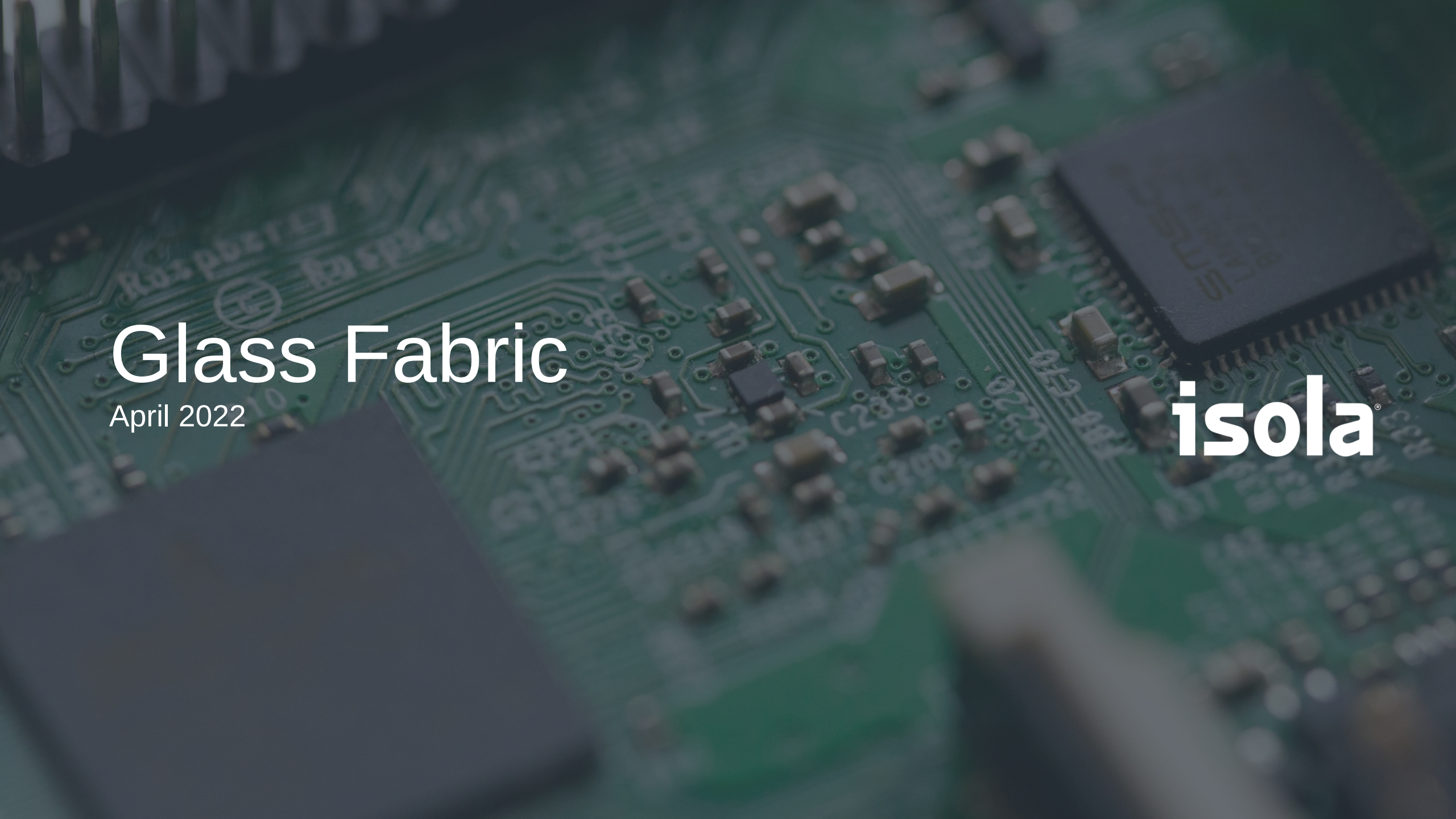




Glass Fabric

April 2022

isola[®]

Glass Style	Weave	Warp Count	Fill Count	Warp Yarn	Fill Yarn	Fabric Thickness inches	Fabric Thickness mm	Fabric Nominal Weight OSY	Fabric Nominal Weight g/m2
1035	Plain	66	68	ECD 900-1/0	ECD 900-1/0	0.0011	0.030	0.88	30
1037	Plain	70	73	ECC 1200-1/0	ECC 1200-1/0	0.0011	0.030	0.68	23
1067	Plain	70	70	ECD 900-1/0	ECD 900-1/0	0.0014	0.035	0.91	31
106	Plain	56	56	ECD 900-1/0	ECD 900-1/0	0.0013	0.032	0.73	25
1078	Plain	54	54	ECD 450 1/0	ECD 450 1/0	0.0017	0.040	1.41	48
1086	Plain	60	60	ECD 450 1/0	ECD 450 1/0	0.0022	0.050	1.60	54
1080	Plain	60	47	ECD 450-1/0	ECD 450-1/0	0.0021	0.064	1.45	49
2113	Plain	60	56	ECE 225-1/0	ECD 450-1/0	0.0031	0.074	2.31	78
2313	Plain	60	64	ECE 225- 1/0	ECD 450-1/0	0.0033	0.080	2.38	81
3313	Plain	61	62	ECDE 300-1/0	ECDE 300-1/0	0.0033	0.081	2.43	82
3070	Plain	70	70	ECDE 300-1/0	ECDE 300-1/0	0.0034	0.086	2.74	93
2116	Plain	60	58	ECE 225-1/0	ECE 225-1/0	0.0037	0.097	3.22	109
1506	Plain	46	45	ECE110-1/1	ECE 110-1/0	0.0056	0.140	4.89	165
1652	Plain	52	52	ECG 150-1/0	ECG 150-1/0	0.0045	0.114	4.09	142
7628	Plain	44	31	ECG 75-1/0	ECG 75-1/0	0.0068	0.173	6.00	203

