RÖCHLING

Röchling Maywo GmbH
Product Range

09/2016

Röchling
Competence in Plastics

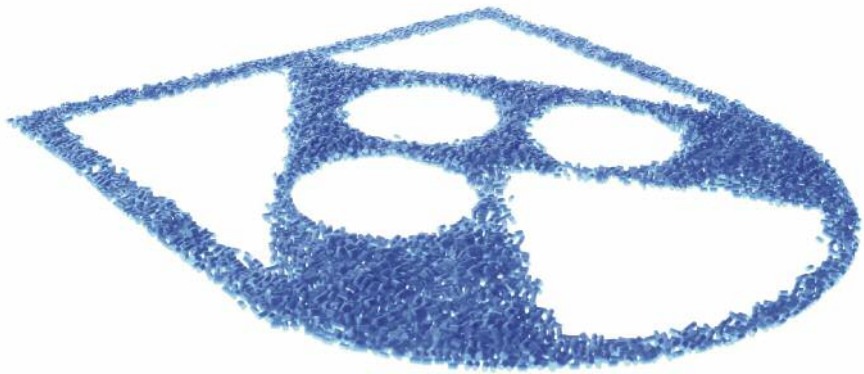
Contents

The Röchling Group is active worldwide in the field of plastics. With approximately 8,500 employees at 77 sites in 22 countries, Röchling counts among the leading international companies in the field of plastics processing today.

Comprising the three divisions of Industrial, Automotive and Medical, the Group generates annual sales of around 1.6 billion Euro in Europe, the Americas and Asia.

Röchling Industrial

The Industrial division has a broad range of products made from thermoplastic polymers, thermosetting plastics and high-performance plastics. Customers are supplied with these products in semi-finished forms, such as sheets, rods, tubes, flat bars and profiles, and finished castings right through to precision-machined parts.



Everywhere and somewhere near you

Röchling Group

Sales: EUR 1.6 billion

Employees: 8,500

Division **Industrial**

Division **Automotive**

Division **Medical**

Röchling Maywo GmbH is based in Bad Grönenbach and is one of the leading European manufacturers of monolayer and co-extruded sheets and films made of PS (polystyrene), ABS (acrylonitrile-butadiene-styrene) and their derivatives.

Maywo products are used in various sectors of industry, such as automotive, electrical, refrigerators and cooling units, as well as in advertising, (transport) packaging, interior fittings, mechanical engineering, technical housings and casings, and also in the games, sports and leisure sector.

Röchling Group
Global presence: 77 sites in 22 countries

Flame retardant plastics increase safety

MAYWOflamm®

Fire safety requirements are being placed on more and more materials in order to prevent them from catching fire, or to at least delay the spread of fire and smoke in the event of a blaze, with a view to increasing safety standards. Plastics are synthetic, organic materials which contain large proportions of carbon and hydrogen and which are therefore inherently flammable. Given the constant addition of further safety precautions, materials are required to have flame-retardant properties for many applications.

MAYWOflamm® plastics are given a flame-retardant finish in order to impede or delay the sequence of events in a combustion process and thereby to reduce thermal feedback. Several flame-retardant types of polymers and polymer blends are available for the very wide and diverse range of applications, as are various flame retardant additives.

MAYWOflamm® flame retardant plastics are mainly used in transportation systems, housing construction, the electrical sector and the building industry.

Customised to your requirements

Depending on their intended use, plastics are required to meet various standards and pass certain fire tests. It is also essential to observe the national standards, as there is no single universal testing and classification system.

We have the relevant knowledge of applications and processes to be able to find the most suitable materials for your products in any given case, solving any technical problems and taking due account of legislation and environmental aspects. Our MAYWO team will be happy to advise you.

There are various fire tests which can be carried out at Röchling Maywo or at external test laboratories depending on the specifications and field of application.

UL 94 flammability rating test

The most widely recognised standard for the definition of the flammability of plastic materials is UL 94, a standard published by the Underwriters Laboratories, an independent product safety certification organization.

