Graphic Innovations

Plotter Materials

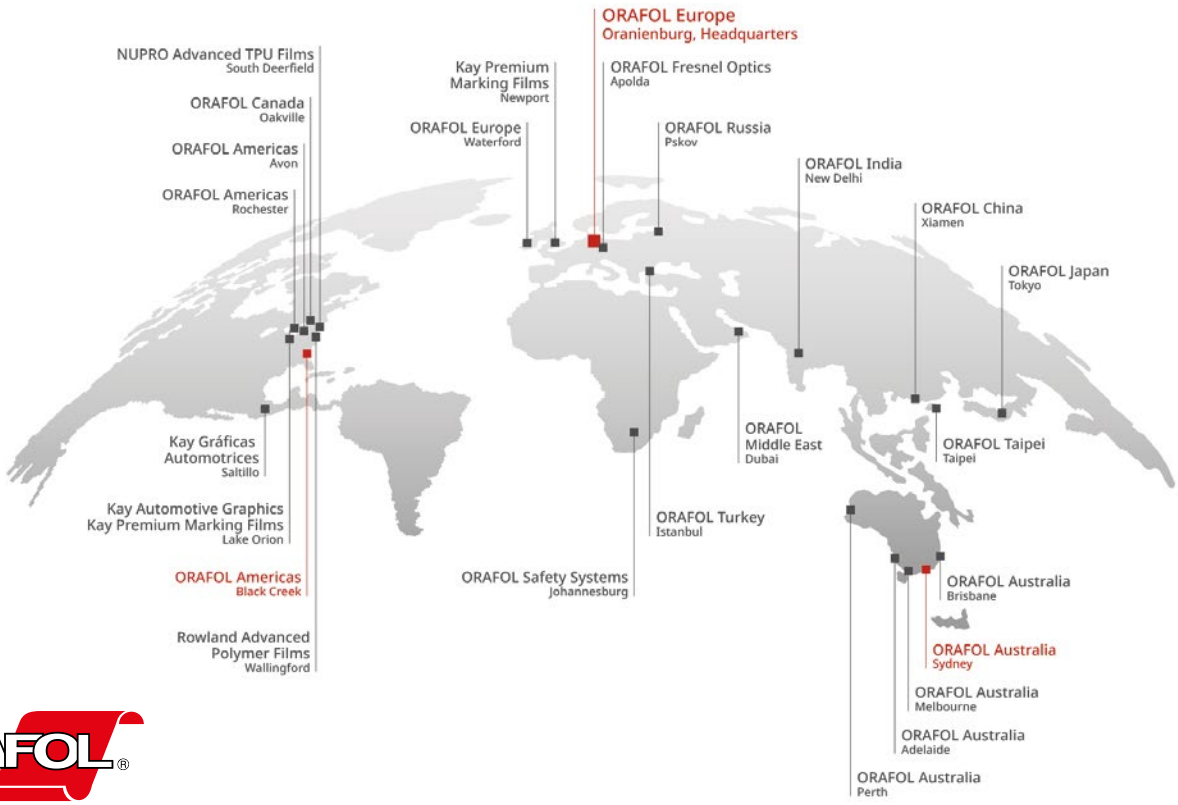
CAD/CAM Vinyls

ORAFOL®

Engineered to Achieve Perfection™

ORAFOL Europe GmbH

ORAFOL's Worldwide Locations



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Plotter Materials - CAD/CAM Vinyls

Extreme: Premium Cast

ORACAL® 951

These super thin high performance PVC films of only 50 micron are characterised by excellent adaptability also to corrugations and rivets, as well as outstanding dimensional stability. Available in a large range of colours (gloss / matt / metallic), with a durability of up to 10 years, this material is a great choice for high quality vehicle and public transport system advertising. The film may also be used for digital thermotransfer printing (with resin ribbons).

Ultimate: High Performance Cast

ORACAL® 751C

This cast PVC film of 60 micron has been developed specifically for easy application on cutting plotter systems for lettering, marking and decoration. The material meets the highest requirements for solidity and durability. It is suitable for uneven surfaces as well as for rivets and corrugations. Colour range includes no less than 117 standard colours with high gloss finished surface, and 2 colours in matt finish. ORACAL® 751C can also be used for digital thermotransfer printing (with resin ribbons).

Versatile: High Performance Cal

ORACAL® 551

ORACAL® 551 material comes with a very good dimensional stability and really good cutting and application characteristics. This polymeric high performance plotter film with a thickness of only 70 micron meets very high requirements for solidity, and it has a durability of up to 8 years. This film has been developed for medium-term outdoor use, and it is in particular suitable for high quality vehicle and public transport system advertising. A colour range consisting of 86 glossy and 2 matt options gives this material a very wide range of application possibilities on very different surfaces.

Universal: Intermediate Cal

ORACAL® 651

Designed for short and medium-term applications, this CAD/CAM vinyl can be used both indoors and outdoors. Its versatility and a range of 59 vivid colours with glossy finish and 56 colours in a matt finish makes it a perfect match for a wide range of decorative works. It displays an excellent degree of opaqueness and comes with a permanent solvent polyacrylate adhesive to allow for an outdoor durability of up to 5 years.

Example 1
ORACAL® 951

Example 2
ORACAL® 751C

Example 3
ORACAL® 551

Optimum: Economy Cal
ORACAL® 641

This permanently bonding material has been designed for universal short and medium term outdoor applications of up to 4 years. It is available in 59 colours with gloss and matt finish.

