

HELSE BERGEN
Haukeland universitetssjukehus



Innhold av allergener i gummiprodukter

Ola Bergendorff

YRKES OCH MILJÖDERMATOLOGI
SKÅNE UNIVERSITETSSYKEHUS
MALMÖ
SVERIGE



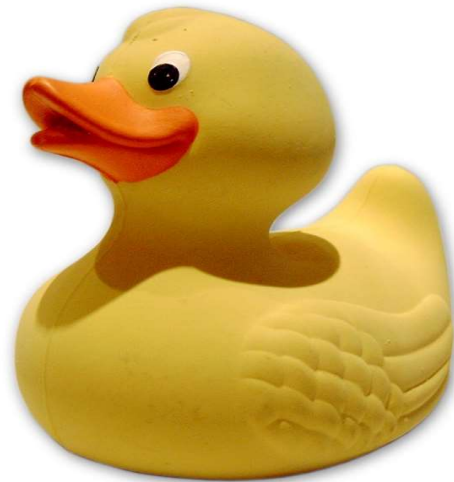
 Skåne University Hospital

2020-03-11



- Latex
- Latexallergi
- Kontaktallergi
- Acceleratorer
- Acceleratorfritt

GUMMI / PLAST



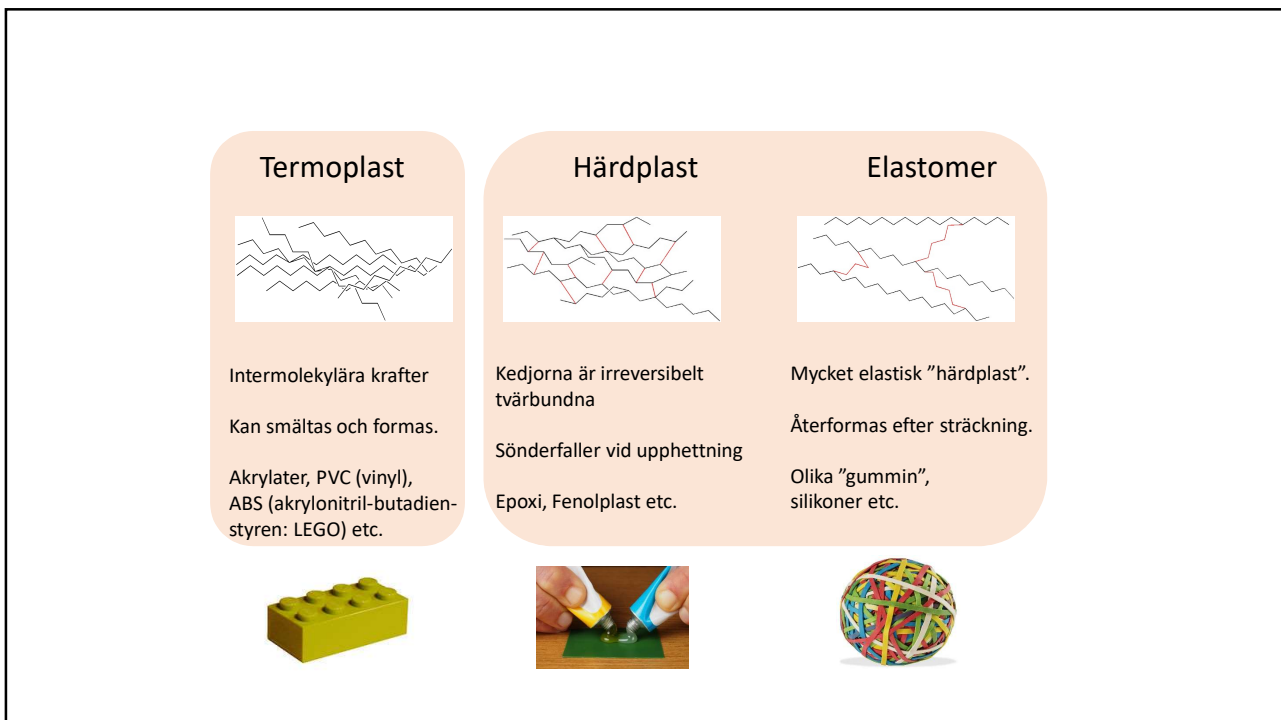
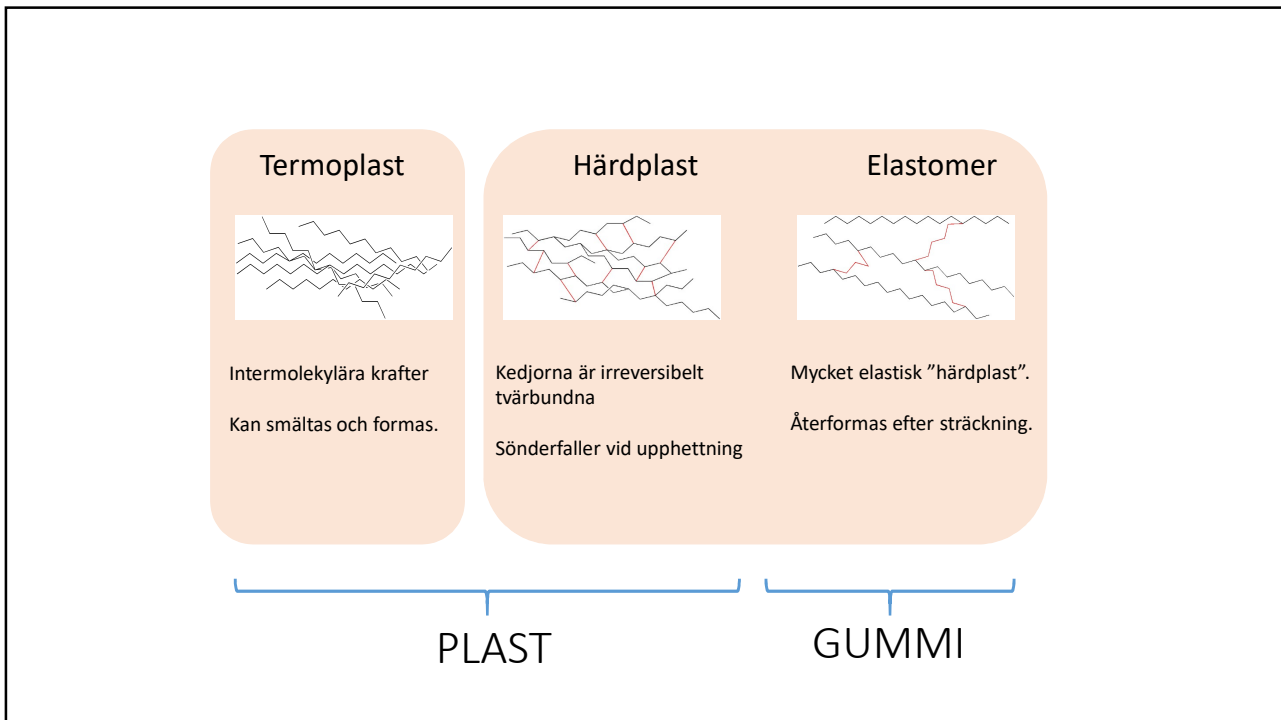
DEFINITIONER