This international conformity test essentially assesses the extinguishing of burning materials according to certain criteria. The plastics can be classed in various categories depending on their composition and properties and in relation to their burning rate, the time it takes to extinguish them, their resistance to drip formation during burning, and the dripping of flaming particles. every material which is tested can be categorised in several grades relating to colour and film thickness or sheet thickness. The thickness of the part must be taken into account in the material specification and must always be stated along with the UL rating. **Röchling Maywo is an accredited supplier of flame retardant plastics certified** as conforming to the **UL standard** by the **Under-writers Laboratories**.

Plastics Fabricated Parts - QMMY2

File No: E332248

Röchling Maywo is certified by the Underwriters Laboratories as a supplier of flame retardant plastics.

UL 94 evaluation categories:	
HB	Slow burning on a horizontal specimen; burning rate <76 mm/min for thickness <3 mm
V-2	Burning stops within 30 seconds on a vertical specimen; drips of flaming particles are allowed
V-1	Burning stops within 30 seconds on a vertical specimen; drips of particles are not allowed
V-0	Burning stops within 10 seconds on a vertical specimen; drips of particles are not allowed
5V	Plastics having a minimum classification of V-2 can undergo additional tests with a 500-watt flame (125 mm flame height)
5VB	Extinguishing of a vertically clamped specimen after five flame applications each lasting five seconds; no drips allowed
5VA	Additional test on a horizontally clamped plate; neither drips nor the formation of burn holes with a diameter >1 mm allowed

Flame retardant plastics help to prevent fire

MAYWOflamm®

MAYWOflamm® products can be supplied in rolls and sheets in thicknesses from 0.3 mm to 14 mm and in varying widths up to a maximum of 2500 mm. They are available with a smooth finish and with all MAYWO surface textures.

MAYWOflamm® ABS

Flame retardant Acrylonitrile-Butadiene-Styrene (ABS) conforming to UL standard

The following UL classes can be supplied as standard:
HB | V0 | 5VA | 5VB

Also available as matt flame-retardant ABS under the brand name **MAYWOflamm® M**

MAYWOflamm® PC/ABS

Flame retardant plastic blend based on Polycarbonate (PC) and Acrylonitrile-Butadiene-Styrene (ABS) for use in rail vehicles

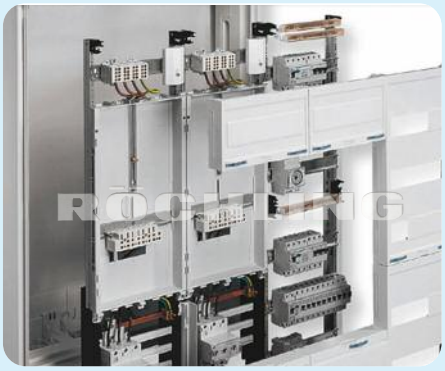
Rail vehicle flameproofing standards:
DIN 5510-2 ~ S – 4 | SR – 2 | ST – 2
NF 16 – 101/102 ~ M 1 | F 2

MAYWOflamm® plus is compliant with **EN 45545-2:2013** – requirement **R1** – hazard level **HL2**

MAYWOflamm® ECE

Flame retardant Acrylonitrile-Butadiene-Styrene (ABS) for use in vehicle construction – compliant with ECE R-118 Annex VI, VII and VIII

Motor vehicle flameproofing standards:
ECE R-118
95/28/EG | FMVSS 302 | CMVSS 302



MAYWOflamm® VDE

Flame retardant high-impact Polystyrene (HIPS)

Glow wire test in accordance with VDE 0471 / DIN EN 60695-2-10:
Glow wire test temperatures
750 °C | 850 °C | 900 °C

Electrostatic discharge (ESD) – what does this actually mean?

MAYWOtron®

Electrostatic discharge (ESD) is a very short release of static electricity resulting from a large potential difference in an electrically insulating material when the charge is equalised by contact with another object.

Electronic components need to be protected. even very minor instances of electrostatic discharge can damage sensitive electronic components. It takes at least about 3000 volts before the human body can actually feel an electrostatic discharge but very low levels of electrostatic discharge in the 5 to 30 volt range are sufficient to cause damage in sensitive components. Considering that the surface potential of an ordinary plastic sheet or of a transport container can be 20,000 volts or more, the danger posed by electrostatic discharge is evidently very high. These ESD effects can lead directly to the total failure of the component but can also result in malfunctions at a later date or reduce the service life of the electronic equipment.