Promotion: Economy Cal
ORACAL® 621

This removable plotter film is ideal for short-term advertising, sales promotions and decorations. It is available in 45 colours with gloss finish. Removal without residue up to 3 years from application means high economic efficiency.

Exhibition: Exhibition Cal
ORACAL® 631

With its matt surface to suppress unwanted reflections, this plotter film adds elegance to any display. It is ideal for exhibition stands, as the acrylate adhesive allows for easy removal without residue. Available in 60 attractive colours, this film is the perfect choice for clean and precise applications with a required durability of up to 3 years. It is certified according to DIN 4102-B1.

Decoration: Wall Art
ORACAL® 638

This is the perfect solution for decorations, markings and labels intended for short and medium-term indoor designs. The soft PVC film conforms well to the substrate, and it is available in 57 colours with a matt surface. The film is very well suited for use on cutting plotter systems. Use of application tape ORATAPE® LT95 is recommended.

Flexible: Banner Cal
ORACAL® 451

This plotter film is constructed specifically for use on banners, ribbons and other flexible surfaces. It adapts well to any surface, remains stable even under demanding conditions and may be easily removed without any trace. Possibilities are endless with a colour range of no less than 23 standard options.

4.

Example 4
ORACAL® 631

5.

Example 5
ORACAL® 641


6.

Example 6
ORACAL® 638

Glass Design:

Frosted Glass Cast ORACAL® 8810

Etched Glass Cal ORACAL® 8510/8510RA/8530

Dusted Glass Cal ORACAL® 8710

These films are the ideal choice whenever a frosted look is desired or the impression of etched, cut or sandblasted glass is called for.
ORACAL® 8810 is available in 5 colours with hoarfrost effect.
ORACAL® 8510 comes in gold and silver, and opens up many possibilities for adding a special touch to shop windows, glass doors and glass-like surfaces. With a permanent solvent polyacrylate adhesive and a durability of up to 7 years, both structures in the 8510 series cover a wide area of application possibilities.
ORACAL® 8510RA is particularly suited for large-sized graphics or decals as the *Rapid*Air® technology enables easy and rapid application without air inclusion onto even or slightly curved surfaces.
ORACAL® 8530 is available in silver with different structures and has the same properties as ORACAL® 8510, but with a removable adhesive.
A cost effective visual cover for glass buildings, partitions or glass doors is offered by ORACAL® 8710.

Translucent:

Translucent Premium Cast ORACAL® 8800

Blockout Film ORACAL® 8870

Translucent Cal ORACAL® 8500

These translucent films are designed specifically to meet the highest performance requirements. Their satin finish prevents unwanted reflections. Series ORACAL® 8800 Translucent Premium Cast is available in 47 colours, and comes with an outdoor durability of up to 10 years. The outstanding digital thermotransfer printing properties of the satin-gloss surface of this material completes the excellent characteristics of this high-performance film.
ORACAL® 8870 Blockout Film is the ideal solution for light boxes and the production of internally illuminated signs as well as the design of backlit acrylglass, glass and pretensioned banner material where only parts of the advertisement should be illuminated. The reduced surface gloss inhibits undesired reflection. Available in white with a black backing and in black with a white backing.
ORACAL® 8500 Translucent Cal comes in 54 colours, with a durability of up to 7 years. All 3 series provide the perfect solution for great designs on illuminated installations made of glass, acrylic glass and pre-tensioned banner material.

Transparent: Transparent Cal

ORACAL® 8300

This UV-stabilised, transparently dyed, gloss special-purpose film boasts a performance of up to 5 years. It is perfect for high-quality illuminated signs and to decorate back-lit glass surfaces. The material is available in 32 vivid transparent colours, which can be superimposed to obtain fine nuances of colour, making the creative possibilities virtually unlimited.

Light boxes: Premium Diffuser Cast

ORACAL® 8830

ORACAL® 8860

The typical use of the new diffuser films is application inside light box displays, where they will ensure evenly distribution of the light, as well as prevent unwanted external visibility of the internal light sources. They provide an easy means of getting a perfect finished look to any internally lit display, and are designed for use with both LED and general light sources. The materials come in two different light transmission grades.

Example 7
ORACAL® 451

Example 8
ORACAL® 8810

Example 9
ORACAL® 8830

Metallised: Polyester Film

ORACAL® 351

Excellent dimensional stability and good processing capabilities characterise this 23 micron / 50 micron polyester film. It is suitable for application on cutting plotter systems, as well as being well suited for printing. The double-sided high-gloss metallic cover provides the best effects when applied onto transparent surfaces.

Metallised: Ultraleaf Cast

ORACAL® 383

The ORACAL® 383 material is a very decorative and permanently bonding cast film, intended for lettering, marking and decorative works. The material was designed to meet the highest performance requirements for long-term outdoor durability. It comes with a three-dimensional structure which stands out due to its smooth surface. It has a permanent dimensional stability, and is available in chrome and gold gloss.

