



Project Title: \_\_\_\_\_ MASTER SIGN PLAN

Address: \_\_\_\_\_ 3800 Tuller Rd., Dublin OH 43235

PID: \_\_\_\_\_ 273-009043

Acreage: \_\_\_\_\_ 1.866

Owner Name: \_\_\_\_\_ Eric Markel

Owner Contact: \_\_\_\_\_ (704) 578-4342

\_\_\_\_\_ Emerkel@carolina.rr.com

Project Representative \_\_\_\_\_ Site Enhancement Services  
J. Charley Schalliol

Name & Contact: 6001 Nimitz Parkway, South Bend, IN 46628

\_\_\_\_\_ 888-660-1838

\_\_\_\_\_ JCS@SESbranding.com

Vicinity Map	Page 3
Existing Conditions Map	Page 4
Existing Monument Signs	Page 5
Site Plan / Proposed Sign Overview	Page 6
Front (West) Elevation	Page 7-8
Rear (East) Elevation	Page 9-10
Wall Sign Details	Page 11-12
Material Data Sheets	Page 13-15

# Vicinity Map

3800 Tuller Rd.  
Dublin, OH 43235

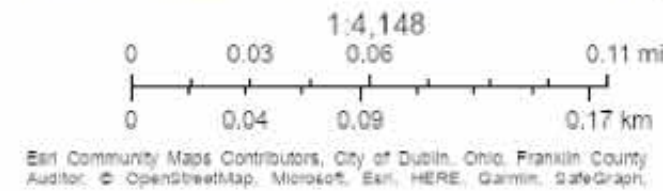


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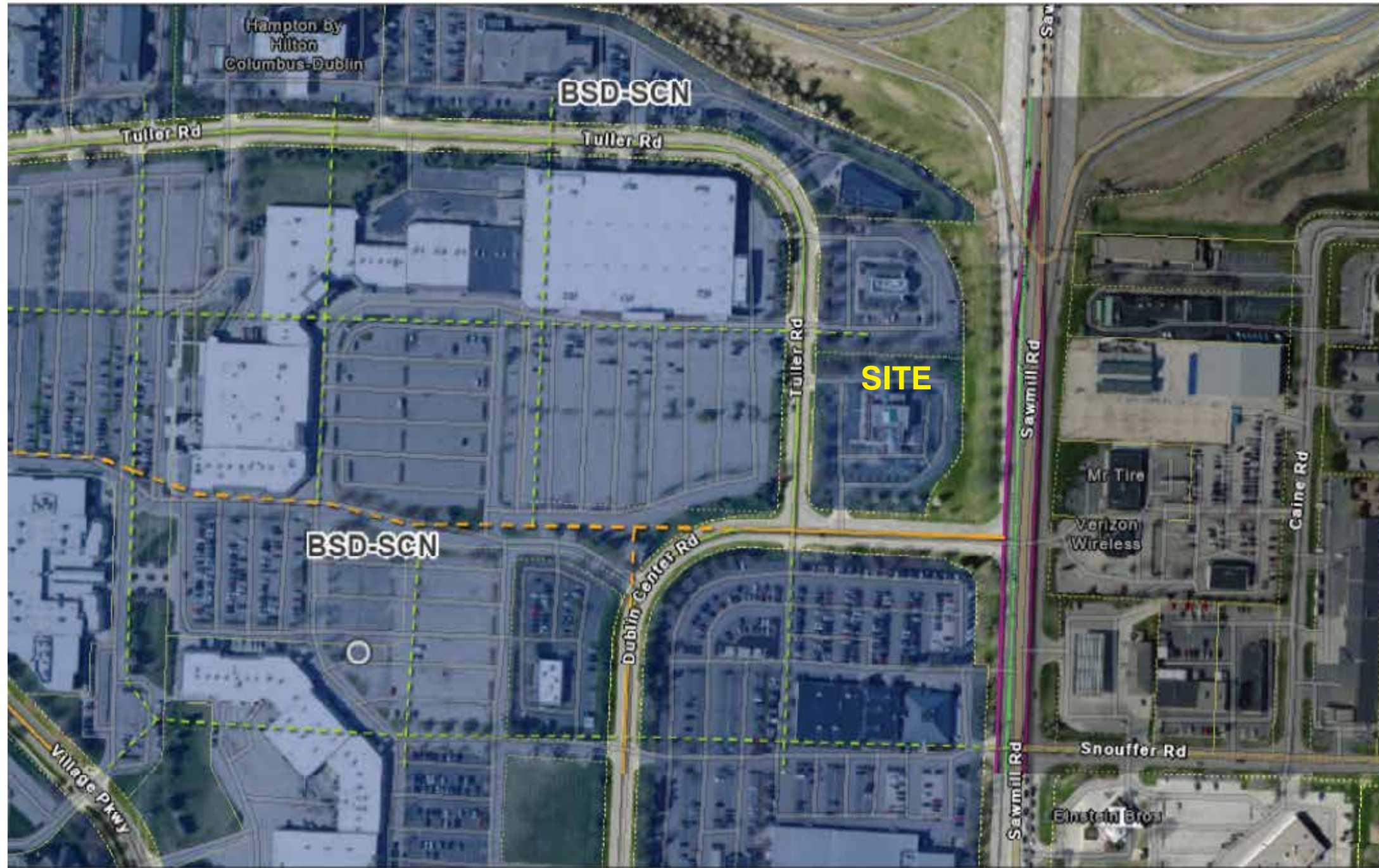
PID: 273-009043

Acreage: 1.866



# Existing Conditions Map

3800 Tuller Rd.  
Dublin, OH 43235

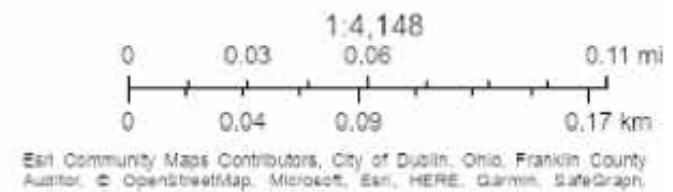


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Address: 3800 Tuller Rd., Dublin OH 43235

PID: 273-009043

Acreage: 1.866



# Existing Monument Signs

3800 Tuller Rd.  
Dublin, OH 43235

These signs to be removed only. Landscaping appearance to remain as-is. Contractor will restore all disturbed areas to equal or better condition than existed before construction.



