

# Technical Annex, Chemical resistance of plastic materials

| + stands for: resistant<br>o stands for: conditionally resistant<br>- stands for: not resistant | Concentration % | at temp. +° C | Poly-amide | Poly-amide | Poly-amide | Thermo-plastic Polyurethane | Poly-propylene | Poly-ethylene | Poly-ethylene | Poly-styrene | Thermo-plastic elastomere | Nitrile butadiene-rubber |
|---|-----------------|---------------|------------|------------|------------|-----------------------------|----------------|---------------|---------------|--------------|---------------------------|--------------------------|
| Reagents  |                 |               | PA 6       | PA 66      | PA 12      | PU                          | PP             | HD-PE         | LD-PE         | PS           | TPE                       | NBR                      |
| Acetaldehyde  | 40              | 20            | o          | o          | +          |                             | +              |               |               |              |                           | 20°C o                   |
| Acetic acid   | 100             | 20            |            |            |            |                             | +              | +             | +             |              |                           | o                        |
| Acetone   | 100             | 20            | +          | +          | +          | -                           | +              | o             | o             |              |                           | -                        |
| Acrylic acid  | 100             | > 30          | -          | -          | -          |                             |                |               |               | -            |                           |                          |
| Allyl alcohol   | 96              | 20            | o          | o          | +          |                             | +              | +             | +             | 20% +        |                           |                          |
| Alum, hydrous   | dilute          | 40            |            |            |            |                             | +              | +             | +             | +            |                           | 20°C +                   |
| Aluminium chloride, hydrous   | dilute          | 40            |            |            |            |                             | +              | +             | +             | +            |                           | 20°C +                   |
| Aluminium sulphate, hydrous   | dilute          | 40            |            |            |            |                             | +              | +             | +             | +            |                           | 20°C +                   |
| Ammonia solution, hydrous   | saturated       | 20            | 20% +      | 20% +      | 20% +      |                             | +              | +             | +             | 20% +        |                           |                          |
| Ammonium chloride, hydrous  | saturated       | 60            |            |            |            | 3% o                        | +              | +             | +             |              |                           | 20% +                    |
| Ammonium nitrate, hydrous   | dilute          | 40            |            |            |            |                             | +              | +             | +             | +            |                           | 20% +                    |
| Ammonium sulphate, hydrous  | dilute          | 40            |            |            |            |                             | +              | +             | +             |              |                           | -                        |
| Aniline hydrochloride, hydrous  | saturated       | 20            |            |            |            |                             | +              | o             | o             |              |                           |                          |
| Aniline, pure   | 100             | 20            | o          | o          | o          |                             | +              | +             | +             | -            | +                         |                          |
| Benzaldehyde, hydrous   | saturated       | 20            | pure o     | pure o     | pure o     |                             | +              |               |               | -            |                           | -                        |
| Benzine   | 100             | 20            | +          | +          | +          |                             | o              | +             | o             | -            | o                         | +                        |
| Benzoic acid, hydrous   | any             | 40            | 20% o      | 20%o       |            |                             | +              | +             | +             | +            |                           | -                        |
| Benzole   | 100             | 20            | +          | +          | +          |                             | o              | o             | o             | -            |                           | -                        |
| Bleaching liquor  | 12,5 Cl         | 20            | -          | -          | o          | 3%-                         | +              | +             | +             | +            |                           | -                        |
| Borax, hydrous  | dilute          | 40            |            |            |            |                             | +              | +             | +             | +            |                           | 20% o                    |
| Boric acid, hydrous   | dilute          | 40            | o          | o          | o          | 3%o                         | +              | +             | +             |              |                           | 20% +                    |
| Bromine, liquid   | 100             | 20            | -          | -          | -          |                             | -              | -             | -             | -            | -                         | -                        |
| Butanediol, hydrous   | to 10           | 20            | pure +     | pure +     |            |                             | +              | +             | +             |              |                           |                          |
| Butanol   | to 100          | 20            |            |            |            |                             | +              | +             | +             | +            |                           | +                        |
