TECHNICAL NOTE

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ENGINEERING # 11 **SPOKANE, WASHINGTON**

PIPE WEIGHT CALCULATOR
FOR
PVC, HDPE, and STEEL
ROUND PIPE

BACKGROUND

The pipe weight calculator was developed to be used with the EQIP cost share program to make it easier to adjust and contract the cost of the pipe. Plastic pipe is generally sold by the piece or ft rate to the end user, however the pipe cost is actually computed based on the per pound rate. In order to adjust the pipe cost rate in contracts, the per pound method has been implemented to make it easier for all to use. Each year the payment support document will be adjusted to the current pipe cost.

The pipe weight calculator is located on the Washington NRCS web page at:

http://www.wa.nrcs.usda.gov/technical/ENG/index.html

The calculator is an Excel spreadsheet developed using actual pipe dimensions and weight data.

INTRODUCTION

There are 4 worksheets in the calculator. These worksheets can be found by using the tabs at the bottom of the spreadsheet.

- **Introduction** – describes how to use the spreadsheet plus gives contact information and credit to the author.
- **PVC** – worksheet to use for Polyvinylchloride pipe.
- **PE** – worksheet for polyethylene pipe, both high and low density.
- **Steel** – worksheet for steel pipelines.
- **References** – reference tables for all of the materials, with inside and outside diameters, wall thickness, weights, and dimension ratios. Also included on this worksheet are the source locations for the references.

In order to use the pipe weight calculator spread sheet the pipe material will need to be determined. Generally the majority of pipelines used in agriculture are plastic. PVC is generally used but PE is also very popular for some conditions. PVC is usually cheaper, is more readily available and easier to use. However PE is more durable, can be exposed to the elements (UV protected) and with fused joints can be leak free. Steel pipe has its advantages because of its strength, where exposure is required and above ground sites, but may not be as durable due to rust and corrosion.

Once the pipe material is chosen, there are a number of different options for each material. Brief descriptions are shown below.

Polyvinylchloride

PVC is further broken down into 5 different categories

- Gasketed joints
  - Iron Pipe Size (IPS)
  - Plastic irrigation pipe (PIP)
- Glued joints
  - Iron Pipe Size (IPS)
  - Plastic irrigation pipe (PIP)
  - Schedule rating (Schedule 40 and 80)

Check with your local irrigation pipe suppliers to determine which type - PIP or IPS is used in your area.

The schedule ratings are generally for higher pressure, smaller diameter applications.

Polyethylene

PE pipe is broken into 5 categories

- Low Density
- HDPE w/ Standard Dimension Ration based on
  - Inside diameter (SIDR = ID/wall thickness)
  - Outside diameter (SDR = OD/wall thickness)
- Corrugated HDPE
  - Corrugated Interior
  - Smooth Interior

Again check with your local supplier companies to determine which type they stock.

Steel Pipe

Five categories are listed for steel pipe

- Galvanized Pipe in Schedule 40 and 80
- Corrugated Metal Pipe (CMP), Galvanized with -
  - 14 gauge wall thickness
  - 12 gauge wall thickness
  - 10 gauge wall thickness
  - 8 gauge wall thickness

The galvanizing process does not add weight to the pipe and if other coatings are used the weight given in the calculator is accurate. The wall thickness for the CMP will need to be determined based on site job conditions.

PROCEDURE

The basic steps necessary to use the pipe weight calculator would be;

Step One:

- After opening the spread sheet and reading the instructions, select the tab for the type of material (PVC, PE, Steel) that you are planning to use.
- Determine which category of pipe you will use.
- Select the diameter.
- Select the class.
- Enter the length.

Step Two:

- Read the pounds per foot.
- Enter the total pounds for your project for the EQIP contract.
- If necessary to use a different diameter pipe on the same job, keep a running total for the job.
- It is highly recommended to retain a copy of the spread sheet for the landowners file.

