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September 23, 2026

Thomas Christiansen
BKP Berolina Polyester GMBH+Co KG
Heidering 28
D-16727 Velten / Germany

SUBJECT: **RENEWAL OF BEROLINA-LINER-UP AND BEROLINA-LINER-UP HF FIBERGLASS REINFORCED ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE USING AOC VIPEL L720-LCB ISO-NPG POLYESTER RESIN BR800026**

Dear Mr. Christiansen:

Your request for the renewal of the above listed product is approved for Citywide Use in the public right of way. This renewal will expire on September 22, 2030. You are required to report any change in the material composition of this product to the City immediately.

For design computations purposes, the "Design Values" listed below shall be used. For project compliance related to UV-CIPP testing, etc., the minimum "Test Values" listed below shall be used to determine acceptable material properties. See project specifications for additional requirements and/or modifications.

Berolina-Liner UP Design Properties

Resin: ..... AOC VIPEL L720-LCB ISO-NPG
Fiberglass: ..... Advantex E-CR glass

Material Properties for Design	Test Value	Design Value (Allowable)	Unit
Initial Hoop Flexural Modulus (per ASTM D2412)	1,215,000	1,215,000	psi
Initial Hoop Tensile Strength (per ASTM D 2290)	26,500	13,250 (F.S.=2.0)	psi
Long Term Retention (per ASTM D2990) (Flexural Modulus,Tensile and compressive Strength)	-	60%	
Long term (50-year) Hoop Flexural Modulus	729,000	729,000	psi
Long term (50-year) Hoop Tensile Strength	15,900	7950 (F.S.=2.0)	psi
Note: The allowable design properties in the above table have been determined by reducing the accepted material properties by a Safety Factor of 2.0.			

Berolina-Liner HF UP Design Properties

Resin: ..... AOC VIPEL L720-LCB ISO-NPG
Fiberglass: ..... Advantex E-CR glass

Material Properties for Design	Test Value	Design Value (Allowable)	Unit
Initial Hoop Flexural Modulus (per ASTM D2412)	2,410,000	2,410,000	psi
Initial Hoop Tensile Strength (per ASTM D 2290)	29,150	14,575 (F.S=2.0)	psi
Long Term Retention (per ASTM D2990) (Flexural Modulus,Tensile and compressive Strength)	-	85%	
Long term (50-year) Hoop Flexural Modulus	2,048,500	2,048,500	psi
Long term (50-year) Hoop Tensile Strength	24,780	12,390 (F.S=2.0)	psi
Note: The allowable design properties in the above table have been determined by reducing the accepted material properties by a Safety Factor of 2.0.			

The material properties listed above are for the structural wall or "Reinforced Wall" portion of the liner as defined by ASTM D3567, Section 7.3.2, 2017 version. All calculations are based on this reinforced wall thickness. For the purposes of contract compliance, the reinforced wall thickness shall be measured by the laboratory using the ASTM D3567 and evaluated per ASTM F2019. The average reinforced wall thickness must meet or exceed the project specifications. The "Surface Layer Thickness" as defined by ASTM D3567 Section 7.3.3 and "Nonreinforced Layers" per Section 7.3.4 shall be measured. Laboratory test reports must contain all information stated in Section 7.5 "Report". Section 7.1.3 of ASTM F2019 is revised to match Brown Book Section 500-1.4.4.8, such that only specimens meeting the approved minimum values shall be considered acceptable.

Initial hoop tensile strength is based on limited data from Ramtech Laboratories Report Number 3265, dated December 3, 2013. Please contact my staff if you wish to have this reevaluated.

Berolina-Liner must be installed per the conditions stated in the City of Los Angeles specification Section 02582 and the Deutsches Institut für Bautechnik (DIBt) Approval Number Z-42.3-336, latest version. If there is any conflict between the DIBt approval and City of Los Angeles specifications, the more stringent shall govern.

You may apply for another four-year extension of this approval 120 days before it expires. Please maintain a copy of this approval for your records. This letter will be required as part of a contractor's submittal package. If you have any questions, please contact (Alan) Chiu Tam at chiu.tam@lacity.org.

Sincerely,

(Alan) Chiu Tam, SE., LEED AP
Senior Structural Engineer
Wastewater Conveyance Engineering Division

Cc: John Calderon, Bureau of Contract Administration, Materials Control
Shirish Mistry, Bureau of Engineering, Structural Engineering Division

Recyclable and made from recycled waste.