ITW Thermal Films' W90/B220 Resin Enhanced Wax Thermal Transfer Ribbon

W90/B220 is a multipurpose thermal transfer ribbon with a resin-enhanced wax formulation which provides high print density and excellent edge definition for awide variety of applications including high speed print and apply labeling systems; shipping, carton and address labeling; small character and graphic sprinting with 300/400 dpi; product ID label and tag printing; and general purpose labeling. W90/B220's anti-static formulation and backcoating prolong print-head life,and W90/B220 provides superior abrasion resistance compared to conventional wax products.

FLEXcon Compatible Pressure-Sensitive Films

THERMLfilm SELECT ™ 21230 - Matte 2 mil topcoated white polyester forgeneral purpose label applications. Printable with premium (wax/resin) andgeneral purpose (wax) ribbons. Solvent-based acrylic adhesive.

THERMLfilm SELECT ™ 22230 - Matte 2 mil topcoated silver polyester forgeneral purpose label applications. Printable with premium (wax/resin) andgeneral purpose (wax) ribbons. Solvent-based acrylic adhesive.

THERMLfilm SELECT ™ 31500 - Matte 2.8 mil topcoated white polypropylenefor economical label applications. Printable with premium (wax/resin) and generalpurpose (wax) ribbons. Water-based acrylic adhesive.

THERMLfilm SELECT ™ 41000 - Matte 3.8 mil print-receptive whitepolyethylene for economical label applications. Fan-foldable and printable withpremium (wax/resin) and general purpose (wax) ribbons. Water-based acrylicadhesive.

All FLEXcon products described above are available on a roll form kraft releaseliner for label sensing equipment found on most thermal transfer printers.

FLEXCON

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ITW Thermal Films W90 Resin Enhanced Wax Thermal Transfer Ribbon

TEST	THERMLfilm SELECT 21860	THERMLfilm SELECT 21830	THERMLfilm SELECT 22830, 10852	THERMLfilm SELECT 21940, 22940	THERMLfilm SELECT 21650	THERMLfilm SELECT 31800	THERMLfilm SELECT 21230	THERMLfilm SELECT 22230	THERMLfilm SELECT 31500	THERMLfilm SELECT 41000
Print Quality[1]	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Excellent	Excellent	Excellent	Excellent
Speed[2]							Medium	Medium	Medium	Medium
Burn[3]							High	High	Medium	High
Smudge Resistance[4]							Excellent	Excellent	Fair	Excellent
Scratch Resistance[5]							Excellent	Excellent	Excellent	Good
Chemical Resistance										
Water										
Immersion[6]							50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub[7]							100 Cycles	100 Cycles	100 Cycles	100 Cycles
Formula 409										
Immersion							50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub							100 Cycles	100 Cycles	100 Cycles	100 Cycles
IPA										
Immersion							50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub							20 Cycles	20 Cycles	20 Cycles	30 Cycles
Gasoline										
Immersion							<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes
Rub							<10 Cycles	<10 Cycles	<10 Cycles	10 Cycles
Brake Fluid										
Immersion							10 Minutes	10 Minutes	10 Minutes	20 Minutes
Rub							<10 Cycles	<10 Cycles	<10 Cycles	<10 Cycles

Test Procedures & Rating Scales

[1] **Print Quality** - The thermal transfer Print Quality evaluation tests the thermal response of a film or topcoat. This test determines how much heat is needed to transfer the image. The image is visually evaluated for print consistency, voids, darkness and density of print legibility.

Rating Scale - Excellent
Good
Fair
Poor

[2] **Speed** - Zebra 140 Thermal Transfer Printer

Rating Scale - High - 6 inches per second
Medium - 3 to 4 inches per second
Slow - 2 inches per second

[3] **Burn** - Zebra 140 Thermal Transfer Printer

Rating Scale - High - 14 to 21
Medium - 8 to 13
Low - 0 to 7

[4] **Smudge Resistance** - The Crockmeter Smudge Resistance test (ASTM F 1319-90) evaluates the printed image for smudge, smear and abrasion resistance. A square of white linen is placed over the acrylic finger on the crockmeter arm, which rubs back and forth over the image 10 cycles (20 passes). The image is scanned prior to and following the test to determine the level of change in ANSI grade, if any.