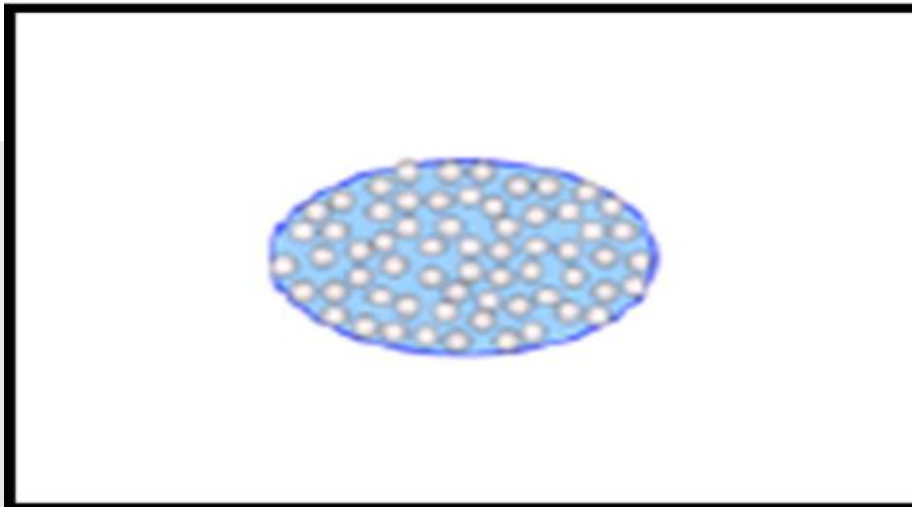
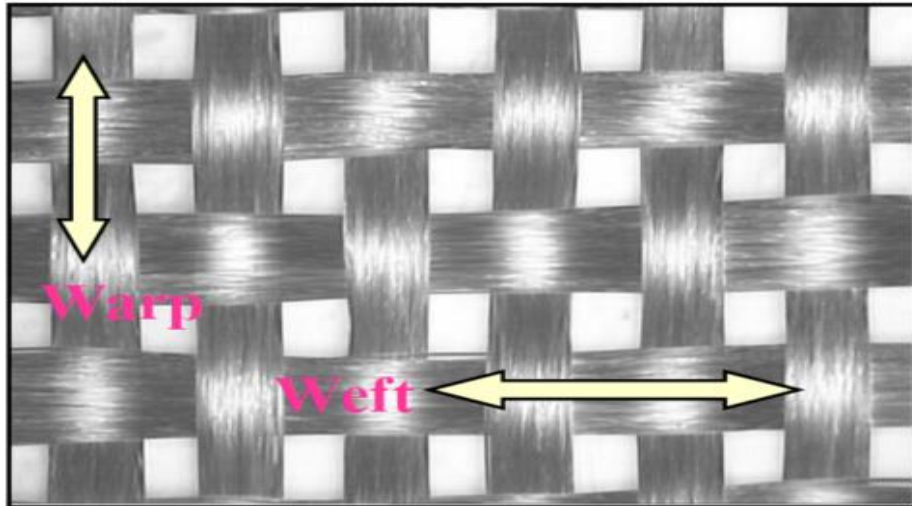
Fiberglass Yarn Nomenclature

<i>1st Letter</i>	E = E-glass (electrical grade)
<i>2nd Letter</i>	C = Continuous Filaments
<i>3rd Letter</i>	Filament Diameter C, D, E, DE, G
<i>1st number</i>	Yardage in one pound
<i>2nd number</i>	Number of strands in a yarn/ strands plied or twisted

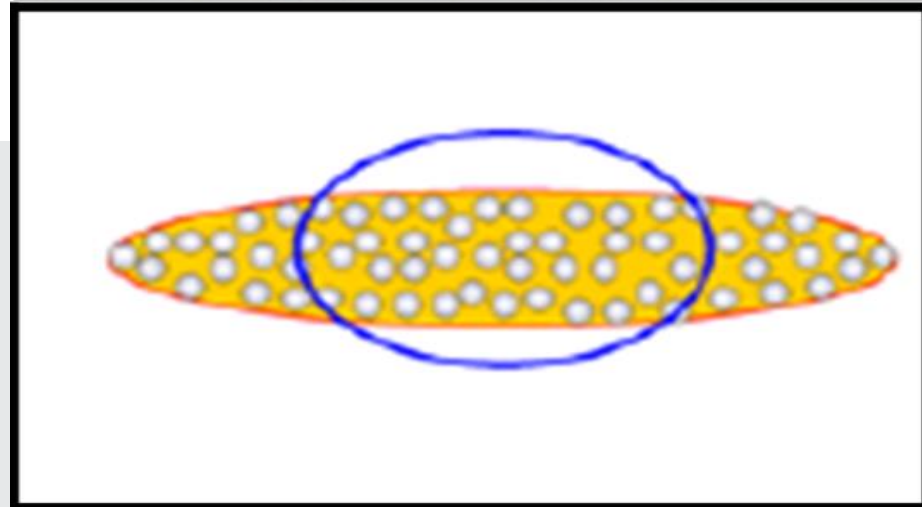
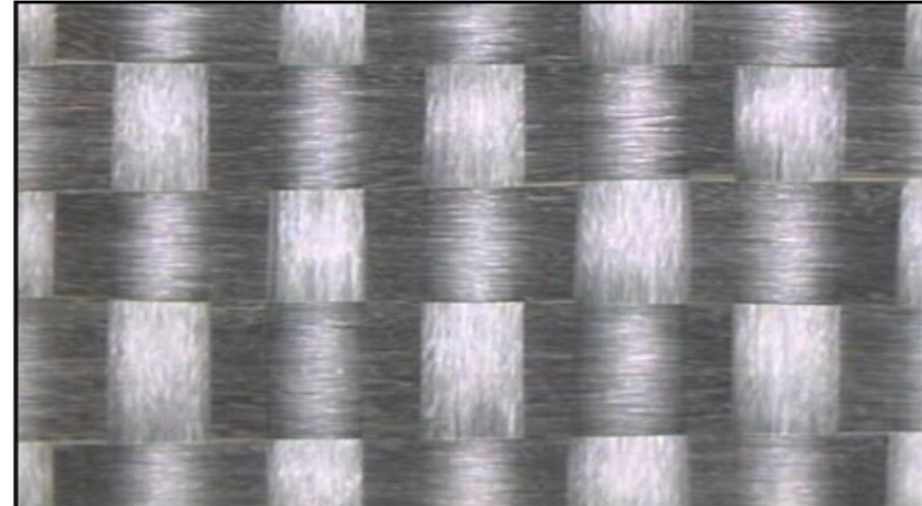
Definitions:

- **Spread Glass** – Glass is spread out in various processes
 - Currently, spread in both directions is industry standard
- **Square Weave** – Glass that has a Balanced Density and/or Yarn Counts in Warp and Fill Directions.

