



**SF₆ Emission Reduction
Partnership for the Magnesium Industry**

Annual Reporting Tool Guidance

U.S. Environmental Protection Agency
January, 2006

Version 1.0

Introduction

The purpose of the SF₆ Emissions Annual Reporting Tool is to assist Partners in tracking total usage for the following cover gases: sulfur hexafluoride (SF₆), HFC-134a, and an unspecified "Other Gas". The U.S. Environmental Protection Agency (EPA) will use the partnership's aggregated data to estimate cover gas usage and emissions from the magnesium industry and track the Partnership's progress towards achieving its goal of eliminating SF₆ emissions by 2010. The following instructions provide guidance and helpful tips for using the latest version of the reporting tool.

Getting Started

The new version of the partner reporting tool utilizes an Excel format and a more streamlined data entry configuration to simplify the reporting process. In addition to tracking SF₆ usage, the new version of the tool includes the ability to track the usage of HFC-134a, and an unspecified "Other Gas". The "Other Gas" category could include other cover gas technologies such as Novec™ 612, SO₂, or even CO₂ "snow." The new version of the tool also allows for cover gas costs to be tracked for the reporting year, and it also allows for historical cover gas usage to be plotted. Using this tool, standardized annual reports are generated for submission to the International Magnesium Association (IMA).

The methodology utilized to estimate cover gas consumption is based on active tracking of cover gas cylinders (e.g., SF₆). The cylinder tracking approach requires input data for 1) Net cover gas consumption whenever a cylinder is changed (in service and out of service gross weights) and 2) the amount of magnesium produced or processed (monthly or annual basis).

Data Requirements

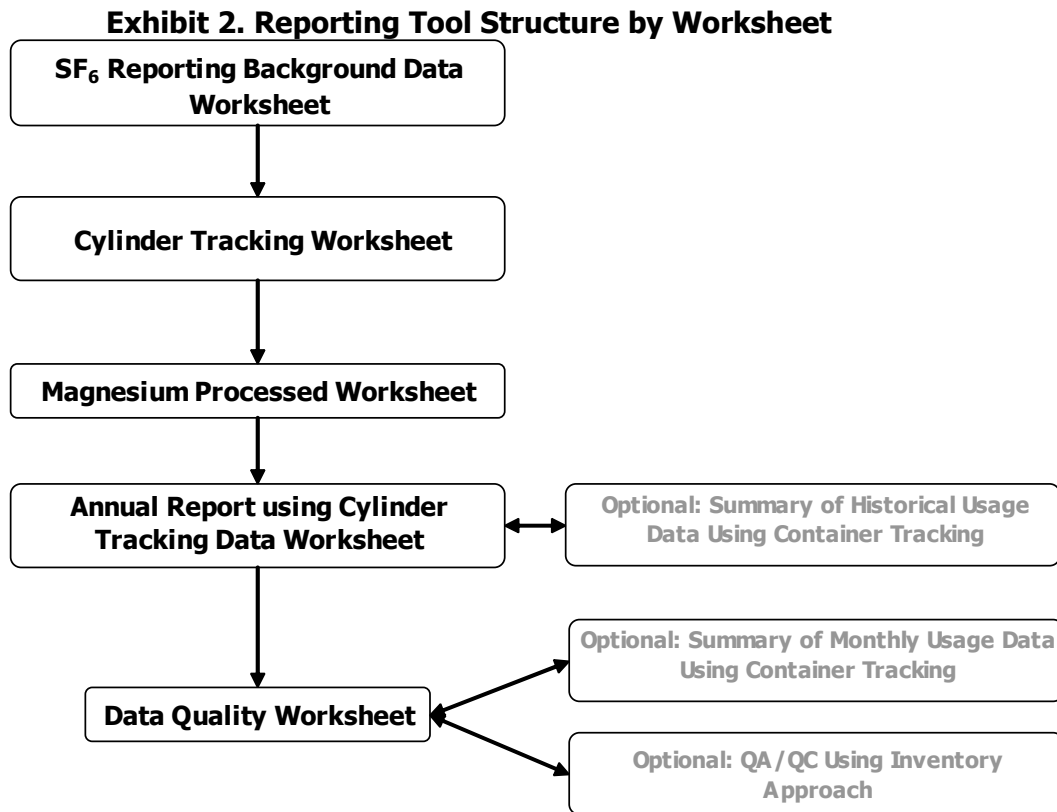
Several types of data are required in order to successfully utilize the tool to generate an annual report. Exhibit 1 lists the data requirements for the cylinder tracking approach.