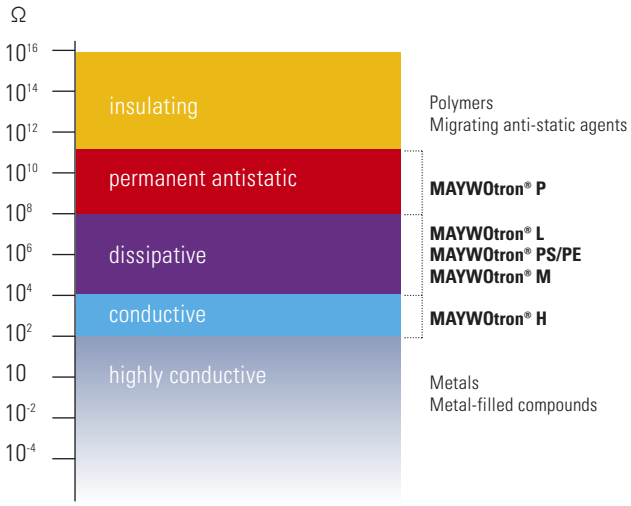
Electric fields can arise through external discharge, e.g. through contact with a charged object but also through handling (friction energy).

MAYWOtron® products are electrically conductive or dissipative plastics with a surface resistivity and volume resistivity which actually prevent electrostatic charge in the first place by guaranteeing a high charge dissipation capability. The required conductivity is achieved by compounding high-quality carbon black which form chains in the plastic.

MAYWOtron® products are mainly used in the transport, packaging, electronics and automotive sectors (e.g. transport trays, crates, storage boxes, blister strips and blister packs) and in electrostatic protected areas (EPA).

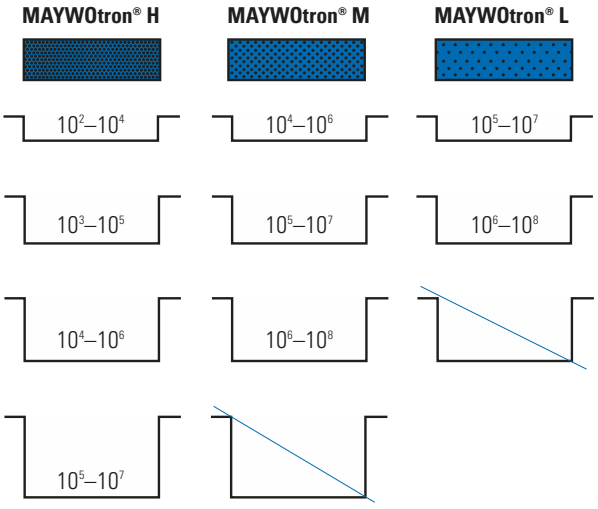
Resistance ranges

MAYWOtron® products can be supplied in different conductivity and resistance ranges.



Effects of stretching on conductivity

Conductivity can be reduced during thermoforming depending on the extent of stretch or even lost if stretched to extremes.
This should be taken into consideration when selecting the right **MAYWOtron®** product. Our MAYWO team will be happy to advise you.



Our products prevent electrostatic charge
MAYWOtron®

MAYWOtron® products can be supplied in rolls and sheets in thicknesses from 0.3 mm to 14 mm and in widths of up to 2500 mm. They are available with a smooth finish and with all MAYWO surface textures. Coloured identification stripes can also be attached on request.

MAYWOtron® H

ABS and high-impact Polystyrene electrostatically **conductive**

Resistance range:
10^2 - 10^4 Ohm

MAYWOtron® PS/PE

Polystyrene/Polyethylene blend electrostatically **dissipative**

Resistance range:
10^4 - 10^7 Ohm

Increased chemical resistance
Increased impact strength

MAYWOtron® M

ABS and high-impact Polystyrene electrostatically **dissipative**

Resistance range:
10^4 - 10^6 Ohm

MAYWOtron® Permanently anti-static

ABS and high-impact Polystyrene Permanently anti-static
low charging

Resistance range:
10^9 - 10^{11} Ohm

Any choice of colour
Option of co-extrusion

MAYWOtron® L

ABS and high-impact Polystyrene electrostatically **dissipative**

Resistance range:
10^5 - 10^7 Ohm

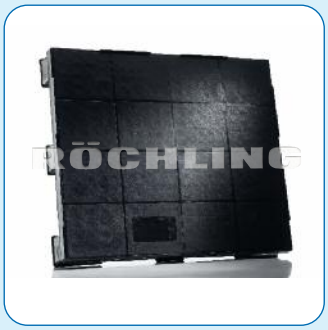
MAYWOtron® pure

ABS and high-impact Polystyrene

- Carbon nanotube based (CNT)