Standard



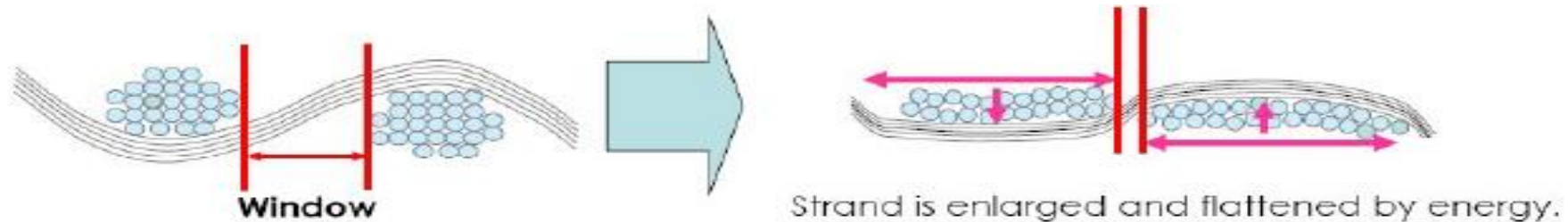
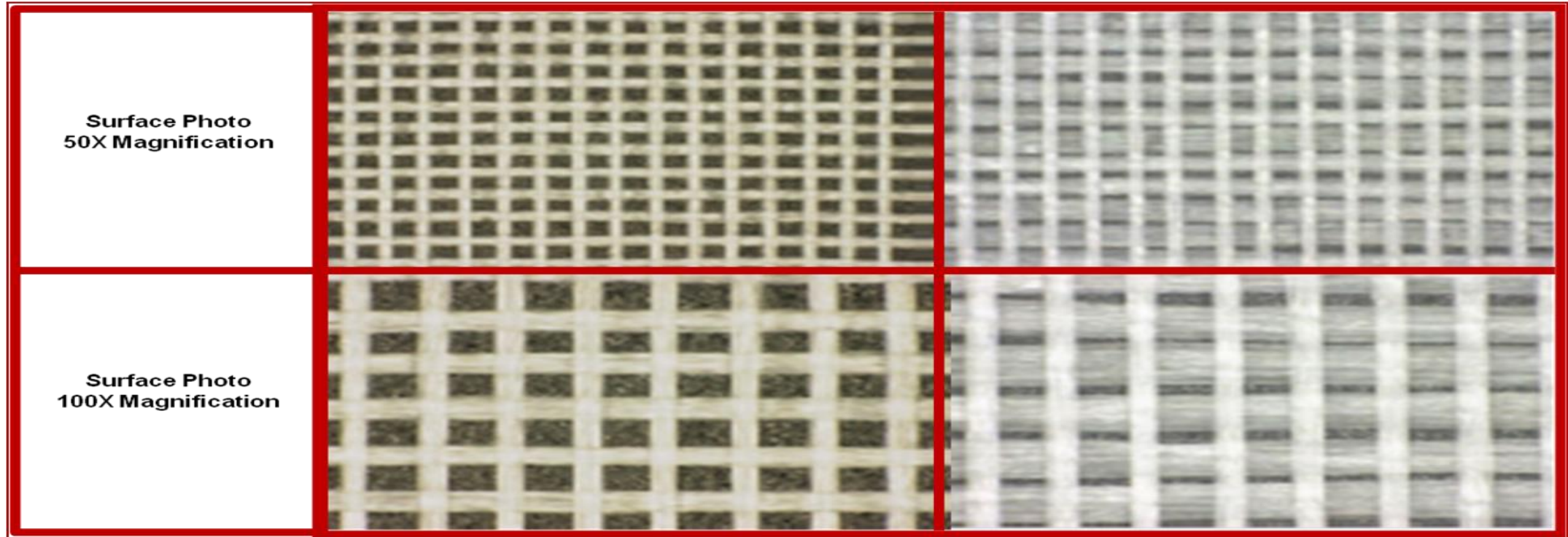
Spread

