

HOSES  
TUBES  
PROFILES



## 66 years extrusion experience



Tero Toppi, Managing Director

Toppi Oy was established in 1953 and is still 100% owned and managed by the Toppi family. Our main office and production is located in Espoo Finland where there are 45 full time employees.

Manufacturing of reinforced hoses was started in 1965. First deliveries to Sweden started in 1985. After this exports expanded to many more countries. The first Topp-brand

ToppAir™ was launched in 1986.

In 2013 we opened a daughter company Toppi Plast Oü based in Pärnu Estonia. Toppi Plast Oü has supported the Toppi growth strategy to be more competitive and to expand into the Baltic market area.

Our strenghts are good technical know-how, knowledge of raw materials, the experience of our professional staff and of course the in-house toolshop.

## Reliable manufacturer of hoses, tubes and profiles



We are manufacturing high quality hoses, tubes, and profiles for industrial and consumer needs.

Most of our products we are manufacturing as a subcontractor.

## From your idea to a finished product!



Thanks to our expertise and experience in plastics, CAD designing and tool making in our modern tool shop, we are able to offer our customers the full service from idea and design, to 3D printed prototypes, tooling and final product. We understand the importance of being flexible and offering our customers the most cost effective and functional solutions to their needs. We take advantage of the latest CAD software in the design process and 3D printing capability of prototypes.

Our extensive knowledge of plastics and long relationships with our material suppliers ensures high quality technical support ensuring we select the best raw materials for every application.



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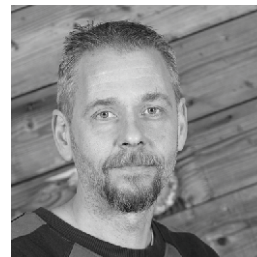
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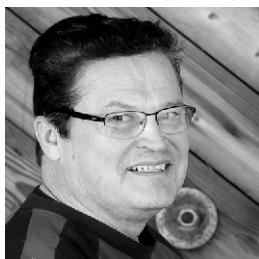


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# HOSES







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Toppi hoses

Oy Toppi Ab has over 50 years of hose production experience, with a wide range of hose products to meet the most demanding consumer and industrial needs. Toppi has the capabilities to manufacture single layer hoses to more complex multi layered reinforced. Most common materials used in hose production is PVC, TPV, Polyurethane and PE, Other grades of material can also be used to achieve specific technical properties.

## Phthalate-free premium-grade water hose

A supreme hose for quality-conscious consumers and professionals. ToppYellow™ is suitable for many different applications; owing to good pressure resistance, it can also be used in pneumatic installations.

ToppYellow™ is manufactured from the best raw materials and is thus a very safe and durable option. The hose excellently withstands even hard external wear, such as abrasion, tensile load, and driving-over. Dirt does not stick to the smooth hose surface and the hose is easy to pull over all kinds of ground surfaces.

**Suitable for food contact.**



## ToppYellow™ To plantations and gardens

### Technical information

Primary use	Irrigation hose for cultivated land and gardens. <b>Suitable for food contact.</b>
Material	PVC and polyester, phthalate-free
Structure	3-layer reinforced hose
Colour	Outer hose yellow
Operating pressure	10 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	12/17, 16/21, 19/25, 25/32
Lengths depending on size (m)	20, 25 and 50



## Very sturdy hose made of recycled PVC, for heavy-duty use

ToppReCycle™ is a convenient and durable water hose made 100 % of clean and odourless recycled plastic for quality-conscious consumers and professionals. Owing to its smooth surface, the hose is easy to pull over all sorts of ground surfaces and floors. ToppReCycle™ leaves no marks on surfaces and dirt does not stick to the hose surface. Due to its durability, ToppReCycle™ is suitable for many applications.

It is the greenest water hose on the market – regardless of its black colour, which also makes the hose suitable for water heating by solar power.



## ToppReCycle™ For heavy-duty use

### Technical information

Primary use	Construction sites, properties, industry, irrigation
Material	100 % recycled PVC and polyester
Structure	3-layer reinforced hose
Colour	Black with yellow stripe
Operating pressure	10 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	16/22, 19/25, 25/32
Lengths depending on size (m)	25 and 50

## High-quality pneumatic hose for a demanding user

ToppAir™ is an excellently durable and flexible fabric-reinforced pneumatic hose. The ToppAir™ hose can often be spotted connected to various pneumatic tools at industrial or construction site environments. Owing to its nitrile rubber content, ToppAir™ retains the flexibility and is pleasant to use in cold conditions as well.

ToppAir™ hoses can be ordered in special lengths and with quick connectors to meet all industrial needs.



## ToppAir™ Durable pneumatic hose

### Technical information

Primary use	Compressed air hose for pneumatic tools
Material	PVC, nitrile rubber and polyester
Structure	3-layer reinforced hose
Colour	Outer hose grey, inner hose black
Operating pressure	20 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	6/11, 8/13, 10/16, 12/18, 16/23, 19/26, 25/33
Lengths depending on size (m)	25 and 50



## Phthalate-free premium-grade universal hose

The transparent, reinforced ToppClear™ is a hose suitable for many different purposes. Resistance to twists, convenience, transparency, and good pressure resistance have made ToppClear™ a popular multi-purpose hose for industrial applications.

As a superbly universal hose, ToppClear™ is just as suitable for domestic needs – wash rooms, saunas, garages, boats, etc.

**Suitable for food contact. In addition for use in the laboratory area.**



## ToppClear™ Universal hose for industry and household use

### Technical information

<b>Primary use</b>	Multi-purpose hose for industrial and domestic applications. <b>Suitable for food contact.</b> In addition for use in the laboratory area.
<b>Material</b>	PVC and polyester, phthalate-free
<b>Structure</b>	3-layer reinforced hose
<b>Colour</b>	Outer and inner hose transparent
<b>Operating pressure</b>	10 bar (4-32 mm) and 6 bar (38 ja 50 mm) (at 20 °C according to the SFS 5408 standard)
<b>Operating temperature range</b>	-20 ... +60 °C
<b>Inner/outer Ø mm</b>	4/10, 6/12, 8/14, 10/16, 12/18, 16/22, 19/25, 25/32, 32/40, 38/47, 50/60
<b>Lengths depending on size (m)</b>	25 and 50

## Genuine and original green garden hose for every home

Owing to its excellent quality, ToppGreen™ has been the most popular garden hose in Finland for decades. The hose walls are 20-40% thicker as compared to any other translucent green hose available on the market. Because of this, ToppGreen™ always does its job. Connectors do not fall off the hose; it does not twist and retains its shape while in use.

When manufacturing ToppGreen™, the environment is also considered, since 60 % of the hose raw materials are recycled.



## ToppGreen™ Most popular garden hose

### Technical information

Primary use	Irrigation hose for agriculture and gardens; also suitable for construction sites
Material	PVC (polyvinyl chloride) and polyester
Structure	3-layer reinforced hose
Colour	Outer hose translucent green, inner hose black
Operating pressure	6 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	12/16, 16/20, 19/24, 25/31
Lengths depending on size (m)	20, 25 and 50



**Premium+ water hose made of PE-copolymer**

ToppAqua™ is a novel product best suitable for places where a truly good water hose is required. ToppAqua™ offers unique advantages to the users. The hose retains its shape very well and even straightens itself, thereby preventing twists. Owing to its excellent constituent materials, ToppAqua™ retains supreme flexibility in cold conditions as well. The extremely light hose floats on water.

Because of its materials, a fine choice for children's water games, indoor swimming halls, and leisure centres. The hose can be disposed of by incineration. Works best on a hose reel or carriage.

**Suitable for food contact.**



## ToppAqua™ Washrooms, swimming halls and spas

### Technical information

Primary use	Washrooms, swimming halls and spas. <b>Suitable for food contact.</b>
Material	PE-copolymer and polyester
Structure	3-layer reinforced hose
Colour	Outer hose ice blue, inner hose white
Operating pressure	10 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-45 ... +52 °C
Inner/outer Ø mm	12/17 and 16/21
Lengths depending on size (m)	20, 25 and 50

## High quality hose for agricultural irrigation

The reinforced green ToppGrow™ is a premium waterhose designed for professional use at plantations. ToppGrow™ is suitable to convey lots of water effortlessly, as an example to irrigation sprinklers.

The ToppGrow™ hose includes features valued by professionals. It has an excellent UV resistance. The pigment keeps light out from the hose preventing growth of algae inside the hose. It is durable and it has good pressure resistance.



## ToppGrow™ Premium waterhose

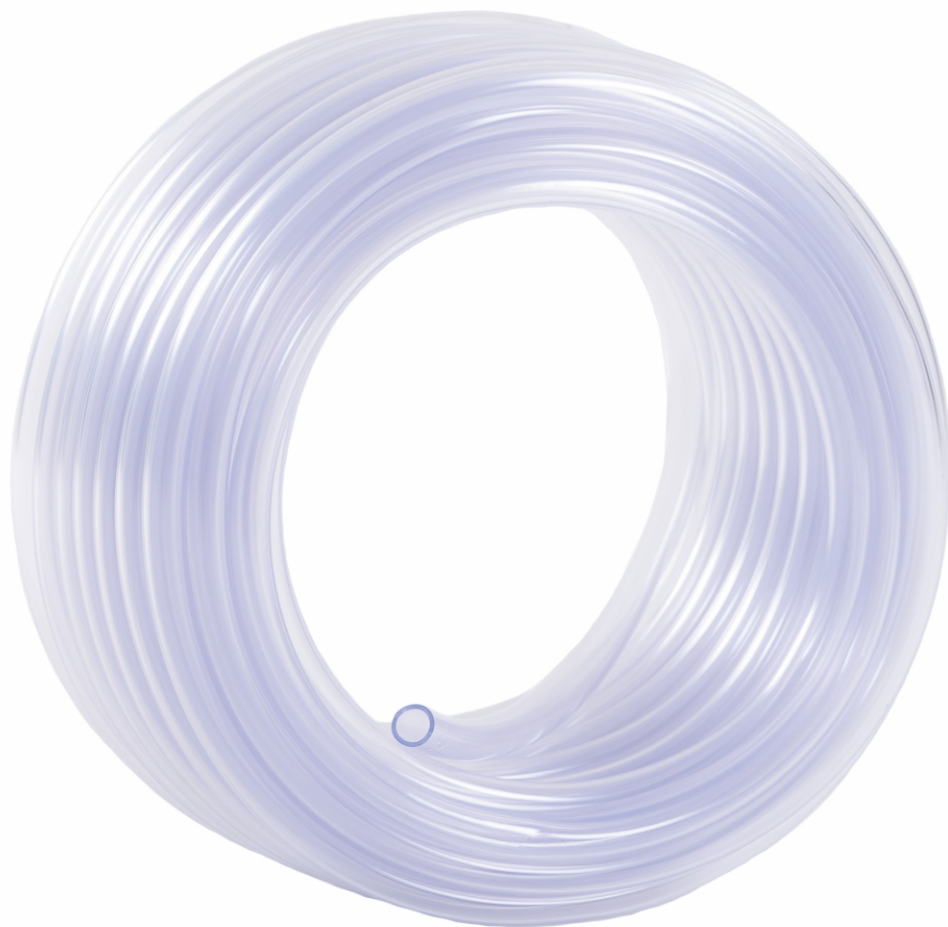
### Technical information

Primary use	Irrigation hose for agriculture
Material	PVC and polyester
Structure	3-layer reinforced hose
Colour	Outer hose green, inner hose black
Operating pressure	10 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	16/22, 19/25, 25/32
Lengths depending on size (m)	25, 36, 50, 100

## Phthalate-free safety usage hose with universal applications

The transparent and non-reinforced ToppBright™ hose serves many industrial and domestic purposes.

**Suitable for food contact.**



## ToppBright™ Universal applications

### Technical information

Primary use	Multi-purpose hose for industrial and domestic applications. <b>Suitable for food contact.</b>
Material	PVC, phthalate-free
Structure	1-layer non-reinforced hose
Colour	Transparent. Other colours available upon request
Operating temperature	-20 ... +60 °C
Inner/outer Ø mm	2/4, 3/5,4, 4/7, 5/8,2, 6/9,6, 8/11,6, 9/12,6, 11/14,8, 12/15,5, 16/20,2, 19/23,6, 25/30,2, 32/40, 38/47, 50/60, 63/74
Lengths depending on size (m)	25, 50 and 100



## Non-reinforced hose with superior flexibility and durability

The flexible, durable and non-reinforced ToppFlex™ hoses are suitable for fuels and many oil based fluids. ToppFlex™ hoses are made of transparent ester based polyurethane. Therefore, they are not recommended for water.

We can manufacture ToppFlex™ in many colours upon request.



## ToppFlex™ For fuels and many oil based fluids

### Technical information

Primary use	For fuels and many oil based fluids
Material	PUR (ester based polyurethane)
Structure	1-layer non-reinforced hose
Colour	Transparent
Operating pressure	-30 ... +80 °C, momentarily +100 °C
Inner/outer Ø mm	3/5, 5/8, 5,5/8, 6/9, 8/11, 9/12, 12/15

## Cost-effective hose to meet the needs of the soft drink industry

ToppDrink has high flexibility and high resistance to stress cracking. Tighter bend radius than polyethylene (LDPE). Easily installed product, especially in applications where flexibility is required and space is at a premium. Also a high kink-resistance.

**Suitable for food contact.**



## ToppDrink™ Easy installation

### Technical information

Primary use	Beverage industry. <b>Suitable for food contact</b>
Material	Polyethene LDPE-EVA
Structure	3-layer reinforced hose
Colour	Natural
Operating pressure	16 bar (6 mm), 10 bar (7,5...9,5 mm), 6 bar (12 mm) (20 °C SFS 5408)
Operating temperature range	-40 ... +50 °C
Inner/outer Ø mm	6/12, 7,5/13, 9,5/15,8, 12/18
Lengths depending on size (m)	Standard length 50

## Flexible and durable polyurethane air hose for pneumatic tools

ToppPur™ reinforced air hose is made of premium quality polyurethane, and is therefore flexible and durable even in cold conditions. ToppPur™ is an excellent option for pneumatic tools that are used in cold outdoor operations.

We deliver ToppPur™ hoses in requested lengths and also with fittings.



**ToppPur™**  
**Good option for  
cold outdoor  
operations**

### Technical information

Primary use	Compressed air hose for pneumatic tools
Material	Ester based polyurethane and polyester
Structure	3-layer reinforced hose
Colour	Outer hose red, inner hose black
Operating pressure	20 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-40 ... +80 °C, momentarily +100 °C
Inner/outer Ø mm	6/12, 8/13, 10/15
Lengths depending on size (m)	30



## Durable and economic hose for air pressure tools

ToppPress™ is a durable and economic reinforced air hose for pneumatic tools. The hose has excellent pressure resistance.

Upon request we can deliver ToppPress™ hoses in specific lengths and with fittings.



**ToppPress™**  
**Excellent**  
**pressure resistance**

### Technical information

Primary use	Compressed air hose for pneumatic tools
Material	PVC and polyester
Structure	3-layer reinforced hose
Colour	Outer hose blue, inner hose black
Operating pressure	20 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	10/15, 12/17,5, 16/21
Lengths depending on size (m)	30

## Premium air hoses with couplings

Premium air pressure hoses with high quality quick couplings installed.

These hoses have been specifically designed for use with air compressors and air tools in demanding environments.



## Technical information

<b>Coupling type</b>	European Universal
<b>Hose materials</b>	Premium: PVC/ Standard couplings, Premium Plus: PVC+NBR/ safety couplings Premium Professional: Polyurethane/ Premium safety couplings
<b>Application</b>	DIY and professional air tools
<b>Colour</b>	Red, grey and blue
<b>Lengths depending on size (m)</b>	10 m

## ToppCover™ – protective hose for a demanding environment

### ToppCover™ 105

is an economic protective hose, which withstands high temperatures. Commonly used in automotive wiring harnesses.

### ToppCover™ 70

is an economic protective hose, which withstands high temperatures. The optimum wall thickness enables easy and fast assembling of cables.