Fluorescent:

Fluorescent Premium Cast Plus ORACAL® 7710 / 7710RA

Fluorescent Premium Cast ORACAL® 7510

Fluorescent Cast ORACAL® 6510

All series consist of fluorescent special-application day-glow films which are particularly eye catching at dawn, dusk, twilight or at other times when visibility is poor. Available in 7 fluorescent colours, ORACAL® 6510 is suitable for short-term application of up to 1 year. The high performance ORACAL® 7510 film is designed for applications of up to 2 years, and this material is also available in 7 fluorescent colours. ORACAL® 7710 series was designed for graphics on e.g. emergency services vehicles, and comes with a durability of up to 3 years.

Reflective:

ORALITE® 5600 Fleet Engineer Grade

ORALITE® 5600E Fleet Marking Grade

ORALITE® 5650RA Fleet Engineer Grade

ORALITE® reflective films series 5600 and 5600E were developed for high quality vehicle letterings, markings and decorations which may be applied within contour markings in accordance with ECE 104 (5600E). Both series can be processed on cutting plotters, and provide good adaptability also to moderately curved surfaces.
The *Rapid*Air®-Technology of the ORALITE® 5650RA material enables easy and quick application reducing the incidence of bubbles and creases, especially of large-sized applications.

Example 10
ORACAL® 383

Example 11
ORACAL® 7510

Example 12
ORACAL® 5600E

Stencil Films

ORAMASK® 810S / 810 / 811 / 813

The ORAMASK® 810 film is the perfect choice for design and lettering of flexible, uneven surfaces. ORAMASK® 810S is ideal for multi-coloured decorations, as it comes with a strong solvent resistance. The relatively high rigidity of ORAMASK® 811 and ORAMASK® 813 stencil films makes them ideal for painting and spraying work on large even surfaces. ORAMASK® 813 film is translucently dyed, ensuring that the surface underneath remains visible; a great advantage when multiple paint applications are required.

Sandblast Films

ORAMASK® 831 / 832

These special purpose PVC films which are 230 and 350 micron thick are designed for a wide range of applications in stonemasonry and artistic sandblasting studios. They are ideal for sandblasting of glass, plastics and wood.

Example 13
ORAMASK® 810

Example 14
ORAMASK® 831 / 832

Application Tape
ORATAPE® MT95 / HT95 / LT95

The special construction of the polyacrylate adhesive in this material enables unproblematic transfer of die-cut and computer-cut letters and symbols. Even after more than 6 months of application, a residueless removal without any considerable increase in adhesive strength has been proven. The high tensile strength of the film ensures precise positioning. These application films are great for almost all well-known types of glossy or matt-finished films. ORATAPE® MT95 with its medium-strength adhesive has been developed for special uses requiring a highly transparent application material. ORATAPE® HT95 comes with a high tensile strength and ORATAPE® LT95 is ideal for special uses which require a lower adhesive power for the transfer of decorations. It is the recommended tape for applications of plotted films applied to inner walls, e.g. ORACAL® 638 and ORAJET® 3628.

Application Tape
ORATAPE® MT80P

The specially adjusted polyacrylate adhesive of the ORATAPE® MT80P allows residueless removal without any major increase in adhesive strength even after over 6 months. The high elongation stability of the front material ensures exact positioning. ORATAPE® MT80P is recommended for all applications that require a repeated use of the film tape.

Application Papers
ORATAPE® MT72 / MT52 / LT52 / LT72

Both application materials ORATAPE® MT52 and MT72 have been designed for use with nearly any type of film that has a smooth and matt surface. With its high dimensional strength and good durability even in wet application, MT72 is up for the most demanding jobs.

The application papers ORATAPE® LT52 and LT72 with their ultra removable adhesive on the basis of natural rubber are particularly well suited for applications using the dry method. These semi-transparent application papers are used to transfer die-cut or computer-cut lettering and symbols.
A natural rubber adhesive developed specifically for this series, ensures both a fast bond to the items while transferred and a flawless removal following the application.

Reliable application tapes are required when computer-cut films are to be professionally and quickly applied.
ORAFOL has developed application materials for a great variety of demands and uses.

