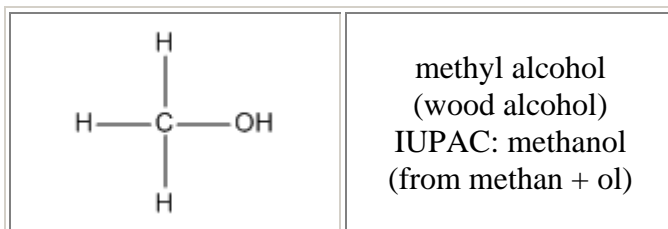


Alcohol Nomenclature

Alcohols (R-OH) are classified as primary (1°), secondary (2°), or tertiary (3°), depending on the number of organic groups bonded to the hydroxyl-bearing carbon. The placement of the hydroxyl group is prioritized in naming and also takes priority over alkenes in the structure.

Example 1

You can see it has the functional group -OH attached to one carbon atom. Its two chemical names are **methyl alcohol** and **methanol**. It also goes by the common names of wood alcohol and completely denatured alcohol.



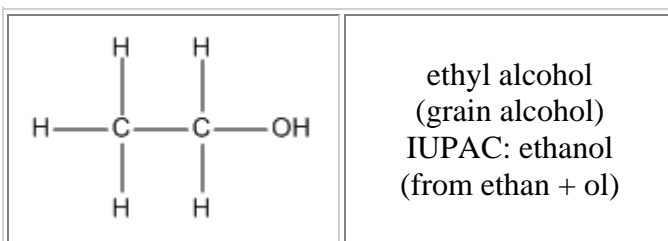
In naming this compound, you can either look at it as a methyl group attached to the -OH or you can look at it as an -OH group attached to a carbon chain consisting of one carbon atom.

You could say that it is a methyl group attached to the alcohol functional group and therefore call it methyl alcohol.

You could also look at this from the IUPAC standpoint (preferred) as a one-carbon-atom chain with an -OH attached to it and therefore start with the name for the carbon chain as methane and then drop the -e and add an -ol ending to indicate that it is an alcohol.

Example 2

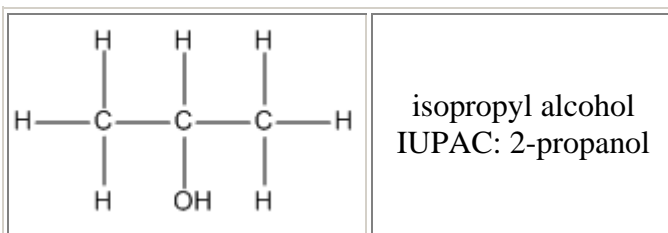
This is the structural formula for the most common of the alcohols, **ethyl alcohol** or **ethanol** (IUPAC). The other names, however, are well ingrained in use and will undoubtedly continue to be used. Grain alcohol is one such name. Also, the name "alcohol" by itself usually refers to ethanol.



In these first two examples there has been no need for the use of numbers to indicate where the -OH group is attached because there is only one place that it can be attached. In methyl alcohol there is only one carbon. In ethyl alcohol the -OH can go on either carbon but either way, that carbon will be the number one carbon, so there is no need for the number.

Example 3

However, in the structural formula shown here, this is not the case. Here it is necessary to indicate where the hydroxyl group is attached to the carbon chain. The IUPAC name for this compound is **2-propanol**.

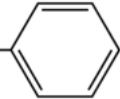


However, the designation of the hydroxyl group can also be placed within the name, making **2-propanol** the same as **propan-2-ol**.

The other approach to naming this compound is to look at it as an alkyl group attached to -OH. Since that alkyl group is an isopropyl group, this alcohol can be named **isopropyl alcohol**.

Sometimes the two methods of nomenclature get mixed together and you may hear of this compound being called isopropanol, using the **iso-** from one name and the **-ol** from the other name. Using this kind of mixed nomenclature is undesirable but at times you may hear it.

I should make one additional comment about the numbering that is used in the IUPAC method of naming alcohols--that is that the number is set up so that the **-OH** group has the lowest number possible. That is, you would **start numbering the carbon chain from the end closest to the -OH group.**

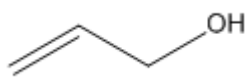
SIDE NOTE: Sometimes you will encounter a substituent called "phenyl" which is R-. When the R is a -OH, it is called 'phenol'.

Oh...one more thing...

since an alcohol is a higher priority group,

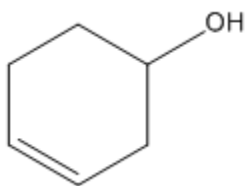
if an alcohol is present, it takes naming/numbering priority over alkenes!!!

Example 1:



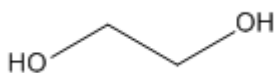
This would be named **prop-2-en-1-ol** or **2-propen-1-ol**.
The common name would be **allyl alcohol**.

Example 2:



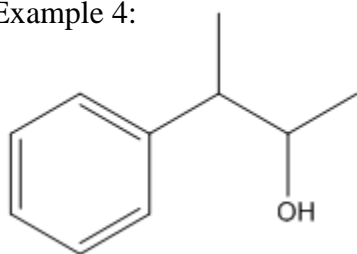
This would be named **3-cyclohexen-1-ol** or **cyclohex-3-en-1-ol**.
The numbering would prioritize the hydroxyl group

Example 3:



This would be named **ethane-1,2-diol**.

Example 4:



This would be named **3-phenylbutan-2-ol** or **3-phenyl-2-butanol**.

Practice

Go to the following web sites and try both drawing and naming. Follow the directions on the site.

1. <http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/Questions/Nomencl/alcohol1.htm>

Please try all 5.

2. <http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/Questions/MOLEDITOR/alcolnomen.htm>

Please do only 1-5 and 7. Skip 6,8,9,10.