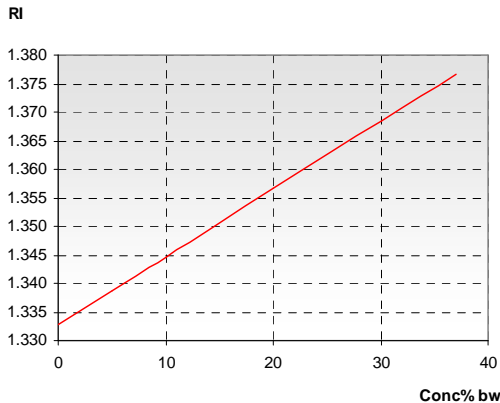


## FORMALDEHYDE, CH<sub>2</sub>O (METHANAL)

### Typical end products

Urea (30%), phenol (20%), melamine-, acetal (10%), polyformaldehyde resins, ethylene glycol, pentaerythritol, hexamethylenetetramine, sterilising mediums, resins

Chemical curve: Formaldehyde R.I. per Conc% b.w. at Ref. Temp. of 20°C



### Introduction

Formaldehyde, CH<sub>2</sub>O (systematic name: methanal), is a colorless gas with a characteristic pungent odor. It is a powerful germicide used for sterilizing purposes. It is the simplest aldehyde. Formaldehyde can be obtained from its cyclic trimer trioxane and the polymer paraformaldehyde. It exists in water as hydrate H<sub>2</sub>C(OH)<sub>2</sub>. Aqueous solutions of formaldehyde are referred to as formalin. "100%" formalin consists of saturated solution of formaldehyde (this is about 40% by volume or 37% by mass) in water, with a small amount of stabilizer, usually methanol, to limit oxidation and polymerization.

### Application

Formaldehyde production is based on a direct oxidation technique and also, to a certain extent, on a silver catalyst method.

The oxidation technique employs an oxide catalyst for a direct oxidation route to formaldehyde. In this process, a mixture of liquid methanol, air and recycled stack gases are fed into an evaporator. The gas mixture from the evaporator is then fed into a fixed bed tube reactor and charged with a molybdenum-based catalyst. The methanol content is maintained at 6-10% of volume.

When the reaction has reached about 350 °C (662°F), the gases are cooled in the evaporator, where the heat is used for methanol evaporation. The formaldehyde is then absorbed in an absorption tower by using the condensation as the absorption liquid.



### Installation

The K-Patents Process Refractometer PR-23 is mounted after the formaldehyde pump. With the K-Patents refractometer the formaldehyde concentration can be measured and maintained within the specified limits. Typical product concentrations vary between 37% and 45%.

K-Patents recommends a product velocity of at least 1.5m/s (5 ft/s).

Substantial savings can be achieved due to consistent product quality. Precise product concentrations will also minimize the need for further product treatment.

<b>CHEMICALS AND ALLIED</b>	
<b>APPLICATION NOTE</b>	<b>4.01.01</b>
<b>CATALYTIC OXIDATION PROCESS: FORMALDEHYDE</b>	

<b>Instrumentation</b>	<b>Description</b>
	<p>K-Patents Sanitary Compact Refractometer PR-23-AC for small pipe line sizes of 2.5 inch and smaller.</p> <p>The PR-23-AC sensor is installed in the pipe bend. It is angle mounted on the outer corner of the pipe bend directly, or by a flow cell using a 3A Sanitary clamp or Varivent® connection.</p>
	<p>K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.</p>
<p>Measurement range:</p>	<p>Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.</p>