Stainless Steel Pipe Weight Chart and Dimensions

Introduction

Mcneil Instrument provides a comprehensive **stainless steel (SS) pipe weight chart** to assist in calculating the weight and dimensions of pipes for various applications. The chart ensures accurate measurements, facilitating efficient transportation and installation. This information is applicable to a range of SS grades such as **ASTM A312 TP304L, TP316, TP316L, TP321, TP347, SS202, and SS410**, among others.

Key Features

1. **Dimension Ranges**:
    - Length, **outer diameter (OD)**, and **wall thickness** across various standards.
    - Includes both **seamless pipes** and **ERW pipes**.
2. **Applications**:
    - Pressure systems require specific grades and dimensions.
    - Industries require precise weight for system build-up.

What Are Nominal Bore and Outside Diameter in Stainless Steel Pipes?

When determining critical attributes like **tolerance** and **pressure levels**, the **Nominal Bore (NB)** and **Outside Diameter (OD)** play a vital role:

- **Outside Diameter (OD):** This represents the pipe's total external diameter, measured in **mm** or **inches**, based on the circumference of the pipe's cross-section.
- **Nominal Bore (NB):** This refers to the pipe's **internal diameter**, also measured in **mm** or **inches**, influenced by the **wall thickness**.

These measurements are essential for ensuring compatibility in various **industrial and structural applications**.

Stainless Steel Pipe Dimensions and Weight Chart

The weight of stainless steel pipes is calculated by multiplying the volume of the material by its density. Knowing the weight is essential for determining the load of an application system before construction.

Our weight chart applies to various grades of SS pipes, including:
ASTM A312 TP304L, TP316, TP316L, TP321, TP321H, TP347H, TP347, TP310S, TP304H, SS 202, SS 410, SS 317L, SS 310, SS 316H, and other **200, 300, & 400 series seamless pipes and tubes**.

Below is a detailed chart showcasing the outer diameter, wall thickness, and corresponding weight for various schedules and dimensions:

Nominal Bore	**Outside Diameter (O.D)**	**Schedule 5S**		**Schedule 10S**		**Schedule 40S**		**Schedule 80S**		**Schedule 160S**		**Schedule XXS**	
		Wt	Weight	Wt	Weight	Wt	Weight	Wt	Weight	Wt	Weight	Wt	Weight
mm	inches	mm	Kg./mt	mm	Kg./mt	mm	Kg./mt	mm	Kg./mt	mm	Kg./mt	mm	Kg./mt
3	1/8	1.24	0.276	1.24	0.28	1.73	0.37	2.41	0.47	-	-	-	-
6	1/4	1.24	0.39	1.65	0.49	2.24	0.631	3.02	0.8	-	-	-	-
10	3/8	1.24	0.49	1.65	0.63	2.31	0.845	3.2	1.1	-	-	-	-
15	1/2	1.65	0.8	2.11	1	2.77	1.27	3.75	1.62	4.75	1.94	7.47	2.55
20	3/4	1.65	1.03	2.11	1.28	2.87	1.68	3.91	2.2	5.54	2.89	7.82	3.63
25	1	1.65	1.3	2.77	2.09	3.38	2.5	4.55	3.24	6.35	4.24	9.09	5.45
32	1 1/4	1.65	1.65	2.77	2.7	3.56	3.38	4.85	4.47	6.35	5.61	9.7	7.77
40	1 1/2	1.65	1.91	2.77	3.11	3.68	4.05	5.08	5.41	7.14	7.25	10.16	9.54
50	2	1.65	2.4	2.77	3.93	3.91	5.44	5.54	7.48	8.74	11.1	11.07	13.44
65	2 1/2	2.11	3.69	3.05	5.26	5.16	8.63	7.01	11.4	9.53	14.9	14.2	20.39

