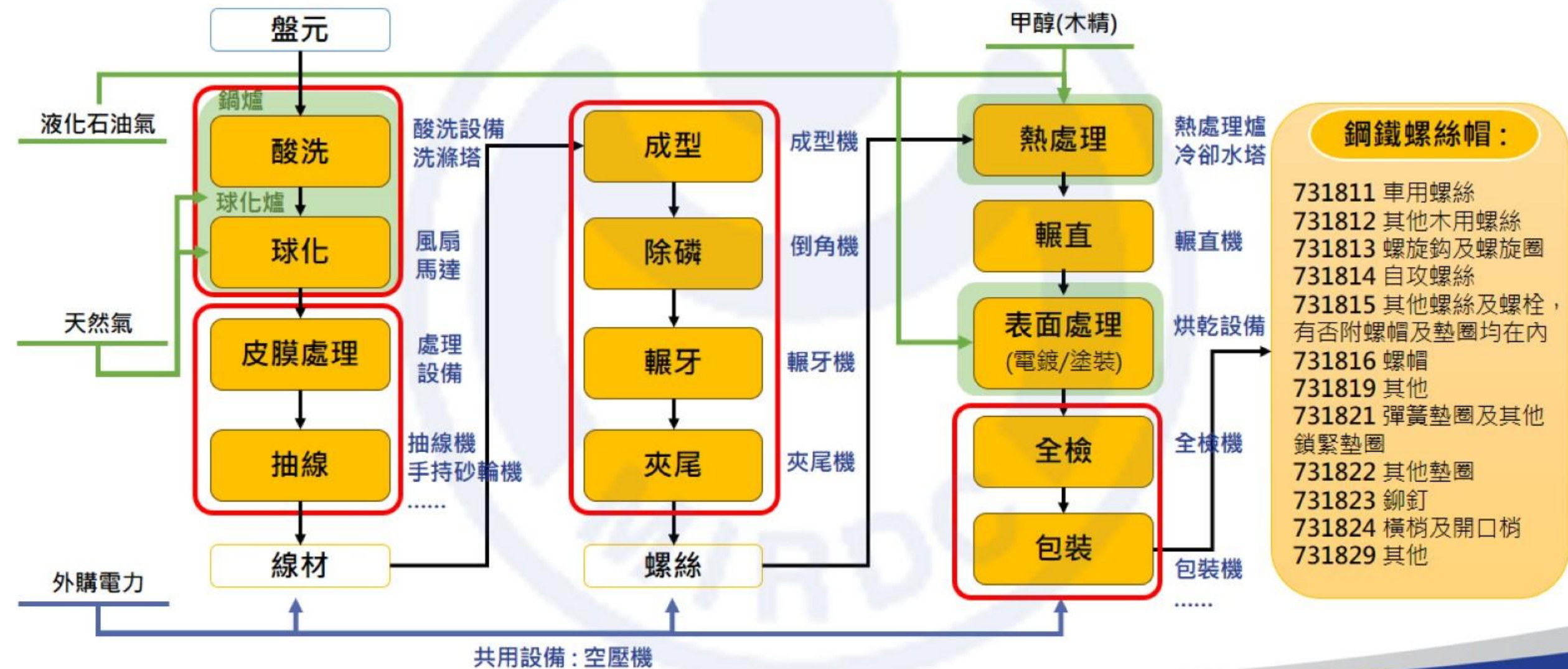
- 以扣件業碳鋼螺絲產品為例



定義系統邊界 – 以扣件業為例



- 製程排放源-以扣件業碳鋼螺絲產品為例



鋼鐵製品計算範例

碳鋼高爐生產的直接排放計算範例-質量平衡法

Consumption levels	AD (tonnes) 活動數據	CC 碳含量	Bio fraction	排放量 Em_k Emissions (t CO ₂) ¹²⁹	Comments
Coke fines	50 000	88,0%		161 216,0	
Iron ores	5 600 000	0,023%		4 719,2	
Coke	2 200 000	88,0%		7 093 504,0	
Plastic wastes	70 000	68,4%	16%	147 270,8	Biomass fraction ¹³⁰ = 28 052 t CO ₂
Scrap (external)	800 000	0,210%		6 155,5	
Scrap (internal)	200 000	0,180%		1 319,0	
Lime calcined	280 000	0,273%		2 800,0	
Natural gas	170 000	75,0%		467 160,0	
Other inputs	40 000	10,0%		14 656,0	
Sum				7 898 800,6	
Carbon in outputs	AD	CC		"Emissions"(negative)	
Steel	-4 800 000	0,180%		-31 657	
Slags	-1 000 000	0,030%		-1 099	
Sum				-32 756,2	
Total direct emissions of the installation				7 866 044	

Mass balance to determine direct emissions
AD = Activity data,
CC = carbon content
 $f=3.664 \text{ tCO}_2/\text{t}$

$$Em_k = AD_k \times CC_k \times f$$

包含生質的排放源(如Plastic wastes)裡，需分別計算生質碳排量及總碳排量
生質碳排量的計算公式如下：

$$BEm_k = AD_k \times CC_k \times Bio_k \times f$$

- $70000\text{t} \times 68.4\% \times 16\% \times 3.664(\text{莫耳比}) = 28052 \text{ t CO}_2$

活動數據為負數：
扣除含碳固體物質
(包括:產品/廢棄物)

質量平衡法為輸入和輸出之間
排放量的差異

鋼鐵製品計算範例

碳鋼高爐生產的間接排放計算範例

			t CO ₂ /年	說明
輸入	活動數據(AD)	排放係數(EF)		
來自電網的電力 (25%)	414,711	0.628	260,438	由50%煤、30%天然氣、 其餘可再生能源混和的
來自廢氣燃燒的 電力(75%)	1,244,133	0.576	716,620	廢氣發電的排放特性與 天然氣發電相似，但效 率較低
總電力消耗	1,658,844	0.589	977,059	排放係數由電網及廢氣 加權平均算出

總間接排放：977,059

鋼鐵製品計算範例

碳鋼高爐生產的直接排放計算範例-扣除廢氣

			t CO ₂ / year	Comment
Total direct emissions of the installation 設施內的總直接排放量		排放係數(天然氣)	7 866 044	From Table 7-6 above
INPUT	AD (TJ)	EF (Nat. Gas)		
Deduction for Waste gases 扣除廢氣	-12 800	56,1	- 478 959	Takes into account a correction factor of 0.667
Total direct emissions of the production process for crude steel products 粗鋼產品生產過程的總直接排放量			7 387 085	Revised total direct emissions 經修正後的總直接排放量

