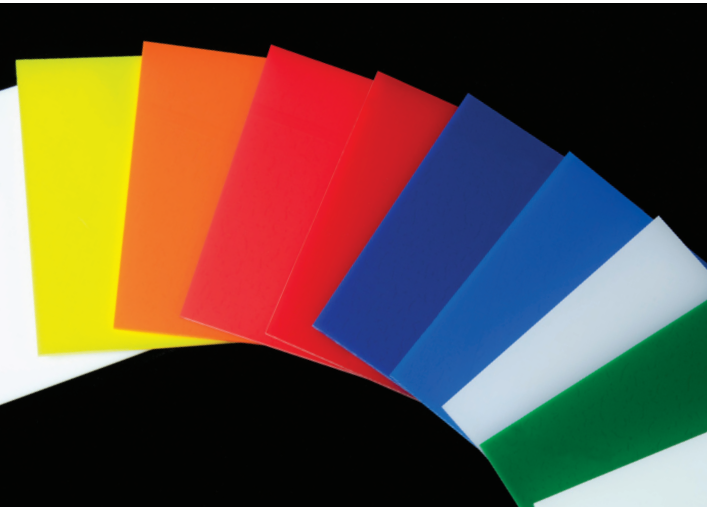


TUFFAK SL matte and TUFFAK AR  
Abrasion resistant • Glare reduction



TUFFAK SL matte adds a design dimension  
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- » Non-glare finish on UV protected side
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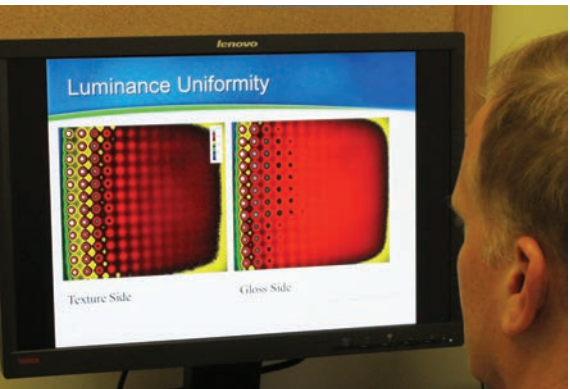
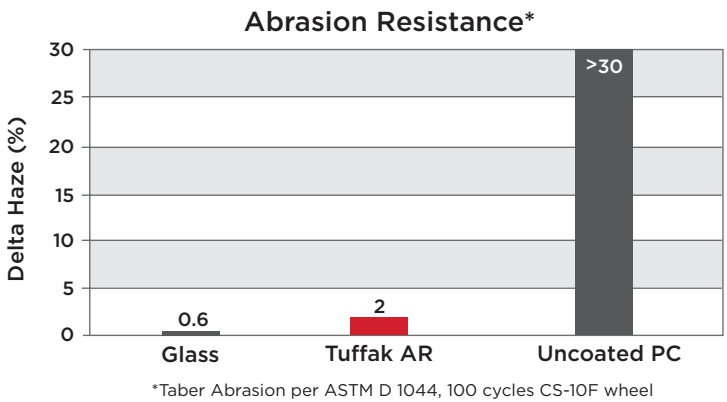
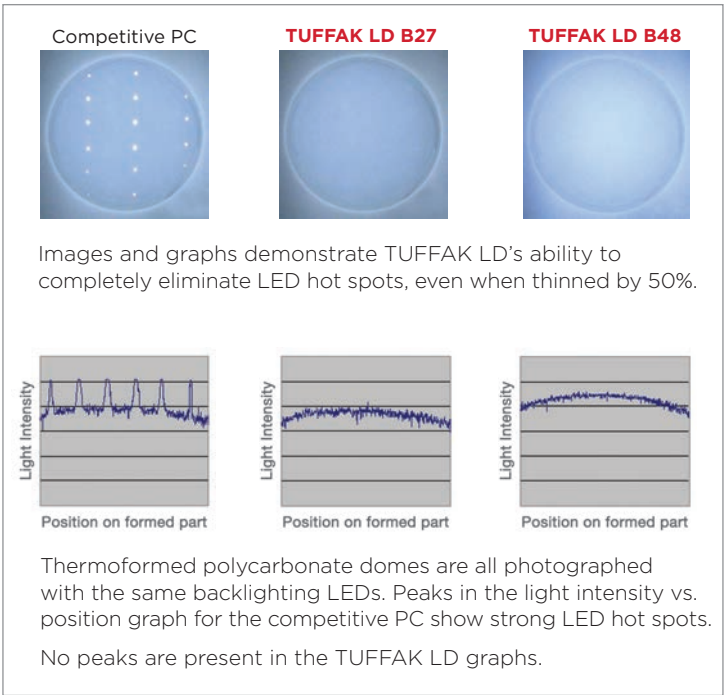
- » Durable hard coated surface on one or two sides offers abrasion resistance for applications that need frequent cleaning and in high traffic areas
- » Anti-graffiti protection for indoor and outdoor kiosks/ signs in airports, hotels, and other public facilities
- » Enhanced chemical resistance
- » UL 972 burglary resistant
- » UL 94 HB flammability rating
- » UL 94 V-O > 0.394"

