

---

# Screen

## Product Data Sheet

---

### PANEL DISPLAY OPTIMA PDO SERIES INKS

Panel Display Optima PDO series inks are recommended for printing onto polycarbonate and print treated polyester used in large format backlit panels, vending machines, membrane switch overlays, nameplates, industrial labels and various other, similar applications. Panel Display Optima PDO series inks are NVP free single pack easy to use UV curing inks with exceptional flexibility and resistance to delamination when used in combination with pressure sensitive adhesives (PSAs) and tapes. Panel Display Optima PDO series inks may also be printed onto PVC and in addition may be used for forming applications as an alternative to solvent based products such as Vynaglaze 4700 series inks.

**CHARACTERISTICS:** Panel Display Optima PDO series inks exhibit excellent and wide ranging adhesion, high image definition and multiple pass intercoat adhesion. Panel Display Optima PDO series inks also have excellent flexibility for embossing and die-cutting coupled with good opacity, density and colour strength, perfect for membrane switch fascia and graphic printing.

**COLOUR RANGE:** The Panel Display Optima PDO series inks colour range consists of 9 strong, bright, lead free, C-Mix 2000 mono pigmented mixing shades which when used in combination with black, white and extender base can be readily mixed to produce almost any colour shade.

The range also includes special opaque white and dense black inks ideally suited for membrane switch, fascia, industrial label and backlit graphic applications.

Typical applications for Panel Display Optima PDO series inks invariably demand bespoke colour shades. Sun Chemical Screen has a number of fully equipped laboratories that can assist with matching or specifying of any bespoke colour shades or effects customers might require. For all enquiries including any special effect requirements, please contact your local Sun Chemical Screen branch.

See table overleaf for full colour range.

**PANTONE:** C-Mix 2000 blend formulations are available to allow simulation of virtually all Pantone®\* colours or the C-Mix 2000 base colours can be used to colour match specific requirements such as warning colours and corporate identities.

\* Pantone Inc.'s check standard trademark for colour

**FORMULATOR:** The computerised Formulator weighing scale and Formulator IDS ink dispenser can further assist in colour management by allowing easy retrieval and weighing or dispensing of special match formulas and Pantone® colours, reducing waste whilst saving time and money.

**LIGHTFASTNESS AND DURABILITY:** Although Panel Display Optima PDO series inks contain the C-Mix 2000 lightfast pigments, we do not recommend these inks for extreme outdoor exposure. If Panel Display Optima PDO series inks are mixed to contain high contents of white or clear, lightfastness may be reduced. For further advice on lightfast and durability, please contact your local Sun Chemical Screen branch.

---

**PROCESS PRINTING:** Panel Display Optima PDO series four colour process inks are available as high colour strength SWOP colours, which are ideally suited for back-lit displays. PDO9601 Transparent Base may be used to adjust density. As with all UV halftone printing, plain-weave meshes and thin, flat stencils should be used to minimise ink deposit, dot gain and other variables associated with four colour process printing.

#### **TECHNICAL DATA AND WORKING ADVICE:**

**SUBSTRATES AND ADHESION:** Panel Display Optima PDO series inks have excellent and wide ranging adhesion and were primarily formulated for use on polycarbonate, print receptive polyester and PVC substrates for use in high tech applications such as membrane switch graphic overlays, fascia panels and industrial labels. It is essential for further processing to achieve good adhesion to both substrate and any underlying layers of ink. It is recommended that a 100% pass on cross-hatch tape test is achieved.

**Note:** Due to different properties and processing of the substrates, pre-testing is deemed essential. For best results, adhesives should be applied 24 hours after curing. The surface of polycarbonate and top-coated polyesters will deteriorate due to a combination of factors which include substrate grade, processing conditions and excessive exposure of the substrate to UV light. Pre-testing of all components and phases of application, to ensure adequate performance, is essential prior to full production use. Not all grades of PVC are suitable for printing with UV curing inks as some grades suffer from embrittlement, resulting in difficulties during the forming process.

**FORMING:** Depending on the degree and angle of draw, Panel Display Optima PDO series inks are suitable for forming and embossing applications. However, as formability depends on a number of factors, including filmweight, adhesion, number of ink layers and depth of draw, pre-tests are strongly recommended before commencing full production runs.

**SWITCH ACTUATION:** Panel Display Optima PDO series inks have been independently assessed for actuation life in graphic overlay membrane switch applications, where actuation life can exceed 1 million actuations. However, actuation life is dependant on a number of factors such as substrate, ink filmweight, numbers of layers, etc therefore customers should satisfy themselves of full suitability under their specific conditions before commencing a full production run.

If using Panel Display Optima Ultra Opaque White PDOW90, switch actuation should be tested on actual switches as the extra opacity of this product may reduce the number of expected actuations.

**CHEMICAL RESISTANCE:** Panel Display Optima PDO series inks have been evaluated for resistance to a number of common chemicals such as bleach, oils, water, white spirit, dilute ammonia, disinfectant, fats and industrial alcohol and was found to have excellent resistance to a minimum of 100 rub cycles.

**ADHESIVE COMPATIBILITY:** Panel Display Optima PDO series inks have been formulated for use with common wet adhesives and adhesive tapes and will resist discolouration and delamination, however some specific ink and adhesive combinations may delaminate and change appearance due to components in the adhesive soaking into the ink film over time. It is recommended that specific ink and adhesive (or tape) combinations are thoroughly tested prior to commercial use.

**POST PRINT FINISHING:** Panel Display Optima PDO series inks can be guillotined, die-cut and embossed, however as these processes can be affected by a number of variables, printers should satisfy themselves of suitability before commencing a full production run.