■ } Monomerer
■ }
■ Tvärbindare

■ ■ ■ ■ ■ ■ ■ ■ Homopolymer

■ ■ ■ ■ ■ ■ ■ ■ Sampolymer

■ ■ ■ ■ ■ ■ ■ ■
■
■
■ ■ ■ ■ ■ ■ ■ ■
 Tvärbunden homopolymer

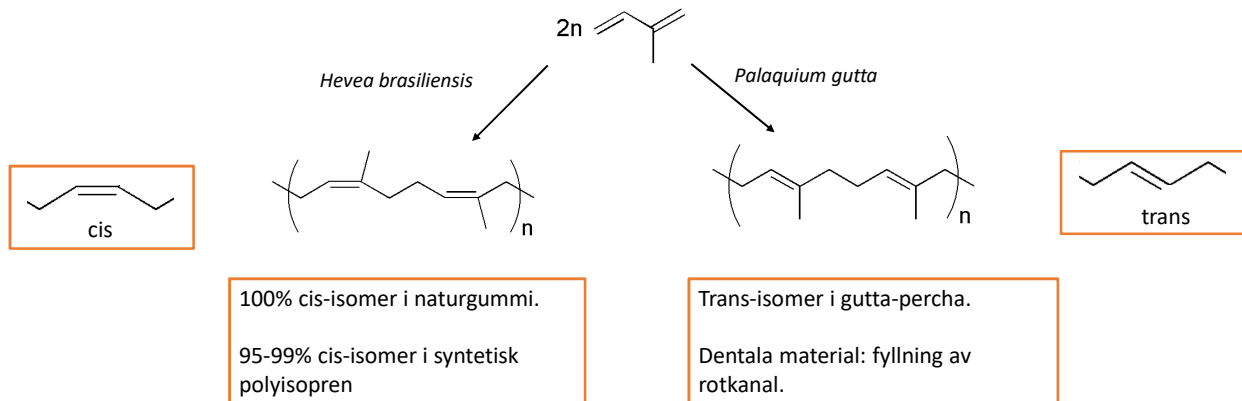


GUMMI



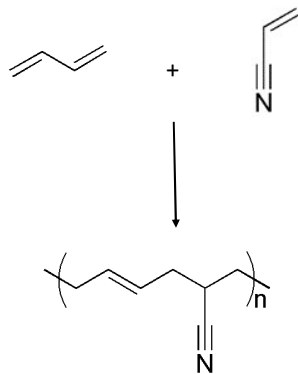
GUMMIPOLYMER

Polyisopren. Isoprenmonomerer



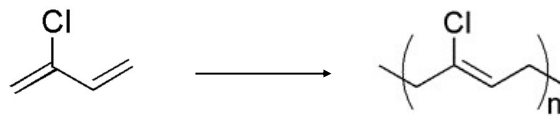
GUMMIPOLYMER

Nitrilgummi. Akrylonitril och butadien är monomerer.