Temperature Resistance (ASTM D 648)

Material	Heat Deflection Temperature (°F) @ 66 psi	Heat Deflection Temperature (°F) @ 264 psi
TUFFAK	280	270
Acrylic (PMMA)	190	181

Impact Resistance (ASTM D 3763)

Material	Total Energy (ft-lbs)
TUFFAK @ 0.125"	> 46
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BRO005

TUFFAK SL and TUFFAK LD

Tradition of delivering the right elements for outstanding electric signage



1

- 1 ) Three-dimensional depth
- » Thermoforming TUFFAK sheet adds dimension to enhance logos, letters, and message
  - » Thinner deep draw areas retain strength



2

- 2 ) Versatile sheet and reel sizes
- » A broad inventory of standard sheet and reels speeds delivery and facilitates production planning
  - » Standard sign colors
  - » Custom sizes can minimize material waste in high volume production jobs



3

- 3 ) TUFFAK LD delivers uniform light diffusion for today's LED signage
- » Eliminates LED hot spots even in deep draw thermoformed areas that are often problematic for other materials
  - » Allows shallow channel letter designs: exceptional light diffusion reduces light intensity variations (shadowing) even at smaller LED-diffuser sheet distances
  - » Extensive standard color palette: color match technology consistently satisfies demanding corporate jobs
  - » Delivers TUFFAK sheet's recognized performance on impact, temperature, and weather resistance
  - » UL recognition: Meets the UL 879 standard for use in electric signs
  - » UL 94 V-2 flammability rating 0.093" - 0.177"
  - » UL 94 V-0 flammability rating 0.236"

Performance that protects the image

- » Weather resistance
  - UV protection technology provides long lasting outdoor life
  - Exceptional toughness properties provide windload and hail impact protection across a broad temperature range
- » Unsurpassed durability in production and use
  - TUFFAK sheet helps minimize breakage losses for high production yields and ensures on-schedule installation
- » Design versatility and dimensional stability
  - Allows closer placement of lighting sources to the sign face for more versatile and cost-effective designs
- » UL Listed: TUFFAK sign grades meet UL 879 criteria for use in electric signs
- » UL 94 HB flammability rating



TUFFAK NR

Non-reflective, co-extruded sheet

Anti-glare surface treatment provides impact resistant solution to current users of non-glare acrylic.

Non-reflective coating is lighter than most matte finishes reducing "pixel" effect.

INTENDED MARKETS

- » TV enclosures
- » Digital displays
- » Menu boards
- » Graphic panels



Specifications	NR non-reflective (coex)	NR-C non-reflective, coated
Technology	Non-reflective coex layer	Non-reflective coated surface
Thickness range	0.040" - 0.200"	0.060" - 0.500"
Maximum width	80.70"	48.00"
Maximum length	120.00"	135.00"
Gloss level - 60°	Target 37 ±3	Target 37 ±5
Non-glare layer	One side only	One side only
Weathering	OK >3,500 hrs. Xenon	OK >3,500 hrs. Xenon
Haze (.0118" thick)	19 - 21	19 - 21
Light transmission (0.118" thick)	88 - 91	88 - 91
Masking (non-reflective side)	Adhesive-based	Adhesive-based

TUFFAK NR-C

Non-reflective, coated sheet

Anti-glare surface with abrasion and chemical resistance.

