



Controltac™ Plus

Graphic Film with Comply™ Adhesive

Series 180C and Film 180Cv2-10

For Screen Printing Only

Description

Film series 180C and film 180Cv2-10 are 2-mil films. They combine the features found in Controltac and Comply adhesive technologies, including pressure activation, slide-ability, repositionability and air release channels, which allow for fast and easy bubble-free graphic installations. The films with the new Comply v2 adhesive also have non-visible air release channels and a higher gloss. These long-term durable and removable films have excellent hiding power and stability, making them perfect for indoor and outdoor signs and fleet graphics, including surfaces with corrugations and rivets. They are designed for screen printing.

Recommended Types of Graphics and End Uses

These end uses are recommended for this film and may be covered by the 3M™ MCS™ Warranty. Certain restrictions may apply; please read the entire bulletin for details.

- Screen printed or cut out graphics
- Indoor and outdoor graphics and signs
- Fleet vehicle graphics, emblems or striping
- Standard vehicle graphics
- Film 180-114 can be used for two-way emblems for windows, except on buses or other vehicles
- Small format original equipment manufacturer's (OEM) decorative and identification graphics, cautionary and safety labeling

Limitations of End Uses

We do not normally warrant other end uses, but please contact us to discuss your needs or let us suggest other 3M products.

Wall Graphics

Two mil cast films are typically the best choice for indoor smooth surface wall graphics. However, the user is responsible for determining the product's suitability, including adhesion and, if required, removal characteristics. Due to the wide variability of smooth indoor walls, neither finished graphics nor removal is warranted, even for removable or changeable films. Instruction Bulletin 5.37 provides comprehensive information for the most successful wall graphics film selection and application.

Unsuitable End Uses for This Film

- Graphics applied to:
 - Stainless steel vehicles
 - Non-flat stainless steel surfaces
 - Non-3M films (see Removal Warranty, page 4)
 - Substrate surfaces that are not clean and smooth (little or no variation in texture)
- Film without graphic protection under these conditions:
 - Vehicle graphics
 - Exposure to abrasive conditions, harsh cleaners or chemicals
- Graphic removal from:
 - Any substrate with poor paint-to-substrate adhesion
 - Painted wallboard, which may cause the paper to separate from the wallboard
 - Under-cured paint
 - Outdoor, horizontal applications
 - Existing graphics that must remain intact; damage may occur during removal of this film
 - Aged paint and metals must be tested to ensure removability. Surface oxidation or chalking may result in adhesive residue upon removal.
- Graphics subjected to:
 - Gasoline vapors or spills at gas pumps, vehicle fuel-tank ports, or top-feeding, petroleum tankers
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684 for alternatives.

Important Information About Bus Applications

Film used on buses must not be applied so as to restrict the safe use of emergency window exits. See the most current version of Instruction Bulletin 5.4 for details.

Compatible Products

Refer to the durability tables for 3M™ MCS™ Warranty for the proper combination of printers, inks, films and graphic protection.

3M Inks

- 3M™ Screen Printing Ink Series 1900
line color and four color
- 3M™ Screen Printing UV Ink Series 9800
line color and four color

3M Graphic Protection Options

- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Screen Print Low Gloss Clear 1930
- 3M™ Screen Print Gloss Clear 9720UV
- 3M™ Screen Print Low Gloss Clear 9730UV
- 3M™ Screen Print UV Gloss Clear 9800CL

OEM Ink and Clear

- Sericol™ Duracal™ UV Screen Print Ink
- Sericol™ Duracal™ Screen Print Clear
(approved for OEM applications only)

Note: See page 6 for how to obtain Duracal inks.

Other Products

- 3M™ Edge Sealer 3950
- 3M™ Prespacing Tape SPCS-55
- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X

Characteristics

All values given are typical for unprocessed film unless noted otherwise and are not for use in specifications. Processing film may change certain values. If you have questions about your construction, contact the Technical Service helpline at 1-800-328-3908.

