

GILES CHEMICAL CORPORATION		
COMPANY PROCEDURE		
Standard Operating Procedure	Page : 1 of 3	Revision : Date : 3/28/06
Reviewed: Carl Mooney	Title: <b>VALIDATION OF THE SPECIFIC GRAVITY vs. % MgSO<sub>4</sub> REFERENCE CHART</b>	

QA-LAB-20

**Safety:** Wear the appropriate lab PPE when working in the lab.

**Purpose:** VALIDATION OF THE SPECIFIC GRAVITY vs. % MgSO<sub>4</sub> REFERENCE CHART

## Procedure:

### Introduction

The Specific Gravity of solutions of MgSO<sub>4</sub> is used for intermediate process control and for the marketing of Liquid Product . A reference chart is needed to easily and quickly convert Specific Gravity determinations to percent Magnesium Sulfate. Such a chart is generated by a simple analytical procedure which follows. Some 1200 reference points may be required over time, and an analysis for all of those is not physically possible, hence some, particularly those at the higher temperatures, are derived by extrapolation.

### Procedure

The weight of a known volume of solution at a temperature is determined, thus establishing a value for Specific Gravity, and a known weight of the same solution is evaporated and heated to the anhydrous state, thus establishing a value for % MgSO<sub>4</sub>.

### Equipment

25 mL Volumetric Flask  
4 mL. Transfer Pipette  
20-100°C Laboratory Thermometer  
100 mL Porcelain Crucible  
Weighing Balance – B440 Sartorius  
105°C Drying Oven  
1000°C Furnace  
Laboratory Dessicator  
Oven Forceps

### Method

1. Place the volumetric flask on the weighing balance and tare the reading to zero.
2. Fill the flask with solution to the mark, using the pipette to adjust as necessary.
3. Place the flask back on the balance and record the weight. **This is the weight of 25 mL, of solution. Divide this number by 25 to obtain the Specific Gravity.**
4. Using the thermometer, thrust the bulb down the neck of the flask into the wider part, meanwhile being careful to not displace the contents of the flask by overflowing. Read and record the temperature. **This is the temperature parameter to be used when entering values on the Specific Gravity vs. MgSO<sub>4</sub> reference chart.**
5. Set the weighing balance to read zero.
6. Place the porcelain crucible on the weighing balance and record the weight.
7. Pour the contents of the volumetric flask into the crucible.
8. Place the crucible on the balance and record the weight

GILES CHEMICAL CORPORATION		
COMPANY PROCEDURE		
Standard Operating Procedure	Page : 2 of 3	Revision : Date : 3/28/06
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QA-LAB-20

9. Subtract the weight at item 5 from the weight at item 7. **This is the weight of the sample**
10. Rinse the flask well with DI water and add the rinse to the crucible.
11. Place the crucible in the drying oven @ 105°C for two (2) overnights.
12. Using forceps remove the crucible and place it in the 450°C furnace for about one hour.
13. Remove the crucible from the furnace using the tongs, and place the crucible in the dessicator until cool.
14. Place the crucible on the balance and record the weight.
15. Return the crucible to the furnace for about 15 minutes and reweigh.
16. If the weight is less than in item 11 repeat item 12 as necessary to constant weight.
17. Subtract the weight of the crucible, item 5, from the weight at item 13. **This is the weight of anhydrous MgSO<sub>4</sub> in the solution sample weighed at item**
18. Divide the weight of the sample at item 16 by the weight at item 8. **This is the percent anhydrous MgSO<sub>4</sub> in the solution sampled.**

Weight of volume of Solution = Specific Gravity  
Weight of equal volume of Water

Weight of dehydrated solids = % MgSO<sub>4</sub>  
Weight of solution sample

<b>GILES CHEMICAL CORPORATION</b>		
<b>COMPANY PROCEDURE</b>		
<b>Standard Operating Procedure</b>	Page : 3 of 3	Revision : Date : 3/28/06
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QA-LAB-20

### TRAINING DOCUMENTATION

	EMPLOYEE	TITLE	SIGNATURE	DATE
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