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Strategic Assessment

InfoTrends Media White Paper

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Executive Summary

Worldwide, HP Indigo currently provides over 1,300 certified media products in 21 different types and grades of media, offering a spectacular choice and range of products available from over 100 different suppliers. Due to impressive advances in HP Indigo technology, customers can confidently select any HP Indigo certified media and be assured of superior performance.

HP Indigo does not manufacture or sell media to their digital print customers. Rather, HP Indigo customers are able to choose media from the broad spectrum of media providers, worldwide. This extensive range of choices enables customers to select the best grade and brand, unconstrained by OEM-brand requirements, at prices comparable to offset printing. With global consistent product testing methodologies, customers can be assured of consistent print quality, eliminating the waste of excess prints, imperfect prints, and associated disposal costs.

Introduction

HP Indigo presses can image on a wide range of substrates, from uncoated papers to lenticular plastics on some models. To provide structure to this broad span of imaging abilities, HP Indigo has tested and certified an impressive array of substrates. This white paper examines the range and depth of HP Indigo compatible substrates.

Media Diversity

HP Indigo presses are capable of imaging on hundreds of different varieties and grades of substrates. Many of the 21 different types and grades of media already certified by HP are available worldwide. This broad range of media and number of products available creates a rich resource for innovative printing solutions by Indigo owners.

HP Indigo has certified over 1,300 unique media products, but the total number of globally available products is over 2,600 because some products are certified for multiple regions, expanding the scope of media available in different regions worldwide.

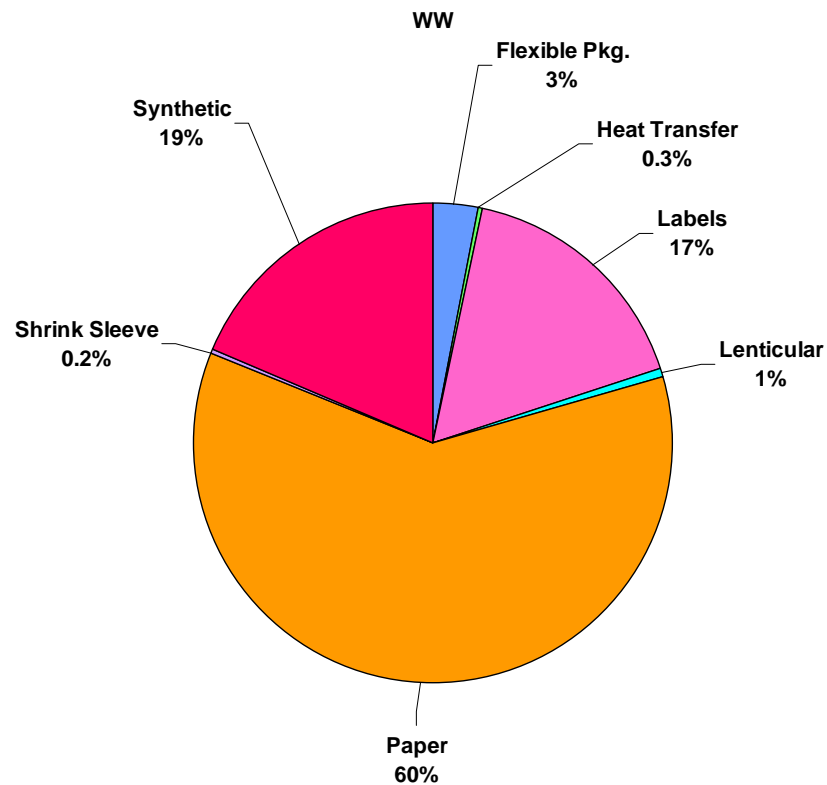
Table 1: Worldwide HP Indigo Media Suppliers by Region and Grade Type

