

 ASSOCIATION POUR L'ASSURANCE QUALITÉ DES FABRICANTS DE BRACELETS CUIR	DOC nb	LIS005_05
	Replace	LIS005_04
AQC Restricted Substances List for Insides (Plastic & Rubber)		
Application date: 16Apr21		Page 1/9
Written by	Quality review (signature/date)	Process owner (signature/date)
	 12Apr21	 12Apr21
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Change log:

Version	Date	Modification
03	18Feb19	<ul style="list-style-type: none"> ✓ Complete review of document and limits ✓ Creation of 2 testing priorities ✓ Phthalates: addition of DHCP and new REACH Annexe XVII limit for the 4 most regulated (sum < 1000 mg/kg) ✓ Metals: Lead limit (500 -> 90 mg/kg), Mercury limit (10 -> 1 mg/kg) ✓ Aromatic amines: addition of p-phenylenediamine and aniline ✓ Bisphenol A limit (1000 mg/kg -> 1 mg/kg) ✓ Vulcanization agents: addition of MBTS (AQC requirement) ✓ Addition of non-brominated flame retardants ✓ Review of the list of brominated flame retardants
04	12Feb21	<ul style="list-style-type: none"> ✓ Complete review of the document taking into account the AQC strategy for generation of proofs of compliance ✓ Addition of an introduction for inside materials classification and AQC regulatory consideration ✓ Change of limit for BPA (Bisphenol A) : from 1 mg/kg to 200 mg/kg (extension of entry 66 from REACH Annex XVI to plastic/rubber parts of bracelets) and precision of analytical method (THF extraction) required by AQC – Decision TWG 10Jul19
05	16Apr21	<ul style="list-style-type: none"> ✓ Precision about internally produced bonded leather

Associated document (level 1):

Document	Title
MAQ016	CHEMICAL COMPLIANCE PROCESS - PROCESSUS CONFORMITE CHIMIQUE

Associated document (level 2):

Document	Title
PRO007	AQC Control Scheme for insides - Plan contrôle AQC intérieurs

Associated document (level 3):

Document	Title
LIS001	AQC Restricted Substances List (RSL) for Leather
LIS008	AQC Restricted Substances List (RSL) for Textiles and Threads

Scope of the document

This document defines the list of restricted dangerous chemical substances and testing requirements for materials used for the inside layers of leather bracelet as specified by AQC. Multiple materials could be used within the inside layer of a bracelet:

- Split leather or Synderme
- Textiles (like tearproof materials, non-woven materials for padding)
- Cork
- Plastic inserts
- Rubber inlays

The present RSL deals only with the chemical requirements for plastic inserts and rubber inlays.

In the specific case of bi-components leather bracelet (bracelet made of rubber with a leather top), the rubber material of the bracelet is in direct and permanent contact with skin. For this reason, a specific option "Rubber in contact with skin" is specifically applied to those particular rubber parts.

For other insides materials, the following AQC requirements are applied:

- Split leather, Synderme and internally produced bonded leather

Split leather is the bottom layer of leather after splitting.

Synderme is a material made of leather particles bonded with a resin (also call latex even if not from natural source). Per ISO 15115 *Leather – Vocabulary*, this material could not be designated as leather.

Internally produced bonded leather (e.g. LIM) is a material made of leather particles from traceable sources bonded with a synthetic bonding agent. Per ISO 15115 *Leather - Vocabulary*, this material cannot be designated as leather.

Taking into consideration that split is leather and Synderme/internally produced bonded leather are mainly composed of leather particles, AQC requirements for those materials are AQC RSL for leather (LIS001).

- Textiles (tearproof materials, non-woven materials)

AQC requirements for tearproof materials and padding materials made of non-woven synthetic fibers are the ones of AQC RSL for Textiles and Threads option "INSIDE" (LIS008)

- Cork

Cork is a material made of particles from outer layer of the bark from a cork oak linked with a polymer (like NBR for instance). This material could be classified as a non-woven textile.