Facing Dublin Center Drive



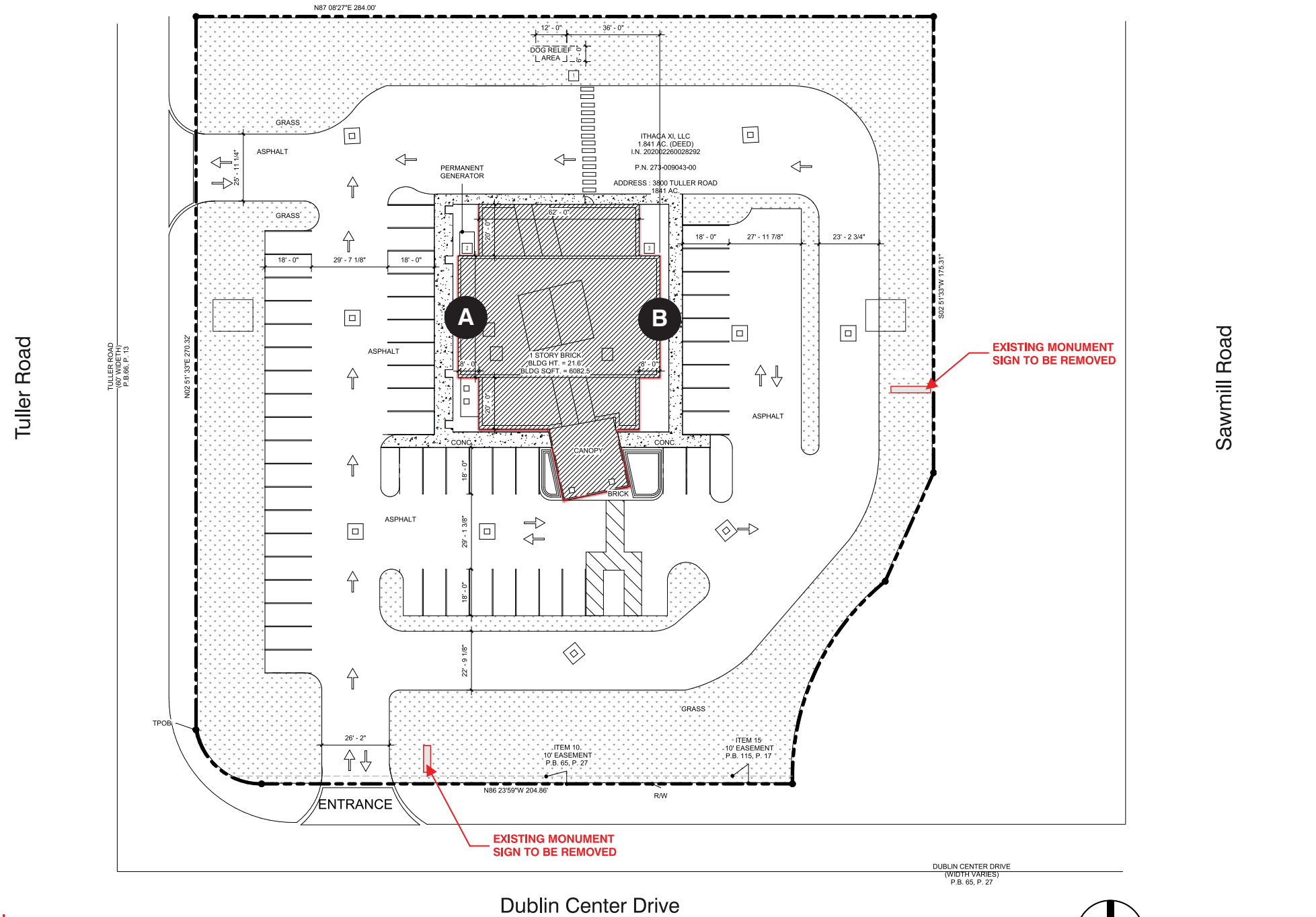
Facing Sawmill Road

# Site Plan

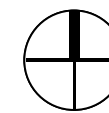
3800 Tuller Rd.  
Dublin, OH 43235

**A** 29" x 32'-7 7/8" Letterset: 78.93 Sq Ft

**B** 29" x 32'-7 7/8" Letterset: 78.93 Sq Ft



Contractor will restore all disturbed areas to equal or better condition than existed before construction. Landscaping appearance to remain as-is (as seen on page 5 of this document.)



SCALE: 1" = 50'-0"

# Front (West) Elevation

3800 Tuller Rd.  
Dublin, OH 43235

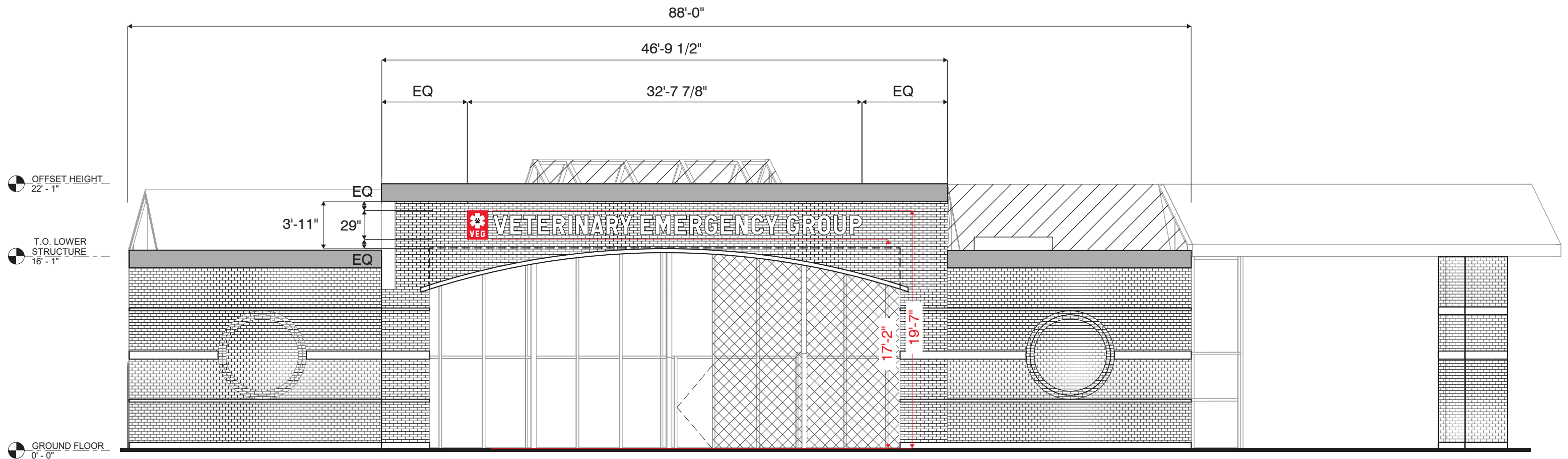
Facing Tuller Road



# Front (West) Elevation

3800 Tuller Rd.  
Dublin, OH 43235

Facing Tuller Road



SCALE: 1/8" = 1'-0"