Media Type	Number of Certified Products					
	Region					
	Asia Pacific	Latin America	Canada	Europe	United States	TOTAL
Flexible Pkg.	12	13	15	22	15	77
Heat Transfer	1	1	3	1	3	9
Lenticular	3	3	3	3	3	15
Paper - Coated Gloss	71	1	185	179	225	661
Paper - Coated - Other	74	12	181	197	196	660
Paper - Cover	2	2	7	7	7	25
Paper - Specialty			5	21	9	35
Paper - Uncoated	8	2	63	75	67	215
Self Adhesive - Paper Labels	14	15	40	54	42	165
Self Adhesive - PE Labels	7	7	7	13	7	41
Self Adhesive - PET Labels	5	5	8	14	8	40
Self Adhesive - PP/BOPP Labels	14	18	28	25	28	113
Self Adhesive - Specialty Labels	5	6	23	23	23	80
Shrink Sleeve				2	2	4
Synthetic	35	30	46	46	46	203
Synthetic - PET	1	1	2	6	2	12
Synthetic - Polyester	32	32	42	41	42	189
Synthetic - PVC	8	8	15	16	15	62
Synthetic - Static Cling	2	2	3	4	3	14
Synthetic - Textile Transfer	1	1	1	1	1	5
Synthetic - Vinyl			2		2	4
Total	295	159	679	750	746	2629

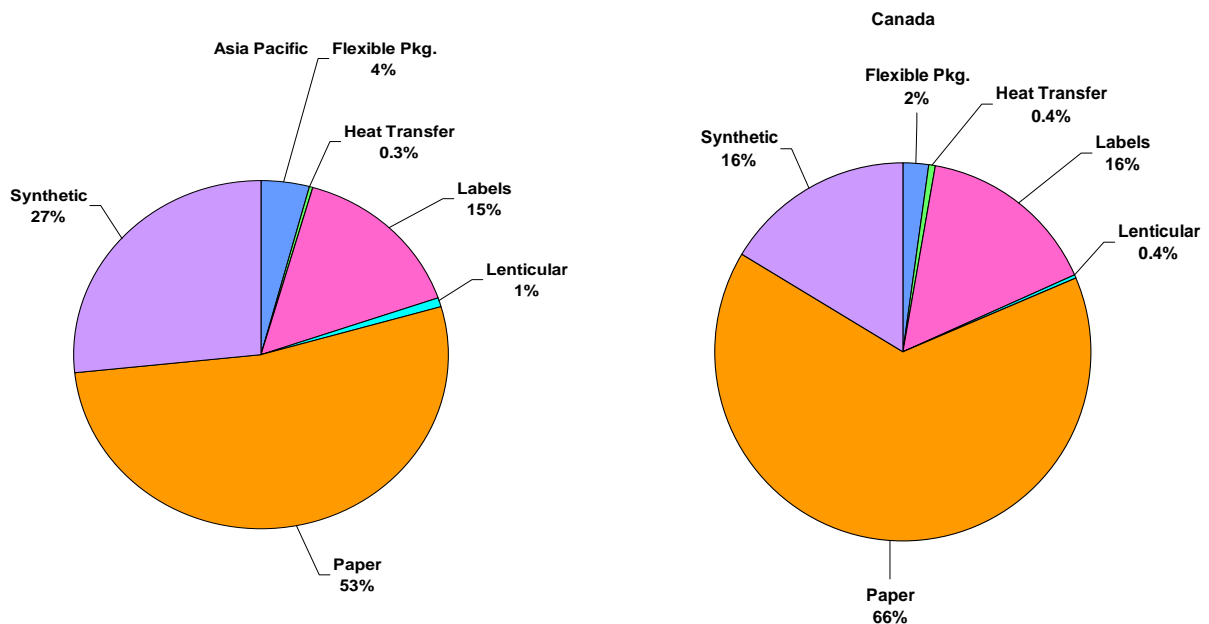
Media Availability

HP Indigo presses support a broad range of media brands and grades, with over 1,300 off-the-shelf certified media solutions worldwide, for industrial and commercial applications. Since many are available worldwide, the total number available globally is nearly doubled.

Chart 1: Number of HP Indigo Certified Substrates Worldwide



Charts 2-3: Number of HP Indigo Certified Substrates Asia-Pacific (Left) and Canada (Right)



Charts 4-5: Number of HP Indigo Certified Substrates Europe (Left) and United States (Right)