Example 15
ORATAPE® MT95

Example 16
ORATAPE® LT52

Product Overview – CAD/CAM Vinyls

Product	Short name	Front material (without release liner and adhesive)	Release liner	Adhesive	Colours	Dimensional stability (FINAT TM 14)	Water resistance (at 23° C)	Temperature resistance (short-term exposure)
ORACAL® 951	Premium Cast	Cast PVC film 50 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	94 high gloss 2 matt, 45 metallic high gloss [3]	Shrinkage [5] 0.1 mm max.	No variation after 100 h [7]	-50° C to +120° C, no variation [7]
ORACAL® 751C	High Performance Cast	Cast PVC film 60 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	117 gloss 2 matt [3]	Shrinkage [4] [5] in length 0.15 mm max.	No variation after 100 h [7]	-50° C to +120° C, no variation [7]
ORACAL® 551	High Performance Cal	Polymeric PVC film 70 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	86 gloss 2 matt [3]	Shrinkage [4] [5] in length 0.2 mm max.	No variation after 100 h [7]	-50° C to +90° C (short-term max. 24 h at +100° C) no variation [7]
ORACAL® 651	Intermediate Cal	Blended polymeric PVC film 70 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	59 gloss 56 matt [3]	Shrinkage [4] [5] in length 0.4 mm max.	No variation after 100 h [7]	-40° C to +80° C no variation [7]
ORACAL® 641	Economy Cal	Soft PVC film 75 micron	Silicone coated paper on one side, white 135 g/m² [1]	Polyacrylate, permanent	59 gloss 59 matt [3]	Shrinkage [4] [5] in length 0.4 mm max.	No variation after 48 h [7]	-40° C to +80° C no variation [7]
ORACAL® 621	Economy Cal	Soft PVC film 75 micron	Silicone coated paper on one side, white 135 g/m² [1]	Polyacrylate, removable [2]	45 gloss [3]	Shrinkage [4] [5] in length 0.4 mm max.	-	-40° C to +80° C no variation [7]
ORACAL® 631	Exhibition Cal	Soft PVC film 80 micron	Silicone coated paper on one side, white 135 g/m² [1]	Polyacrylate, removable [2]	60 matt [3]	Shrinkage [4] [5] in length 0.4 mm max.	No variation after 48 h [7]	-40° C to +80° C no variation [7]
ORACAL® 638	Wall Art	Soft PVC film 80 micron	Silicone coated paper on one side, white 135 g/m² [1]	Polyacrylate, easily removable	57 matt	Shrinkage [4] [5] in length 0.4 mm max.	-	-40° C to +80° C no variation [7]
ORACAL® 451	Banner Cal	Highly flexible special PVC film 80 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	23 semi gloss [3]	Shrinkage [4] [5] in length 0.4 mm max.	No variation after 100 h [7]	-20° C to +65° C no variation [8]
ORACAL® 8800	Translucent Premium Cast	Cast PVC film 50 micron	Translucent polyester film, silicone coated on one side, 100 micron	Solvent polyacrylate, permanent	47 semi gloss [3]	Shrinkage [5] 0.1 mm max.	-	-45° C to +80° C no variation [8]
ORACAL® 8500	Translucent Cal	Translucent special PVC film 80 micron	Silicone coated paper on one side, white 137 g/m² [1]	Solvent polyacrylate, permanent	54 semi gloss [3]	Shrinkage [4] [5] in length 0.2 mm max.	-	-40° C to +90° C no variation [8]
ORACAL® 8300	Transparent Cal	UV stabilised PVC film 80 micron	Silicone coated paper on one side, white 137 g/m²	Solvent polyacrylate, permanent	32 gloss [3]	Shrinkage [4] [5] in length 0.4 mm max.	-	-40° C to +80° C no variation [8]
ORACAL® 8870	Blockout Film	Opaque Cast PVC film 100 micron	Silicone coated paper on both sides, white, 137 g/m²	Solvent polyacrylate, permanent	White with black backing and black with white backing	Shrinkage [5] 0.1 mm max.	-	-40° C to +80° C no variation [7]
ORACAL® 8860	Diffuser Premium Cast	Cast PVC film 55 micron 60% light transmission	Silicone coated paper on one side, white 137 g/m²	Solvent polyacrylate, permanent	White matt	Shrinkage in length 0.1 mm max. [5]	-	-40° C to +80° C no variation
ORACAL® 8830	Diffuser Premium Cast	Cast PVC film 55 micron 30% light transmission	Silicone coated paper on one side, white 137 g/m²	Solvent polyacrylate, permanent	White matt	Shrinkage in length 0.1 mm max. [5]	-	-40° C to +80° C no variation
ORACAL® 8810	Frosted Glass Cast	Cast PVC film 80 micron	Special polyester film 100 micron	Solvent polyacrylate, permanent	5 hoarfrost effect	Shrinkage [6] 0.1 mm max.	No variation after 100 h [7]	-40° C to +90° C no variation [6]
ORACAL® 8710	Dusted Glass Cal	Polymeric PVC film 70 micron	Silicone coated paper on one side, white 137 g/m²	Solvent polyacrylate, permanent	Translucent grey	Shrinkage [7] 0.1 mm max.	-	-40° C to +90° C no variation [7]
ORACAL® 8530	Etched Glass Cal	Special PVC film 80 micron	Silicone coated paper on both sides, white, 137 g/m²	Solvent polyacrylate, removable	silver with fine or coarse structure	Shrinkage [4] [6] in length 0.2 mm max.	-	-40° C to +90° C no variation [6]
ORACAL® 8510 **ORACAL® 8510RA**	Etched Glass Cal	Polymeric PVC film, 80 micron	Silicone coated paper on both sides, white, 137 g/m² PE coated *Rapid*Air® paper on both sides, white, 145 g/m²	Solvent polyacrylate, permanent RA: With *Rapid*Air®	Gold, silvergrey with fine or coarse structure	Shrinkage [4] [6] in length 0.2 mm max.	- -	-40° C to +90° C no variation [6]

[1] *For white vinyl a blue version is used*
[2] *By specialist application residueless removal to a great extent from most substrates*
[3] *Special colours upon request*
[4] *No measurable shrinkage in cross direction*
[5] *Adhered to steel*
[6] *Adhered to glass*
[7] *Adhered to aluminium*
[8] *Adhered to acrylic glass*
[9] *72 hours after adhering to aluminium at room temperature*
[10] *0.5% household cleaners at room temperature and at +65° C, waterbased*
[11] *By specialist application under vertical outdoor exposure (normal climate of central Europe) - in years. For additional specifications, download Processing and Handling Instructions on www.orafol.com*
[12] *Average value*