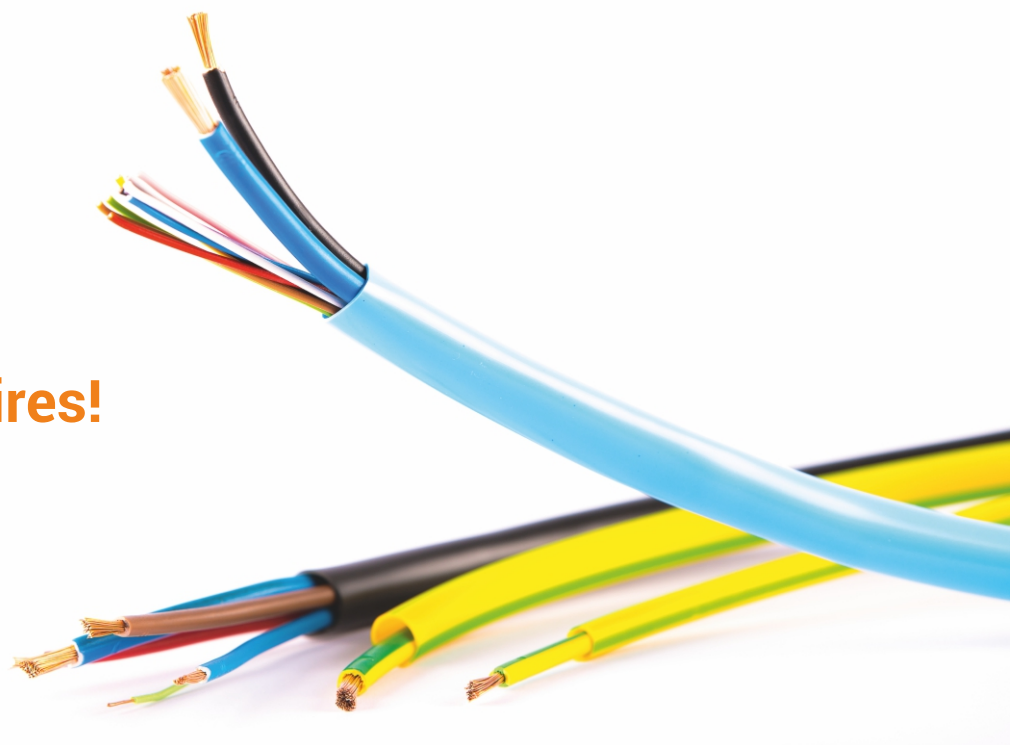
### ToppCover™ DIN 40621

is a safe and durable insulation hose for electric cables. There are several colours available for marking needs.

### ToppCover™ DIN 40621 KEVI

is a safe and durable insulation hose for earthing wires.

**ToppCover™**  
**Cover your wires!**



## Technical information

<b>Material</b>	PVC
<b>Structure</b>	1-layer non-reinforced hose
<b>Colour</b>	Several colours available
<b>Operating temperature</b>	-20 ... 105 °C
<b>Inner diameter (mm)</b>	1-60
<b>Lengths depending on size (m)</b>	50-5000



## Durable First Aid Hose for domestic needs

The reinforced ToppSafety™ HBS (Husbrandslang) waterhose is designed for domestic fire fighting, also suitable for daily use in many other places such as in the garage and the washing room.

## ToppSafety™ HBS

### First aid hose for domestic needs



### Technical information

Primary use	Domestic fire hose
Material	PVC and polyester
Structure	3-layer reinforced hose
Colour	Outer and inner hose black
Operating pressure	10 bar (at 20 °C according to the SFS 5408 standard)
Operating temperature range	-20 ... +60 °C
Inner/outer Ø mm	12,7/16,7 (1/2")
Lengths depending on size (m)	25 m standard length and custom lengths

## Durable First Aid Fire Reel hose that meet the standard

The reinforced ToppSafety™ NBR hoses are designed for First Aid Fire Hose Reels in public and industrial buildings. The hoses are very durable and therefore suitable for daily usage – they withstand traction and are always easy to keep clean.

ToppSafety™ NBR hoses meet the EN 694 quality standard.

## ToppSafety™ NBR For public and industrial buildings



### Technical information

<b>Primary use</b>	Fire safety hose in public and industrial buildings
<b>Material</b>	PVC/NBR (polyvinylchloride/nitrile rubber) and polyester
<b>Structure</b>	3-layer reinforced hose
<b>Colour</b>	Outer and inner hose black
<b>Operating pressure</b>	10 bar (at 20 °C according to the SFS 5408 standard)
<b>Operating temperature range</b>	-20 ... +60 °C
<b>Inner/outer Ø mm</b>	19/26, 25/33
<b>Lengths depending on size (m)</b>	Custom lengths

## Durable binding for a tidy cable installation

ToppBand™ PA is a durable binding spiral for bringing various cables together neatly. The binding can be easily installed and opened. ToppBand™ secures cables tightly every time.

## ToppBand™ PA

### Organize your tubes and wires



### Technical information

<b>Material</b>	Polyamid (PA)
<b>Structure</b>	Cut 1-layer tube
<b>Colour</b>	Black
<b>Operating temperature</b>	-40 ... +80 °C
<b>Inner/outer Ø mm</b>	6/4, 8/6, 10/8, 12/10, 15/12,5, 18/15
<b>Lengths depending on size (m)</b>	50, 100, 350, 700



## Durable binding for a tidy cable installation

ToppBand™ PE is a durable binding spiral for bringing various cables together neatly. The binding can be easily installed and opened. ToppBand™ secures cables tightly every time.

## ToppBand™ PE

### Organize your tubes and wires



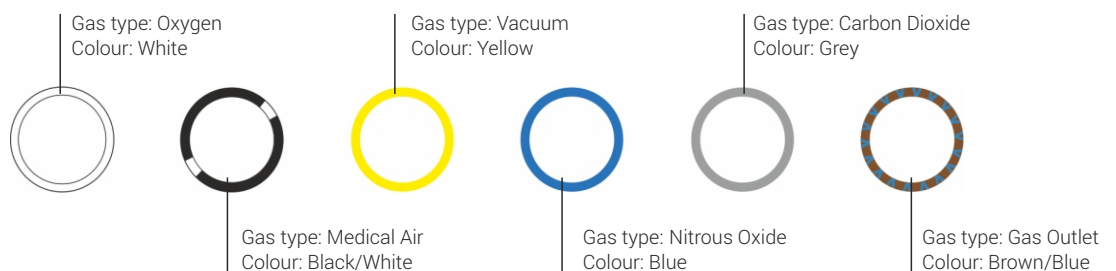
## Technical information

<b>Material</b>	Polyethylene (PE)
<b>Structure</b>	Cut 1-layer tube
<b>Colour</b>	Black
<b>Inner/outer Ø mm</b>	6/4, 8/6, 10/8, 12/9, 12/10, 15/12,5, 18/15
<b>Lengths depending on size (m)</b>	7, 10, 25, 50, 100

## ToppMedic™ – low pressure hoses for medical use

ToppMedic hoses are manufactured in accordance with ISO EN 5359 standard. All material used to manufacture ToppMedic hoses are phthalate free and fully compliant with REACH (1907/2006) and RoHS directive (2011/65/EU).

All ToppMedic hoses are antistatic and colour coded making them suitable to low pressure medical gas installations.



### ToppMedic™ assortment:

Product number	Gas type	Dimensions	Length	Colour
19606011030	Oxygen	6/11	30 m	White
19608014030	Medical Air	8/14	30 m	Black/White
19610016030	Vacuum	10/16	30 m	Yellow
19606011030-1	Nitrous Oxide	6/11	30 m	Blue
19606011030-2	Carbon Dioxide	6/11	30 m	Grey
19612017430	Gas Outlet	12/17,4	30 m	Brown/Blue

## Technical information

<b>Application</b>	Reinforced tubing for gas supply
<b>Material</b>	Antistatic food grade PVC, DEHP Free, 85 Shore
<b>Structure</b>	3-layer hose reinforced with polyester yarn
<b>Packaging</b>	Heat shrink film PE
<b>Operating pressure</b>	14 bar/ 20 °C

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## Toppi is a leader in pneumatic tube manufacturing

Toppi has been supplying tubing to the pneumatic industry from our modern production facility for decades. We offer a wide range of tubing to meet the most demanding pneumatic applications. We work closely with all the major material suppliers in Europe to ensure the highest quality and most appropriate materials are used for our pneumatic tubes.

The most common materials we use for pneumatic tube production are PA11, PA12 HDPE, LDPE, LLDPE, and TPU.

Toppi is very proud to have developed its own CNC bending machine for plastic tubing, allowing us to bend tubes from CAD drawing eliminating the need for expensive moulds and tooling.

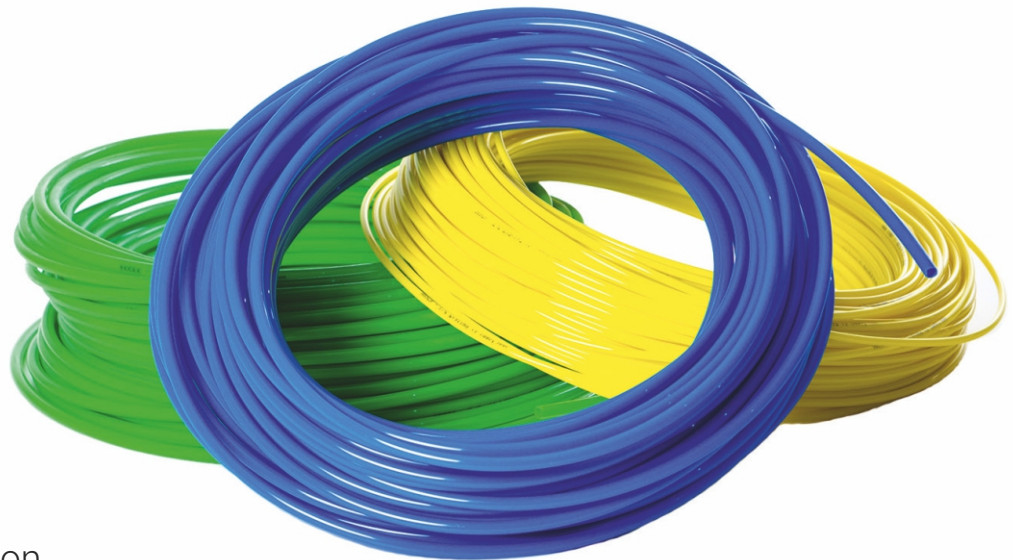
Toppi also specialises in manufacturing customizes multi cables which is usually a combination of tubes, and electric cables within one protective sheath. Toppi Multi cables are most commonly used in the machine industry with the benefit of having all required tubes and cables neatly organised in a compact sheath.

For further information please contact our experienced sales team who are happy to help find the best solution for your needs.

**PA11 (hard), PA11P40 (semi-hard) and PA11F15 (soft)**

Flexible pressure-resistant tubes for pneumatic and hydraulic applications, as well as for grease lubrication.

Superior in high temperature applications.



## Technical information

<b>Material</b>	Polyamide PA11 (Nylon 11) Rilsan		
<b>Hardness</b>	PA11 (70 Shore D)	PA11P40 (63 Shore D)	PA11F15 (52 Shore D)
<b>Installation temperature</b>	-20 °C ... +50 °C		
<b>Working temperature</b>	-40 °C ... +80 °C		
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure		
<b>Tolerances</b>	According to DIN 74324		
<b>Colours</b>	Natural, black, blue, yellow, red, green, silver, etc.		
<b>Dimensions</b>	Outer diameter 3,0 mm...28,0 mm / inner diameter 2,0 mm...24,0 mm		
<b>Chemical resistance</b>	Good chemical resistance against oils, hydraulic fluids, and fuels. Not suitable for chloride compounds		
<b>Density</b>	1,05 g/cm³ according to the ISO 1183 testing method		

Burst pressure in different temperatures:

burst pressure in different temperatures:														
Material	PA11				PA11P40				PA11F15				weight g/m	bending radius min. mm
dimensions mm outer/inner	temperature °C				temperature °C				temperature °C					
	20	40	60	80	20	40	60	80	20	40	60	80		
4/2	225	159	123	96	132	96	75	63	87	63	51	45	9,9	24
5/3	168	117	90	72	99	72	57	48	63	45	36	30	13,2	30
6/4	135	96	72	57	78	57	45	36	51	36	30	27	16,5	36
8/6	96	66	51	42	57	42	33	27	36	27	21	15	23,1	50
10/8	75	54	42	33	42	30	24	21	27	18	15	12	29,7	80
12/10	60	42	33	42	36	27	21	18	21	15	12	9	36,3	118
14/12	51	36	27	21	30	21	18	15	18	12	9	6	42,9	163
15/12,5	60	42	33	27	36	27	21	18	21	15	12	9	56,7	90
16/12	96	66	51	42	57	42	33	27	36	27	21	15	92,4	100
18/15	60	42	33	27	36	27	21	18	21	15	12	9	81,6	177
22/18	66	45	36	27	39	27	21	18	24	18	15	12	131,9	196

## PA12P40

High pressure resistance tube which can be used in high temperatures also. It has a good impact resistance too.

Can be used in pneumatics, industrial robots and instrumentation lines. Superior in high temperature applications.



## Technical information

<b>Material</b>	Polyamide PA12P40 (Nylon 12)
<b>Installation temperature</b>	-20 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Natural, black, blue, yellow, red, green, silver, etc.
<b>Dimensions</b>	Outer diameter 3,0 mm...28,0 mm / inner diameter 2,0 mm...24,0 mm
<b>Chemical resistance</b>	Good chemical resistance against oils, hydraulic fluids, and fuels. Not suitable for chloride compounds
<b>Density</b>	1,03 g/cm³ according to the ISO 1183 testing method

Burst pressure in different temperatures:

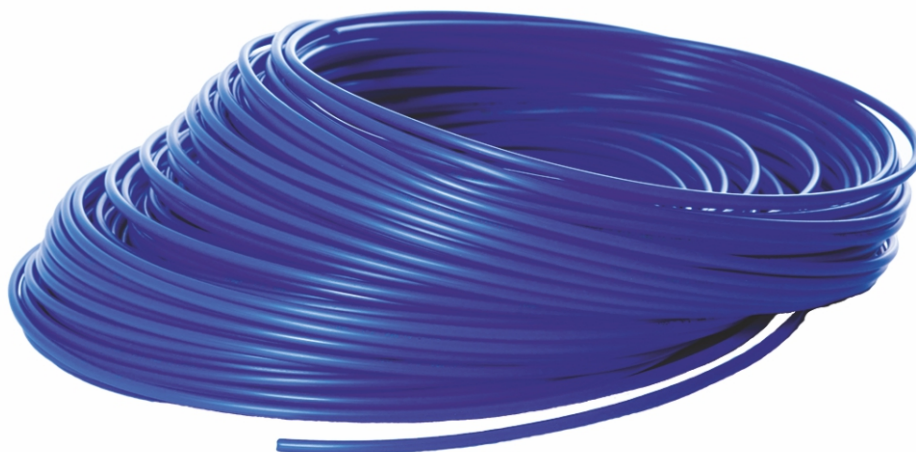
Material	PA12P40					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
4/2	132	96	75	63	9,9	24
5/3	99	72	57	48	13,2	30
6/4	78	57	45	36	16,5	36
8/6	57	42	33	27	23,1	50
10/8	42	30	24	21	29,7	80
12/10	36	27	21	18	36,3	118
14/12	30	21	18	15	42,9	163
15/12,5	36	27	21	18	56,7	90
16/12	57	42	33	27	92,4	100
18/15	36	27	21	18	81,6	177
22/18	39	27	21	18	131,9	196



## PA Premium

PA Premium has been developed especially for media lines on passenger cars and trucks.

Thanks to its excellent resistance it is particularly suitable for fuel, diesel, air brake, oil, cooling fluid or pneumatic and hydraulic applications.



## Technical information

<b>Material</b>	Polyamide PA
<b>Installation temperature</b>	-20 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Natural, black, blue, yellow, red, green, silver, etc.
<b>Dimensions</b>	Outer diameter 3,0 mm...28,0 mm / inner diameter 2,0 mm...24,0 mm
<b>Chemical resistance</b>	Good chemical resistance against oils, hydraulic fluids, and fuels. Not suitable for chloride compounds
<b>Density</b>	1,03 g/cm³ according to the ISO 1183 testing method

Burst pressure in different temperatures:

Material	PA					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
4/2	136	99	77	65	9,9	24
5/3	102	74	59	49	13,2	30
6/4	80	59	46	37	16,5	36
8/6	59	43	34	28	23,1	50
10/8	43	31	25	22	29,7	80
12/10	37	28	22	19	36,3	118
14/12	31	22	19	15	42,9	163
15/12,5	37	28	22	19	56,7	90
16/12	59	43	34	28	92,4	100
18/15	37	28	22	19	81,6	177
22/18	40	28	22	19	131,9	196

## PA12HIPHL-DIN

We manufacture the brake tubes strictly according to the DIN 74324 quality standard which requires a black colour.

Vehicle tubes are manufactured according to the DIN 73378 quality standard, which offers many colour alternatives.