鋼鐵製品計算範例

報告期內生產商品的活動層級範例

Products	Activity Level (AL)	Units
<i>Precursors</i> 前驅物		
Pig Iron	4 000 000	t / year
Crude steel	5 000 000	t / year
<i>Iron or steel products</i> 鐵或鋼製品		
Sheets	3 500 000	t / year
Bars	800 000	t / year
Rails	500 000	t / year
Total goods produced	4 800 000	t / year
Internal scrap 內部廢棄物	200 000	t / year

鋼鐵製品計算範例

鋼鐵製品的特定隱含排放量計算範例

Total amount of goods produced (產品總數量)	4,800,000	t / year
Total direct emissions of the production process for steel products (生產過程中的直接排放總量)	7,387,085	t CO ₂ / year
Total indirect emissions of the installation (設備的間接排放量)	977,059	t CO ₂ / year
Specific direct embedded emissions (特定直接隱含排放量)	1.539	t CO ₂ / steel product
Specific indirect embedded emissions (特定間接隱含排放量)	0.203	t CO ₂ / steel product
Specific total embedded emissions (特定總隱含排放量)	1.742	t CO ₂ / steel product

$$1.539 = 7,387,085 \div 4,800,000$$

SEE (direct) tCO₂e/t = 直接排放總量/產品總數量

$$0.203 = 977,059 \div 4,800,000$$

SEE (indirect) tCO₂e/t = 間接排放總量/產品總數量

$$1.742 = 1.539 + 0.204$$

SEE (total) tCO₂e/t = SEE (direct) + SEE (indirect)

五、CBAM過渡期生產設施溝通表格說明

CBAM過渡期生產設施溝通表格

生產商各項細部資訊填報

Sheet A: 生產設施資訊

Sheet D: 製程之碳排放量

Sheet B: 碳排放量之源流及排放源

Sheet E: 前驅物之碳排放量

Sheet C: 生產設施碳排放及能源

Sheet F: 計算工具

碳排放資訊綜合整理表單

綜整表單：製程

綜整表單：產品

綜整表單：溝通用

部分表單填報指引

Sheet G: 填報指引



扣件業 示範教學



公司名稱：ABC company

產品名稱

1

螺絲螺帽 (CN code: 7318)

出口概況

2

22% 外銷歐盟/全年
1.22% 單一客戶/當季

申報期間

3

2023年6月1日至8月31日

申報摘要

4

- 單一客戶進口的量：228噸
- 使用前驅物/量：盤元線材 / 237噸
- 全廠溫室氣體排放項目
 - 範疇一：天然氣(NG)、液化石油氣(LPG)、
甲醇(木精)
 - 範疇二：電力
 - 範疇三：盤元線材

填報流程方法說明

1. 確認製程

- 1-1 球化(酸洗+球化)
- 1-2 抽線(皮膜處理 + 抽線)
- 1-3 成型(打頭+軋牙...)
- 1-4 熱處理
- 1-5 表面處理(外包)

Step 1

2. 釐清製程排放源

- 2-1 NG用在球化(加熱)和抽線(鍋爐)製程
- 2-2 LPG、木精用在熱處理製程
- 2-3 每個製程都有用電

Step 2

3. 確認排放源數據蒐集方式

- 3-1 NG是流量計分錶統計(單位是 km^3)，可分製程提供
- 3-2 LPG是槽車入廠時秤重(單位是t)，僅熱處理製程用
- 3-3 用電量是智慧電錶分錶統計，可分製程提供

Step 3

Step 4

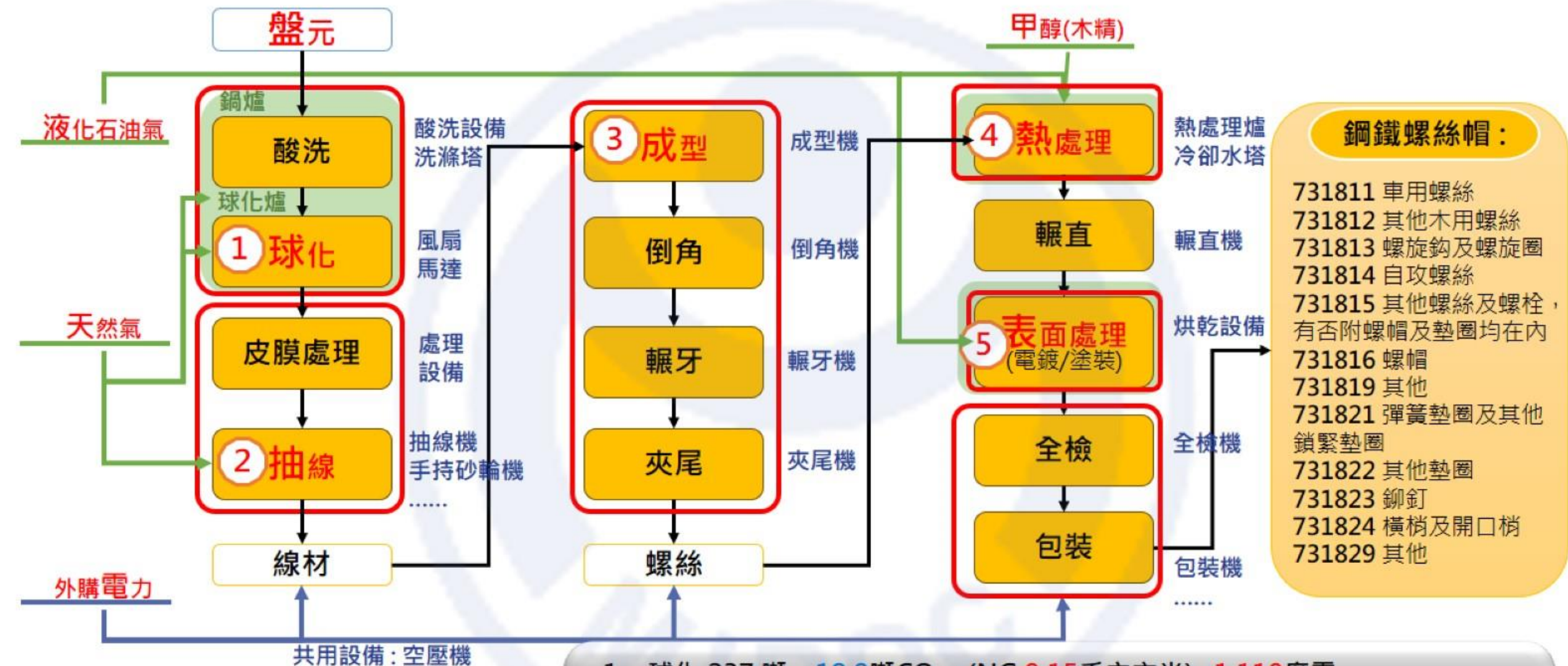
4. 廠商數據提供步驟

- 4-1 全廠產量和此次申報產量(單位:t)
- 4-2 全廠各製程的產量(單位:t)
- 4-3 全廠球化和抽線製程分別的天然氣用量(單位: km^3)
- 4-4 全廠各製程的用電度數(單位:MWh)
- 4-5 全廠前驅物盤元使用量(單位:t)
- 4-6 NG單位轉換， $\text{km}^3 \times 0.6(\text{密度}) = \text{t}$

