EVOLVER

The evolution of fencing

TECHNICAL DATA SHEET

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Contents

Evolver Composite Fencing

The Evolver fence system allows for complete customisation by pairing optimised aluminium octagonal shaped posts and smart aluminium framing with environmentally friendly bamboo composite boards. The unique design of the posts lets you position your horizontal fence boards in multiple directions, and the smart framing streamlines/simplifies installation and provides slope correction. Choose from a range of beautiful natural-looking fence boards in capped Infinity bamboo composite or Eva-tech composite boards to complete this long-lasting, corrosion resistant, and low-maintenance fencing system.

Product name: Evolver composite fencing
Product application: Fencing
Material: Infinity
Material description: Co-extruded profiles with a cellulose-polymer composite core.

Document layout

Eva-Last strives to evaluate their products in depth and present the technical and safety information available in a manner that assists with the application thereof. If additional data or information is required, please do not hesitate to contact us at **rad@eva-last.com**.

In an attempt to simplify the information, similar data is loosely grouped into the categories summarised below. This document is ordered according to these categories and the applicable page number for the start of each section captured in the Table of contents above.

- Material composition
- Physical properties
- Mechanical properties
- Thermal properties
- Fire reaction properties
- Weathering properties
- Surface properties

The Material compositions section captures a summary of the product make-up from the Material Safety Data Sheet (MSDS). A link to the MSDS is provided for additional detail. Summaries of chemical compliance data available are also collected in this section.

The Physical properties section provides a summary of available profiles and general material properties such as density, water absorption, etc. Additional profile information can be obtained from drawings in the appropriate Appendix. Where possible, material properties that can be assigned to more specific categories are moved to the relevant section.

The Mechanical properties section captures data related to the product's reaction to various load conditions. The section is broadly assembled into the below categories. Additional profile and sectional information are captured by the drawings in the appropriate Appendix.

- Material specific mechanical properties
- Profile specific mechanical properties
- Sectional properties

Product properties such as the expansion coefficient, thermal resistance, etc. are captured, where applicable, in the Thermal properties section.

Information regarding the product's reaction to fire is captured in the Fire Reaction properties section.

Test data relating to the acoustic performance of the, where applicable, is summarised in the acoustic properties section.

Information on the product's resistance to mold, termites, etc. is collected in the Biodegradation properties section.

The Surface properties section summarise information regarding the finish or texture of the product. Test data on aspects such as slip resistance (where applicable) is captured in section.

Where the products form part of a system and, as a result, utilise other components, an additional section to capture useful data regarding these components is added to the document.

Where information is not yet available, the section is simply omitted. In the cases where information can be substituted or supplemented with alternative data (based on similar compositions, etc.), an attempt to do so is made. Where this is the case, it is highlighted. Please make use of the data accordingly. For any additional information regarding this, please feel free to contact **rad@eva-last.com**.

Always ensure the product and application thereof is suitable, rational, and compliant with any applicable regulations or standards. Wherever necessary, consult a suitably qualified professional. For information about the installation and use of the product, please see the applicable Installation Guide (IG). For additional material safety and handling information, please refer to the applicable MSDS. For any further information, please contact **rad@eva-last.com**.

Please note this is an initial version of a new product and, as a result, limited test data is available. The information within this document is based on internal laboratory reports at various stages of product development and data from what are similar products. The information herein is for internal consumption only. For additional information please contact **rad@eva-last.com**.

Material composition

The following table is a simplified material composition for the Infinity material technology based on internal reports. For more information regarding the composition, safety, and handling of the material, please see the **Infinity and Eva-tech MSDS**. To confirm which substances are compatible, or incompatible, with the product, please refer to **Appendix B**.

Component	Substance	Mass (%)
Cap and core	Polyethylene	62%
	Cellulose fibre (Bamboo fibres)	28%
	Calcium carbonate	4%
Additional additives	Other	6%

The following table provides a brief overview of the material composition of Aluminium 6063-T5 for information.

Component	Substance	Mass (%)
Core	Aluminium, Al	97.5%
	Magnesium, Mg	0.45 to 0.90%
	Silicon, Si	0.20 to 0.60%
	Iron, Fe	0.35%
Other		0.65 to 1.5%
Coating	Anodised	N/A

Material compliance

Infinity has been assessed to determine whether it contain Substances of Very High Concern (SVHC) that may be classified as carcinogenic, mutagenic, or toxic to reproduction of humans or animals, or have a persistent, cumulative, or negative impact on the environment in accordance with European REACH (Registration, evaluation, and authorization of chemicals) regulations.

Compliance report	Results	Issue date	Compliance body	Information
SVHC compliance	Pass	2019-06	EU REACH	Of the 197 substances evaluated, non-have been detected. SVHC concentration require detection levels of less than 0.05% of the whole product. See this **link** for the full list of substances.

Physical properties

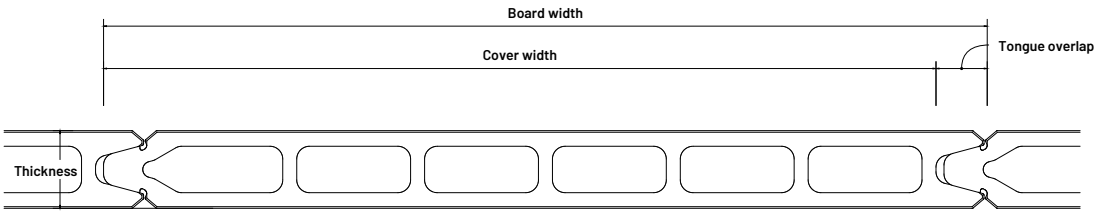
General material properties

Typical properties of the Infinity material technology are captured below as an indication of the expected behaviour of Evolver fence boards.

Properties	Results	Requirement	Test method	Information
Density	1 250 to 1 300 kg/m^2 (78.04 to 81.16 lb/ft^3)	N/A	EN 15534-1	Based on tests performed upon STGJOTG01
Moisture content	0.2%	Less than 5%	EN 15534-1 for 28 days	Infinity materials were evaluated for water absorption properties in accordance with the test method listed to determine dimensional stability. See the report **here** for further details.
Water absorbtion (Mass)	0.6%	Less than 7%		
Thickness swell (Dimensional)	0.2%	Less than 5%		
Length swell (Dimensional)	0.1%	Less than 0.6%		
Width swell (Dimensional)	0%	Less than 1.2%		

Profile properties

The following table is a summary of the currently available profiles, please see **Appendix A** for profile drawings.



Profile ID	Application Type	Board width (mm) (in)	Thickness (mm) (in)	Mass per meter (kg/m) (lb/ft)	Cover width [1] (mm) (in)	Coverage [2] (m/m^2) (ft/ft^2)	Coverage mass [3] (kg/m^2) (lb/ft^2)
STGJ 124	Fence board	220 (8.67)	19.4 (0.77)	3.09 (2.08)	210.9 (8.31)	4.74 (1.45)	14.65 (3.01)

Profile ID	Part	Width (mm) (in)	Thickness (mm) (in)	Gauge (mm) (in)	Mass per meter (kg/m) (lb/ft)
ST13L50	Post – Square	72.0 (2.84)	72.0 (2.84)	1.5 (0.06)	1.91 (4.22)
STOTG11	Post – Octagonal	90.0 (3.55)	90.0 (3.55)	2.0 (0.08)	2.14 (4.72)
STOTG6	Siding - Box side	14.0 (0.56)	24.0 (0.95)	1.0 (0.04)	0.18 (0.40)
STOTG5	Siding - Cover side	7.8 (0.31)	24.0 (0.95)	1.0 (0.04)	0.1 (0.23)
STOTG7	Siding - Attachable channel	20.5 (0.81)	28.9 (1.14)	2.0 (0.08)	0.4 (0.89)
ST09J6	Railing - Top rail	30.0 (1.19)	19.5 (0.77)	0.8 (0.04)	0.24 (0.53)
ST09J7	Railing - Bottom rail	40.0 (1.58)	19.5 (0.77)	1.0 (0.04)	0.29 (0.64)
N/A	Railing - Intermediate rail	50.4 (1.99)	19.5 (0.77)	1.0 (0.04)	0.39 (0.86)

Mechanical properties

Material specific mechanical properties

Composite

All information within this table is currently based on internal laboratory results of Infinity.

Properties	Result	Test Method	Information
Scratch resistance	20 N (4.497 lbf)	FORD FLTM BO 162-01	A standardised test using weighted sharp nails to scratch the surface of the profiles to determine the surface's scratch resistance.
Abrasion resistance	13 mg/c (36 x 10-6 oz/c)	ASTM D4060	A standardised test to estimate the wear resistance of the Infinity cap. The product was subjected to abrasive wheels carrying 1kg loads at 60 rotations a minute for 1 000 cycles.
Cap delamination	60 N / 50 mm (13.49lbf / 2″) 5.32mm (0.210″)	ISO 24345-2006	Allowable peel-off length is 10 mm.
Shore hardness (D)	71	ISO 868	A standardised test to determine the depth of penetration of a specific indenter. Results greater than 60 fall under the category "Extra hard".
Creep recovery	83%	ASTM D7032	A 9.5 kN/m^2 (198.4 psf) load applied to the profiles for 24 hours to a solid deck profile. The profiles were then allowed to recover for 24 hours. The deflection was monitored before, during loading, immediately after loading and after a rest period and the recovery thereof measured.
Brinelle Hardness	39.8 N/mm^2 (2.745 lbf/in^2)	EN 15534-1	A standardised test to determine the resistance to indentation and cracking of the surface cap on the Infinity material. The hardness of the material was measured before the impact test was performed.
Impact test – Value of residual indentation	0.08 mm (0.003″)	EN 15534-1	
Maximum crack length	No crack	EN 15534-1	

Aluminium 6063-T5

Typical mechanical properties for Aluminium 6063-T5 from online sources.