Physical Characteristics

Characteristic	Description
Film	Cast vinyl
Thickness	Without adhesive: 2 mils (0.05 mm) With adhesive: 3-4 mils (0.08-0.10 mm)
Colors	See the Color Chart on page 3
Adhesive	Pressure activated, positionable with air release channels
Adhesive color	Films with * in color chart: clear All other films: gray-pigmented
Liner	Polyethylene-coated layflat paper
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C) <i>minimum</i>
Adhesion <i>24 hours after application</i>	ABS: 4.2 pounds/inch (0.75 kg/cm) Acrylic enamel: 3.5 pounds/inch (0.63 kg/cm) Aluminum, anodized: 7.9 pounds/inch (1.42 kg/cm) Aluminum, etched: 5.2 pounds/inch (0.93 kg/cm) Chrome: 4.8 pounds/inch (0.87 kg/cm)
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water <i>(this does not include immersion)</i>

Color Chart

Solid Colors			
180Cv2-10 White			
180C-10	White	180C-23	Deep Red
180C-12	Black	180C-25	Sunflower*†
180C-13	Tomato Red	180C-27	Indigo (Navy)
180C-14	Bright Orange	180C-29	Russet Brown
180C-15	Bright Yellow*†	180C-31	Medium Grey*
180C-17	Vivid Blue	180C-37	Sapphire Blue
180C-19	Deep Mahogany Brown	180C-38	Royal Purple*
180C-22	Matte Black*	180C-39	Tan
180C-41	Dark Gray*	180C-96	Teal*
180C-46	Kelly Green	180C-98	Dark Violet*
180C-47	Intense Blue	180C-103	Magenta*
180C-49	Beige	180C-120	Satin Aluminum
180C-53	Cardinal Red	180C-131	Satin Gold*
180C-54	Light Orange	180C-173	Salmon Pink*
180C-56	Dark Green	180C-176	Aqua*
180C-57	Olympic Blue	180C-186	Bright Green*
180C-58	Burgundy*	180C-193	Mauve
180C-63	Geranium*	180C-196	Apple Green*
180C-77	Peacock Blue	180C-307	Dark Aqua*
180C-88	Violet*		
Metallic and Transparent Colors			
180C-201	Slate*	180C-227	Bright Blue*
180C-203	Red*	180C-228	Dark Burgundy*
180C-211	Charcoal*	180C-229	Copper*
180C-216	Sage Green*	180C-237	Silver Blue*
180C-217	Dark Blue*	180C-239	Chocolate Brown*
180C-220	Light Silver*	180C-241	Gold*
180C-221	Grey*	180C-114	Transparent*†

* Indicates clear adhesive; all other adhesive is gray-pigmented

† Indicates minimal or no hiding power

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	<p>Surface type: Flat, with and without rivets, simple curves, moderate compound curves, and corrugations</p> <p>Substrate type: ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints)</p> <p>Application temperature: - Flat surfaces with and without rivets: 40° to 100°F (4° to 38°C) - Corrugated surfaces with rivets: 50° to 100°F (10° to 38°C)</p>
Applied film shrinkage	0.015 inches (0.4 mm)
Finished graphic exposure temperature	-65° to +225°F (-60° to +107°C)
Graphic removal	Removable with heat and/or chemicals from most substrates within the warranty period at 50°F (10°C) minimum (air and substrate)

Warranty Information

See the 3M Graphics Market Center Warranty Brochure for the complete warranty and remedy details. The warranty given in the Product Bulletin that is current at the time you purchased the film is the one that 3M will honor.

3M™ MCS™ Warranty for Finished Graphics

Warranted Durability for Graphic Constructions in a Vertical Exposure																
Warranties shown in years	No Printing				Ink Series 1900				Ink Series 9800				Ink Series 9800 Metallic			
	Vehicle	Railroad	Signs	OEM	Vehicle	Railroad	Signs	OEM	Vehicle	Railroad	Signs	OEM	Vehicle	Railroad	Signs	OEM
Graphic Protection	Film Colors 180Cv2-10◆● and 180C-10◆●, 12◆●, 13◆, 14◆, 15◆, 19, 22, 23, 29, 39, 49, 58, 63, 88, 96, 103, 173, 176, 186, 193, 196, 307															
1920DR, air dry	—	—	—	—	5	5◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6■	6◆■	5■	5■	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2◆	2	2	—	—	—	—	—	—	—	—
9720UV	—	—	—	—	6	6◆	5	5	7	7◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3◆	3	3	3	3◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5◆	5	5	5	—	5	5
None	7, LT	8◆	6	5	—	—	—	—	—	—	2	—	—	—	—	—
Film Colors 180C-17, 25◆, 37, 46, 47, 53◆, 54, 56, 57, 77																
1920DR, air dry	—	—	—	—	5	5◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6■	6◆■	5■	5■	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2◆	2	2	—	—	—	—	—	—	—	—
9720UV	—	—	—	—	6	6◆	5	5	6	6◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3◆	3	3	3	3◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5◆	5	5	5	—	5	5
None	6, LT	6◆	6	5	—	—	—	—	—	—	2	—	—	—	—	—
Film Colors 180C-120, 131																
1920DR, air dry	—	—	—	—	5	5◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6■	6◆■	5■	5■	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2◆	2	2	—	—	—	—	—	—	—	—
9720UV	—	—	—	—	6	6◆	5	5	5	5◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3◆	3	3	3	3◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5◆	5	5	5	—	5	5
None	6	6◆	5	5	—	—	—	—	—	—	2	—	—	—	—	—
Film Colors 180C-114, 201, 203, 211, 217, 220, 221, 227, 228, 229, 237, 239, 241																
1920DR, air dry	—	—	—	—	5	5◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6■	6◆■	5■	5	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2◆	2	2	—	—	—	—	—	—	—	—
9720UV	—	—	—	—	6	6◆	5	5	5	5◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3◆	3	3	3	3◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5◆	5	5	5	—	5	5
None	6	6◆	5	5	—	—	—	—	—	—	2	—	—	—	—	—