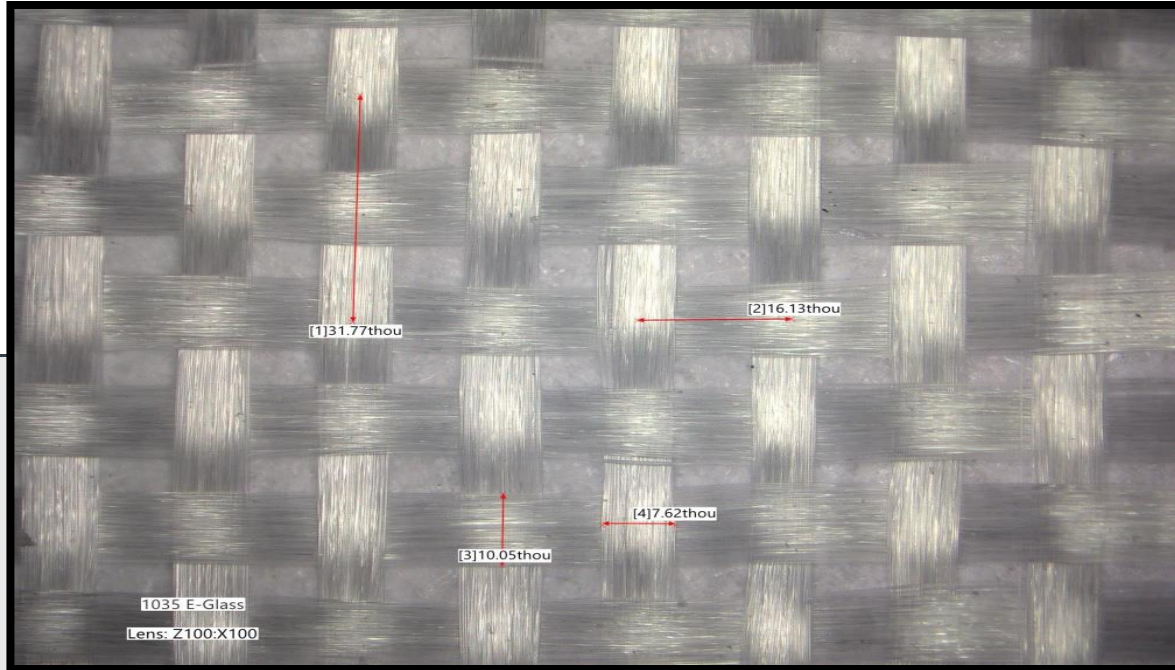


106 Glass Examples

Standard Glass

Spread Glass

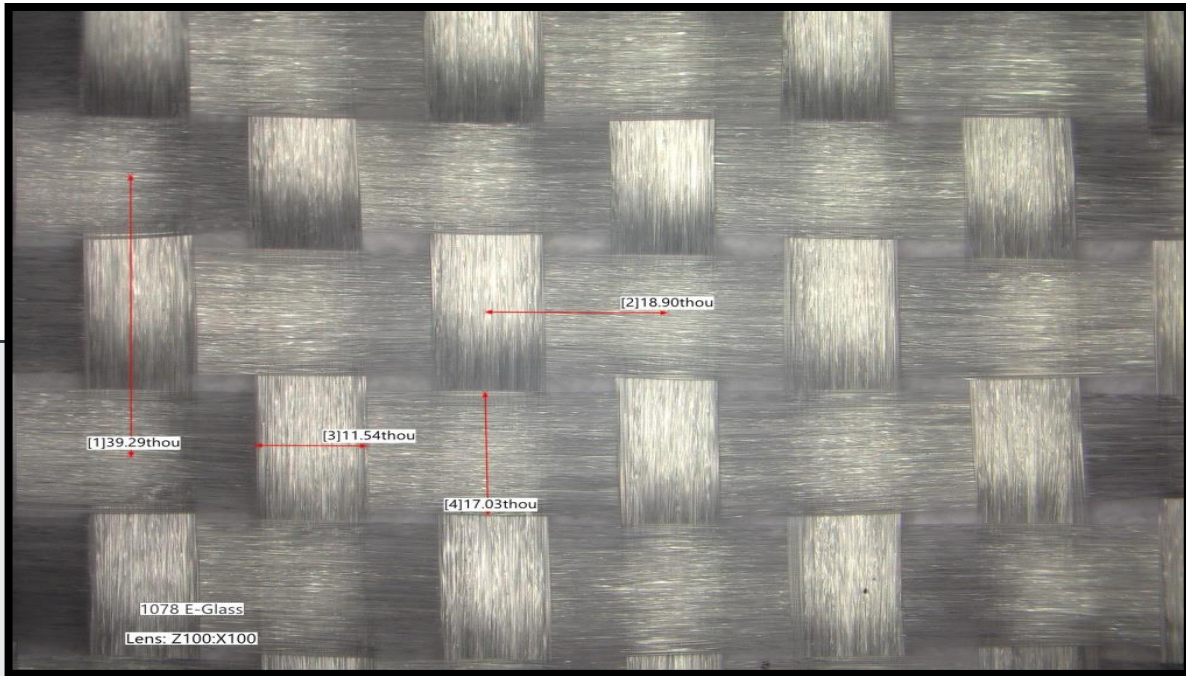




1035

- **Warp & Fill Count:** 66 x 68 (ends/in)
- **Thickness:** 0.0011" / 0.028 mm

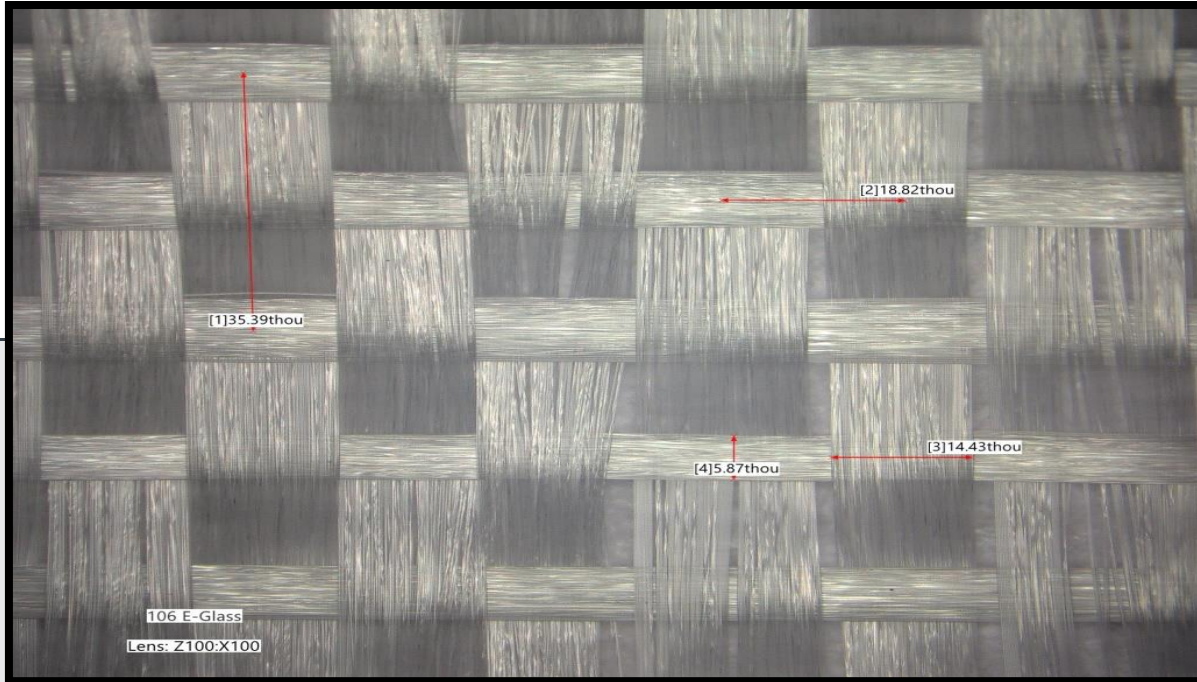
Photos courtesy of Isola R & D Laboratories



✓ 1078

- **Warp & Fill Count:** 54 x 54 (ends/in)
- **Thickness:** 0.0017" / 0.043 mm

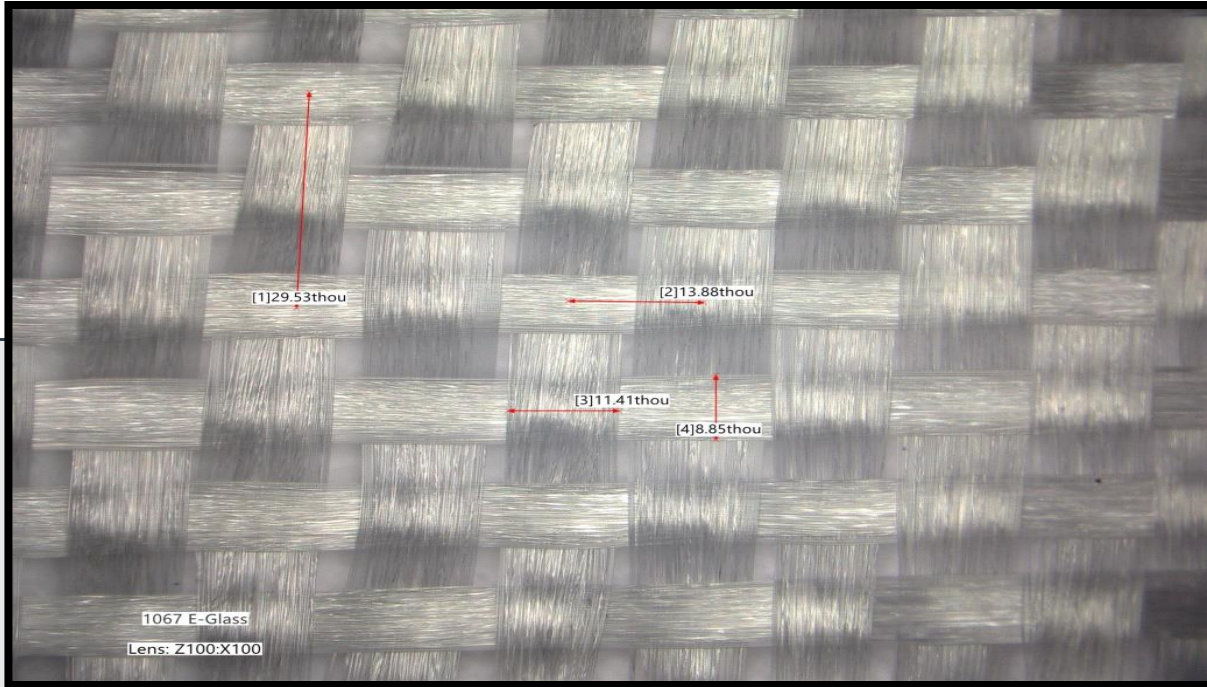
Photos courtesy of Isola R & D Laboratories