When used in the inside layer of a watch bracelet, AQC requirements for this material are the ones of AQC RSL for Textiles and Threads option "INSIDE" (LIS008).

For the definition of the limit present in this Restricted Substances list (RSL), AQC takes into consideration all the current international regulations for dangerous substances available and select the strictest limit. The list of chemicals present in this document has been selected on the basis of a risk-based approach completed by AQC experience and knowledge.

International regulations mentioned in this document are:

Abbreviation	Regulation	Country	Comment
EU POP annex A	Regulation (EU) 2019/1021 of the European Parliament and of the Council on persistent organic pollutants	European Union	Annex A : Elimination
GB 20400-2006	Leather and fur—Limit of harmful matter	China	-
GB 25038	Rubber shoes – Health and safety specifications	China	-
GB 28480	Adornment -- Provision for limit of baneful elements	China	-
JP 112	Law on Control of Household Products Containing Harmful Substances	Japan	-
OChim	Ordinance on Protection against Dangerous Substances and Preparations	Switzerland	-
ORRChim	Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles	Switzerland	-
Proposition 65	Safe Drinking Water and Toxic Enforcement Act	USA (California)	-
REACH XIV	Regulation (EC) no 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)	European Union	Annex XIV Substances subject to authorization
REACH XVII			Annex XVII Substances subject to restriction
REACH SVHC			Substances of Very High Concern
RoHS	Directive 2011/65/EU of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment	European Union	-

Specific AQC considerations

In the column for regulation, “AQC” stands for extra-regulatory limit set by AQC in a pro-active way:

- “AQC” alone is applied for substances without known regulation
For some substances, AQC performs testing without limit (for information) or with a limit concentration
- (AQC) after a regulation indicates that the scope has been enlarged to glues by AQC or that the limit applied by AQC is lower than requested by the more stringent regulation.

AQC limit for REACH SVHCs

Article 33(1) of REACH requires that a supplier of articles containing a SVHC included in the Candidate List for authorization in a concentration above 0.1% (w/w) has to provide relevant safety information to the recipients of these articles (Watch Brands). Upon request of a consumer, Watch Brands have to provide relevant safety information about the SVHC to this consumer (Article 33(2) of REACH). This requirement is also present in Swiss ordinance OChim, article 71.

There is no regulatory requirement to limit SVHC content in articles to 1'000 mg/kg. Nevertheless, AQC Bracelet manufacturers limit all SVHC listed substances to 1'000 mg/kg in leather bracelet and also in leather before manufacturing.

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AQC limit for Proposition 65

For substances listed in the Proposition 65 California, AQC limits take into account the limit in articles present in the case law of Proposition 65 and more precisely the limits indicated in the reformulation injunctions of settlements and judgements.

AQC considers in case law: leather articles and related articles to the watch bracelet but also any other articles with a related exposure scenario (skin contact).

For substances without any indication of a limit in articles, AQC performs testing of a risk-based selection of substances potentially used for leather production and keeps available for Watch Brands all the data as a support for labelling decision.

AQC limit for EU POP

AQC limits for substances listed in Annex A (elimination) of the EU POP regulation are “not detectable” otherwise some specific limits are indicated (ex: SCCP)

AQC limits for substances listed in Annex B (restriction) of the EU POP regulation are in accordance with the specific indications for leather (ex: PFOS)

General requirements for laboratory testing

- Sample picture

Picture of samples received by the laboratory have to be taken **without** plastic bag.

- Sample preparation

Sample preparation methods to apply are the ones described in normalized analytical methods.

AQC has no specific requirement for samples preparation when internal methods are applied by the laboratory.

