Well advised with Roth.

# Plastics – Technical data / Key to symbols

## Sterilizing plastics – Autoclaving

Recommended autoclave cycle:
20 minutes at 121 °C, 1 bar

1. Clean autoclave goods thoroughly prior to sterilizing.
2. Rinse off used detergent with distilled water.
3. Unscrew caps to enable pressure compensation.
4. Only autoclave containers with stop-cock when empty, screw off stop-cocks.

   Following plastics can be autoclaved repeatedly:
   ETFE, PFA, PTFE, FEP, E-CTFE, PMP/TPX®, PP, SI, PVDF; PES, PSU

**Note:**
Polycarbonate PC and Polysulfone PSU are also autoclavable, however this reduces the mechanical stability. This can result in material failure particularly when under high mechanical strain, e.g. during centrifuging.

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## Standard abbreviations for plastics

| DIN-Abbrev. | Description | Application temperature (°C) from | to | |
|---|---|---|---|---|
| ABS | acrylic butadiene styrene copolymer | -40 | +85 | (+100) |
| E-CTFE | ethylene chlortrifluorethylene | -70 | +150 | (+170) |
| ETFE | ethylene tetrafluor ethylene | -100 | +150 | (+180) |
| FEP | tetrafluor ethylene perfluorpropylene | -100 | +205 | |
| HDPE | polyethylene high density | -50 | +80 | (+120) |
| LDPE | polyethylene low density | -50 | +75 | (+90) |
| MF | melamine | -60 | +80 | (+120) |
| NR | natural rubber | -40 | +80 | |
| PA | polyamide (PA6) | -30 | +80 | (+140) |
| PBT | polybutylene terephthalate | -50 | +150 | |
| PC | polycarbonate | -100 | +135 | (+140) |
| PE | polyethylene (see HDPE/LDPE) | -40 | +80 | (+90) |
| PES | polyether sulfone | -100 | +150 | |
| PETG | polyethylene terephthalate | -40 | +65 | |
| PFA | perfluoralkoxy | -200 | +260 | |
| PMMA | polymethylmethacrylate | -40 | +85 | (+90) |
| PMP (TPX®) | polymethylpentene | 0 | +150 | (+180) |
| POM | polyoxymethylene | -40 | +110 | (+140) |
| PP | polypropylene | -10 | +110 | (+140) |
| PS | polystyrene | -20 | +70 | (+80) |
| PSU | polysulfone | -100 | +150 | |
| PTFE | polytetrafluor ethylene | -200 | +260 | |
| PVC | polyvinylchlorid | -20 | +80 | |
| PVDF | polyvinylidene flouride | -40 | +105 | (+150) |
| SAN | styren acrylonitrile | -20 | +85 | (+95) |
| SI | silicone rubber | -50 | +180 | (+250) |
| TPE | thermoplastic elastomer | -50 | +121 | |

Temperature in ( ) short-term

All values given in this table refer to plastic raw material and can only be regarded as guidelines. As the temperature resistance may vary with different conditions of manufacturing or chemical influences, suitability tests by the user are highly recommanded.

**No legal claims can be derived from this information; nor do we accept any liability for it.**

## Key to symbols

NEW — News and Programme extensions

**Programme extension!**

A 121 °C — All autoclavable products in our catalogue are identified by this symbol. Please also note any additional instructions when autoclaving.

**Temperature Resistance:**

❄ — Safe to freeze (approx. -10/-20 °C)

❄❄ — Suitable for low temperatures (approx. -70/-80 °C)

❄❄❄ — Suitable for liquid nitrogen (gaseous phase / -196 °C)

See catalogue text for detailed information.

ready-to-use — Ready-to-use products and reagents

S — Sterile products

❄ — All products identified as being particularly temperaturesensitive are shipped **in special ice boxes with freezer packs or in dry ice.**

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# Chemical resistance of plastics