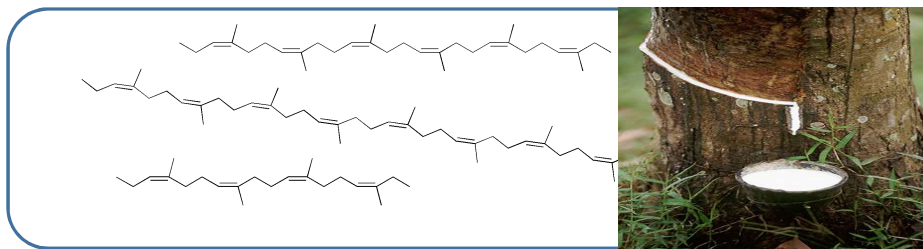


GUMMIPOLYMER

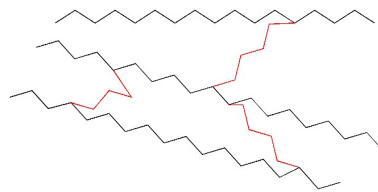
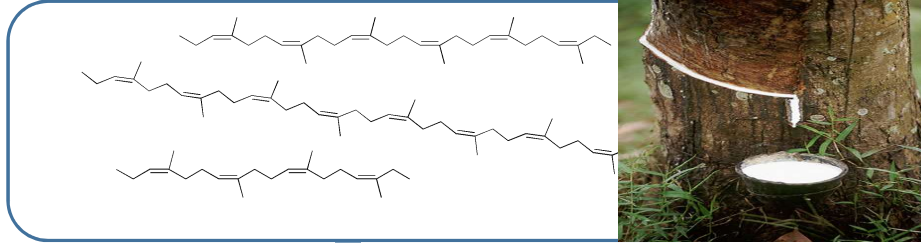
Polykloroprenogummi. Neopren.



NATURGUMMI

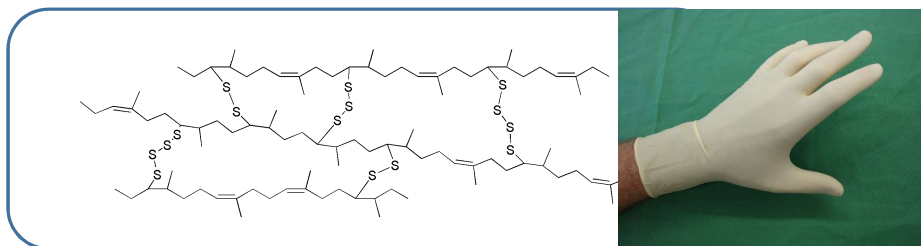
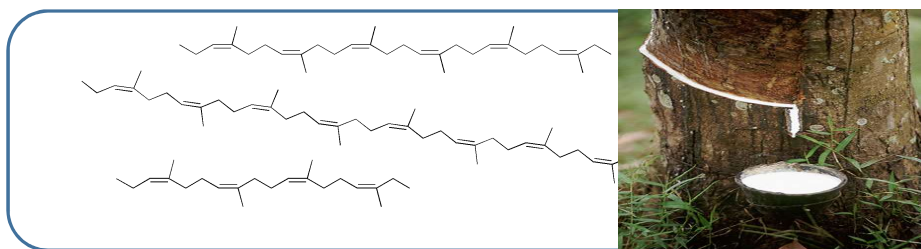


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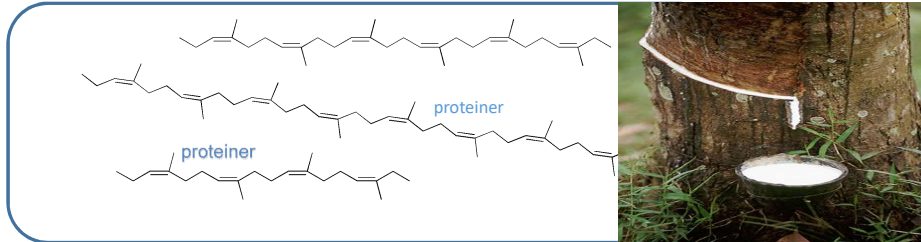


ELASTOMER

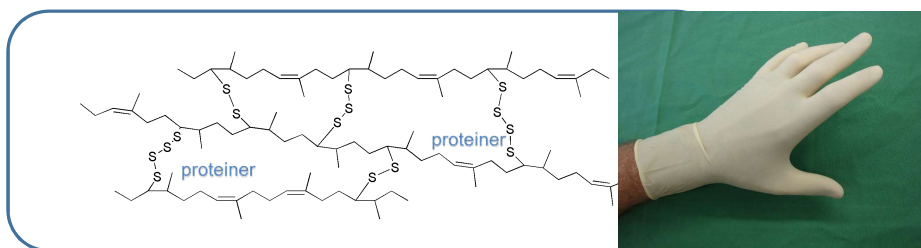
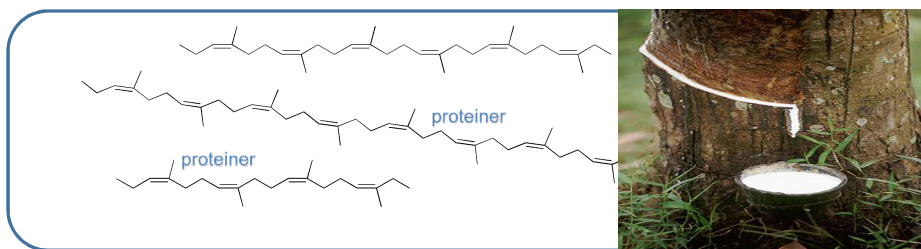
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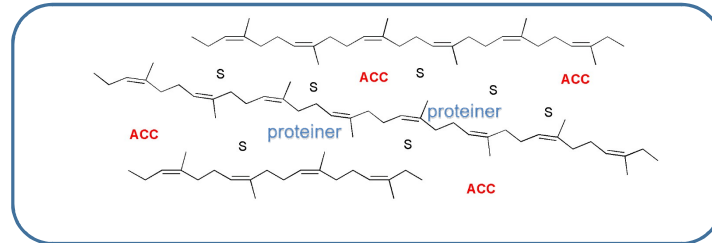
NATURGUMMI