5. 其他

- 5-1 製程外包需向協力商索取資料，建議索取申報期間全廠產量、全廠燃料用量、全廠用電量
- 5-2 前驅物(盤元/線材等)的排放係數、爐號、金屬含量等資料需向供應商索取
- 5-3 B工作表需與供應商索取熱值或排放係數數據，若沒有可使用國內環境部或歐盟提供的數據，留意單位轉換

定義系統邊界、拆解主要製程，釐清設備、源流及投入前驅物



全廠產量數據 X 申報範圍產量比例 ➡

1. 球化 237 噸 - 18.9噸CO₂e (NG 9.15千立方米)+1,110度電
2. 抽線 264 噸 - 3.1噸CO₂e (NG 1.5千立方米)+3,256度電
3. 成型 236 噸 - 32,295度電
4. 熱處理 228 噸 - 52.92噸CO₂e (LPG 13.86噸+木精 6.36噸)+ 89,976度電
5. 電鍍 228 噸 - 11.66噸CO₂e (LPG 3.66噸)+ 21,432度電

溫馨提示

- 盤點各製程設備的燃燒排放源以及外部電力，再統計申報範圍的使用量
- 球化、抽線製程配置流量計**分錶**量測天然氣耗用量，計算方式如下：

各製程的總用氣量 $\times$ (銷歐產量/總產量)

- 熱處理製程的液化石油氣是由槽車載運，計算申報範圍的入庫量+期初存量-期末存量，即為申報範圍的使用量，再依分配原則計算如下：

總用量 $\times$ (銷歐產量/總產量)

- 各製程(球化、抽線、成型)配置**分錶**量測用電量，計算方式如下：

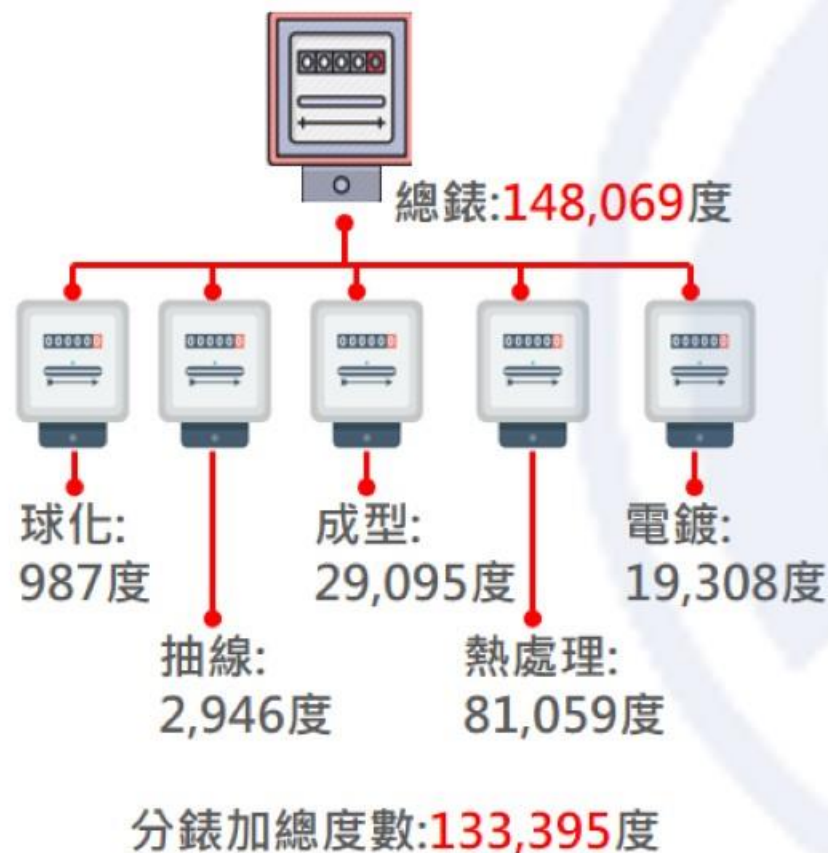
各製程的總用電量 $\times$ (銷歐產量/總產量)

(註:1.分錶的加總不等於總錶，還是要用總錶的實際用量，按各分錶的比例分配；
2.若是只有一個台電電錶，依照設備功率及稼動時數算出區域用電，按區域的比例分配)

分配原則說明

情境一

❑ 廠商有分錶，但是各分錶的加總(133,395度)與總錶(148,069度)不同



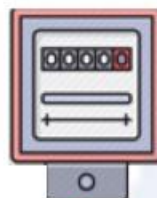
用電範圍	分錶(度)	各製程分錶度數按比例計算如下
分錶 (球化)	987	$148,069 * (987 / 133,395) = 1,096$
分錶 (抽線)	2,946	$148,069 * (2,946 / 133,395) = 3,270$
分錶 (成型)	29,095	$148,069 * (29,095 / 133,395) = 32,295$
分錶 (熱處理)	81,059	$148,069 * (81,059 / 133,395) = 89,976$
分錶 (電鍍)	19,308	$148,069 * (19,308 / 133,395) = 21,432$
計算後加總	$1,096 + 3,270 + 32,295 + 89,976 + 21,432 = 148,069$ 度	

(此數據為範例情境，實際依各廠視狀況不同)

分配原則說明

情境二

- ❑ 廠商只有一顆總錶，依各製程設備“**額定功率*稼動時數**”去估算區域用電量(與實際值會有差距)。



總錶:148,069度



各製程設備推估總用電度數:185,159度

註：依此申報範圍的產量分別估算稼動時數，如遇外包熱處理或電鍍時，需請外包廠按比例推估。

(此數據為範例情境，實際依各廠視狀況不同)

用電範圍	各製程用電量推估	按分配比例計算
球化區	$350 \times 4.5 = 1,575$	$148,069 \times (1,575 / 185,159) = 1,259$
抽線區	$56 \times 80 = 4,480$	$148,069 \times (4,480 / 185,159) = 3,583$
成型區	$15 \times 2,400 = 36,000$	$148,069 \times (36,000 / 185,159) = 28,789$
熱處理區	$365 \times 320 = 116,800$	$148,069 \times (116,800 / 185,159) = 93,403$
電鍍區	$274 \times 96 = 26,304$	$148,069 \times (26,304 / 185,159) = 21,035$
加總	185,159度	148,069度

表A. 廠商及生產相關資訊

A. Sheet "A_InstData" - General information, production processes and purchased precursors

1 Reporting period	Start: 2023/6/1	End: 2023/8/31	請填入報告期間
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Please enter here the starting date and the end date of the reporting period to which all data entered in this communication template refers to. For example, if you want to report data based on the whole calendar year 2023, the starting date would be 1.1.2023 and the end date 31.12.2023.