Resistance range:
10^2 – 10^4 Ohm / 10^4 – 10^6 Ohm
10^5 – 10^7 Ohm

Abrasion-resistant, ESD protection for clean rooms, high purity, no separation of carbon black particles



ABS / TPU elec. conductive

ABS base with an elec. conductive TPU cap sheet

- Surface resistance
- Also available with recycled ABS base

Resistance range:
10^2 – 10^4 Ohm / 10^4 – 10^6 Ohm
10^5 – 10^7 Ohm

ABS elec. conductive / TPU elec. conductive

Electrically conductive ABS base with an elec. conductive TPU cap sheet

- Contact resistance

Resistance range:
10^2 – 10^4 Ohm
10^4 – 10^6 Ohm
10^5 – 10^7 Ohm

Embossing texture 1 | Surface texture 2 | Surface texture 3 | Surface texture 3.1 | Surface texture 4 | Surface texture 6 | Surface texture 7 | Surface texture 8 | Surface texture 9

High-quality recycled plastics
MAYWOreg®

In times of constantly increasing raw material costs and growing price pressure, the reprocessing of plastic waste to high standards is a very good way of keeping costs under control. The advantages for our environment are at least as important, considering the resources and energy which are saved in the recycling of plastics.

Röchling Maywo will take all the offcuts, rejects, waste and used moulds which you have collected and will make them into high-quality sheets and rolls for you. Valuable resources can be conserved by using recycled materials. Far less energy is required for delivery and transport in many cases, which equates to a considerable reduction in CO2. Plastic is a resource which can still be reused at the end of the product cycle. This assumes, though, that the materials are properly sorted and are free of impurities. We will be happy to talk to you over the telephone or visit your premises in person and advise you with options which are available for you and how you can turn your "waste" into quality assets and reap financial rewards at the same time.

Slight quality imperfections cannot always be entirely ruled out after reprocessing/recycling because the material has already gone through the product cycle once, although it is necessary to distinguish between visual appearance and mechanical properties. MAYWOreg® is basically reclaimed from high-grade source materials which is why we can guarantee a product of a high quality standard. Minor flaws may be visible but these have no effect on the mechanical properties of the material.

Our know-how – your benefit

The modern equipment in our laboratory is in constant use as we carry out tests on our sheets and rolls to measure various material properties, such as colour, moisture and impact strength, and to monitor their fire safety.

Röchling Maywo GmbH is certified by the Underwriters Laboratories and can therefore mix production offcuts with UL-listed plastics without losing its UL listing.

We are fundamentally committed to our environmental policy of careful stewardship of resources and responsibility or the avoidance of waste. Top of our company agenda is our aim of making only products which are fully recyclable.

REACH Regulation on Chemicals 1907/2006/EC

Röchling Maywo GmbH is registered with the ECHA as a supplier of plastic products made from virgin and recycled materials.
You can download data sheets for our products from our website at **www.roechling.com**. Naturally we will also email or fax them to you on request. We do, of course, inform our customers immediately of any legal changes on the handling of plastics.

Co-extrusion

Co-extrusion is a process involving the use of two or more extruders which enables the production of sheets and rolls consisting of several layers. The process can bring a significant reduction in your material purchase costs if the base layer is made with recycled/reprocessed materials and the cap sheet with virgin material.
The layers can be built up in various ways depending on the subsequent application. The layering most frequently used is a base layer from recycled materials with a cap sheet made of virgin materials on the top **(A-B)** or on the top and the bottom **(A-B-A)**. This cap sheet can be supplied in any colour and also with certain surface properties, e.g. anti-static, UV protection or a specific surface finish (matt/silk matt/gloss).
It is also possible to have three layers **(A-B-C)**, comprising a base layer made of recycled materials, a middle layer made of virgin materials, and a transparent cap sheet made of PMMA, PVDF or a high-gloss coat.

