



# **Food Contact Rubbers 2 - Products, Migration and Regulation: Rapra Review Report 182 (Rapra Review Reports. Report 182)**

*Martin J Forrest*

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In contrast to plastics, rubbers are rarely used in the packaging of food products. Examples of where they are found include: the use of rubber seals in flip top stoppers on beer bottles, rubber seals used in some jar tops, and the seal that is present in the ends of food cans. However, in the processing of food, there are a number of situations where significant contact of the food with rubber products can occur. This is due to the fact that the unique properties of rubber lead to it being used in a wide range of products, including conveyor belting, hosing, seals, gaskets, skirting and specific products such as milk liners. It is also the case that the range of contact conditions encountered (i.e., food type, contact temperature, time and area) mean that a wide variety of rubber types are employed. The contact times with food in processing situations tend to be short and the contact areas, apart from hose and belting, are small. This is in contrast to plastics which, when used as packaging materials, often have long contact times and large surface contact areas. The inherent properties and processing requirements mean that rubber compounds are normally more complex than plastics. For example, it is common practice for a rubber formulation to contain additives such as process aids and plasticizers, antidegradants, a curative, and cure co-agents and accelerators, resulting in a list of from ten to fifteen ingredients. In order to achieve the desired final properties, it is also relatively common for the base polymers to be blended. The consequence of these considerations is that, compared to plastics, there will be a larger range of chemical species present that have the potential to migrate into food. Another very important consideration with rubbers is that chemical reactions take place during the vulcanisation process and further chemical modification of the matrix occurs due to the action of antidegradants. Both of these processes result in the generation of low molecular weight reaction products and breakdown products. The combined effect of all of these factors is to greatly complicate the process of predicting what has the potential to migrate from a rubber product into food. It is the need for knowledge in this area that has led the UK's Food Standards Agency (FSA) to fund a number of research projects at independent research organisations such as Rapra to look into the use of rubber as a food contact material. The objective of this Rapra Review Report is to provide a comprehensive overview of the use of rubber as a food contact material, from an initial description of the types of rubber which are used in the industry, through the formulation of products, and the contact regulations and migration testing regimes, to the research that is on-going to improve its safety and the trends for the future. This report is a completely revised and updated version of Rapra Review Report 119 published in 2000. Since that time a number of important developments have taken place, notably the beginning of the harmonisation of the legislation within Europe with the issuing of the Council of Europe (CoE) Resolution on rubber in 2004, and the FSA has commissioned a number of fundamental studies at Rapra into the potential migrants that are present in rubber products (FSA contracts FS2248, A03038 and A03046). This Rapra Review Report comprises a concise, expert review, supported by an extensive bibliography compiled from the Polymer Library on the topic of rubbers in contact with food. This bibliography provides useful additional information on this topical field.

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