### Technical information

<b>Material</b>	Polyamide PA12HIPHL-DIN
<b>Hardness</b>	63 Shore D ISO 868
<b>Installation temperature</b>	-20 °C ... +93 °C
<b>Working temperature</b>	-40 °C ... +93 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Black in DIN 74324. Red, blue, yellow in DIN 73378
<b>Dimensions</b>	Outer diameter 4,0 mm...18 mm / inner diameter 2,0 mm...14,0 mm
<b>Density</b>	1,03 g/cm³ according to the ISO 1183 testing method

Burst pressure in different temperatures:

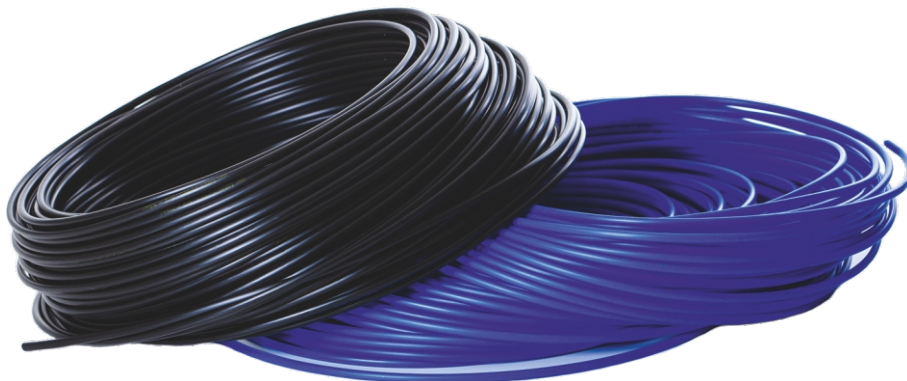
Material	PA12HIPHL-DIN					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
4/2	132	96	75	63	9,9	24
6/4	78	57	45	36	16,5	36
6,4/4,3	78	57	45	36	18,5	38
8/6	57	42	33	27	23,1	50
9/6	78	57	45	36	37,1	54
9,5/6,4	78	57	45	36	40,6	57
10/7	69	51	39	33	42,1	60
10/8	42	30	24	21	29,7	80
11/8	63	45	36	30	47,0	66
12/9	57	42	33	27	52,0	75
12,7/9,5	57	42	33	27	58,6	79
14/10	66	48	39	30	79,2	84
15,8/11,2	66	48	39	30	102,4	95
16/12	57	42	33	27	92,4	100
18/14	48	36	27	24	106,0	129

## PUR

Flexible tube which performs especially well in low temperatures but can be used in high temperature applications too.

It has excellent abrasion resistance and very good elasticity but there is no plasticizers used.

Can be used in pneumatics, industrial robots and instrumentation lines.



## Technical information

<b>Material</b>	Polyurethane
<b>Hardness</b>	53 Shore D
<b>Installation temperature</b>	-30 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Silver, black, blue (yellow, red, green, natural) etc.
<b>Dimensions</b>	Outer diameter 3,0 mm...25,0 mm / inner diameter 2,0 mm...21,0 mm
<b>Chemical resistance</b>	Excellent chemical resistance against oils, hydraulic fluids and fuels
<b>Density</b>	1,23 g/cm <sup>3</sup> according to the ISO 1183-1-A testing method

Burst pressure in different temperatures:

Material	PUR (Polyurethane)				weight g/m	bending radius min. mm
dimensions mm outer/inner	temperature°C					
	20	40	60	80		
4/2	59	47	34	27	1,1	9
4,3/2,8	37	28	22	16	1,0	15
5/3	44	34	28	21	1,5	14
5/3,1	40	31	25	19	1,5	15
6/3,9	37	28	22	16	2,0	20
6/4	34	28	22	16	1,9	21
8/5,7	31	22	19	15	3,0	34
8/6	25	19	16	12	2,7	40
9,5/6,4	34	28	22	17	4,7	35
10/7	31	25	19	16	4,9	40
10/8	19	16	12	9	3,4	64
12/9	25	19	16	13	6,0	60
14/11	22	16	12	10	7,2	83
15/12,5	16	12	9	7	6,6	118

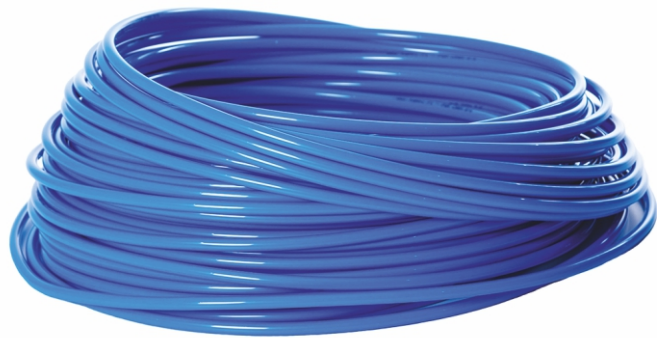


## PUR C98A

Flexible tube which performs especially well in low temperatures but can be used in high temperature applications too.

It has excellent abrasion resistance and very good elasticity but there is no plasticizers used.

Can be used in pneumatics, industrial robots and instrumentation lines.



## Technical information

<b>Material</b>	Polyurethane C98A
<b>Hardness</b>	98 Shore A
<b>Installation temperature</b>	-30 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Silver, black, blue (yellow, red, green, natural) etc
<b>Dimensions</b>	Outer diameter 3,0 mm...16,0 mm / inner diameter 2,0 mm...13,0 mm
<b>Chemical resistance</b>	Excellent chemical resistance against oils, hydraulic fluids and fuels
<b>Density</b>	1,22 g/cm³ according to the ISO 1183-1-A testing method

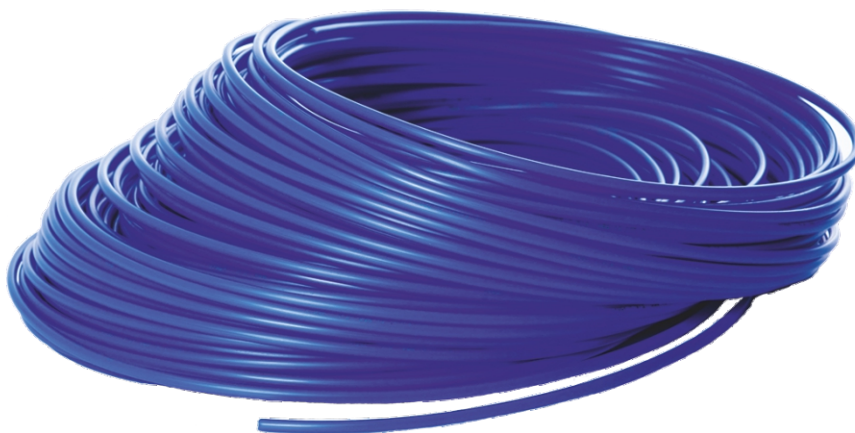
Burst pressure in different temperatures:

Material	PUR C98A (Polyurethane)					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
4/2	57	45	33	26	1,1	9
4,3/2,8	36	27	21	15	1,0	15
5/3	42	33	27	20	1,5	14
5/3,1	39	30	24	18	1,5	15
6/3,9	36	27	21	15	2,0	20
6/4	33	27	21	15	1,9	21
8/5,7	30	21	18	14	3,0	34
8/6	24	18	15	12	2,7	40
9,5/6,4	33	27	21	16	4,7	35
10/7	30	24	18	15	4,9	40
10/8	18	15	12	9	3,4	64
12/9	24	18	15	13	6,0	60
14/11	21	15	12	10	7,2	83
15/12,5	15	12	9	7	6,6	118

## PE-LD

Low density polyethylene tube has competitive price and reasonable heat and pressure resistance. It is suitable for recycling using modern methods of shredding and cleaning.

Good chemical resistance. PE-LD tubing is often used in pneumatic equipment due to its easy installation.



## Technical information

<b>Material</b>	PE-LD
<b>Installation temperature</b>	-30 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Natural, black, blue, (yellow, red, green, silver) etc.
<b>Dimensions</b>	Outer diameter 4,0 mm...22 mm x inner diameter 2,0 mm...18,0 mm
<b>Chemical resistance</b>	Good chemical resistance against gases and liquids
<b>Density</b>	0,922 g/cm <sup>3</sup> according to the ISO 1183 testing method

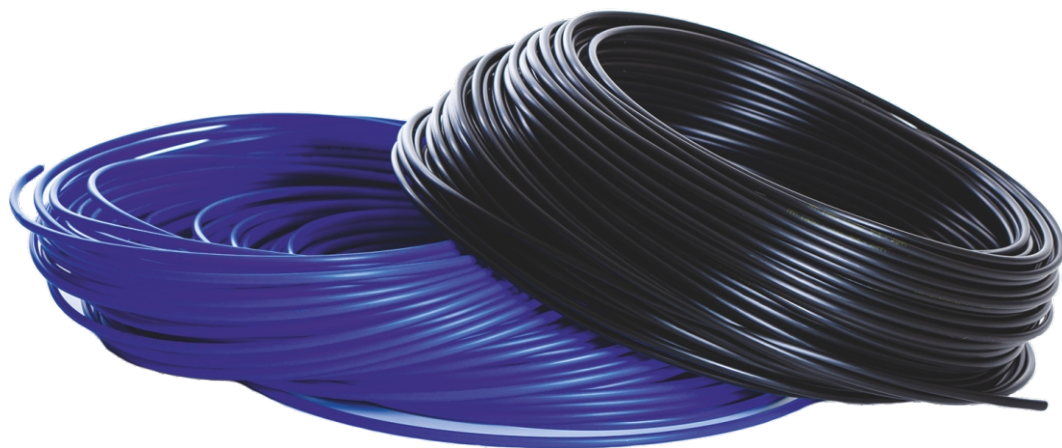
Burst pressure in different temperatures:

Material	PE-LD				
dimensions outer/inner	temperature °C			weight g/m	bending radius min. mm
	20	40	60		
4/2	50	25	12,5	9,9	24
5/3	37,5	20	10	13,2	30
6/4	30	15	7,5	16,5	36
8/6	20	10	5	23,1	50
10/8	15	7,5	5	29,7	80
12/9	20	10	5	52,0	75
14/12	10	5	2,5	42,9	163
15/12,5	12,5	7,5	2,5	56,7	147
16/12	20	10	5	92,4	100
20/16	15	7,5	5	118,8	161
22/18	15	7,5	5	131,9	196

## PES (PE-LLD)

Linear low density polyethylene tube with good chemical resistance and competitive price.

Mostly used in pneumatics and in installations where gas and chemical contact is required.



## Technical information

<b>Material</b>	PES (PE-LLD)
<b>Installation temperature</b>	-30 °C ... +50 °C
<b>Working temperature</b>	-40 °C ... +80 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colour</b>	Blue, natural, black. Other colours by request.
<b>Dimensions</b>	Outer diameter 4,0 mm...22 mm x inner diameter 2,0 mm...18,0 mm
<b>Chemical resistance</b>	Good chemical resistance against gases and liquids
<b>Density</b>	0,931 g/cm <sup>3</sup> according to the ISO 1183 testing method

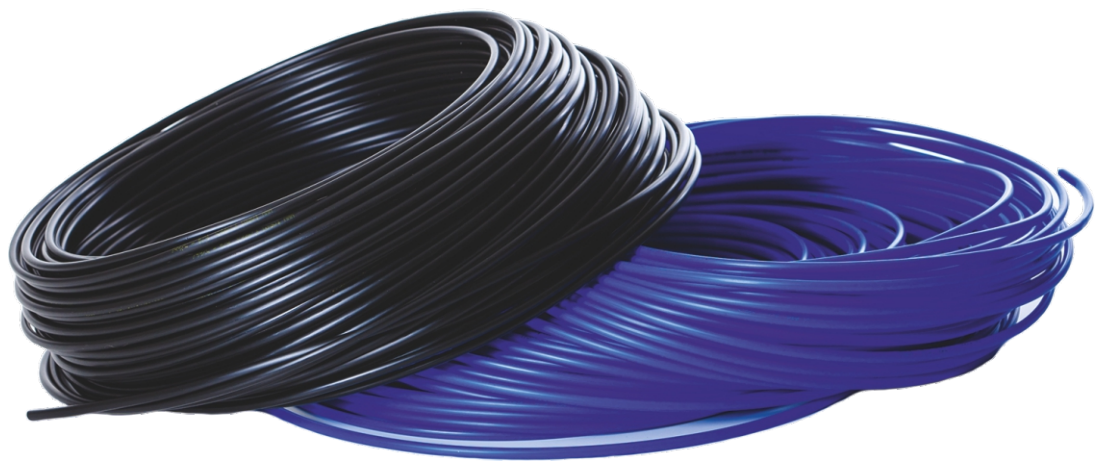
Burst pressure in different temperatures:

Material	PES (PE-LLD)					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
4/2	96	66	45	30	8,8	24
5/3	72	51	33	24	11,7	30
6/4	57	39	27	18	14,6	36
8/6	42	30	18	11	20,5	50
10/7	42	30	18	12	37,3	70
10/8	30	21	15	9,5	26,3	80
12/9	42	30	18	12	46,1	75
12/10	30	21	15	8	32,2	130
14/12	21	15	9	3	38,0	163
15/12,5	24	18	12	6	50,3	147
16/12	42	30	18	12	81,9	100
20/16	30	21	15	9	105,3	161
22/18	27	18	12	6	117,0	196



## PE-HD

Cost-effective tube with superior chemical resistance. High impact strength for more demanding applications.



## Technical information

<b>Material</b>	PE-HD High-density polyethylene
<b>Hardness</b>	65 Shore D ISO 868
<b>Installation temperature</b>	-30 °C ... +50 °C
<b>Working temperature</b>	-30 °C ... +60 °C, temporarily 100 °C
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Colours by request
<b>Dimensions</b>	On request
<b>Chemical resistance</b>	Good chemical resistance against gases and liquids

## PEX

ToppTube™ PEX is a high density cross linked polyethylene tube which is easy to process. It has excellent resistance against heat, impact and chemicals.

It is mostly used in piping and plumbing parts. Can be used on portable water application too.



## Technical information

<b>Material</b>	Cross-linked polyethylene PEX
<b>Hardness</b>	56 Shore D ISO 868
<b>Installation temperature</b>	-30 °C ... +60 °C
<b>Working temperature</b>	-40 °C ... +80 °C (temporarily 100 °C)
<b>Operating pressure</b>	Recommendation: 1/3 of burst pressure
<b>Tolerances</b>	According to DIN 74324
<b>Colours</b>	Black, blue, natural
<b>Dimensions</b>	Outer diameter 4,0 mm...22 mm x inner diameter 2,0 mm...18,0 mm
<b>Chemical resistance</b>	Excellent chemical resistance in lower pressures and temperatures, especially against gases and liquids
<b>Density</b>	0,924 g/cm³ according to the ASTM D792 testing method

Burst pressure in different temperatures:

Material	PEX					
dimensions mm outer/inner	temperature °C				weight g/m	bending radius min. mm
	20	40	60	80		
6/4	70	55	37	23	14,8	40
8/6	52	38	28	19	20,7	60
10/8	43	31	22	14	26,6	80
12/10	39	28	20	12	32,6	100

## ToppSpiral™ – handy accessibility with a tailored spiral tube

ToppSpiral™ is a premium quality spiral tube. Its flexibility provides handy accessibility in pneumatic systems. The tube is made of durable polyamid which maintains its shape. For vertical installations we recommend a semi-rigid quality, and for horizontal installations a rigid quality.

We manufacture ToppSpiral™ spiral tubes to order.



## Technical information

<b>Recommendation</b>	For horizontal fitting medium hard polyamide, for vertical fitting hard polyamide
<b>Spiral diameter</b>	Minimum 22 mm, maximum 320 mm
<b>Tube diameter</b>	Outer diameter 4 mm - 25 mm, inner diameter 2 mm - 19 mm
<b>Colour</b>	Blue, other colours by request
<b>Ordering</b>	The spirals are manufactured by request



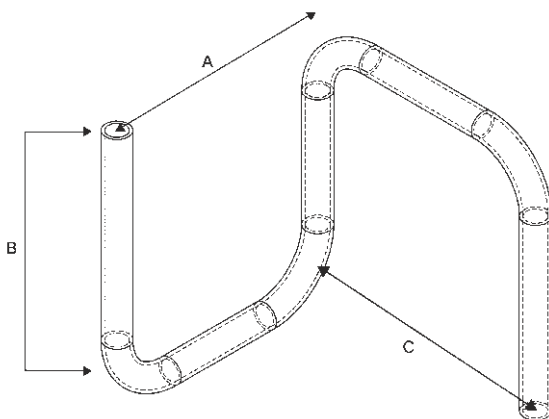


### ToppPart™ – pre-bent tubes

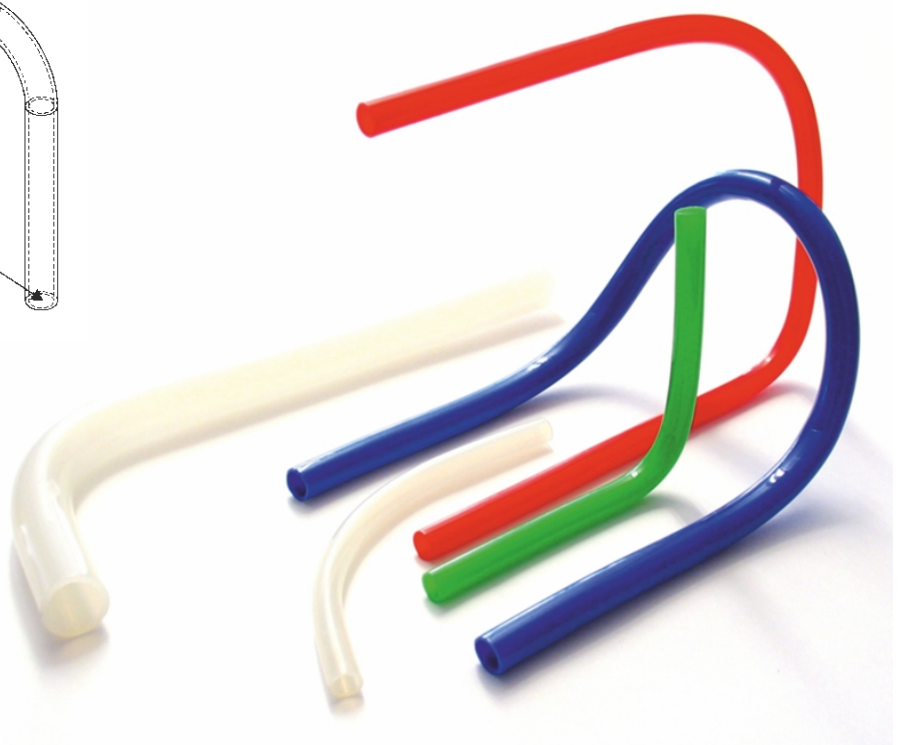
The pre-bent ToppPart™ tubes are designed for instant installations in pneumatic and liquid applications. Hence, the installation of ToppPart™ tubes is very fast and easy. And less time in installations means savings.

