



# Customer Acceptance Standard

No. TP-230 LD  
 Date: 03-Nov-10  
 Supersedes: 01-Oct-10  
 Page 1 of 5

## L-Glass™ Continuous Yarn for High Speed PCB Applications

### I. DESCRIPTION

Fiberglass yarn is a natural, lustrous, white, continuous filament yarn which is evenly twisted on supply packages. The yarns are smooth, non-cellular and generally cylindrical in form. The yarns are made of glass of high stability and durability and are with the exception of sizing ingredients, inorganic, incombustible and will neither expand nor contract with moisture changes. The individual glass fibers do not tend to absorb moisture and are extremely flexible. The sizing may be burned off the yarn under certain conditions. Weathering tests have indicated comparatively unlimited stability under repeated cycles of heat, cold, sunlight, dampness and drying.

### I. USE

These yarns are used for further fabrication typically: warping, weaving for glass fabrics and tapes.

### III. YARN NOMENCLATURE

(US Customary System)	Example Product Name (SI System)
<u>LCD510 1/0 1.0Z</u>	<u>LC5-10 1X0 Z40</u>
L- L-Glass™ Glass formulation	L- L-Glass™ Glass Formulation
C- Continuous filaments	C- Continuous filaments
D- Filament diameter (See Table 1)	5- Filament diameter (See Table 1)
510- Yards per pound divided by 100	10- grams per 1000 meters of yarn
1/0- Single yarn end	1X0- Single yarn end
1.0Z- One turn per inch (TPI)	Z40- Twists per meter (TPM)

Throughout history, the actual yardage or Tex of yarn products has often been shifted from the actual yield provided in the product name. Therefore, the yarn name is only used as a descriptor. The table in section V. must be utilized to obtain the actual bare glass yield of a yarn product.



## Customer Acceptance Standard

No. TP-230 LD  
 Date: 03-Nov-10  
 Supersedes: 01-Oct-10  
 Page 2 of 5

### IV. GENERAL INFORMATION

Reference Textiles Fibers For Industry for more information

Filament Designatio US Units	Filament Designation SI Units	Range for Average Filament Diameter			
		Minimum Inches	Maximum Inches	Minimum µm	Maximum µm
D	5.0	0.00019	0.000229	4.83	5.83
DE	6.0	0.00023	0.000269	5.84	6.85
E	7.0	0.00025	0.000299	6.35	7.61

### V. AVAILABLE PRODUCTS AND BARE GLASS YIELD PROPERTIES

Product Name*	Product Name (SI) *	Sizing	Bare Glass Yield						Typical Cv**
			Nominal Yds/ lb	Minimum Yds/ lb	Maximum Yds/ lb	Nominal Tex	Minimum Tex	Maximum Tex	
LCD1020 1/0 1.0Z	LC5-4.9 1X0 Z40	620-1	102000	94860	109140	4.9	4.5	5.2	1.4
LCD510 1/0 1.0Z	LC5-10 1X0 Z40	620-1	51000	47426	54574	9.7	9.1	10.5	1.2
LCDE340 1/0 1.0Z	LC6-15 1X0 Z40	620-1	34000	32232	35768	14.6	13.9	15.4	2
LCE255 1/0 1.0Z	LC7-19 1X0 Z40	620-1	25500	23997	27023	19.5	18.4	20.7	2

NOTE: See Section VIII for bobbin selections

- \*- Nomenclature used for identification purposes only. Nomenclature may not indicate true yield.
- \*\* - Cv provided as a reference only. This is not a specified product property.

### VI. AVAILABLE PRODUCTS AND ADDITIONAL PHYSICAL PROPERTIES

Product Name	Tex Designation	Sizing	Strand Solids			Minimum Tensile	
			Percent Strand Solids	Minimum Percent Strand Solids	Maximum Percent Strand Solids	Lbs	Newtons
LCD1020 1/0 1.0Z	LC5-4.9 1X0 Z40	620-1	2.0	1.75	2.25	0.5	2.2
LCD510 1/0 1.0Z	LC5-10 1X0 Z40	620-1	2.0	1.75	2.25	1.1	5.0
LCDE340 1/0 1.0Z	LC6-15 1X0 Z40	620-1	2.0	1.75	2.25	1.5	6.8
LCE255 1/0 1.0Z	LC7-19 1X0 Z40	620-1	1.68	1.38	1.96	1.9	8.3

This specification is subject to change without notice.

A. REMARKS:

- Strand solids limits are for “as produced”. Monthly charts available from producing plant on request.
- Breaking Strength – The strength is expressed in pounds (newtons) per end. The minimum strengths will be the average of four breaks per package.
- Diameter – Filament diameter is listed for reference purposes only, and is not a cause for rejection.
- Moisture – The maximum moisture for individual packages is 0.75%.