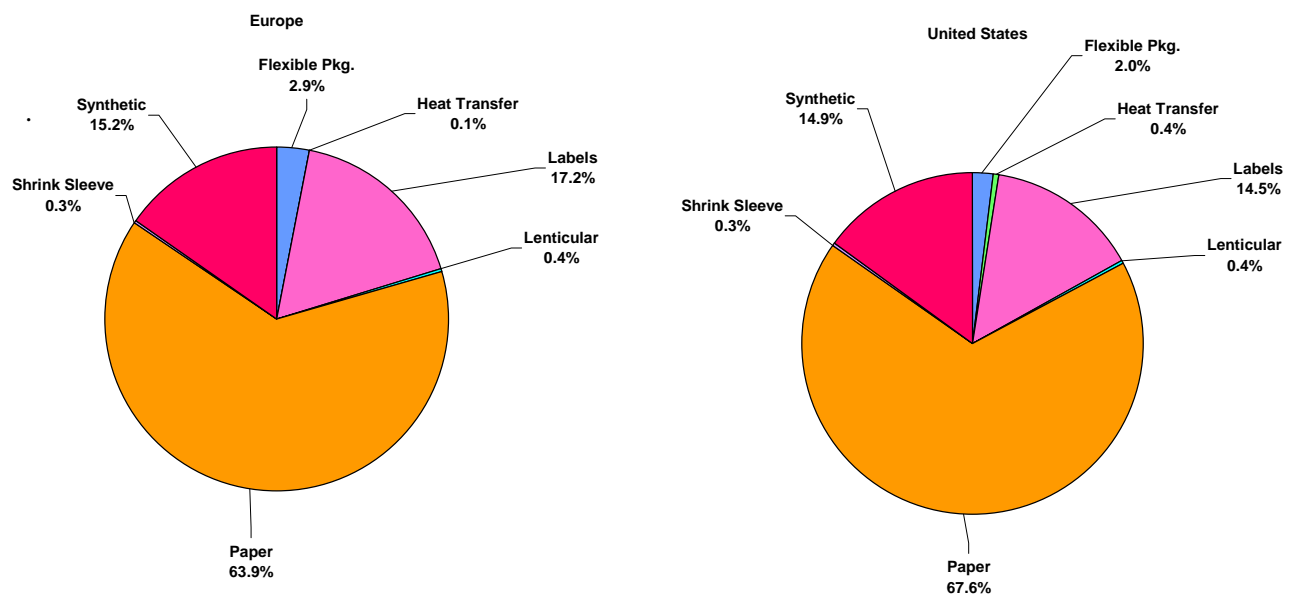


Table 2: Total Number of HP Indigo Certified Substrates by Region

Asia Pacific	295
Latin America	159
Canada	679
Europe	750
United States	746
Total	2,629

HP Indigo's support and promotion of the substrate industry helps ensure that its customers have local media available; reducing shipment costs, providing just-in-time solutions, and offering appropriate inventory levels. To ensure product availability, HP Indigo has over 1,300 certified media products provided by over 100 worldwide media suppliers.

Unlike some digital printing companies, HP does not require its customers to use HP-Indigo-specific branded papers, thus offering the widest range and business opportunities. HP does recommend media that it has tested and certified. HP Indigo qualifies media tested at Rochester Institute of Technology (RIT), Singapore, and Barcelona, Spain.

HP Indigo is the ONLY digital technology that enables its customers to print on many kinds of plastic films like PVC, OPP/BOPP, PET, PE, PC, PLA, and OPS depending upon the type of HP Indigo press. In the example below, labels, films, flexible packaging, and rigid materials all image brilliantly. This ability is particularly important for test-marketing new products in multiple languages and dialects as hundreds of individual versions can be produced in a single run without incurring the additional costs associated with offset printing of make-ready, coming up to color, and clean-up.

Picture 1: HP Indigo Specialty Media Examples

As a result of broad media diversity and superior imaging ability, HP Indigo customers' volumes grow by an average of nearly 50% year-on-year, the fastest in the color production market, creating more and more opportunities for paper manufacturers to develop new products. This impressive volume growth is driven

by the expanded range of printing options an Indigo press provides for its customers. Between 2004 and 2007, HP Indigo experienced strong double-digit growth.

With its global position, the list of HP Indigo-certified solutions is growing 35% year-over-year. HP customers can access the HP Media Locator, view the list, and search for a specific media solution over the Web from anywhere in the world by logging onto <http://h21021.www2.hp.com/medialocator/>. This site requires a username and password. At this site, customers can sign up for automatic media updates that are e-mailed to them whenever a new media is certified.