80	3	2.11	4.51	3.05	6.45	5.49	11.3	7.62	15.2	11.1	21.3	15.24	27.65
100	4	2.11	5.84	3.05	8.36	6.02	16.07	8.56	22.3	13.49	33.54	17.12	41.03
125	5	2.77	9.47	3.4	11.57	6.55	21.8	9.53	31.97	15.88	49.11	19.05	57.43
150	6	2.77	11.32	3.4	13.84	7.11	28.3	10.97	42.7	18.2	67.56	21.95	79.22
200	8	2.77	14.79	3.76	19.96	8.18	42.6	12.7	64.6	23	111.2	22.23	107.8
250	10	3.4	22.63	4.19	27.78	9.27	60.5	12.7	96	28.6	172.4	25.4	155.15
300	12	3.96	31.25	4.57	36	9.52	73.88	12.7	132	33.32	238.76	25.4	186.97
350	14	3.96	34.36	4.78	41.3	11.13	94.59	19.05	158.08	35.71	281.7	-	-
400	16	4.19	41.56	4.78	47.29	12.7	123.3	21.41	203.33	40.46	365.11	-	-
450	18	4.19	46.8	4.78	53.42	14.27	155.8	23.8	254.36	45.71	466.4	-	-
500	20	4.78	59.25	5.54	68.71	15.09	183.42	26.19	311.2	49.99	564.68	-	-
600	24	5.54	82.47	6.35	94.45	17.48	255.41	30.96	442.08	59.54	808.22	-	-

Stainless Steel Pipe Pressure Classifications

The **stainless steel pipe weight chart** integrates with pressure classes to determine the suitability of pipe dimensions for specific uses:

- **Pressure Classes**: 150, 300, 600, 2500, PN6 to PN64.

- **Application Insight**: Useful in evaluating system weights and transportation logistics.

Calculation Process

The weight is derived by:

1. Calculating the **volume** of the stainless steel.
2. Multiplying the volume by the **density** of the specific grade.
3. Utilizing the **chart values** for efficient and accurate estimation.

How to Calculate Stainless Steel Pipe Weight

The calculation involves:

1. Determining the volume of the pipe using its outer diameter, wall thickness, and length.
2. Multiplying the volume by the density of the stainless steel material (specific to the grade used).

For instance:

- **Grade Density Examples**:
  - **SS 304L**: ~7.93 g/cm³
  - **SS 316L**: ~7.98 g/cm³

Formula:
Weight (kg/m)=(Outer Diameter−Wall Thickness)×Wall Thickness×Length×Density

Stainless Steel Pipe Tolerances

Stainless steel pipes adhere to stringent ASTM/ASME standards for reliability and durability. The table below summarizes the tolerances and testing requirements:

Specification	Nominal Diameter (mm)	Outside Diameter Variation (mm)	Wall Thickness Variation (%)	Exact Length Tolerance (mm)	Testing

ASTM A213/ASME SA 213 Seamless Boiler, Superheater, and Heat Exchanger Tubes	< 25.4	±0.1016	+20 / -0	±3.175	Flattening Test
	25.4 - 38.1 incl.	±0.1524	+22 / -0	±3.175	Tension Test
	50.8 - 63.5 excl.	±0.254	+2 / -0	±4.46	Hardness Test
	76.2 - 101.6 incl.	±0.381	+22 / -0	±4.76	Hydrostatic Test
ASTM A249/ASME SA 249 Welded Boiler, Superheater, Heat Exchanger, and Condenser Tubes	< 25.4	±0.1016	±10	±3.175	Tension Test
	50.8 - 63.5 excl.	±0.254	±10	±4.762	Reverse Bend Test

	76.2 - 101.6 incl.	±0.381	±10	±4.762	Hydrostatic Test
ASTM A269/ASME SA 269 Seamless and Welded Tubing for General Service	< 12.7	±0.13	-1	±3.2	Flare Test (Seamless Only)
	12.7 - 38.1 excl.	±0.13	±10	±3.2	Flange Test (Welded Only)
	139.7 - 203.2 excl.	±0.76	±10	±4.8	Reverse Flattening Test (Welded Only)
ASTM A270/ASME SA 270 Seamless and Welded Sanitary Tubing	25.4	±0.05 / ±0.20	±10	±3.2	Reverse Flattening Test
	101.6	±0.08 / ±0.38	±10	±3.2	Hydrostatic Test
ASTM A312/ASME SA 312 Seamless and Welded Pipes	3.175 - 38.1 incl.	±0.4 / ±0.79	Minimum Wall -12.5%	±6.4	Tension Test
	101.6 - 203.2 incl.	±1.59 / ±0.79	±6.4	Hydrostatic Test	
ASTM A358/ASME SA 358 Welded Pipes	219.08 - 750 incl.	±0.5% / -0.3	±6.0	Hydrostatic Test	