ToppPart™ tubes are an alternative to places where there is no room for conventional tubing or where metal tubes cannot be installed. ToppPart™ tubes are tailored according to customer's specific needs. We can manufacture both 2D and 3D shapes using our unique state of the art CNC bending technology.

A, B and C refers to the length between bends, these can be between 120 mm – 2000 mm. We will be happy to consider the dimensions on request.



**ToppPart™**  
**Easy and fast**  
**installation!**



## One Product – multiple solutions

A ToppMulti™ cable is a selection of e.g. pneumatic tubes, fluid tubes, electrical cables and optical fibres combined into one cable.

We manufacture the ToppMulti™ cables according to our customers specific needs.



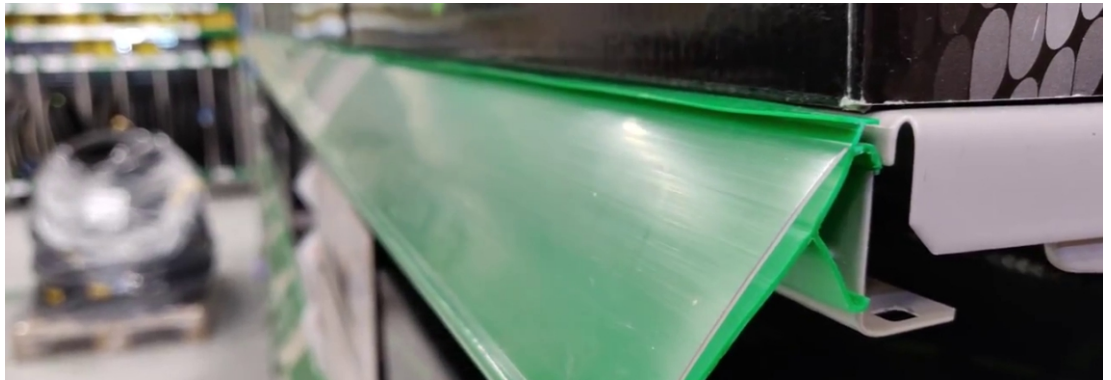
## Technical information

<b>General</b>	Extruded PE- (Polyethylene) PA- (Polyamide) or PUR- (Polyurethane) tubes in variable combinations covered with a PVC jacket. Other materials in tubing and jacket on request
<b>Working pressure</b>	See separate tube leaflets for information
<b>Temperature range</b>	See separate tube leaflets for information
<b>Quality control</b>	Continuous measurement of tube outer diameter from two directions, wall thickness at six points. Regular control of the tubes burst pressure
<b>Tolerance of tubes</b>	Complying DIN 74324
<b>Number of tubes</b>	1-19 pcs., the maximum number of tubes depends on the individual tube sizes
<b>Electrical cables</b>	Optional for supplying of electrical signals, usually supplied by customer
<b>Jacket</b>	PVC (polyvinyl chloride), black, blue or grey. Other materials on request
<b>Bending radius</b>	Minimum seven (7) times the maximum measure of the jacket
<b>Lengths</b>	Standard length is 500 m, delivered on drum
<b>Protective foil</b>	Polyester, standard thickness 12 µm

Examples	O-3 PE - 6/4 BLA
	L-3 PE - 6/4 BLA
	LAL-3 PE - 6/4 BLA
	OAL-3PE 6/4 BLA
Explanation	
O	More or less round jacket, maximum 3 pcs.filler profiles used
L	Jacket only
LAL	Jacket with aluminium (12 µm) and polyester foil (12 µm), and without filler profiles
OAL	Jacket with aluminium (12 µm) and polyester foil (12 µm), and filler profiles
3	Number of tubes, numbering clockwise beginning from center
PE	Polyethylene tubing used. Other materials by request
6/4	Tube size, the tubes can have different colors (max. 6) or numbering
BLA	The color of jacket, other colours on request



# PROFILES



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## Profile by your need

We manufacture rigid and soft ToppProfile™ plastic profiles according to our customers specific needs. These needs can be protection, connection, fastening etc. We can deliver the profiles in requested lengths and also with adhesive tape which provides easy and fast installation.

All the tooling used in manufacturing is made by ourselves in our in-house toolshop which has over 50 years experience in designing tools. With this procedure, we can ensure that our customers will receive a profile which exactly meets their needs.

Materials used in ToppProfiles™ are mainly as follows:

- ABS (acrylonitrile-butadiene-styrene)
- ASA (acrylonitrile-styrene-acrylate)
- PA (polyamid)
- PE (polyethylene)
- PS (polystyrene)
- PUR (polyurethane)
- PVC (polyvinylchloride)

We also excel co- and tri-extrusion. With this technique we can integrate different materials and colors into one product.

When you need new plastic profile, or need to modify or improve an existing profile, please contact us [info@toppi.fi](mailto:info@toppi.fi)



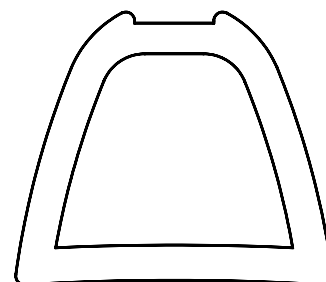


## ToppFender™ – protect boats

ToppFender is an extremely tough PVC fender profile commonly used to protect boats from impact on jetties and piers, ToppFender is also ideal for car park walls and warehouses and many other applications where protection from impact is needed. ToppFender can be cut and installed using common wood working tools, and ensuring the perfect fit in even the most difficult installations.

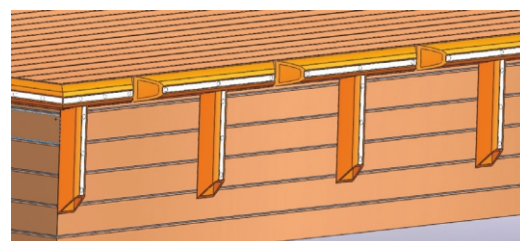
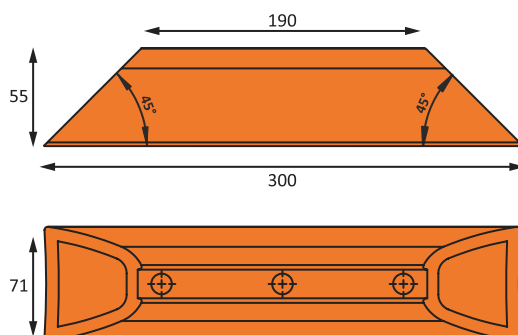
### Technical information

<b>Material</b>	PVC (polyvinylchloride), 100% recycled material
<b>Colour</b>	Black
<b>Dimensions</b>	Length 800 x height 55 mm x width 71 mm



## ToppFender™ Reflex 30 cm 45/45

ToppFender™ Reflex comes pre-cut with two 45 degree angles and includes high quality stainless steel screws and reflective tape.



### Technical information

<b>Material</b>	PVC (polyvinyl chloride)
<b>Colour</b>	Brown, orange, beige, black and grey
<b>Dimensions</b>	30 cm x 7,1 cm x 5,5 cm
<b>Other info</b>	Package includes 3 pcs 6 x 50 Torx25 A4 -screws and very effective reflector



## ToppSun™ – easy roofing solution

ToppSun roof panels have been designed for easy installations and superior durability. ToppSun roof panels are manufactured from the highest quality PVC ensuring excellent UV resistance and durability in the harshest of environments.

ToppSun roofing panels are sold in a variety of lengths and packs include fastening clips and edge profiles to ensure easy installation. Upon request Toppsun can be manufacture to any length any colour, making it the perfect roofing solution for custom installations, MOQ's apply for custom orders.



## Technical information

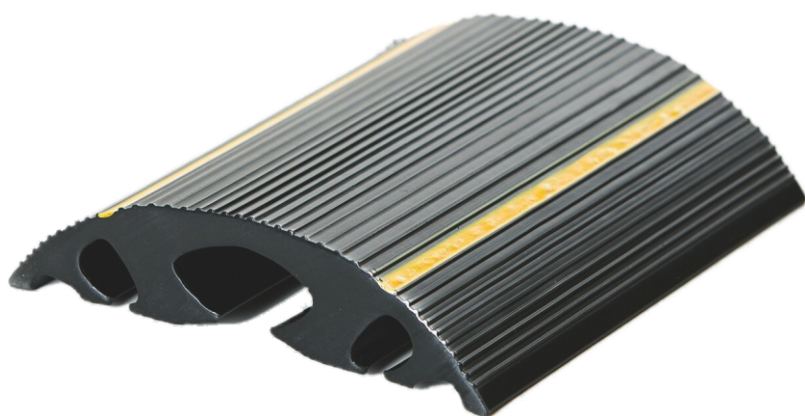
<b>Dimensions</b>	Profile height 24 mm, thickness 1,5 mm, length 2000, 2500 and 3000 mm overall width 220 mm, effective width 200 mm (other by request)
<b>Colour</b>	Bright
<b>Thermal expansion</b>	Eliminated by the way of attachment
<b>Snow load resistance</b>	Alternate bays k 600 mm, 1,8 kN/m <sup>2</sup> - alternate bays k 400 mm, 2,7 kN/m <sup>2</sup>





## Cable Protector – protect hoses and cables

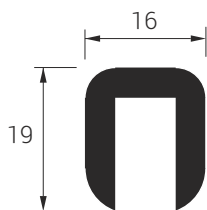
New cable protector profile has been designed to protect hoses and cables in the toughest environments. Suitable for both indoor and outdoor use, tough enough to be driven over by cars and forklifts of up to 2ton in at max 20°C. Common applications are in concerts, construction sites, and fairs grounds to name a few.



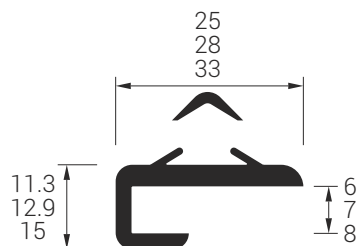
### Technical information

<b>Material</b>	PVC
<b>Colour</b>	Black with yellow stripes
<b>Dimensions</b>	160 mm x 35 mm, length 2 meters. Other dimensions and corner pieces by request.