| Chemicals at 20 °C | MF | ETFE | PA | PC | HDPE | LDPE | PMMA | POM | PP | PS | PTFE/ FEP | PVC | SAN | PMP | PVDF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | | ❍ | ❍ | – | ❍ | ❍ | – | ❍ | – | – | ● | – | – | ❍ | – |
| Acetic Acid, glacial | ❍ | ❍ | – | – | ❍ | ❍ | – | – | ❍ | | ● | | | ❍ | ❍ |
| Acetone | ● | ❍ | ● | – | ● | ❍ | – | ● | ● | – | ● | – | – | ❍ | – |
| Acetonitrile | | ● | ● | – | ● | ● | – | ❍ | – | – | ● | – | | – | ❍ |
| Acetylene (Ethine) | | ● | ● | ● | ● | ● | | ● | ● | | ● | | – | | ● |
| Aluminum Chloride, saturated | | | – | ❍ | ● | ● | ● | – | ● | | ● | ❍ | ● | | ● |
| Ammonia, pure | | ● | | – | ● | ● | ❍ | | ● | ❍ | ● | | ❍ | ❍ | – |
| Ammonium Chloride, solid | ● | | ● | ● | ● | ● | ● | ❍ | ● | | ● | | | | ● |
| Aqua Regia | – | ● | – | – | – | – | | – | – | – | ● | – | – | ❍ | – |
| Ascorbic Acid, water solution | | ● | ❍ | ❍ | ● | ● | | ❍ | ● | | ● | | | | ● |
| Benzaldehyde | | ❍ | – | – | ❍ | ❍ | – | ● | ❍ | – | ● | – | ❍ | ● | ❍ |
| Benzine | ● | ● | ● | ❍ | ❍ | – | ❍ | ● | – | – | ● | ❍ | – | ❍ | ● |
| Benzoic Acid, saturated | | ● | – | – | ● | ● | ● | ❍ | ❍ | ❍ | ● | ● | ● | ● | ● |
| Benzol | ● | ● | ❍ | – | – | – | – | ❍ | – | – | ● | – | – | ❍ | ● |
| Calcium Chloride, water solution | | ● | ● | ● | ● | ● | ● | ❍ | ● | ● | ● | ● | ● | ● | ● |
| Carbon Tetrachloride (TETRA) | ● | ● | – | – | – | – | | ❍ | – | – | ● | – | – | – | ❍ |
| Chlorine 97 % | | | – | – | – | – | ❍ | – | – | – | ● | – | – | – | ● |
| Chlorine, water solution | | ● | – | – | ❍ | – | ❍ | – | – | – | ● | ❍ | ❍ | – | ● |
| Chlorobenzene | | ● | – | – | – | – | – | ● | – | – | ● | – | – | – | ● |
| Chloroform (Trichloromethane) | ● | ❍ | – | – | – | – | – | – | – | – | ● | – | – | – | ❍ |
| Copper(II) Chloride, saturated | | | – | ● | ❍ | ● | | ❍ | ❍ | | ● | ● | | ● | ❍ |
| Cyclohexane | ● | ● | ● | ❍ | – | – | ❍ | ● | – | – | ● | ❍ | ❍ | – | ● |
| Decahydronaphtalene | | ● | ● | – | ❍ | – | – | ● | – | – | ● | ❍ | – | – | ❍ |
| Dichloromethane (Methylene Chloride) | | ❍ | – | – | – | – | | ❍ | – | – | ● | – | – | – | ❍ |
| Diethyl Ether | | ● | ● | – | – | – | – | ● | – | – | ● | – | – | – | ❍ |
| Dimethyl Formamide (DMF) | | ❍ | ● | – | ● | ❍ | | ● | ● | – | ● | – | – | ● | – |
| Dimethyl Phtalate (DMP) | | | ❍ | – | – | ❍ | | ❍ | ❍ | – | ● | – | – | | ❍ |
| Dimethylsulfoxide (DMSO) | | ● | ❍ | – | ● | ● | | ● | ● | ● | ● | – | | ● | – |
| 1,4-Dioxane | | ● | ● | – | ❍ | ❍ | – | ● | ❍ | – | ● | – | – | ❍ | – |
| Ethanol 96 % | ● | ● | ● | ❍ | ● | ● | – | ● | ● | – | ● | ❍ | ❍ | ● | ● |
| Ethyl Acetate | ● | ● | ● | – | ❍ | – | | ● | ❍ | – | ● | – | – | – | – |
| Ethylene Chloride | | ● | – | – | ❍ | ❍ | | ● | – | – | ● | – | – | – | ● |
| Ethylene Glycol | ● | ● | ❍ | ❍ | ● | ● | ❍ | ● | ● | ● | ● | ❍ | ● | ● | ● |
| Ethylenediaminetetraacetic Acid (EDTA) | | ● | ❍ | ❍ | ● | ● | | ● | ● | | ● | | | | ● |
| Fluorinated Alcanes (FKW) | | ● | ❍ | ❍ | | – | | ❍ | ❍ | – | ● | | | | – |
| Fluorine | | ❍ | – | – | – | – | | – | – | – | ❍ | ❍ | – | – | ❍ |
| Formaldehyde 40 % | | ● | ❍ | ● | ● | ❍ | ● | ● | ● | – | ● | ❍ | – | ● | ● |