INTENDED MARKETS

- » Digital displays
- » Outdoor menu boards
- » Ruggedized electronics for military, aerospace and consumer products

Characteristics	NR	NR-C
Anti-glare	✓	✓
Non-pixelating	✓	✓
Economical	✓	
Outdoors suitable	✓	✓
2nd surface printing	✓	✓
Chemical resistant		✓
Abrasion resistant		✓
Formability	✓	
Cold bending	✓	
Gloss consistency	✓	

TUFFAK NR and NR-C

Non-reflective sheet applications



Menu boards



Medical monitors



Message centers



Heavy duty gauges



Outdoor signage



Fuel dispensers

TUFFAK SL and TUFFAK LD

Tradition of delivering the right elements for outstanding electric signage



1

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- » Thermoforming TUFFAK sheet adds dimension to enhance logos, letters, and message
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2

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INTENDED MARKETS

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Non-pixelating	✓	✓
Economical	✓	
Outdoors suitable	✓	✓
2nd surface printing	✓	✓
Chemical resistant		✓
Abrasion resistant		✓
Formability	✓	
Cold bending	✓	
Gloss consistency	✓	

TUFFAK NR and NR-C

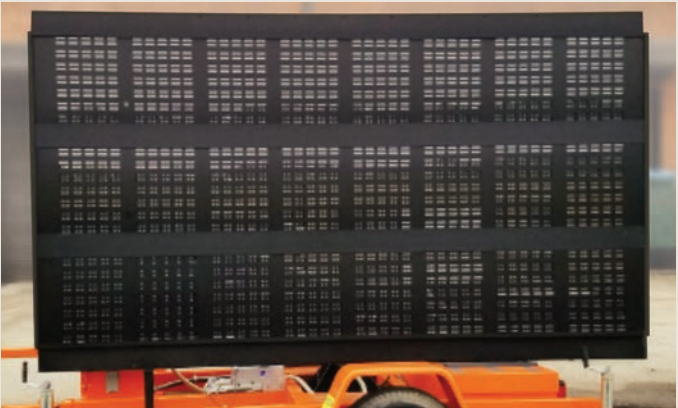
Non-reflective sheet applications



Menu boards



Medical monitors



Message centers



Heavy duty gauges



Outdoor signage



Fuel dispensers

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Tradition of delivering the right elements for outstanding electric signage



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Characteristics	NR	NR-C
Anti-glare	✓	✓
Non-pixelating	✓	✓
Economical	✓	
Outdoors suitable	✓	✓
2nd surface printing	✓	✓
Chemical resistant		✓
Abrasion resistant		✓
Formability	✓	
Cold bending	✓	
Gloss consistency	✓	