T37



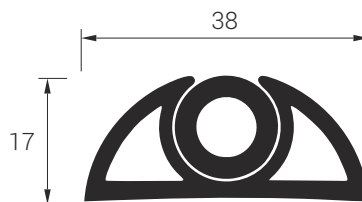
T67



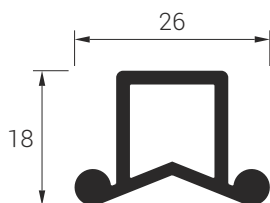
T44



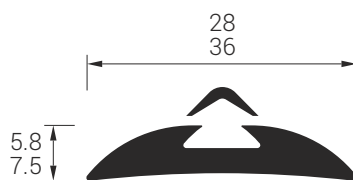
T91



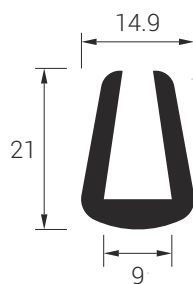
T58



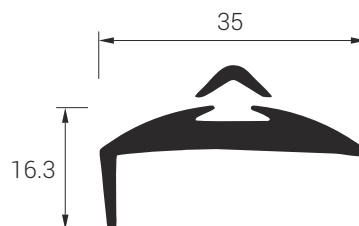
T92



T64

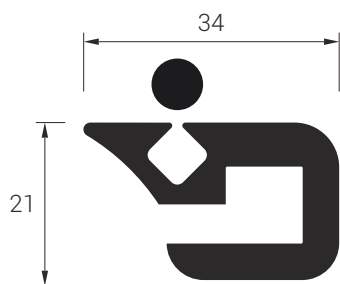


T93

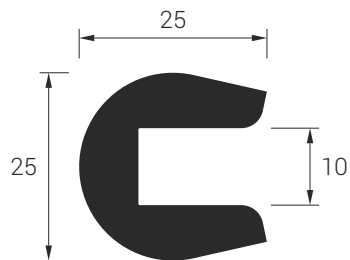




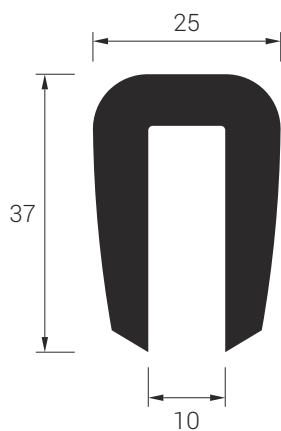
T96



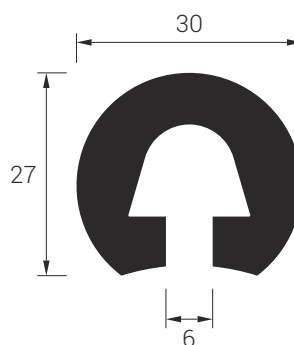
T102



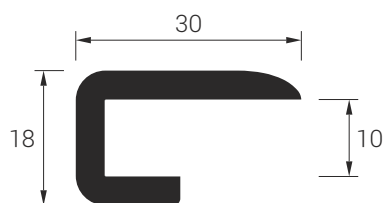
T98



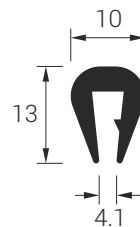
T103



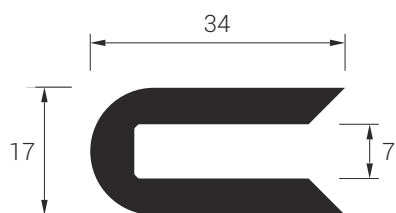
T100



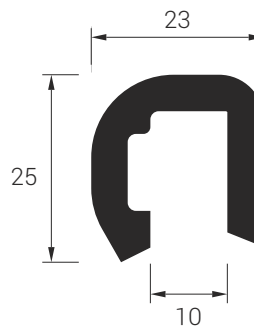
T105



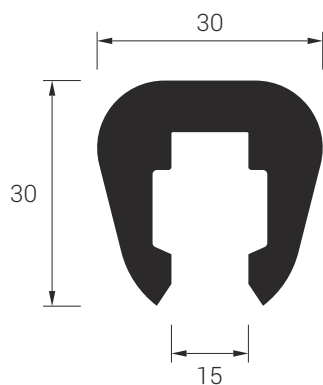
T101



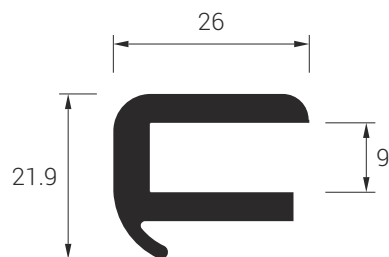
T138



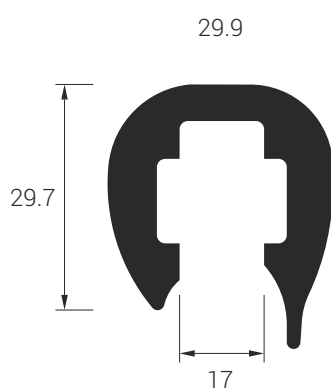
T139



T145



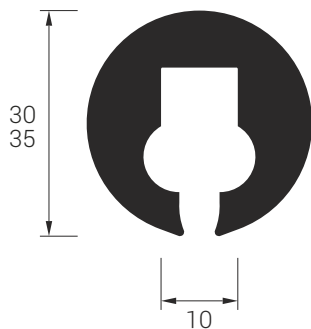
T141



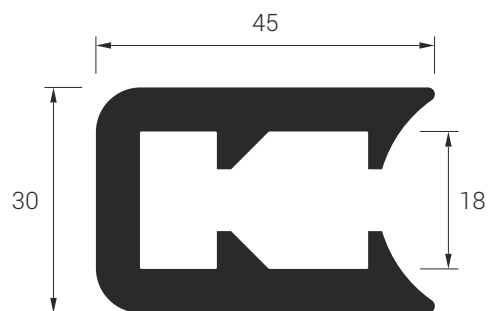
T150



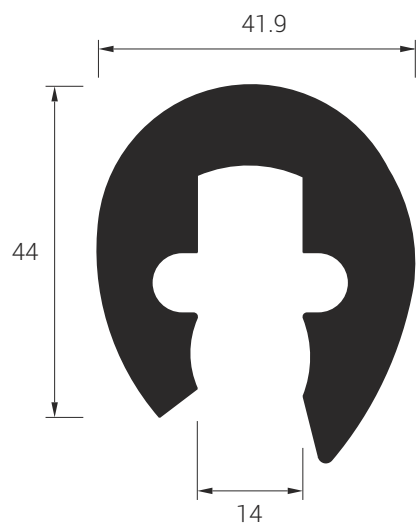
T143



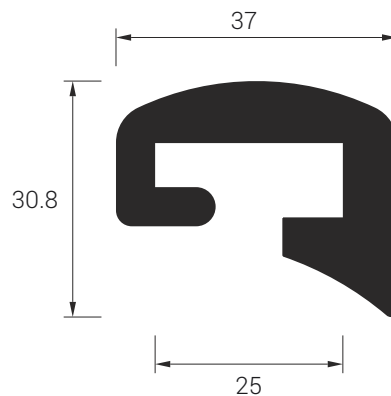
T151



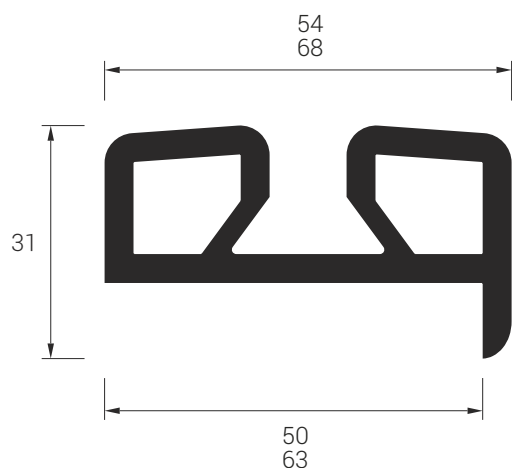
T144



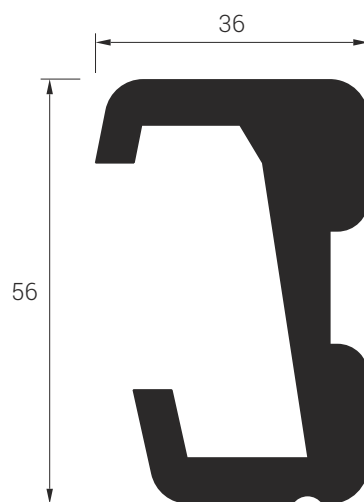
T153



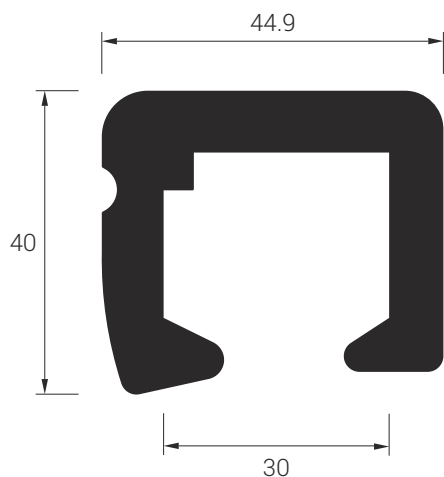
**T156**



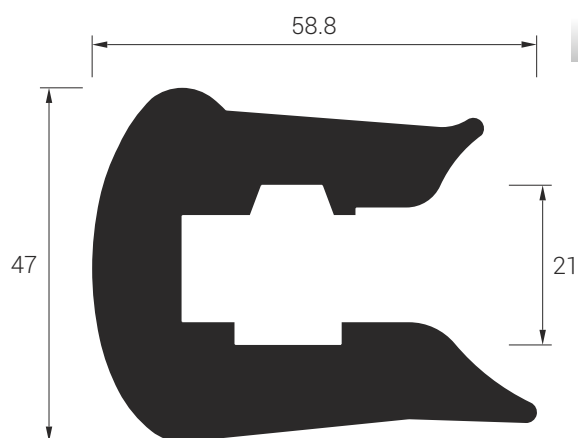
**T166**



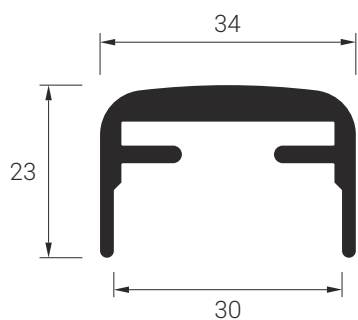
**T158**



**T167**

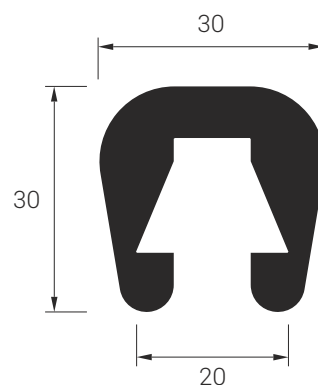


**T161**

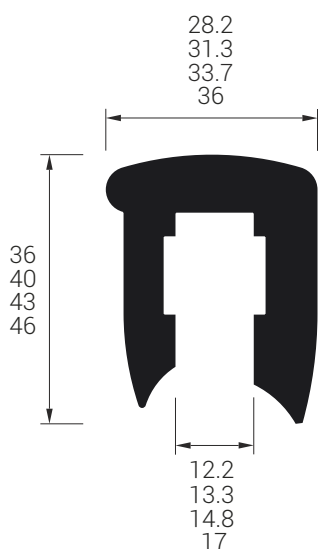


**T171**

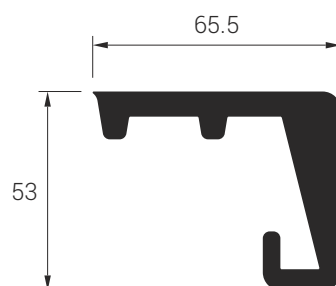
scale 1:2



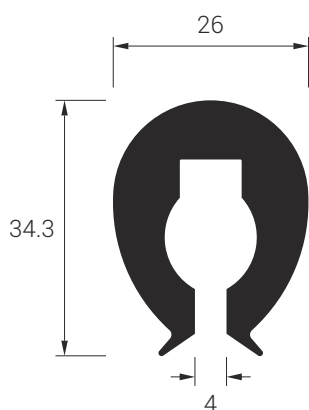
**T164**



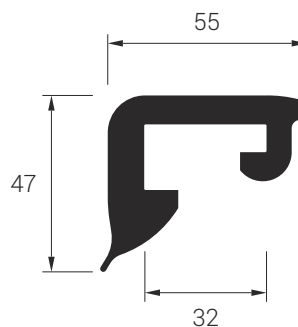
**T173**



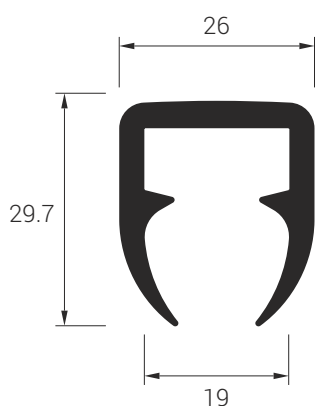
**T174**



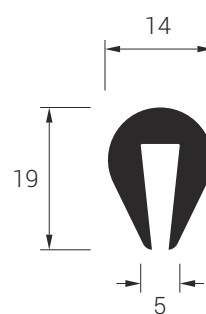
**T331**



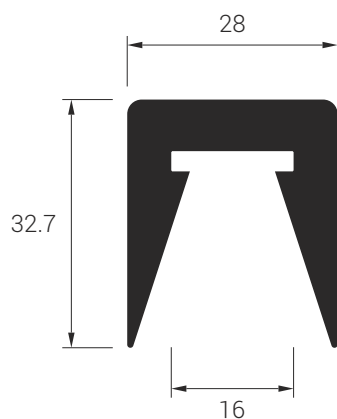
**T183**



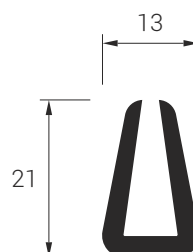
**T380**



**T186**

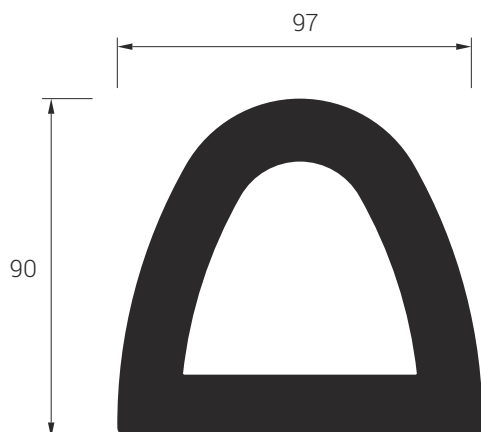


**T382**

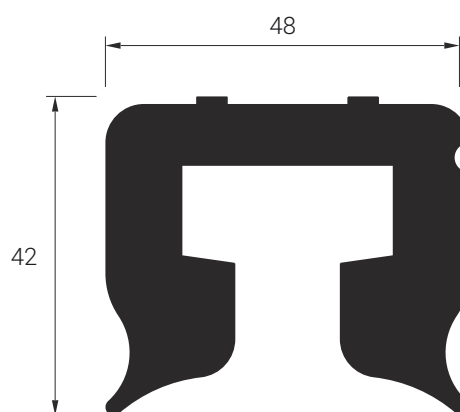


**T190**

scale 1:2

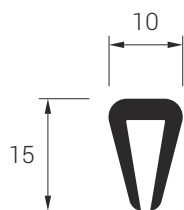


**T392**

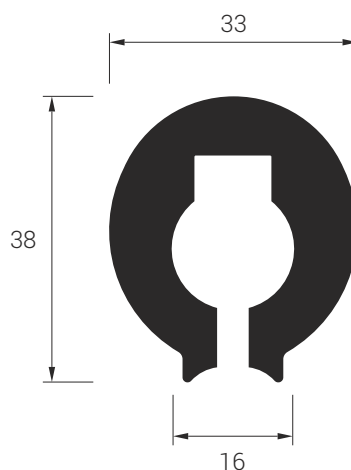




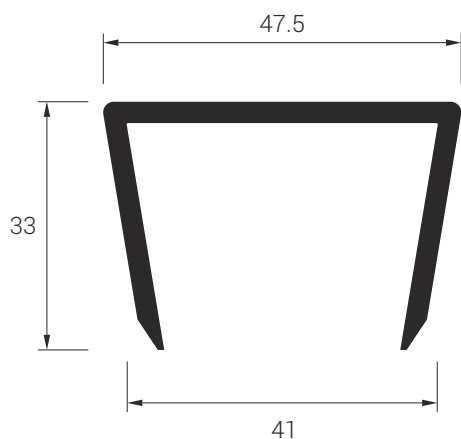
**T397**



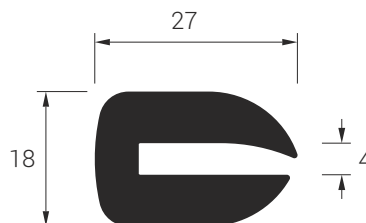
**T556**



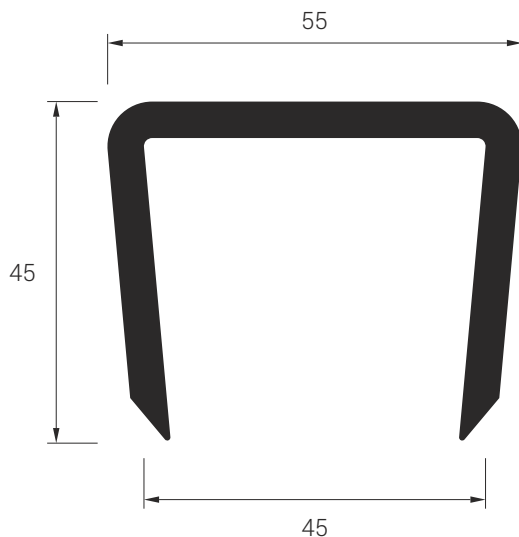
**T407**



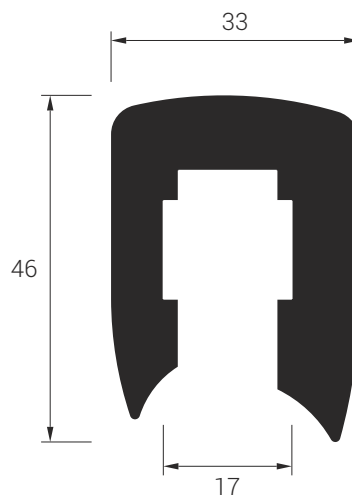
**T557**



**T440**

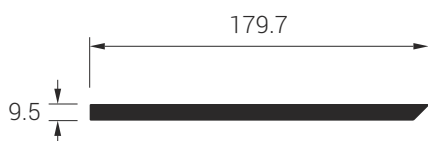


**T558**

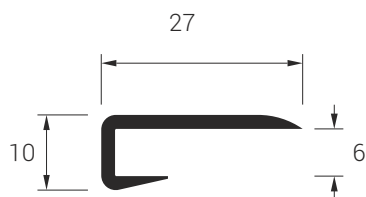


**T444**

scale 1:4

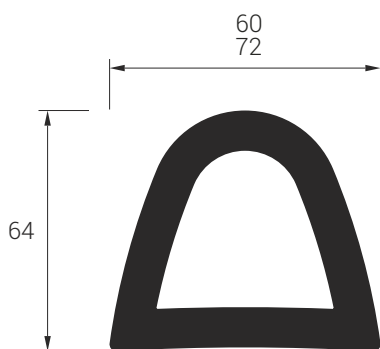