Understanding the Importance of SS Pipe Weight Chart

The **SS pipe weight chart** serves multiple purposes:

1. **Pressure Capacity Assessment**: Helps determine the pressure classes (e.g., 150, 300, 600, etc.) suitable for various applications.

2. **Application Load Calculation**: Facilitates the estimation of overall application weight, aiding transportation and installation.
3. **Material Selection**: Assists in choosing the right grade and dimensions for specific requirements, ensuring safety and efficiency.

Stainless Steel Pipe Standard Sizes and Thickness

Stainless steel pipes are rated according to **ANSI** or **ASME 36.19M standards** to ensure consistency and reliability in industrial applications. The sizes range between **1/8 inches to 12 inches**, catering to diverse requirements. Wall thicknesses vary as per the selected **Schedule (SCH)**. For instance:

- **SCH 10**: Thickness ranges from **1.25 mm to 4.58 mm**.
- **SCH 40**: Thickness ranges from **1.73 mm to 9.53 mm**.

The selection of pipes depends significantly on the **Schedule rating** as it dictates the pipe's **pressure handling capability** and **application suitability**. Therefore, it is crucial to select the appropriate **size and thickness** using the **ASME chart**.

DIN Standards for Stainless Steel Pipes

To maintain consistency in **stainless steel pipe dimensions** globally, the **DIN EN ISO 1127** standard is implemented. It covers specifications from **DIN 2462** (for seamless pipes) and **DIN 2463** (for welded pipes). Key factors defined in this standard include:

- **Pipe length**
- **Dimensional details**
- **Tolerance limits**

Outer Diameter Classifications (D-Groups):

- **D1**: Tolerance of **±1.5%**; Minimum diameter of **±0.75 mm**
- **D2**: Tolerance of **±1%**; Minimum diameter of **±0.5 mm**
- **D3**: Tolerance of **±0.75%**; Minimum diameter of **±0.3 mm**
- **D4**: Tolerance of **±0.5%**; Minimum diameter of **±0.1 mm**

Wall Thickness Classifications (T-Groups):

- **T1**: Tolerance of **±15%**; Minimum thickness of **±0.6 mm**
- **T2**: Tolerance of **±12.5%**; Minimum thickness of **±0.4 mm**
- **T3**: Tolerance of **±10%**; Minimum thickness of **±0.2 mm**
- **T4**: Tolerance of **±7.5%**; Minimum thickness of **±0.15 mm**
- **T5**: Tolerance of **±5%**; Minimum thickness of **±0.1 mm**

By adhering to these DIN standards, **Mcneil Instrument** ensures that its stainless steel pipes are dimensionally accurate and meet global quality benchmarks for **seamless** and **welded pipe manufacturing**.

Stainless Steel Square Pipe & Tubing dimensions and weight chart

Size Range (mm)	Thickness (mm)	Weight (Kg/Metre)
20 x 20	2	1.11
25 x 25	2	1.43
25 x 25	2.5	1.74
25 x 25	3	2.04
30 x 30	2	1.74
30 x 30	2.5	2.14
30 x 30	3	2.51
30 x 30	3.2	2.65
40 x 40	2	2.37
40 x 40	2.5	2.92
40 x 40	3	3.45
40 x 40	4	4.46
40 x 40	5	5.4
50 x 50	2	3
50 x 50	2.5	3.71

