

## PERCHLORATE CONTAINING PRODUCTS AND MATERIALS

PRODUCTS/MATERIALS	MAX. CONC.	NOTES
Research & testing of rocket motors & ordnance	<100%	
Laboratory reagent	<70%	
Perchloric acid production	<70%	impurity or by-product, about 10,000 tons of perchloric acid and all
Perchlorate production	<100%	perchlorate, ammonium, sodium, potassium, magnesium
Solid rocket motors	<70%	most common use, rockets, space shuttle
Fireworks & pyrotechnics	<70%	
Explosives – military	<30%	detonators, flash powders, initiators, propellants
Explosives – geoseismic	<30%	blasting agents, mining, oil drilling
Flares/fusees	<15%	highway, marine and railroad uses, clandestine methamphetamine labs
Gas generators	<30%	ejection seats, aircraft oxygen, fire extinguisher cartridges
Air bag initiators for vehicles	<30%	uses sodium azide but contains magnesium perchlorate as initiator
Ordnance	<30%	
Model rocket engines	<30%	
Batteries	<5%	part of electrolyte of lithium cells (specialized), zinc & magnesium batteries
Coatings – bronze patina solution only	<5%	
Laser dye	<5%	specialized dye contains organic perchlorate compounds
Photography as flash powder	<5%	military applications, no longer used for general use
Bleaching agent to destroy dyes	<1%	impurity or by-product
Chemistry – brine separation	ppm	impurity or by-product
Chlorate manufacturing	ppm	impurity or by-product, about 800,000 tons produced in US
Chlorite manufacturing	ppm	impurity or by-product, sodium chlorite and sodium hypochlorite
Evaporite minerals	ppm	impurity or by-product, lighting may contribute
Explosives – nitrate based	ppm	impurity or by-product, when Chilean potassium nitrate is used
Fabric dye mordant	ppm	impurity or by-product, used to fix dyes to fabric
Fertilizer - Caliche deposits	<3%	impurity or by-product, sodium nitrate impurity
Herbicide (defoilants)	ppm	impurity or by-product, sodium chlorate
Laundry bleach	ppm	impurity or by-product, sodium hypochlorite
Nitrate/Nitric acid manufacturing	ppm	impurity or by-product, when Chilean potassium nitrate is used
Pharmaceutical – diagnosis	<1%	no longer used to treat hyperthyroidism
Pool shock, sanitizer	<1%	impurity or by-product, sodium hypochlorite, perchlorate detected in pools
Pulp & paper bleaching	ppm	impurity or by-product, sodium chlorate

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Safety matches	ppm	impurity or by-product, potassium chlorate
Miscellaneous industrial uses	nd*	dopant, dessicant, catalyst, acid digestion
Nuclear laboratories in actinide research	nd*	perchloric acid
Engine oil testing	nd*	perchloric acid to determine base number (BN) ASTM D2896
Leather tanning extraction of chromium	nd*	perchloric acid to digests leather samples, not detected in products
Etching brass and copper	nd*	perchloric acid
Electro-machining	nd*	sodium perchlorate solution
Electropolishing operations	nd*	perchloric acid
Colorado River	ppb	impurity or by-product
Food	ppb	lettuce, milk
Aluminum refining	?	unlikely, aluminum electro-polishing only
Animal fattening agent	?	unconfirmed, feedlot contamination
Electronic tubes	?	unlikely, electron tube with contaminant at military base
Lubricating oil additive	?	unlikely, anti-oxidants added.
Nuclear reactor	?	unlikely, used for actinide (radioactive metals) research
Synthetic rubber	?	unlikely, rubber is used as a binder in rocket motor fuel
Adhesives	?	experimental or unconfirmed, dental bonding or steel plate bonding
Analysis- Ice cream butterfat	?	
Cathodic protection systems	?	unconfirmed
Cloud seeding	?	experimental
Dielectric for transformers	?	unconfirmed

\* although the concentration of perchloric acid used is up to 70%, perchlorate is not detectable in the product