Exhibit 1. Data Requirements for the Cylinder Tracking Approach

- Amount of magnesium processed during the year on a monthly or annual basis (metric tons or short tons)
- Cost of cover gas (\$/kg or \$/lbs) *optional*
- Date container was placed in service
- Date container was removed from service
- Initial gross weight of cylinder (lbs or kg)
- Final gross weight of cylinder (lbs or kg)

Reporting Tool Structure

Using the tool requires data entry in multiple steps with several output sheets (primarily the annual report). The flow chart in Exhibit 2 presents the worksheets that must be completed using the cylinder tracking method along with some supporting worksheets provided for the user (e.g., a historical summary). The yellow navigational arrows at the top of each worksheet will allow you to move between worksheets easily. If you are revisiting the tool to enter cylinder tracking data, use the drop-down list provided below the navigational arrows to jump between sections.



- The *SF₆ Reporting Background* worksheet is where the user inputs important information about the desired reporting year (this will determine which data set is the basis for the Annual Report), the unit of data input measurement, and the average cost of cover gas for the selected reporting year (this is optional).
- The *Cylinder Tracking* worksheet provides an area to enter the “in service” and “removed from service” date for cover gas cylinders, as well as the initial and final gross weight of these cylinders.
- The *Magnesium Processed* worksheet provides an area to enter the amount of magnesium processed by month, by cover gas. Or alternatively, the total amount of magnesium processed by year.
- The *Annual Report* worksheet summarizes the information filled in on the *Cylinder Tracking* and *Magnesium Processed* worksheets for the selected reporting year, and is

the final submission document delivered to the IMA. From this worksheet historical data can also be viewed that shows historical cover gas usage going back to 1990 (if it has been entered).

- The *Data Quality* worksheet is an important section of the tool where information on the technique used to conduct your gas usage estimate is required. Once complete, this section should be included with the report submittal to IMA. Also included on this worksheet is an opportunity to 1) perform a QA/QC check on consumption data using an alternate estimation method (Cylinder Inventory Approach), and 2) view monthly cover gas consumption rates.

Using the Tool

Open the file, and select "Enable Macros"¹. This feature is very important as the reporting tool will not function properly without the macros enabled. The introductory worksheet provides areas for company information used on the cover page of the report. Once you have filled out all of the requested information, proceed by clicking on the yellow arrow to view the *Tool Structure* worksheet. Clicking on the yellow arrow from the *Tool Structure* worksheet will take you to the *Reporting Background* worksheet. Exhibit 3 presents a screen shot of the *Reporting Background* worksheet.

¹ You may experience problems with security levels being too high in Excel. Before opening the tool in Excel, the macro security level must be changed to a lower setting. To do this, simply open Excel and go to Tools, Macro, and then Security. Set the Security level to "Medium." After adjusting the security level to "Medium," close Excel and double click on the tool and select "Enable Macros."

Exhibit 3. Reporting Background Worksheet

The screenshot shows a software window titled "Emission Reduction Partnership for the Magnesium Industry - Reporting Tool". The window has a menu bar with "File", "Edit", "Save Tool", and "Exit". Below the menu bar is a header area with a logo for "Mg" and the text "Reporting Background". The main content area contains five numbered steps:

- 1. Reporting Year**
Select the desired reporting year below.
A dropdown menu labeled "Select Reporting Year" is shown.
- 2. Unit of Measurement**
This option will apply for all data inputs.
Two radio buttons are shown: "Pounds" (unselected) and "Kilograms" (selected).
- 3. Nature of Data**
Is gas consumption data actual (i.e., measured) or estimated?
Two radio buttons are shown: "Actual" (unselected) and "Estimated" (selected).
- 4. What is the average cost of the cover gas during the Reporting Year?**
Average Cost of SF₆: [text box] \$/kg
Average Cost of HFC-134a: [text box] \$/kg
Average Cost of Other Gas: [text box] \$/kg
- 5. Please check the box below to indicate if the information in this report should be treated as CBI when shared with the partners.**
A checkbox labeled "Treat this information as CBI." is shown and is currently unchecked.

Reporting Background

The numbers below correspond with the steps on the *Reporting Background* worksheet.

1. Reporting Year

Select the current reporting year that gas consumption is being summarized from 1990 to 2015. The annual report is generated only for the reporting year selected; however, you can enter data for any year in the data input worksheets.

