

|  |  |
| --- | --- |
| **Document Number** | **Meter Reading Guide SOP D.17.01** |
| **Owner/Contact Information:** | Utilities |
| **Effective Date:** | 10/27/17 |
| **Last Revised/Reviewed:** |  |
| **Related Policies and Procedures** |  |

1. **Purpose/Introduction**

The purpose of this Meter Reading Guide is to ensure the accuracy of in-house meter reading and monthly billing processes. Accurate data is also used to track overall campus energy performance, annual goals for reducing energy use intensity, and results of specific energy conservation measures. Energy/utility meters for electricity, water, chilled water, and steam are included in this Guide.

1. **Definitions**

**Building Number:** Identifies each building/facility with a unique three-digit number assigned by

the Office of Space Management.

**Meter ID:** Each meter has an ID assigned by the Facilities Operations Controls Shop. The Meter ID

consists of the Building Number, category of utility, and a number designating the meter’s load.

For example, in 006E1 and 008W1 the 006= Building Number, E= Electricity and W=Water. The

number 1 refers to the main load measured by this meter and distinguishes the first water meter

from a second one that serves a different part of the same building.

**LCD:** Liquid Crystal Display.

**Compound Water Meter:** A meter that has two registers, one to measure high flow rate water

volumes (cubic feet or gallons) and one to measure low flow rate water volumes of a facility with

variable water usage/flow.

**Fixed Zero:** Some water meters have one or two fixed zeros on the right side of the display to

indicate the numerical reading is multiplied by 10 for one zero and by 100 for two zeros. When

reading this type of meter it is important to note the fixed zero(s) in the Logbook as they appear

in the meter’s display with a handwritten box around the zero(s).

1. **Procedural Steps**

**3.1 How To Read Meters:**

**3.1.1 Electricity Meters:** These meters measure the total energy consumed over time in kiloWatthours (kWh) and the demand (Peak) in kiloWatts (kW). UNCG uses two types of meters to measure electricity consumption, Nexus 1262 and SHARK 200, which are both manufactured by Electro Industries/GaugeTech. Electricity meters are usually located inside the Electrical/Mechanical Room or outside with the transformer as shown in Figure 1. There are only a few meters on campus that do not read in kWh. These are usually panel meters on main switchgear that may read in MegaWatt-hours (MWh).

** **

Main Meter located inside Mechanical Room Main Meter located outside

**Figure 1. Electricity Meter locations**

A. Nexus 1262: A Main Meter usually measures all of the electricity consumed by the

building/facility. The Nexus 1262 meter measures the cumulative electricity consumed in “kWh” and the maximum demand (Peak) in “kW”.

**Electricity Main Meter IDs:** As shown in Figure 2, these meters are labeled with numbers and a letter (Meter ID) in the Logbook.

A picture containing graphical user interface

Description automatically generated

**Electricity Main Meter Reading:** The Nexus meter LCD shows the current cumulative energy consumed in (kWh) and the maximum demand (Peak) in (kW). Figure 3 shows how to read the energy consumption (kWh). Figure 4 shows how to read the demand (kW).

A picture containing diagram

Description automatically generated

Text, letter

Description automatically generated

**Electricity Meter (kW) Demand Reset:** After reading the maximum demand (Peak) in (kW), reset the meter to begin a new demand period by pushing the pin in. Display and location of the reset pin is shown in Figure 5.

A picture containing text

Description automatically generated

B. **SHARK 200:** A Submeter measures the electricity consumed by specific equipment in a building/facility. Typical loads measured by a Shark 200 include lighting, mechanical equipment, or an entire food service operation like Taco Bell/Wing Street. Electricity **Submeter “SHARK” ID:** The submeter’s Meter ID is similar to the main meter ID, with a capital letter added to the right side (A, B, C, etc.). These letters differentiate between the lighting load, mechanical load, or other loads such as the “C” Store load at Moran Commons (Dining Hall). In Figure 6, the capital letter D, indicates that this submeter is the fourth one fed by the main electrical service that main meter (022E1) is measuring.

Graphical user interface

Description automatically generated with medium confidence

**Electricity Submeter Reading:** The SHARK 200 displays the cumulative energy consumed in

two rows, with each row containing 4 digits. The meter reading is obtained by combining

the two rows into one 8-digit number, as shown in Figure 7.

Graphical user interface

Description automatically generated

* + 1. **Water Meters:**

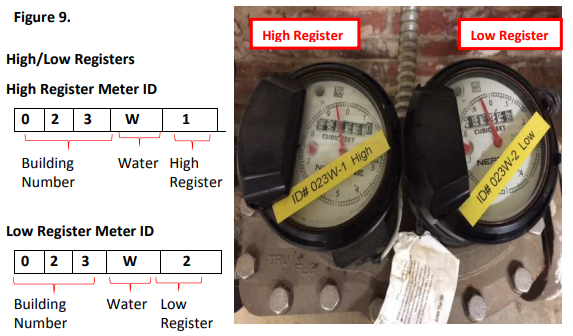
These meters measure the cumulative water consumption in “Cubic Feet” or in “Gallons”. The City of Greensboro Water Resources Department measures the water provided to the campus in units of Centum Cubic Feet (CCF) (Hundred Cubic Feet), which is why most of the meters on campus measure water consumption in Cubic Feet. Some of the buildings have a compound or dual register water meter, that consists of one low and one high register. The high register measures higher flow rates of water consumption, while the low register captures the lower flow rate consumption as shown in Figure 9.