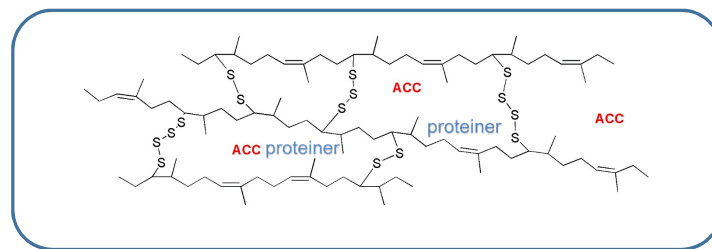
NATURGUMMI



NATURGUMMI



VULKANISERING



KONTAKTEKSEM MOT GUMMI SKA INTE FÖRVÄXLAS
MED LATEXALLERGI (TYP I-ALLERGI)



Gummiträdets mjölksaft (latex) innehåller proteiner som kan ge latexallergi.



Latexallergi fastställs genom pricktest eller blodprov där antikroppar mot latexprotein mäts upp.

Urtikaria



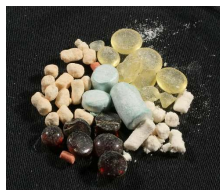
- ❑ typ I allergi - t ex astma, kontakturtikaria/nässelutslag
- ❑ allergen: proteiner i naturlatex

Eksem



- ❑ typ IV allergi - kontaktallergiskt eksem
- ❑ allergen - *tillsätts* vid tillverkning av gummi: acceleratorer, antioxidanter

Latex



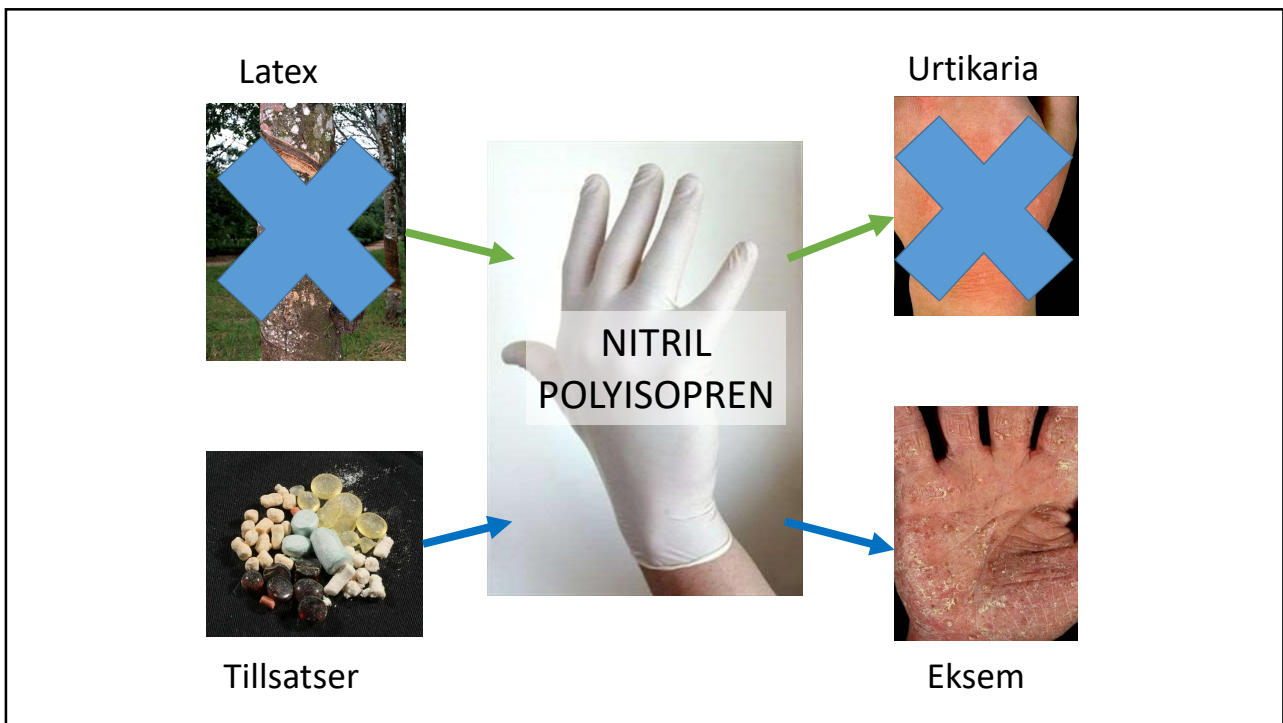
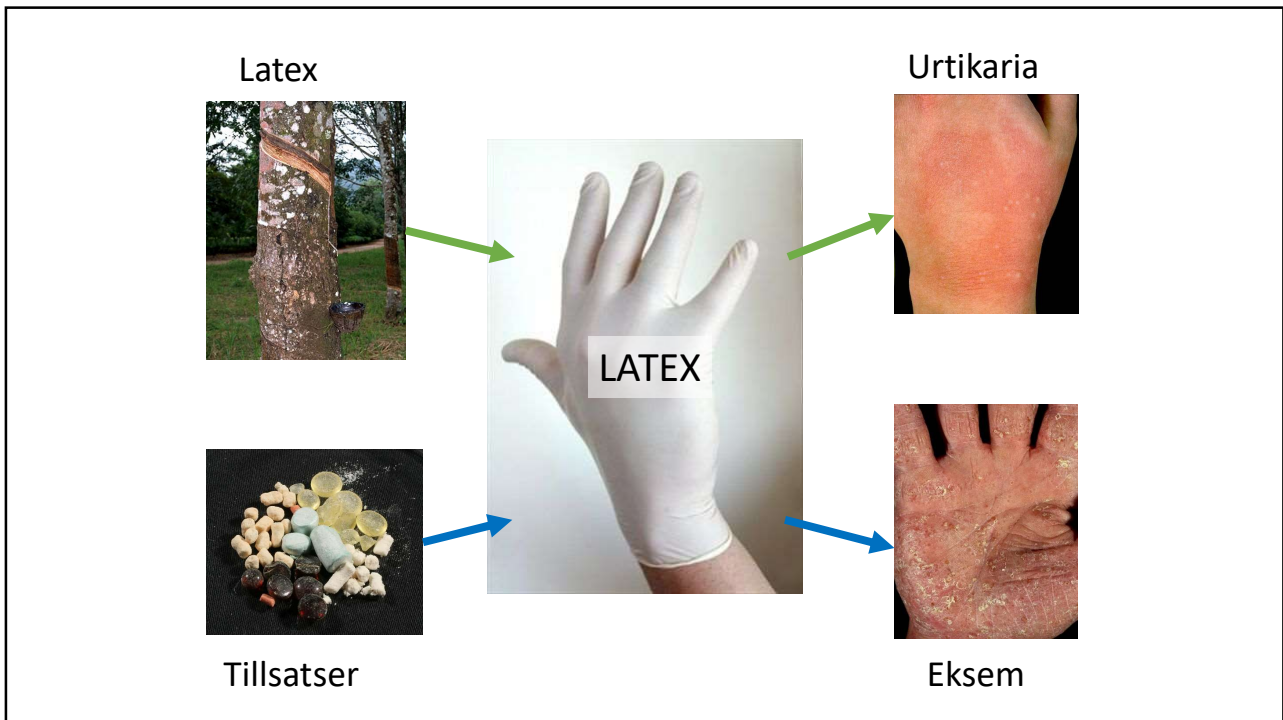
Tillsatser