Properties	Value	Notes
Typical yield strength	145 MPa (21 000 psi)	
Ultimate tensile strength	186 MPa (27 000psi)	
Modulus of Elasticity	68.9 GPa (10 000 ksi)	
Bulk Modulus	160 GPa	
Poisson Ratio	0.33	
Shear modulus	25.8 GPa (3 740 ksi)	
Shear strength	117 MPa (17 000 psi)	

Profile flexural properties

Flexural properties of polymer composites can be influenced by the profile geometry and span. Typical properties of the Infinity material technology are captured below based on internal test results. See **Appendix A** for profile details. STGJ03I Hollow fence board was tested externally in accordance with EN 15534-1 to verify its conformity with the listed test requirements below. These results serve as an indication of the composite material's performance in fencing applications.

Profile	Span (mm) (in)	Ultimate Load (kN) (lbf)	Deflection at 500 N (mm) (in)	Requirement	Result	Information
STGJ03I Hollow fence profile 161.9 x19 mm (6.374 x 0.748")	230 (9")	5.498 (1235.9)	0.29 (0.012)	Less than 2.5 mm (0.099") of deflection	Pass	STGJ03I is an interlocking profile, that requires no mechanical fastening.

Impact of weathering (material factor estimate)

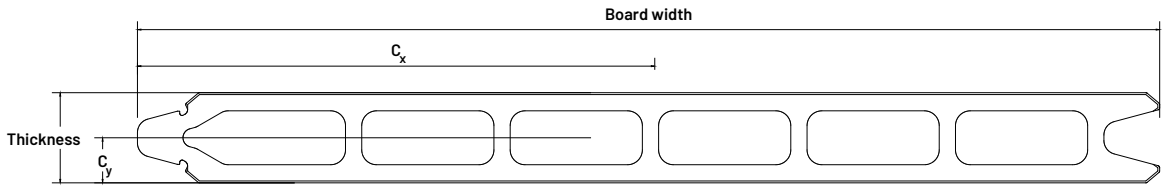
Material properties can vary as a result of long-term weathering. To estimate this impact on the material's flexural properties, the product is subjected to various weathering effects and the performance with and without weathering is compared. The overall end-use adjustment factor is selected based on the weathering effect that has the most impact on the material.

Typical properties of the Infinity material technology are captured below as an indication of the expected behaviour.

Properties	Flexural strength (%)	Flexural stiffness (%)	Adjustment factor	Test method	Information
High temperature effect	96.8	90.3	0.9	ASTM D7032 – 17, ASTM D2565, and ASTM D790.	To confirm compliance with ICC-ES, AC 174, Infinity materials were evaluated for a decking application to determine what affect temperature, moisture and UV exposure had on the flexural performance of the material in accordance with the test methods listed. The end use adjustment factor is based on the effect with the most impact. The results of which can be located within the issued CCR report, **here**.
Low temperature effect	145.6	137.5	1.0		
Moisture effect	108.3	108.5	1.0		
UV resistance	92.7	94.4	1.0		
Freeze-thaw resistance	104.8	100.7	1.0		
Overall end-Use adjustmentfactor			0.9		

Sectional properties

The following table provides a sectional property summary of the currently available Evolver fence profiles. Please see **Appendix A** for profile drawings and further information.



Composite profile details					Moments of inertia		Centroid		Elastic sectional modulus	
Profile ID	**Application**	**Width (mm) (in)**	**Thickness (mm) (in)**	**Area (mm^2) (in^2)**	**Ix (mm^4) (in^4)**	**Iy (mm^4) (in^4)**	**Cx (mm) (in)**	**Cy (mm) (in)**	**Sx (mm^3) (in^3)**	**Sy (mm^3) (in^3)**
ST13L50	Post – Square	72.0 (2.84)	72.0 (2.84)	704 (1.09)	468 875 (1.13)	455 099 (1.09)	36.0 (1.42)	36.5 (1.44)	12 844 (0.78)	12 641 (0.77)
STOTG11	Post – Octagonal	90.0 (3.54)	90 (3.54)	791 (1.23)	690 413 (1.66)	691 438 (1.66)	46.0 (1.81)	45.0 (1.77)	15 342 (0.94)	15 034 (0.92)
STOTG6	Siding - Box side	14.0	24 (0.95)	66 (0.10)	1 781 (0.01)	3 767 (0.01)	12.0 (0.47)	7.0 (0.28)	254 (0.02)	313 (0.02)
STOTG5	Siding - Cover side	7.8 (0.31)	24 (0.95)	38 (0.06)	292 (0.001)	2 382 (0.01)	12.0 (0.47)	4.7 (0.18)	62 (0.004)	199 (0.01)
STOTG7	Siding - Attachable channel	20.5 (0.81)	28.9 (1.14)	148 (0.23)	4 973 (0.012)	18 875 (0.05)	14.3 (0.56)	11.9 (0.47)	416 (0.03)	1 323 (0.08)
ST09J6	Railing - Top rail	30.0 (1.18)	19.5 (0.77)	89 (0.14)	8 947 (0.02)	5 115 (0.01)	9.6 (0.38)	15.2 (0.59)	589 (0.04)	533 (0.03)
ST09J7	Railing - Bottom rail	40.0 (1.58)	19.5 (0.77)	108 (0.17)	19 045 (0.05)	6 030 (0.02)	9.7 (0.4)	21.8 (0.86)	872 (0.05)	625 (0.04)
N/A	Railing - Intermediate rail	50.4 (1.99)	19.5 (0.77)	144 (0.22)	35 625 (0.09)	8 041 (0.02)	9.7 (0.38)	28.0 (1.10)	1 272 (0.08)	833 (0.05)

Thermal properties

Typical properties of the Infinity material technology are captured below.

Properties	Results	Test method	Information
Coefficient of thermal expansion (CTE) Infinity composite materials	45 x 10-6 mm/mm/°C (25 x 10-6in/in/°F)	ISO 11359-1 and 2 (A)	Materials were evaluated at temperatures between 23.6 and 80 °C (74.48 and 176 °F) resulting in a total temperature change of 56 °C (132.8 °F). The full details of this testing can be in the following SGS EU report **here**.
Coefficient of thermal expansion (CTE) Aluminium 6063-T5	23.4 x 10-6 mm/mm/°C (13.0 x 10-6in/in/°F)	ISO 11359-1 and 2 (A)	Per online sources at temperature ranges of 20 to 100 °C. (68.0 to 212 °F)

Fire reaction properties

The following fire reaction properties are captured below for Infinity material technologies as an indication of their expected behaviour. A solid deck profile was tested but is assumed to be applicable to fencing applications as the test itself is not application dependent.

Infinity Fire reaction properties

Standard	Properties	Result	Requirement	Test Method	Information
ICC-ES AC 174	Flame spread index (FSI)	110	Less than 200	ASTM E84	STGJ02AEN was evaluated in a decking application, by an external laboratory.
	Smoke development index	500	Less than 450		

Single flame source test

This table presents the classification results based on Clause 9.6.1 of EN 15534-1:2014, which is aligned with EN 13501-1:2007+A1:2009 standards, specifically tested on the Infinity Fence Board STGJ03I (162 x 19mm or 6.378 x 0.748 inches).

Standard	Properties	Result	Requirement	Class	Test Method	Information
EN15534-1	Flame spread (Fs)	41 mm (1.614")	Less than 150 mm (5.906") within 20 seconds	Class E	Modified Single flame source test (EN ISO 11925-2 +AC:2011 excluding flooring)	The classification of the fence profile was determined through a partial test regimen where specific results were examined to establish its classification. The comprehensive testing protocol was not fully executed in this case.
	Paper ignition	None	None			Paper did not ignite

Infinity FR Fire reaction properties

Below, we have compiled the fire reaction properties for Infinity Material Technologies, providing an indication of their anticipated behavior. While a cladding profile was tested, it is assumed to be applicable to the fencing application due to the vertical test orientation. It's important to note that Infinity FR exhibits improved fire reaction characteristics compared to standard Infinity.

Standard	Properties	Result		Requirement	Test Method	Information
EN 13501	Fire growth rate (FIGRA) threshold 0.4MJ	49 W/s	B - s2,d0	Less than 750 W/s	EN 13823	Profile STGJ69B FR was installed in an internal corner application, set alight and the behavior of the material on fire was documented and the measurable properties taken to determine a classification. The report can be found **here**.
	Total heat release (THR) at 600 seconds	4.7 MJ				
	Smoke growth rate (SMOGRA)	16 m^2/s^2		Less than 180 m^2/s^2		
	Total smoke production (TSP) at 600 seconds	97 m^2		Less than 200 m^2		
	Droplets	No		No	EN ISO 11925-2 Exposure 30 s	
	Flame spread	Pass		Less than 150mm in 60 seconds		
	Ignition of paper	No		No		
	Smoke development index (SDI)	500		Less than 450		

Weathering properties

The environment to which materials are exposed influences how quickly the material will weather (or deteriorate). This includes degradation factors like UV exposure, oxidation or contact with organisms within the environment such as termites or mold. The impact of these factors is captured below. The impact of weathering on the flexural performance (material factor estimate) of the products is captured in the Mechanical properties section above.