It is important that all data entered in this template (embedded emissions, carbon price due, product properties, etc.) all relate to that same reporting period entered above.

2 About the installation	請填入工廠基本資料
--------------------------	-----------

i. Name of the installation (optional):	
ii. Name of the installation (English name):	ABC Company
iii. Street, Number:	
iv. Economic activity:	
v. Post code:	
vi. P.O. Box:	
vii. City:	
viii. Country:	Taiwan

... A_InstData B_Emlnst C_Emissions&Energy D_Processes E_PurchPrec F_Tools G_FurtherGuidance Summary_Processes Summary_Produc ...

❑ 報告期間：填寫報告期間之起始與終止日，最少須涵蓋三個月。

*所有回報之數據皆須以此報告期間為準。

❑ 廠商資訊：廠商之英文名稱及所在國家為必填，其餘選填。

表A. 廠商及生產相關資訊

3 Verifier of the report – only if available and not required during transitional period

過渡期不須第三方查證

4 Aggregated goods categories and relevant production processes

(a) List of aggregated goods categories, relevant precursors and corresponding production routes

Please list here ALL aggregated goods categories, including any relevant precursor types produced WITHIN the installation.

Where relevant, please list all production routes through which the aggregated goods are produced.

ID	Aggregated goods category	Route	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6
G1	Iron or steel products	All production routes	All production routes					
G2								
G3								
G4								
G5								
G6								
G7								
G8								
G9								
G10								

產品類型: 鋼鐵製品

生產途徑: 為系統自動帶入格式

For information, emissions from the following precursors are relevant for the embedded emissions of the types of aggregated goods listed above. Where those precursors are actually relevant for your production processes, please make sure those are also listed either in the table above (if produced within your installation) or under chapter 5 "purchased precursors" below (where produced in other installations).

Relevant precursors:

Crude steel	Direct reduced	Pig iron	Alloys (FeMn, {	Sintered Ore	Hydrogen		
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相關前驅物(上游原料)

... A_InstData B_Emlnst C_Emissions&Energy D_Processes E_PurchPrec F_Tools G_FurtherGuidance Summary_Processes Summary_Produc ... (+)

- 第三方查證於過渡期間非強制要求項目，業者可自由選擇是否要取得第三方查證，並填報查證機構資訊。
- 生產途徑：顯示「All production routes」:表示所有生產途徑列入申報範圍，不需在此列出。
顯示「Please select」:需於後續欄位使用下拉式選單列出生產途徑。
- 相關前驅物：系統自動帶入與上述填報之產品類別相關的前驅物。

表A. 廠商及生產相關資訊

(b) Relevant production processes

Based on the list under (a), please list here only aggregated goods categories for which you want to establish distinct "production process" and assign all aggregated goods categories and relevant precursors that will be covered by its system boundary.

Example: If "ammonia" and "nitric acid" are both produced in your installation, you may either create a separate production process for each of these good types, or report them combined under 'nitric acid' under a 'bubble approach'. In the case of the latter, please select as of column F which other process you want to include under this 'bubble approach'. Note: the 'bubble approach' is only allowed if all ammonia produced is processed into nitric acid. If parts of the ammonia are exported from the installation, two separate production processes have to be selected here.

4(b) 填報申報產品之製程(若該產品有不同製程可分別列出)

ID	Production process	Included goods categories listed under (a)						Name	Error message
		1	2	3	4	5	6		
P1	Iron or steel products	Iron or steel products						Anneal	
P2	Iron or steel products	Iron or steel products						Wire Drawing	
P3	Iron or steel products	Iron or steel products						Forming	
P4	Iron or steel products	Iron or steel products						HT	
P5	Iron or steel products	Iron or steel products						Electroplating	

製程

製程所涵蓋之申報產品

製程名稱

- 4(b) 填報申報產品之製程：根據4(a)申報之產品類別定義相對應製程，每項所列之產品類別皆須歸類於任一製程。
- 針對鋼鐵、煉鋁、混合肥料等產業類別，生產者可針對其生產設施情況，將同一類別之生產商品列入同一個聯合製程（泡泡途徑，bubble approach）當中。

5 Purchased precursors

Please list here all precursors that are produced OUTSIDE the installation (e.g. purchased) and consumed within the installation.

Please also list the country in which the relevant precursor was produced (see sheet "C_CodeLists" to find the correct country codes) and the relevant production routes, if known.

前驅物之製程、原產國及生產途徑

ID	Production process	Country code	Route 1	Route 2	Route 3	Route 4	Route 5	Name	Error
PP1	Iron or steel products	TW						Wire Rod	
PP2									

前驅物(線材盤元)製程填寫

- 5 需列出所有於設施外生產之前驅物，前驅物生產途徑的填寫方式同4(a)申報產品之生產途徑

表B.碳排源流及排放源

- 此處著重填報**碳排源流放計算方法與相關數據**，系統會自動產出燃料之碳排放數據。(填入範疇一之液化石油氣、天然氣與甲醇，數據為假設，僅供範例使用)
- 需填報之數據有：源流碳排放計算方法、資源流名稱、活動數據、淨熱值/燃料之碳排係數等，系統將會根據所選用之計算方法，提示必填之欄位(黃底表格)。

B. Sheet "B_Emlnst" - Installation's emission at source stream and emission source level

1	Source streams and emission sources
Please click on this link for further guidance on how to complete this section.	

Source Streams (excluding PFC emissions)

#	Method	Source stream name	Activity data (AD)	AD Unit	Net calorific value (NCV)	NCV Unit	Emission factor (EF)	EF Unit	Carbon content	C-Content Unit	Oxidation factor (OxF)	OxF Unit	Conversion factor (ConvF)	ConvF Unit	Biomass content (BioC)
Ex.1	Combustion	Heavy fuel oil	252,000.00	t	45.00	GJ/t	73.00	tCO ₂ /TJ			100.00	%		%	0.00
Ex.2	Process Emissions	Raw meal for clinker	121,000.00	t			0.09	tCO ₂ /t				%		%	0.00
Ex.3	Mass balance	Steel	-1,808,226.00	t			0.00		0.39	tC/t		%	100.00	%	0.00
1	Combustion	LPG	17.52	t	50.50	GJ/t	63.10	tCO ₂ /TJ			0.00	%		%	0.00
2	Combustion	NG	6.39	t	61.22	GJ/t	56.10	tCO ₂ /TJ			0.00	%		%	0.00
3	Mass Balance	Methanol	6.36	t		GJ/t			1.375	tC/t		%		%	
4												%		%	
5												%		%	
6												%		%	
7												%		%	
8												%		%	
9												%		%	