LT = Lifetime

◆ = Warranty for vertical railroad applications for these colors only and printed with line color inks.

● = Warranty for vertical railroad applications, colors 10 and 12 have 2 additional years for legibility only.

■ = Warranty requires oven drying the last color of ink series 1900 and screen print 1920DR for 2 hours at 150°F (65°C).

Warranted Durability for OEM Applications

OEM applications using Sericol Duracal UV Screen Print Ink and Clear
3 years

Formulas for Other U.S. Warranted Durabilities

Use the warranted durability for your construction if exposed in a U.S. vertical orientation and use the following formulas to determine other durabilities.

Exposure	Percentage of U.S. Vertical Exposure	Example
U.S. Non-vertical	50% (0.5)	0.5 x 5 years = 2.5 years
Desert Southwest Vertical	70% (0.7)	0.7 x 5 years = 3.5 years
Desert Southwest Non-vertical	35% (0.35)	0.35 x 5 years = 1.75 years
Horizontal, Vehicle only	Warranted for legibility only for the stated durability.	

Legibility Warranty for Horizontal Exposure of Fleet Vehicle Graphics *in years*

Applications subjected to maximum sunlight and environmental conditions used on rooftops of commercially-owned fleet vehicles where identification from the air is needed. The graphic will change color, lose gloss and chalk.

Film Colors 180C-10, 12, 13, 14, 15, 25, 53, 54		Exposure	
Ink series	Clear	U.S.	U.S. Desert Southwest
No printing	None	5	3
1900	1920DR, oven dry	5	3
9800	9720UV	5	3

Warranty Stipulations for Van, Bus, Recreational Vehicles or Automobile ("Vehicle") Paint Refurbishing Reimbursement

A Pre-Installation and Inspection Report (see Instruction Bulletin 5.36), completed prior to graphic installation, must be submitted with any claim for paint damage sustained during the removal of 3M removable or changeable graphic film from vehicles. A separate report for each vehicle involved in the claim is required. A claim cannot be authorized without these reports.

Lifetime Warranty for Trailers Only

This extended warranted durability and remedy is in addition to the terms of the 3M™ MCS™ Warranty for the constructions indicated in the Warranted Durability table on page 3 for fleet vehicles only. A fleet vehicle is defined as being a commercial straight truck or trailer only. The Lifetime Warranty is extended to the original graphics purchaser who still owns the fleet vehicle for which any claim is submitted. The additional remedy, described below, is a pro-rated material replacement and labor reimbursement.

Exposure		Percentage of Replacement/Reimbursement	
U.S.	U.S. Desert Southwest	Material	Labor
<i>Failure occurs during year:</i>			
8	5	100	100
9	6	80	50
10	7	60	25
11	8	40	10
12	9	20	0
13	10	10	0
14	N/A	10	0
15	N/A	10	0
16 plus	N/A	10	0

Fleet Labor Reimbursement

3M will reimburse 100% of the labor costs associated with the removal, remanufacture and reapplication of a **commercial fleet graphic only** to the extent that 3M determines such amount is reasonable and necessary in the circumstances. This labor cost reimbursement will be determined by 3M on a case-by-case basis taking into account the expected amount of labor needed to make such repairs and other considerations.

Labor Reimbursement Remedy for Removable and Changeable Films

If the film cannot be successfully removed or an excessive amount of adhesive residue remains on the surface, 3M will reimburse a portion of extra removal costs.

Removal requires heat and/or chemicals. The ease and rate of removal depends on a number of factors. See Instruction Bulletin 6.5 for details.

See warranty removal limitations on page 1.