Colour fade

Weathering over time can result in a colour change of the material. **ΔE** is a common form of measurement for colour fade. The **ΔE** denotes the colour difference between an original sample and a tested sample after a certain number of hours of exposure to UV light (and potentially other weathering effects). **ΔE** is measured on a scale of 1 to 100 and provides a simple metric of how the human eye perceives colour change. Both 'light' and 'dark' colours are evaluated to provide an indication of the range of performance of the product.

Standard	ID	Name	Generic description	Hours	ΔE	Grey Scale	Observations	Test method	Notes
ICC-ES AC 174	C02	Baltic Nero	Dark Brown /Black	1000	0.23	5	Changes not perceptible to the human eye	ASTM G155-13	As part of ICC-ES AC 174 requirements. The results of the issued CCRR can be found here.
				2000	0.89	4 to 5			
				3000	1.27	4	Changes perceptible at a glance		
				4000	2.46	3 to 4			
	C70	Caribbean Coral	Light Grey	1000	0.44	4 to 5	Changes perceptible through close observation		
				2000	0.88	4 to 5			
				3000	1.11	4 to 5	Changes perceptible at a glance		
				4000	2.48	3 to 4			

Biodegradation

Materials exposed to organisms such as termites or mold can degrade as a result.
Fungal and Termite resistance
As a certain percentage of cellulose-polymer composition contains cellulose fibres which may provide nutrition to fungi and mold, promote growth, samples were exposed to spores and their growth rates monitored.

Standard	Fungal strand	Measured value	Test method	Information
ICC-ES AC 174 (Fungal resistance)	G. trabeum (change in mass)	0.77%	ASTM D 2017	To confirm compliance with ICC-ES, AC 174, biodegradation resistance requirements. The results of which can be located within the issued CCR report, here.
	P. Placenta (change in mass)	0.91%		
	T. Versicolor (change in mass)	0.90%		
	I.Lacteus (change in mass)	0.91%		
ICC-ES AC 174 (Termite resistance)	G. trabeum (change in mass)	0.77%		

The Infinity material technology was submitted for testing to confirm the effectiveness of fungistatic compounds within the composition's formulation, then visually assessed in accordance with the following scale.

0 – No growth, the material is resistant to fungal attack.
1 – Initial growth, the material is partially protected against fungal attack or generally not susceptible to such attach
2 – Obvious growth and sporulation, the material is susceptible to fungal attack

Standard	Fungal strand	Measured value	Test method	Information
Eurocode	A. Niger, ATCC 6275	0	ISO 16869	To confirm compliance with ISO 16869 for fungal, Infinity samples were exposed to spores for a period of 21 days and their growth rates monitored. The report can be found **here**.
	C. Globosum, ATCC 6205	0		
	P. Variotii, CICC 40379	0		
	P. Funiculosum, CICC 40279	0		
	T. Longibrachiatum CICC 13053	0		

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Contact information

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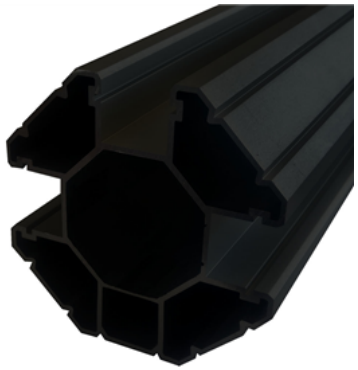
Appendix A
Profile

Profile properties	
Product code	STOTG11
Sectional area (mm^2)	791
Approximate mass (kg/m)	2.1



Sectional properties	
I_x(mm^4)	690 413
I_y(mm^4)	491 438
C_x(mm)	46.0
C_y(mm)	45.0
S_x(mm^3)	15 342
S_y(mm^3)	15 035

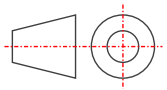
Drawing title

STOTG11 - Aluminium post

File name

Evolver fence profiles - TDS - Version 1.0

File details



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Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

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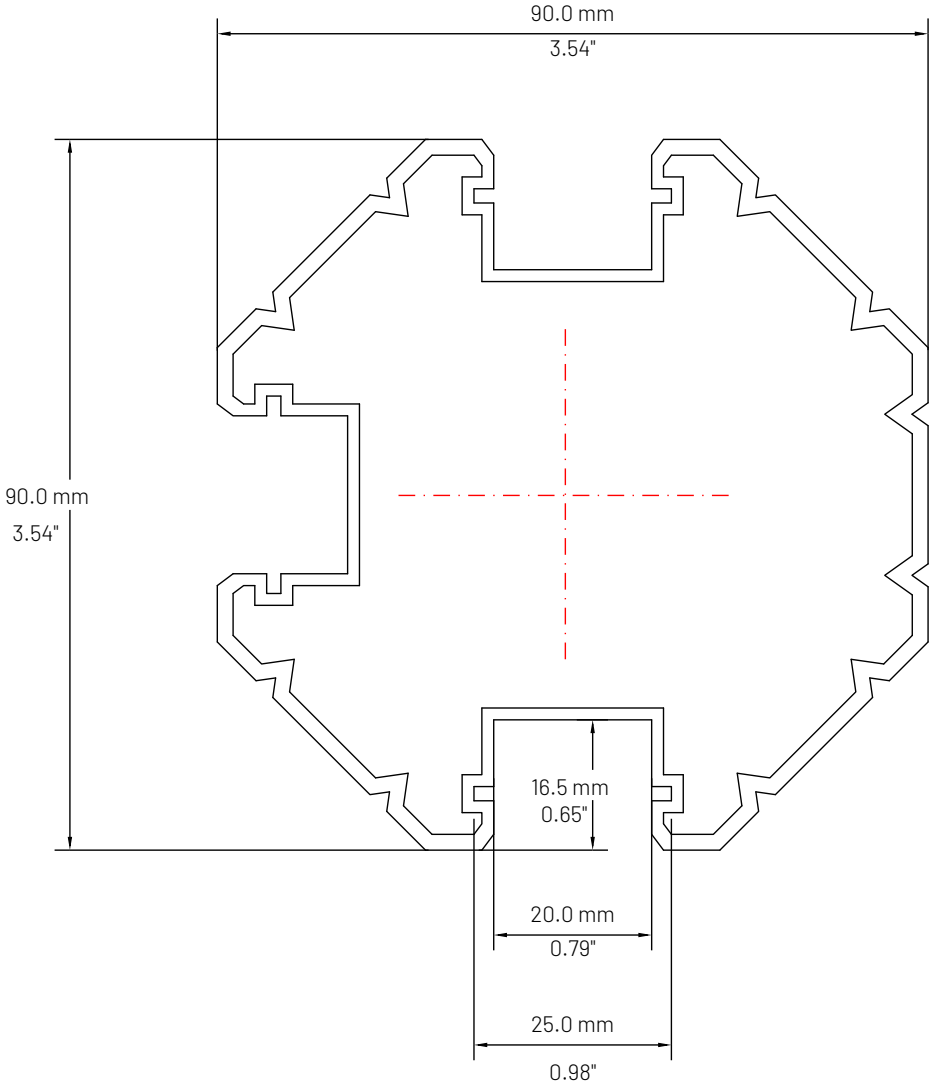


Profile properties	
Product code	ST13L50
Sectional area (mm²)	704
Approximate mass (kg/m)	1.9

Sectional properties	
I_x (mm⁴)	468 875
I_y (mm⁴)	455 099
C_x (mm)	36.0
C_y (mm)	36.5
S_x (mm³)	12 844
S_y (mm³)	12 642

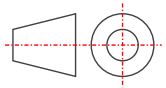
Drawing title

ST12L50 - Aluminium post

File name

Evolver fence profiles - TDS - Version 1.0

File details



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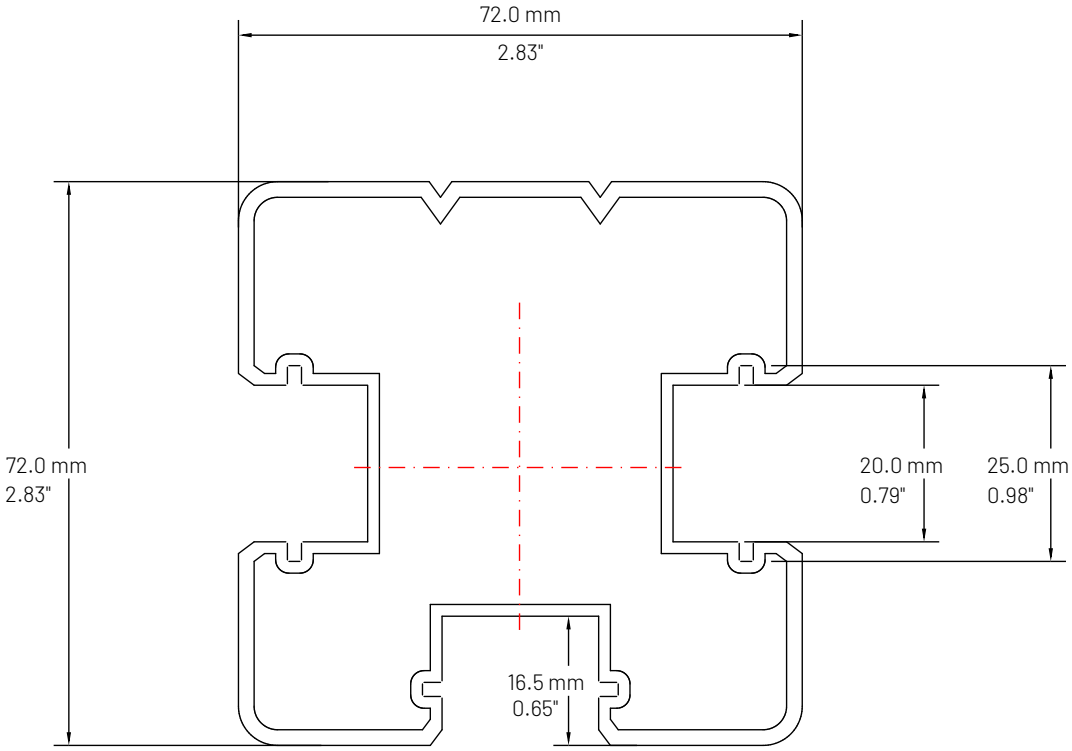