# Rear (East) Elevation

3800 Tuller Rd.  
Dublin, OH 43235

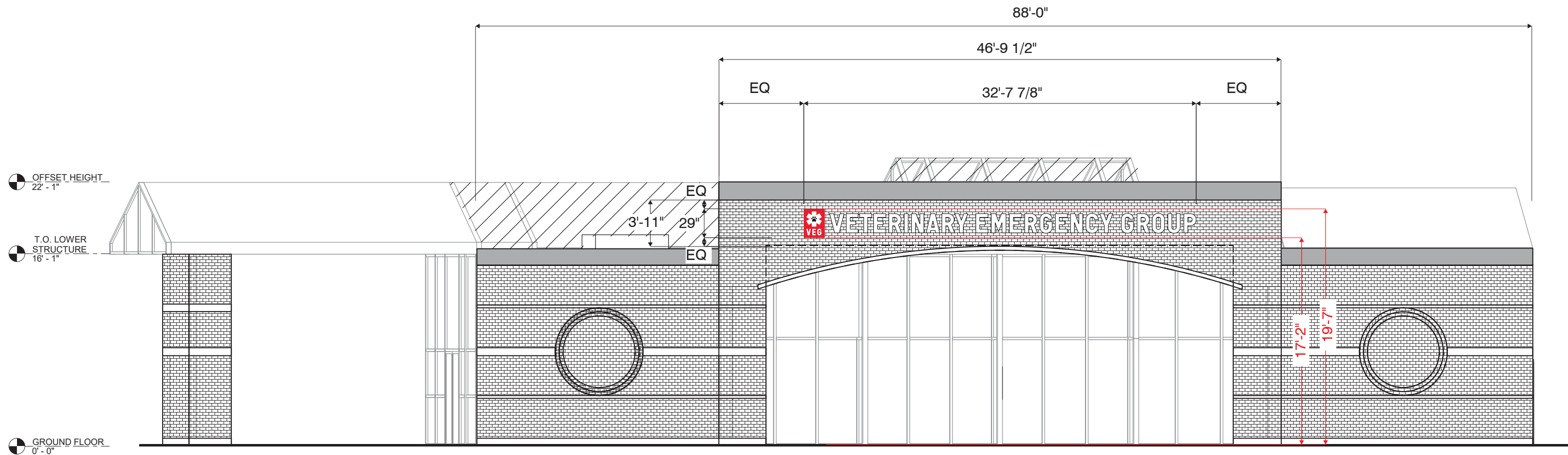
Facing Sawmill Road



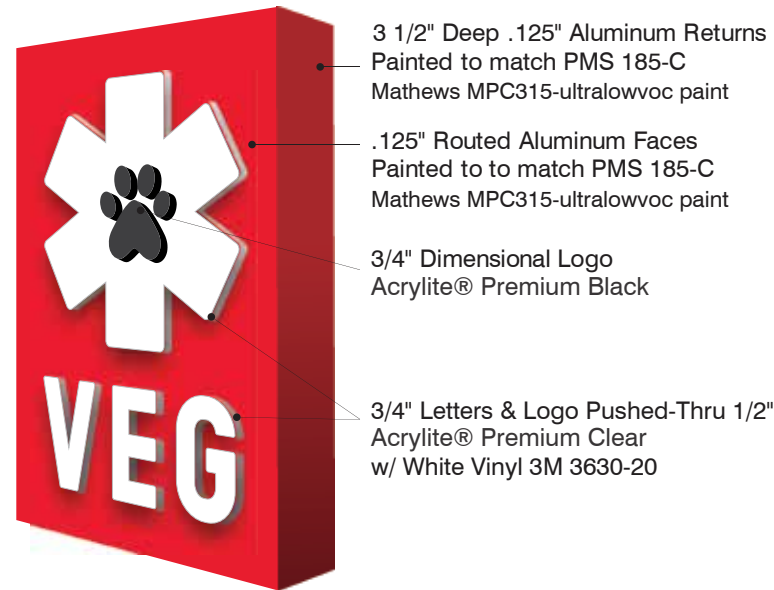
# Rear (East) Elevation

3800 Tuller Rd.  
Dublin, OH 43235

Facing Sawmill Road

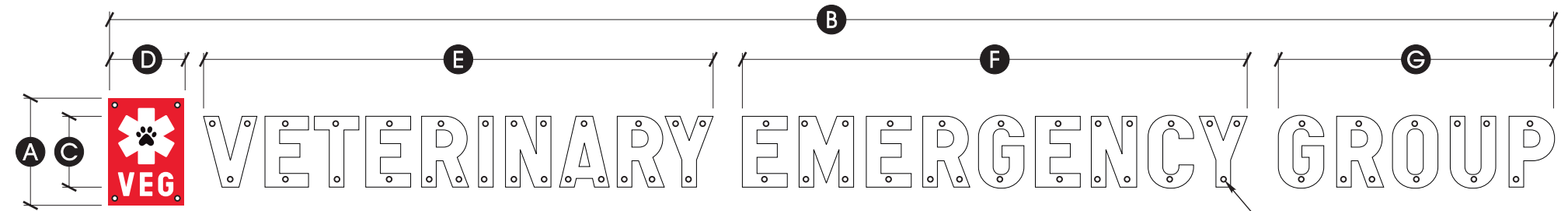


SCALE: 1/8" = 1'-0"



- 3 1/2" Deep .125" Aluminum Returns Painted to match PMS 185-C Mathews MPC315-ultralowvoc paint
- .125" Routed Aluminum Faces Painted to match PMS 185-C Mathews MPC315-ultralowvoc paint
- 3/4" Dimensional Logo Acrylite® Premium Black
- 3/4" Letters & Logo Pushed-Thru 1/2" Acrylite® Premium Clear w/ White Vinyl 3M 3630-20

LOGO DETAIL

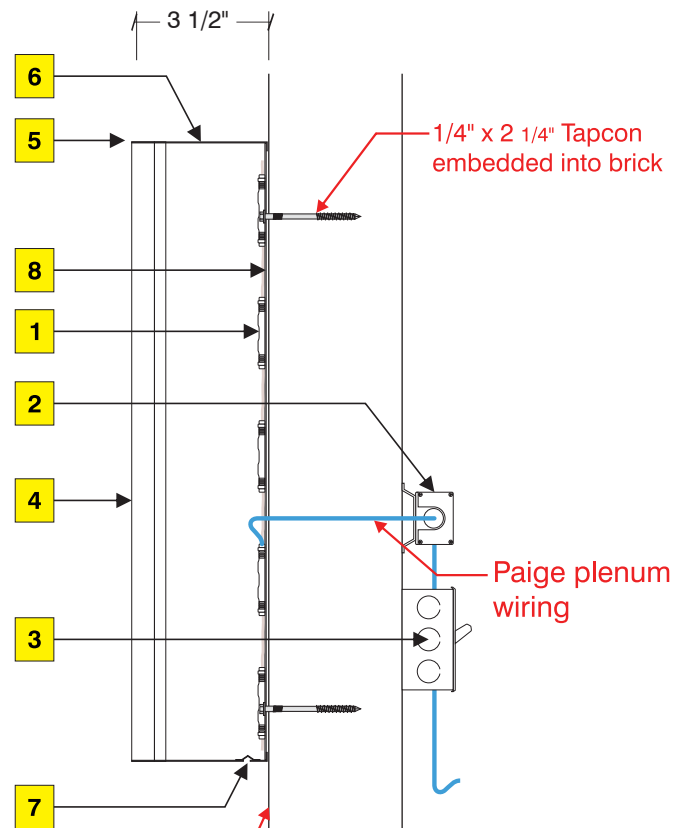


A	B	C	D	E	F	G	A x B = SQ FT
29"	32'- 7 7/8"	19 1/8"	1- 8 1/2"	11'- 6 1/8"	11'- 4 3/4"	6'- 2 7/8"	78.93

MOUNTING LOCATIONS, TYP.



\*Nighttime Illumination



Existing brick facade

Note: Stainless steel and non-corrosive fasteners are being used.

**Illumination**

- Principal QM2-7100K White LEDs
- Remote Principal P-OH060-12-EC 60W power supplies
- UL Listed disconnect switches internal to the building

**Faces**

- 1" Thick Routed Acrylite® Premium Clear w/ vinyl applied to letter face, White 3M 3630-20
- No trim caps, trimless construction

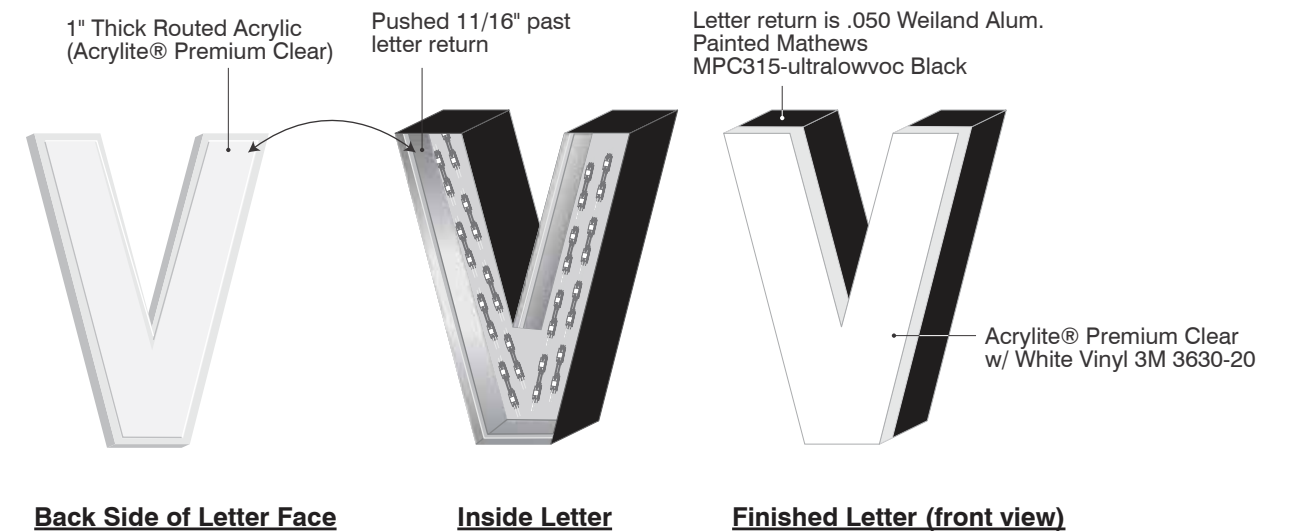
**Returns**

- .050 Wieland Aluminum Painted Black Mathews MPC315-ultralowvoc paint
- 1/4" Weep Holes

**Backs**

- .050 Wieland Aluminum

**Colors to match**



Back Side of Letter Face

Inside Letter

Finished Letter (front view)