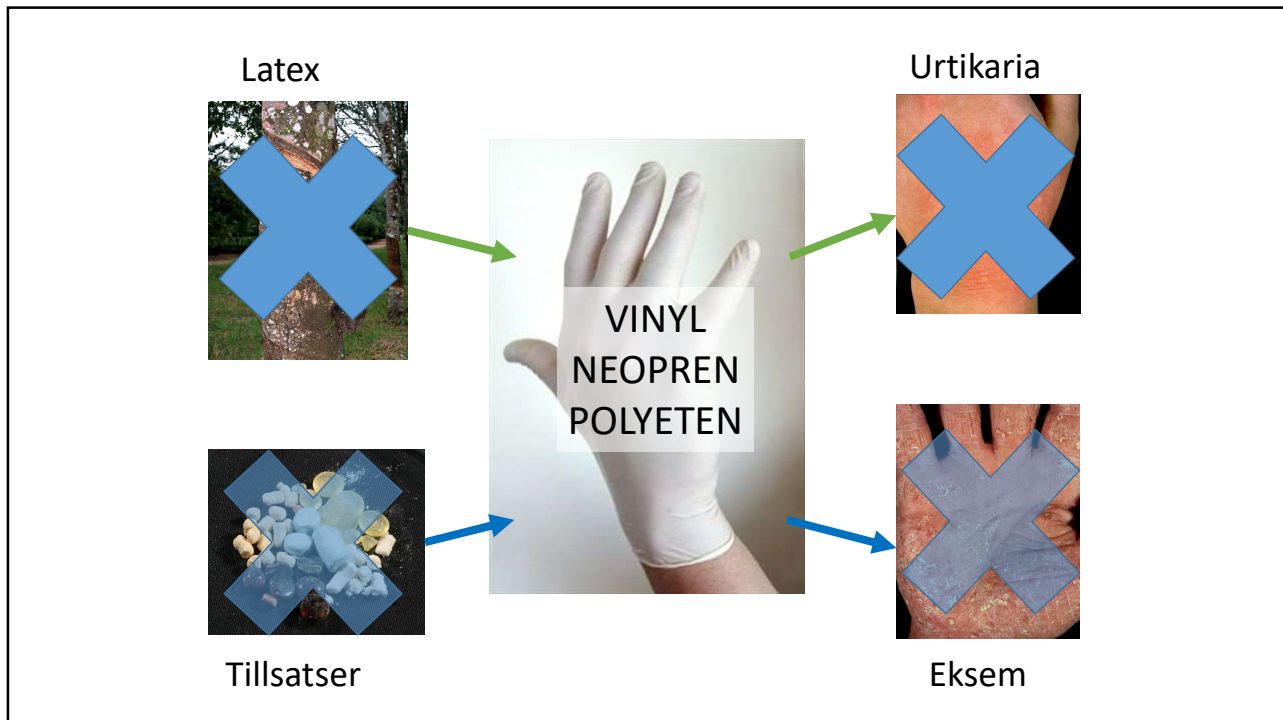


Urtikaria



Eksem





GUMMITILLSATSER

Allergena acceleratorer och antioxidanter



SVENSK BASSERIE

Nr	Testämne	Konc %
1	Kaliumbikromat	0.5
2	p-Fenylendiamin bas	1.0
3	Tiuram-mix	1.0
4	Neomycinsulfat	20.0
5	Kobolt(II)klorid hexahydrat	0.5
6	Quaternium 15	1.0
7	Nickel(II)sulfat hexahydrat	5.0
8	Kinolinmix	6.0
9	Kolofonium	20.0
10	Parabenmix	16.0
11	PPDA-mix (svartgummimix)	0.6
12	Sesquiterpenlaktonmix	0.1
13	Merkaptomix	2.0
14	Epoxiharts	1.0
15	Perubalsam (Myroxylon Pereirae)	25.0
16	p-tert-Butylfenol formaldehydharts	1.0
17	Parfymmix II	14.0
18	Formaldehyd	2.0*
19	Parfymmix I	8.0
20	Fenol-formaldehyd-harts (PFR-2)	1.0
21	Diazolidinyurea (Germall II)	2.0*
22	Cl-Me-isotiazolinon (Kathon CG)	0.02*
23	Amerchol L 101 (Lanolin)	50.0
24	Kainmix	10.0
25	Lavsyramix	0.3
26	Tixocortol pivalat	0.1
27	Textilfärgmix	6.6
28	Budesonid	0.01
29	Metyldibromoglutaronitril	0.5
30	Metylisotiazolinon	0.2*

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26	Tixocortol pivalat	0.1
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28	Budesonid	0.01
29	Metyldibromoglutaronitril	0.5
30	Metylisotiazolinon	0.2*

Gummi



SVENSK BASSERIE

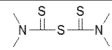
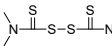
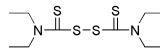
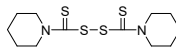
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Gummi

Plast

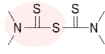
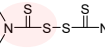
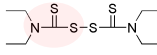
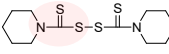
ACCELERATORER

Tiuram mix

Kemiskt namn	Förkort.	Struktur
Tetrametyltiuram monosulfid	TMTM	