Rating Scale - Excellent - No change to ANSI Grade
Good - Reduced ANSI Grade by 1
Fair - Reduced ANSI Grade by 2
Poor - Reduced ANSI Grade by 3 or more

[5] **Scratch Resistance** - The Scratch Resistance test evaluates the functionability of the thermal print to the film or topcoat. The printed image is scratched with a fingernail five times, then is examined for ink lift-off.

Rating Scale - Excellent - No scratch off
Good - Slight scratch off
Fair - Moderate scratch off
Poor - Significant scratch off

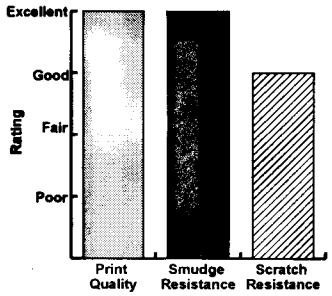
[6] **Chemical Resistance - Immersion Test** - The Chemical Immersion test evaluates the effect of solvent exposure on the printed surface. The printed sample is applied to a stainless steel plate and immersed half-way in the test solvent. After each 10-minute cycle, the sample is removed from the solvent and rubbed with a paper clip. The printed sample is evaluated when wet and after it dries to determine any change in appearance.

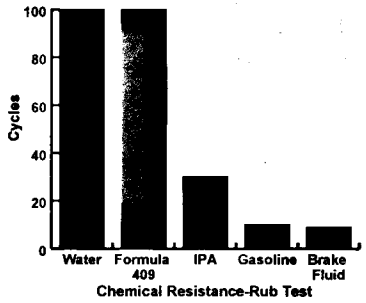
Rating Scale - 10 Minutes - One 10-minute cycle
20 Minutes - Two 10-minute cycles
30 Minutes - Three 10-minute cycles
40 Minutes - Four 10-minute cycles
50 Minutes - Five 10-minute cycles

[7] **Chemical Resistance - Rub Test** - The Crockmeter Chemical Rub test (ASTM F 1319-90, modified) exposes the printed image to test chemicals to evaluate for smudge, smear and abrasion resistance. A square of white linen that has been soaked with the test chemical is placed over the acrylic finger on the crockmeter arm, which rubs back and forth over the image until the chemical rub causes a change in the image.

Rating Scale - 10 Cycles - 20 Passes
20 Cycles - 40 Passes
30 Cycles - 60 Passes
40 Cycles - 80 Passes
50 Cycles - 100 Passes
60 Cycles - 120 Passes
70 Cycles - 140 Passes
80 Cycles - 160 Passes
90 Cycles - 180 Passes
100 Cycles - 200 Passes

THERMLfilm SELECT 41000





ITW Thermal Films' M95/B128 Midrange Wax/Resin Thermal Transfer Ribbon

M95/B128 is a midrange thermal transfer ribbon which provides excellent edge definition and print quality at high dpi and print speeds, and strong abrasion resistance on paper, synthetics, and polyesters. M95/B128 is developed to perform on a wide range of substrates for applications including high speed print and apply labeling systems: automated routing and material handling labeling; shipping, carton and address labeling; and all product ID label and tag printing for retail, industrial and apparel applications, including steam resistant apparel tags.

FLEXcon Compatible Pressure-Sensitive Films

THERMLfilm® SELECT™ 21860, 21830, 22830 and 10852 - Gloss topcoated polyesters for high-performance label applications. THERMLfilm® SELECT™ 21860 and 21830 2 mil white; THERMLfilm® SELECT™ 22830 2 mil silver; THERMLfilm® SELECT™ 10852 1 mil clear over laminate. All four films are coated with a solvent-based acrylic adhesive; SELECT™ 21860 features an aggressive, high-performance adhesive that bonds well to metal and plastic surfaces. Printable with super premium (resin) and premium (wax/resin) ribbons.

THERMLfilm® SELECT™ 21940 and 22940 - Gloss 2 mil topcoated white and silver polyester (respectively) for general purpose label applications. Construction features high-performance solvent-based acrylic adhesive with high peel and high shear that resists cold flow and ooze to increase efficiency in dispensing and diecutting. The topcoat offers static dissipating properties to reduce print voids. Fan-foldable and printable with super premium (resin) and premium (wax/resin) ribbons.

THERMLfilm® SELECT™ 21650- Gloss 2 mil print-receptive white polypropylene for economical label applications. Fan-foldable and printable with super premium (resin) and premium (wax/resin) ribbons. Water-based acrylic adhesive.