AQC Restricted Substances List for Insides (Plastic & Rubber)

Substance family	Substance Name	Abbr.	CAS Number	AQC limit	Strictest Regulation	Test Method
Aldehyde	Formaldehyde	-	50-00-0	75 mg/kg	GB 20400-2006	ISO 17226-1 adapted
Aromatic amines	Biphenyl-4-ylamine	-	92-67-1	< 30 mg/kg each	REACH XVII (entry 43)	ISO 14362 adapted
	Benzidine	-	92-87-5			
	4-chloro-o-toluidine	-	95-69-2			
	2-naphthylamine	-	91-59-8			
	4-o-tolylazo-o-toluidine	-	97-56-3			
	5-nitro-o-toluidine	-	99-55-8			
	4-chloroaniline	-	106-47-8			
	4-methoxy-m-phenylenediamine	-	615-05-4			
	4,4'-methylenedianiline	MDA	101-77-9			
	3,3'-dichlorobenzidine	-	91-94-1			
	3,3'-dimethoxybenzidine	-	119-90-4			
	4,4'-bi-o-toluidine	-	119-93-7			
	4,4'-methylenedi-o-toluidine	-	838-88-0			
	6-methoxy-m-toluidine	-	120-71-8			
	4,4'-methylenebis[2-chloroaniline]	MOCA	101-14-4			
	4,4'-oxydianiline	-	101-80-4			
	4,4'-thiodianiline	-	139-65-1			
	o-toluidine	-	95-53-4			
	4-methyl-m-phenylenediamine	-	95-80-7			
2,4,5-trimethylaniline	-	137-17-7				
4-methyl-m-phenylenediamine	-	90-04-0				
4-aminoazobenzene	-	60-09-3				
2,6-xylidine	-	87-62-7				
2,4-xylidine	-	95-68-1				
benzotriazoles	2-benzotriazol-2-yl-4,6-di-tert-butylphenol	UV-320	3846-71-7	1000 mg/kg	REACH SVHC	Solvent extraction GC-MS detection
	2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol	UV-327	3864-99-1	1000 mg/kg		
	2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol	UV-328	25973-55-1	1000 mg/kg		
	2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol	UV-350	36437-37-3	1000 mg/kg		
Bisphenols	Bisphenol A	BPA	80-05-7	200 mg/kg	REACH XVII (entry 66) (AQC)	THF extraction GC-MS detection
	Bisphenol S	BPS	80-09-1	for information	AQC	
	Bisphenol F	BPF	620-92-8	for information		
	Bisphenol AF	BPAF	1478-61-1	for information		
Chlorine compounds	Alkanes, C10-13, chloro	SCCP	85535-84-8	1000 mg/kg	REACH SVHC ORRChim EU POP. Annex A	Solvent extraction GC-MS detection
	Alkanes, C14-17, chloro	MCCP	85535-85-9	for information	AQC	
Flame retardants	Polybromobiphenyls	PBB	59536-65-1	not detected	REACH XVII (entry 8) (AQC)	ISO 17881 adapted
	Diphenyl ether, pentabromo derivative	PentaBDE	32534-81-9	not detected	EU POP annex A	
	Diphenyl ether, octabromo derivative	OctaBDE	32536-52-0	not detected	EU POP annex A	
	Diphenyl ether, decabromo derivative	DecaBDE	1163-19-5	not detected	EU POP Annex A	
	Diphenyl ether, tetrabromo derivative	TetraBDE	40088-47-9	not detected	EU POP Annex A	
	Diphenyl ether, heptabromo derivative	HeptaBDE	68928-80-3	not detected	EU POP annex A	
	Diphenyl ether, hexabromo derivative	HexaBDE	36483-60-0	not detected	EU POP annex A	
	Diphenyl ether, nonabromo derivative	NonaBDE	63936-56-1	not detected	AQC	
	Hexabromocyclododecane and isomers	HBCDD	Several CAS	not detected	Proposition 65 (AQC)	
	Tri(aziridin-1-yl) phosphine oxide	TEPA	545-55-1	not detected	REACH XVII (entry 7) (textile bracelets)	
	Tris(2-chloroethyl) phosphate	TCEP	115-96-8	not detected	REACH XIV (AQC)	
	Tris(2,3-dibromopropyl) phosphate	TRIS	126-72-7	not detected	REACH XVII (entry 4) (textile bracelets)	

