Chemical Reactivity Worksheet

Reactivity is the tendency of substances to undergo chemical change, which can result in hazards—such as explosions or the generation of toxic gas. The Chemical Reactivity Worksheet (CRW) is a software program you can use to view the reactivity hazards of individual chemicals and to predict the hazards that could occur if chemical substances were to mix together.

Note that this reactivity functionality has also been incorporated into CAMEO Chemicals, a software tool for emergency responders and planners.

Key Program Features

- **Extensive Chemical Database:** The CRW uses a chemical database that includes reactivity information for thousands of chemicals. Find a chemical of interest by search on a name, identification number, or other search criteria.
- **Chemical-Specific Reactivity Information:** Chemical datasheets list the intrinsic hazards (such as flammable, explosive, or polymerizable) of each chemical and describe whether a chemical reacts vigorously with air, water, or other materials. The datasheets also include case histories on specific chemical incidents.
- **Reactivity Predictions:** In addition to reactivity information on the datasheets, you can also use the CRW to predict reactivity between chemicals. By adding substances from the database to the worksheet, the CRW allows you to virtually "mix" chemicals—like the chemicals in the derailed tank cars at right—to find out what dangers could arise from accidental mixing.
- **Custom Chemical Component:** This tool allows you to expand the database to include new chemicals—including your own proprietary chemicals.

The CRW is developed by the National Oceanic and Atmospheric Administration in collaboration with the U.S. Environmental Protection Agency and the Center for Chemical Process Safety.

How the CRW Predicts Reactivity

Reactive groups are categories of chemicals (such as "acid halides" or "ketones") that react in similar ways, because they have similar chemical structures. To predict the potential reactivity of a mixture of chemicals, the CRW first identifies the reactive groups to which the chemicals belong, and then predicts the kind of pair-wise reactions likely to occur when members of these groups are mixed together. The reactive hazards of any two groups are expressed by a series of statements (such as "Heat generated by chemical reaction causes pressurization").

Note: The CRW only accounts for reactions between two chemicals at a time. If you have more than two chemicals on your reactivity mixture worksheet, it predicts the reactivity between all possible pairs of those chemicals. The model does not predict catalytic interactions.

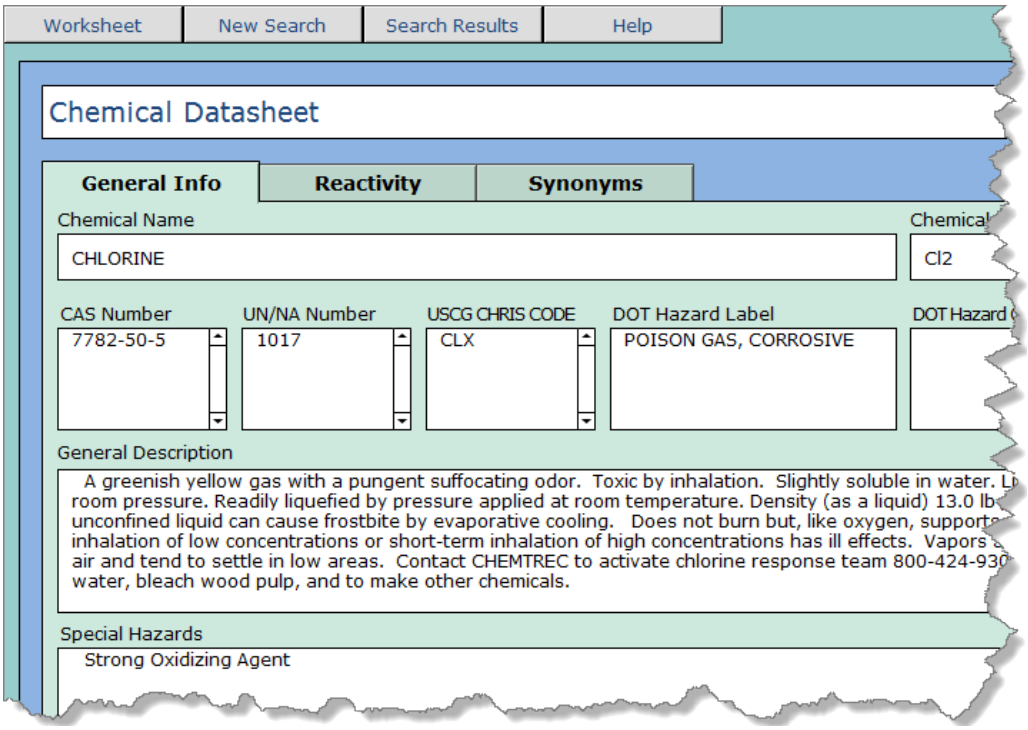
Getting the CRW

To download the CRW, go to http://response.restoration.noaa.gov/crw_download.