## SIGN MOUNTING HEIGHT TO BE 30FT MAXIMUM

ANCHOR TO BE THRU BOLTS IF POSSIBLE, ALTERNATE ANCHORS PER WALL TYPE SHOWN BELOW FOR USE IF THRU BOLTING IS NOT POSSIBLE

ANCHOR SCHEDULE: 1/4" DIA. ANCHORS	
ANCHOR QUANTITY: ( 2 ) PER LETTER MIN., ( 4 ) FOR LOGO	
WALL STRUCTURE	ANCHOR TYPE
WOOD BLOCKING	LAG BOLT (1-1/2" EMBEDMENT) THRU BLOCKING
EIFS OVER 5/8" PLYWOOD	LIBERTY TOGGLE BOLT
HOLLOW CONCRETE BLOCK, BRICK	SLEEVE ANCHOR (1-1/2" EMBEDMENT)
SOLID CONCRETE	WEDGE ANCHOR ( 2-1/2" EMBEDMENT)
<b>CMU, SOLID CONCRETE, BRICK</b>	<b>MASONRY SCREW (2" EMBEDMENT)</b>
	HILTI HIT ROD W/ HY-20 ADHESIVE (3" EMBEDMENT)

ALL ANCHORS SHALL BE CHOSEN AND PLACED IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS

SIGN TO BE CONSTRUCTED TO NEC 600 STANDARD  
SIGN TO BEAR UL LABEL  
SIGN TO HAVE ELECTRICAL DISCONNECT ON THE EXTERIOR



<p>SITE ADDRESS:</p> <p>3800 TULLER ROAD DUBLIN, OH 43235</p>	<p>DESIGN PARAMETERS: 2017 OHIO BUILDING CODE, ASCE 7-10 WIND SPEED DATA 1. <math>V_{ULT}</math> WIND SPEED = 115 MPH <math>V_{ASD}</math> WIND SPEED = 89 MPH 2. WIND RISK CATEGORY II 3. WIND EXPOSURE C 4. INTERNAL PRESSURE COEF. N/A</p> <p>SEISMIC DATA SEISMIC DESIGN CATEGORY B SEISMIC RISK CATEGORY II SITE SOIL CLASSIFICATION D SS = 0.123 g, SMS = 0.196 g, SDS = 0.131 g, S1 = 0.062 g, SM1 = 0.148 g, SD1 = 0.099 g EQUIVALENT LATERAL FORCE <math>C_e = 0.043</math>, R = 3, BASE SHEAR <math>V = 2.6</math> LBS</p>	<p>NATHAN P. PRESNELL, P.E. #79812 DATE SIGNED: 9/21/2023</p>
<p>ENCON SERVICES, INC. P.O. BOX 3613 APOLLO BEACH, FL 33572 813-655-3373, OC#01893 ENCON@ME.COM</p>		

## EnCon Services, Inc.

Sign Design Calculations

Job Description  
Veterinary Emergency Group  
3800 TULLER ROAD  
Dublin, OH 43235  
Letters  
Design per 2017 Ohio Building Code  
ASCE 7-10, Load Case: D + 0.6W  
Seismic Design Category B

PREPARED BY: EnCon Services, Inc.  
PO Box 3613  
Apollo Beach, FL 33572  
813-655-3373  
OC #01893  
  
Nathan P. Presnell, PE  
OH PE #79812

Design Specifications	
Risk Category II	
Kzt	1
Exposure Factor	C
Kd	0.85
Kz	0.98
$V_{ULT}$	115 (mph)
GCp-GCpi	1.1 Zone 4, H < 60 Feet
Ult. Wind Pressure	31.0 (psf)

Sign Information	
Height	1.59 (ft)
Width	1.59 (ft)
Thickness	1.00 (ft)
Distance grade to top	30 (ft)

Wind Shear Force 29.60 (lb)  
Est. Weight of Sign 25 (lb)

**Total Shear Force = 38.92 (lb)**

**Total Tension Force = 47.06 (lb)**

	Required	Provided
Fastener size (Nominal)	1/4	1/4
Minimum number of fasteners	2	2
Shear Force per fastener (lb)	19.5	170
Tension Force per fastener (lb)	23.5	260

Combination Tension and Shear ratio **0.20 < 1 O.K.**

THREADED ROD THROUGH WALL IS PREFERRED IN ALL INSTANCES. IF IT IS NOT POSSIBLE TO USE THREADED ROD, SEE CHART BELOW FOR APPROPRIATE ANCHOR SELECTION. SIZE AND NUMBER REQUIRED ARE NOTED IN THE CHART ABOVE.

WALL STRUCTURE	ANCHOR TYPE
WOOD BLOCKING	LAG BOLT (1-1/2" EMBEDMENT) THROUGH BLOCKING
EIFS OVER 5/8" PLYWOOD	LIBERTY TOGGLE BOLT OR THRU BOLT WITH SLEEVE
HOLLOW CONCRETE BLOCK, BRICK	SLEEVE ANCHOR (1-1/2" EMBEDMENT)
SOLID CONCRETE	WEDGE ANCHOR ( 2-1/2" EMBEDMENT)
<b>CMU, SOLID CONCRETE, BRICK</b>	<b>MASONRY SCREW (2" EMBEDMENT)</b>
	HILTI HIT ROD W/ HY-20 ADHESIVE (3 1/2" EMBEDMENT)

ALL ANCHORS SHALL BE CHOSEN AND PLACED IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS

Veterinary Emergency Group Dublin Ohio 29 Inch Logo calc R1



DATE SIGNED:  
9/21/2023

## Qwik Mod™ Series

Better coverage with a wider optic — accomplish more with our NEW Qwik Mod™ Series.

### SPECIFICATIONS

Beam Angle	170° Ultra-Wide Low Dome Batwing Optic with Diamondback Optic Lens Technology
Certifications	UL & cUL Recognized (SAM Manual), CE, RoHS
Dimensions	QM1: 0.69"W x 1.4"L x 0.25"H QM2: 0.69"W x 2.2"L x 0.25"H QM3: 0.69"W x 3.14"L x 0.25"H QM4: 1.7"W x 1.77"L x 0.25"H
Fastening	Peel & Stick / Mechanical Screw Hole
Input	12VDC
Operating Temp	-30° to +60°C
Packaging	QM1: 150 mods (60 ft.) per bag or 1500 mods (600 ft.) per case QM2: 76 mods (44.7 ft.) per bag or 912 mods (536.52 ft.) per case QM3: 50 mods (33.3 ft.) per bag or 750 mods (500 ft.) per case QM4: 38 mods (25.3 ft.) per bag or 912 mods (608 ft.) per case
Power Supply	P-LED 12VDC
Protection Grade	IP68
Spacing	QM1: 2.5 mods/ft. (fully stretched) QM2: 1.7 mods/ft. (fully stretched) QM3 and QM4: 1.5 mods/ft. (fully stretched)
Warranty	10-Year Product / 5-Year Limited Labor



### FEATURES

- Diamondback 170° Optic Lens
- Integrated aluminum heat sink
- Waterproof IP68
- Snap & Peel Qwik Release Tab
- Four different mod styles to perform in a wide variety of sign applications
- More light diffusion with a wider batwing resulting in better coverage

### WIRING DETAILS

White Solid	Positive
White/Black Stripe	Negative

Check module for polarity.

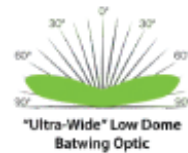


Qwik Release Tab reduces labor time

### POWER SUPPLY OPTIONS

Power Supply	60W		36W		20W		12W	
	Watts/Mod	Max Mods	Watts/Mod	Max Mods	Watts/Mod	Max Mods	Watts/Mod	Max Mods
QM1	0.4	150	0.41	87	0.42	47	0.44	27
QM2	0.8	76	0.81	44	0.84	23	0.88	13
QM3	1.2	50	1.22	29	1.26	15	1.32	9
QM4	1.6	38	1.62	22	1.68	11	1.76	6

Watts per mod may vary depending on run footage.



p-led.com | 325.227.4577 | sales@p-led.com

REV20220930

## Universal 60W Power Supply



### PART

UL Part Number	Ordering Part Number
PL-60-12-U	P-OH060-12-PL

### PERFORMANCE

Input Voltage	100-277 VAC
Input Current	1.1A-0.45A
Input Frequency	47-63Hz
Power Factor	Normal
Output Voltage	DC12V ±3%
Output Current	0-5.0A
Output Power	60W Max.