✓ 106

- **Warp & Fill Count:** 56 x 56 (ends/in)
- **Thickness:** 0.0013" / 0.033 mm

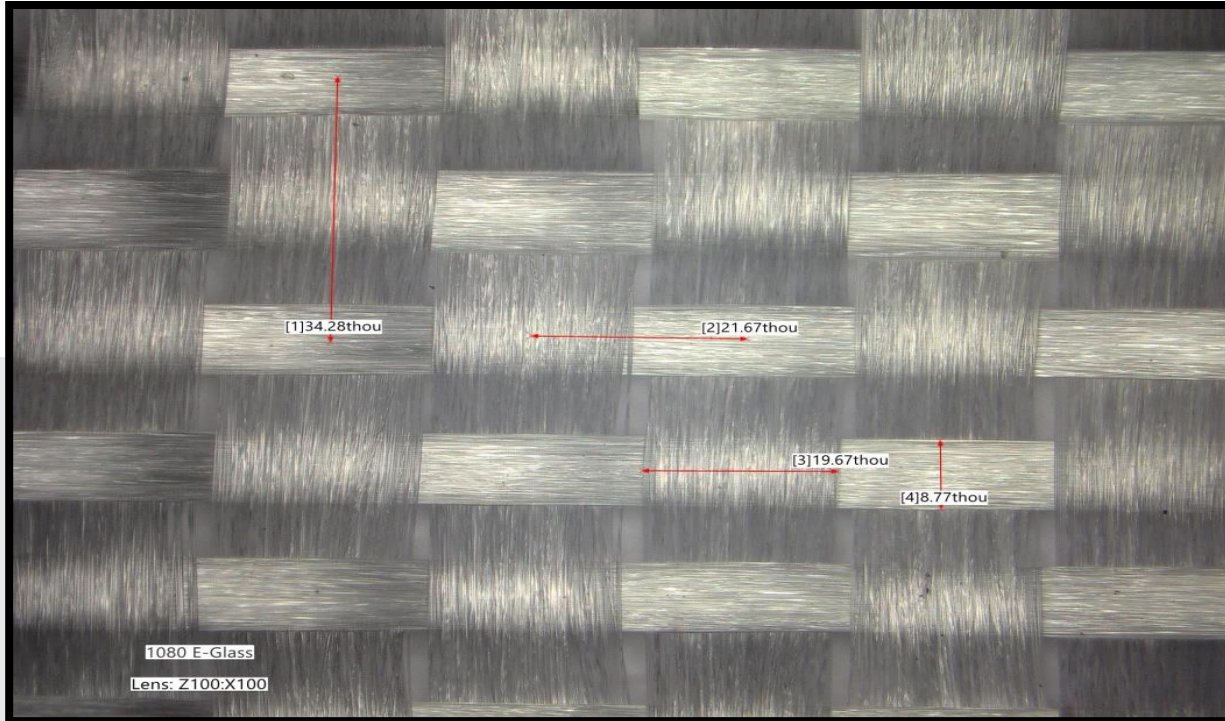
Photos courtesy of Isola R & D Laboratories



✓ 1067

- **Warp & Fill Count:** 70 x 70 (ends/in)
- **Thickness:** 0.0014" / 0.035 mm

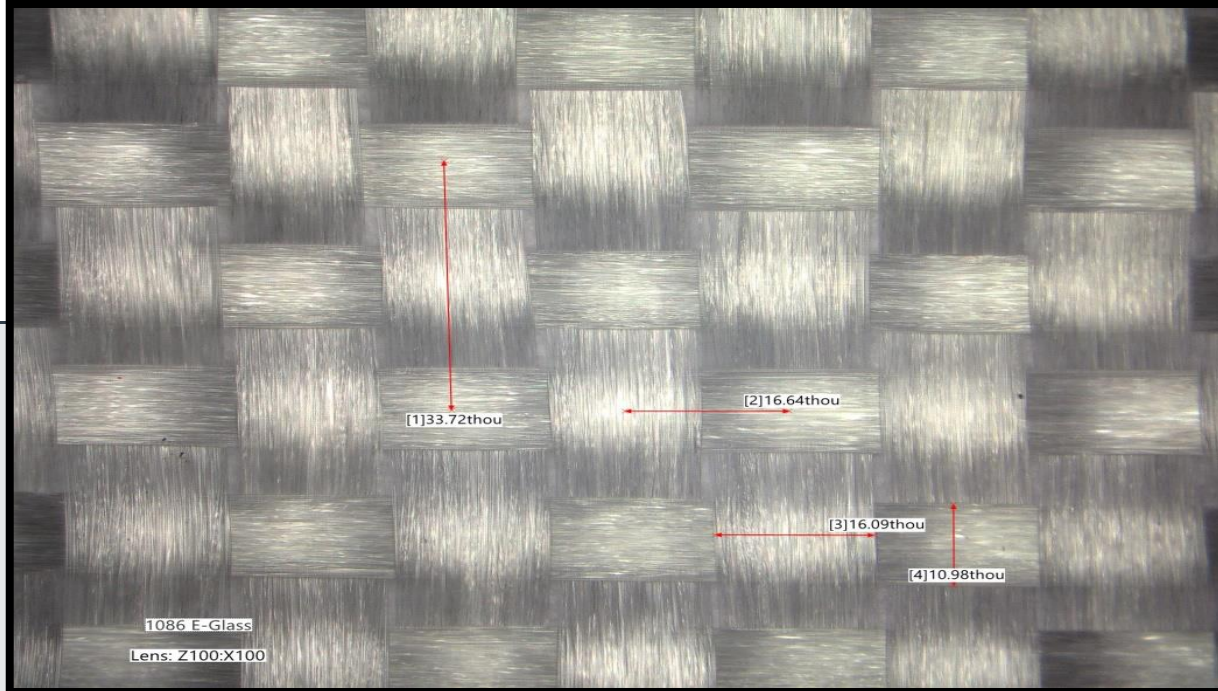
Photos courtesy of Isola R & D Laboratories



✓ 1080

- **Warp & Fill Count:** 60 x 47 (ends/in)
- **Thickness:** 0.0021" / 0.053 mm

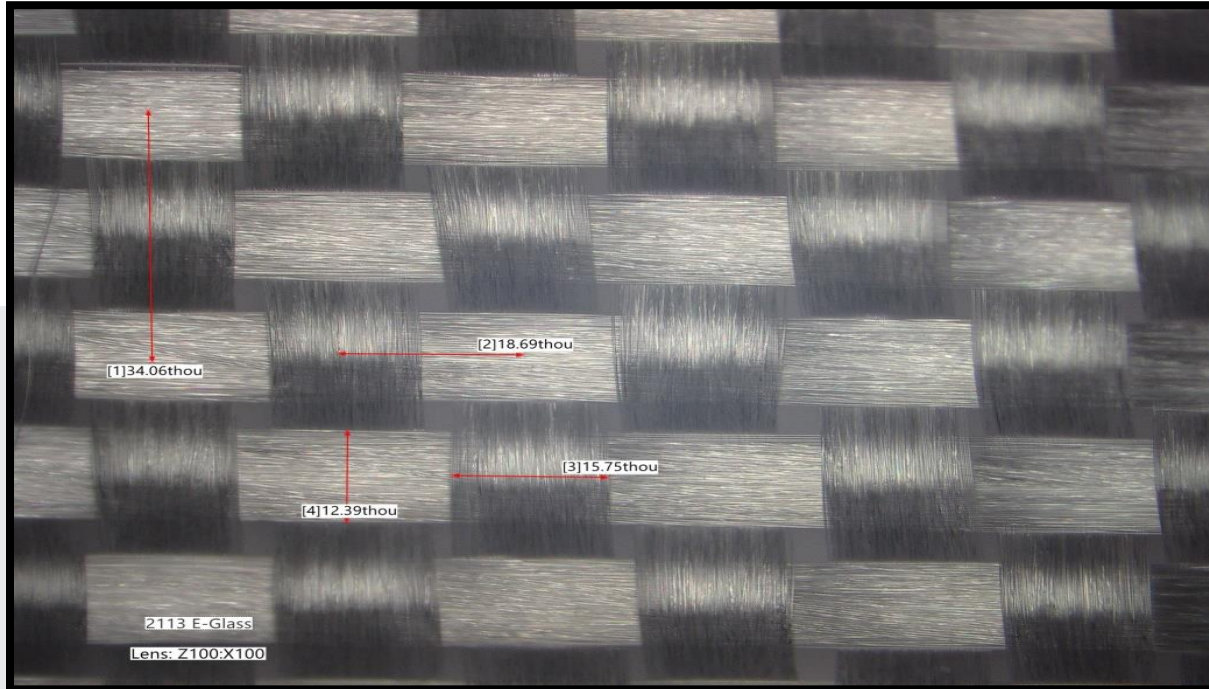
Photos courtesy of Isola R & D Laboratories