2. Unit of Measurement

Select the unit of measurement, either pounds or kilograms, by clicking on the button to the left of the units. On the official reporting sheet, kilograms will be used. Therefore, if you choose to summarize gas usage in pounds, the final cover gas usage rates in the tool will be converted into kilograms and metric tons for reporting consistency.²

3. Nature of Data

Select whether the consumption data you are entering is actual (i.e., measured) or estimated.

² Also for usage rate (kg SF₆/tonne) comparison with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Paris: Intergovernmental Panel on Climate Change, United Nations Environment Programme, Organization for Economic Cooperation and Development, International Energy Agency. IPCC/UNEP/OECD/IEA (1997)

4. Average Cost of Cover Gas

Enter the average cost of the SF₆, HFC-134a, and "Other Gas" for the selected reporting year in \$/kg or \$/lb. This cost data is used in the annual report to indicate the overall cost of melt protection at your facility. This component is provided for your convenience and is not required for reporting purposes.

5. Reporting as Confidential Business Information (CBI)

Select this check box if you would like the information treated as CBI when shared with the partners. EPA uses the data for tracking the Partnership's progress and preparing the U.S. inventory of greenhouse gas emissions.³ The data is aggregated such that company-specific data can not be identified. In documenting these analyses for the national inventory or outreach literature, EPA may mention the progress of a particular partner.

Click on the yellow arrow to continue once you have filled out all of the background data. You will then proceed to the worksheet where data is input using the cylinder tracking method.

Cylinder Tracking Approach

The following instructions provide details on how to enter the required cylinder tracking data. The annual report generated by the cylinder tracking method requires detailed cylinder utilization data for cover gas usage for an entire year, as well as the amount of magnesium processed during the year for each cover gas utilized.

Cylinder Tracking

The following fields are required in order to track consumption: "in service date"⁴, "date removed from service", "initial gross weight", and "final gross weight". The "tracking year", "days in use", and "gas used" during the tracking period are automatically calculated when this data is entered. The *Cylinder Tracking* worksheet of the reporting tool is designed to be utilized "**real-time**" as the cover gas cylinders are put into and out of service throughout the year. For example, this file can then be utilized as a digital back-up of hard-copy tracking data frequently found at cylinder storage locations. In this way cover gas tracking by the partner is continuously up-to-date and as accurate as possible. Actively entering cylinder tracking data throughout the year also makes submission of the annual report much easier because the data for the year is already entered.

If you have historical data and do not wish to enter it cylinder by cylinder, it is possible to enter gas usage for an entire historical year by creating a theoretical "annual cylinder". Simply enter the first day of the year in the In Service Date column (ex. 01/01/95), and enter the last day of the year in the Date Removed from Service column (ex. 12/31/95). For usage estimates, enter the total amount of gas used during the year in the Initial Gross Weight column, and enter zero in the Final Gross Weight column.⁵ An example is shown below in Exhibit 4. Partners are

³ EPA, *U.S. Inventory of Greenhouse Gas Emissions and Sinks 1990-2003*. Environmental Protection Agency, Washington D.C., April 2005. Available online at:

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2005.html>

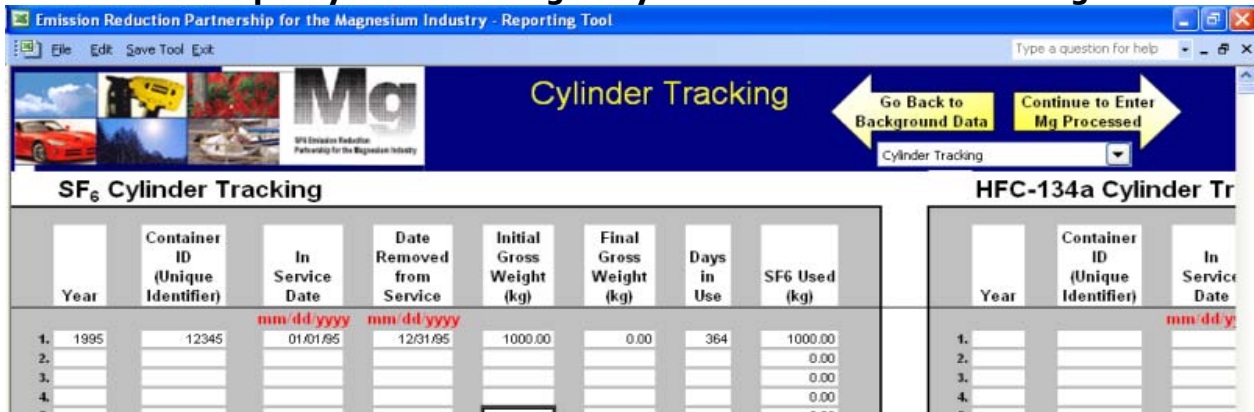
⁴ If the In Service Date and the Date Removed from Service span across two years (i.e. end of 2004 and beginning of 2005), then the consumption is accounted for in the first year that the cylinder was in service (the In Service Date).