**T574**

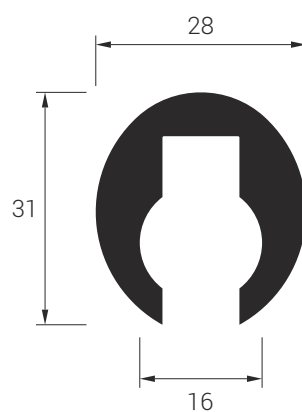


**T578**

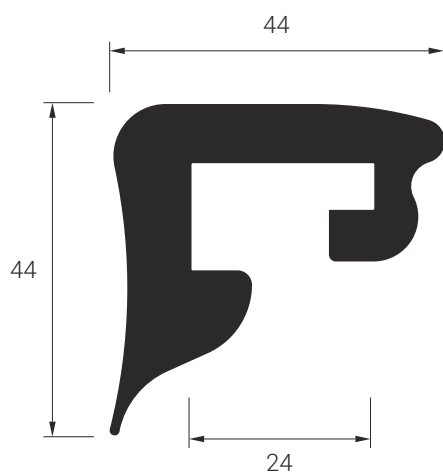
scale 1:2



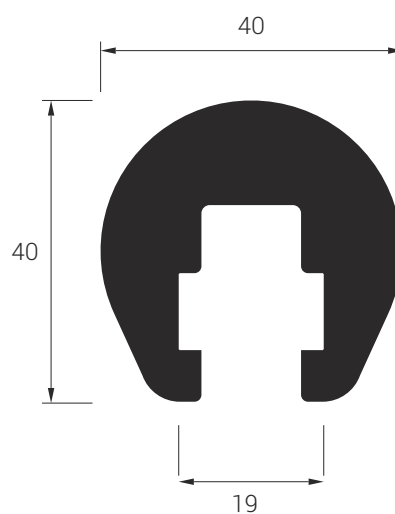
**T619**



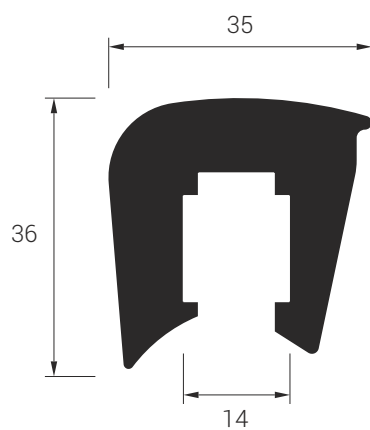
**T600**



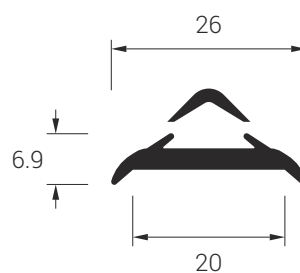
**T625**



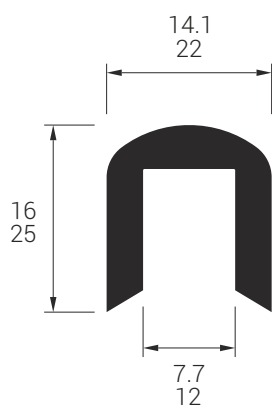
**T601**



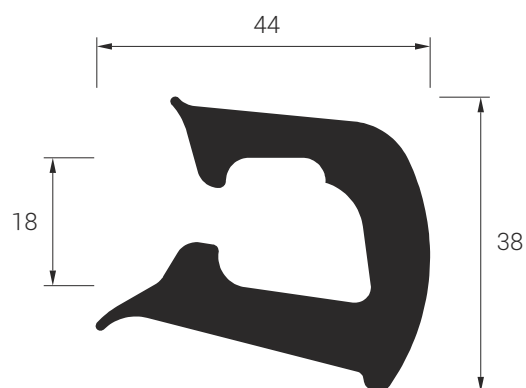
**T631**



**T613**

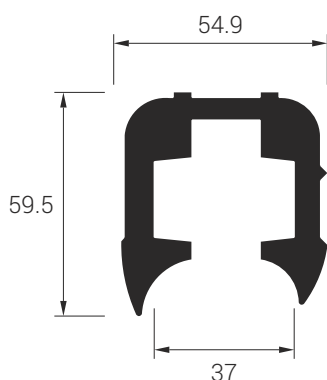


**T693**

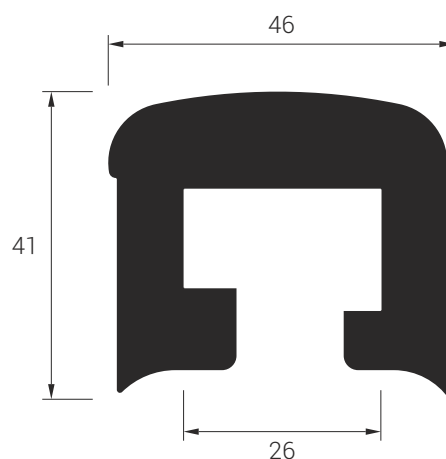


**T745**

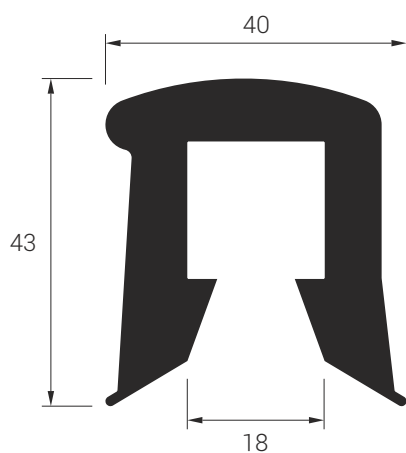
scale 1:2



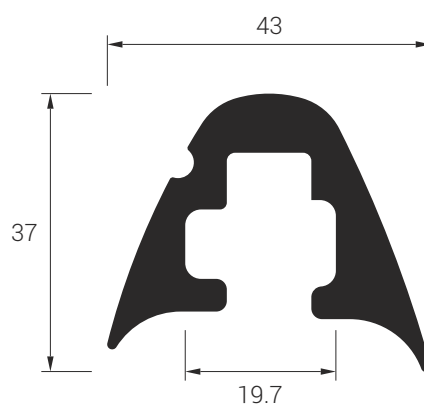
**T844**



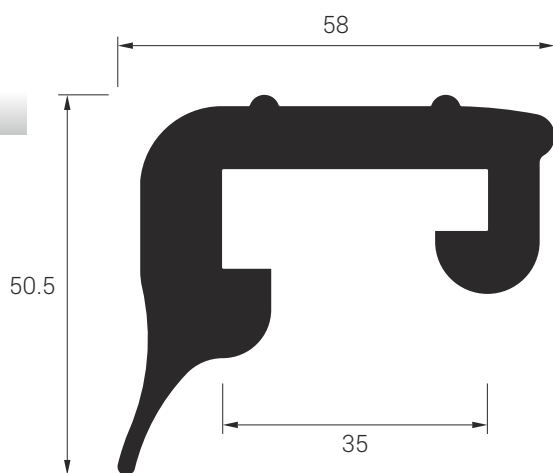
**T782**



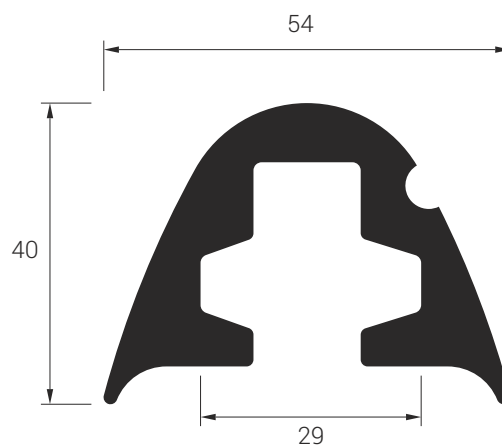
**T872**



**T805**

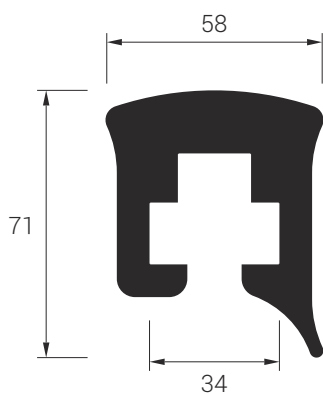


**T884**



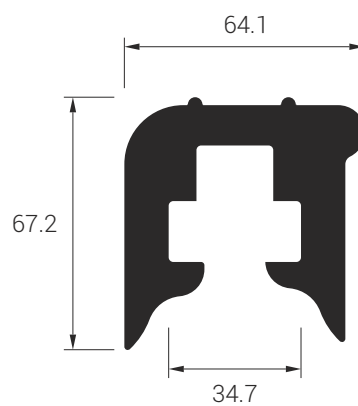
**T806**

scale 1:2



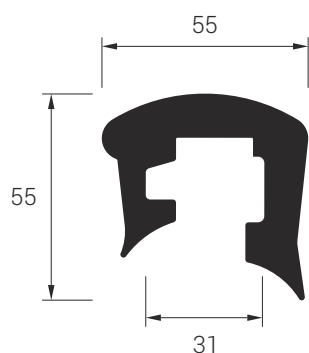
**T966**

scale 1:2

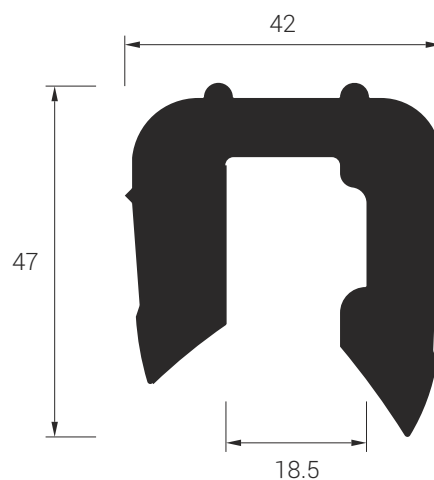


**T973**

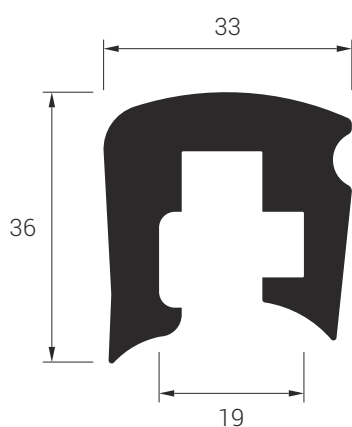
scale 1:2



**T1035**

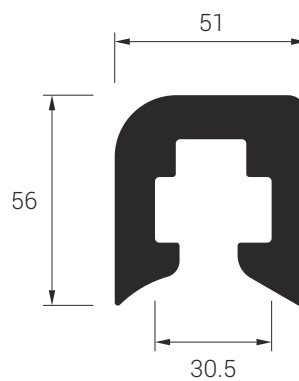


**T975**



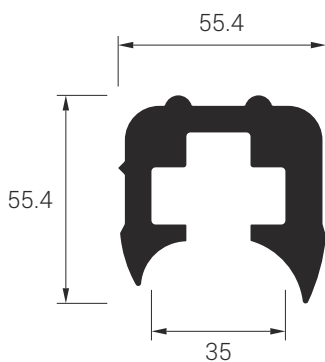
**T1071**

scale 1:2

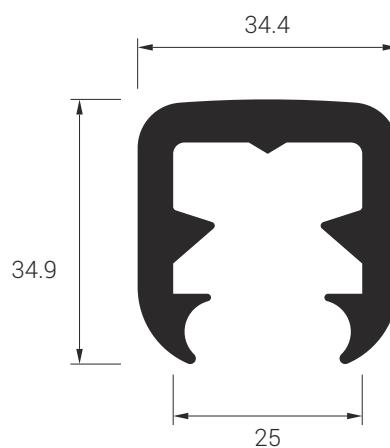


**T1000**

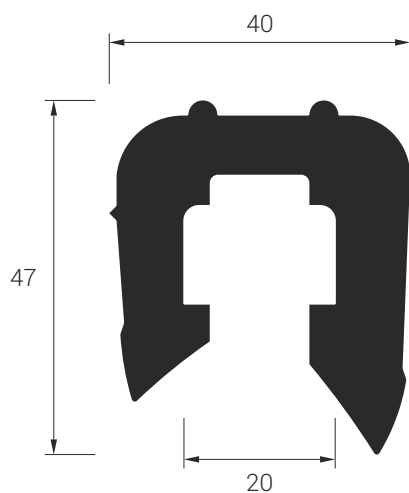
scale 1:2



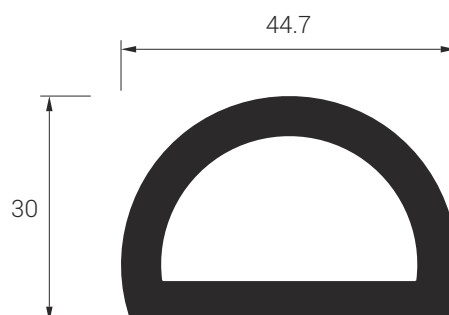
**T1072**



**T1027**

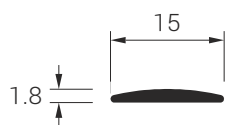


**T1074**

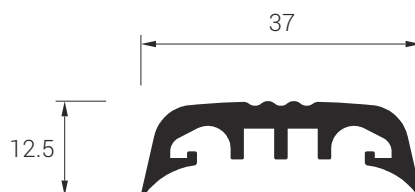




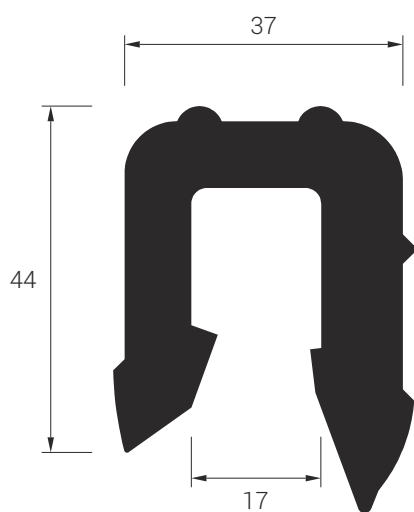
T1124



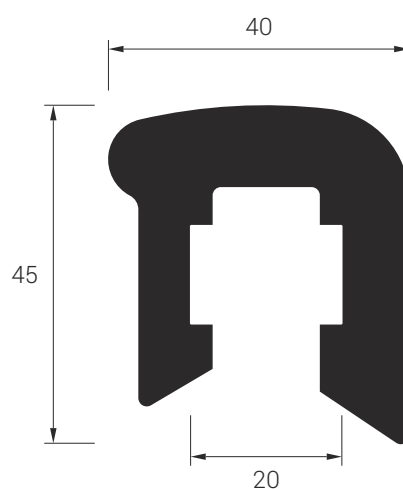
T1122



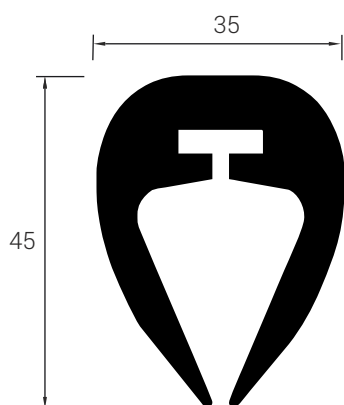
T1198



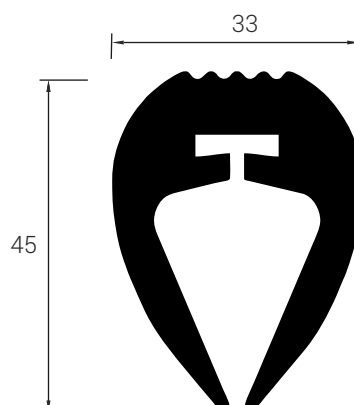
T1092



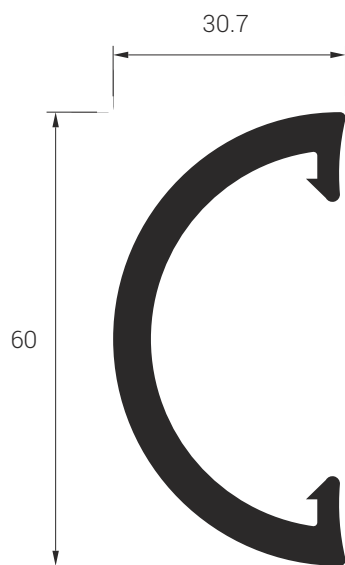
T1360



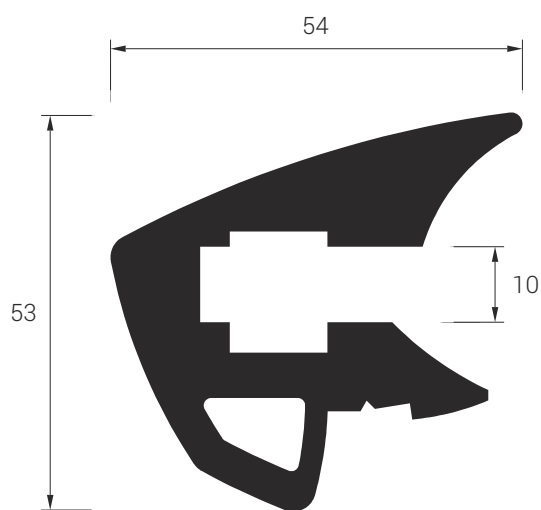
T1123



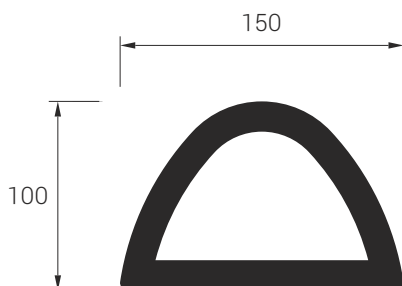
T523



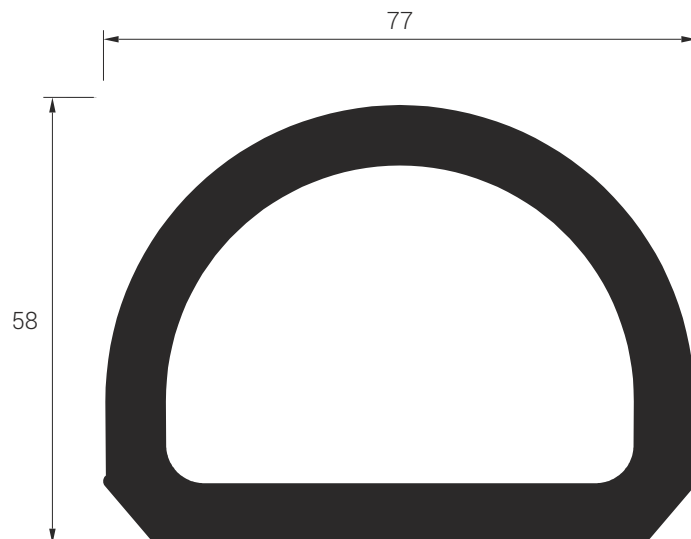
T1576



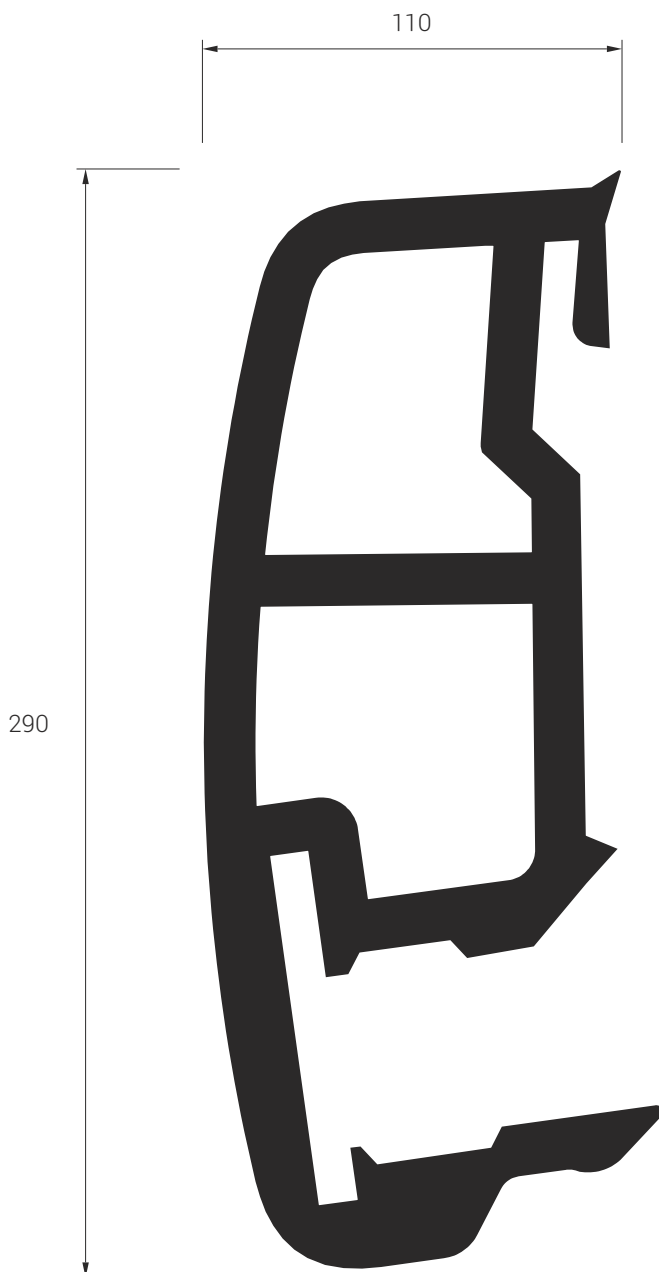
T817



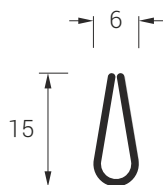
T1530



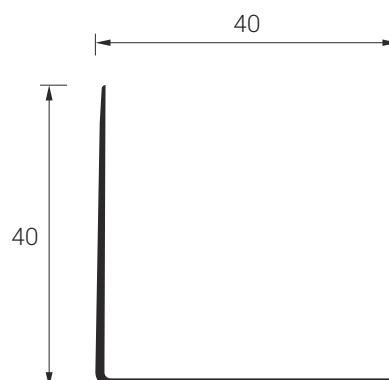
T1603



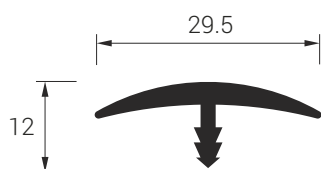
**T57**



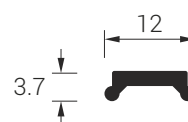
**T61**



**T73**

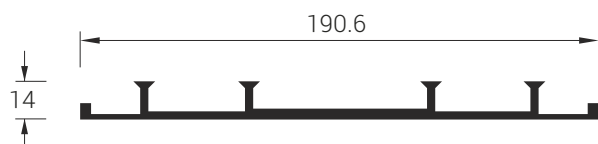


**T119**

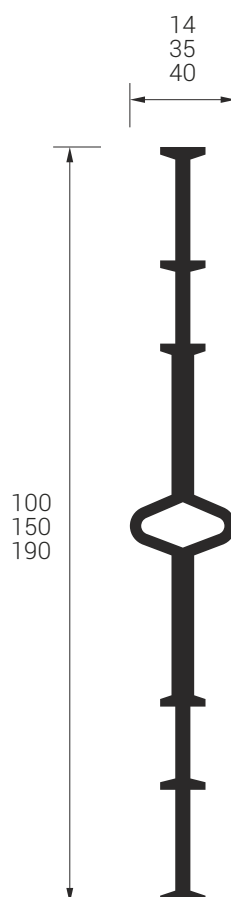


**T168**

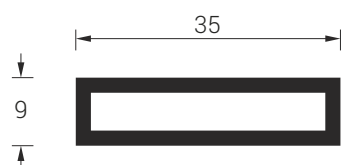
scale 1:2



**T169**

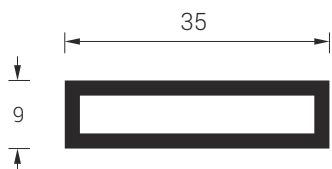


**T184**

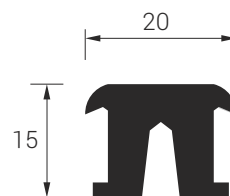




