

Removers mr-Rem 700, mr-Rem 500, mr-Rem 400 and mr-Rem 660

Characteristics

mr-Rem 700, mr-Rem 500, mr-Rem 400 and **mr-Rem 660** are ready-to-use solvent based removers.

They are designed for a clean scum-free removal and lift-off of resist films from a broad range of substrate materials (e.g. silicon, SiO₂, glass, gold, silicon nitride, III/VI semiconductors, metals) used in microlithography.

mr-Rem 660 (based on N-methyl-2-pyrrolidone, NMP) is designed for effective and complete removal of conventional novolak based positive and negative resists, epoxy based resists, PMGI, PMMA, mr-PosEBR and other resists films.

In 2009 the European Union reclassified N-Methyl-2-pyrrolidone (CAS [872-50-4]) to a category 2 reprotoxin requiring R61 "May cause harm to unborn child". NMP is listed as a Substance of Very High Concern (SVHC). NMP is a constituent of the remover **mr-Rem 660**. Already in 2010 micro resist technology developed and commercialised NMP-free alternatives – **mr-Rem 400** and **mr-Rem 500** - for the removal of photoresists.

mr-Rem 400 (NMP free) is designed for effective and complete removal of conventional novolak based positive and negative resists.

mr-Rem 500 (NMP free) is designed for effective removal of strongly crosslinked negative resists, e.g. SU-8, EpoCore, EpoClad and mr-DWL, and for mr-PosEBR.

In 2013 the European Union reclassified N-Ethyl-2-pyrrolidone (NEP, CAS [2687-91-4]) to a category 2 reprotoxin requiring R61 "May cause harm to unborn child". NEP is a constituent of the removers **mr-Rem 400** and **mr-Rem 500**. In 2014 micro resist technology has therefore developed the NMP & NEP free alternative **mr-Rem 700** for the removal of photoresists.

mr-Rem 700 (NMP & NEP free) is designed for effective and complete removal of conventional novolak based positive and negative resists, PMGI, PMMA and other conventional resists films, as well as strongly crosslinked negative resists, e.g. SU-8, EpoCore, EpoClad and mr-DWL.

Physical properties of the removers

	mr-Rem 660	mr-Rem 400	mr-Rem 500	mr-Rem 700
	NMP containing	NMP free, NEP containing	NMP free, NEP containing	NMP and NEP free
Colour, appearance	Colourless-slightly yellow, clear, liquid	Colourless, clear, liquid	Colourless, clear, liquid	Colourless, clear, liquid
Density (20 °C) [g cm ³]	1.033 ± 0.002	0.988 ± 0.002	1.007 ± 0.002	1.089 ± 0.002
pH value	7	7	7	8

Processing

When used in immersion mode, a two-bath system is recommended to reduce the possibility of re-deposition of removed resist. The first bath removes the bulk of the resist and the second, fresh bath removes remaining traces of resist material.

Remover baths should be changed when the removal rate drops significantly.

After resist removal the substrates are rinsed in water, then in isopropanol (IPA), and then dried (e.g. by spin drying or nitrogen blow).

This information is based on our experience and is, to the best of our knowledge, true and accurate. It should inform you about our products and their application processes. We do not guarantee special properties of our products nor their use for specific processes.

Processing Guidelines - Removers

The resist removal is done at room temperature. To improve the performance of the removal it can also be carried out at higher temperatures (40 – 60 °C) and ultrasonic assisted.

Typical removal times range from a few seconds to minutes for conventional photoresists. For strongly crosslinked photoresists, such as SU-8, it will take some hours to max. 1 day, since it is rather a swelling and lifting of the crosslinked materials than a dissolution.

mr-Rem 700 shows the best performance concerning removal velocity and cleanness. mr-Rem 700 is alkaline (pH 8), and hence, can cause surface roughness or a slight surface attack on sensitive substrates, such as Al.

Storage

Storage at temperatures of 18 – 25 °C is recommended. Keep the bottle closed when not in use. Under these conditions a shelf life of 12 months from the date of manufacture is ensured.

Disposal

Dispose waste according to your national regulations for halogen free solvent based solutions.

Environmental and health protection

All removers contain solvents. Ensure that there is adequate ventilation while processing the removers. Avoid contact of the removers with skin and eyes and breathing solvent vapours. Wear suitable protective clothing, safety goggles and gloves.

Please, review the current product Material Safety Data Sheet before using the products.

Equipment

Removers **mr-Rem 660**, **mr-Rem 400**, **mr-Rem 500** and **mr-Rem 700** are compatible with glass, ceramic, polyethylene, high-density polyethylene, TEFLON, stainless steel, and similar materials.

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