Orientation	Remedy
Vertical	7 years or the Warranted Durability, whichever comes first
Non-vertical	50% of the U.S. vertical Warranted Durability, not to exceed 3.5 years

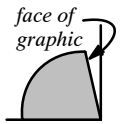
Warranty Notes

Terms



Vertical exposure

The face of the graphic is $\pm 10^\circ$ from vertical.



Non-vertical exposure

The face of the graphic is greater than 10° from vertical.

Desert southwest exposure. Graphics exposed to solar energy more than half of the time in Arizona, New Mexico and the desert areas of California, Nevada, Utah and Texas. A detailed map is available upon request.

OEM. Labels and decorative graphics produced for original equipment manufacturers.

Signs. Graphics applied outdoors and exposed to the elements.

Railroad. Graphics applied on railroad cars but not railroad engines.

Fleet vehicle. Straight trucks and trailers used in commercial fleets.

Standard vehicle. Buses, vans, automobiles, recreational vehicles.

Graphic Performance Life

The actual performance life of a graphic depends on the:

- Correct combination of 3M-recommended graphics products
- Ink formulation
- Adequate ink drying or UV curing
- Selection and preparation of the substrate
- Surface texture
- Application methods
- Angle and direction of sun exposure
- Environmental conditions
- Cleaning or maintenance methods

Removal Warranty Exceptions

Removal is not warranted under some conditions. Please refer to *Unsuitable End Uses for This Film*, page 1.

Graphic Protection

Any graphic exposed to abrasive conditions (including vehicle graphics), harsh cleaners or chemicals must include graphic protection in order to be warranted.

Application Outside the U.S.

Contact the 3M organization for that country.

Application to Glass

3M accepts no liability for glass breakage when using this film for window graphics. See Instruction Bulletin 5.1 for details.

Graphics Made with Components Not Sold or Recommended by 3M

The 3M MCS warranty does not cover finished graphics made with other manufacturers' inks, film, graphic protection and/or application tapes, except as noted in this Bulletin. The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include non-3M graphic products.

Warranty and Limited Remedies

The following is made in lieu of all other express or implied warranties, including any implied warranty of **merchantability** or fitness for a particular purpose or implied warranty arising out of a course of dealing, custom or usage of trade: all 3M products are warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. These remedies are exclusive. **In no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M materials charges.**

See the Graphics Market Center Warranty Brochure, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

Screen Printing

Formulations and processing conditions can affect ink durability. Refer to the Product and Instruction Bulletins for your ink for limitations and proper usage.

Graphic protection can improve the appearance, performance and durability of your graphic. A clear coat also prevents chalking on unprinted colored films. Use standard screen printing methods to apply clear coats.

How to Order Sericol Inks

Sericol's Duracal inks can be obtained through their distributor network. Please refer to this web site for details: <http://www.sericol.com/Distributors/distribFR.htm>. You can also contact Sericol at: Sericol Inc. Corporate Office 1101 W. Cambridge Drive, Kansas City, KS 66103 Tel: 913-342-4060, Fax: 913-342-4752.

Cutting

The following are common cutting methods for this film. See Instruction Bulletin 4.1 for details.

- Bandsawing
- Hot kiss cutting
- Drum-type electronic cutting
- Flat-bed electronic cutting
- Guillotine
- Hand cut
- Cold and hot steel-rule die cutting

The following minimum values for electronic cutting text of this film are based on upper case Helvetica medium type. Weeding can be more difficult with smaller text.

Minimum stroke width:	0.25 inch (6.35 mm)
Minimum height:	3.0 inch (76.2 mm)
Minimum radius for end of stripe:	0.125 inch (3.18 mm)

Application Tapes

The type of application tape to use depends on the type of graphic produced and the ink or screen print clear coat that was applied last. See Instruction Bulletin 4.3 for details.

- Use a prespacing tape if the graphic has large amounts of the liner exposed.
- Use a premasking tape if very little of the liner is exposed.

Last Coating	Premasking Tape	Prespacing Tape
Unprinted	SCPM-3	SCPS-55
1920DR	SCPM-3	SCPS-55
1930	SCPM-3	SCPS-55
9720UV	SCPM-44X	SCPS-55
9730UV	SCPM-44X	SCPS-55
Ink series 9800, no clear	SCPM-44X	SCPS-55
9800CL	SCPM-44X	SCPS-55

Application

Refer to the Instruction Bulletins listed in the **3M Related Literature** section, located at the end of this Bulletin, for more complete information.

