



EMMERSON RESOURCES LIMITED
STANDARD OPERATING PROCEDURE #039

Taking Specific Gravity Measurements on DDH core

CONTROLLED COPY

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GENERAL DESCRIPTION:

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Introduction

Mineral Exploration Companies and Mining Companies routinely use the “Water Displacement Method” to determine the Specific Gravity of Diamond Drill Core and other rock samples. This method involves determination of the “dry mass” by using a calibrated scale. This means the sample is weighted. The same sample is then submerged in water and the “wet mass” is then determined. This means the sample is weighted while suspended in water. The displacement or the volume of the sample is then determined by subtracting the wet mass from the dry mass. The density or specific gravity (SG) can then be calculated by dividing the dry mass (DM) by the volume.

$$\text{In summary } (SG) = \frac{(DM)}{(DM - WM)}.$$

Where:

SG = Specific Gravity
DM = Dry Mass
WM = Wet mass

- Specific Gravity is a unit less number (dimensionless quantity.) It is the ratio between the density of the material of interest and a standard material (e.g. water at its greatest density). The units cancel out leaving a numerical value only.

Using gold as an example:

- Density of gold: 19.3 g/cm³
- Density of water at 4 Degrees Celsius: 1 g/cm³
- Specific Gravity of gold:
- (Density of gold) / (Density of Water) = (19.3 g/cm³) / (1 g/cm³) = 19
- Specific Gravity readings are collected 1 every in every 5 metres unless in Ore Material then readings are to be collected 1 every metre or as directed by the Geologist.
- Water tank is filled up.
- There is a Specific Gravity Template on the laptop which has an allowance for the of the uplift of the cradle once emerged in water which is 0.186.
- Scales are hooked up and zeroed with core cradle hanging underneath.
- 1 metre of core is then placed into the cradle.
- The cradle is then steadied so there is no movement and the weight is then typed directly into the computer into the Excel spread sheet in the DRY MASS (DM) column.
- The cradle is then lowered into the water ensuring the entire metre of core is submerged and then the weight is then typed into the WET MASS (WM) column.
- Once the dry mass and the wet mass are entered into the spread sheet it will give you a volume which is Dry mass – Wet Mass – 0.186 for the uplift of the cradle.
- Then to get the Specific Gravity there is a formula which is the DRY Mass Divided by the Volume = SG
- Once the SG readings are completed for the hole, the data is loaded onto the company server and sent to the project Geologist.
- The project geologist then checks and provides the data to the company database administrator who then loads into our relational database.

Calculation of SG from Water Immersion Readings

Hole ID:

Operator:

Correction for constant immersion depth

0.186

From	To	Mass	Immersed Weight	Total volume	Correction	Adjusted Volume	SG
				0	0.186	-0.186	0.0000
				0	0.186	-0.186	0.0000
				0	0.186	-0.186	0.0000
				0	0.186	-0.186	0.0000

Of interest:

- Iron has a specific gravity of 7.87, so it is 7.87 times as dense as water.
- Lead has a specific gravity of 11.35, so it is 11.35 times as dense as water.
- Mercury has a specific gravity of 13.56, so it is 13.56 times as dense as water.
- Gold has a specific gravity of 19.3, so it is 19.3 times as dense as water.