Tetrametyltiuram disulfid	TMTD	
Tetraetyltiuram disulfid	TETD	
Dipentametyltiuram disulfid	DPTD	

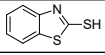
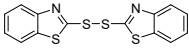
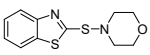
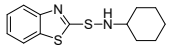
ACCELERATORER

Tiuram mix

Kemiskt namn	Förkort.	Struktur
Tetrametyltiuram monosulfid	TMTM	
Tetrametyltiuram disulfid	TMTD	
Tetraetyltiuram disulfid	TETD	
Dipentametyltiuram disulfid	DPTD	

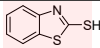
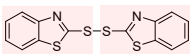
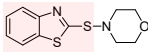
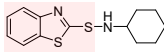
ACCELERATORER

Merkapto mix

Kemiskt namn	Förkort.	Struktur
2-Merkaptobenzotiazol	MBT	
2,2'-Dibenzotiazyl disulfid	MBTS	
2-(4-Morfolinylmerkaptobenzotiazol	MOR	
N-Cyklohexyl-2-benzotiazolsulfenamid	CBS	

ACCELERATORER

Merkapto mix

Kemiskt namn	Förkort.	Struktur
2-Merkaptobenzotiazol	MBT	
2,2'-Dibenzotiazyl disulfid	MBTS	
2-(4-Morfolinylmerkaptobenzotiazol	MOR	
N-Cyklohexyl-2-benzotiazolsulfenamid	CBS	

ANTIOXIDANT - ANTIOZONANT

Antioxidanter sätts till före vulkningen för att minska det åldrande som UV-ljus och syre orsakar

Svarta gummiprodukter

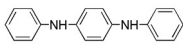
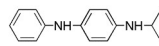
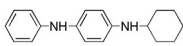
- PPD-derivat
- IPPD in Basserien
- PPDA-mix
 - IPPD
 - CPPD
 - DPPD

Ljusa gummiprodukter

- Steriskt hindrade fenoler
 - Handskar i sjukvården
 - Låg allergenitet

ANTIOXIDANT - ANTIOZONANT

PPDA-mix

Kemiskt namn	Förkort.	Struktur
N,N'-Difenyl-p-fenylendiamin	DPPD	
N-Isopropyl-N-fenyl-4-fenylendiamin	IPPD	
N-Cyclohexyl-N-fenyl-4-fenylendiamin	CPPD	

