

A NEW SERVICE LIFE INDICATOR FOR ORGANIC VAPOUR CARTRIDGES

Jaime Lara¹, Daniel Cossement², François Lemay¹, Daniel Drolet¹ and Emmanuelle St-Pierre¹

¹) IRSST 505 West De Maisonneuve Blvd. Montreal Quebec Canada

²) Institut de recherches sur l'hydrogène Université du Québec à Trois Rivières Quebec Canada

Organic vapour cartridges are commonly used when the concentration of these vapours could be harmful for the workers. The cartridge service life is limited and is a function of the vapour concentration and characteristics (such as volatility and polarity) and environmental conditions (such as air humidity, temperature and flow). To determine the cartridge service life a laboratory test or the use end-of-service-life-indicators (ESLI) are recommended. The laboratory tests are time-consuming, complex and costly but only a limited number of ESLI for specific contaminants exist. Alternatively, mathematical models to estimate the service life of cartridges can be used. This study describes the development of an enhanced version of the approach used by G. Wood based on an accurate characterization of the activated carbon parameters that are included in the mathematical model. These parameters were obtained using measured adsorption capacity values with hydrophobic and hydrophilic organic solvents having a broad range of vapour pressures. Software was developed and made available to respiratory cartridges users for single and multiple contaminant organic vapours. The user should provide information about cartridge model type of contaminant(s), concentration(s), temperature and humidity. The software will give an answer in terms of service life expectation and restrictions when applicable. The particular benefit of this software, other than modified Wood's approach, is that it contains information for different commercially available cartridges and its ease-of-use to low-skill users.