**CURING:** Actual cure speeds will vary depending on ink shade, mesh grade, other printing parameters that affect ink deposit and the actual UV curing unit used. Belt speeds as high as 40 m/min, with two lamps at 80 watts/cm can be achieved, dependent on these variables. Ink adhesion can only be achieved if the UV ink film is fully cured. Substrates can have differing receptivity to UV ink, and on certain rigid and/or coloured materials it may be necessary to cure ink more effectively to achieve satisfactory adhesion.

**INTERCOAT ADHESION:** Panel Display Optima PDO series inks exhibit excellent intercoat adhesion and compatibility with pressure sensitive adhesives. However, as with all UV inks, intercoat adhesion should be monitored throughout the print run especially when processing multiple colours and layers.

---

**MODIFICATION:** Panel Display Optima PDO series inks are single package inks which do not require the use of any additives under normal printing conditions. If viscosity reduction is required, up to 5% by weight of UV Thinner TU05 may be added.

**PRINTING MATERIALS:** High quality photopolymer emulsions and capillary films such as SunCoat or Murakami will enhance the print quality normally expected from Panel Display Optima PDO series inks.

Print quality is partially dependent on the stencil and detailed instructions for all SunCoat and Murakami products are available in the form of Product Data Sheets from your local Sun Chemical Screen branch. Specialist advice is also available.

Sharp, high quality polyurethane squeegees of approximately 75-85 durometer are recommended, although squeegees within a range of 60-90 durometer are useable.

High quality, monofilament polyester mesh in the range 120/34 – 165/27 will give optimum results. However, curing parameters may need to be adjusted to ensure sufficient cross linking if coarser meshes are used due to increased ink film weights.

**WASHING UP:** Commercial screen cleaners, such as those in the 'SunCoat' range are recommended for best results. Product Data Sheets and advice on the SunCoat range of screenwashes is available from your local Sun Chemical Screen branch.

**COVERAGE:** Up to 70m<sup>2</sup>/kg can be achieved with Panel Display Optima PDO series inks, but mileage will vary according to the grade of mesh, stencil thickness, squeegee hardness, machine type, etc.

**STORAGE:** Panel Display Optima PDO series inks should be stored in closed, black polyethylene containers at temperatures between 5-32°C. Panel Display Optima PDO series inks have a minimum shelf life of 12 months but can remain usable for longer periods, depending on storage conditions.

**HANDLING:** The raw materials in Panel Display Optima PDO series inks are strictly assessed by independent laboratories for skin irritation and toxicity effects. As a result the inks are described as mild to moderate skin irritants. In practice this means that irritation is of a low order and the inks are well within recognised safety limits. As a sensible precaution we recommend that any ink transferred to the skin is removed immediately by washing with soap and copious amounts of water. For further details on the handling of UV materials please refer to the Printing Ink Advisory Committee book entitled 'The Printers Guide to Health and Safety', chapter four deals with this issue in detail. Concise health and safety data sheets will be provided by your local Sun Chemical Screen branch.

Panel Display Optima PDO series inks have also been formulated to the latest raw material guidelines and do not contain N-Vinyl Pyrolidone (NVP).

**TOYS (SAFETY) REGULATIONS BS5665 PART 3 1989/EN71/3 1989:** These inks have been formulated to exclude heavy metal based pigments. However, inks are supplied without warranty due to risk of contamination throughout the many processing steps from raw materials to finished toy. To ensure conformity analysis is therefore essential. The inks may be analysed or alternatively the finished toy. Please refer to our company statement concerning inks for toys.

Panel Display Optima PDO series inks have also been formulated in accordance with CONEG limits and EC Packaging Waste requirements.

Your nearest Sun Chemical Screen branch will be pleased to supply further details.

<b>C-MIX 2000 BLENDING COLOURS</b>	
Primrose	PDOY30
Golden Yellow	PDOY50
Orange	PDOO50
Scarlet	PDOR20
Red	PDOR50
Magenta	PDOM50
Violet	PDOV50
Blue	PDOB50
Green	PDOG50
Blending Black	PDON50
Blending White	PDOW50
Blending Clear	PDOC50
<b>STANDARD PRODUCTS</b>	
Dense Black	PDON501
Opaque White	PDOW501
Ultra Opaque White	PDOW90
<b>PROCESS COLOURS</b>	
SWOP Process Yellow	PDOS231
SWOP Process Cyan	PDOS235
SWOP Process Magenta	PDOS240
SWOP Process Black	PDOS271
Process Base	PDO9601
<b>MODIFIER</b>	
Thinner	TU05

*This information has been carefully compiled from experience gained in the laboratory and under commercial conditions. However, the product's performance and its suitability for the customer's purpose depend on the particular conditions of use and the material being printed. We recommend that customers satisfy themselves that each product meets their requirements in all respects before commencing a print run. Since we cannot anticipate or control the conditions under which our products are used it is not possible to guarantee their performance. All sales are subject to our standard terms and conditions of sale.*

*We would point out that the information contained in this leaflet is only a recommendation and may need to be altered to suit the conditions and efficiency of the equipment employed. Sun Chemical Screen products are not designed for use in conjunction with those of any other ink maker or similar supplier unless agreed in writing. PDS No. 300. April 2012*

**SUN CHEMICAL SCREEN**  
**NORTON HILL, MIDSOMER NORTON, BATH BA3 4RT TEL: 01761 414471 FAX: 01761 416609**  
**www.sunchemical.com**