KEYPOINT INTELLIGENCE

Direct-to-Film Report

A Comprehensive Keypoint Intelligence Evaluation

SUBLISTAR DTF-6004 Star IV

With SUBLISTAR cold-peel film and adhesive powder
Driven by SAi FlexiPRINT RIP v22.0.3

Background Specifications	
Printhead	On demand Piezo head
Print Resolution	Up to 1800dpi
Print Speed	Up to 12m2/hr in 4 pass mode
Maximum Print Width	600 mm
Maximum Media Width	700 mm
Ink Type	SUBLISTAR Heat transfer pigment (C,M,Y,K,LC,LM,LK,LLK,R,G,B,Or,W)

OUR TAKE

The DTF-Star IV series is manufactured by SUBLISTAR, a Chinese vendor headquartered out of Nanjing. The device supports printing up to 600mm and can be purchased in two, three, four or five head configuration model versions. The device we tested was the DTF-6004 STAR IV model device which is equipped with four Epson i3200 heads. The device can be set up in a CMYKW ink-set offering high-speed printing up to 22m2/hr. The device we tested was set up with extra colours to maximise image quality including Light inks (LcLmLkLLK) and spot colours(RGBOr). The device was connected to the SUBLISTAR S10i powder shaker.

The extra ink sets helped the device achieve some excellent image quality results with spot colour reproduction on white tshirts being well above average for colour match accuracy. Output had a very pleasing appearance with none of the graininess that we often see. Output was not quite as rich on black t-shirts with the black material impacting lighter colour areas making them more muted. Not surprisingly, the colour gamut results were well above average, especially on white t-shirts where we saw the largest colour gamut to date. Gamut size on black was not as larg as white but still above average.

Ink consumption on our standard test target and ink consumed in the weak printhead clean ere both among the lowest we have seen to date.

Colour matching were very good, especially on white t-shirts where the average of only DeltaE5.86 was well above average. Output quality on halftones was again very good with smooth skin tones, vibrant vector graohics and realistic memory colours.

Speeds were modest with production mode running at just above 7m2/hr with high quality 12 pass mode, half that at just north of 3.5m2/hr. Speeds were recorded it the device set to a low (25%) feather setting.

Wash test performance was good, with only minor degradation in quality after 20 wash/dry cycles on both white and black t-shirts with both still being classified as perfectly suitable for external use.

In closing, there is a lot to like about this product for those looking to deliver the highest quality output at a premium price.

APR 2025

TECHNOLOGY HIGHLIGHTS

Automatic in-line head cleaning system

The device conducts automatic nozzle cleaning to reduce the risk of blockages. The cycle is conducted every 6 hours and runs the weak strength head clean routine. This means that based on our results the device will consume 7.24ml of ink every day in head maintenance without operator interventions.

Transparent Ink Option

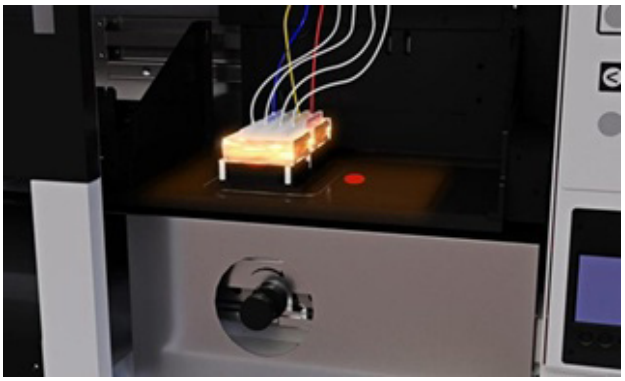
SUBLISTAR offers a transparent ink that the company messages as improving washability results for fine detail work such as wash instructions. The transparent ink takes the place of either the Light colour or the spot RGBOr colour ink head.

Print Head Heating System

The device includes a heater in the ink damper and the carriage base, that they promote as providing superior performance when tasked with operating in a lower-temperature environment by maintaining good fluidity of the ink.