### PHYSICAL

Length	6.73" (171mm)
Width	1.90" (48.5mm)
Height	1.39" (35.5mm)
Mounting Length	7.80" (198mm)
Weight	1.14lbs (520g)
Lead Lengths	SVT Cable 8.66" ±0.39" (220mm ± 10mm)

### FEATURES

- Universal input voltage 100 – 277 VAC
- Aluminum shell, silicone potted
- 100% full load burn-in tested
- Dry or Damp Locations Rated

### SAFETY

Over Current Protection	110-120%
Short Circuit Protection	Hiccup mode, auto recover
Other Protection	Over Voltage/Over Load/Short Circuit
UL	UL879 / UL8750
CE-LVD	EN61347-1:2008+A1:2011+A2:2013 EN61347-2-13:2014

### ENVIRONMENTAL

CE-EMC	EN55015, EN61527, EN61000
FCC	FCC 47 CFR PART 15, CLASS B
IP Rating	IP67
Operating Temperature	-30°C to 60°C (-22°F to 140°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Relative Humidity	20 to ±90% RH non cond.

### ORDERING GUIDE


P	O	H	060	12	PL
Power Supplies	Outdoor, Direct-wire	100-277 VAC	Max. 60W	12VDC Output	Principal LED Power Supply




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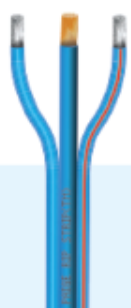
REV20220711  
Data subject to changes.





## RIP STRIP® Plenum

Sunlight resistant CL3P Plenum + LED sign wire  
18-2 conductor with ground



Connecting you to more.

---

**PART#** 98P1814M 1,000 ft.  
98P1814L 500 ft.

**1.0 APPLICATION**

**1.1** Plenum LED Sign Wire, 2 conductor  
18 AWG stranded tinned copper and a  
14 AWG stranded bare copper conductor  
75°C (UL) CL3P FT-6 Made in USA

**2.0 CONSTRUCTION: COMP A**

**2.1 CONDUCTOR**

2.1.1 Material: Tinned Copper  
2.1.2 Size: 18 AWG  
2.1.3 Stranding: 7 Strands

**2.2 INSULATION**

2.2.1 Material: Paige Compound #12056  
2.2.2 Wall Thickness: .020" nom  
2.2.3 Component Diameter Thickness:  
.085" nom  
2.2.4 Color Code: Light Blue + Light  
Blue/Red

**3.0 CONSTRUCTION: COMP B**

**3.1 CONDUCTOR**

3.1.1 Material: Bare Copper  
3.1.2 Size: 14 AWG  
3.1.3 Stranding: 19 Strands

**3.2 INSULATION**

3.2.1 Material: Paige Compound #12056  
3.2.2 Wall Thickness: .020" nom  
3.2.3 Component Diameter Thickness:  
.114" nom

3.2.4 Color Code: Light Blue

**2.3 OVERALL DIAMETER**

2.3.1 .322" nom

**2.4 ASSEMBLY: (COMP A&B)**

2.4.1 This is an integral construction  
cable

**2.5 MARKING**

2.5.1 PAIGE WEATHER RESISTANT  
RIP STRIP® LED PLENUM + P/N  
(\*SEE BELOW) CONDUIT NOT  
REQUIRED E191597 14 AWG 1C  
+ 18 AWG 2C 75°C (UL) CL3P  
SUNLIGHT RESISTANT FT-6 "ROHS  
COMPLIANT" MADE IN USA  
WWW.PAIGESIGNWIRE.COM  
(sequential footage markers)  
\*98P1814M - 1,000 ft. reel  
98P1814L - 500 ft. box

**2.6 TEMPERATURE/VOLTAGE**


2.6.1 75°C / 300V


**3.0 PACKAGING**


3.1 P/N 98P1814M - 1000 ft. reel  
3.2 P/N 98P1814L - 500 ft. box

**4.0 STANDARD**


4.1 NEC/UL compliant for all applications other  
than "Wet" (direct exposure to the elements)

 200 Sheffield Street, Suite 302, Mountainside NJ 07092

 908-667-7810  
800-327-2443

 paigesignwire.com  
team@paigesignwire.com

RoHS



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## Strong on Color and Durability.

Easy on the Environment.

This environmentally friendly, high-performance polyurethane paint limits VOC to less than 50g/L while providing greater durability, gloss retention and hiding than standard acrylic polyurethane paints.



**Requires Less Paint, Saving Time and Money!**

With a formulation of 50-67% solids, MAP-LV provides superior hiding, fast film build, and more square foot per gallon coverage.

**Features & Benefits:**

- More overall square foot coverage than conventional toners
- Excellent adhesion to all Matthews primers
- 50% better gloss retention in UVB accelerated exposure
- High solids formula and maximum pigment content for superior hiding and fast film build
- 50% more impact resistant in direct and reverse impact testing
- Enhanced protection in corrosive environments
- Withstands extreme changes in temperature
- Spray, brush or roll

**Making the Switch is Easy!**

MAP-LV uses the same mix ratio, color selection and great customer service you have come to know from Matthews Paint.



**Variety of Products:**

- Satin and gloss levels available (In between gloss levels are easily achieved by mixing satin with the new MAP-LVC clears.)
- Companion products: three clear coats (matte, satin & gloss), three spray reducers, a brush/roll reducer, an ultra low VOC primer and an accelerator
- Three popular factory pack colors: Brushed Aluminum, Brilliant Gold and Dark Bronze



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P  
Primers

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Clears

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Cleaners

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760 Pittsburgh Drive • Delaware, OH 43015  
Toll Free: 800.323.6593 • Fax: 800.947.0377  
[www.matthewspaint.com](http://www.matthewspaint.com)

 #MPC315 5/22

## Tapcon®

DRIVING CONCRETE CONNECTIONS

### BLUE CLIMASEAL® TAPCON®



**Product Features & Benefits**

- Patented Advance Threadform provides superior pull-out performance
- Application of Climaseal® coating adds extra corrosion protection
- 30% less installation torque; 20% more holding power
- Reversible and removable, can be installed close to concrete edge
- Building code approved

**Common Applications**

- Downspout straps
- Electrical equipment
- Furring strips
- Flag holders
- Hurricane preparation
- HVAC strapping
- 2 x 4's
- Window/Door frames & bucks

### 410 STAINLESS STEEL TAPCON®



**Product Features & Benefits**

- 410 Series Stainless for superior corrosion protection
- Cuts threads into concrete, brick and hollow block
- Reversible and removable, can be installed close to concrete edge
- Fast installation... drill a hole... drive an anchor

**Common Applications**

- Marine
- Screened porch and pool enclosures
- Railings—safety and decorative

---

### MAXI-SET TAPCON®



AVAILABLE IN SILVER OR WHITE FINISH

**Product Features & Benefits**

- Patented Advance Threadform provides superior pull-out performance
- Large 5/8" diameter flange provides more bearing surface than regular Tapcon
- UltraShield™ long-life finish delivers excellent corrosion protection
- Reversible and removable, can be installed close to concrete edge
- Building code approved.

**Common Applications**

- Shutters—protective and decorative
- Screened porch and pool enclosures

### WHITE TAPCON®



**Product Features & Benefits**

- Patented Advance Threadform provides superior pull-out performance
- White UltraShield long-life finish delivers excellent corrosion protection
- Recommended for use in ACQ pressure-treated lumber
- Reversible and removable, can be installed close to concrete edge
- Building code approved


**Common Applications**

- Window frames
- Shutters—protective and decorative

## Tapcon®


DRIVING CONCRETE CONNECTIONS

### FOR FASTENING IN:



APPROVED FOR TREATED LUMBER


### ADVANCED THREADFORM TECHNOLOGY:



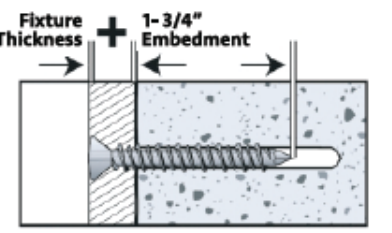
30% less installation torque • 20% more holding power

### HOW TO CHOOSE A TAPCON:

- 1 Choose a head type:**




Star Head    Hex Head    Maxi-Set
- 2 Choose a Length:**


- 3 Choose a Diameter:**

HEAVY DUTY  
1/4" DIA.