| Butylacetate  | 100             | 20            | +          | +          | +          |                             | o              | o             | o             | -            |                           | -                        |
| Calcium chloride, hydrous   | saturated       | 40            | +          | +          | +          |                             | +              | +             | +             | +            |                           | 20% +                    |
| Carbon bisulphide   | 100             | 20            | +          | +          | +          |                             | +              | o             | o             | -            |                           | -                        |
| Carbon dioxide  | 100             | 60            | +          | +          | +          |                             |                |               |               |              |                           | 20% +                    |
| Carbon dioxide, dry   | 100             | 60            |            |            |            |                             | +              | +             | +             | 50°C +       |                           | 20% +                    |
| Carbon tetrachloride  | 100             | 20            | +          | +          | +          |                             | -              | o             | -             | -            |                           |                          |
| Caustic pot ash solution, hydrous   | 50              | 20            | +          | +          | +          |                             | +              | +             | +             | +            | 10% +                     |                          |
| Caustic soda lye, hydrous   | 10              | 20            | +          | +          | +          | 3%o                         | +              | +             | +             | +            | 50% +                     |                          |
| Chlorine  | any             | 20            | -          | -          | -          |                             | -              | -             | -             | -            | -                         | -                        |
| Chrome alum, hydrous  | dilute          | 40            |            |            |            |                             | +              | +             | +             |              |                           | 20% +                    |
| Citric Acid   | to 10           | 40            | 20% +      | 20% +      | 20% +      | 3%o                         | +              | +             | +             | +            |                           | 20% +                    |
| Cooling liquids DIN 53521   |                 | 120           | o          | o          |            |                             |                |               |               |              |                           |                          |
| Copper monochloride, hydrous  | saturated       | 20            |            |            |            |                             | +              | +             | +             |              |                           | +                        |
| Copper sulphate, hydrous  | saturated       | 60            |            |            |            |                             | +              | +             | +             |              |                           | 20% +                    |
| Cresol, hydrous   | to 90           | 20            | pure -     | pure -     |            |                             | +              | +             | o             | o            |                           | -                        |
| Cyclohexanol  | -               | 20            | +          | +          | +          |                             | +              | +             | +             | +            |                           | +                        |
| Diesel fuel   |                 | 85            | +          | +          | +          | 20% +                       | 20% +          | 20% +         | 20% +         |              |                           |                          |
| Drilling oil  |                 |               | +          | +          | +          |                             |                |               |               |              |                           |                          |
| Ethanoic acid   | 10              | 20            | o          | o          | +          | 3% o                        | +              | +             | +             | o            | +                         |                          |
| Ethyl alcohol, hydrous  | 10              | 20            | 40 Vol.%+  | 40 Vol.%+  | 40 Vol.%+  |                             | +              |               |               |              | +                         | +                        |
| Ethyl dichloride  | 100             | 20            |            |            |            |                             | o              | -             | -             |              |                           | -                        |
| Ethyl ether   | 100             | 20            |            |            |            |                             | o              |               |               |              |                           | o                        |
| Ethylene oxide, liquid  | 100             | 20            |            |            |            |                             | o              |               |               |              |                           |                          |
| Ferric cyanide, hydrous   | saturated       | 60            |            |            |            |                             | +              | +             | +             |              |                           |                          |
| Ferrous chloride, hydrous, indiff.  | 10              | 20            | +          | +          |            | +                           | +              | +             | +             |              | +                         |                          |
| Fluorine  | 50              | 40            | pure -     | pure -     | pure -     |                             | -              | -             | -             |              |                           |                          |