Our products keep a steady grip on costs

MAYWOreg®

MAYWOreg® products can be supplied in rolls and sheets in thicknesses from 0.3 mm to 14 mm and in varying widths up to a maximum of 2500 mm. They are available with a smooth finish and with all MAYWO surface textures. Coloured identification stripes can also be attached on request.

MAYWOreg® recycled material

- Recycled materials pigmented black

MAYWOreg® recycled materials/ reconditioned material mixed with virgin materials

- Choice of mixing ratios
- Designed to improve mechanical properties

MAYWOreg® reworked material

- Sorted by colour or pigmented black
- All MAYWO products can be processed again:
  ABS | HIPS | MAYWOtron | MAYWOblend | MAYWOflamm | MAYWOsol

MAYWOreg® recycled materials/ reconditioned material with coloured stripes

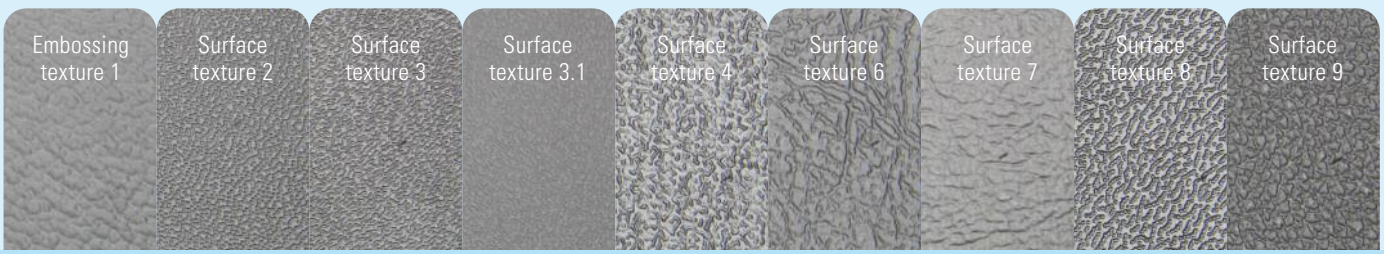
- Coloured strips available in 50 mm width in the following colours as standard:
  blue, yellow, grey, green, light blue, orange, red, black, white, brown, pink
- Other colours and widths available on request

MAYWOreg® recycled material, white or coloured

- Subject to availability

MAYWOreg® co-extruded materials

- Reconditioned materials/ recycled materials with co-extruded cap sheet made with virgin material
- Two-layer co-extruded A/B
- Three-layer co-extruded A/B/A
- Three-layer co-extruded A/B/C



ABS und PS
(Acrylonitrile-Butadiene-Styrene and Polystyrene)

Single-layer and co-extruded materials of ABS (Acrylonitrile-Butadiene-Styrene) and PS (Polystyrene) can be supplied in film and sheet form. They are available with a smooth finish and with all MAYWO surface textures. Coloured identification stripes can also be attached on request.

- Films: thickness: 0.3 – 2.8 mm; width: 300 – 1200 mm
- Sheets: thickness: 0.5 – 15.0 mm; width: 300 – 2500 mm

The following types of ABS and PS are available:

ABS	
SMA	Increased impact strength and heat resistance
SMB	High-gloss surface finish
SMC	Increased heat resistance
SMD	Matt surface finish
Seidenmatt	Semi matt surface finish
HIG	High-gloss surface finish/increased impact strength
Fridge type	Increased impact strength, even in sub-zero temperatures

PS
High gloss on one side
Refrigerator type
High impact resistance
Short-term & long-term anti-static properties
UV resistance

ABS sheets and films can be supplied with the same properties as the PS products:
- High impact resistance
- Short-term & long-term anti-static properties
- UV resistance

ABS / TPU
(Acrylonitrile-Butadiene-Styrene / Thermoplastic Polyurethane)

Our composite **ABS sheets** with **TPU cap sheet** can be supplied in thicknesses from 2 mm to 8 mm and in varying widths up to a maximum of 1350 mm. The surface is textured (surface texture 8). Various colours are possible on request.

