

## PIPE WEIGHT CALCULATOR USER GUIDE

### Introduction

The Pipe Weight Calculator is a Microsoft Excel® workbook designed to help field level NRCS employees quickly determine the weight of pipe used in NRCS contracts. The tool uses the method described in the Plastic Pipe Institute's Technical Note 7 (Method For Calculating An Estimated Weight-Per-Foot of Solid-Wall Plastic Pipe: TR-7 2007) to calculate the pounds per foot. **Please read the “known issue” section at the end of this document before using the tool.**

### Workbook Purpose and Description

This workbook is intended to aid the planner and/or designer in determining pipe weight for PVC, HDPE, Aluminum, or Steel Pipe for use in contracts where pipe is paid for in pounds. The tool is part of an Excel spreadsheet; the spreadsheet also contains tables that contain values for the physical properties (e.g. diameter, wall thickness) for pipes. The workbook requires a basic knowledge of Microsoft Excel®.

The pipe weight calculator is not a design tool; it is used to calculate the weight of pipe. The user should have an estimate of planned pipe length prior to using the spreadsheet. The calculator provides the user with the weight of the pipe.

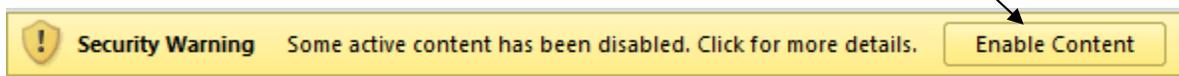
Once the practice is installed, the actual pipe length installed will need to be converted to pounds for final practice certification of quantity.

### Using the Workbook

To open the workbook, start MS Excel®, and open the file <PipeWeightCalculator\_August2012>. The top of the Excel window may display a Security Warning. The spreadsheet contains Visual Basic programming language, this content must be enabled and the user should click on <Enable Content>. See Figure 1. If Excel, does not display a security warning, disregard Figure 1.

Figure 1

Click on Enable Content



### **Calculating the weight per foot**

When the pipe dimensions are designated by outside diameter and wall thickness:

$$W = SG23 \times (OD - t_{avg}) \times t_{avg} \times 1.36196$$

Where:

**W** is the Weight-Per Foot - The solid wall pipe or tubing weight-per-foot, *in pounds per foot*, calculated using the material density, the average inside or outside

diameter, and the average wall thickness, and rounded to three decimals for tubing and two decimal places for pipe.

**SG23** is Specific Gravity - The specific gravity of the pigmented plastic pipe material compound at 23°C, *in grams per cubic centimeter*, rounded to three decimal places. Values used in the tool are SG23 = 1.400 for PVC and SG23 = 0.955 for PE.

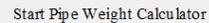
**OD** is the Average Outside Diameter: The outside diameter, *in inches*, rounded to three decimal places, obtained from the applicable pipe standard, plus, if applicable, half of the total diameter tolerance. If the diameter is specified as a value with a plus-or-minus tolerance, the average diameter is the specified value.

**T<sub>avg</sub>** is the wall thickness value, *in inches*, rounded to three decimal places, obtained from the applicable pipe standard, plus, if applicable, half the total wall thickness tolerance.

The following instructions explain how to use the workbook to calculate pipe weight.

1. Enter general information (cooperator, project, calculations done by, calculations checked by, and date, etc.) at the top of the workbook.

2. Left click the “**Start Pipe Weight Calculator**” button.



3. A screen appears requesting the user to select a pipe material (i.e., PVC, PE, Steel or Aluminum). Once the pipe material is selected click “**OK**”

The user needs to know specific attributes of the pipe in order to get the weight per foot. The user must know:

- The pipe material (e.g. PVC (IPS), PE, aluminum, or, steel),
- The pipe type (IPS, PIP, etc.)
- The nominal diameter of the pipe,
- The pressure rating or dimension ratio (DR) of the pipe, and
- The length of the pipe.

The tool either gets the diameter and wall thickness of the pipe from the appropriate table and calculates the weight per foot of the pipe, or gets the weight per foot, depending on the pipe type and material.

4. Select whether the pipe weight calculated is for planning or as-built documentation.

### Known Issues:

Schedule 40, 80 & 120: The tool correctly lists the type of pipe selected in the final table. However, it does not report the correct pressure rating for the schedule pipe in an intermediate

window. **Solution (until the next tool version): Ignore the pressure rating of schedule pipe in the immediate window and continue.**

Pressure Ratings for PVC: the pressure ratings for PVC that are listed are for PVC if PVC1120, PVC1220, or PVC2120. If other resins are used, the pressure ratings will be different. In all cases, the pipe weight is correct if the user selects the pipe based on the SDR. **Solution (until the next tool version): If PVC1120, PVC1220, or PVC2120 is used there is no issue. These are by far the most common resins. Otherwise select the pipe based on SDR, and ignore the reported pressure rating.**

Pressure ratings for PE: The pressure ratings for PE pipe are correct if PE2708, PE 3608, PE3708, PE4608, or PE4708 are used. The pressure ratings are low if PE4710 or PE 3701 is used. The pipe weights for PE4710 is 0.4% low if the PE pipe is PE4710 and selected based on SDR or SIDR. **Solution (until the next tool version): If PE3710 or PE4710 are used, select the pipe based on SDR or SIDR, and realize there is a 0.4% error in the weight of the pipe.**

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Contact the State Conservation Engineer for any questions, concerns, or errors.