B. TEST METHODS FOR PHYSICAL PROPERTIES

The physical properties as listed in this specification shall be tested according to the methods as specified in the reference listed below:

1. Yards per Pound (Linear Density – TEX) – W-07Ea-T\*
2. Ignition Loss – W-07Ea-T\*
3. Filament Diameter – D-02C and D-02Ca-T\*
4. Breaking Strength – S-01Fm-T\*\*
5. Twist per Inch (per Meter) – D-15A-T\*.

(Physical test methods will soon be changed to ASTM Methods where applicable.)

\* AGY Test Methods. Copies available upon request.

\*\* AGY Test Methods for fine yarns (510s (10 TEX) or finer glass)



# Customer Acceptance Standard

No. TP-230 LD  
 Date: 03-Nov-10  
 Supersedes: 01-Oct-10  
 Page 4 of 5

## VII. AVAILABLE PRODUCTS AND VISUAL PROPERTIES

Product Name	Tex Designation	Sizing	Maximum Average Broken Filaments (360° Count)	Filament Count*	Approximate Yarn Diameter		Twist Tolerance	
					Inches	mm	TPI	TPM
LCD1020 1/0 1.OZ	LC5-4.9 1X0 Z40	620-1	10	102	0.0033	0.085	± 0.30	± 12
LCD510 1/0 1.OZ	LC5-10 1X0 Z40	620-1	10	204	0.0048	0.122	± 0.30	± 12
LCDE340 1/0 1.OZ	LC6-15 1X0 Z40	620-1	10	204	0.054	0.179	± 0.30	± 12
LCE255 1/0 1.OZ	LC7-19 1X0 Z40	620-1	10	204	0.0065	0.165	± 0.30	± 12

\* The number of filaments and nominal filament diameter is for reference purposes only. Yarns are controlled according to yards per pound (linear density-TEX).

A. The product shall be free of the following internal or external (depending where found) characteristics.

- |                 |                            |
|-----------------|----------------------------|
| Entrapped Waste | Dirt, Grease or Oil        |
| Ends Out        | Mixed Yarns**              |
| Damaged Yarn*   | Cut Tubes                  |
| Unbalanced Yarn | Cracked Tubes              |
| Sloughed Yarn*  | Protruding Ends (start up) |
| Bad Builds      | Loops                      |
| Water Spots     | Broken Filaments (fuzz)    |

\* AGY accepts no responsibility for any damaged or sloughed material that is contained in a carton that shows any evidence of physical abuse. Any carton showing evidence of having been opened from the bottom will be considered as having been mishandled by the customer. Such damage or questions of damage is the responsibility of the carrier as, according to AGY terms of sale, delivery to the carrier constitutes delivery to the customer. Advanced Glassfiber Yarns accepts no responsibility for any damage occurring in a customer's plant.

\*\* In the event that AGY or the customer has reason to suspect that a shipment may contain MIXED YARN, the party first suspecting such condition will notify the other, and AGY assumes responsibility for initiating appropriate action. The use of the suspect material should be discontinued pending an investigation of the facts.

## VIII. PACKAGING WEIGHT AND METERING DATA

- Average package weight is for information only.
- All packages are completely splice-free.
- Metered and non-metered material is packaged separately.

This specification is subject to change without notice.



# Customer Acceptance Standard

No. TP-230 LD  
 Date: 03-Nov-10  
 Supercedes: 01-Oct-10  
 Page 5 of 5

Product Name	Tex Designation	Sizing	Bobbin Type	Average Package Wt		Shipment Makeup*		Comments
				Lbs.	Kg	Ratio	Description	
LCD1020 1/0 1.0Z	LC5-4.9 1X0 Z40	620-1	7636	2	0.91	50%	Metered	1
						50%	0.25lb (0.11kg) to full	
LCD510 1/0 1.0Z	LC5-10 1X0 Z40	620-1	7636	2	0.91	50%	Metered	1
						50%	0.25lb (0.11kg) to full	
LCDE340 1/0 1.0Z	LC6-15 1X0 Z40	620-1	7636	2	0.91	50%	Metered	1
						50%	0.25lb (0.11kg) to full	
LCE255 1/0 1.0Z	LC7-19 1X0 Z40	620-1	7636	2	0.91	50%	Metered	1
						50%	0.25lb (0.11kg) to full	

\*Shipment makeup ratio of percent metered may be decreased with beam orders of the same product.

## PACKAGING WEIGHT AND METERING DATA Notes:

- Metering tolerance for all other yarns is plus 3%.

## IX. PACKAGE DESCRIPTION

See AGY document AGY - PD 1 for more information.

## X. PREPARATION FOR SHIPMENT

- Package Identification
  - ⇒ An identification disc will identify each package.
  - ⇒ The discs for the various yarn constructions will be per the system of identification set up by AGY.
- The packages shall be packed in a container suitable to insure adequate protection in transit and stores.
- A content label shall adequately identify each carton.

## Document history

Date	Description of Change	Author
6/08/10	Original Issue	Ogilvie
10/1/10	Corrected solids specs and added tensile specs for LCD1020.	Ogilvie
11/3/10	Changed LCE225 maximum yardage spec from 27003 to 27023.	Ogilvie

This specification is subject to change without notice.