活動數據換算
1000Nm³換算成t
公式:體積 X 密度

淨熱值換算

淨熱值Kcal X 4.187/密度/10³
※氣態燃料總熱值(高位) X 0.9 = 淨熱值(低位)
※油類液態總熱值(高位) X 0.95 = 淨熱值(低位)

燃燒排放係數採用IPCC最新值
(環境部6.0.4表第i欄查找換算)
燃燒係數單位一律採用tCO₂/TJ

$2\text{CH}_3\text{OH} + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 4\text{H}_2\text{O}$
每 1 mole CH₃OH (分子量32)燃燒產生
1 mole CO₂ (分子量44)
甲醇碳排放係數:44/32=1.375(tCO₂/t)

表B.碳排源流及排放源

碳排放之源流

表格	表格原文	說明
方法	Method	說明源流的計算途徑，為下拉式選單，共三種： 1. 燃燒排放 (combustion) 2. 製程排放 (process emissions) 3. 質量平衡法 (Mass balance)
源流名稱	Source stream name	填報源流名稱，例如煤炭、天然氣等。
活動數據	Activity data (AD)	基於計算途徑所取得燃料或原物料使用或生產之數據，並依適當單位 (t、1000Nm ³) 申報。
活動數據單位	AD Unit	
淨熱值	Net calorific value (NCV)	燃料燃燒所產生之熱量扣除形成水的汽化熱，單位為GJ/t。
淨熱值單位	NCV Unit	
初步排放係數	Emission factor (EF)	● 為初步透過燃料或原物料碳含量估算混合燃料之碳排係數。 ● 單位為下拉式選單，依照源流性質選擇適當單位。
排放係數單位	EF Unit	

表B.碳排源流及排放源

碳排放之源流

表格	表格原文	說明
碳含量	Carbon content	燃料或原物料轉換成碳量數據，單位為tC/t。
碳含量單位	Carbon content Unit	
氧化係數	Oxidation factor	燃料所含之碳元素經燃燒氧化後轉為二氧化碳之比率，單位為%。
氧化係數單位	Oxidation factor Unit	
轉換係數	Conversion factor	燃料所產生逸散的二氧化碳之於燃燒前燃料總碳含量之比率，單位為%。
轉換係數單位	Conversion factor Unit	
生質燃料碳含量	Biomass Content	生質燃料含碳元素之比例，單位為%。
生質燃料碳含量單位	BioC Unit	

表B.碳排源流及排放源

接續表B1.後半部

B. Sheet "B_Emlnst" - Installation

1 Source streams and emission sources

[Please click on this link for further guidance on I](#)

Source Streams (excluding PFC emis

#	Method	Source stream name	F(C2F6)	CF4 Emissions (t CF4)	C2F6 Emissions (t C2F6)	GWP (CF4) (tCO2e/t)	GWP (C2F6) (tCO2e/t)	CF4 Emissions (t CO2e)	C2F6 Emissions (t CO2e)	Collection efficiency, %	CO2e fossil (t)	CO2e bio (t)	Energy content (fossil), TJ	Energy content (bio), TJ
Ex.1	Combustion	Heavy fuel oil									827,820	0	11,340.0	0.0
Ex.2	Process Emissions	Raw meal for clinker									10,641	0	0.0	0.0
Ex.3	Mass balance	Steel									2,560,307	0	0.0	0.0
1	Combustion	LPG									56	0	0.9	0.0
2	Combustion	NG									22	0	0.4	0.0
3	Mass Balance	Methanol									9	0	0.0	0.0
4														
5														
6														
7														
8														
9														

燃料碳排放量及能量：
系統將會根據前述填報之數據自動計算

表B.碳排源流及排放源

B. Sheet "B_Emlnst" - Installation's emission at source stream and emission source level

1 Source streams and emission sources											
PFC Emissions											
#	Method	Type of anode	Activity data (AD)	AD Unit	Net calorific value (NCV)	NCV Unit	Emission factor (EF)	EF Unit	Carbon content	C-Content Unit	Oxidation factor (OxF)
Ex.	Overvoltage method	Centre Worked Pre-Bak	5,000.00	t							
1				t							
2				t							
3				t							
Emissions Sources (Measurement-Based Approaches)											
#	Name	Type of GHG	Activity data (AD)	AD Unit	Net calorific value (NCV)	NCV Unit	Emission factor (EF)	EF Unit	Carbon content	C-Content Unit	Oxidation factor (OxF)
Ex.1	N2O	N2O									
Ex.2	CO2 transfer	CO2									
1											

PFC之碳排放：此處著重填報全氟碳化物碳排放之計算方法及相關數據，系統則會自動產出碳排放數據。

(扣件業沒有PFC排放，PFC碳排放之計算方法及相關數據，請參閱附件)

此處以排放源之實際監測數據為主，需填報排放源監測之相關資訊，表格欄位說明，請參閱附件。

表C.碳排放及能源

□ 針對生產設施投入之燃料，若是表B的欄位不夠填寫，可於表C1.加填(手動填報黃色欄位)。

C. Sheet "C_Emissions&Energy" - Installation-level GHG emissions and energy consumption

1 Fuel balance

Please enter in the table below the amount of energy consumed for each use type:

- Fuel input to all CBAM production processes (including precursors produced within the installation), either directly or via the production of measurable heat (e.g. steam) with the exception of fuel for electricity.
- Fuel input for electricity production
- Fuel input to all non-CBAM production processes, either directly or via the production of measurable heat (e.g. steam).

	Unit	Total fuel input	Direct fuel for CBAM goods	Fuel for electricity	Direct fuel for non-CBAM goods	Rest
i. Fuel balance: from sheet "B_Emlnst"	TJ	1.28				
ii. manual entries	TJ					
iii. Results:	TJ	1.28				1.28

由前項表單B自動帶入相關數據

手動填報其他未於前項表單B列入之燃料使用 (非必填)

表C.碳排放及能源

- ☐ 溫室氣體排放以及數據品質資訊，除了計算相關燃料使用之碳排放，還必須填報生產設施之間接排放(電力)，以及相應之數據品質資訊。

2 Greenhouse gas emissions balance & information on data quality

(a) GHG balance by type of GHG

Values below are taken automatically from entries in sheet "B_Emlnst". If entries made in that sheet are incomplete, please enter the total emissions figures manually under ii. to override automatic results displayed under i.