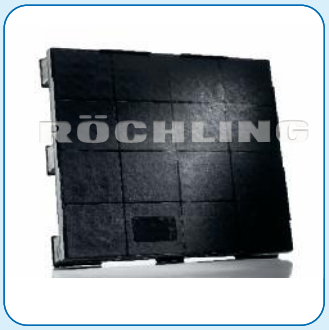
Properties
- Excellent scratch resistance
- High resistance to wear
- Slip resistance
- Very pleasant surface feel (soft-touch coating)

Areas of application
- Workpiece holders/trays
- Transport pallets
- Packaging units/trays
- Panelling parts

ABS / TPU

ABS base with a TPU cap sheet

- ABS layer can be supplied in any colour
- TPU layer can be supplied in any colour



ABS / TPU elec. conductive

ABS base with an elec. conductive TPU cap sheet

- Surface resistance
- Also available with recycled ABS base

Resistance range:
10^2 – 10^4 Ohm / 10^4 – 10^6 Ohm
10^5 – 10^7 Ohm

ABS recycled / TPU

ABS recycled material with a TPU cap sheet

- TPU layer can be supplied in any colour

ABS elec. conductive / TPU elec. conductive

Electrically conductive ABS base with an elec. conductive TPU cap sheet

- Contact resistance

Resistance range:
10^2 – 10^4 Ohm / 10^4 – 10^6 Ohm
10^5 – 10^7 Ohm

MAYWOblend
MAYWOdec
MAYWOsol

MAYWOblend

PS/PE-Blend

Properties
- Good chemical resistance
- High elasticity
- Food safety approval
- High resistance to impact

Applications
- Automotive industry
- Heavy-duty workpiece holders
- Suitcases
- Food packaging
- Toys

ABS/PC-Blend

Properties
- High impact strength at low temperatures
- Heat resistance
- High strength

Applications
- Automotive industry
- Electrical and electronics industry
- Household appliances
- Transport industry
- Consumer goods industry

MAYWOdec

ABS + PMMA

Film lamination of deep-drawing quality – printed decorative film (virtually any design possible) or transparent PMMA film

Design options:
- Various wood effect finishes
- Various metal effect finishes
- Carbon fibre finish, etc.
- UV-resistant
- Outdoor applications
- Solutions for specific applications such as washrooms

ABS + PVDF

Film lamination – transparent film

Properties
- High UV resistance
- High degree of chemical resistance
- Anti-graffiti coating
- Dirt-protection

MAYWOsol

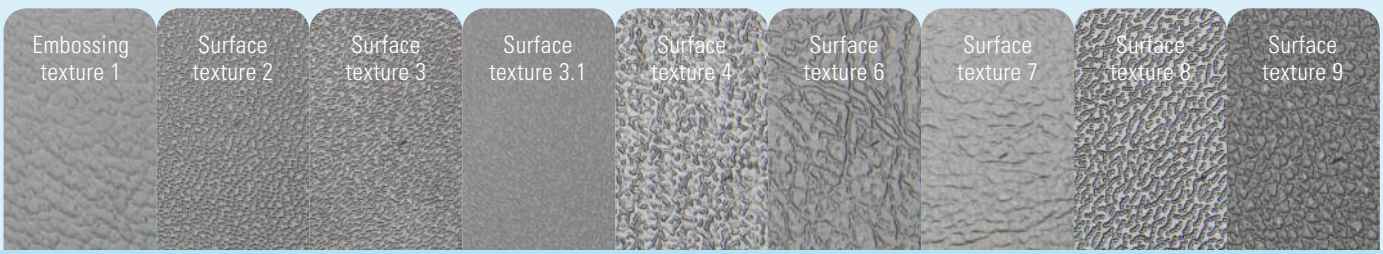
ASA Acrylonitrile-Styrene-Acrylate

Properties
- Excellent resistance to weathering, ageing and discolouration
- Great suitability for long-term use
- Heat resistance
- High resistance to impact
- High rigidity and dimensional stability

ABS + PMMA

ABS base with a coloured PMMA cap sheet

Properties
- Excellent resistance to weathering, ageing and discolouration
- Increased chemical resistance
- High resistance to breakage
- Heat resistance
- High rigidity and dimensional stability



RÖCHLING

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Plastics Fabricated Parts - QMMY2
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INTEGRATED MANAGEMENT SYSTEM
RÖCHLING
Quality wins

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