



INVENTORY MULTI-TIERED ASSESSMENT AND PRIORITISATION FRAMEWORK

Identification of Polymers of Low Concern to Human Health

Introduction

This paper outlines the approaches and the sources used to identify the polymers of low concern to human health.

Background

To increase efficiency, the stakeholder advisory groups assisting the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) with the development of the Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework agreed that certain chemicals of inherently low concern to human health should be identified as a first step in the framework. This included the identification of polymers of low concern.

During a pilot evaluation of the IMAP Framework, an approach was developed for identifying polymers with reactive functional groups consistent with polymers of low concern (PLCs). This approach was included into the IMAP Framework Tier I exclusion filters which identify chemicals that are not expected to pose a concern to human health as a first step prior to applying further risk characterisation tools at Tier I. Polymers identified by this approach are automatically determined as not expected to pose a concern to human health at Tier I regardless of exposure and do not proceed to Tier II assessment.

The approach developed has been independently validated by Australian scientific experts.

Approach

For the assessment of polymers under the IMAP Framework, NICNAS only has access to the chemical name listed on the Australian Inventory of Chemical Substances (AICS), and so cannot undertake assessment against the Polymer of Low Concern (PLC) criteria used in the NICNAS New Chemicals Program for certain characteristics – Number Average Molecular Weight (NAMW) and low molecular weight species; and Functional Group Equivalent Weight (FGEW) for reactive functional groups.

The degradability criterion within the PLC criteria, which mostly applies to biologically derived polymers, is not considered relevant for human health considerations as it relates primarily to environmental considerations, which are being assessed separately.

For the majority of polymers on AICS, the NAMW and low molecular weight species criteria are considered to be met. The exception to this is for alcohol ethoxylates and propoxylates (AEs), for which there is widespread use of lower molecular weight forms of these polymers as surfactants. On this basis AEs were not considered to be of low concern to human health for the purpose of the Tier I exclusion filter.

For all other polymers, NICNAS evaluated each polymer in order to identify the presence of potential reactive functional groups (RFGs). These RFGs were then screened against RFGs considered low concern as described in the PLC criteria in the NICNAS Handbook for Notifiers available on the NICNAS website (www.nicnas.gov.au). Polymers with RFGs other than those considered low concern in the PLC criteria were not considered to be of low concern to human health for the purpose of the Tier I exclusion filter.

Application of the validated approaches to identify polymers of low concern to human health in the Stage One chemicals

The above lists and rules were applied to the Stage One list of 3,000 chemicals.

Forty-three (43) polymers of low concern to human health in the Stage One list were identified (Table 1).

Table 1: Stage One Chemicals identified as low concern to human health

CAS Registry Number	AICS Chemical Name
9002-86-2	Ethene, chloro-, homopolymer
9002-89-5	Ethenol, homopolymer
9003-04-7	2-Propenoic acid, homopolymer, sodium salt
9003-18-3	2-Propenenitrile, polymer with 1,3-butadiene
9003-20-7	Acetic acid, ethenyl ester, homopolymer
9003-22-9	Acetic acid, ethenyl ester, copolymer with chloroethene
9003-27-4	1-Propene, 2-methyl-, homopolymer
9003-28-5	1-Butene, homopolymer
9003-29-6	Butene, homopolymer
9003-53-6	Benzene, ethenyl-, homopolymer
9004-36-8	Cellulose, acetate butanoate
9004-70-0	Cellulose, nitrate
9005-84-9	Amylodextrin
9010-77-9	2-Propenoic acid, polymer with ethene
9016-00-6	Poly[oxy(dimethylsilylene)]

Table 1: Stage One Chemicals identified as low concern to human health (continued)

CAS Registry Number	AICS Chemical Name
9032-42-2	Cellulose, 2-hydroxyethyl methyl ether
24937-78-8	Acetic acid, ethenyl ester, copolymer with ethene
25085-02-3	2-Propenoic acid, sodium salt, polymer with 2-propenamide
25101-28-4	2-Propenoic acid, 2-methyl-, methyl ester, polymer with 1,3-butadiene, butyl 2-propenoate and ethenylbenzene
25213-24-5	Acetic acid, ethenyl ester, polymer with ethenol
25322-99-0	2-Propenoic acid, 2-methyl-, butyl ester, polymer with butyl 2-propenoate and methyl 2-methyl-2-propenoate
25852-37-3	2-Propenoic acid, 2-methyl-, methyl ester, polymer with butyl 2-propenoate
26813-14-9	1,3-Pentadiene, polymer with 2-methyl-2-butene
27136-15-8	2-Propenoic acid, 2-methyl-, methyl ester, polymer with butyl 2-propenoate and ethenylbenzene
27965-85-1	2-Propenoic acid, 2-methyl-, methyl ester, polymer with 1,3-butadiene, ethenylbenzene and ethyl 2-propenoate
29497-08-3	2-Propenoic acid, butyl ester, polymer with 1,1-dimethylethyl 2-propenoate and ethenylbenzene
52624-57-4	Oxirane, methyl-, polymer with oxirane, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1)
58205-99-5	Oxirane, methyl-, polymer with oxirane, ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (4:1)
64754-90-1	Ethene, homopolymer, chlorinated
66071-86-1	Soybean oil, polymer with isophthalic acid and pentaerythritol
67762-94-1	Siloxanes and silicones, dimethyl, methyl vinyl
68002-19-7	Urea, polymer with formaldehyde, butylated
68037-01-4	1-Decene, homopolymer, hydrogenated
68441-17-8	Ethene, homopolymer, oxidized
68442-33-1	1-Propene, homopolymer, chlorinated
68648-89-5	Benzene, ethenyl-, polymer with 2-methyl-1,3-butadiene, hydrogenated
68957-96-0	Cellulose, 2-hydroxyethyl ether, polymer with ethanedial
69430-47-3	Siloxanes and silicones, dimethyl, reaction products with methyl hydrogen siloxanes and 1,1,3,3-tetramethyldisiloxane
70131-67-8	Siloxanes and silicones, dimethyl, hydroxy terminated
70879-60-6	2-Propenoic acid, 2-methyl-, polymers with ethyl acrylate and polyethylene glycol monomethacrylate C16-18-alkyl ethers
70900-21-9	Siloxanes and silicones, dimethyl hydrogen terminated
103651-02-1	2-Propenoic acid, 2-methyl-, butyl ester, polymers with acrylonitrile, (butylated formaldehyde, melamine polymer), 2-hydroxypropyl methacrylate, methyl methacrylate and styrene
118539-59-6	9-Octadecenoic acid, 12-hydroxy-, [R-(Z)]-, homopolymer, ester with .alpha.-2-naphthalenyl-.omega.-hydroxypoly(oxy-1,2-ethanediyl)