Energy Saving Curing Unit

Sublistar have designed their curing unit to minimise heat escaping thereby reducing the energy requirement to maintain the consistent temperature required. The curing station also includes a permanent purifier to minimise air pollutants.



Advanced Pass System

The device includes advanced algorithms and tension-controlled paper feeding to reduce visible streaks, maintain crisp fine details and minimise uneven color printing.

MPM (Multi-Printer Manager)

SUBLISTAR'S MPM (Multi Printer Manager) software enables one computer to manage multiple printers, helping workers to control machine production more quickly and further improve production efficiency.

PRINT SPEED

Print speed was assessed using the vector graphic shown to the right with 540mm (W) x 450mm (L) dimensions. The image was submitted to the device in various quality modes.

Timings were taken from the moment the printhead started printing the film to the moment the printhead has finished printing and commenced returning to the docking station.

Where multiple film widths are provided for testing, speed analysis shall be conducted on each film with the print speed expressed in m2/hr based on the film width provided.

Note: Film widths tested below the maximum supported width of the device will show slightly reduced maximum print speeds due to the higher impact of each carriage step versus the carriage width covered.

	Maximum Print Speed (Seconds)
	60cm film
Production (1080dpi)	7.09 m2/hr
Highest Quality (1440dpi)	3.54 m2/hr

INK CONSUMPTION

Ink consumption was assessed using the graphic shown to the right with 320mm x 350mm dimensions. The image was submitted to the device in production and high-quality modes.

If the vendor recommends different quality settings for transfer onto white versus black t-shirts then testing shall be conducted accordingly

	Production Mode	High Quality
Total CMYK Ink Consumption	1.279 ml	1.279 ml
Total White Ink Consumption	3.065 ml	3.065 ml

INK CONSUMPTION DURING A CLEANING CYCLE

	Weak	Medium	Strong
Ink consumed on a full head clean cycle	1.81 ml	11.17 ml	28.92 ml

Vendor Ink Cleaning Cycles: The DTF-6004 does an auto head clean every six hours at the weak strength setting. No other manual head cleaning is required unless the operator detects a nozzle blockage.

IMAGE QUALITY

All image quality analysis conducted by Keypoint Intelligence is carried out using white and black Next Level 3600 premium 100% combed ring-spun cotton T-shirts manufactured in a single batch shipment. Jobs are submitted using the vendors recommended settings. Information on settings provided in the Supporting Test Data section at the back of the report.

COLOUR ACCURACY

The KPI test target containing 9 Pantone spot colours was released to the device with the RIP set to Spot Colour Matching ON. The printed patches were compared to the Pantone reference library, with the Delta E00 variance measured using a calibrated XRite Exact spectrophotometer.

Note: a DeltaE00 value of less than 4.0 is typically regarded as a near perfect visual match.

White T-shirt Colour Matching Measured in **ΔE⁰⁰**

PANTONE Colour	Home Depot 165C	Cadbury 2685C	Walmart 285C	McDonalds 123C	Coca Cola 485C	IKEA 109C	Fedex 363C	UPS 476C	Ford 294C
Production Mode	5.98	15.25	2.82	5.56	3.51	4.1	3.23	4.85	7.4
High Quality Mode	6.99	14.56	2.63	5.15	3.3	4.41	3.81	5.19	7.63

Black T-shirt Colour Matching Measured in **ΔE⁰⁰**

PANTONE Colour	Home Depot 165C	Cadbury 2685C	Walmart 285C	McDonalds 123C	Coca Cola 485C	IKEA 109C	Fedex 363C	UPS 476C	Ford 294C
Production Mode	16.38	14.37	6.17	17.94	11.92	18	6.6	6.2	6.57
High Quality Mode	14.47	14.09	5.3	16.16	10.59	15.75	7.19	6.25	6.61

COLOUR GAMUT

Colour Gamut Analysis

A 400 colour patch profiling target was printed with colour matching disabled. The patches were read using an Xrite i1iO table/ES 2000 spectrophotometer with XRite's Color Profiler software to create an icc profile. The icc profile was assessed using Chromix ColorThink software to determine the CIE colour gamut volume measurements. The graphical representations of colour gamut presented below were created using Chromix ColorThink Pro software)