TUFFAK NR and NR-C

Non-reflective sheet applications



Menu boards



Medical monitors



Message centers



Heavy duty gauges

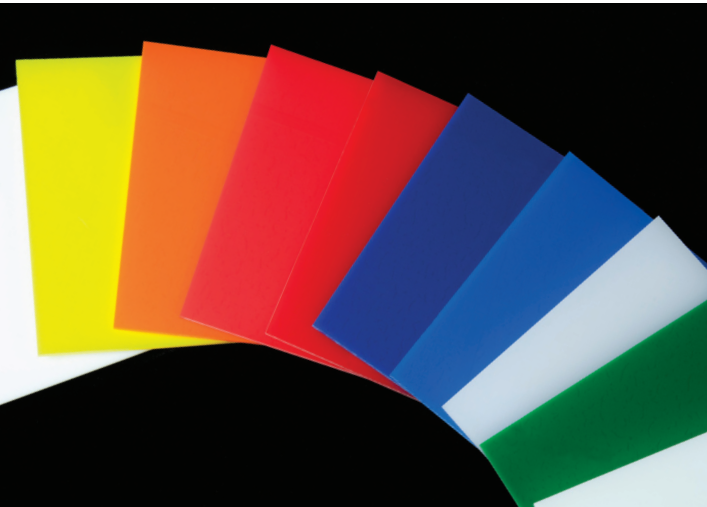


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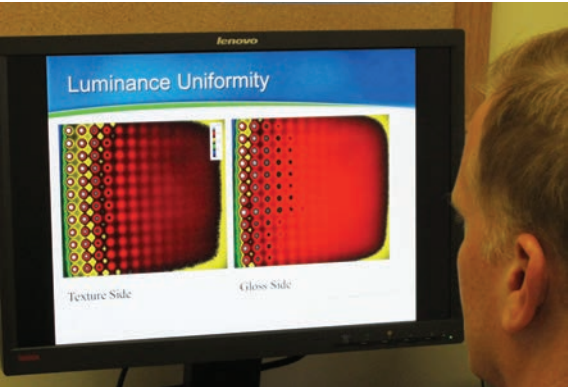
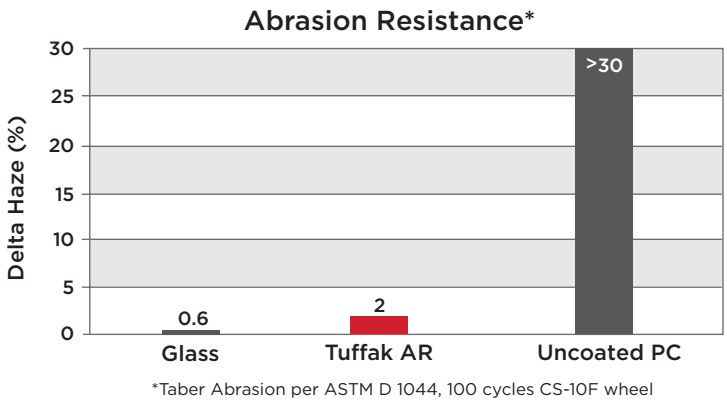
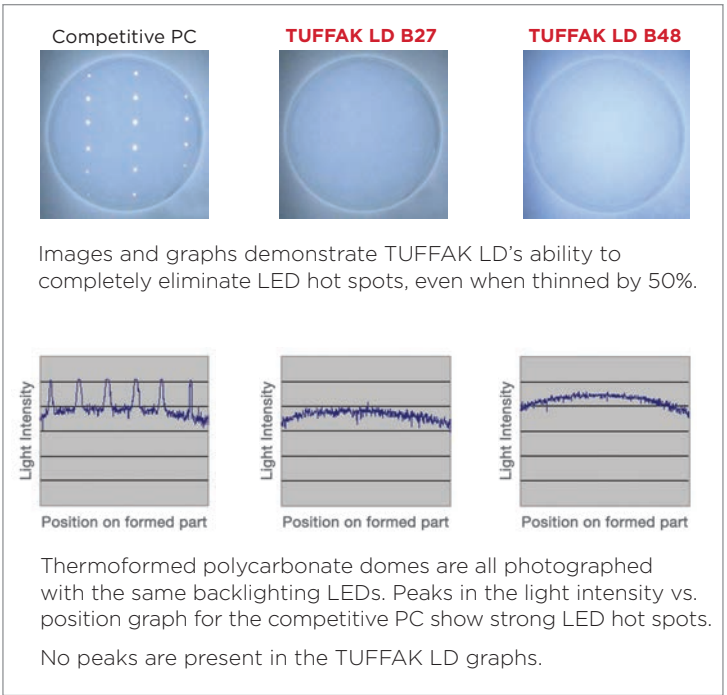