Adhesive

The combined features found in Controltac and Comply adhesive technologies, including pressure activation, slide-ability, repositionability and air release channels in the adhesive, allow for fast and easy bubble-free graphic installations. An air bubble trapped under the film can be rubbed out easily and usually does not require making an air release hole. Applying firm pressure bonds the adhesive to the substrate, and by design, destroys the positionability feature.

The adhesive characteristics may be reduced under these conditions:

- The film has been removed, even partially, from the original liner and reapplied to the same liner or another liner.
- Application at higher than 100°F (38°C) causes the film to lose its positionability even with light hand pressure.

Method

Do not use detergent and water or a commercial application liquid to position the graphic on a vehicle.

Finishing

3M edge sealer 3950 may be used if needed.

Removal

This film is warranted to be removable using chemicals or heat. 3M™ Controltac™ Film Remover R221 and 3M™ Controltac™ Adhesive Remover R231, are available. Removing the film from a pre-existing graphic will damage that graphic. See Instruction Bulletin 6.5 for removal details.

Shelf Life, Storage, and Shipping

Activity	Recommendation
Shelf life	Total shelf life: 2 years Up to 2 years unprocessed, OR process within 1 year and apply within 1 year of processing
Storage conditions	<ul style="list-style-type: none"> • 80°F (27°C) maximum • Out of sunlight • Clean dry area • Original container • Bring the film to print room temperature before using
Shipping finished graphics	Flat, or rolled printed side out on 5 inch (13 cm) or larger core; this helps prevent the liner and premasking tape from wrinkling or popping off

See Instruction Bulletin 6.5 for details.

Maintenance and Cleaning

Use a cleaner designed for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline.)

Chalking on unprinted film can be washed off with normal graphic cleaning methods.

Health and Safety

Caution

When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information.

To obtain MSDS sheets for 3M products:

- By fax, call 1-800-364-0768 in the US and Canada or 1-650-556-8417 for all other locations.
- Electronically, visit us at <http://www.3m.com/msds>.
- By mail, or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

Attention: Authorized Graphics Manufacturers

Visit our password-protected website for exclusive product information, profiles and services. Certain restrictions apply.

1. Go to www.scotchprint.com.
2. Select a country.
3. Click *Login* on upper left side of screen.
4. Click Register.
5. Enter authorization code: **CGD_SGN**.
6. Complete the information and submit.
An e-mail will be sent when your authorization is completed.

3M Related Literature

Before starting any job, be sure you have the most current Product and Instruction Bulletins.

The information in 3M Product and Instruction Bulletins is subject to change. Current Bulletins, as well as a list of all Bulletins updated within the last three months, are available at www.scotchprint.com or through our Fax-on-Demand system. Any warranty, if offered, is based on information in the appropriate Bulletin(s) that was current at the time you purchased the 3M products. The following Product and/or Instruction Bulletins provide the information and processes you need to properly make the graphics described in this Bulletin.

Fax-on-Demand phone numbers:
United States or Canada: 1-800-364-0768
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
Product Bulletins		
3M™ Screen Printing Ink Series 1900 and Screen Print Clear Coat VI0402	1900	2501
3M™ Screen Printing UV Ink Series 9800	9800	2513
3M™ Screen Printing Ink Series 9700UV	9700	2507
Instruction Bulletins		
Design of graphics	2.1	5501
Screen printing with ink series 1900	3.11	6011
Screen printing with UV ink series 9800 - line color - 4-color	3.20 3.21	6020 6021
Screen printing with ink series 9700UV	3.4	6004
Scoring and cutting	4.1	6501
Using 3M application tapes; premasking and prespacing for films	4.3	6503
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Applying 3M graphic films with Comply adhesive	5.31	7031
Application, special applications and vehicles	5.4	7004
Application, general procedures for interior and exterior dry applications	5.5	7005
Application: special considerations for complex contours of automobiles, vans and buses and inspection forms	5.36	7036
A guide to understanding and applying graphics to common interior wall surfaces	5.37	7037
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Graphics Market Center Warranty Brochure		9503

Bulletin Change Summary

New Product. 3M™ Controltac™ Plus Graphic Film with Comply™ v2 Adhesive 180Cv2-10 has been added. It carries the same warranty as film 180C-10.

General. This warranty information has been reorganized but no values have changed. Special circumstance warranties or limitations now have headings that are more closely associated with the terms in the Graphics Market Center Warranty Brochure. Information on using this film for wall graphics has been updated (see page 1).



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Fax-on-Demand document: 1009
www.3M.com/graphics

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Fax 52-55-52-70-22-77

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