| Formic Acid 98 % | ● | ● | – | – | ● | ● | – | – | ❍ | – | ● | ❍ | – | ❍ | ❍ |
| Glycerine | ● | ● | ● | ❍ | ● | ● | ● | ● | ● | ● | ● | ❍ | ● | ● | ● |
| Haloalkanes (FCKW) | | | ❍ | ❍ | | | | ● | ❍ | – | ● | | | | ❍ |
| n-Heptane | | ● | ● | ● | ❍ | – | ● | ● | ❍ | – | ● | | ● | ❍ | ● |
| n-Hexane | | ● | ● | ❍ | ❍ | – | | ● | ❍ | – | ● | | ● | – | ● |
| Hydrobromic Acid 50 % | | ● | – | – | ● | ● | | – | ● | – | ● | ❍ | | – | ❍ |
| Hydrochloric Acid, concentrated | – | ● | – | – | ● | ● | | – | ● | ❍ | ● | ❍ | ❍ | ● | ● |
| Hydrofluoric Acid, concentrated | – | | – | – | | | | – | ❍ | | ● | | | | ● |
| Hydrogen Chloride, gasious | | | – | – | ● | | | – | ● | | ● | ❍ | | | ● |
| Hydrogen Peroxide 90 % | – | ● | – | ● | ● | ● | – | – | ● | ● | ● | ❍ | | ● | – |
| Mercury | | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ❍ | ● | ● | ● |
| Methanol | | ● | ❍ | – | ● | ● | – | ● | ● | – | ● | ❍ | – | ● | ● |
| Methyl Ethyl Ketone (MEK) | | ❍ | ● | – | ❍ | – | – | ● | ❍ | – | ● | – | – | – | – |
| Methyl Methacrylate | | | ❍ | – | | | | ❍ | ❍ | – | ● | – | | – | ❍ |
| Oleum (fuming Sulfuric Acid) | | | – | – | – | – | – | – | – | – | ● | – | | – | – |
| Oxalic Acid | | ● | – | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● | ❍ |
| Oxygen | | | ❍ | ● | ❍ | ❍ | | ● | ❍ | ● | ● | ● | | | ● |
| Perchloric Acid 70 % | | ● | – | – | ❍ | – | | – | – | ❍ | ● | – | | ❍ | ❍ |
| Petroleum Ether | | | ● | – | ❍ | ❍ | | ● | ❍ | – | ● | ❍ | ❍ | ● | ❍ |
| Phenol | | ● | – | – | ❍ | ❍ | – | – | ● | – | ● | – | – | ● | ● |
| Phosphoric Acid 85 % | – | ● | – | ● | ● | ● | ❍ | – | ● | ● | ● | ● | ● | ● | ● |
| Phosphoryl Chloride | | | – | – | ❍ | ❍ | | – | ❍ | | ● | – | | | – |
| Potassium Hydroxide, concentrated | – | ● | ● | – | ● | ● | ● | ❍ | ● | ❍ | ● | ● | ❍ | ● | – |
| Potassium Permanganate | | ● | – | ● | ❍ | ● | ❍ | ● | ● | ❍ | ● | ❍ | ❍ | ● | ● |
| Pyridine | | ● | ● | – | ❍ | ❍ | | ● | ❍ | – | ● | – | – | ❍ | – |
| Salicylic Acid, saturated | | ● | ● | ● | ● | ● | | – | ● | ● | ● | ❍ | ● | ● | ● |
| Silver Nitrate, water solution | | | ● | ● | ● | | | ● | ● | | ● | | | | ● |
| Sodium Hydroxide, concentrated | – | | ❍ | – | ● | ● | ● | | ● | | ● | | | | – |
| Sodium Thiosulfate | | ● | ● | | ● | ● | | ● | ● | | ● | | ● | | ● |
| Sulfuric Acid 95 % | | ● | – | – | – | – | – | – | – | – | ● | ❍ | – | ❍ | ● |
| Tetrahydrofuran (THF) | ● | ❍ | ● | – | – | – | – | ● | – | – | ● | – | – | – | – |
| Thionyl Chloride | | ● | – | – | – | – | | ❍ | – | – | ● | – | – | – | – |
| Tincture of Iodine | | ● | – | – | ❍ | ❍ | – | ● | ● | ❍ | ● | – | ❍ | ● | ● |
| Toluene | | ● | ● | – | ❍ | ❍ | – | – | ❍ | – | ● | – | – | ❍ | ● |
| Trichloroacetic Acid (TCA) | | | – | – | ❍ | – | | – | ● | – | ● | – | | | ❍ |
| Trichloroethylene (TRI) | | ● | – | – | – | – | | – | – | – | ● | – | – | – | ● |
| Urea | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ❍ | ● | ● | ● |
| Xylene | | ● | ● | – | – | – | – | ● | – | – | ● | – | – | – | ● |

● resistent
❍ conditionally resistent
– not resistent

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