AQC Restricted Substances List for Insides (Plastic & Rubber)

Substance family	Substance Name	Abbr.	CAS Number	AQC limit	Strictest Regulation	Testing Method
Metals	Chromium	Cr	18540-29-9	1000 mg/kg	RoHS AQC limit for Cr(VI)	EPA 3050B or EN 16711-1
	Cadmium	Cd	7440-43-9	100 mg/kg	REACH XVII (entry 23)	
	Lead	Pb	7439-92-1	100 mg/kg	Prop65 (2012-00629)	
	Arsenic	As	7440-38-2	10 mg/kg	GB 28480 (AQC)	
	Mercury	Hg	7439-97-6	1 mg/kg	JP 112	
	Tin ¹	Sn	7440-31-5	1 mg/kg	REACH XVII entry 20 (AQC)	
Nitrosamines	N-nitrosodimethylamine	NDMA	62-75-9	not detected	GB 25038 (AQC)	GT/24153
	N-nitrosodiethylamine	NDEA	55-18-5			
	N-nitrosodipropylamine	NDPA	621-64-7			
	N-nitrosodibutylamine	NDBA	924-16-3			
	N-nitrosopiperidine	NPIP	100-75-4			
	N-nitrosopyrrolidine	NPYR	930-55-2			
	N-nitrosomorpholine	NMOR	59-89-2			
	N-nitroso N-methyl N-phenylamine	NMPPhA	614-00-6			
N-nitroso N-ethyl N-phenylamine	NEPhA	612-64-6				
Perfluorinated compounds	Perfluorooctane sulfonates	PFOS	1763-23-1	1000 mg/kg	ORRChim EU POP annex B	ISO 23702-1
	Perfluorooctanoic acid and its salts	PFOA	several including 335- 67-1	0.025 mg/kg	REACH XVII (Entry 62)	
	Perfluorooctanoic acid related substances	-	Several	1 mg/kg		
	Henicosafuoroundecanoic acid	PFUnA	2058-94-8	0.025 mg/kg (sum)	REACH XVII entry ongoing (AQC)	
	Heptacosafuorotetradecanoic acid	PFTDA	376-06-7			
	Pentacosafuorotridecanoic acid	PFTTrDA	72629-94-8			
	Tricosafuorododecanoic acid	PFDoDA	307-55-1			
	Perfluorononanoic acid and its sodium and ammonium salts	PFNA	375-95-1			
	Nonadecafluorodecanoic acid and its sodium and ammonium salts	PFDA	3108-42-7 3830-45-3 335-76-2			
	C9-C14 PFCA related substances	-	several	1000 mg/kg	REACH SVHC	
	Perfluorohexane-1-sulphonic acid	PFHxS	355-46-4 375-73-5 375-72-4 25628-08-4 34454-97-2			
	Perfluorobutane sulfonic acid and its salts	PFBS	375-73-5 375-72-4 25628-08-4 34454-97-2	1000 mg/kg	AQC	
Undecafluorohexanoic acid, its salts and related substances	PFHxA	several	for information			
Phenols	Octylphenols	OP	-	100 mg/kg (sum OP+OPEO)	REACH SVHC OChim Annex XIV (AQC)	Solvent extraction GC-MS detection
	- 4-(1,1,3,3-tetramethylbutyl)phenol	PTOP	140-66-9			
	Octylphenol ethoxylates	OPEO	-			
	- 4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated	-	9002-93-1 2497-59-8 2315-67-5 2315-61-9			
	Nonylphenols	NP	25154-52-3	100 mg/kg (sum NP+NPEO)	REACH SVHC Annex XIV (AQC)	
	- 4-Nonylphenol, branched and linear	4-NP	several CAS			
	Nonylphenol Ethoxylates	NPEO	-	1000 mg/kg	REACH SVHC	
	- 4-Nonylphenol, branched and linear, ethoxylated	(4-NPEO)	several CAS incl. 26027-38-3			
p-(1,1-dimethylpropyl)phenol	PTPP PTAP	80-46-6	1000 mg/kg	REACH SVHC	Solvent extraction GC-MS detection	
4-heptylphenol, branched and linear	4-HP	1987-50-4 72624-02-3				
Tris(4-nonylphenyl, branched and linear) phosphite (TNPP) with ≥ 0.1% w/w of 4- nonylphenol, branched and linear (4-NP)	TNPP	-				