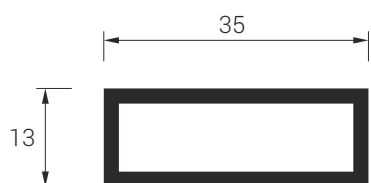
**T184**



**T201**

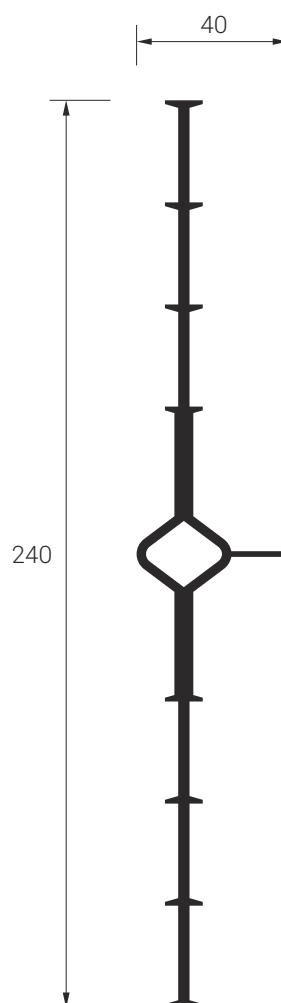


**T185**

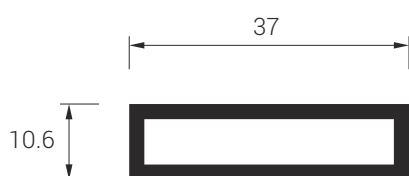


**T242**

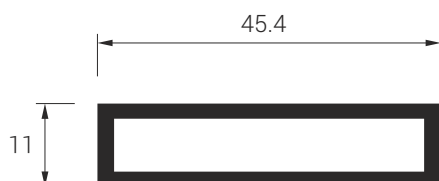
scale 1:2



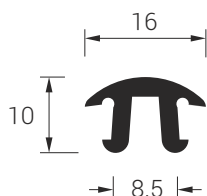
**T192**



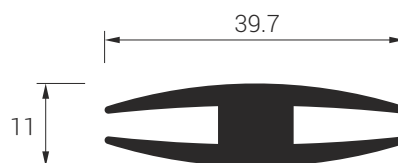
**T197**



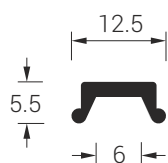
**T333**



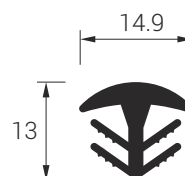
**T433**



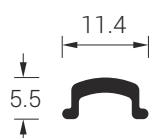
**T335**



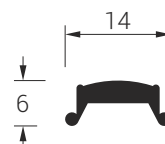
**T450**



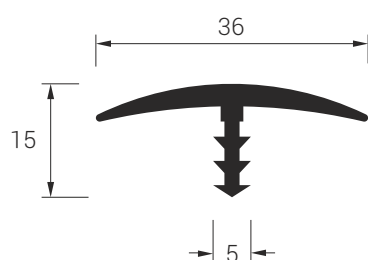
**T337**



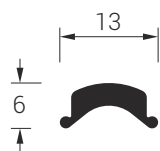
**T501**



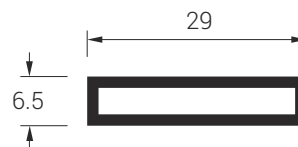
**T432**



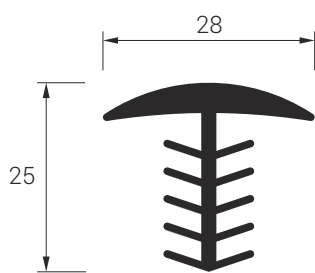
**T502**



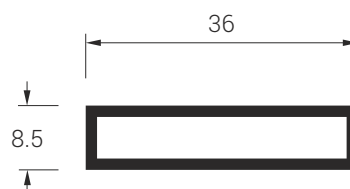
**T679**



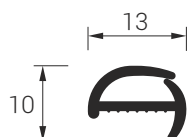
**T563**



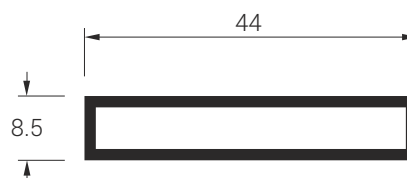
**T680**



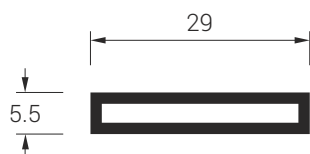
**T595**



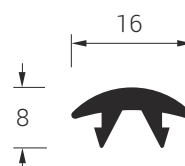
**T681**



**T678**

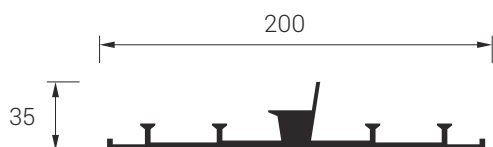


**T719**

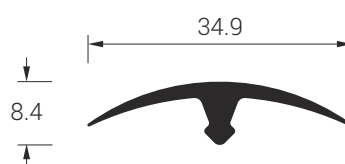


**T728**

scale 1:4

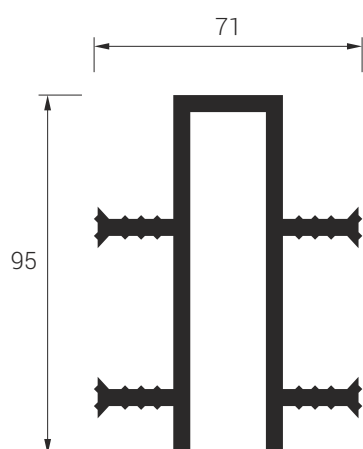


**T779**



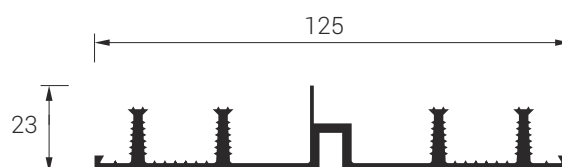
**T729**

scale 1:8

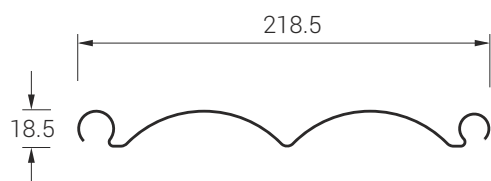


**T784**

scale 1:4

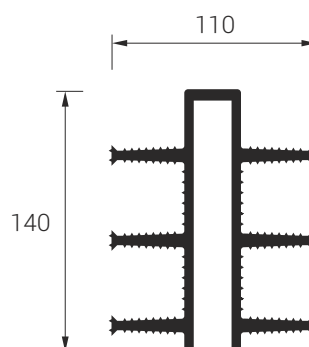


**T743**

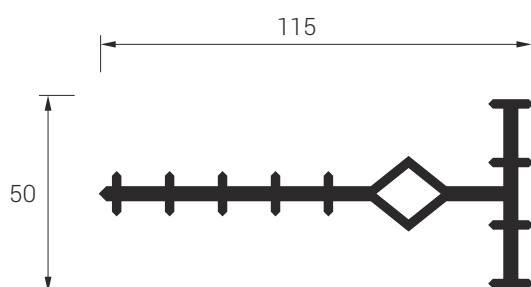


**T785**

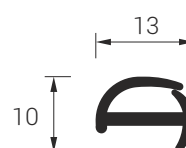
scale 1:4



**T759**

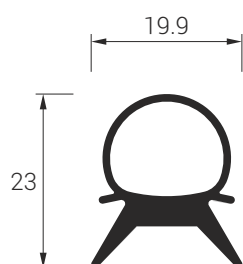


**T792**

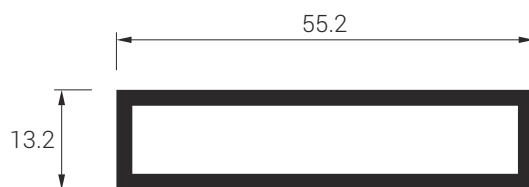




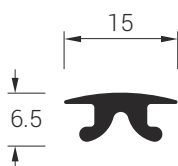
**T818**



**T847**



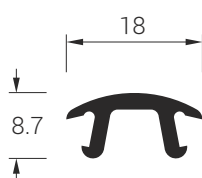
**T819**



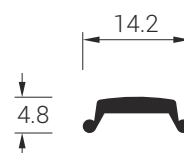
**T849**



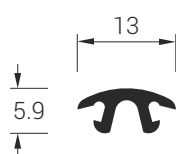
**T839**



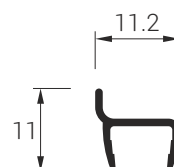
**T854**



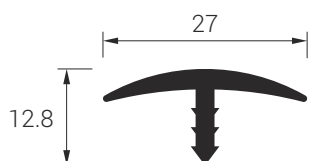
**T841**



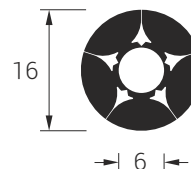
**T858**



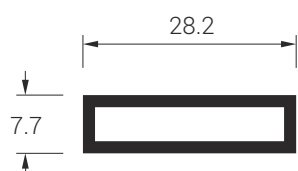
**T866**



**T909**

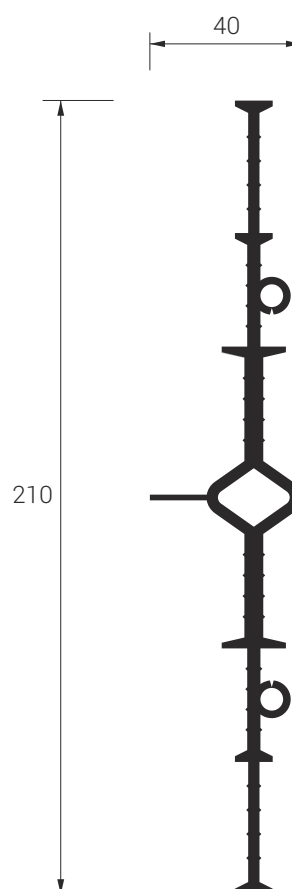


**T869**

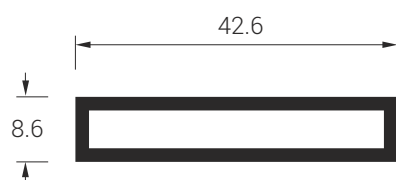


**T919**

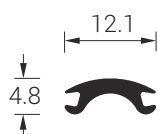
scale 1:2



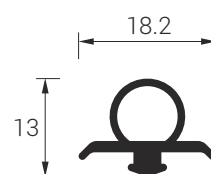
**T870**



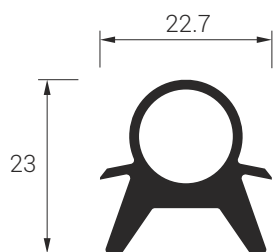
**T882**



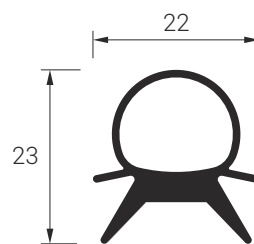