Additionally, HP Indigo supports the widest range of weights from light-weight 27# text, 40 gsm on its commercial web presses to heavy-weight 24 PT, 600 microns on the industrial sheet fed press, the HP Indigo s2000 press.

HP Indigo's global partner program encompasses media partners from all over the world. Some of these are regional, but others are global. HP Indigo customers have the ability to print on a wide selection of media. Many plain offset papers can be used with this technology as well as media optimized specifically for HP Indigo customers by manufacturers and surface treated media. While the use of surface treatments has declined dramatically in North America and Europe, the use of treatments like Sapphire has been useful in emerging markets. This enables mills and merchants to quickly handle the surge of HP Indigo customers in rapidly changing markets. Additionally, for HP Indigo label and packaging customers, the use of DigiPrime from Michelman enables multiple types of synthetics to be used successfully on these presses.

Media Cost

As a result of competition, volume growth, and increases in variety, prices of many media choices have become competitive with traditional offset and other digital printing segments. HP Indigo has worked with the worldwide media industry to promote media for use on HP Indigo presses. HP Indigo has established close partnerships with many large and influential media providers, ensuring the availability of quality papers at competitive prices. Unencumbered by OEM mark-ups, HP Indigo media is competitively priced with many similar products in the market. As shown in the Table below, the price of many papers used on HP Indigo presses are now almost exactly the same as corresponding products for traditional offset substrates.

This sample may not be valid for all regions or for all suppliers, but it gives an indication of the pricing parity that HP Indigo products have achieved due to their strong growth.

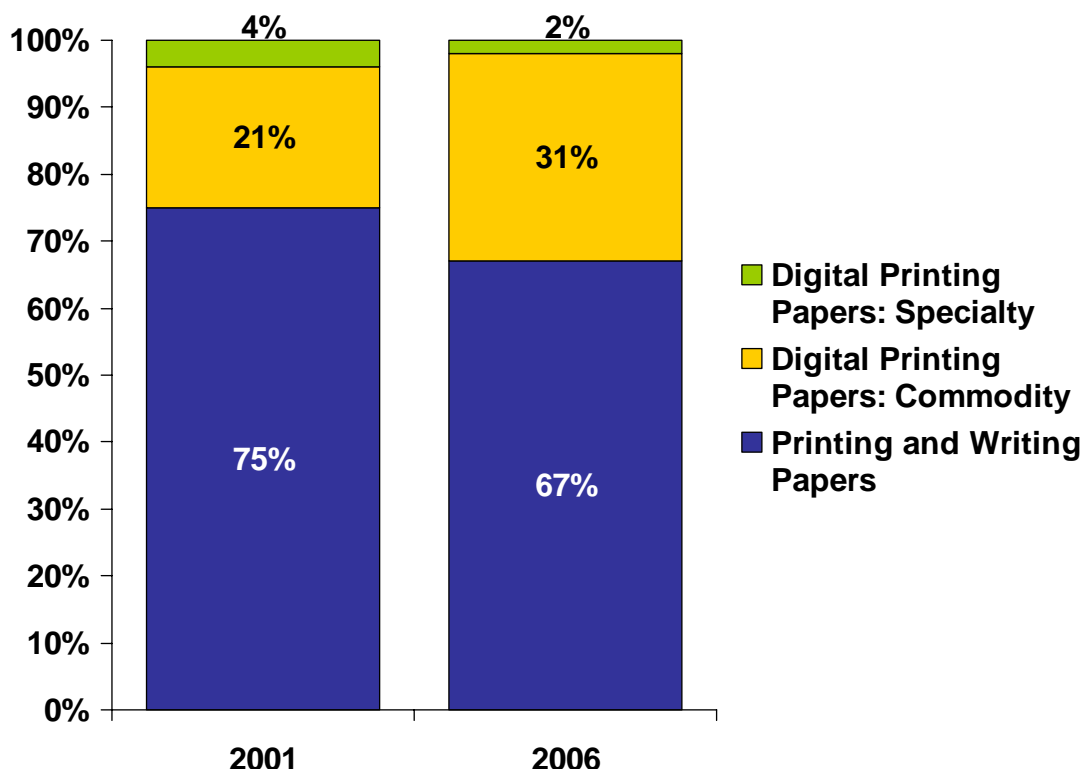
Table 3: A Price Comparison of HP Indigo Substrates