Adhesive power (FINAT TM 1, after 24 h) [12]	Resistance to solvents and chemicals [9]	Resistance to Cleaning agents [10]	Tensile strength (DIN EN ISO 527)		Elongation at break (DIN EN ISO 527)		Service life in years [11]			Recommended application temperature	Shelf life	Standard roll widths. Standard length is 50m for all.
			Along	Across	Along	Across	Black/ white	Transparent/ coloured	Metallic			
18 N/25 mm [5]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [7]	Min. 21 MPa Metallic: Min. 19 MPa	Min. 21 MPa Metallic: Min. 19 MPa	Min. 150% Metallic: Min. 120%	Min. 150% Metallic: Min. 120%	10	8	6 [13]	min. +8° C	2 years in original packaging at 20° C and 50% relative humidity **STANDARD SPLICE-FREE**	1260 1000 630 500 378 Special widths available upon request
18 N/25 mm [5]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 120%	Min. 120%	8	7 [15]	5 [14]	min. +8° C		
18 N/25 mm [5]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 150%	Min. 170%	8	7 [15]	4	min. +8° C		
18 N/25 mm [5]	-	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	5	4 [15]	4	min. +8° C		
16 N/25 mm [5]	-	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	4	3	3	min. +10° C		
7 N/25 mm [5]	-	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	4	3	3	min. +10° C		
7 N/25 mm [5]	-	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	3	3	3	min. +10° C		
6 N/25 mm [5]	-	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	2 [17]	2 [17]	-	min. +10° C		
14 N/25 mm [5]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [7]	Min. 15 MPa	Min. 15 MPa	Min. 120%	Min. 150%	3	3	-	min. +8° C		
18 N/25 mm [6] 16 N/25 mm [8]	-	No variation [6]	Min. 21 MPa	Min. 21 MPa	Min. 120%	Min. 120%	10	8	5	min. +8° C		
18 N/25 mm [6] 16 N/25 mm [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [8]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	7	7	5	min. +8° C		
18 N/25 mm [6] 16 N/25 mm [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [7]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	-	5	-	min. +8° C		
16 N/25 mm [6] 18 N/25 mm [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [6]	Min. 17 MPa	Min. 17 MPa	Min. 120%	Min. 120%	10	-	-	min. +8° C		1260 [16]
18 N/25 mm [6] 16 N/25 mm [8]	-	No variation [8]	Min. 21 MPa	Min. 21 MPa	Min. 120%	Min. 120%	10	-	-	min. +8° C		1260 [16]
18 N/25 mm [6] 16 N/25 mm [8]	-	No variation [8]	Min. 21 MPa	Min. 21 MPa	Min. 120%	Min. 120%	10	-	-	min. +8° C		1260 [16]
16 N/25 mm [6] [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [6]	Min. 9 MPa	Min. 9 MPa	Min. 40%	Min. 40%	-	7	-	min. +8° C		
18 N/25 mm [6] 16 N/25 mm [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [6]	Min. 20 MPa	Min. 20 MPa	Min. 130%	Min. 130%	-	7	-	min. +8° C		1260 [16]
6 N/25 mm [6]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [6]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	-	5	-	min. +8° C		1260 [16]
18 N/25 mm [6] 16 N/25 mm [8]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [6]	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 130%	-	7	-	min. +8° C		1260 [18] 1520 (only 090) 1260 [16] 1520 (only 090)

[13] *Brilliant blue L, copper, gold metallic, bronze, pale gold, pyrite, red gold L, foliage green metallic, steppe green metallic: 3 years*
[14] *Gold L: 3 years*
[15] *Brilliant blue: 3 years*
[16] ORACAL® 8510RA, 8530, 8710, 8800 and 8870 are only available in 1260 mm.
[17] *Indoor use*

The statements in this information sheet are based upon our knowledge and practical experience. This data is intended only as a source of information and is given without guarantee and does not constitute a warranty. Due to the wide variety of possible uses and applications customers should independently determine the suitability of this material for their specific purpose, prior to use.