THERMLfilm® SELECT™ 31800- Gloss 2.8 mil topcoated white polypropylene for economical label applications. Printable with super premium (resin) and premium (wax/resin) ribbons. Water-based acrylic adhesive.

THERMLfilm® SELECT™ 21230 and 22230 - Matte 2 mil topcoated white and silver polyesters (respectively) for general purpose label applications. Printable with premium (wax/resin) and general purpose (wax) ribbons. Solvent-based acrylic adhesive.

THERMLfilm® SELECT™ 31500- Matte 2.8 mil topcoated white polypropylene for economical label applications. Printable with premium (wax/resin) and general purpose (wax) ribbons. Water-based acrylic adhesive.

THERMLfilm® SELECT™41000- Matte 3.8 mil print-receptive white polyethylene for economical label applications. Fanfoldable and printable with premium (wax/resin) and general purpose (wax) ribbons. Water-based acrylic adhesive.

All FLEXcon products described above are available on a roll form kraft release liner for label sensing equipment found on most thermal transfer printers.

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ITW Thermal Films M95 Midrange Wax/Resin Thermal Transfer Ribbon

TEST	THERMLfilm SELECT 21860	THERMLfilm SELECT 21830	THERMLfilm SELECT 22830, 10852	THERMLfilm SELECT 21940, 22940	THERMLfilm SELECT 21650	THERMLfilm SELECT 31800	THERMLfilm SELECT 21230	THERMLfilm SELECT 22230	THERMLfilm SELECT 31500	THERMLfilm SELECT 41000
Print Quality[1]	Excellent	Excellent	Excellent	Excellent	Good	Good	Excellent	Excellent	Excellent	Excellent
Speed[2]	Medium	Medium	Medium	Medium	Medium	Medium	Slow	Slow	Slow	Medium
Burn[3]	High	High	High	High	High	High	High	High	High	High
Smudge Resistance[4]	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Excellent
Scratch Resistance[5]	Fair	Fair	Fair	Good	Excellent	Good	Excellent	Excellent	Excellent	Excellent
Chemical Resistance										
Water										
Immersion[6]	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub[7]	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles
Formula 409										
Immersion	30 Minutes	30 Minutes	30 Minutes	20 Minutes	30 Minutes	30 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub	80 Cycles	80 Cycles	80 Cycles	50 Cycles	80 Cycles	80 Cycles	100 Cycles	100 Cycles	100 Cycles	100 Cycles
IPA										
Immersion	10 Minutes	10 Minutes	10 Minutes	10 Minutes	<10 Minutes	<10 Minutes	50 Minutes	50 Minutes	50 Minutes	50 Minutes
Rub	20 Cycles	20 Cycles	20 Cycles	10 Cycles	10 Cycles	10 Cycles	50 Cycles	50 Cycles	40 Cycles	100 Cycles
Gasoline										
Immersion	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes
Rub	<10 Cycles	<10 Cycles	<10 Cycles	<10 Cycles	<10 Cycles	<10 Cycles	10 Cycles	10 Cycles	10 Cycles	10 Cycles
Brake Fluid										
Immersion	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes	<10 Minutes
Rub	10 Cycles	10 Cycles	10 Cycles	<10 Cycles	10 Cycles	10 Cycles	<10 Cycles	<10 Cycles	<10 Cycles	10 Cycles

Test Procedures & Rating Scales

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[3] **Burn** - Zebra 140 Thermal Transfer Printer

Rating Scale - High - 14 to 21
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Low - 0 to 7

[4] **Smudge Resistance** - The Crockmeter Smudge Resistance test (ASTM F 1319-90) evaluates the printed image for smudge, smear and abrasion resistance. A square of white linen is placed over the acrylic finger on the crockmeter arm, which rubs back and forth over the image 100 cycles (200 passes). The image is scanned prior to and following the test to determine the level of change in ANSI grade, if any.

Rating Scale - Excellent - No change to ANSI Grade
Good - Reduced ANSI Grade by 1
Fair - Reduced ANSI Grade by 2
Poor - Reduced ANSI Grade by 3 or more

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50 Cycles - 100 Passes
60 Cycles - 120 Passes
70 Cycles - 140 Passes
80 Cycles - 160 Passes
90 Cycles - 180 Passes
100 Cycles - 200 Passes

THERMLfilm SELECT 21940