	Price	Price per Sheet
Sterling Ultra Digital - Gloss - 80# Cover - for HP INDIGO - 18 x 12 - White	\$33.73	\$0.13
Sterling Ultra - 80lb - Cover - White - Glossy - 18 x 12 - 250 Sheets	\$33.73	\$0.13
Sterling Ultra Digital - Gloss - 80# Text - for HP INDIGO - 12 x 18	\$36.10	\$0.07
Sterling Ultra - 80lb - Text - White - Gloss - 12 x 18 - 500 Sheets	\$35.91	\$0.07
Mohawk Strathmore I-Tone Writing 24# - Ultimate White - Wove - 18 x 12 - 500 sheets	\$68.29	\$0.14
Mohawk Strathmore Writing 24# - Bright White - Wove - 18 x 12 - 500 sheets	\$59.78	\$0.12

Source: www.paper.com - 2/28/2008

Between 2001 and 2006, U.S. consumption of printing and writing grades declined 8% while consumption of papers for digital printing increased by about 10%, clearly indicating a transition from offset to digital.

Chart 6: U.S. Consumption of Printing and Writing Grades, 2001-2006



Source: AF&PA and InfoTrends

Extensive mill consolidations during this time period resulted in lower production and even elimination of slower-selling products. During the same timeframe, low-cost, high-brightness papers flowed into North America, further reducing the demand for specialty media and impacting domestic production. In mid-2005, the paper industry adopted a 92-bright standard. Customers who bought laser papers for the high brightness feature now found they could often substitute commodity 92-bright papers, reducing the market for value-added specialty grades. Nonetheless, the demand for media for all HP Indigos increased nearly 30% while the demand for media for other production imaging devices decreased 2%.

Most of HP Indigo media solutions are off-the-shelf products: standard offset, or optimized by the paper mills on the paper machines or by label converters at their assembly lines. **The need for Indigo-specific media has significantly decreased over the past few years because:**

- HP Indigo's technology and ink have continually improved over the years, enabling many standard offset papers to be approved for HP Indigo presses.

- HP Indigo's growth is significant and continues to expand. Paper and substrate producers now see the economies of scale favoring manufacturing media specifically for HP Indigo's customer base. This enables an extensive offering of "off the self" products.
- HP Indigo has established very deep relationships with mills worldwide that better enable communication, development, and promotion of its media. By working with HP Indigo media, solution providers such as Nalco and Michelman, as well as mill research and development teams, can remove the costs and road blocks to the manufacturing process.

Mills and manufacturers of media have integrated HP Indigo products into their product offerings and operations to respond to the demand and business opportunities provided by this market segment. All vendors offering 12" x 18" sizes are also featuring some products in the 13" x 19" size. Specifically, Mohawk Fine Papers is offering all of its HP Indigo products in 13" x 19" in addition to the 12" x 18" size.

Streamlining production reduces expense. HP Indigo works closely with solution providers such as chemical providers Nalco and Michelman to optimize manufacturing facilities and substrate production to the digital industry.

If mills plan to manufacture paper or substrates for HP Indigo customers, consulting with these companies for advice and solutions can eliminate time and redundant research and development expenses. These companies also provide off-machine chemical surface treatments enabling regions to expand media offerings and quality for HP Indigo customers..

The use of surface treatments, which varies according to worldwide location, can enable HP Indigo customers to print the widest variety of media as well as the most expansive applications possible.

The value/cost of HP Indigo media solutions range from commodity offset to premium digital grades, depending on customer wants and needs. This enables customers to choose appropriate media for each job without the constraints of dependency on OEM media products.

Media Quality

HP Indigo certifies media in three different locations worldwide, using a systematic methodology that is proven and appreciated by its customers. This approach provides repeatable results that work.

For further information on media testing, contact:

The Americas RIT (industrial and commercial)

Full Name: Bill Garno
Job Title: Director
Company: RIT

E-mail: wtqter@rit.edu

Full Name: Judy Finlay
Company: HP Indigo

E-mail: judy.finlay@hp.com

For other regions, testing is done at HP Indigo sites. These include:

Asia-Pacific Asia Pacific (for all presses) and Europe (for commercial only)

Full Name: Lloyd Darby

E-mail: lloyd.darby@hp.com

Europe Europe (Industrial presses only)

Full Name: Gerard Geurts

E-mail: gerard.geurts@hp.com

By selecting products recommended by HP, customers are assured of consistent, quality results. The online certified media guides allow customers to easily select the best substrates for their application and job expectations.