⁵ A warning message will appear when using the theoretical "annual cylinder" approach due to the large cylinder gross weight. This warning can be ignored in this case by clicking "yes" to continue.

encouraged to input historical data in order to fully utilize the historical data presentation capacity of the tool.

If you are copying and pasting a large amount of historical data into the cylinder tracking sheet from another Excel worksheet, you must only copy and paste *columns* of data. An error message will appear if rows of data are copied into the Excel spreadsheet. Also note that the cylinder tracking data does not have to be entered in chronological order for the tool to function. The computational architecture of the tool is based on the cylinder service dates and not the order in which they appear.

Exhibit 4. Example Cylinder Tracking Entry for Historical Cover Gas Usage Data



Once you have finished filling out information on gas consumption, please be sure to save the tool. Please refer to the "Saving the Tool" section near the end of this guidance document.

If you are at the end of the month or year (depending on your magnesium production tracking regime) click on the forward arrow to proceed to the *Magnesium Processed* worksheet.

Magnesium Processed

Enter the amount of magnesium processed by month or alternatively, the total amount of magnesium processed by year in the yearly total cell after December. If you will eventually want to view a monthly summary of this data, please enter magnesium processed by month. If you are entering production data on a monthly basis, please leave the yearly total cell blank. Entering both monthly and yearly data will result in double-counting of values. Exhibit 5 presents a screen shot of the *Magnesium Processed* worksheet.

Exhibit 5. Magnesium Processed Worksheet

	Magnesium Processed with SF6 (Metric Tons)	Magnesium Processed with HFC-134a (Metric Tons)	Magnesium Processed with Other Gas (Metric Tons)
1990			
1991			
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
1991 Total			

Annual Report

The *Annual Report* worksheet summarizes the information filled in on the *Cylinder Tracking* and *Magnesium Processed* worksheets, and is the annual report document to be sent to the IMA. Please note that the annual report that the tool generates is driven by the reporting year selected in the *Reporting Background* worksheet. There is an opportunity within this worksheet to describe any actions you have taken to reduce gas usage. Please take a moment to fill out that information (if applicable) to complete the cylinder tracking report. This report is printable by clicking on the "Click Here to Print Report" button. Once you have finished filling out the information for the report, click on the forward arrow to proceed to either the *Data Quality* worksheet or the *Historical Data* worksheet.

Data Quality

The *Data Quality* worksheet is an important section of the tool where information regarding the technique used to conduct your estimates is required. Question 2a provides an opportunity to conduct a QA/QC on consumption data using an alternate estimation method, The Cylinder Inventory Approach. The details of this approach are outlined at the end of this guidance document in Appendix A. Question 3 provides an opportunity to view data previously entered into the tool from a monthly perspective (e.g., monthly SF₆ consumption rates). Once complete, the *Data Quality* worksheet should be printed out and included with the partner submittal package to the IMA.

Historical Data

This worksheet summarizes historical cover gas usage and usage rates and is printable by clicking on the "Click Here to Print Historical Data" button. This report provides the partner with a historical perspective of consumption and usage rates within the company and is not required as part of the annual submission to the IMA.

Saving the Tool

Saving the Mg Processing tool once you have completed entering data is important. Simply select "Save Tool" from the menu toolbar at the top of the screen and select a location on your computer where you would like to save the tool.

If you have previously saved a version of the tool and would like to store new data that has been entered, go to File, then Save, and the current file will be saved. If you would like to replace the existing file with the new file you have just created, save the tool with the same name. If you want to save a new file so that there are multiple versions on your computer, save the file with a different name.

Appendix A. QA/QC Using the Cylinder Inventory Approach

The Cylinder Inventory method provides a detailed description of cover gas cylinders as they flow in and out of the facility over the course of a year. The inventory approach requires Cylinder Inventory data at the beginning and end of the year, purchases and returns during the course of the year, and the amount of magnesium processed during the year. The cover gas consumption estimates generated under this approach are then compared to the results generated by using the Cylinder Tracking approach. The equation for calculating the amount of gas used during the year is provided below in Equation 1.