50 x 50	3	4.39
50 x 50	4	5.72
50 x 50	5	6.97
50 x 50	6	8.2
50 x 50	8	10.5
60 x 60	3	5.34
60 x 60	3.2	5.67
60 x 60	3.6	6.34
60 x 60	4	6.97
60 x 60	5	8.54
70 x 70	2.5	5.28
70 x 70	3	6.28
70 x 70	3.5	7.25
70 x 70	3.6	7.46
70 x 70	4	8.23
70 x 70	5	10.1
70 x 70	8	15.29
70 x 70	10	19.13
80 x 80	3	7.22
80 x 80	3.5	8.35
80 x 80	3.6	8.59
80 x 80	4	9.48
80 x 80	5	11.7
80 x 80	6	13.8
80 x 80	6.3	14.4
80 x 80	8	17.83

80 x 80	10	21.88
90 x 90	3	8.16
90 x 90	3.5	9.45
90 x 90	3.6	9.72
90 x 90	4	10.7
90 x 90	5	13.3
90 x 90	6	15.7
90 x 90	6.3	16.4
90 x 90	8	20.32
90 x 90	10	25.53
100 x 100	3	9.1
100 x 100	4	12
100 x 100	5	14.8
100 x 100	6	17.6
100 x 100	6.3	18.4
100 x 100	8	22.9
100 x 100	10	27.86
100 x 100	12	33.44
120 x 120	4	14.5
120 x 120	5	18
120 x 120	6	21.3
120 x 120	6.3	22.3
120 x 120	8	27.9

120 x 120	10	34.13
120 x 120	12	39.94
120 x 120	16	54.64
140 x 140	6	25.97
140 x 140	8	32.89
140 x 140	10	41.15
150 x 150	4	18.3
150 x 150	5	22.7
150 x 150	6	27
150 x 150	6.3	28.3
150 x 150	8	35.4
150 x 150	10	43.47
150 x 150	12	53.48
150 x 150	16	65.05
160 x 160	6	27.39
160 x 160	8	36.9
160 x 160	10	46.88
180 x 180	5	27.97
180 x 180	6	33.26
180 x 180	8	43

180 x 180	10	53
180 x 180	12	61.01
180 x 180	16	81.3
200 x 200	5	31.18
200 x 200	6	37.09

Difference between Schedule 10, SCH 20 and SCH 40 pipe

Schedule	Wall Thickness	Comparison
SCH 10	Thinner wall	Thinnest among SCH 10, 20, and 40
SCH 20	Medium thickness	Thicker than SCH 10 but thinner than SCH 40
SCH 40	Thick wall	Thickest among the three, suitable for high-pressure applications

Key Notes:

- **Wall thickness varies** depending on the pipe diameter, even within the same schedule rating.
- **Larger diameter pipes** have different thicknesses for the same schedule number.
- **Verification is essential** before selecting the right schedule for your application.

Standard Pipe Size Tolerance

The tolerance level for pipes is calculated based on the ASME Standard 999. According to this standard, stainless steel pipes typically have an under-tolerance of -0.031" for all outer diameter (OD) measurements. When considering over-tolerance, the value increases in proportion to the external diameter of the pipes.

Pipe Thickness Tolerance as per ASME

Determining the exact thickness of stainless steel pipes is challenging, as it cannot solely be based on the bore and external diameter. Therefore, both parameters must be taken into account and compared with the ASME 999 chart to obtain an accurate understanding of the thickness. For seamless pipes, it's worth noting that their actual thickness may deviate by up to 12.5% from the specified value.

Size differences between stainless steel seamless and welded pipes:

Property	Seamless Pipes	Welded Pipes
Manufacturing Process	Single material sheet rolled into a long cylinder	Multiple lengths joined together with seams
External Diameter	Approximately 20 inches	Approximately 16 inches
Construction	No seams, continuous structure	Seams along the length of the pipe
Physical & Chemical Properties	More uniform in strength and composition	Seams may result in slightly lower strength at the weld points

Why the Chart Is Essential

1. **System Optimization**: Ensures accurate pressure and weight management.
2. **Material Selection**: Facilitates the choice of appropriate **grades** and **dimensions** for specific projects.
3. **Ease of Transport**: Helps in planning logistics by knowing exact weights beforehand.