For example, if a European customer selects **Europe** for a **Region**, the **HP Indigo 5000** for **Machine Type** and **Paper** for **Media**, a few of the 447 HP Indigo-certified selections he could choose are shown below.

Table 4: An Example of HP Indigo Media Selection Guide

Region: Europe

Machine

Type: HP Indigo 5000

Media: Paper



Best-performing papers, suitable for demanding applications/higher ink coverage.

Best ink adhesion and blanket compatibility.



Recommended papers, suitable for standard applications and ink coverage.

Good ink adhesion and blanket compatibility.



Good papers, suitable for less demanding applications and ink coverage.

Sufficient ink adhesion and blanket compatibility for most applications.



Green Star Substrates refer to certified products based on previous certification methods (prior to March 2006).

The current standards of performance now ranks each media via a star system, which indicates the substrate's performance level for run-ability/transport, ink adhesion, & blanket compatibility individually.

447
records
returned

Name	Weight (US)	Weight (EU)	Certification Date	Grain	Runnabil-ity	Blanket Compatibility	Fixing	Supplier
4CC Art 130	90#text	130	2-Feb-01	Long				STORA ENSO
Arctic the Matt 4DI	-----	100	1-Mar-07	Long				Arctic Paper
Century Soho	-----	140	10-Apr-01	Long				Fedrigoni Group
Marcate								
Nettuno								

Colorplan	-----	135gsm	5-Apr-07	Long	★ ★ ★	★ ★ ★	★ ★ ★	GF Smith
Digilabel PE	-----	210	24-Aug-06	Short	★ ★ ★	★ ★ ★	★ ★ ★	Proost en
White Matte	-----							Brandt
Dura-Go	-----	280 micro	25-Aug-06	----	★ ★ ★	★ ★ ★	★ ★ ★	Hanita
I89160M 60lb	-----							Coatings
Folex	-----	75	2-Jul-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	Folex AG
Digiprint	-----							
IG/WOSA	-----							
Forever	-----	150 gsm	26-Nov-07	Long	★ ★ ★	★ ★ ★	★ ★ ★	OTS-
Digiprint WT	-----							Forever
Icewhite IQ -	-----	340 gsm	6-Feb-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	Koehler
340 gsm	-----							
Icewhite IQ -	-----	60 gsm	12-Dec-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	Koehler
60 gsm	-----							
Impressions	-----	363 gsm	16-Jan-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	ICG/Hollisto
Invercote	92#	250	15-Dec-05	Short	★	★	★	n
Albato	cover							IGGESUND
Invercote	-----	260gsm	6-Feb-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	paperboard
Creato	-----							IGGESUND
Jefferson	111#	-----	17-Jan-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	paperboard
Spirit								Hankuk
								Paper
								Mfg. Co.
								Ltd.
Mellotex	100#	270	10-Apr-01	Long	★	★	★	Tullis
Brilliant white	cover							Russell
Nevia BEHN	-----	105 gsm	23-May-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	Gold East
AC 105	-----							Paper USA
PCL-3-White	-----	180	12-Apr-06	Short	★ ★ ★	★ ★ ★	★ ★ ★	Label
laid	-----							Connections
Pinnacle	-----	210 gsm	17-Jan-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	ICG/Hollisto
Polar Art	-----	170	22-Feb-02	Long	★	★	★	n
Polar Bear	80#	-----	7-Nov-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	MODO (m-
Plus								real)
								Hankuk
								Paper
								Mfg. Co.
								Ltd.
Resolution	8 oz	-----	15-Oct-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	BBA, Fiber
Silver Digital	80# text	115	15-May-02	Long	★ ★ ★	★ ★ ★	★ ★ ★	Web
gloss	-----							M-real
Silver Digital	90# text	130	15-May-02	Long	★	★	★	
matte	-----							M-real
SOVEREIGN	60#	89 gsm	15-Dec-06	Long	★ ★ ★	★ ★ ★	★ ★ ★	Aconda
								Paper
								S.A.
XPRI Velvet	111#	300gsm	24-Jan-07	Short	★ ★ ★	★ ★ ★	★ ★ ★	Hankuk
Cover								Paper
								Mfg. Co.
								Ltd.