LIGHT DUTY  
3/16" DIA.
- 4 Choose a drill bit long enough to allow the hole to be drilled at least 1/4 in. longer than anchor embedment:**



### PERFORMANCE VALUES:

Anchor Diameter	Ultimate Pull-Out in Concrete (4,000 PSI)*			
	Depth of Embedment in Solid Material			
	1"	1-1/4"	1-1/2"	1-3/4"
3/16"	650 lbs.	870 lbs.	1,090 lbs.	1,460 lbs.
1/4"	800 lbs.	1,340 lbs.	1,820 lbs.	2,380 lbs.


  

Anchor Diameter	Ultimate Shear in Concrete (4,000 PSI)*			
	Depth of Embedment in Solid Material			
	1"	1-1/4"	1-1/2"	1-3/4"
3/16"	720 lbs.	800 lbs.	860 lbs.	990 lbs.
1/4"	1,360 lbs.	1,370 lbs.	1,380 lbs.	1,670 lbs.

Ultimate Pullout/Shear in Hollow Block*			
Anchor Diameter	Anchor Embedment	Ultimate Pullout	Ultimate Shear
3/16"	1"	340 lbs.	730 lbs.
1/4"	1"	500 lbs.	1,000 lbs.

\*A safety factor of 4:1 or 25% of ultimate pullout/shear value is generally accepted as a safe working load.



## 3M™ Scotchcal™ Translucent Graphic Film Series 3630 3M™ Envision™ Translucent Film Series 3730

Product Bulletin 3630/3730  
Revision N, January 2022

### Film Series 3630 Film Series 3730

#### Product Description

- 2-mil, vinyl translucent films, available in crisp, clear colors (many with simulated PANTONE® color references)
- For screen printing, cut graphics, and thermoforming
  - Use Film Series 3630 for fluorescent or LED lighting applications
  - Use Film Series 3730 for LED applications

#### Product Features

- 3M™ Scotchcal™ Translucent Film Series 3630 and 3M™ Envision™ Translucent Film Series 3730 (the "Products") have matte surface finishes to eliminate glare and provide uniform color in reflected and transmitted light
- Pressure-sensitive, non-removable adhesive adheres to rigid and flexible substrates alike
- Synthetic, lay-flat liner is unaffected by water or humidity
- Cut electronically
- Thermoformable
- Not removable
- Expected performance life of seven years (unwarranted period for unprinted film with no graphic protection, applied to a flat, vertical, outdoor surface)

#### Recommended Types of Graphics and End Uses

- For indoor or outdoor use on internally-illuminated sign faces
- First and second surface application on rigid substrates
- First surface applications only on flexible substrates
- Thermoforming on rigid plastic substrates
- For use with fluorescent bulbs or LEDs. For best results, 3M recommends:
  - film 3630 for fluorescent or LED light applications
  - film 3730 for LED applications

When constructed and used as described in this bulletin, these types of graphics and end uses may be warranted by the 3M™ MCS™ Warranty or the 3M Performance Guarantee. Please read the entire bulletin for details.

#### Special Considerations

3M recommends weeding before thermoforming when using film with red pigments. The red pigments available to film manufacturers today can stain plastic when thermoformed.

3M helps users match day/night colors when the same color density is required in frontlit and backlit graphics to maximize a sign's effectiveness. Please contact 3M for assistance when this is a concern.

#### Recommended Compatible Products

##### Screen Printing Inks

- [3M™ Screen Printing Ink Series 1900](#)
- [3M™ Screen Printing UV Ink Series 9800](#)

#### Quick Links

[3M Graphics Warranties](#)  
[Technical Information Selector](#)  
[Safety Data Sheets \(SDS\)](#)  
[Videos](#)

Some of these links lead to web-based resources that are not product-specific.



## 3M™ Scotchcal™ Translucent Graphic Film Series 3630 3M™ Envision™ Translucent Film Series 3730

Product Bulletin 3630/3730  
Revision N, January 2022

### Certificate of 3M™ MCS™ Warranty

Graphic manufacturers who produce digitally printed graphics made with all branded 3M Graphics products, including 3M ink purchased through a qualified 3M distributor or 3M printing partner, may register to be recognized with a Certificate of 3M™ MCS™ Warranty. Only graphic manufacturers having a current Certificate of 3M™ MCS™ Warranty are eligible to extend this warranty to their customers.

**NOTE:** For non-digitally printed finished graphics, check your eligibility for the 3M™ MCS™ Warranty by viewing the warranty period found within this product bulletin or by using the warranty selector at [www.3mgraphics.com/warranties](http://www.3mgraphics.com/warranties).

### Characteristics

These are the typical values for unprocessed product. Processing may change the values.

#### Physical Characteristics

Characteristic	Value
Material	Vinyl
Film Color	<b>Film Series 3630:</b> Translucent, 78 colors <b>Film Series 3730:</b> Translucent, 25 colors See "Colors" on page 4.
Thickness	<b>Without adhesive:</b> 2 mil (0.05 mm) <b>With adhesive:</b> 3 – 4 mil (0.08 – 0.1 mm)
Adhesive	Pressure-sensitive
Adhesive Color	Clear
Liner	Translucent, synthetic lay-flat liner
Typical Adhesion 24 Hours After Application	<b>Acrylic and uncoated, clear polycarbonate:</b> 4 lbs/in. (0.7 kg/cm)
Chemical Resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water (does not include immersion)
Flammability	Users may view the linked ASTM E84 reports <a href="#">3630</a> and <a href="#">3730</a> or go to the online product catalog at <a href="http://3mgraphics.com">3mgraphics.com</a> . For all other test reports call 1-800-328-3908.

#### Application Characteristics

Characteristic	Value
Finished Graphic Application Recommendation	<b>Surface type:</b> Flat, without rivets <b>Surface type*:</b> 3M flexible substrates; rigid substrates such as flat acrylic, polycarbonate**, high temperature co-polyester sheet, glass <b>Application method:</b> Wet or dry, typical <b>Application temperature:</b> 60°F (16°C) minimum air, substrate
Temperature Range After Application	-50°F to +170°F (-45°C to +77°C) (Though not for extended periods of time at the extremes.) Low temperature impacts on film applied to flexible substrates may result in cracking of the film and/or substrate
Recommended Light Source (for best results)	<b>Film Series 3630:</b> Fluorescent bulbs <b>Film Series 3730:</b> LEDs
Graphic Removal	Not removable

\*These films typically adhere to solar-grade polycarbonate substrates. However, some lots of this substrate may inhibit adhesion. See [3M Instruction Bulletin 5.7](#) for additional information.  
\*\*Polycarbonate substrates require oven drying before use to remove moisture from the polycarbonate that will otherwise cause the film to bubble. Refer to manufacturers instructions for proper drying times and temperatures.

#### IMPORTANT NOTE

Surface impressions may occur when the film is rolled up and the liner impresses slightly upon the vinyl surface. These impressions may disappear when the film is exposed to the sun, or a heat gun can be used on dull areas to restore the film's original appearance. Surface impressions are not considered a product quality defect as they are temporary in nature.

#### IMPORTANT NOTE

The user is responsible for determining and complying with all applicable building codes affecting the use of materials in interior and exterior awning, banner, and sign face applications, including flammability standards. For more information on flammability requirements, contact your local building code officials. For information on the results of flammability testing on 3M flexible substrates, call 1-800-328-3908.



## 3M™ Scotchcal™ Translucent Graphic Film Series 3630 3M™ Envision™ Translucent Film Series 3730

### Shelf Life, Storage, and Shipping

#### Shelf Life

The shelf life is **never more than three years** from the date of manufacture on the original box. Processing the film changes its shelf life to **one year** from the processing date, but no later than three years from the manufacturing date.

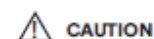
#### Storage Conditions

- 40°F to 100°F (4°C to 38°C)
- Out of sunlight
- Clean, dry area
- Original container
- Bring the film to room temperature before use

#### Shipping Finished Graphics

Flat, or rolled printed side out on a 6 in. (15 cm) or larger core. This helps prevent the application tape, if used, from popping off.