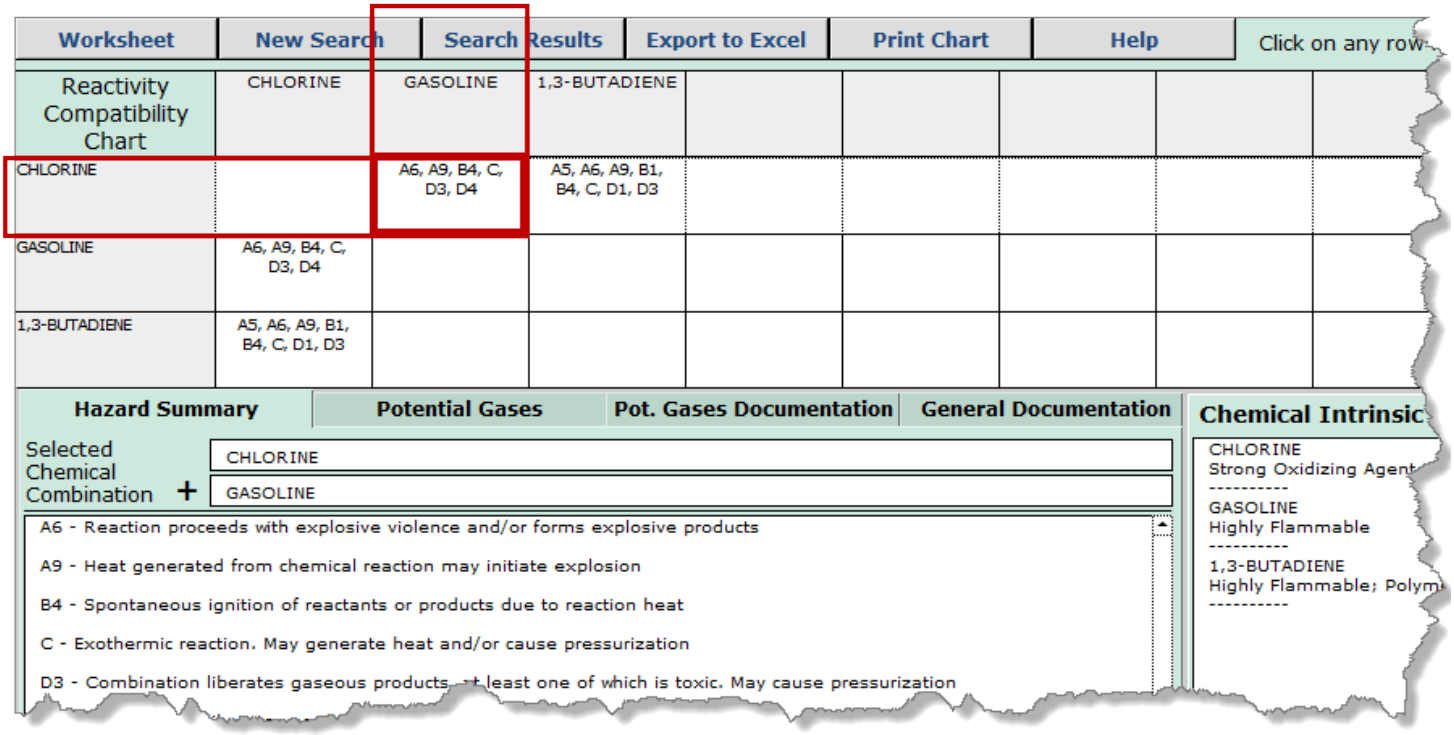
The CRW runs on Windows and Macintosh computers.

CRW Contact Information

For additional information:
http://response.restoration.noaa.gov/crw
orr.reactivity@noaa.gov
(206) 526-6322



Above, part of the chemical datasheet for chlorine is shown. Below, the reactivity hazards for a mixture of chlorine, gasoline, and 1,3-butadiene are shown. Note that the chart uses codes for the hazards, but you can get detailed information below the chart for each pair of chemicals by clicking on their intersecting cell in the chart.



For further information about NOAA's Office of Response and Restoration, please call (301) 713-2989 or visit our Web site at response.restoration.noaa.gov

U.S. Department of Commerce • National Oceanic and Atmospheric Administration May 2012