| Formaldehyde, hydrous   | dilute          | 40            | pure +     | pure +     | pure +     |                             | 40% +          | 40% +         | 40% +         | 30% +        |                           | 20°C o                   |
| Formic acid, hydrous  | 10              | 20            | o          | o          | +          |                             | +              | +             |               | +            |                           |                          |
| Glucose, hydrous  | any             | 50            |            |            |            |                             | +              | +             | +             |              |                           |                          |
| Hydraulic fluid, hardly inflammable   |                 | 80            | +          | +          | +          |                             |                |               |               |              |                           |                          |
| Hydraulic oil H and HL (DIN 51524)  |                 | 100           | +          | +          | +          |                             |                |               |               |              |                           |                          |

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|---|-----------------|---------------|-----------|-----------|-----------|----------------------------|---------------|--------------|--------------|-------------|--------------------------|--------------------------|
| Reagents  |                 |               | PA 6      | PA 66     | PA 12     | PU                         | PP            | HD-PE        | LD-PE        | PS          | TPE                      | NBR                      |
| Hydrobromic acid, hydrous   | to 10           | 40            | -         | -         | -         |                            | +             | +            | +            |             |                          | -                        |
| Hydrochloric acid, hydrous  | 30              | 20            | 20% -     | 20% -     | 20% -     | 3% -                       | +             | +            | +            | 15% +       | 10% +                    | o                        |
| Hydrogen  | 100             | 60            | 20°C +    | 20°C +    | 20°C +    |                            | +             | +            | +            |             |                          | 20°C +                   |
| Hydrosilicofluoric acid, hydrous  | to 30           | 20            | -         | -         |           |                            | +             | +            | +            |             |                          |                          |
| Hydroxylamine sulphate, hydrous   | to 12           | 30            |           |           |           |                            | +             |              |              |             |                          |                          |
| Kerosine  | 100             | 80            | +         | +         | +         |                            | 20°C +        | 20°C +       | 20°C o       | -           |                          |                          |
| Lactic acid, hydrous  | to 90           | 20            | 10% +     | 10% +     | 10% +     | 3% o                       | +             | +            | +            | 80% +       |                          | +                        |
| Lubricating grease, base diester oil  |                 | 110           | o         | o         |           |                            |               |              |              |             |                          |                          |
| Lubricating grease (base polyphenyle ester)   |                 | 110           | +         | +         | +         |                            |               |              |              |             |                          |                          |
| Lubricating grease, base silicone oil   |                 | 110           | +         | +         | +         |                            |               |              |              |             |                          |                          |
| Magnesium carbonate, hydrous  | saturated       | 100           |           |           |           |                            | +             |              |              | 50°C +      |                          |                          |
| Magnesium chloride, hydrous   | saturated       | 20            | 10% +     | 10% +     | 10% +     |                            | +             | +            | +            | +           |                          | +                        |
| Mercury   | pure            | 20            | +         | +         | +         |                            | +             | +            | +            | +           |                          | +                        |
| Methyl alcohol  | 100             | 20            | +         | +         | +         |                            | 40°C +        | +            | +            | +           | +                        | +                        |
| Methylene chloride  | 100             | 20            | o         | o         | o         |                            | o             | o            | -            |             |                          |                          |
| Mineral oil   |                 |               | +         | +         | +         |                            | 20°C +        | 20°C +       | 20°C +       |             |                          |                          |
| Nickel chloride, hydrous  | saturated       | 20            | 10% o     | 10% o     | 10% o     |                            | +             |              |              | +           |                          | +                        |
| Nickel sulphate, hydrous  | saturated       | 20            | 10% o     | 10% o     | 10% o     |                            | +             | +            | +            |             |                          | +                        |
| Nitric acid, hydrous  | 50              | 20            | -         | -         | -         | 3% -                       | o             | o            | o            | 30% +       |                          | -                        |
| Nitro glycerin  | dilute          | 20            |           |           |           |                            |               | -            | -            |             |                          |                          |
| Oil and grease  |                 | 20            | +         | +         | +         |                            | o             |              |              |             | o                        |                          |
