



# LEVEL GAUGES

## Literature





**Figure 1 STAUFF Level Gauges**

### Introduction:

Stauff Level Gauge is measuring equipment used to ascertain the amount of fluid in a reservoir or tank. They find applications in large tanks, pressure vessels, fluid reservoirs, drums, etc. Stauff level gauge comes in handy in situations where it is hazardous to directly measure the level of the fluid. In cases where the tank operates at high pressure, the fluid contains harmful chemicals, or fluids that have high volatility, it is strongly recommended to use a Stauff level gauge.

Level gauges can be of different types depending on their size and use. There are however three popular kinds of level gauges. They are:

- Transparent level gauge
- Reflex level gauge
- Magnetic level gauge

Most level gauges are designed to work with a maximum temperature of 194°F or 90°C. Their configuration differs depending on their application.

### Materials:

The Stauff level gauge has different sensitive parts, hence different materials.

Steel St 12 with a black coating of epoxy is used to make the housing part of the level gauge. This St 12 is made following the German Standard DIN1623. It is equivalent to the SPCA of EN10130 standard as well as the DC01 of JIS standard. The table below shows the chemical composition of Steel St 12 material.

Elements	Percentage Content
Carbon (C)	≤ 0.10
Manganese (Mn)	0.20 – 0.45
Nitrogen (N)	≤ 0.007
Sulfur	≤ 0.035
Phosphorus (P)	≤ 0.035

The mechanical properties of the material are shown below

Elongation	$\geq 28$
Tensile Stress (Mpa)	270 – 410
Yield Stress (Mpa)	$\leq 280$

Epoxy is used to coat the housing part to improve its durability. Epoxy is a liquid chemical that solidifies when mixed with hardener. The solid epoxy is advantageous in coating the housing part because epoxy is needed to not wear easily even under high temperature. Epoxy also has a fine finish and is resistant to scratches. If it gets dirty by harsh environmental conditions or any means, epoxy is very easy to clean.

- The scale plate of the gauge is made of polyvinyl chloride. Polyvinyl chloride, called PVC, is commonly used to produce industrial and domestic products. This is due to their strength, rigidity, and also given the fact that they are highly resistant to flame.

The sight tube and plugs are made of polyamide. Polyamide (PA) is commonly called nylon. They are used during production due to their high oil and chemical resistance. Moreover, polyamides have high thermal resistance, rigidity and also sliding features.

### Design of Stauff Level Gauge:

Stauff level gauges are typically designed for large reservoirs with a maximum pressure of 29 psi or 2 bar. But then, special sizes can be made for small and medium reservoirs. Special sizes can range from 305mm to a maximum size of 950mm. The level gauge is known to have a tolerance of 1mm. Here is the specific design for the gauge.

- Plastic dampening clips are used for gauge size more than 17.7 inches or 450mm
- There is a structure whose function is to split the level gauge display into various sections.
- The placement of the struts is flexible, to suit the client's needs.



Figure 2 STAUFF Level Gauges

There is a scale plate which gives a visual indication of the fluid level.

### Types of Stauff Level Gauges:

There are 3 types of Stauff level gauge.

#### Type 1: SNA Series

The SNA series is designed to function with a temperature less than 194°F or 90°C. The calibration on the thermometer begins from -14°F (-10°C) to 176°F (80°C). The SNA series gauge has a tightening torque value of 70in/lb or 7.9 Nm. The SNA 127, SNA 254, and SNA 305 are designed with M12 Bolts standards whereas the SNA 076 have M10 Bolts standards. Typically, materials used are epoxy coated metal shroud for the house and polyamide for the sight tube. However, special requests can be made for different material usage.

#### Type 2: SNK/SNK Series:

These series of gauges are used for petroleum, gasoline, lubricant and material based application. Their maximum working temperature is 194°F or 90°C. The calibration on the thermometer ranges from 14°F (-10°C) to 176°F (80°C). This series of gauge follows the ‘O’ or ‘C’ standard plug type, made with the DIN ISO 6952 standards.

#### Type 3: SNKK Series (Compact Level Gauges)

These series are used for compact applications. They are fit in places with small spaces. By size, they are 40mm shorter in length than other series. The plugs are made with the DIN EN 175301-803-B/ISO6952 standards.

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