Profile properties	
Product code	ST09J6
Sectional area (mm^2)	89
Approximate mass (kg/m)	0.24

Sectional properties	
I_x(mm^4)	8 947
I_y(mm^4)	5 115
C_x(mm)	9.6
C_y(mm)	15.2
S_x(mm^3)	590
S_y(mm^3)	534

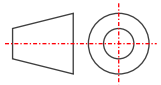
Drawing title

ST09J6 - Aluminium rail

File name

Evolver fence profiles - TDS - Version 1.0

File details



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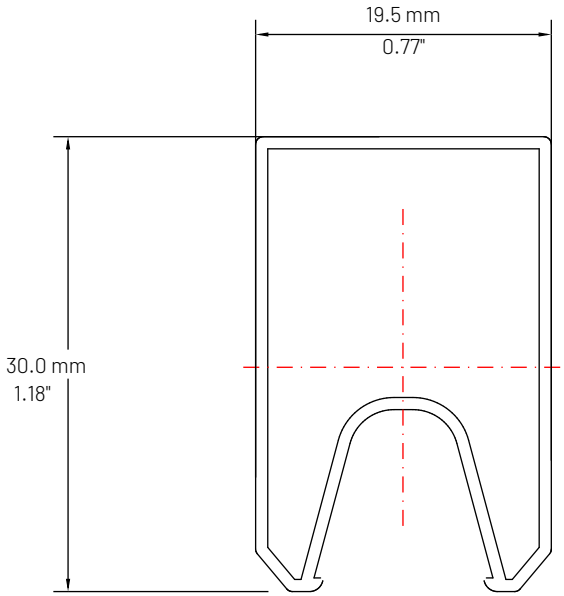
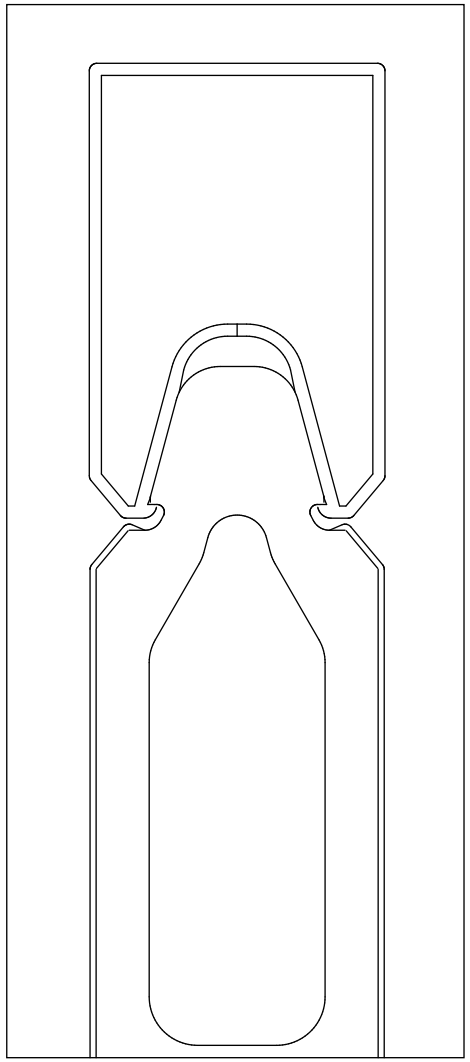




Profile properties	
Product code	ST09J7
Sectional area (mm^2)	144
Approximate mass (kg/m)	0.39

Sectional properties	
I_x(mm^4)	35 625
I_y(mm^4)	8 041
C_x(mm)	9.7
C_y(mm)	28.0
S_x(mm^3)	1 273
S_y(mm^3)	833

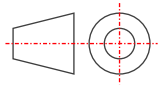
Drawing title

Intermediate Rail - Aluminium rail

File name

Evolver fence profiles - TDS - Version 1.0

File details



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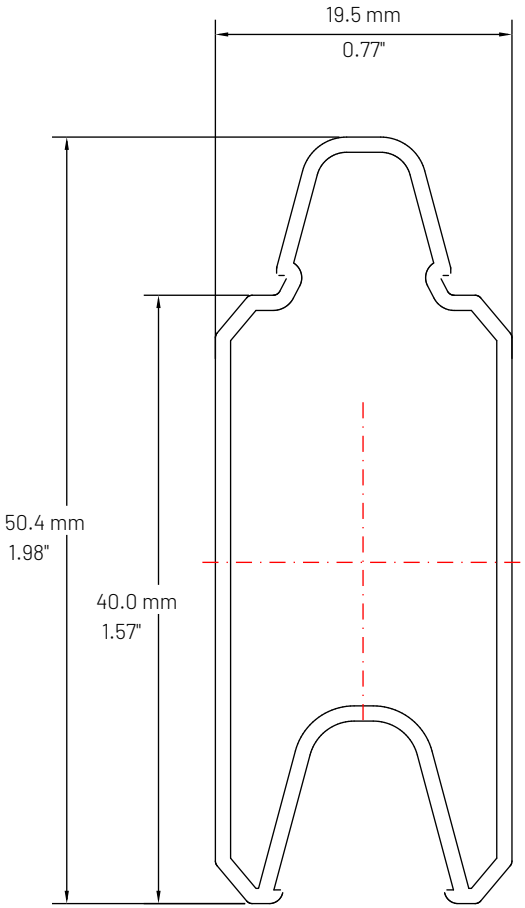
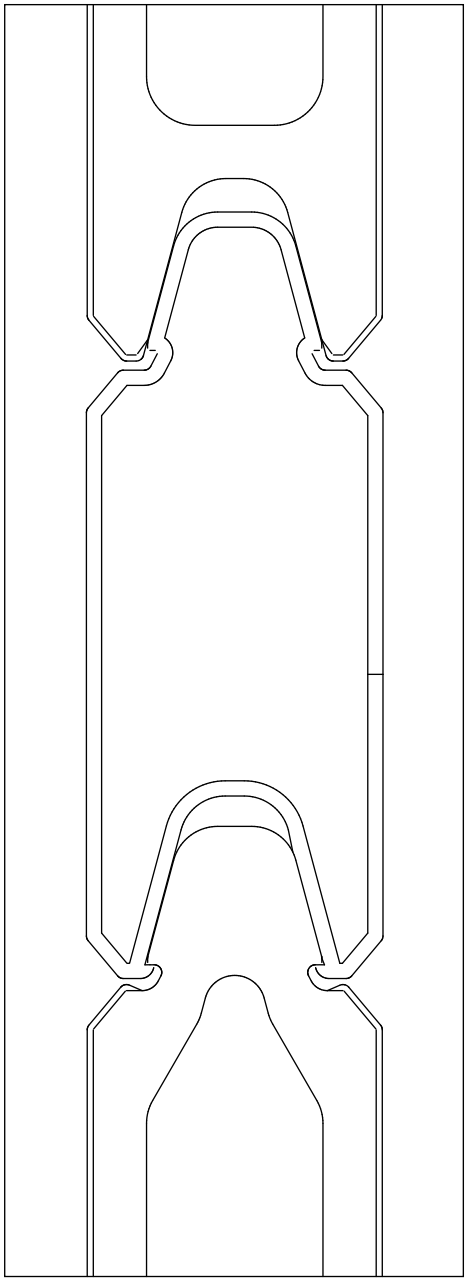




Profile properties	
Product code	ST09J7
Sectional area (mm^2)	108
Approximate mass (kg/m)	0.3

Sectional properties	
I_x(mm^4)	19 045
I_y(mm^4)	6 030
C_x(mm)	9.7
C_y(mm)	21.8
S_x(mm^3)	874
S_y(mm^3)	625