### Health and Safety



#### CAUTION

When handling any chemical products, read the manufacturers' container labels and the safety data sheets (SDS) for important health, safety, and environmental information. To obtain SDS for 3M products go to [3M.com/SDS](http://3M.com/SDS). To request SDS by mail, or in case of an urgent situation, call 1-800-364-3577 or 1-651-737-6601.

When using any equipment, always follow the manufacturer's instructions for safe operation.

### Warranty Information

#### Warranty Coverage Overview

The warranty coverage for eligible graphics is based on the user both reading and following all applicable and current 3M Graphics Product and Instruction Bulletins. The warranty period for eligible graphics is as stated in the 3M Graphics Warranties Matrices at the time that the film was purchased. Information found at [3M.com/graphicswarranties](http://3M.com/graphicswarranties) includes:

- [3M Graphics Warranties Bulletin](#)
  - This bulletin contains information on limitations and exceptions, and warranty period reductions for 3M Graphics Warranties. The warranty period may be reduced and stipulations may apply for certain constructions, applications, and graphic exposures as covered in this Bulletin.
- [3M Graphics Warranties Selector](#)
  - Use this selector to search for your vertical warranty period by product type, ink type, film name, and/or ink/primer platform.
- [U.S. Desert Southwest Region Map](#)
  - Use this map of hot, arid desert areas to determine if you are subject to reduced warranted durabilities.

The warranties set forth in this Bulletin are made in lieu of all other express or implied warranties, including any implied warranty of merchantability, fitness for a particular purpose, or arising out of a course of dealing, custom, or usage of trade.

#### Technical Information

The technical information, guidance, and other statements contained in this document or otherwise provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.

## 3M™ Scotchcal™ Translucent Graphic Film Series 3630 3M™ Envision™ Translucent Film Series 3730

### Product Selection and Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment, reviewing all applicable regulations and standards, and reviewing the product label and use instructions. Failure to properly evaluate, select, and use a 3M product in accordance with instructions or to meet all applicable safety regulations may result in injury, sickness, death, and/or harm to property.

### Warranty, Limited Remedy, and Disclaimer

Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

### Limitation of Liability

Except for the limited remedy stated above, and except to the extent prohibited by law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.



TECHNICAL INFORMATION

## ACRYLITE® Premium (FF) Physical Properties for Extruded Sheet

# ACRYLITE®

ACRYLITE® Premium (FF) is the highest quality continuously manufactured sheet on the market today. Using a proprietary, innovative process, ACRYLITE® Premium (FF) sheet products are economical, provide tight thickness tolerance, high optical characteristics and low stress levels. ACRYLITE® Premium (FF) sheet is readily available in a variety of standard sizes, thicknesses and colors. Colorless ACRYLITE® Premium (FF) sheet carries an exclusive 30-year limited warranty on light transmission – your assurance of a quality product.

### Characteristics

ACRYLITE® Premium (FF) is a lightweight, rigid and weather-resistant thermoplastic that is dimensionally stable, resistant to breakage and can be easily fabricated and cemented.

Because of its virtually distortion-free clarity, it is well suited for use in a variety of applications.

- Skylights
- Window glazing
- Retail displays
- Signs
- Optical displays
- Picture framing

### Availability

ACRYLITE® Premium (FF) sheet is available in thicknesses from .060" (1.5 mm) to .472" (12 mm) and actual sheet sizes from 48" x 96" to 72" X 120". Custom sizes are also available. All sheets are protected with polyethylene film or paper masking.

### Safety

ACRYLITE® Premium (FF) sheet is more impact resistant than glass. If subjected to impact beyond the limit of its resistance, it does not shatter into small slivers, but breaks into comparatively large pieces. ACRYLITE® sheet meets the requirements of ANSI Z97.1 for use as a Safety Glazing Material in Buildings (for thicknesses .080" to .500" [2.0 mm – 12.0 mm]).

### Weather Resistance

ACRYLITE® Premium (FF) sheet will withstand exposure to blazing sun, extreme cold, sudden temperature changes, salt water spray, etc. It will not deteriorate after many years of service because of the inherent stability of acrylic resins. ACRYLITE® has been widely accepted for use in school buildings, industrial plants, and outdoor signs.

### Dimensional Stability

Although ACRYLITE® will expand and contract due to changes in temperature and humidity; it will not shrink with age. Some shrinkage occurs when ACRYLITE® is heated to forming temperature, but post-forming stability is excellent.

### Light Weight

ACRYLITE® sheet is only half the weight of glass and 43% the weight of aluminum.

### Rigidity

ACRYLITE® sheet is not as rigid as glass or metals. However, it is more rigid than many other plastics such as acetates, polycarbonates or vinyls. Under wind load an acrylic sheet will bow and foreshorten as a result of deflection.

For glazing installations the maximum wind load and the size of the window must be considered when the thickness of a panel is to be determined.

If ACRYLITE® sheet is formed into corrugated or domed shapes, rigidity will be increased and deflection minimized.

### Cold Flow

Large, flat ACRYLITE® sheet, if insufficiently supported, may deform permanently due to continuous loads such as snow, or even their own weight. Increased rigidity obtained by forming will minimize cold flow.

## ACRYLITE® Premium (FF) Physical Properties for Extruded Sheet

# ACRYLITE®

### Strength and Stresses

Although the tensile strength of ACRYLITE® Premium (FF) is 10,000 psi (69 Mpa) at room temperature (ASTM D 638), stress crazing can be caused by continuous loads below this value. For glazing applications, continuously imposed design loads should not exceed 750 psi (5.2 Mpa) at 73°F (23°C). Temporary loads of up to 1,500 psi (10.4 Mpa) may be imposed for short durations of time at 73°F (23°C).

Localized, concentrated stresses must be avoided. For this reason, and because of thermal expansion and contraction, large sheets should never be fastened with bolts, but should always be installed in frames.

All thermoplastic materials, including ACRYLITE® Premium (FF) sheet, will gradually lose tensile strength as the temperature approaches the maximum recommended for continuous service—160°F (71°C).

### Expansion and Contraction

Like most other plastics, ACRYLITE® Premium (FF) sheet will expand and contract from 3 to 8 times as much as glass or metals. The designer should be aware of its coefficient of expansion and make appropriate provisions. A 48" pa-nel will expand and contract approximately .002" for each degree fahrenheit change in temperature. In outdoor use, where summer and winter temperatures differ as much as 100°F, a 48" sheet will expand and contract approximately 3/16". Sash rabbets must be of sufficient depth to allow for expansion as well as for contraction.

ACRYLITE® Premium (FF) also absorbs water when exposed to high relative humidity, resulting in expansion of the sheet. At relative humidity of 100%, 80%, and 60%, the dimensional changes are 0.6%, 0.3% and 0.2%, respectively.

### Heat Resistance

ACRYLITE® Premium (FF) sheet can be used at temperatures from -30°F (-34°C) up to +190°F (+88°C), depending on the application. It is recommended that temperatures not exceed 160°F (71°C) for continuous service, or 190°F (88°C) for short, intermittent use.

Components made of ACRYLITE® should not be exposed to high heat sources such as high wattage lamps, unless the finished product is ventilated to permit the dissipation of heat.

### Light Transmission

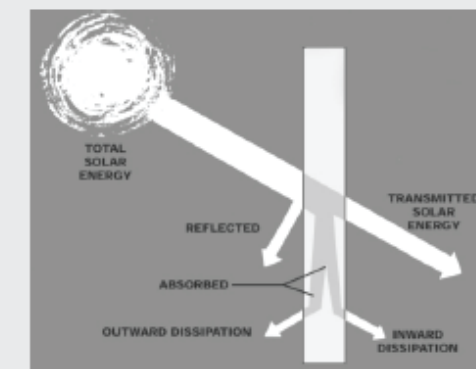
Clear, colorless ACRYLITE® Premium (FF) sheet has a light transmittance of 92%. It is warranted not to lose more than 2-15% of its light-transmitting ability in a 30-year period. Contact Roehm America LLC for the complete warranty.