HP Indigo customers get first-hand media support from its highly experienced media specialists across different geographies. This approach provides the customer with expert assistance without bias towards OEM media. Depending on individual needs and requirements, HP's Indigo specialists work directly with the customer with personal visits, phone advice, training, and customer seminar forums. Simultaneously, to provide coordinated, positive results, HP's Indigo specialists work with substrate producers and merchants to inform and train them on media requirements and the relationship of media to the HP Indigo print process.

Using RIT as its main substrate evaluation and certification center in North America, HP Indigo is cooperating with RIT on several different programs, including:

- Training and education
- Media industry collaboration
- Graphic arts student training
- Substrate suppliers and manufacturers instruction

The primary testing site in North America is at RIT. For information on substrate certification for HP Indigo presses, visit the RIT Printing Applications Lab at http://www.printlab.rit.edu/services_hp.php.

Media that Meets Environmental Standards

Adopting combinations of environmentally responsible actions can generate more profit. Substrates that meet environmental standards do not necessarily cost more. Indigo customers can choose from a variety of FSC, recycled, and other papers that meet environmental standards, as many of its media suppliers are accredited for most eco standards. Since HP does not require its customers to use specific branded papers, customers can choose from the growing population of papers that meet environmental standards.

Eco-certification has become an important issue to some customers. The most well-known are:

- **FSC (Forest Stewardship Council):** Established and well-known in the Graphic Arts Industry, this certification has been granted to numerous paper mills, distributors, and printers. It is widely promoted by conservation advocacy groups (Forest Ethics, Greenpeace, Sierra Club) and often drives initial demand for Chain of Custody systems.
- **SFI (Sustainable Forestry Initiative):** This standard is a relatively recent addition to the Chain of Custody market. Supported by some conservation groups, SFI also has the participation of many of the region's largest wood-product manufacturers—particularly in the paper sector.
- **PEFC (Programme for the Endorsement of Forest Certification):** This international organization facilitates the mutual recognition and co-endorsement of national forest certification systems. SFI is a member organization of PEFC in the United States.
- **Recycled papers:** While there are varying degrees of recycled fiber among the different brands, most mills follow the EPA guidelines that require a minimum of 30% post-consumer content for most uncoated printing and writing papers, and 10% for most coated papers. Many mills list up to 100% recycled content, composed of PCW (post-consumer waste) as well as pre-consumer waste.

While all media from these manufacturers or distributors may not qualify for some ecological certifications, contacting a supplier will confirm which papers meet those requirements. Contact each certification group for a complete listing as additional manufacturers and distributors are continuously being certified.

The use of digital technology enables printers to maximize profits by minimizing wasted media. With an HP Indigo device, the first print is as saleable as the last, providing a more efficient print process because:

- No extra paper is needed to “come up to color” as in offset processes.
- No paper is discarded due to excess prints and dated material. The only paper used is the amount of paper needed, reducing the cost of the overall print run with less waste and disposal costs, increasing profits.
- No dangerous chemicals are needed to clean the press after printing, as in traditional offset printing, eliminating the costs of acquiring, using, and disposing of these chemicals.

Summary

Over the past few years, HP Indigo has vastly expanded its range of certified media to include flexible packaging, heat transfer media, labels, lenticular products, shrink sleeve, synthetics, and, of course, papers (coated and uncoated, from light weights to cover and paperboard stocks). Many of these products are available worldwide, increasing the range of substrates for incremental printing opportunities.

Many HP Indigo substrate prices are on par with their corresponding offset substrates. Since many more printers, copiers, and presses can now image on 12" x 18" and 13" x 19" sheets, it makes sense for mills to offer these sizes as HP Indigo-certified products and offset sizes. With global standardized certification procedures, customers can expect superior quality output from any certified media, manufactured to the same specifications as tested.

With the increased interest and emphasis on ecologically sound procedures, mills are actively seeking certification from environmental groups for their products to meet their customers' demands. As these certifications increase, many more HP Indigo products will be available with these credentials. This means broad access to a wide variety of substrates, at reasonable prices, and with the assurance that the output will satisfy and delight the most demanding critic of all—customers.

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