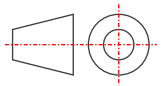
Drawing title

ST09J7 - Aluminium rail

File name

Evolver fence profiles - TDS - Version 1.0

File details



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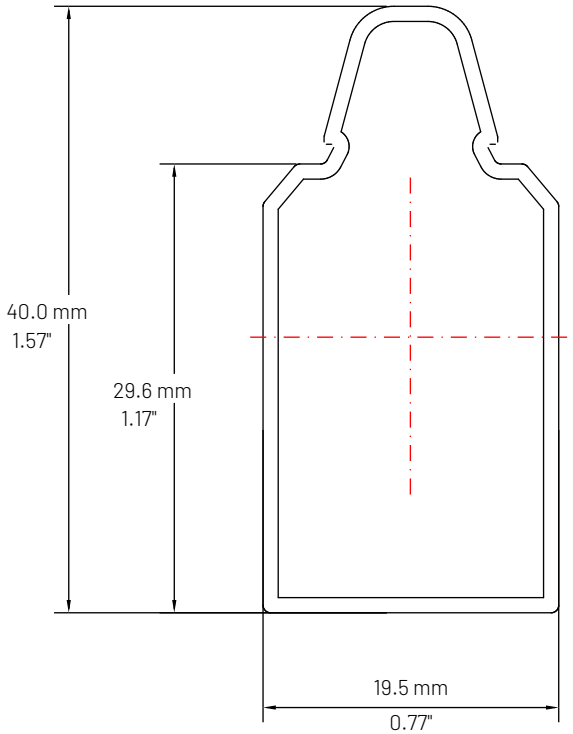
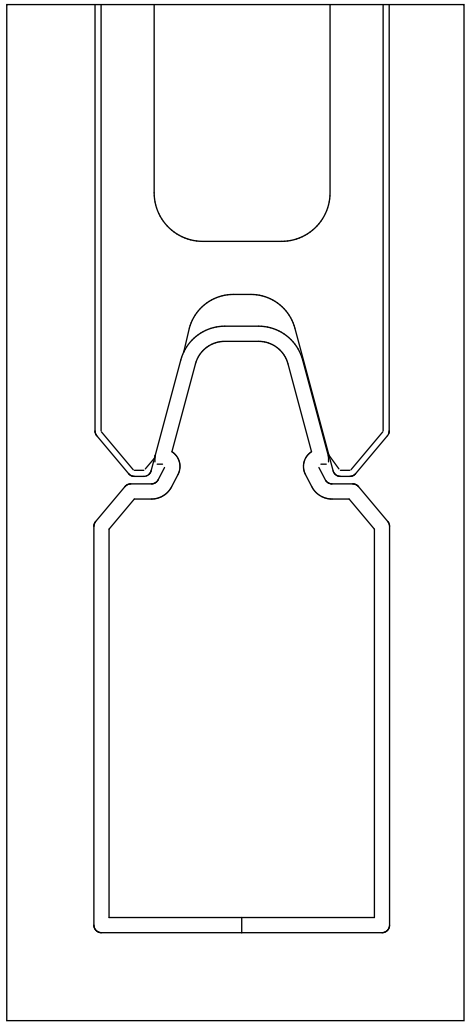
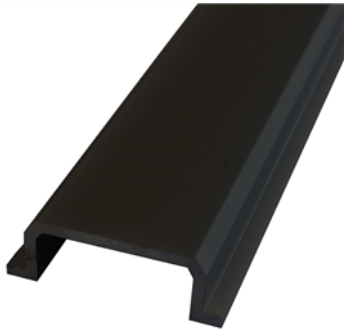




Profile properties	
Product code	STOTG5
Sectional area (mm²)	38
Approximate mass (kg/m)	0.1



Sectional properties	
I_x(mm⁴)	292
I_y(mm⁴)	2 382
C_x(mm)	12.0
C_y(mm)	4.7
S_x(mm³)	62.5
S_y(mm³)	198

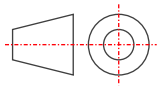
Drawing title

STOTG5 - Aluminium siding - cover slide

File name

Evolver fence profiles - TDS - Version 1.0

File details



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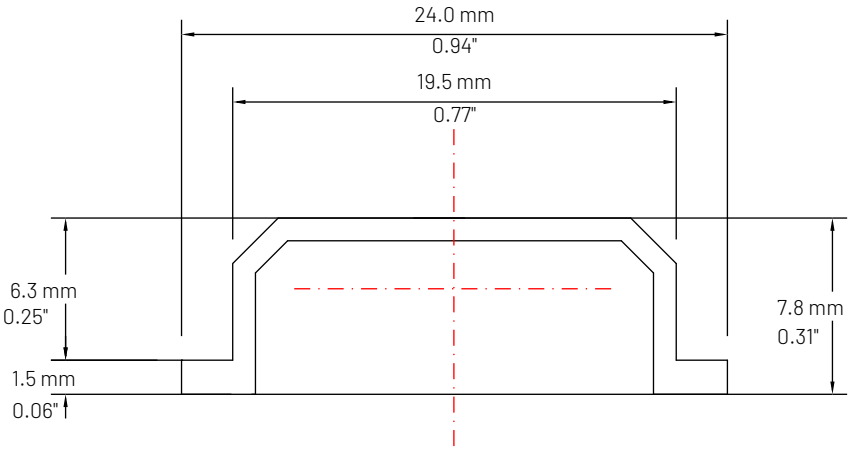

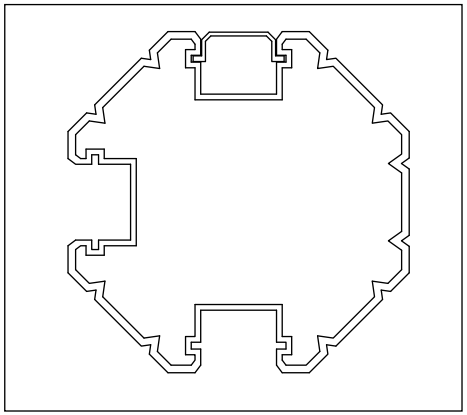

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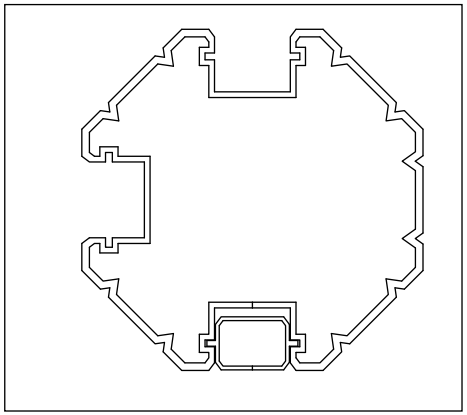
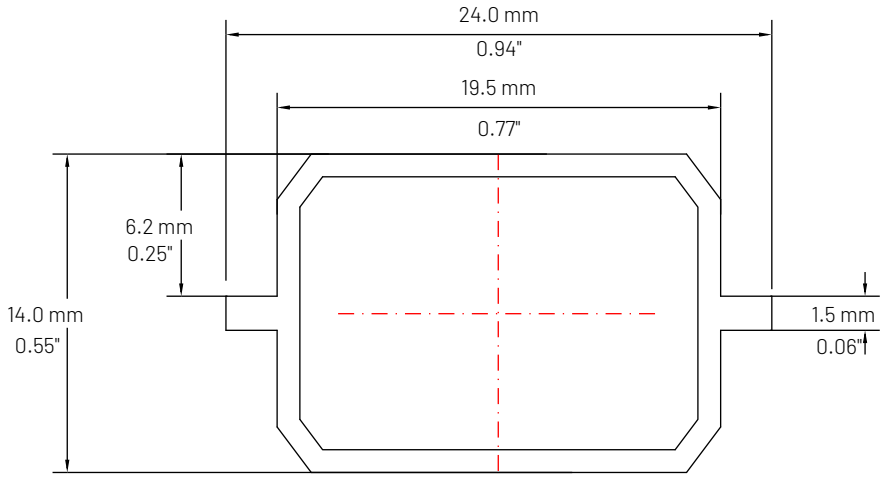
Profile properties	
Product code	STOTG6
Sectional area (mm^2)	66
Approximate mass (kg/m)	0.2





Sectional properties	
I_x(mm^4)	1 781
I_y(mm^4)	3 767
C_x(mm)	12.0
C_y(mm)	7.0
S_x(mm^3)	254
S_y(mm^3)	314