	White T-shirt		Black T-shirt	
	Production	High Quality	Production	High Quality
Colour Gamut (CIE)	329,859	338,491	182,372	149,612

TEXT AND FINE LINES

	White T-shirt		Black T-shirt	
	Production	High Quality	Production	High Quality
Text (Minimum Legible Size)	4	4	5	5
Fine Lines	Very Good	Very Good	Very Good	Very Good

Text and Fine Line Analysis

Visual assessment of the output was conducted with and without magnification. Fonts were assessed using the sans serif Arial font recording the smallest font size with clear definition. Fine lines and circles are evaluated using a selection of standard laundry symbols with a rating scale from Excellent to Poor.

HALFTONE AND VECTOR GRAPHICS

Image quality files were submitted using the vendor recommended settings. The output was visually appraised in a professional D50 light viewing booth by two technicians assessing the output independently across a range of quality attributes with scores assessed over a five-scale rating (Excellent, very Good, Good, Fair, Poor).

White T-shirt

Halftone Reproduction		
	Production	High Quality
Skin Tones	Excellent	Excellent
Memory Colours	Excellent	Excellent
Greyscales	Very Good	Very Good
General Comments	Smooth natural skin tones and vibrant memory colours with no graininess. Greyscales had smooth gradations aided by the LK and LLK inks but lost some detail in darkest contrast areas and had a slight cyan hue	

Vector Reproduction		
	Production	High Quality
Solids	Excellent	Excellent
Fine Details	Excellent	Excellent
General Comments	Rich solids, smooth gradations and crisp fine details across our wide range of test elements. Neon spot colours were rich and vibrant	

Black T-shirts

Halftone Reproduction		
	Production	High Quality
Skin Tones	Excellent	Excellent
Memory Colours	Excellent	Excellent
Greyscales	Excellent	Excellent
General Comments	Smooth natural skin tones, vibrant memory colours, neutral greyscales with smooth gradations and rich dark contrasts	

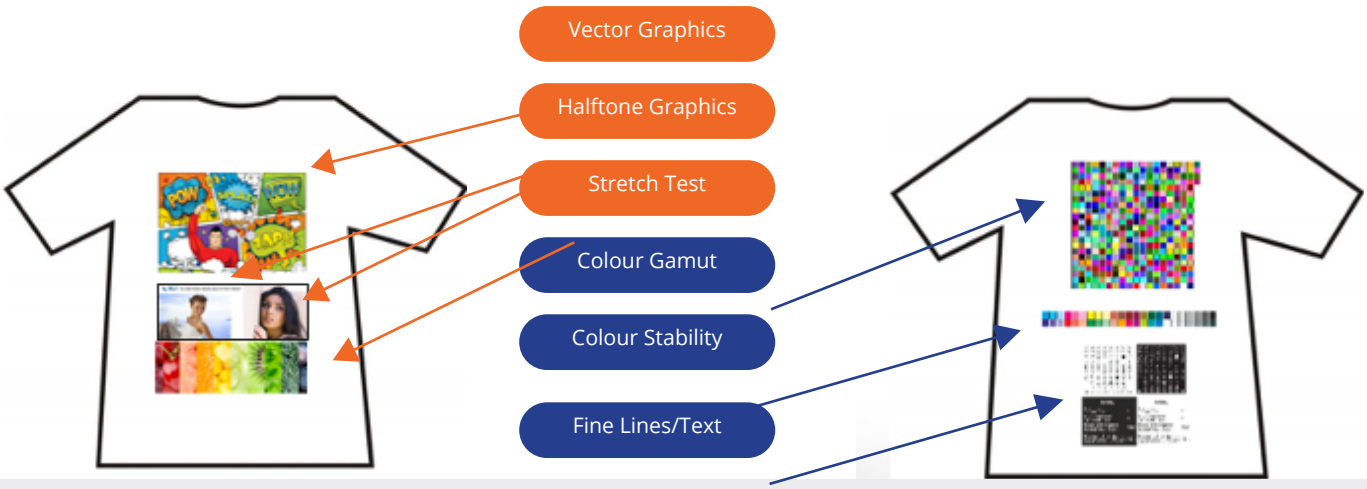
Vector Reproduction		
	Production	High Quality
Solids	Excellent	Excellent
Fine Details	Excellent	Excellent
General Comments	Smooth natural skin tones and vibrant memory colours with no graininess. Greyscales had smooth gradations aided by the LK and LLK inks, lightest greyscales were affected somewhat by the black material see-through and some detail was lost in darkest contrast areas. There was a slight cyan hue	