Product Overview – CAD/CAM Vinyls

Product	Short name	Front material (without release liner and adhesive)	Release liner	Adhesive	Colours	Dimensional stability (FINAT TM 14)	Water resistance (at 23° C)	Temperature resistance (short-term exposure)
ORACAL® 351	Polyester Film	Metallised polyester film 23 micron	Silicone coated paper on one side, 137 g/m²	Solvent polyacrylate, permanent	Chrome, matt chrome, gloss gold on both sides	Shrinkage [2] [3] in length 0.1 mm max.	-	-40° C to +120° C no variation [4]
		50 micron			chrome brushed, rose gold			
ORACAL® 383	Ultraleaf Cast	Metallised cast film 85 micron	Metallised silicone coated paper on one side, 135 g/m²	Solvent polyacrylate, permanent	Chrome, and Gloss gold with structured surface	Shrinkage [3] 0.25 mm max.	-	-54° C to +71° C no variation [4]
ORACAL® 7710 **ORACAL® 7710RA**	Fluorescent Premium Cast Plus	Cast PVC film 170 micron	Special silicone coated paper on one side, 137 g/m²	Solvent polyacrylate, permanent	2 gloss	Shrinkage [3] 0,15 mm max.	No variation after 100 h [7]	-50° C to +120° C no variation [4]
			Double sided PE coated *RapidAir*® paper, one side siliconised, 143 g/m²	Solvent polyacrylate, repositionable, with permanent final adhesion				
ORACAL® 7510	Fluorescent Premium Cast	Cast PVC film 150 micron	Silicone coated paper on one side, white 137 g/m²	Solvent polyacrylate, permanent	7 gloss	Shrinkage [2] [3] 0.3 mm max.		-40° C to +110° C no variation [4]
ORACAL® 6510	Fluorescent Cast	Cast PVC film 110 micron						-40° C to +105° C no variation [4]
ORALITE® 5600	Fleet Engineer Grade	Cast PVC film 150 micron	PE coated silicone paper on both sides, white 145 g/m²	Solvent polyacrylate, permanent, removable by heat	11 gloss	-	-	-50° C to +95° C no variation [4]
ORALITE® 5600E	Fleet Marking Grade	Cast PVC film 135 micron						
ORALITE® 5650RA	Fleet Engineer Grade	Cast PVC film 150 micron		Solvent polyacrylate, permanent, repostion-able, removable by heat RA: With *RapidAir*®				
ORAMASK® 810S	Stencil Film	Translucent special PVC film 80 micron	Special silicone coated paper on one side, white 137 g/m²	810S: Solvent poly-acrylate, removable, with weak final tack 810: Polyacrylate, removable, with weak final tack, 811, 813: Polyacrylate, removable	Dark grey matt	-	-	-
ORAMASK® 810 **ORAMASK® 811** **ORAMASK® 813**			ORAMASK® 811 [1]		Grey matt White matt Blue matt	Shrinkage [2] [3] in length 0.4 mm max.		
ORAMASK® 831	Sandblast Film	PVC film 230 micron	Silicone coated paper on one side, white 137 g/m²	Polyacrylate, removable	Green matt	-	-	-
ORAMASK® 832		PVC film 350 micron			Grey matt			

[1] *For white vinyl a blue version is used*
[2] *No measurable shrinkage in cross direction*
[3] *Adhered to steel*
[4] *Adhered to aluminium*
[5] *72 hours after adhering to aluminium at room temperature*
[6] *0.5% household cleaners at room temperature and at +65° C, waterbased*
[7] *By specialist application under vertical outdoor exposure (normal climate of central Europe) - in years. For additional specifications, download Processing and Handling Instructions on www.orafol.com*
[8] *Average value*

Adhesive [8] power (FINAT TM 1, after 24 h)	Resistance to solvents and chemicals [5]	Resistance to Cleaning agents [6]	Tensile strength (DIN EN ISO 527)		Elongation at break (DIN EN ISO 527)		Service life in years [7]			Recommended application temperature	Shelf life	Standard roll widths. Standard length is 50m for all.	
			Along	Across	Along	Across	Black/ white	Transparent/ coloured	Metallic				
12 N/25 mm [3]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [4]	Min. 200 MPa	Min. 260 MPa	Min. 120%	Min. 80%	2 (gloss gold on both sides: 1)			min. +8° C		1260 1000 630	500 378
16 N/25 mm [3]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [4]	Min. 17 MPa	Min. 17 MPa	Min. 35%	Min. 35%	-	-	5	min. +10° C		1220	
18 N/25 mm [3]	Short-term resistant to most oils, greases, fuels, aliphatic solvents, weak acids, salts and alkalis	No variation [4]	Min. 18 MPa	Min. 18 MPa	Min. 150%	Min. 150%	-	3	-	min. +8° C		1260 1520	
16 N/25 mm [3]										min. +15° C			
18 N/25 mm [3]	-	No variation [4]	Min. 15 MPa	Min. 15 MPa	Min. 120%	Min. 120%		2 [9]		min. +8° C		1260 1000 630	500 378
16 N/25 mm [3]			Min. 13 MPa	Min. 13 MPa	Min. 100%	Min. 100%		1 [10]					
17 N/25 mm [3]	-	-	Min. 10 MPa	Min. 10 MPa	Min. 100%	Min. 100%	7	7	-	min. +15° C		1235	610 [11]
1 N/25 mm [3]	-	-	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	-	-	-	min. +8° C		1260 1000 630 500 378	
810: 1 N/25 mm [3]					ORAMASK 813: Min. 90%	ORAMASK 813: Min. 90%				min. +10° C to +25° C			
811: 6 N/25 mm [3]													
813: 6 N/25 mm [3]													
5 N/25 mm [3]	-	-	Min. 19 MPa	Min. 19 MPa	Min. 130%	Min. 150%	-	-	-	min. +10° C			
6 N/25 mm [3]													

[9] *Fluorescent yellow: 3 years*
[10] *Fluorescent yellow: 2 years*
[11] *White: also available in 378 mm (only 5600), 760 mm, 1370 mm and 1520 mm*

The statements in this information sheet are based upon our knowledge and practical experience. This data is intended only as a source of information and is given without guarantee and does not constitute a warranty. Due to the wide variety of possibe uses and applications customers should independently determine the suitability of this material for their specific purpose, prior to use.