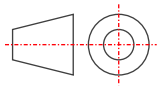
Drawing title

STOTG6 - Aluminium siding - box slide

File name

Evolver fence profiles - TDS - Version 1.0

File details



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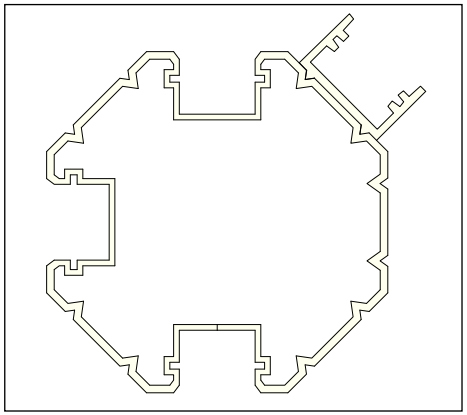
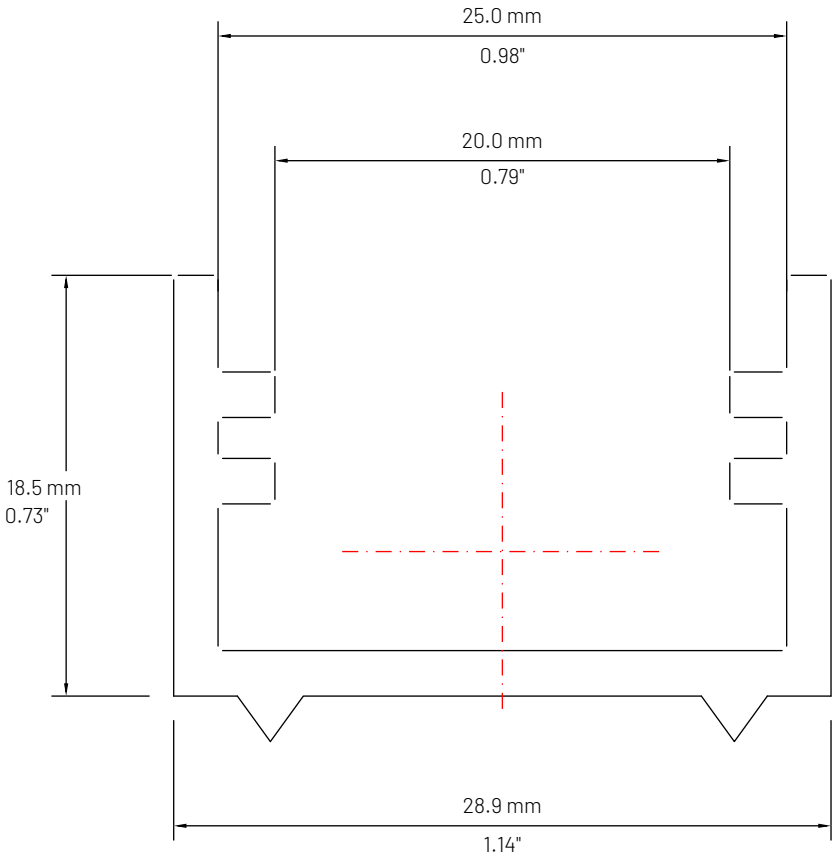
Profile properties	
Product code	STOTG7
Sectional area (mm^2)	148
Approximate mass (kg/m)	0.4





Sectional properties	
I_x(mm^4)	4 973
I_y(mm^4)	18 875
C_x(mm)	14.3
C_y(mm)	11.9
S_x(mm^3)	416.3
S_y(mm^3)	1 324

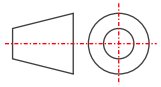
Drawing title

STOTG7 - Aluminium siding - attachable channel

File name

Evolver fence profiles - TDS - Version 1.0

File details



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Profile properties	
Product code	STGJ124
Sectional area (mm²)	2 079
Approximate mass (kg/m)	2.7

Sectional properties	
I_x(mm⁴)	8 522 376
I_y(mm⁴)	105 417
C_x(mm)	64.0
C_y(mm)	7.1
S_x(mm³)	76 566
S_y(mm³)	10 978

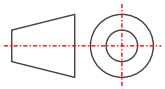
Drawing title

STGJ124 - Infinity Evolver fence board

File name

Evolver fence profiles - TDS - Version 1.0

File details



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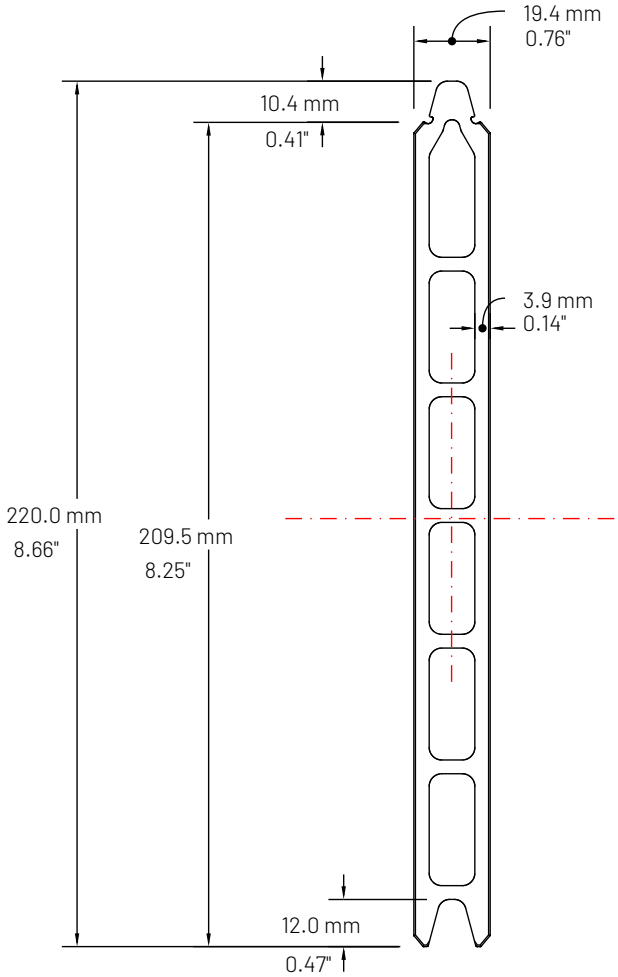
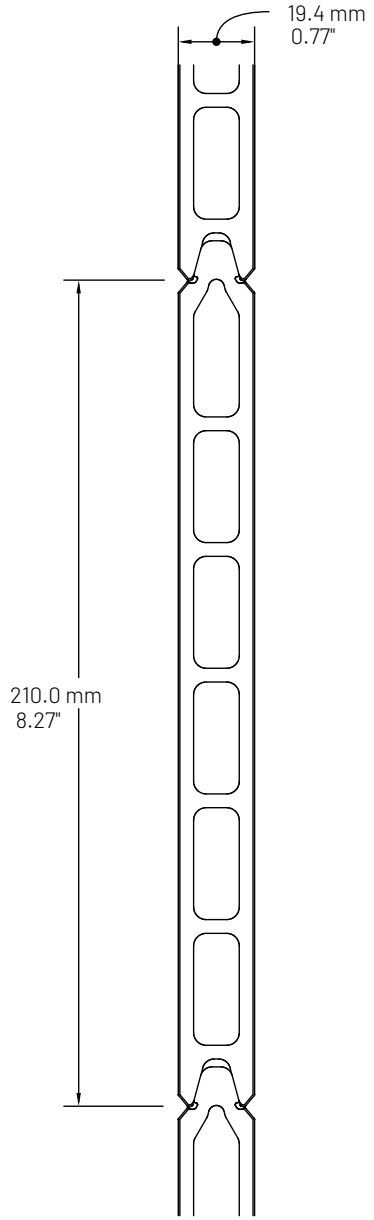




Appendix B
Accessories

Profile properties
Product code
Sectional area (mm^2)
Approximate mass (kg/m)

Sectional properties
I_x(mm^4)
I_y(mm^4)
C_x(mm)
C_y(mm)
S_x(mm^3)
S_y(mm^3)

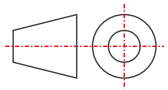
Drawing title

Octagonal post cap

File name

Evolver fence profiles - TDS - Version 1.0

File details



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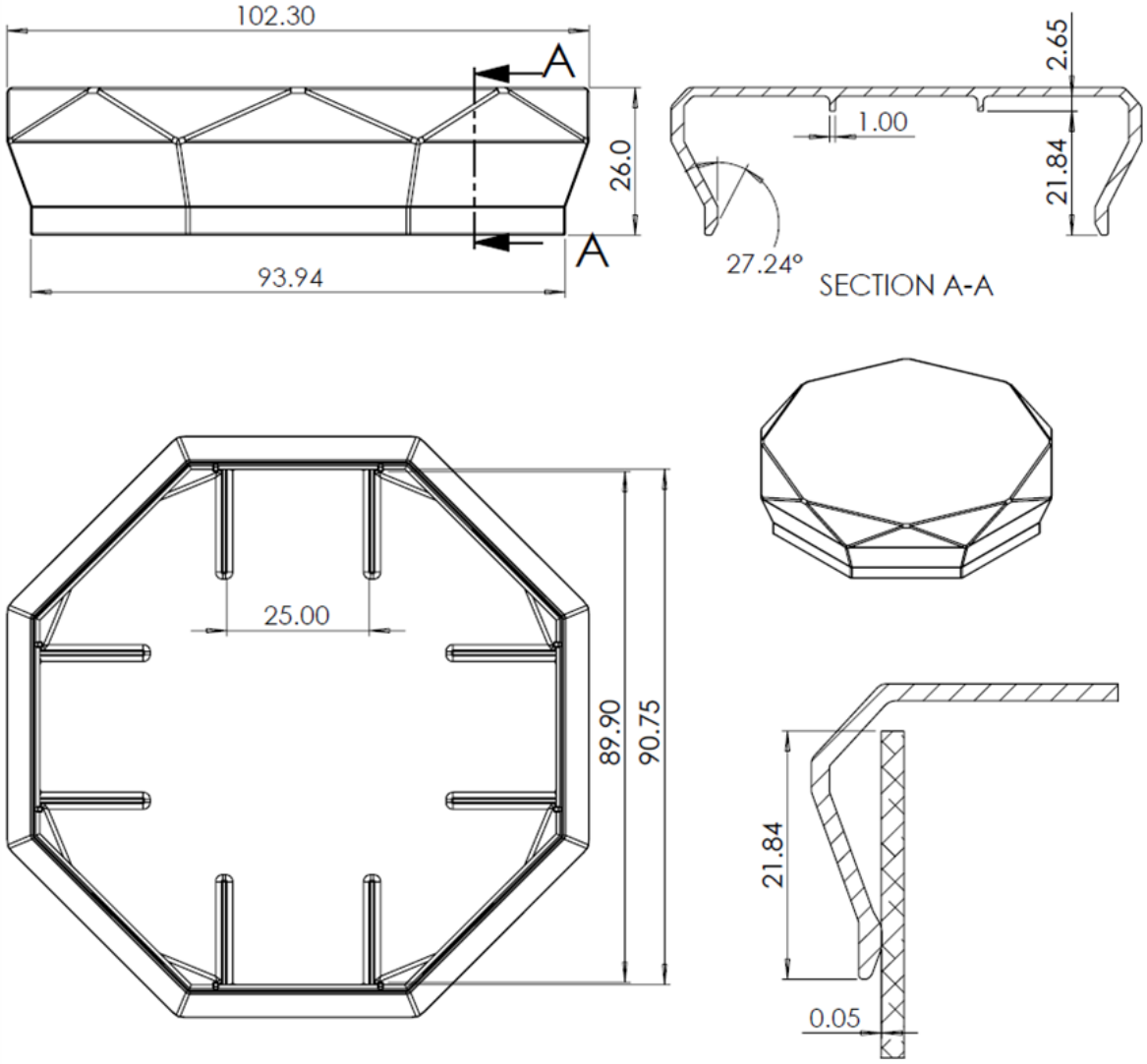