Halftone Image Targets

Vector Image Targets

WASHABILITY PERFORMANCE

Washability testing was conducted using two apparel types; Next Level 3600 100% cotton white and black t-shirts. Tests were conducted with the device printing in production mode with two presses. Garments were washed inside out using a Hoover H-Wash 300 H3W 410TAE 10Kg washing machine, at 30°C with a Proctor & Gamble's Fairy non bio detergent and dried between each wash using a Candy CSE H8A2LE 8Kg heat pump tumble dryer set to hang dry setting. The impact of washing on garment quality over 5/10/15 and 20 wash/dry cycles was assessed across a range of quality attributes comparing back to the garment prior to the first wash/dry cycle.



Note:

Keypoint Intelligence washability test performance should NOT be compared against results quoted by vendors based of AATCC or other standards which maybe limited to assessing one parameter (color fastness alone) or use different test parameters for washing and drying and can greatly influence results. Comparisons should ONLY be conducted within the same test protocol.

COLOUR STABILITY

	Colour Stability Results	
# of Washes	White T-shirt	Black T-shirt
5	1.24	1.11
10	1.94	1.55
15	2.46	2.08
20	2.68	2.35

Colour stability was assessed using a 84 patch IDEAlliance ISO12647-7 media wedge. The media wedge was measured using an X-Rite spectrophotometer and colour stability versus the original pre-washed output using EFI Verifier software, recording the mean and max colour shift in DeltaEOO. Note: DeltaE00 is a measure of colour difference. A DeltaE00 of 4 is commonly regarded as being undetectable by the human eye.

TEXT DEGRADATION

Font legibility was assessed throughout the washability test routine. On white T-shirts the black fonts were assessed, and on the black T-shirts the white fonts were assessed.

Assessments are judged by two analysts from a 1m viewing distance based on a three-star system (see table to right).

Assessments are carried out before washing, and after 5,10, 15 and 20 washes

Text Degradation Scoring System	
8-pt. or less	***
9-11-pt.	**
12-pt. or more	*

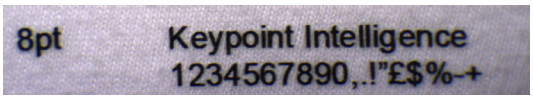
	Text Degradation Results	
# of Washes	White T-shirt	Black T-shirt
5	***	***
10	***	***
15	***	***
20	***	**

8 Point Font in HQ mode with T-seal 2nd Press (Images Enlarged)

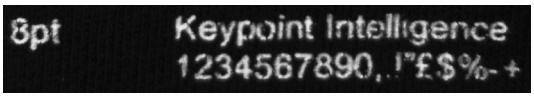
White T-shirt

Black T-shirt

Pre-Wash



20 Washes



HALFTONE AND VECTOR IMAGE DEGRADATION

Halftone and vector graphic quality retention was assessed throughout the washability test routine.

Assessments are judged by two analysts from a 1m viewing distance based on a three-star system (see table to right).