ACRYLITE® Gallery UV filtering (OP3) sheet is formulated with ultraviolet absorbers designed to help protect pictures, photographs and posters from the damaging effects of ultraviolet light. ACRYLITE® Gallery UV filtering (OP3) sheet absorbs more than 99.7% of the radiation in the ultraviolet range below 200-390 nanometers.

### Solar Energy Control

Transparent colored ACRYLITE® extruded sheet can be used to reduce glare and solar energy transmittance. Transparent colored sheets are available in a range of color densities. This wide range of transmittance values enables the architect to select a density which will provide adequate daylight and at the same time will control glare and solar heat build-up.

### Distribution of Solar Energy



### Chemical Resistance

ACRYLITE® Premium (FF) has excellent resistance to many chemicals including:

- Solutions of inorganic alkalis such as ammonia
- Dilute acids such as sulfuric acid up to a concentration of 30%
- Aliphatic hydrocarbons such as hexane and VM&P naphtha

## ACRYLITE® Premium (FF) Physical Properties for Extruded Sheet

# ACRYLITE®

ACRYLITE® Premium (FF) sheet is not attacked by most foods and foods are not affected by it.

It is attacked, in varying degrees, by:

- Aromatic solvents such as benzene and toluene
- Chlorinated hydrocarbons such as methylene chloride and carbon tetrachloride
- Ethyl and methyl alcohols
- Some organic acids such as acetic acid
- Lacquer thinners, esters, ketones and ethers

For a listing of the resistance of ACRYLITE® sheet to more than 60 chemicals, refer to the table on page 5.

### Formability

ACRYLITE® Premium (FF) sheet will soften as the temperature is increased above 195°F (91°C). As the temperature is increased the sheet passes through the thermo-elastic state to the thermoplastic state. The change is gradual rather than sharply defined. The forming temperature range is between 290°F and 320°F (143°C and 160°C). Because the sheet gradually becomes thermoplastic, certain procedures should be considered during thermoforming. If the sheet is to be hung in an oven, it is necessary to use a continuous clamp rather than several individual clamps. This will prevent the sheet from permanently deforming between clamps. If the sheet is to be heated by infrared heaters while clamped in a horizontal frame, it may be necessary to control the heaters above the center of the sheet. This will prevent the center from becoming too hot and sagging under its own weight.

The sheet will exhibit very little "memory" after forming and probably will not return to its original flat condition if reheated. ACRYLITE® Premium (FF) sheet will shrink in the machine direction when heated without a frame. Sheet thicknesses of .118" (3.0 mm) and greater will shrink no more than 3%. Thinner thicknesses could shrink more.

### Cutting and Machining

ACRYLITE® Premium (FF) sheet can be sawed with circular saws or band saws. It can be drilled, routed, filed and machined much like wood or brass with a slight modification of tools. Because the sheet softens quickly, it is necessary to keep the cutting tool and machined edge of the sheet as cool as possible. Cooling of the cutting tool is recommended. Tool sharpness and "trueness" are essential to prevent gumming, heat buildup and stresses in the part. Heat buildup at the machined edge could lead to subsequent stress crazing and therefore must be avoided.

### Laser Cutting

Laser technology is ideal for quick and accurate cutting, welding, drilling, scribing and engraving of plastics. CO<sub>2</sub> lasers focus a large amount of light energy on a very small area which is extremely effective for cutting complex shapes in acrylic sheet. The laser beam produces a narrow kerf in the plastic allowing for close nesting of parts and minimal waste.

CO<sub>2</sub> lasers vaporize the acrylic as they advance resulting in a clean polished edge but with high stress levels; annealing acrylic sheet after laser cutting is recommended to minimize the chance of crazing during the service life of the part.

### Cementing

ACRYLITE® sheet can be cemented using common solvent cements or polymerizable cements such as ACRIFIX®. The most critical factor is good edge preparation of the part to be cemented. The edge of the sheet must be properly machined in order to have a square flat surface and no stresses. Annealing of the part prior to cementing is recommended. Cement and cement fumes should not contact formed or polished surfaces.

### Annealing

ACRYLITE® Premium (FF) sheet may be annealed at 180°F (82°C) with the heating and cooling times determined by the sheet thickness. An approximate guideline is annealing time in hours equals the sheet thickness in millimeters and the cool-down period is a minimum of 2 hours ending when sheet temperature falls below 140°F. For example, 1/8" (3mm) ACRYLITE® sheet would be heated for 3 hours at 180°F (82°C) and slowly cooled for 3 hours.

### Flammability

ACRYLITE® is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. ACRYLITE® sheet usually burns rapidly to completion if not extinguished. The products of combustion, if sufficient air is present, are carbon dioxide and water. However, in many fires sufficient air will not be available and toxic carbon monoxide will be formed, as it will when other common combustible materials are burned. We urge good judgment in the use of this versatile material and recommend that building codes be followed carefully to assure it is used properly.

## ACRYLITE® Premium (FF) Physical Properties for Extruded Sheet

# ACRYLITE®

The combustibility test data for ACRYLITE® sheet is: self-ignition temperature (ASTM D-1929) is 850°F (455°C), smoke density as measured by ASTM D-2843 is 6.4%, and the rate of burning as measured by ASTM D-635 is 1.0 in/min (25mm/min) for 1/8" (3mm) thick sheet. While these data are based on small scale laboratory tests frequently referenced in various building codes, these tests do not duplicate actual fire conditions.

### Thermal Conductivity

The thermal conductivity of a material—its ability to conduct heat—is called k-Factor. The k-Factor is an inherent property of the material, and is independent of its thickness and of the surroundings to which it is exposed. The k-Factor of ACRYLITE® sheet is:

1.3 B.T.U. / (hour) (sq. ft.) (°F/inch) or 0.19 W /m. K

Whereas the k-Factor is a physical property of the material, the U-Factor—or overall coefficient of heat transfer—is the value used to calculate the total heat loss or gain through a window.

The U-Factor is the amount of heat per unit time and area which will pass through a specific thickness and configuration of material per degree of temperature difference on each of its two sides. This value takes into account the thickness of the sheet, whether the sheet is in a horizontal or vertical position, as well as the wind velocity. U-Factors are based on specific conditions (e.g., single-glazed or double-glazed installations) and are different for summer and winter.

Listed below are U-Factors for several thicknesses of ACRYLITE® sheet for single-glazed, vertical installations, based on the standard ASHRAE\* summer and winter design conditions.

### U-Factors—BTU/hour sq. ft. F° (w/m² x K)

ACRYLITE® Premium (FF) Sheet Thickness		Summer Conditions	Winter Conditions
mm	inches		
3.0	.118	0.98 (5.56)	1.06 (6.02)
4.5	.177	0.94 (5.34)	1.02 (5.79)
6.0	.236	0.90 (5.11)	0.97 (5.51)
9.5	.375	0.83(4.71)	0.89 (5.05)

\*American Society of Heating, Refrigerating and Air-Conditioning Engineers

The total heat loss or gain through a window (due to temperature difference only) can be calculated by multiplying the area of the window, times the difference between indoor and outdoor temperatures, times the appropriate U-Factor (from Table above). Heat intake through solar radiation must be added to arrive at the total heat gain.

ACRYLITE® Premium (FF) sheet is a better insulator than glass. Its U-Factor or overall coefficient of heat transfer is approximately 10% lower than that of glass of the same thickness. Conversely, its RT-Factor is about 10% greater.

### Thermal Shock and Stresses

ACRYLITE® Premium (FF) sheet is more resistant than glass to thermal shock and to stresses caused by substantial temperature differences between a sunlit and a shaded area of a window or by temperature differences between opposite surfaces of a window.

### Surface Hardness

The surface of plastic is not as hard as that of glass. Therefore, reasonable care should be exercised in handling and cleaning ACRYLITE® sheet.

### Electrical Properties

ACRYLITE® sheet has many desirable electrical properties. It is a good insulator. Its surface resistivity is higher than that of most plastics. Continuous outdoor exposure has little effect on its electrical properties.

### Chemical Resistance

The table on the next page gives an indication of the chemical resistance of ACRYLITE® Premium (FF) sheet. The code used to describe chemical resistance is as follows:

R= Resistant

ACRYLITE® Premium (FF) sheet only withstands this substance for long periods and a temperature of 120°F (49°C).