✓ 1086

- **Warp & Fill Count:** 60 x 60 (ends/in)
- **Thickness:** 0.0022" / 0.056 mm

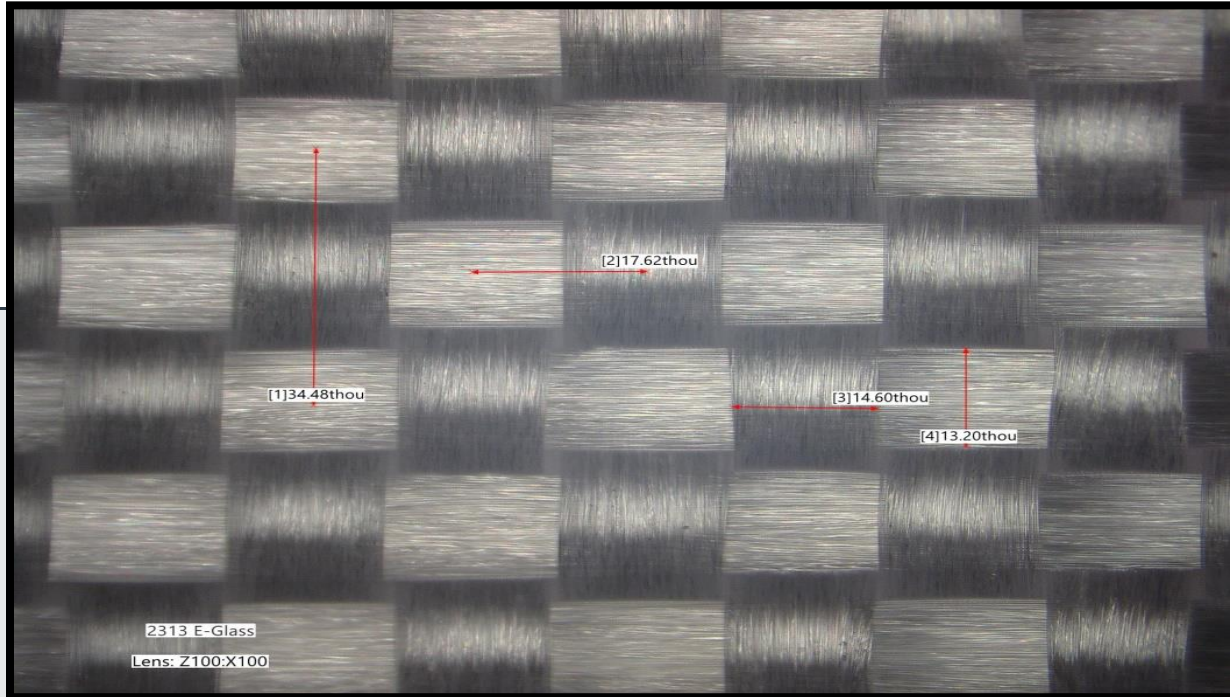
Photos courtesy of Isola R & D Laboratories



✓ 2113

- **Warp & Fill Count:** 60 x 56 (ends/in)
- **Thickness:** 0.0031" / 0.079 mm
- Glass yarn is different in x and y.

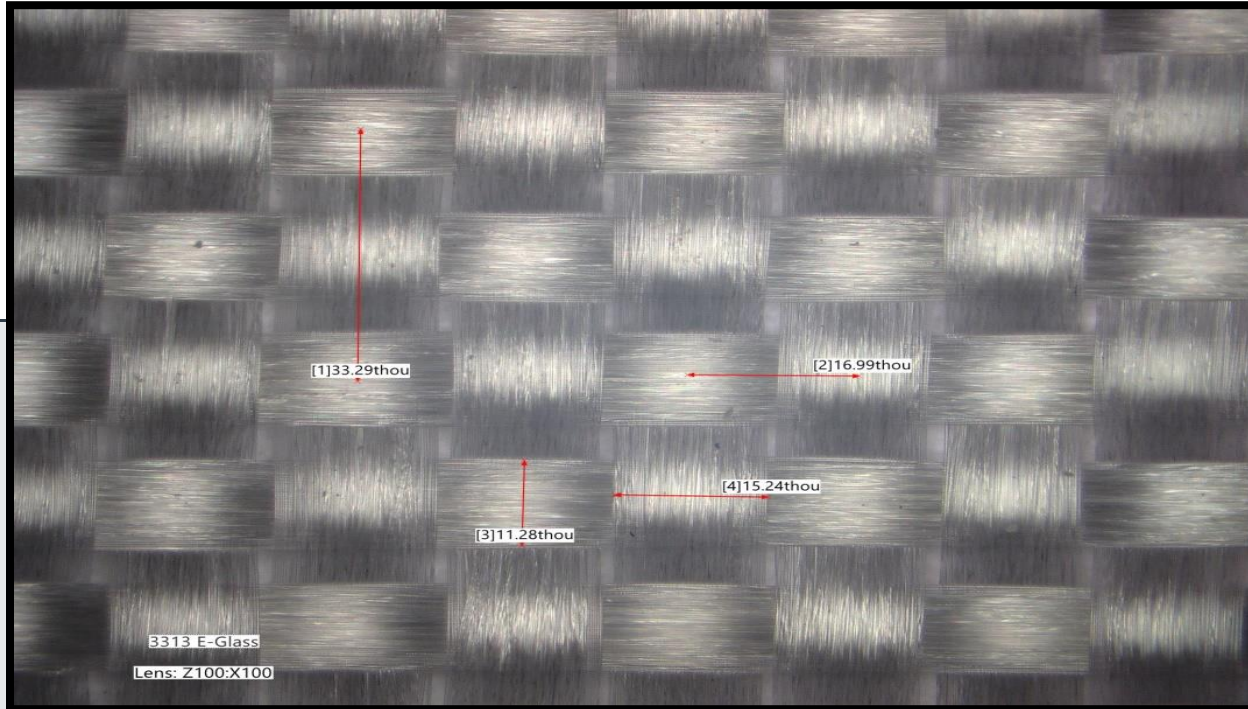
Photos courtesy of Isola R & D Laboratories