Product Overview – Application Materials

Product	Short name	Front material	Thickness	Adhesive	Adhesive power (FINAT TM 1, 24 h, stainless steel)	Shelf life
ORATAPE® MT95	Application Tape	Transparent polyethylene based film	155 micron	Modified polyacrylate, medium adhesive strength	2 N/25 mm	2 years
ORATAPE® HT95	Application Tape	Transparent polyethylene based film	155 micron	Modified polyacrylate, high adhesive strength	3.5 N/25 mm	2 years
ORATAPE® LT95	Application Tape	Transparent polyethylene based film	150 micron	Modified polyacrylate, low adhesive strength	< 1 N/25 mm	2 years
ORATAPE® MT80P	Application Tape	Transparent PVC based film	100 micron	Modified solvent polyacrylate, medium adhesive strength	2 N/25 mm	2 years
ORATAPE® MT72	Application Paper	Semi-transparent paper	110 micron	Natural rubber, medium adhesive strength	4 N/25 mm	6 months
ORATAPE® LT72	Application Paper	Semi-transparent paper	110 micron	Natural rubber, low adhesive strength	2 N/25 mm	6 months
ORATAPE® MT52	Application Paper	Semi-transparent paper	95 micron	Natural rubber, medium adhesive strength	4 N/25 mm	6 months
ORATAPE® LT52	Application Paper	Semi-transparent paper	95 micron	Natural rubber, low adhesive strength	2 N/25 mm	6 months

Notes on Processing and Handling

Introduction
The following general tips are given for application of ORAFOL® Plotter Materials. If you want to apply plotter material on a car, please also see our practical information for self-adhesive films for application on cars (Download: www.orafol.com). ORAFOL recommends using only material with the same batch number for one graphic application. In this context ORAFOL ensures that every film roll consists of material of the same batch number and consequently does not have any splice. When different batch numbers are used the technician should make tests to find out possible differences in using the films and in the quality of the graphic application.

Storage and processing conditions
ORACAL®, ORAMASK®, ORALITE® and ORATAPE® self-adhesive products are supplied in rolls which should at all times be stored either suspended or standing on the roll blocks provided in a cool, dry place protected from sunlight. Prior to processing, the self-adhesive films should be accommodated to the humidity and temperature prevailing in the processing area. Relative humidity between 40% and 50% and temperatures in the range of +18° C to +22° C are considered ideal. Extreme variations of the above conditions could lead to expansion or shrinkage of the protective paper. The result is insufficient flatness of the self-adhesive material and dimensional changes in the cuts. Please refer to the storage instructions provided in the technical data sheet included with each roll.

Preparing the surface
The high-quality special adhesives used for ORACAL® self-adhesive materials create an excellent bond with just about any clean, smooth and weatherproof surface which is free from grease, wax and silicone. Prior to applying the ORAFOL® self-adhesive products, clean the surface thoroughly with isopropanol and wipe it dry with a cloth. Gas bubbles may form between the film and the surface if any solvent residue remains as a result of improper cleaning or if the lacquer on the surface is too fresh. Allow at least three weeks to elapse before applying the film to lacquer which has been air-dried or baked. Isopropanol is recommended as the cleaning agent, as other agents may, under certain circumstances, attack the lacquer or reduce the adhesive strength of the film. For surfaces which tend to outgas, such as polycarbonate products, we recommend the following steps. Clean the surface, apply a piece of film and store it at + 60° C for about 24 hours. If after this time bubbles have formed in the bond, outgassing is still taking place. In such a case, the plastic material must be thermally treated or stored under room conditions for a longer period. When using ORAMASK® plotter films, it is important that the surfaces receiving the designs are thoroughly cleaned. Isopropanol is preferred for cleaning lacquered surfaces and vehicle tarpaulins. When used on those surfaces (tarpaulins in particular), the spirit should be removed as soon as possible after cleaning to prevent it from penetrating into the surface coating. Be sure to allow sufficient time for the solvent to evaporate after cleaning. For jobs calling for multi-coloured designs, make absolutely sure that the ORAMASK® plotter films are only applied onto paint which is thoroughly dry. Residual solvents may cause residue from the adhesive to remain after the stencil film is removed.

Application temperatures
The application should be at the temperature mentioned in the respective data sheet. A significant drop in temperature should be avoided during the first 24 hours after adhesion. Should a temperature drop nonetheless occur, we recommend treating the film with hot air from a hot-air gun.

Removing silicone paper
Lay the cut plotter film with the film side down on a flat surface. Pull back only as much silicone paper as required to begin mounting. Always draw the silicone paper from the film, never the other way round.

Application
ORAFOL recommends to use only material with the same batch number for the same colour. There are two major methods of application: dry and wet adhesion.