Equation 1. Calculation for Cylinder Inventory Approach

Amount of gas used during the year = (Gas on site at the beginning of the year) + (Gas purchased) - (Gas returned) - (Gas on site at the end of the year)

The Cylinder Tracking approach calculates the amount of gas used based on the difference of a cylinder's *gross* weight at the beginning and end of service on a continuous basis as cylinders are changed-out, whereas the Cylinder Inventory approach calculates the amount of gas used for the reporting year based on the *net* weight of cylinders on site at the beginning of the year, cylinder purchases and returns during the year, and cylinders on site at the end of the year. The Cylinder Tracking approach can be thought of as a real-time data entry method, while the Cylinder Inventory approach is conducted at one time by reviewing the previous year's gas cylinder inventory records.

The following instructions apply if you are performing an annual inventory QA/QC of SF₆, HFC-134a, and "Other Gas" consumption. Input data is required on four worksheets:

- 1) Beginning of Year
- 2) Purchases
- 3) Returns
- 4) End of Year

After selecting the Cylinder Inventory option, the tool will proceed to the "Beginning of Year" worksheet.

Beginning of Year

The input cells on this worksheet expand based on the reporting year selected. The most important piece of data that affects the annual consumption estimate is the "Actual Net Weight" column. The "Actual Net Weight" is the measured weight of the cover gas in each container at the beginning of the year. The sum of the net weight of cover gas in the containers at the beginning of the year is the first factor in Equation 1.

If you have entered historical data for previous years, you can import the end of year "Actual Net Weight" data (since end of year values from the previous year should be equal to the beginning of the year). Simply click on the button labeled "Click Here to Import End of Year Data" to import the previous year's end of year values as seen in Exhibit A-1. If you would like to erase the imported end of year values, click on "Click Here to Erase." Please note that the year in which you are importing data must be selected as the reporting year for this functionality to operate properly. Since the first row of cells for each year is set aside for end of year data, you will not be able to enter values manually into this first row.

Once you have finished filling out the information for the beginning of year, click on the forward arrow to continue. Please note that throughout this section and the purchases, returns, end of year sections, if a net weight for cylinders is aggregated then only one entry can be utilized for this data point. For example if you have 10 cylinders on-site at the beginning of the year and you know that the net total amount of SF₆ is 1000 lbs, then you can enter one beginning of year cylinder entry of 1000 lbs.

Exhibit A-1. Beginning of Year Worksheet

Purchases

This worksheet contains input cells for containers of SF₆ *purchased* during the year, seen in Exhibit A-2. This worksheet provides entries for the "Actual Net Weight" of SF₆, HFC-134a, and "Other Gas". The net weight of the cover gas purchased during the year is the second factor in Equation 1. Once you have finished filling out the information for purchases, click on the forward arrow to continue to the returns section.

Exhibit A-2. Purchases Worksheet

Returns

This worksheet contains input cells for containers of SF₆ returned or moved off-site during the year, seen in Exhibit A-3. This worksheet provides entries for the “Actual Net Weight Returned” of SF₆, HFC-134a, and “Other Gas”. The net weight of the cover gas returned during the year is the third factor in Equation 1. Once you have finished filling out the information for returns, click on the forward arrow to continue to the end of year section.

Exhibit A-3. Returns Worksheet

End of Year

This worksheet contains input cells for containers of SF₆ at the *end of the reporting year*, seen in Exhibit A-4. This worksheet provides entries for the “Actual Net Weight” of SF₆, HFC-134a, and “Other Gas”. The total net weight of the cover gas at the end of the year is the fourth factor in Equation 1. Once you have finished filling out the information for end of year, click on the forward arrow to proceed to the QA/QC worksheet.

Exhibit A-4. End of Year Worksheet

QA/QC

This worksheet summarizes the historical results for the Inventory method in the first table, and presents the difference between the data entered for the Inventory method and the Cylinder Tracking method in the second table. Values second table indicate the difference between the two methods. Please note that the *Beginning of Year, Purchases, Returns, and End of Year* worksheets must be properly populated for the *QA/QC* worksheet to function properly.

* * *

If you have any comments or questions about the use of this tool please contact EPA's Program Manager, Scott Bartos at bartos.scott@epa.gov or by telephone at (202) 343-9167.