ANTIOXIDANT - ANTIOZONANT

PPDA-mix

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N,N'-Difenyl-p-fenylendiamin	DPPD	
N-Isopropyl-N-fenyl-4-fenylendiamin	IPPD	
N-Cyclohexyl-N-fenyl-4-fenylendiamin	CPPD	

EXPONERING FÖR GUMMIALLERGEN

Gummiartiklar

Skyddshandskar
Skor
Stövlar
Resår i underkläder
Verktygshandtag
Ortopediska bandage
Kondomer
Dykardräkt
Simglasögon

Andra exponeringar

Insecticider (TETD, *Tenutex*)
Disulfiram (TETD, *Antabuse*)
Fungicider (Thiram, Ziram, zineb)
Skärvätskor
Oljor
Kylvätskor
Lim



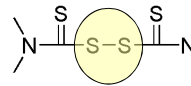
KEMISKT SLÄKTSKAP

Zinkditiokarbamat



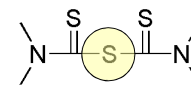
oxidation \downarrow \uparrow reduktion

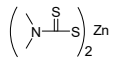
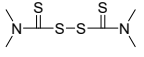
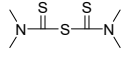
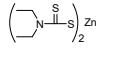
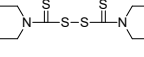
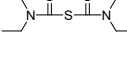
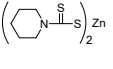
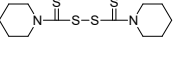
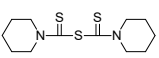
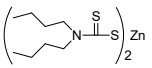
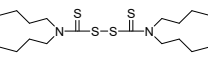
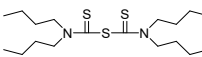
Tiuramdisulfid



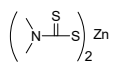
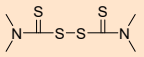
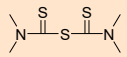
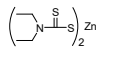
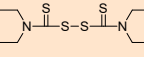
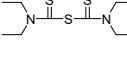
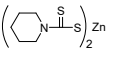
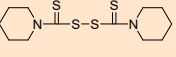
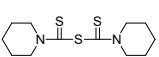
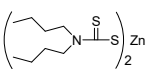
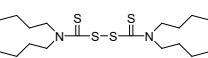
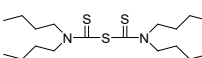
- svavel \downarrow \uparrow + svavel

Tiurammonosulfid

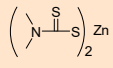
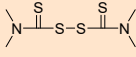
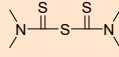
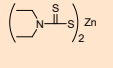
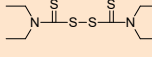
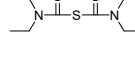
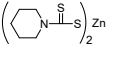
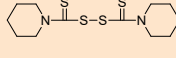
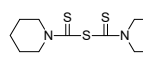
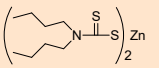
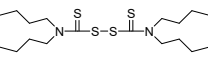
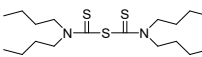


	Zinkditiokarbat	Tiuramdisulfid	Tiurammonosulfid
Metyl	 ZDMC	 TMTD	 TMTM
Etyl	 ZDEC	 TETD	 TETM
Pentamethylen	 ZPD	 DPTD	 DPTM
Butyl	 ZDBC	 DBTD	 DBTM

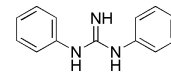
TIURAMMIX

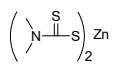
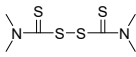
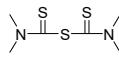
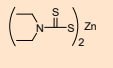
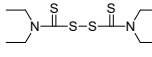
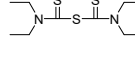
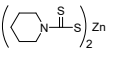
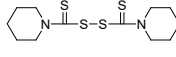
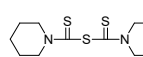
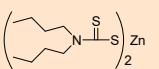
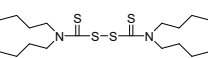
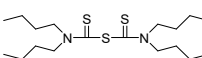
	Zinkditiokarbat	Tiuramdisulfid	Tiurammonosulfid
Metyl	 ZDMC	 TMTD	 TMTM
Etyl	 ZDEC	 TETD	 TETM
Pentamethylen	 ZPD	 DPTD	 DPTM
Butyl	 ZDBC	 DBTD	 DBTM

CHEMOTECHNIQUE GUMMIKEMIKALIESERIE


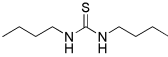
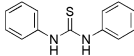
	Zinkditiokarbat	Tiuramdisulfid	Tiurammonosulfid
Metyl	 ZDMC	 TMTD	 TMTM
Etyl	 ZDEC	 TETD	 TETM
Pentamethylen	 ZPD	 DPTD	 DPTM
Butyl	 ZDBC	 DBTD	 DBTM

CARBA-MIX (EXKLUSIVE DPG)




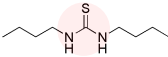
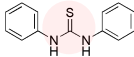
	Zinkditiokarbat	Tiuramdisulfid	Tiurammonosulfid
Metyl	 ZDMC	 TMTD	 TMTM
Etyl	 ZDEC	 TETD	 TETM
Pentamethylen	 ZPD	 DPTD	 DPTM
Butyl	 ZDBC	 DBTD	 DBTM