✓ 2313

- **Warp & Fill Count:** 60 x 64 (ends/in)
- **Thickness:** 0.0033" / 0.084 mm

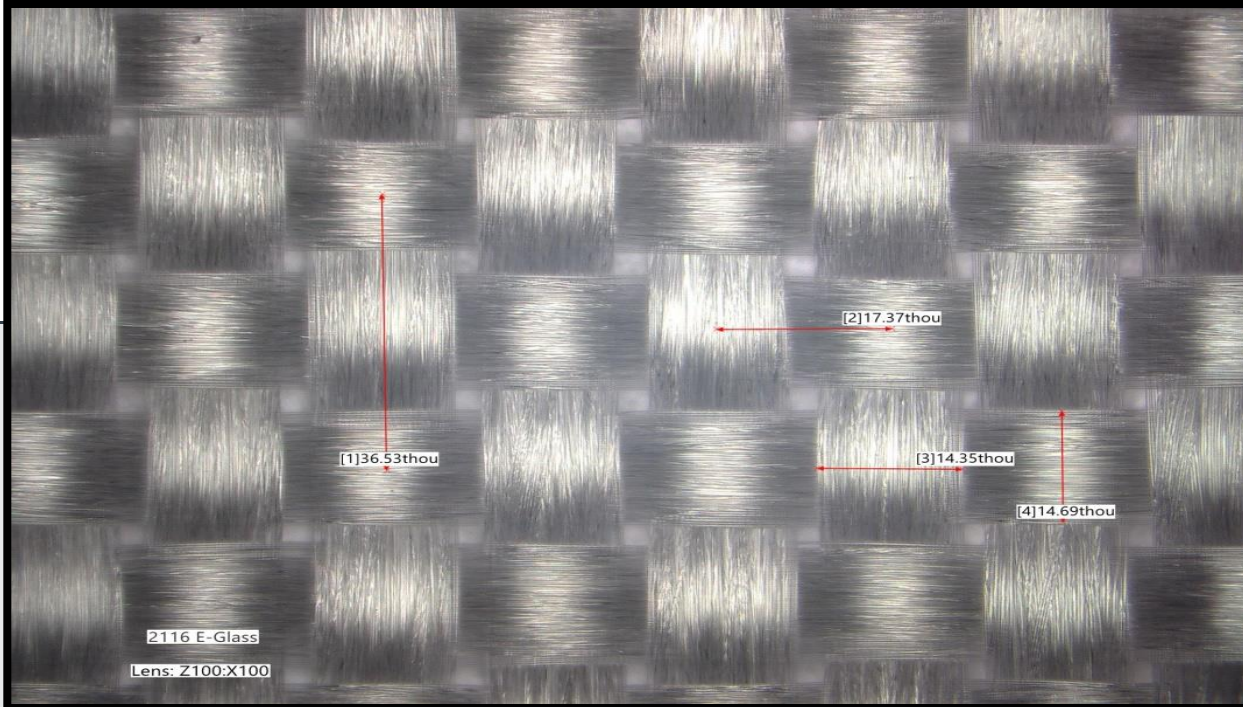
Photos courtesy of Isola R & D Laboratories



3313

- **Warp & Fill Count:** 60 x 62 (ends/in)
- **Thickness:** 0.0033" / 0.084 mm

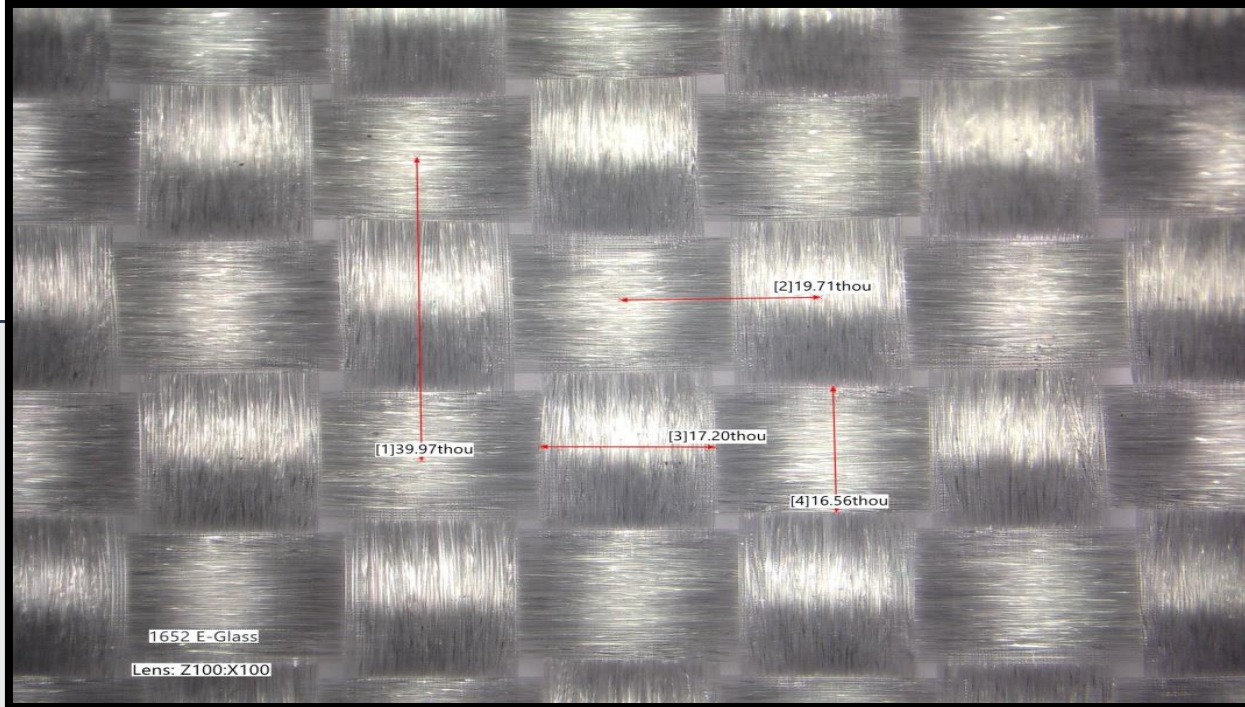
Photos courtesy of Isola R & D Laboratories



✓ **2116**

- > **Warp & Fill Count:** 60 x 58 (ends/in)
- > **Thickness:** 0.0037" / 0.094 mm