| Oleic acid  | -               | 20            | +         | +         | +         |                            | +             | +            | +            | +           |                          | o                        |
| Oxalic acid   | any             | 20            | 10% o     | 10% o     | 10% o     | 3% o                       | +             | +            | +            | +           |                          | o                        |
| Ozone   | pure            |               | -         | -         | -         |                            | o             | o            | o            |             |                          |                          |
| Phosgene, gaeous  | 100             | 20            |           |           |           |                            | o             | o            | o            |             |                          |                          |
| Phoshoric acid, hydrous   | dilute          | 20            | 10% -     | 10% -     | 10% -     | 3% o                       | +             | +            | +            | 86% +       |                          | -                        |
| Phosphorus pentoxide  | 100             | 20            |           |           |           |                            | +             |              |              |             |                          |                          |
| Potassium bromide, hydrous  | any             | 20            | 10% +     | 10% +     | 10% +     |                            | +             | +            | +            | +           |                          |                          |
| Potassium chloride, hydrous   | 10              | 20            | +         | +         | +         |                            | +             | +            | +            | +           |                          | +                        |
| Potassium dichromate, hydrous   | 40              | 20            | 5% o      | 5% o      | 5% o      |                            | +             | +            | +            |             |                          | +                        |
| Potassium nitrate, hydrous  | any             | 20            | 10% +     | 10% +     | 10% +     |                            | +             | +            | +            | +           |                          | +                        |
| Potassium permanganate, hydrous   | saturated       | 20            |           |           |           |                            | +             |              |              | +           |                          |                          |
| Sea water   |                 | 40            | +         | +         | +         | 20°C +                     | +             | +            | +            | +           | +                        | 20°C +                   |
| Soap solution, hydrous  | any             | 20            | dilute +  | dilute +  | dilute +  |                            | +             | +            | +            |             |                          | +                        |
| Sodium chlorate, hydrous  | saturated       | 20            | 10% o     | 10% o     | 10% o     |                            | +             | +            | +            |             |                          |                          |
| Sodium sulphide, hydrous  | dilute          | 40            |           |           |           |                            | +             | +            | +            |             |                          |                          |
| Sulphuric acid, hydrous   | 10              | 20            | -         | -         | -         | 3% -                       | 50% +         | 50% +        | 50% +        | +           | 98% +                    | -                        |
| Tin dichloride, hydrous   | dilute          | 40            |           |           |           |                            | +             | +            | +            | -           | 10% +                    | 20°C +                   |
| Toluene   | 100             | 20            | +         | +         | +         | -                          |               | o            | o            | o           |                          | -                        |
| Trichloroethylene   | 100             | 20            | o         | o         | o         |                            | o             | o            | -            |             |                          |                          |
| Urea, hydrous   | to 10           | 40            | 20% +     | 20% +     | 20% +     |                            | +             | +            | +            | +           |                          |                          |
| Vinyl acetate   | 100             | 20            |           |           |           |                            | +             |              |              |             |                          |                          |
| Waste gas-, containing carbon dioxide   | any             | 60            |           |           |           |                            |               | +            | +            |             |                          |                          |
| Waste gas-, containing SO2  | low             | 60            |           |           |           |                            |               | +            | +            |             |                          |                          |
| Xylene  | 100             | 20            | +         | +         | +         |                            | -             | o            | o            | -           |                          | -                        |
| Zinc chloride, hydrous  | dilute          | 60            | 10% o     | 10% o     |           |                            | +             | +            | +            | 50°C +      |                          | 20°C +                   |
| Zinc sulphate, hydrous  | dilute          | 60            |           |           |           |                            | +             | +            | +            |             |                          | 20°C +                   |

Source: *Plastic Table*, B. Carlowitz, Carl Hanser Verlag, et. al.

The above mentioned data enable a preselection. However it is not the use of the data, to promise definite properties of the products or their suitability for a concrete application purpose. The data doesn't release the purchaser to control the quality conformance.