Installation level data:	Unit	Total CO2 emissions	Biomass emissions	Total N2O emissions	Total PFC emissions	Total direct emissions	Total indirect emissions	Total emissions
i. from sheet "B_Emlnst"	tCO2e	87	0	0	0	87		
ii. manual entries	tCO2e						73.2	
iii. Results:	tCO2e	87	0	0	0	87	73	160

由前項表單B自動帶入
相關數據

手動填報入間接排放(電力)，
計算方式如下：

$$(1,110 + 3,256 + 32,295 + 89,976 + 21,432) \times 0.495 / 1000 = 73.29$$

(b) GHG balance by type of monitoring methodology

Values below are taken automatically from entries in sheet "B_Emlnst" and point (a) above.

	Unit	- based (excl. PFC emissions)	Total PFC emissions	Measurement - based	Other
Emissions	tCO2e	87	0	0	0

(c) Information on the data quality and quality assurance

General information on data quality:	Please select from the hierarchical order (descending order) in the drop-down list the predominant approach for determining the installation's direct emissions.
Justification for use of default values (if	If the predominant method was to use default values published by the European Commission, please select from the drop-down list the most appropriate justification for not achieving higher data quality.
Information on quality assurance:	Please select from the hierarchical order (descending order) in the drop-down list the approach for quality assurance of emissions data.

i. General information on data quality:	Mostly measurements & national standard factors for e.g. the emission factor
ii. Justification for use of default values (if relevant):	
iii. Information on quality assurance:	Internal audits

1. 球化 237 噸 - 1,110度電
2. 抽線 264 噸 - 3,256度電
3. 成型 236 噸 - 32,295度電
4. 熱處理 228 噸 - 89,976度電
5. 電鍍 228 噸 - 21,432度電

數據品質(下拉式選單)的相關資訊：數據蒐集
方法、預設值使用原因、品質驗證資訊

表D.生產流程中各製程的生產量

□ 此處填報申報產品製程之製造數量和產品流通情況。

D. Sheet "D_Processes" - Production level and attributed emissions for SEE calculation

Data input for the determination of the specific embedded emissions

1 Production process 1:

Anneal

Iron or steel products

由表A4(b) 中填報之製程自動帶入

[Please click on this link for further guidance on how to complete this section.](#)

(a) Total production levels:	Production route	Unit	Amounts
1 Anneal Iron or steel products	All production routes	t	237
2	n.a.		
3	n.a.		
4	n.a.		
5	n.a.		
6	n.a.		
7	n.a.		
8	n.a.		
Total production within installation (= denominator for SEE calculation):		t	237

(b) Production details	Unit	Amounts
i. Produced for the market	t	237
ii. Share of total under (a) produced for the market		100.0%
iii. Total production only for the market?		TRUE

表單填答檢核：
完成填答呈現綠色，反之則為紅色。

(a)填報製程於申報範圍內之產量
(如圖)

1. 球化 237 噸
2. 抽線 264 噸
3. 成型 236 噸
4. 熱處理 228 噸
5. 電鍍 228 噸

(b)直接進入市場流通之產量
(不限於歐盟市場)

表D.生產流程中各製程的生產量

(c) Consumed in other 'production processes' within the installation:		Unit	Amounts
1	Wire Drawing	t	0
2	Forming	t	0
3	HT	t	0
4		t	
5		t	
6		t	
7		t	
8		t	
9		t	
(d) Consumed for non-CBAM goods within the installation:		t	0
(e) Control:		t	0

(c)生產產品用於設施內其他製程之數量

(e)控制項：系統自動計算，數值應為“0”
(前四項生產數量應達成平衡： $a-(b+c+d)=0$)

(d)生產產品用於設施內生產非CBAM管制產品之數量

MIRDC

表D.製程之碳排放量-歸因碳排放量計算

□ 此處著重製程歸因碳排放量之計算，需填報可測熱量、廢氣、電力之輸出輸入資訊。

Calculation of the attributed emissions:

Anneal

[Please click on this link for further guidance on how to complete this section.](#)

	Measurable heat	Waste gases	Indirect emissions
(f) Please select which elements are applicable	FALSE	FALSE	TRUE
Based on your selection, related sections below might become irrelevant and greyed out below.			
	Unit	Value	
(g) Directly attributable emissions (DirEm*)	tCO2e	18.90	

1. 球化 237 噸 – 18.9噸CO₂e (NG 9.15千立方米)
2. 抽線 264 噸 – 3.1噸CO₂e (NG 1.5千立方米)

產品之直接排放量，計算方式如下：
表b天然氣為 22 噸二氧化碳當量
球化使用的天然氣比例:為9.15/10.65=0.859
球化直接排放量:22*0.859=18.9

序號	表格名稱	說明
f	適用要素	● 根據申報之製程，回答是否有可測熱量（熱能）及廢氣輸出或輸入的情形。 ● 為下拉式選單，填答「True」或「False」。
g	直接歸因碳排放量 (Directly attributable emissions)	與製程相關之直接碳排放量總和，此處之計算需避免重複計算： 1. 不包含前驅物之數據。 2. 可測熱量的輸入可包含於此，或是填報於(h)，但僅能擇一欄位計算。 3. 自其他製程輸入之廢氣不應計於此處，應計於「(i)廢氣之輸入」。 4. 製程產生之廢氣若輸出作為其他製程之燃料，碳排放量必須計入此處，同時仍需填報「(i)廢氣之輸出」，系統將會自行扣除重覆計算部分。

表D.製程之碳排量-歸因碳排量計算

(h) Import and export of measurable heat		Unit	Imported	Exported
i. Amount of net measurable heat		TJ		
ii. Emissions factor		tCO ₂ /TJ		
(i) Waste gases		Unit	Imported	Exported
i. Amount of waste gas		TJ		
ii. Emission factor		tCO ₂ /TJ		
(j) Indirect emissions from electricity consumption		Unit	Value	
i. Electricity consumption		MWh	1.1100	
ii. Emission factor of the electricity		tCO ₂ /MWh	0.495	
iii. Source of the emission factor		-	D.2.3	
(k) Electricity exported from the production process		Unit	Value	
i. Amounts exported		MWh	0	
ii. Emission factor of the electricity		tCO ₂ /MWh	0.000	

1. 球化 237 噸 -1,110度電

產品之間接排放量，
計算方式如下：
 $1,110/1,000=1.11$

序號	表格名稱	說明
h	可測熱量的輸入與輸出	● 需填報輸出與輸入之活動數據以及可測熱量之碳排放係數。 ● 碳排係數之填報需考量鍋爐的加熱效率，例如：原先碳排係數為96tCO₂/TJ，鍋爐之效率為90%，應填報之碳排係數則為96*0.9=86.4。
i	廢氣的輸入與輸出	● 需填報輸出與輸入之活動數據。 ● 廢氣之碳排係數因不影響整體碳排放數據之計算，此處則為選填。
j	電力使用的間接碳排放	i. 電力使用量：填報製程邊界內的電力使用量。 ii. 電力的碳排放係數：根據所選用的數據，填報電力之平均碳排放係數 iii. 碳排放係數的來源： ① D2.1：特定預設值。 ② D2.2：替代預設值。 ③ D2.3：供應商提供之數據。 ④ D2.4：生產設施之實際碳排放量計算。 ⑤ Mix(混合)：若電力來自多個外部來源，則選擇此項。
k	製程所產並輸出之電力	● 需填報製程所產並對外輸出之電力數據以及碳排係數。

