

# CASTLE CHEMICALS

## PRODUCT BIODEGRADABILITY STATEMENT

### Cleaning Chemicals and Surfactant Biodegradation.

Commercial and domestic cleaning product formulations are generally a combination of inorganic acid or alkali salts, chelating agents, organic surface active agents ('Surfactants') and rheology modifiers.

Biodegradability is a much abused concept; in general terms, only the true organic (non mineral) materials in a formulation are actually 'biodegradable', i.e. carbon based organic materials capable of being broken down in the environment by the action of microorganisms. With regard to completely mineral formulations or the inorganic components of mixtures, we can only consider their neutralisation, or removal from the aqueous environment as inactive or benign salts. The in use route for disposal of most cleaning materials should always be via sewer and hence municipal treatment regimes. These municipal treatment processes use biological breakdown for organics and other treatments / filtration for removal of inorganics from the waste water.

For organic surfactants in particular, some of the very properties that make surfactants unique in their abilities, and endow cleaning chemicals with their high performance, can also be the issues that need to be quickly minimized in the general aquatic environment. Thus biodegradability is a vital consideration when formulating our products.

In definition: Biodegradability; primary, or functional biodegradability is defined as the initial breakdown of the surfactant, which results in the loss of its surface active properties. Ultimate biodegradability or mineralisation is defined as the breakdown of the product to carbon dioxide, methane, water and mineral salts within a defined time period. The current Australian Standard AS 4351.1 - AS 4351.8 (1996) is a series of ultimate biodegradation tests that closely follow well developed ISO Standards and their corresponding OECD protocols.

At Castle Chemicals we strive to use suppliers surfactant materials and, or compile our formulations with surfactants to meet with the protocol / minimum biodegradability standards of AS 4351 and thus would be classified as ultimately, or 'readily' biodegradable. Our QA system allows for tracing of all raw materials back to their origins and thus tracking for record keeping purposes. We retain samples of all products manufactured for 3 years for this purpose also.

These are our minimum standards, but we will continue to endeavor to improve upon these requirements and, or meet / exceed any new and future legislation.



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