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Substance family	Substance Name	Abbr.	CAS Number	AQC limit	Strictest Regulation	Testing Method
Phthalates	Diisobutyl phthalate	DIBP	84-69-5	1000 mg/kg (sum)	REACH XVII (entry 51)	ISO 14389
	Dibutyl phthalate	DBP	84-74-2			
	Benzyl butyl phthalate	BBP	85-68-7			
	Bis(2-ethylhexyl) phthalate	DEHP	117-81-7			
	Bis(2-methoxyethyl) phthalate	DMEP	117-82-8			
	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters	DHNUP (L&R)	68515-42-4	1000 mg/kg (each)	REACH SVHC	
	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich	-	71888-89-6			
	Di-isopentyl phthalate	DIPP	605-50-5			
	Di-n-pentyl phthalate	DnPP	131-18-0			
	N-pentyl-isopentylphthalate	nPIPP	776297-69-9			
	1,2-Benzenedicarboxylic acid, dipentyl ester, branched and linear	DNiPP (L&R)	84777-06-0			
	Di-n-hexyl phthalate	DnHP	84-75-3			
	1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	DIHxP (L&R)	68515-50-4			
	1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters or mixed decyl and hexyl and octyl diesters	-	68648-93-1 68515-51-5			
	Dicyclohexyl phthalate	DHCP	84-61-7			
	Diisohexyl phthalate	DIHP	71850-09-4			
	Di-n-octyl phthalate	DNOP	117-84-0			
Di-"isononyl" phthalate	DINP	28553-12-0 68515-48-0	REACH XVII (entry 52) (AQC)			
Di-"iso-decyl" phthalate	DIDP	26761-40-0 68515-49-1				
Polycyclic Aromatic Hydrocarbons (PAHs)	Benzo(a)pyrene	BaP	50-32-8	1 mg/kg	REACH XVII (entry 50) ORRChim	AfPS-GS-2014-01-PAK
	Benzo(a)anthracene	BaA	56-55-3	1 mg/kg		
	Benzo(b)fluoranthene	BbF	205-99-2	1 mg/kg		
	Benzo(e)pyrene	BeP	192-97-2	1 mg/kg		
	Benzo(j)fluoranthene	BjF	205-82-3	1 mg/kg		
	Benzo(k)fluoranthene	BkF	207-08-9	1 mg/kg		
	Chrysene	CHR	218-01-9	1 mg/kg		
	Dibenzo(a,h)anthracene	DBA	53-70-3	1 mg/kg	REACH SVHC OChim	
	Phenanthrene	PEH	85-01-8	1000 mg/kg		
	Fluoranthene	FLT	206-44-0	1000 mg/kg		
	Pyrene	PYR	129-00-0	1000 mg/kg		
	Benzo(g,h,i)perylene	BPE	191-24-2	1000 mg/kg		
	Anthracene	-	191-24-2	1000 mg/kg	Prop 65	
	Indeno(1,2,3-cd)pyrene	IPY	193-39-5	for information		
	Naphtalene	NAP	91-20-3	for information	AQC	
	Acenaphtylene	ANY	208-96-8	for information		
	Acenaphtalene	ANA	83-32-9	for information		
Fluorene	FLU	86-73-7	for information	EU POP Annex A ORRChim ORRChim (AQC) REACH SVHC Ochim REACH XVII (entry 57) (AQC) Prop 65 AQC		
Hexachlorobuta-1,3-diene	-	87-68-3	not detected			
Hexachlorobenzene	HBC	118-74-1	not detected			
1,1-dichloroethylene	-	75-35-4	1000 mg/kg			
N,N-dimethylformamide	DMFo	68-12-2	1000 mg/kg			
Formamide	-	75-12-7	1000 mg/kg			
N,N-dimethylacetamide	DMAC	127-19-5	1000 mg/kg			
2-ethoxyethanol	EGEE	110-80-5	1000 mg/kg			
Cyclohexane	-	110-82-7	for information			
Benzene	BTEX	71-43-2	for information			
Toluene		108-88-3				
Ethylbenzene		100-41-4				
Meta-Xylene		108-38-3				
Ortho-Xylene		95-47-6				