表E.前驅物之碳排放量：使用量

情境一

- 此處填報個別前驅物之相關資訊，以計算前驅物所產生之碳排放量。
- 假設盤元線材是用高爐生產的(綜整表單：產品中需填入生產鋼廠之爐號)

1 Purchased precursor 1:

Wire Rod

Iron or steel products

(a) Total purchased levels:		Production route	Unit	Amounts
1	Wire Rod Iron or steel products	All production routes	t	237
2		n.a.		
3		n.a.		
4		n.a.		
5		n.a.		
6		n.a.		
7		n.a.		
8		n.a.		
Total consumption within installation:			t	237
(b) Consumed in "production processes" within the installation:			Unit	Amounts
1	Anneal		t	237
2	Wire Drawing		t	0
3	Forming		t	0
4	HT		t	0
5	Electroplating		t	0
6				
7				
8				
9				
10				
(c) Consumed for non-CBAM goods within the installation:			t	0
(d) Control:			t	0

系統自動帶入生產商所列之前驅物，填入外購該項前驅物之總數量（黃色）

(b)製程所使用前驅物之數量

(c)用於生產非CBAM管制商品之前驅物數量（選填）

控制項：系統自動計算，數值應為“0”
(前三項生產數量應達成平衡： $a-(b+c)=0$)

表E.前驅物之碳排量：特定隱含碳排量計算

情境一

- 此處計算個別前驅物之特定隱含碳排放量：用高爐生產的盤元線材是2.2 tCO₂e/t
(未來需要區分前驅物之直接及間接排放量)

Specific embedded emissions: Wire Rod

(e) Emissions embedded in this purchased precursor
Please enter here the values and sources for the specific embedded direct and indirect emissions, as obtained from the supplier.
For the SEE (direct), the 'Type of value' relates to whether the direct emissions are measured, or whether a default value provided by the European Commission was applied.
In order to obtain these data and information, you may want to ask your supplier to fill in an empty copy of this communication template.

Parameter:	Unit	Value	Source
i. Specific embedded direct emissions (SEE (direct))	tCO ₂ e/t	2.200	Measured
ii. Specific embedded indirect emissions (SEE (indirect))	tCO ₂ e/t	0.000	D.2.3
iii. Justification for use of default values (if relevant):			

若使用預設值需填報使用理由，如：

1. 使用更精確的監測系統會產生不合理的成本。
2. 數據缺漏。
3. 其他。

前驅物之特定隱含直（間）
接碳排放量。

● 填報前驅物特定隱含碳排放量之數據來源。

● 直接隱含碳排放量之來源：

1. 量測值 (Measured)
2. 預設值 (Default)

● 間接隱含碳排放量之來源：

1. D2.1：特定預設值。
2. D2.2：替代預設值。
3. D2.3：供應商提供之數據。
4. D2.4：生產設施之實際碳排放量計算。
5. Mix(混合)：若電力來自多個外部來源，則選擇此項

表E.前驅物之碳排量：使用量

情境二

- 假設外購的盤元線材是用高爐、電弧爐生產的(從爐號可追溯)，那麼在表A5填寫盤元線材需分開(如下圖)

5 Purchased precursors

Please list here all precursors that are produced OUTSIDE the installation (e.g. purchased) and consumed within the installation.

Please also list the country in which the relevant precursor was produced (see sheet "c_CodeLists" to find the correct country codes) and the relevant production routes, if known.

ID	Production process	Country code	Route 1	Route 2	Route 3	Route 4	Route 5	Name	Error
PP1	Iron or steel products	TW						Wire Rod(Blast furnace)	
PP2	Iron or steel products	TW						Wire Rod(electric arc furnace)	

- 表E1會帶入高爐、電弧爐生產的盤元線材，分別填入數量(黃色部分，如下圖)

1 Purchased precursor 1:

Wire Rod(Blast furnace)	Iron or steel products
-------------------------	------------------------

(a) Total purchased levels:		Production route	Unit	Amounts
1	Wire Rod(Blast furnace) Iron or steel products	All production routes	t	137
2		n.s.		
3		n.s.		
4		n.s.		
5		n.s.		
6		n.s.		
7		n.s.		
8		n.s.		
Total consumption within installation:			t	137
(b) Consumed in "production processes" within the installation:			Unit	Amounts
1	Anneal		t	137
2	Wire Drawing		t	0
3	Forming		t	0
4	HT		t	0
5	Electroplating		t	0
6				
7				
8				
9				
10				
(c) Consumed for non-CBAM goods within the installation:			t	0
(d) Control:			t	0

2 Purchased precursor 2:

Wire Rod(electric arc furnace)	Iron or steel products
--------------------------------	------------------------

(a) Total purchased levels:		Production route	Unit	Amounts
1	Wire Rod(electric arc furnace) Iron or steel products	All production routes	t	100
2		n.s.		
3		n.s.		
4		n.s.		
5		n.s.		
6		n.s.		
7		n.s.		
8		n.s.		
Total consumption within installation:			t	100
(b) Consumed in "production processes" within the installation:			Unit	Amounts
1	Anneal		t	100
2	Wire Drawing		t	0
3	Forming		t	0
4	HT		t	0
5	Electroplating		t	0
6				
7				
8				
9				
10				
(c) Consumed for non-CBAM goods within the installation:			t	0
(d) Control:			t	0

表E.前驅物之碳排放量：使用量

情境二

- 此處計算個別前驅物之特定隱含碳排放量：用電弧爐生產的盤元線材是0.6 tCO₂e/t

Specific embedded emissions:

Wire Rod(electric arc furnace)

(e) Emissions embedded in this purchased precursor

Please enter here the values and sources for the specific embedded direct and indirect emissions, as obtained from the supplier.

For the SEE (direct), the 'Type of value' relates to whether the direct emissions are measured, or whether a default value provided by the European Commission was applied.

In order to obtain these data and information, you may want to ask your supplier to fill in an empty copy of this communication template.