Step Three:

- If a hard copy is necessary, simply select the printer icon on the left side of the toolbar and ok, or select, file, print, ok. In either case the entire material worksheet will print out.
- If an electronic copy is required, simply save a copy of the worksheet with a unique name.

EXAMPLE

You are working with Erosia and Dustin Field on a new irrigation pipeline. They are doing a pivot with 1200 ft long supply line that is 8” diameter, 125 psi, PVC. You have been asked to determine the pounds of pipe for the contract.

After entering the landowner information, you have already determined that in your area, for 8” pipe - gasket is much easier and available to use and IPS is the pipe of normally stocked. After selecting the diameter (8”) and pressure rating (125 psi), you enter the length of 1200 ft. The pipe weight per foot is 4.73 and the total number of pounds would be 5,676 for this job. You print out the page and enter the data in the contract. A copy is shown below.

U.S. Department of Agriculture			**EXCEL Spread sheet**	**FILE NAME**	Pipe Weight Calculator
Natural Resources Conservation Service			**Version 110507**	**JOB NO.**	TN 10 Example
COOPERATOR	Erosia and Dustin Field	**PROJECT**	Irrigation Water Conveyance		
BY	Walter Piper	**DATE**	11/6/2007		
CHECKED BY	_____	**DATE**	_____		
SUBJECT	Pipe Weight Calculations	**PROGRAM**	EQIP	**SHEET**	

Pipe material =	**PVC - IPS (SDR-PR) - ASTM D2241**		
Diameter =	8	in.	
Pressure Rating =	125	psi	
Length =	0	ft.	
Unit Weight =	4.59	lbs/ft.	
Total Weight =	0	lbs	

This is for pressure rated polyvinyl chloride (PVC) pipe made with a standard outside dimension (SDR) also referred as Iron Pipe Size (IPS) pipe. It conforms to the specifications of ASTM D2241. It has bell-ends and connected with solvent weld (glued) fittings.

Pipe material =	**PVC - IPS (SCH) - ASTM D1785**		
Diameter =	6	in.	
Pipe Schedule =	40		
Length =	0	ft.	
Pressure Rating =	180	psi	
Unit Weight =	3.68	lbs/ft.	
Total Weight =	0	lbs	

This is for Schedule 40 and 80 rated polyvinyl chloride (PVC) pipe made with a standard outside dimension (SDR) also referred as Iron Pipe Size (IPS) pipe. It conforms to the specifications of ASTM D2241. It is has bell-ends and connected with solvent weld (glued) fittings. The pressure rating varies with pipe diameter.

Pipe material =	**PVC - IPS - Gasketed - ASTM D2241**		
Diameter =	8	in.	
Pressure Rating =	125	psi	
Length =	1200	ft.	
Unit Weight =	4.73	lbs/ft.	
Total Weight =	5676	lbs	

This is for pressure rated polyvinyl chloride (PVC) pipe made with a standard outside dimension (SDR) also referred as Iron Pipe Size (IPS) pipe. It conforms to the specifications of ASTM D2241. It is connected with gasketed bell-ends.

Pipe material =	**PVC - PIP - Solvent Weld**		
Diameter =	8	in.	
Pressure Rating =	43	psi	
Length =	0	ft.	
Unit Weight =	1.46	lbs/ft.	
Total Weight =	0	lbs	

This is for polyvinyl chloride (PVC) plastic irrigation pipe (PIP). It is bell-ended connected with solvent weld (glued) fittings.

Pipe material =	**PVC - PIP - Gasketed**		
Diameter =	12	in.	
Pressure Rating =	100	psi	
Length =	0	ft.	
Unit Weight =	7.62	lbs/ft.	
Total Weight =	0	lbs	

This is for polyvinyl chloride (PVC) plastic irrigation pipe (PIP). It is connected with gasketed bell-ends. Typically used for pipelines when the diameter is larger than 6 inches.