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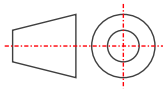
Profile properties
Product code
Sectional area (mm²)
Approximate mass (kg/m)

Sectional properties
I_x(mm⁴)
I_y(mm⁴)
C_x(mm)
C_y(mm)
S_x(mm³)
S_y(mm³)

Drawing title
Square port cap

File name
Evolver fence profiles - TDS - Version 1.0

File details



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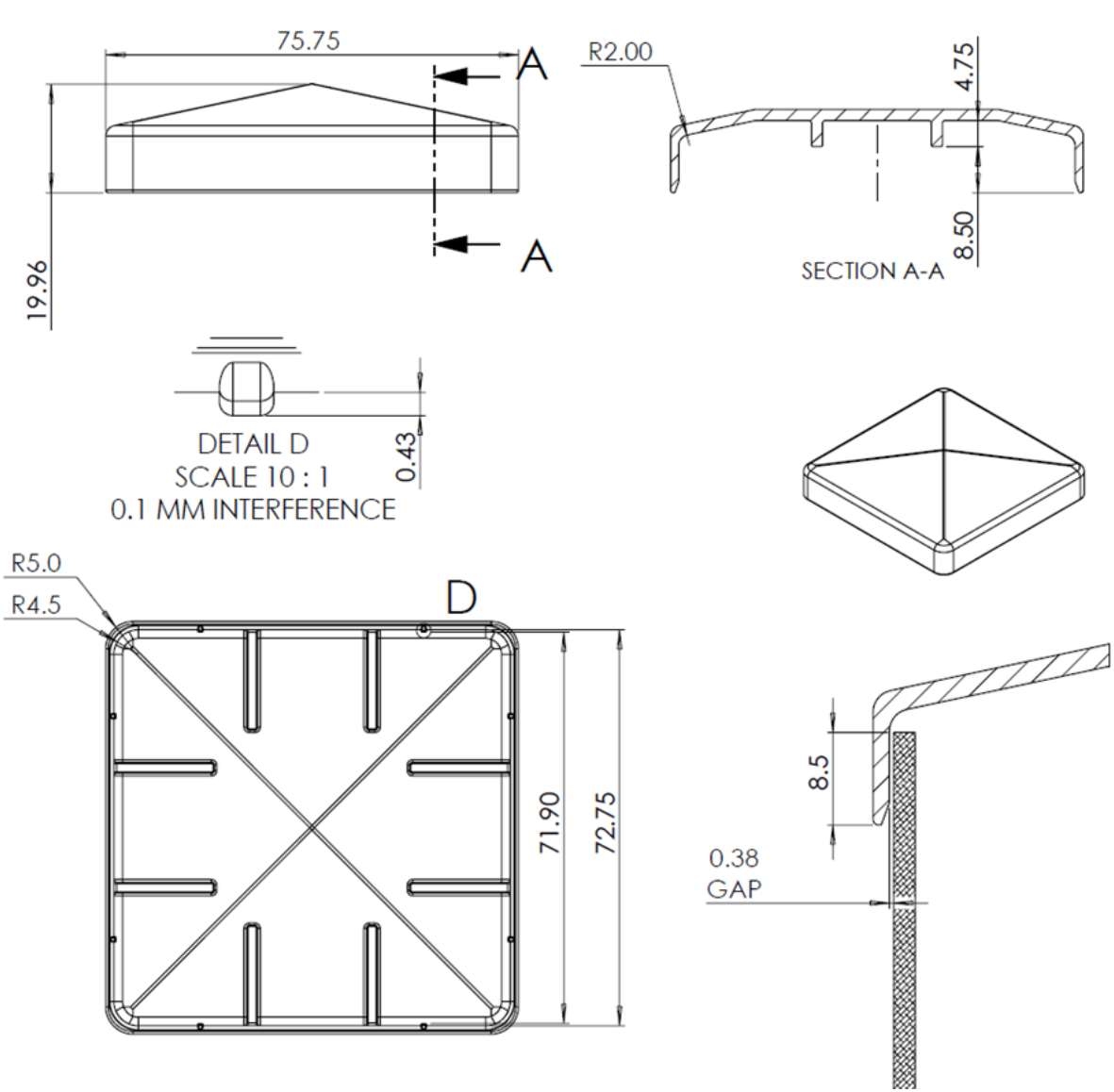

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Appendix C
Material compatibility

The following information provides a list of substances that may negatively impact that Infinity cap material. Below is an extensive (not complete) list of common substances and solutions known to influence the surface of cap on Infinity. It is important to check material compatibility when choosing chemicals that the product may encounter, as they may prematurely degrade the product, these may include ingredients in cleaning products, pool additives and even oils and saps from local vegetation.

Symbol legend

The symbols and abbreviations used have the following meanings:

+ = Resistant over a period of months to years.

0 = Limited resistance: some swelling, solvation or environmental stress cracking is possible.

- = Not resistant: severe swelling, decomposition, solvation or environmental stress cracking.

soln. = Saturated aqueous solution.

Resistance definition

Good resistance: Water, aqueous salt solutions, detergent solutions, dilute acids, and alkalis.

Limited resistance: Alcohols, aliphatic hydrocarbons, oils, and fats.

Not resistant: Concentrated mineral acids, aromatic and/or halogenated hydrocarbons, esters, ethers, ketones.

Solvents: Examples are methyl ethyl ketone, tetrahydrofuran, toluene, dimethyl-formamide.

Source data:

BASF – Chemical resistance of styrene co-polymers - www.basf.de/plastics

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Acetone		o	-	o	
Acetaldehyde*	100%	o	-	o	
Acetic Acid*	10%	+	+	+	
Acetic Acid*	60%	+	o	+	
Acetic Anhydride*		-	-	-	
Air		+	+	+	
Aluminium Chloride	all conc	+	+	+	
Aluminium Fluoride	all conc	+	+	+	
Aluminium Sulphate	all conc	+	+	+	
Alums	all types	+	+	+	
Ammonia	100% dry gas	+	+	+	
Ammonium Carbonate		+	+	+	
Ammonium Chloride	sat'd	+	+	+	
Ammonium Fluoride	sat'd	+	+	+	
Ammonium Hydroxide	10%	+	+	+	
Ammonium Hydroxide	28%	+	+	+	
Ammonium Nitrate	sat'd	+	+	+	
Ammonium Persulphate	sat'd	+	+	+	
Ammonium Sulphate	sat'd	+	+	+	
Ammonium Metaphosphate	sat'd	+	+	+	

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Ammonium Sulfide	sat'd	+	+	+	
Amyl Acetate#*	100%	-	-	-	
Amyl Alcohol#*	100%	+	+	+	
Amyl Chloride#	100%	-	-	-	
Aniline#*	100%	+	-	-	
Aqua Regia+		-	-	-	
Arsenic Acid	all conc	+	+	+	
Aromatic Hydrocarbons#*		-	-	-	
Ascorbic Acid	10%	+	+	+	
Barium Carbonate	sat'd	+	+	+	
Barium Chloride	sat'd	+	+	+	
Barium Hydroxide		+	+	+	
Barium Sulphate	sat'd	+	+	+	
Barium Sulphide	sat'd	+	+	+	
Beer		+	+	+	+
Benzene#*		-	-	-	-
Benzoic Acid	all conc	+	+	+	+
Bismuth Carbonate	sat'd	+	+	+	+
Bleach Lye	10%	+	+	+	+
Borax	sat'd	+	+	+	+
Boric Acid	all conc	+	+	+	+