¹ In case of total Tin > 1 mg/kg, the following testing is performed

Substance family	Substance Name	Abbr.	CAS Number	AQC limit	Strictest Regulation	Testing Method
Organotins	Tributyltin and related compounds Incl. TBT metacrylate	TBT	several CAS incl. 2155-70-6	1000 mg/kg each	REACH XVII entry 20 & REACH SVHC	ISO 16179 adapted
	Triphenyltin and related compounds Incl. TPT hydroxide	TPT	several CAS incl. 76-87-9			
	All other tri-substitued tin compounds	-	Several CAS			
	Dibutyltin and related compounds	DBT	several CAS incl. 683-18-1			
	Diocetyl tin and related compounds	DOT	several CAS			
	di-μ-oxo-di-n-butylstanniohydroxyborane	DBB	75113-37-0		ORRChim REACH XVII entry 21	

OPTION FOR RUBBER IN CONTACT WITH SKIN

Substance family	Substance Name	Abbr.	CAS Number	AQC limit	Regulation	Testing Method
Metals	Chromium (VI)	Cr(VI)	18540-29-9	3 mg/kg	AQC	IEC 62321-7-2
	Nickel (release)	Ni	7440-02-0	0.88 µg/cm ² /week	REACH	EN 1811
Vulcanization agents	2-Mercaptobenzothiazole	2-MBT	149-30-4	For information	Prop65	solvent extraction GC-MS
	Di(benzothiazol-2-yl) disulphide	MBTS	120-78-5	For information	AQC	
	2-Imidazolidinethione	2-IZT	96-45-7	1000 mg/kg	REACH SVHC	

AQC ALLERGEN REDUCTION PROGRAM

Allergenic Substances (H317)	Abbreviation	CAS Number	Comment
Formaldehyde	-	50-00-0	H317 only if C > 2000 ppm
Aromatic amines: 4-o-tolyazo-o-toluidine	-	97-56-3	
Aromatic amines: 4-chloroaniline	-	106-47-8	
Aromatic amines: 4,4'-methylenediamine	MDA	101-77-9	
Aromatic amines: 3,3'-dichlorobenzidine	-	91-94-1	
Aromatic amines: 4,4'-methylenedi-o-toluidine	-	838-88-0	
Aromatic amines: 4-methyl-m-phenylenediamine	-	95-80-7	
Bisphenol A	BPA	80-05-7	
Bisphenol F	BPF	620-92-8	
Chromium (VI)	Cr(VI)	18540-29-9	No harmonized CLP – 3/4
p-(1,1-dimethylpropyl)phenol	PTPP PTAP	80-46-6	
4-heptylphenol, branched and linear	4-HP	72624-02-3	
4-tert-octylphenol	PTOP	140-66-9	
Di-n-octyl phthalate	DNOP	117-84-0	
PAHs: benzo(def)chrysene also called benzo(a)pyrene	BaP	50-32-8	
Hexachlorobuta-1,3-diene	-	87-68-3	
Di-μ-oxo-di-n-butylstanniohydroxyboran (Dibutyltin hydrogen borate)	DBB	75113-37-0	
2-Mercaptobenzothiazole	2-MBT	149-30-4	
Di(benzothiazol-2-yl) disulphide	MBTS	120-78-5	
2-Imidazolidinethione	2-IZT	96-45-7	
Nickel (release)	Ni	7440-02-0	

Limits for substances in bold type are AQC internal requirements tighter than requested by the current regulation.