**T953**



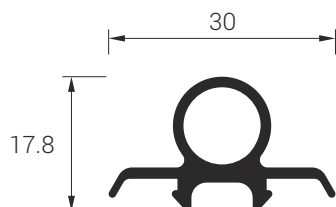
T965



T969

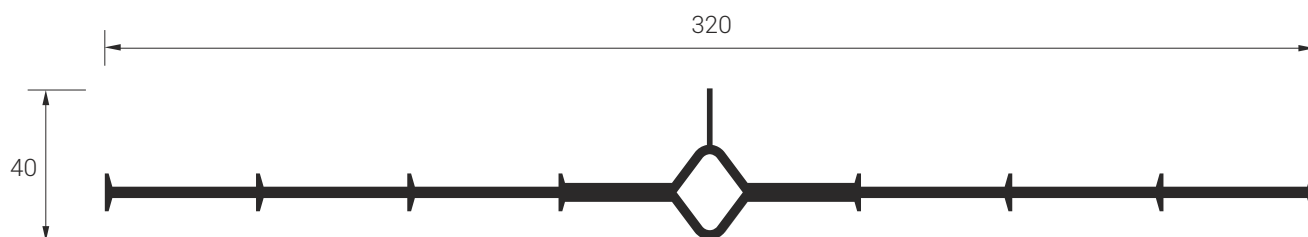


T977

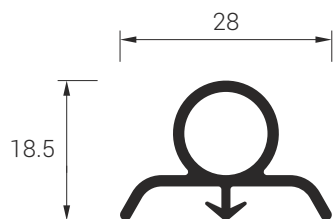


T998

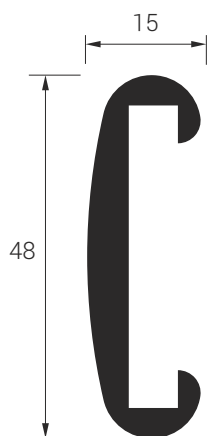
scale 1:2



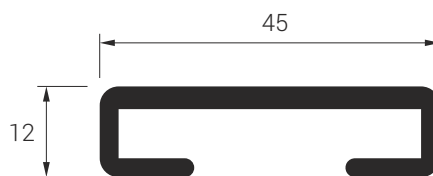
T1018



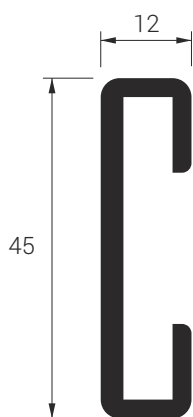
T160



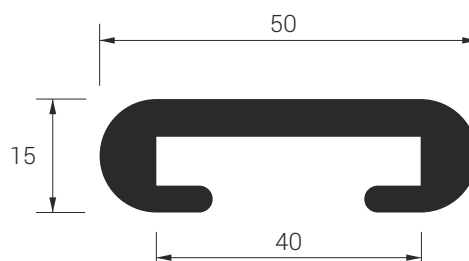
T477



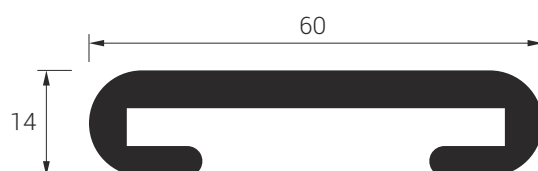
T293



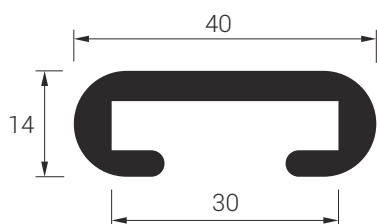
T478



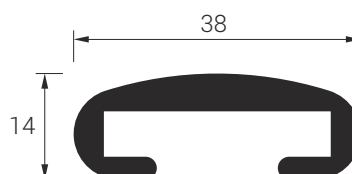
T651



T476

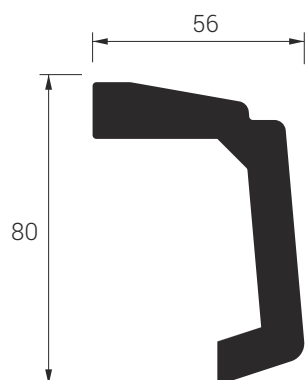


T709

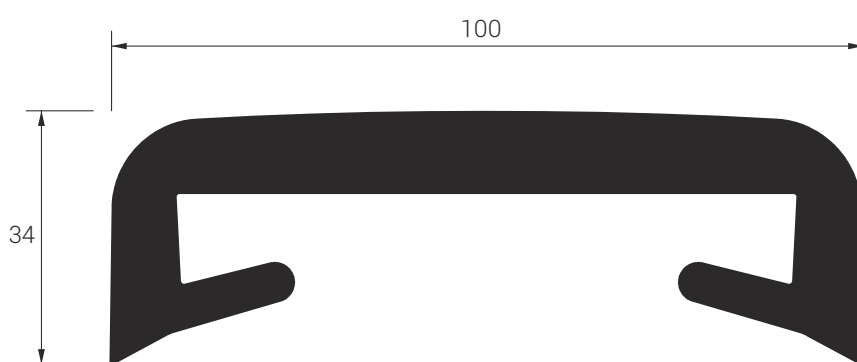




**T999**



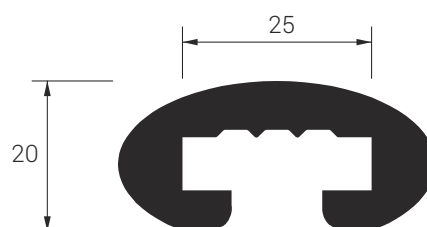
**T1451**



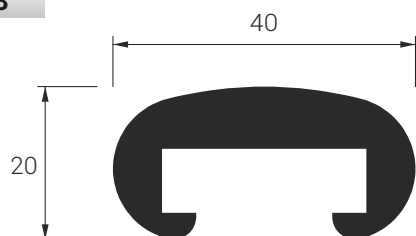
**T1065**



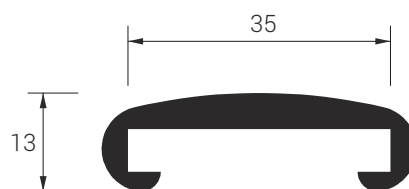
**T1502**



**T1328**



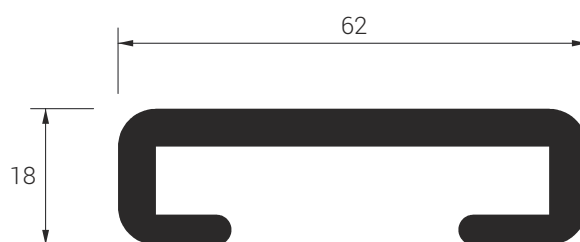
**T1533**



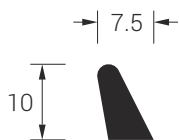
**T1450**



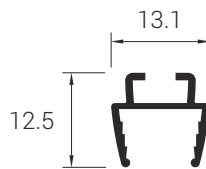
**T1605**



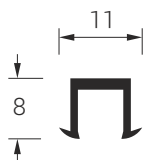
**T17**



**T951**



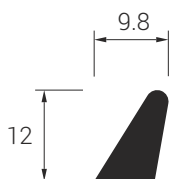
**T229**



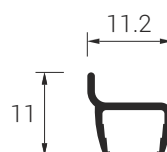
**T1077**



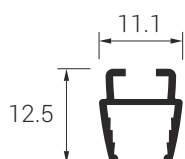
**T569**



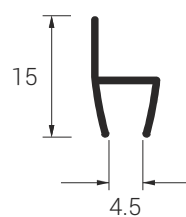
**T1078**



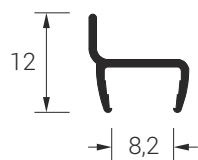
**T887**



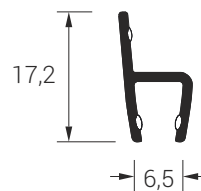
**T1215**



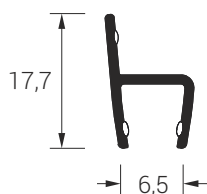
**T1307**



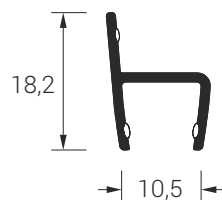
**T1373**



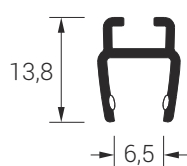
**T1370**



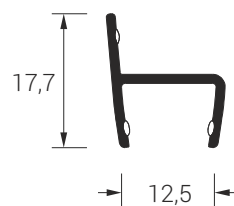
**T1374**



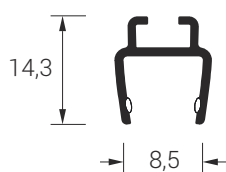
**T1371**



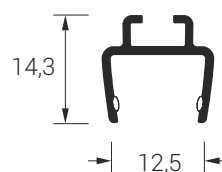
**T1389**



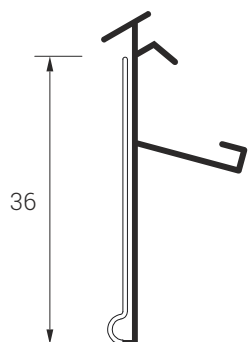
**T1372**



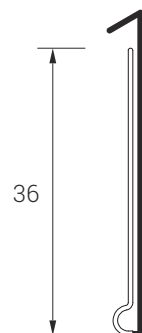
**T1390**



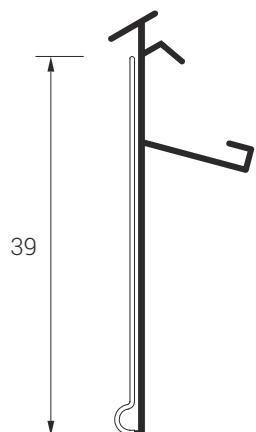
**T1336**



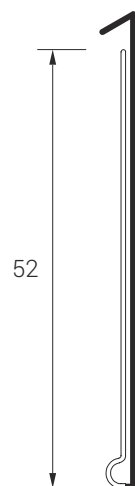
**T1339**



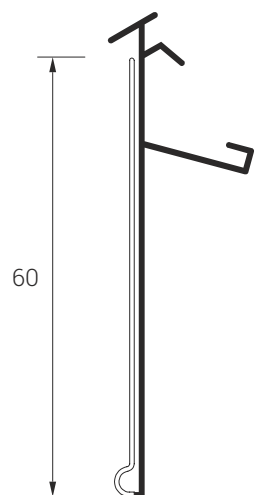
**T1337**



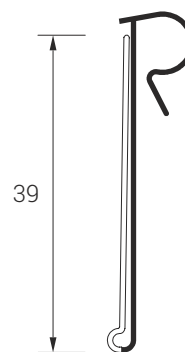
**T1340**



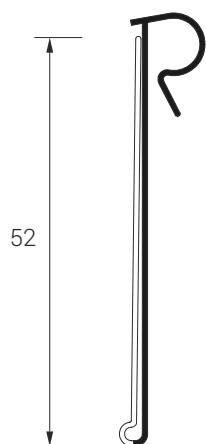
**T1338**



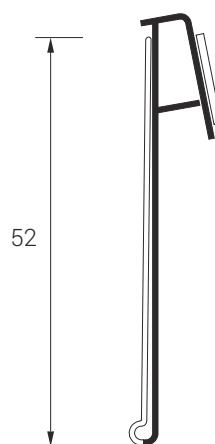
**T1341**



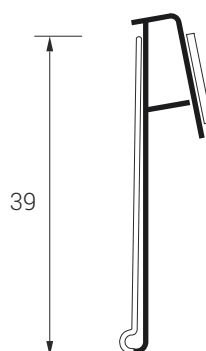
T1342



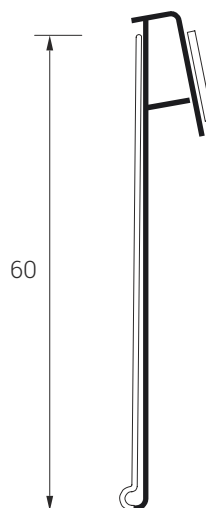
T1351



T1343

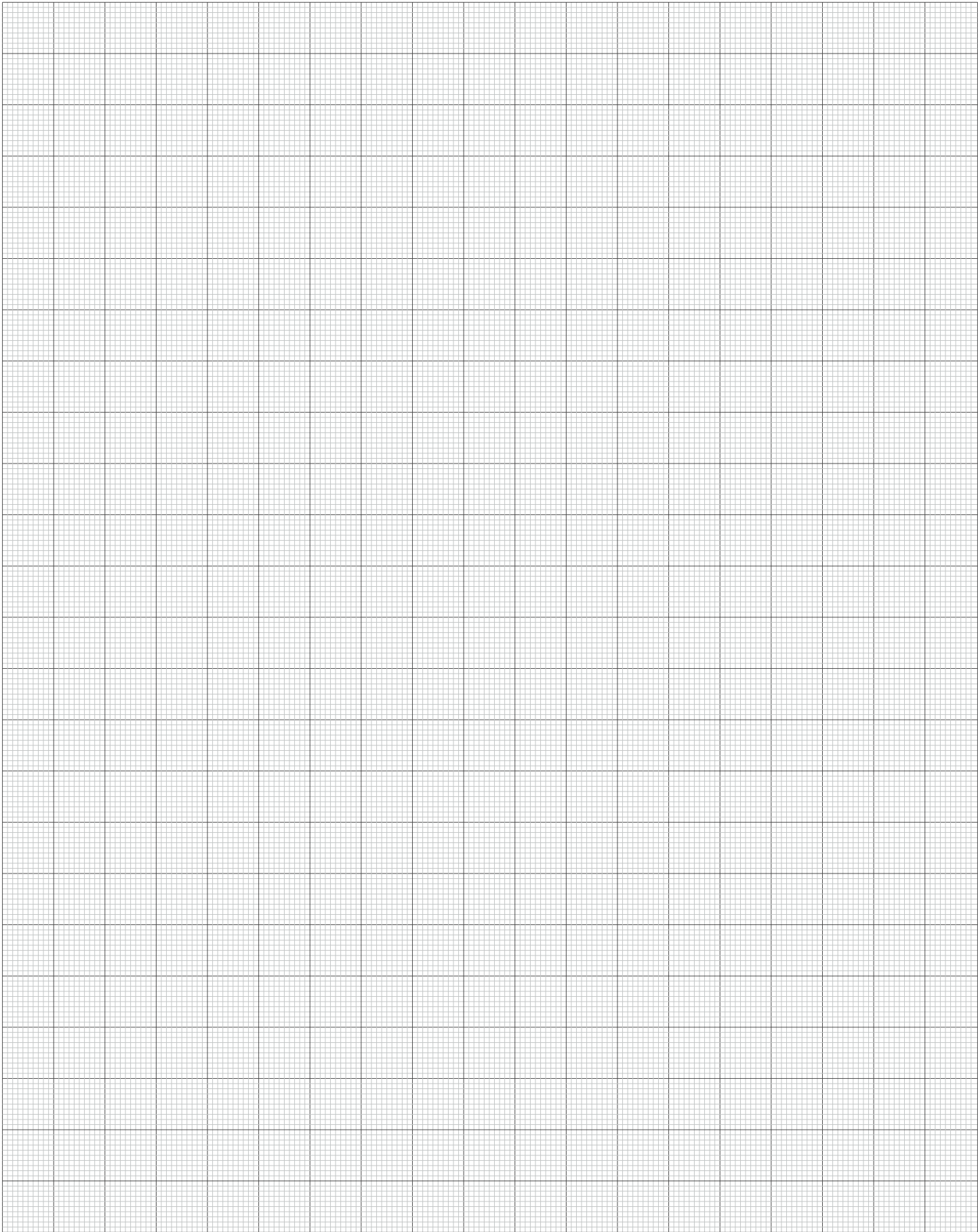


T1345

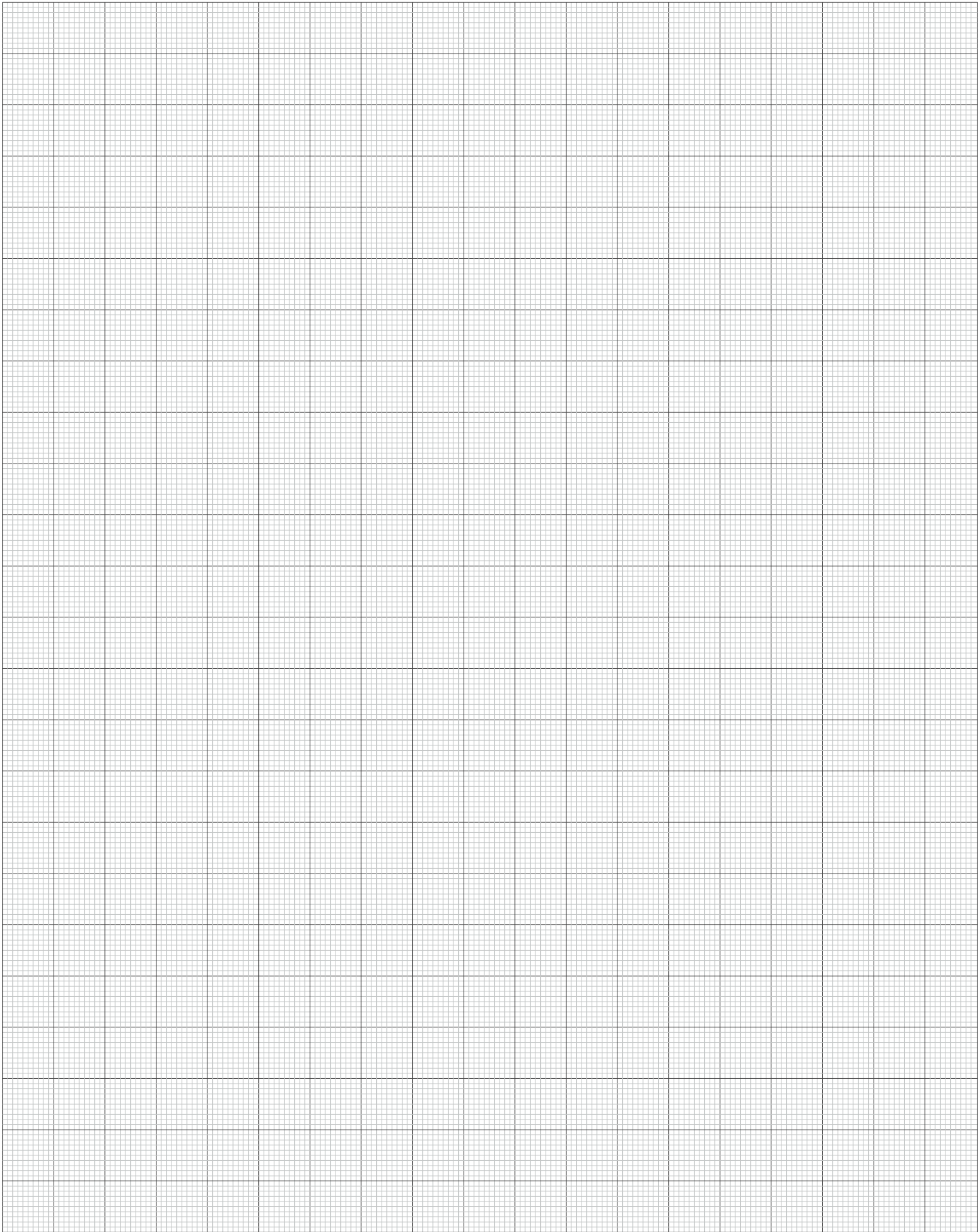




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