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REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Boron Trifluoride		+	+	+	+
Brine		+	+	+	+
Bromine+	liquid	-	-	-	-
Bromine Water#	sat'd	-	-	-	-
Butanediol*	10%	+	+	+	+
Butanediol*	60%	+	+	+	+
Butanediol*	100%	+	+	+	+
Butter*		+	+	+	+
n-Butyl Acetate#*	100%	o	-	+	o
n-Butyl Alcohol*	100%	+	+	+	+
Butyric Acid#	conc	-	-	-	-
Calcium Bisulphide		+	+	+	+
Calcium Carbonate	sat'd	+	+	+	+
Calcium Chlorate	sat'd	+	+	+	+
Calcium Chloride	sat'd	+	+	+	+
Calcium Hydroxide	conc	+	+	+	+
Calcium Hypochloride	bleach sol	+	+	+	+
Calcium Nitrate	50%	+	+	+	+
Calcium Oxide	sat'd	+	+	+	+
Calcium Sulphate		+	+	+	+
Camphor Oil#*		-	-	o	-
Carbon Dioxide	all conc	+	+	+	+
Carbon Disulphide		-	-	-	-
Carbon Monoxide		+	+	+	+
Carbon Tetrachloride#		-	-	o	-
Carbonic Acid		+	+	+	+
Castor Oil*	conc	+	+	+	+
Chlorine+	100% dry gas	o	-	-	-
Chlorine Liquid+		-	-	-	-
Chlorine Water+	2% sat'd sol	+	+	+	+
Chlorobenzene#*		-	-	-	-
Chloroform*#		-	-	o	-
Chlorosulphonic Acid	100%	-	-	-	-
Chrome Alum	sat'd	+	+	+	+
Chromic Acid	80%	-	-	-	
Chromic Acid	50%	+	o	+	
Chromic Acid	10%	+	+	+	
Cider*		+	+	+	
Citric Acid*	sat'd	+	+	+	
Coconut Oil Alcohols*		+	+	+	
Coffee		+	+	+	
Cola Concentrate*		+	+	+	
Copper Chloride	sat'd	+	+	+	

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Copper Cyanide	sat'd	+	+	+	
Copper Fluoride	2%	+	+	+	
Copper Nitrate	sat'd	+	+	+	
Copper Sulphate	sat'd	+	+	+	
Corn Oil*		+	+	+	
Cottonseed Oil*		+	+	+	
Cuprous Chloride	sat'd	+	+	+	
Detergents Synthetic*		+	+	+	
Developers Photographic		+	+	+	
Dextrin	sat'd	+	+	+	
Dextrose	sat'd	+	+	+	
Diazo Salts		+	+	+	
Dibutylphthalate*		o	o	o	
Dichlorobenzene#*		-	-	-	
Diethyl Ketone#*		o	-	o	
Diethylene Glycol*		+	+	+	
Diglycolic Acid*		+	+	+	
Dimethylamine		-	-	-	
Disodium Phosphate		+	+	o	
Emulsions, Photographic*		+	+	+	
Ethyl Acetate#*	100%	o	-	o	
Ethyl Alcohol*	100%	+	+	+	
Ethyl Alcohol*	35%	+	+	+	
Ethyl Benzene#*		-	-	-	
Ethyl Chloride#		-	-	-	
Ethyl Ether#		-	-	-	
Ethylene Chloride#*		-	-	-	
Ethylene Glycol*		+	+	+	
Fatty Acids*		+	+	+	
Ferric Chloride	sat'd	+	+	+	
Ferric Nitrate	sat'd	+	+	+	+
Ferrous Chloride	sat'd	+	+	+	+
Ferrous Sulphate		+	+	+	+
Fish Solubles*		+	+	+	+
Fluoboric Acid		+	+	+	+
Fluosillcic Acid	conc	+	o	+	o
Fluosillcic Acid	32%	+	+	+	+
Formic Acid	all conc	+	+	+	+
Fructose	d	+	+	+	+

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Fruit Pulp*		+	+	+	+
Furtural#	100%	-	-	o	-
Furturyl Alcohol#*		-	-	o	-
Gallic Acid*		+	+	+	+
Gasoline#*		-	-	o	o
Glucose		+	+	+	+
Glycerine*		+	+	+	+
Glycol*		+	+	+	+
Glycolic Acid*	30%	+	+	+	+
Grape Sugar		+	+	+	+
n-Heptane#*		-	-	o	o
Hexachlorobenzene		+	+	+	-
Hexanol Tertiary*		+	+	+	+
Hydrobromic Acid	50%	+	+	+	+
Hydrochloric Acid	all conc	+	+	+	+
Hydrocyanic Acid	sat'd	+	+	+	+
Hydrofluoric Acid*	60%	+	+	+	+
Hydrogen		+	+	+	+
Hydrogen Chloride	dry gas	+	+	+	+
Hydrogen Peroxide	30%	+	+	+	+
Hydrogen Peroxide	10%	+	+	+	+
Hydrogen Sulphide		+	+	+	+
Hydroquinone		+	+	+	+
Hypochlorous Acid conc.	conc.	+	+	+	+
Inks*		+	+	+	+
Iodine+ in KI sol'n	in KIsol'd	o	-	o	
Isopropyl Alcohol	100%	-	-	-	
Lead Acetate	sat'd	+	+	+	
Lead Nitrate		+	+	+	
Lactic Acid*	20%	+	+	+	
Linseed Oil*	100%	o	-	o	
Magnesium Carbonate	sat'd	+	+	+	
Magnesium Chloride	sat'd	+	+	+	
Magnesium Hydroxide	sat'd	+	+	+	
Magnesium Nitrate	sat'd	+	+	+	
Magnesium Sulphate	sat'd	+	+	+	
Mercuric Chloride	40%	+	+	+	
Mercuric Cyanide	sat'd	+	+	+	
Mercury		+	+	+	
Methyl Alcohol*	100%	+	+	+	
Methylethyl Ketone#*	100%	o	-	o	

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Methylene Chloride#*	100%	-	-	o	
Milk		+	+	+	
Mineral Oils#		o	-	o	
Molasses		+	+	+	
Naphtha#*		o	-	o	
Naphthalene#*		-	-	o	
Nickel Chloride	conc	+	+	+	
Nickel Nitrate	sat'd	+	+	+	
Nickel Sulphate	conc	+	+	+	
Nicotine*	dilute	+	+	+	
Nitric Acid	0-30%	+	+	+	
Nitric Acid+	30-50%	+	o	+	
Nitric Acid+	70%	+	o	+	
Nitric Acid+	95-98%	-	-	-	
Nitrobenzene#*	100%	-	-	-	
n-Octane		+	+	+	
Oleic Acid		o	-	o	
Oxalic Acid*	sat'd	+	+	+	
Perchloroethylene#		-	-	-	
Phosphoric Acid	95%	+	o	+	
Photographic Solutions		+	+	+	
Plating Solutions*					
Brass		+	+	+	+
Cadmium		+	+	+	+
Chromium		+	+	+	+
Copper		+	+	+	+
Gold		+	+	+	+
Indium		+	+	+	+
Lead		+	+	+	+
Nickel		+	+	+	+
Rhodium		+	+	+	+
Sliver		+	+	+	+
Tin		+	+	+	+
Zinc		+	+	+	+
Potassium Bicarbonate	sat'd	+	+	+	+
Potassium Bromide	sat'd	+	+	+	+

REAGENT	CONC.	LDPE		HDPE	
		70°	140°	70°	140°
Potassium Bromate	10%	+	+	+	+
Potassium Carbonate		+	+	+	+
Potassium Chlorate	sat'd	+	+	+	+
Potassium Chloride	sat'd	+	+	+	+
Potassium Chromate	40%	+	+	+	+
Potassium Cyanide	sat'd	+	+	+	+
Potassium Dichromate	40%	+	+	+	+
Potassium Ferri/Ferro	Ferro				
Cyanide	sat'd	+	+	+	+
Potassium Fluoride		+	+	+	+
Potassium Hydroxide	conc	+	+	+	+
Potassium Nitrate	sat'd	+	+	+	+
Potassium Perborate	sat'd	+	+	+	+
Potassium Perchlorate	10%	+	+	+	+
Potassium Permanganate	20%	+	+	+	+
Potassium Persulphate	sat'd	+	+	+	+
Potassium Sulphate	conc	+	+	+	+
Potassium Sulphide	conc	+	+	+	+
Potassium Sulphite	conc 100%	+	+	+	+
Propargyl Alcohol*		+	+	+	+
n-Propyl Alcohol*		+	+	+	+
Propylene Dichloride#*		-	-	-	-
Propylene GlyCol*	sat'd	+	+	+	+
Pyridine*		+	-	+	-
Resorcinol		+	+	+	+
Salicylic Acid	sat'd	+	+	+	+
Sea Water		+	+	+	+
Selenic Acid Shortening*	any conc	+	+	+	+
Sliver Nitrate Sol'n		+	+	+	+
Soap Solutions*	any conc	+	+	+	+
Sodium Acetate	sat'd	+	+	+	+
Sodium Benzoate	35%	+	+	+	+
Sodium Biscarbonate	sat'd	+	+	+	+
Sodium Bisulphate	sat'd	+	+	+	+
Sodium Bisulphite	sat'd	+	+	+	+
Sodium Borate	dilute	+	+	+	+
Sodium Bromide	dilute	+	+	+	+
Sodium Carbonate	conc	+	+	+	+
Sodium Chlorate	sat'd	+	+	+	+
Sodium Chloride	sat'd	+	+	+	+
Sodium Cyanide	sat'd	+	+	+	+
Sodium Dichromate	sat'd	+	+	+	+