Assessments are carried out before washing, and after 5,10, 15 and 20 washes

Graphics Degradation Scoring System	
No Degradation	***
Minor Degradation (still suitable for wearing in public)	**
Major Degradation (unsuitable for wearing in public)	*

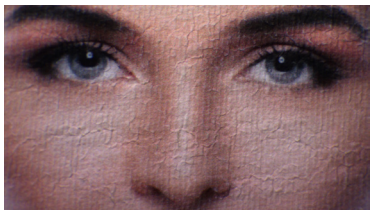
	Graphic Degradation Results	
# of washes	White T-shirt	Black T-shirt
5	***	***
10	***	***
15	***	**
20	**	**

Images in Production Mode with 2nd Press (Images Enlarged)

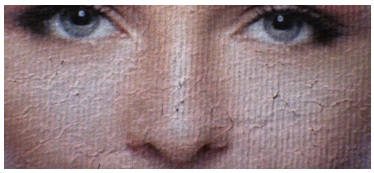
White T-shirt

Black T-shirt

Pre-Wash



20 Washes



STRETCH RESISTANCE

Ink elasticity was assessed throughout the washability test routine using both halftone and solid graphics. Stretch testing was conducted on black t-shirts with a 150% stretch applied using clamps and a set weight over 10 seconds in a horizontal orientation (parallel to shoulders). Images were then taken with a 115% stretch applied simulating modest stretch during wearing. Stretch tests were conducted after 10 and 20 washes.

Stretch Degradation Scoring System	
No Degradation	***
Minor Degradation (still suitable for wearing in public)	**
Major Degradation (unsuitable for wearing in public)	*

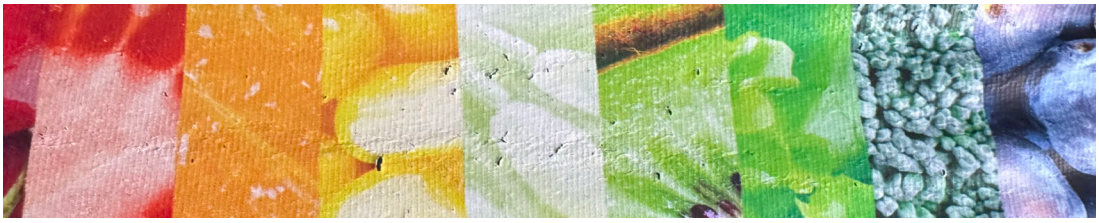
	Stretch Resistance Results
# of washes	
10	**
20	**

Images in Production Mode (Images Enlarged)

Pre-Wash

10 Washes

20 Washes



COLOUR GAMUT SHRINKAGE

	Colour Gamut Shrinkage Results	
# of washes	White T-shirt	Black T-shirt
10	10%	6%
20	16%	10%

Colour gamut shrinkage was assessed using a 400 colour patch IT8 profile target. The target was measured with an X-Rite spectrophotometer using XRite Profilemaker to create an icc profile. The resulting icc profile was then assessed using Chromix ColorThink Pro software to determine the colour gamut size expressed as a CIE volume. The CIE volume after each set number of wash cycles was compared versus the original pre-washed output to determine gamut shrinkage.

SUPPORTING TEST DATA

Device Speed Modes Used For Test	
Production Mode – White	720 x 1800dpi 6 pass
High Quality Mode – White	720 x 2400dpi 12 pass
Production Mode – Black	720 x 1800dpi 6 pass
High Quality Mode – Black	720 x 2400dpi 12 pass

Recommended Cleaning Procedure	
Cleaning Frequency	The device had an automatic head cleaning every six hours and no further user head cleaning is required unless a nozzle blockage is detected by the operator.
Clean Cycle Used	Weak

Powder / Cure and Image Transfer Settings	
Feed Speed	INA
Pre-Heat Temp	67°C
Heat Temp	I21°C
First Film Transfer Setting	165°C press on med pressure for 15 seconds
Second Press Setting	150°C press on med pressure for 15 seconds

About Keypoint Intelligence

For over 60 years, clients in the digital imaging industry have relied on Keypoint Intelligence for independent hands-on testing, lab data, and extensive market research to drive their product and sales success. Keypoint Intelligence has been recognized as the industry's most trusted resource for unbiased information, analysis, and awards due to decades of analyst experience. Customers have harnessed this mission-critical knowledge for strategic decision-making, daily sales enablement, and operational excellence to improve business goals and increase bottom lines. With a central focus on clients, Keypoint Intelligence continues to evolve as the industry changes by expanding offerings and updating methods, while intimately understanding and serving manufacturers', channels', and their customers' transformation in the digital printing and imaging sector.