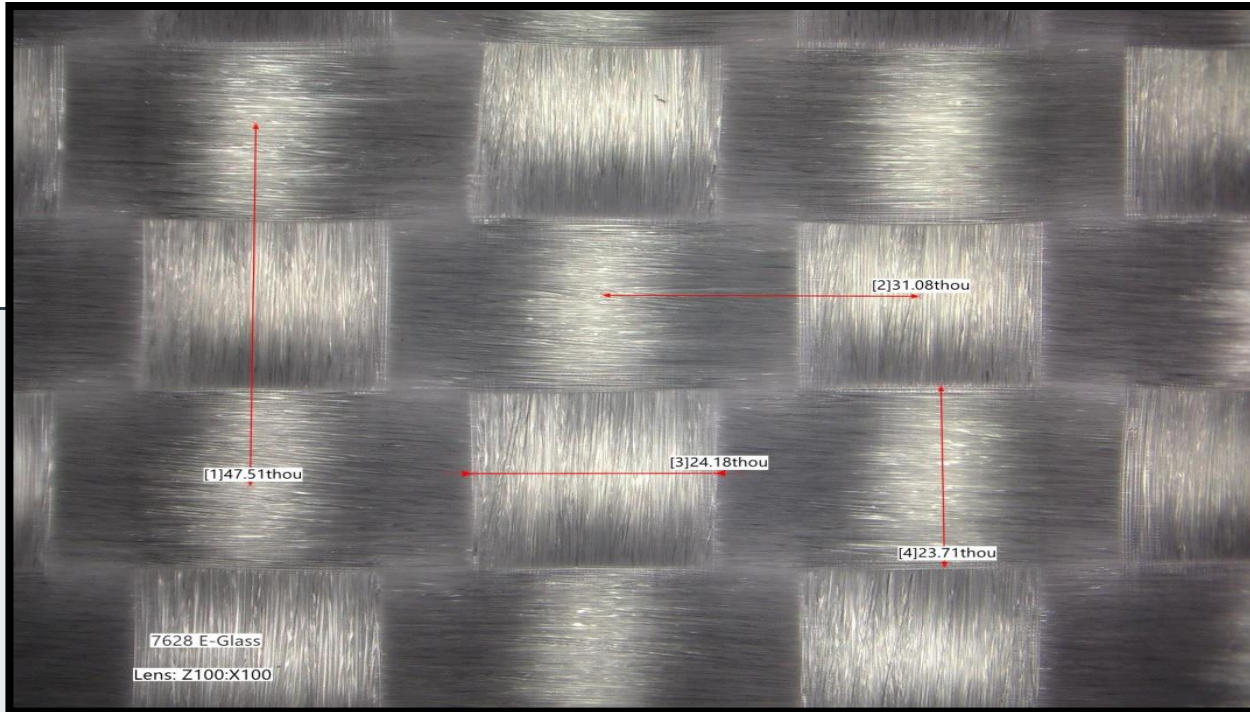
Photos courtesy of Isola R & D Laboratories



✓ 1652

- **Warp & Fill Count:** 52 x 52 (ends/in)
- **Thickness:** 0.0045" / 0.114 mm

Photos courtesy of Isola R & D Laboratories



7628

- **Warp & Fill Count:** 44 x 31 (ends/in)
- **Thickness:** 0.0068" / 0.173 mm

Photos courtesy of Isola R & D Laboratories

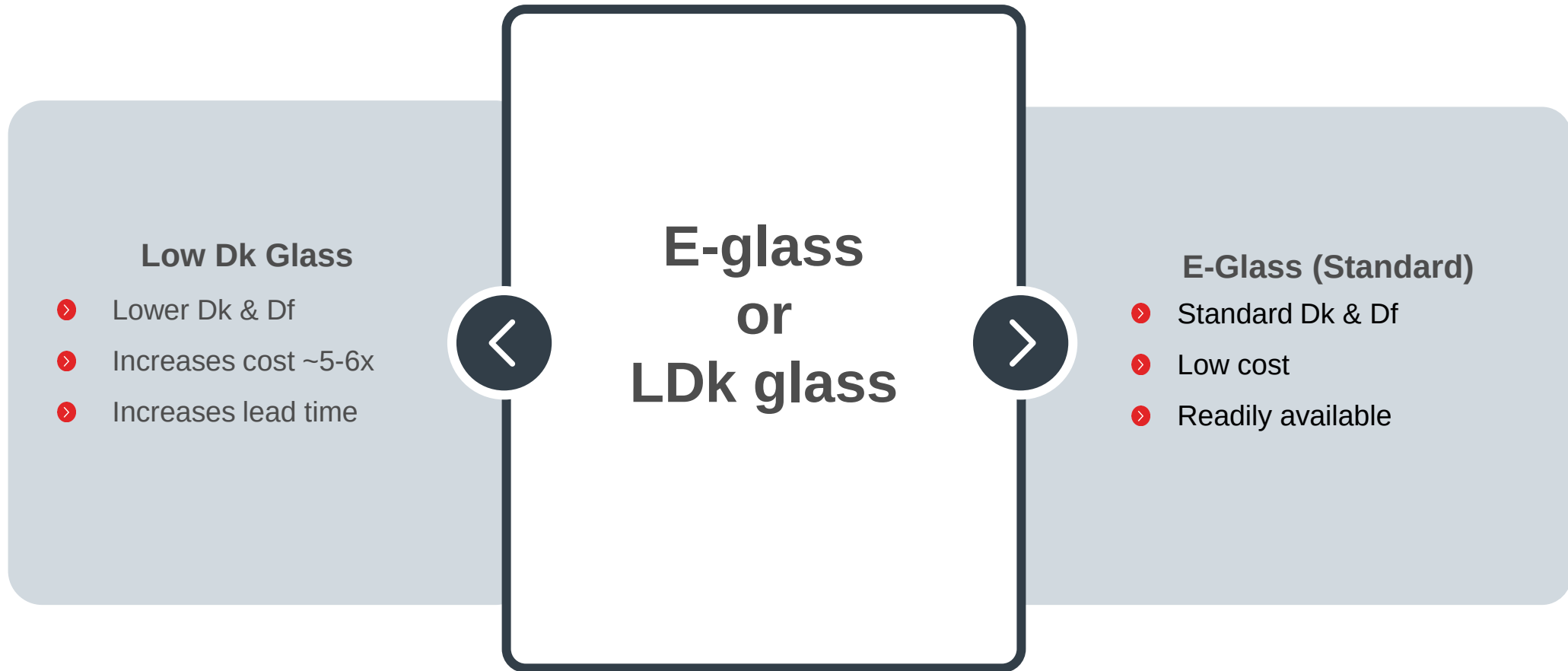
> Glass Yarn Properties

	Property		E-Glass	Low Dk			Low CTE	
	Advantage	Disadvantage		D-Glass	L-Glass	NE-Glass	T-Glass	S-Glass
SiO₂	Dk, Df	Drilability	52-56%	72-76%	52-56%	52-56%	64-66%	64-66%
CaO		Dk	20-25%	0%	0-10%	0%	0%	0-0.3%
Al₂O₃		Df	12-16%	0-5%	10-15%	10-18%	24-26%	24-26%
B₂O₃	Dk, Dk		5-10%	20-25%	15-20%	18-25%	0%	0%
MgO	Meltability	Dk	0-5%	0%	0-5%	5-12%	9-11%	9-11%
Na₂O, K₂O		Dk, Df, Durability	0-1%	3-5%	0-1%	0-1%	0%	0-0.3%
TiO₂, LiO₂	Meltability		0%	0%	0-5%	0%	0%	0%

Property	Unit	E-Glass	Low Dk Glass	Low CTE Glass
Dk @ 1GHz	Freq	6.8	4.8	5.4
Df @ 1 GHz	Freq	0.0035	0.0015	0.0043
Tensile Modulus	Gpa	75	64	86
Thermal Expansion	ppm/°C	5.6	2.8	3.3

- > Composition determines the effects of glass on the composite
- > Low glass CTE values increase the gap between other components of the composite

Glass Style Decision Tree



Thank You

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