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Material	Total Energy (ft-lbs)
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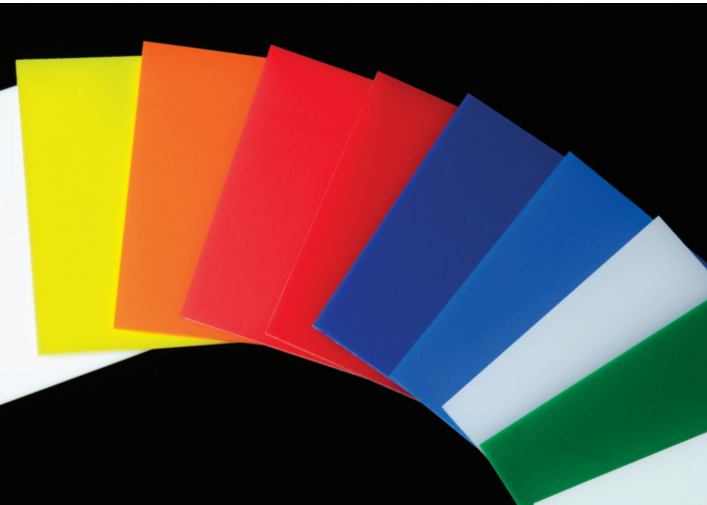
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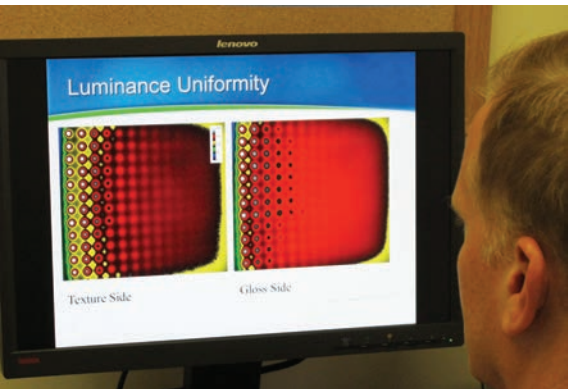
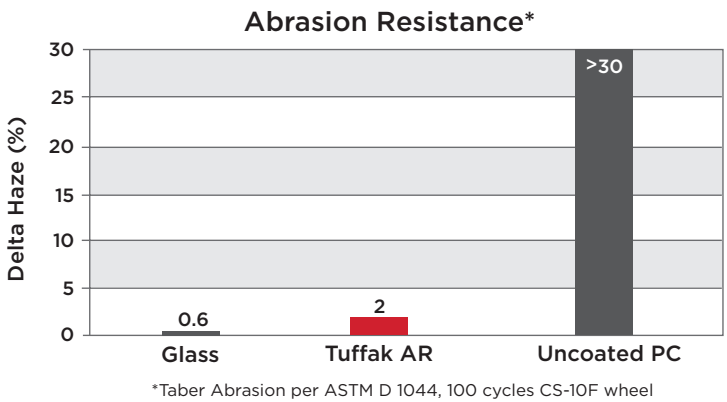
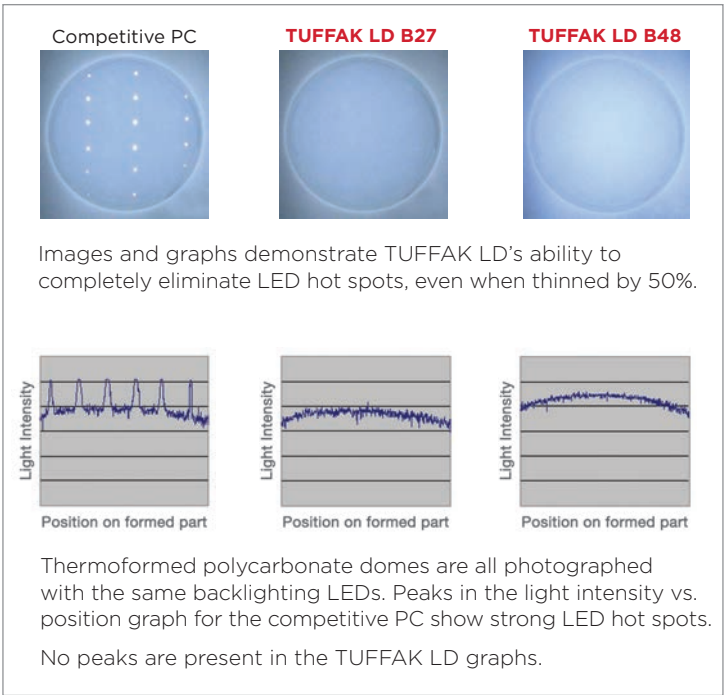
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