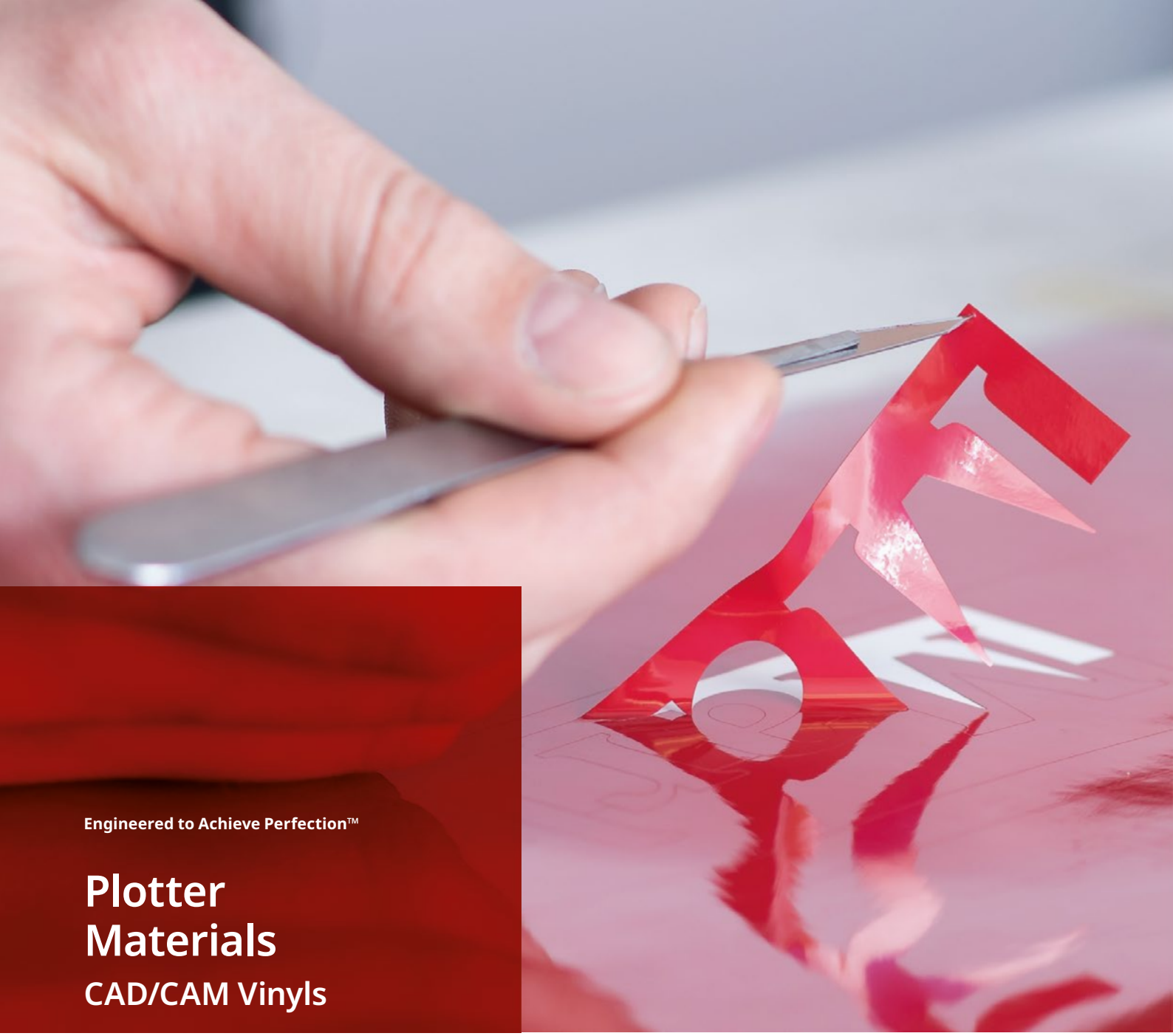
For dry adhesion, first position the film cut and press it at one corner on the surface. Then adhere the remainder by applying a plastic squeegee across the film in overlapping sweeps. Depending on the size of the cut being mounted , the silicone paper may be removed completely before bonding or gradually during the procedure. When using ORATAPE® application paper or film, pull these slowly away from the film at a 180° angle.

Wet adhesion should only be done in warm weather when temperatures are at least +18° C. Spray the exposed adhesive side with low-surface-tension water (water mixed with a flushing agent) and lay it upon the receiving surface. The ease of precise positioning is the great advantage of the wet adhesion method. Press the film to the surface using sweeping, overlapping motions. Make sure that the water is completely squeezed out from between the surface and the adhesive. For wet adhesion, we recommend ORATAPE® MT72 application paper. After a short drying period, remove application paper carefully at a 180° angle. Slightly moistening the back side of the application paper makes this procedure even easier. The bond is improved if the film is pressed again to the surface after a few hours. To avoid differences in perceived colour after adhesion, ORACAL® coloured films should always be worked and adhered in one direction only. When mounting across overlapping sheets of metal or expansion joints, use a sharp knife to separate the film at these points so that the film does not come loose when exposed to motion. Different background profiles are used in vehicle construction. When applying films to such backgrounds, always follow the profile. Never just lay out the film and press it under tension into the recess. With overlapping film adhesion, it is important to make sure that the edges of the sheets overlap by minimum 4 mm and a maximum of 12 mm. When applying film to film, make absolutely sure that only films of the same manufacturer of the same type are put on top of each other (monomeric film on monomeric film, and polymeric film on polymeric softened film). Caution! Certain thermal insulation glazing systems may be damaged by self-adhesive films due to thermal stress caused by extreme temperature fluctuations.

Application on cars
For application on cars please see in addition the practical information on how to apply self-adhesive films on cars. For the application on car windows the remarks in the practical information for application on cars are to be followed.

Removability
Environment and surface temperature must be at least +20° C before these films can be removed. Using a knife, start by lifting up cautiously one corner of the film. Then slowly draw the film from the surface at a 180° angle. Heating the film with a hot-air gun while pulling makes removal considerably easier. If the film being removed is very old, a small amount of residue from the adhesive may remain on the surface. It can be removed easily with varnish thinner.

This information is based on our knowledge and experience. We have not explained all considering aspects of application. Specialised or occupational knowledge and competence of a professional sign maker are presupposed. Due to the diversity of potential influencing factors during application and use, we recommend to conduct own tests of our products by customers who wish to use the films for special applications. No legally binding warranty of certain qualities can be derived from our information.



Engineered to Achieve Perfection™

Plotter Materials

CAD/CAM Vinyls

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