* **Water Meter Reading:** The water meter shown in Figure 8 displays the cumulative water consumed in Gallons.

A picture containing text, device, gauge

Description automatically generated

* **Compound Water Meter:** This meter has a High Register and Low Register. The High Register usually has one or more fixed zeros. The fixed zeros should be “boxed in” and clearly indicated in the Logbook. Figures 10 & 11 display the High and Low Register meter reading.



A close-up of a stopwatch

Description automatically generated with medium confidence

A close-up of a clock

Description automatically generated with medium confidence

**3.1.3 Chilled Water Meter:**

* These meters measure the total energy consumed over time in ton-hours and the instantaneous demand in tons received from the chiller plant to cool the facility. One ton of cooling = 12,000 Btu/hr. Only some of the buildings served by the chiller plant have these meters. These meters are located inside the mechanical room.
  + **Chilled Water Meter Reading:** Figure 12 shows a Chilled Water Meter ID and reading.

Graphical user interface, application

Description automatically generated

* + 1. **Steam Meter:**
* These meters measure the amount of steam consumed over time in pounds (lb). Only some of the buildings served by the Steam Plant have these meters and they are usually located inside the mechanical room or steam room.
  + **Steam Meter Reading:** The number shown on the steam meter’s LCD display must be multiplied by 10 to get the current cumulative pounds of steam. Figure 13 shows a steam meter ID and reading.

Graphical user interface

Description automatically generated

* + 1. **Logbook:**
* A three-ring binder has all in-house meter information and readings for a fiscal year. Each page of the Logbook belongs to a single meter, and includes the Meter ID, location, type (Electricity or Water), building name, date of each reading, and the monthly readings for the entire fiscal year. Each page starts with the last reading of the prior fiscal year. The first page in the Logbook is the first meter to read each month, with subsequent meter readings following the sequence of the pages. Currently, the office of Facilities Operations Accounting is the home of the Logbook. The Meter Reader uses the Logbook to record the monthly meter readings and then returns it to Facilities Operations Accounting when all meters are read, documented, and validated. Figures 14, 15, 16, and 17 show pages for Electricity, Water, Chilled Water, and Steam meters in the Logbook.

Calendar

Description automatically generated

**Figure 14:** Electricity Meter Page in the Logbook

Table

Description automatically generated

**Figure 15:** Water Meter Page in the Logbook

A piece of paper with writing on it

Description automatically generated with medium confidence

**Figure 16:** Chilled Water Meter Page in the Logbook

Text

Description automatically generated with medium confidence

**Figure 17:** Steam Meter Page in the Logbook

* 1. **Meter Reading Procedure:**

**3.2.1 General**

* Only a trained [see SOP] technician assigned by the Plumbing Shop supervisor is to read the meters.
* For consistency, only one technician should read all campus meters for the current month. The second technician can read all meters the next month to ensure that both Meter Readers maintain familiarity with all meter locations.
* Each Meter Reader should know the exact location of each meter to allow for easy transition from one meter to another in different buildings. If the Meter Reader cannot find a specific meter, or has a question about the type of meter or how to read it, then Controls Shop personnel are available to answer any questions.
* Meter Reader starts the in-house reading on the first business day of each month. The Meter Reader returns the Logbook with all entries to Facilities Operations Accounting no later than the end of the 4th business day of each month.
* All pages in the Logbook should have the current month’s readings entered before returning the Logbook to Facilities Operations Accounting.
* Logbook pages are organized to allow the Meter Reader to start reading the meters on the first page and then proceeding sequentially through all pages to the last page in the Logbook. The Meter Reader is to follow this sequence each month.

**3.2.2 Reading Utility Meters**

* When reading each meter, ensure that sufficient light is available to obtain an accurate reading. Use a flashlight if needed.
* For each meter, confirm that the number of digits written down for the current month’s reading matches (or is consistent with) the number of digits in the previous month’s reading.
* Put a handwritten box around any fixed zeros on the meter. This usually only applies to water meters.
* Write down the date the meter was read next to the meter reading.
* Flag any meter that has no label and apply one with the Meter ID.
* For each meter, compare the current reading with the previous reading to determine the following:
  + The current reading is the same as last month’s reading, which usually indicates a problem with the meter.
  + The current reading has changed by a factor of 10 or more compared to last month’s reading.
  + If either A or B above are noted, then flag that meter in the Logbook for further action [see SOP].

1. **Revision Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision #** | **Section #** | **Summary of Changes** | **Approval Date** |
|  |  |  |  |