DIALKYLTIUREA

Kemiskt namn	Förkort.	Struktur
Dietyltiourea	DETU	
Dibutyltiourea	DBTU	
Difenyltiourea	DPTU	

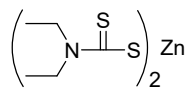
Accelerator in polykloropren/neoprengummi

DIALKYLTIUREA

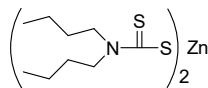
Kemiskt namn	Förkort.	Struktur
Dietyltiourea	DETU	
Dibutyltiourea	DBTU	
Difenyltiourea	DPTU	

Accelerator in polykloropren/neoprengummi

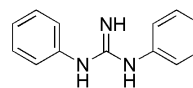
CARBA-MIX



Zinkdietyltiokarbamat



Zinkdibutyltiokarbamat

Difenylguanidin
DPG

- Ingår i TrueTest, MEKOS-test
- Kompletterar till viss del Tiuram-mix
- Innehåller difenylguanidin

KONTAKTALLERGIFREKvens VID TEST PÅ YMDA 2015

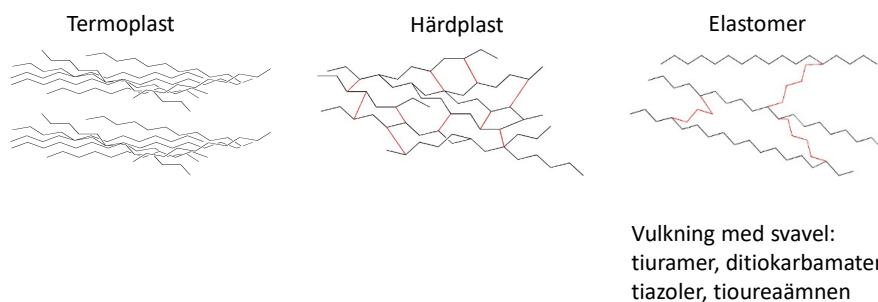
Vanligaste gummikemikalier:

- | | |
|-------------------------|-----|
| • Carbamix | 1,7 |
| • Difenylguanidin (DPG) | 1,6 |
| • Tiuram-mix | 1,0 |

KONTAKTALLERGI FÖR ÄMNEN I HANDSKAR HOS 17 AV 311 SJUKHUSANSTÄLLDA MED HANDEKSEM UNDER 2018

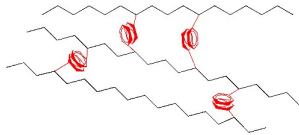
Allergen	n (%)
Difenylguanidin (DPG)	9 (2.9)
Tiuram mix	6 (1.9)
Tetraetyltiuram disulfid (TETD)	3 (1.0)
Cyclohexyl tioftalimid	3 (1.0)
Tetrametyltiuram disulfid (TMTD)	2 (0.6)
Dipentametylenetiuram disulfid	1 (0.3)
Trifenylguanidin	1 (0.3)
Zinc dimetylditiokarbamat	1 (0.3)
Dibenzotiazyl disulfid	1 (0.3)

ACCELERATORFRITT GUMMI ?

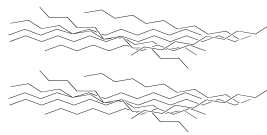


ACCELERATORFRITT GUMMI ?

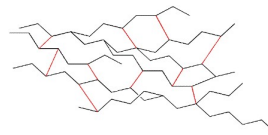
Termoplastisk elastomer



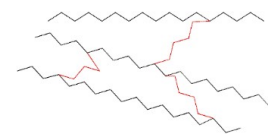
Termoplast



Hårdplast



Elastomer



Segmentpolymer, blocksampolymer.
Eng.: Block copolymer.

Styren-butadien-blocksampolymer

Tactylon, Elastyren, Flexylon

Vulkning med svavel:
tiuramer, ditiokarbamater,
tiazoler, tioureaämnen

Vulkning utan svavel:
peroxider



HUDPROBLEM ORSAKADE AV HANDSKAR

- hudirritation – ocklusionseffekt
”mekaniska” faktorer
- allergi
 - typ I allergi - t ex astma, kontakturtikaria/nässelutslag
allergen - **proteiner i naturlatex**
 - typ IV allergi - kontaktallergiskt eksem
allergen - tillsätts vid tillverkning av gummi, t ex tiuramer, ditiokarbamater, merkapto-bensotiazol

MATERIAL I ENGÅNGSHANDSKAR

MATERIAL	STERILA OPERATION	OSTERILA UNDERSÖKNING	STÄDNING/ DISKNING
LATEX - NATURGUMMI Kontaktallergi+ Allergi typ I	Vissa arbetsplatser är latexfria		
POLYISOPRENGUMMI (SYNTEISK) Kontaktallergi	Vanligt förekommande operationshandskar		
NEOPREN – POLYKLOROPREN	Dyrare. Bra alternativ för kontaktallergiker		
NITRIL Kontaktallergi		De vanligast förekommande som undersökningshandskar	Vanlig på lab – skydd mot kemikalier
VINYL (PVC)		Alternativ för gummiallergiker	
POLYETEN (PE)			

Materialet känt för att kunna ge allergisk reaktion

Allergier är ovanliga för dessa material

- Latex
- Latexallergi
- Kontaktallergi
- Acceleratorer
- Acceleratorfritt