Parameter:

	Unit	Value	Source
i. Specific embedded direct emissions (SEE (direct))	tCO ₂ e/t	0.600	Measured
ii. Specific embedded indirect emissions (SEE (indirect))	tCO ₂ e/t	0.000	D.2.3
iii. Justification for use of default values (if relevant):			

綜整表單：製程

- 此表單為系統根據生產商於各項表單填報之數據進行統整，生產商可於此檢視數據是否有缺漏或是錯誤。
- 此表單毋需填寫。

1 Summary of the installation, processes and production routes

1 Summary of the installation

Name of the installation (English name):

ABC Company

Street, Number:

Economic activity:

Country:

Taiwan

UNLOCODE:

Coordinates of the main emission source (latitude):

Coordinates of the main emission source (longitude):

Reporting period start: 2023/6/1

Reporting period end: 2023/8/31

2 Summary of the production processes, included precursors and production routes, where relevant

Aggregated good							
(a) produced	Routes	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6
G1 Iron or steel products	All production routes	All production					
G2							
G3							
(b) Production process	Aggregated goods category	1	2	3	4	5	6
P1 Anneal	Iron or steel products	Iron or steel					
P2 Wire Drawing	Iron or steel products	Iron or steel					
P3 Forming	Iron or steel products	Iron or steel					
P4 HT	Iron or steel products	Iron or steel					
P5 Electroplating	Iron or steel products	Iron or steel					
P6							
P7							

A_InstData | B_Emlnst | C_Emissions&Energy | D_Processes | E_PurchPrec | F_Tools | G_FurtherGuidance | Summary_Processes

綜整表單：產品

- 此表單為申報產品之綜整欄位，須根據申報之各項產品填報相應之產品資訊，包含原物料含量、原產地碳費等。
- 產品資訊：根據前項表單所提報之資訊，填寫申報產品之製程、CN Code、產品名稱（與進口商溝通之名稱）。

申報產品之製程 Production process from which the products arise	Type of aggregated good or precursor	申報產品之CN編碼 CN Codes	申報產品之CN Name CN Name	產品名稱 Product name (used for communication with reporting declarant, e.g. on invoices)
Ex. Example process A	Iron or steel products	72071919	Semi-finished products of iron or non-alloy steel, containing by weight < 0.25% carbon, of circular or polygonal	Example name A
1 Anneal	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS
2 Wire Drawing	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS
3 Forming	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS
4 HT	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS
5 Electroplating	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS

- 官方表單中，無法選擇CN code 7318，經由調整後，已可選擇此編碼。
- 廠商若需索取修正過之表單，請掃描簡報下載QR CODE，或加入【金屬中心CBAM服務團】索取！

- 產品含量資訊：系統將根據不同種類之產品要求填報不同之產品含量資訊。

*鋼鐵及下游製品類別

CN Codes	The main reducing agent of the precursor, if known	Steel mill identification number	% Mn	% Cr	% Ni	% other alloys	% carbon	t scrap per t steel	% other materials	% pre-consumer scrap
72071919	Coal or coke	623108	13.95%	0.41%	2.10%	3.66%	0.35%		0.01%	
7318	Coal or coke	MR476	0.76%	0.98%	0.02%	0.00%	0.36%		0.00%	
7318	Coal or coke	MR476	0.76%	0.98%	0.02%	0.00%	0.36%		0.00%	
7318	Coal or coke	MR476	0.76%	0.98%	0.02%	0.00%	0.36%		0.00%	
7318	Coal or coke	MR476	0.76%	0.98%	0.02%	0.00%	0.36%		0.00%	
7318	Coal or coke	MR476	0.76%	0.98%	0.02%	0.00%	0.36%		0.00%	

鋼鐵製程所使用之還原劑

生產鋼廠之爐號

產品金屬含量資訊

綜整表單：產品

- 此表單為申報產品之綜整欄位，須根據申報之各項產品填報相應之產品資訊，包含原物料含量、原產地碳費等。
- 原產國已繳碳費：使用前述sheet F之碳費計算工具取得數據並於此填報碳費與折扣類型。

原產國 碳費類 型		碳費涵蓋 碳排量之 比例	原產國貨幣及單位碳費				碳費折扣類型及涵 蓋碳排量之比例			獲得折扣之 額度		
Form of carbon price	Share of total embedded emissions covered by the carbon price	Embedded emissions covered by the carbon price	Currency		Carbon price (CP)		Form of rebate	Share of embedded emissions covered by the rebate	Embedded emissions covered by rebate	Amount of rebate		Result: Effective CP due
Tax or levy	69.8%	0.915 tCO ₂ e/t	USD	US Dollar	50.00	USD/t	Tax	90.0%	1.180 tCO ₂ e/t	20.00	USD/t	35.41 USD/t
Tax or levy	100.00%	50.031 tCO ₂ e/t	TWD	New Taiwan D	100.00	TWD/t	Free allocation	0.00%	0.000 TWD/t	0.00	TWD/t	100.00 TWD/t

綜整表單：溝通用

- 此表單整合前項所有表單內容，並以此表單作為生產商與進口商提交數據之檔案
- 此表單毋需填寫。

1 Summary of the installation and production processes

1 Installation details

Parameter	Value
Name of the installation (English name):	ABC Company
Street, Number:	
Economic activity:	
Country:	TW
UNLOCODE:	
Coordinates of the main emission source (latitude):	
Coordinates of the main emission source (longitude):	
Reporting period start:	2023/6/1
Reporting period end:	2023/8/31

2 Summary of the production processes and production routes, where relevant

Aggregated (a) good produced Iron or steel p	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Production (b) process	Aggre goods
G1	All production						P1 Anneal	Iron c
G2							P2 Wire Drawing	Iron c
G3							P3 Forming	Iron c
G4							P4 HT	Iron c
G5							P5 Electroplating	Iron c
G6							P6	
G7							P7	
G8							P8	
G9							P9	
G10							P10	

2 Summary of products

Production process from which the products arise	Type of aggregated good or precursor	CN Codes	CN Name	Product name (used for communication with reporting declarant, e.g. on invoices)	SEE (direct)	SEE (indirect)	SEE (total)	Unit	Share of emissions by default value	Source for electricity EF	Embedded electricity (MWh/t)	The main reducing agent of the precursor, if known	Steel mill identification number	%
1 Anneal	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS	2.280	0.002	2.282	tCO2e/t	0%	D 2.4	0.005	Coal or coke	MR476	0
2 Wire Drawing	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS	0.012	0.006	0.018	tCO2e/t	0%	D 2.4	0.012	Coal or coke	MR476	0
3 Forming	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS	0.000	0.068	0.068	tCO2e/t	0%	D 2.4	0.137	Coal or coke	MR476	0
4 HT	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS	0.232	0.195	0.427	tCO2e/t	0%	D 2.4	0.395	Coal or coke	MR476	0
5 Electroplating	Iron or steel products	7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and	SPACED THREAD SCREWS	0.051	0.046	0.097	tCO2e/t	0%	D 2.4	0.092	Coal or coke	MR476	0
6														
7														
8														
9														

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