

Certificate of Compliance

Certificate: 1620362

Master Contract: 249294

Project: 2327297

Date Issued: July 9, 2010

Issued to: Hyundai Engineering Plastics
Co., Ltd.
1233 Tong Jeong-Li, Seok Mun-Myun
Dang Jin-Gun
Chung Cheong Nam-Do, 343-856
South Korea
Attention: Chun-sik Jung

The products listed below are eligible to bear the CSA Mark shown



Kelly Yaremko

Issued by: Kelly Yaremko

PRODUCTS

CLASS 7621 01 - PLASTIC PIPE - Polyolefin Compounds

CLASS 7621 61 - PLASTIC PIPE Polyolefin Compounds - Evaluated to NSF/ANSI 61

Cross-linked Polyethylene (PEX) Compound for hot and cold water supply tubing:

- Polylink XP650 (Natural)

APPLICABLE REQUIREMENTS

CSA Standard B137.5-02 - Cross-linked Polyethylene (PEX) Tubing for Pressure Applications

ANSI/NSF-61-2003e - Drinking Water System Components - Health Effects



Supplement to Certificate of Compliance

Certificate: 1620362

Master Contract: 249294

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
2327297	July 9, 2010	Update certification to new submittor per file transfer (Proj 2295076)



Descriptive and Test Report

MASTER CONTRACT: 249294

REPORT: 1620362

PROJECT: 2327297

Edition 1: April 28, 2005; Project 1620362 - Toronto
Issued by S.A. Allidina, M.Eng., P.Eng.

Edition 2: July 9, 2010; Project 2327297 - Toronto
Issued by Kelly Yaremko

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PRODUCTS

CLASS 7621 01- PLASTICS - Polyolefin Compounds

- Cross-linked Polyethylene (PEX) Compound for hot and cold water supply tubing:
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APPLICABLE REQUIREMENTS

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ANSI/NSF-61-2003e - Drinking Water System Components - Health Effects

The test report shall not be reproduced, except in full, without the approval of CSA International.

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MARKINGS

The words "CSA CERTIFIED PEX COMPOUND" and/or the CSA Certification Mark (CSA monogram), with "B137.5", and "ANSI/NSF 61" may be applied to containers containing the Certified product.

Containers of this Certified product shall be marked with the product nomenclature, and a production code which identifies the date of manufacture.

The production code shall be sufficient to enable the relevant quality control data to be identified, and extracted if required.

ALTERATIONS

This report and certification applies only to the compound evaluated. No change in formulation, neither types, nor quantities of additives, is permitted. The substitution of alternate additive or of changes in quantities must be authorized by Canadian Standards Association, in writing, for the terms of the Certification to extend to such changes.

Tubing made from the compound to meet average degree of cross-linking of at least 70%.

FACTORY TESTS

There shall be adequate facilities for producing subsequent products identical to the listed products and provision for tests and inspection of components necessary to ensure uniform products. Quality Control test records shall be maintained and made available for review by CSA inspectors (see Appendix 1).

DESCRIPTION

Polylink XP650 (Natural) is composed of 95% Silane –grafted HDPE and 5% polyethylene based Catalyst masterbatch.

TEST REPORT

Testing was done under projects 1393906 and 1620362. Toxicological tests for compliance with NSF 61 were completed under project 1640862.

Lot 1 (Natural)

Sample: Tubing Size NPS 1/2

Toxicity - NSF 61: Satisfactory.

Density = 0.947 g/cc.

Environmental Stress Crack Resistance: Satisfactory.

Average degree of cross-linking (as received) = 68.8%.

Bent Tube Hydrostatic Pressure Strength: Hot Bending: Satisfactory. Cold Bending: Satisfactory.

Excessive Temperature and Pressure Capability (48h): Satisfactory

FTIR scan: RTN #5-2003-1009

LONG TERM HYDROSTATIC PRESSURE TEST

System: Water In/Air Out

Temperature: 82°C

Size: NPS ½ Commercially extruded PEX Tubing having DOC 68.8% as received

<u>Sample No</u>	<u>Fibre Stress</u> <u>psi</u>	<u>Failure Time</u> <u>hrs</u>	<u>Failure</u> <u>Type</u>
1	940	15.00	ductile
2	934	23.20	ductile
3	918	348.00	ductile
4	898	455.60	ductile
5	895	633.10	ductile
6	887	395.50	ductile
7	885	305.70	ductile
8	880	8566.23	ductile
9	873	12048.00	ductile
10	870	861.00	ductile
11	868	1200.10	ductile
12	853	12023.00	non-failure
13	849	41.50	ductile
14	846	12023.00	non-failure
15	843	12023.00	non-failure
16	837	3265.00	ductile
17	837	16006.00	non-failure
18	828	12018.00	non-failure

19823 12018.00non-failure
20823 12018.00non-failure

Regression Analysis (data as of August 30, 2004)

Number of points	=	20
Extrapolated Stress at 100,000 hrs	=	789 psi
Slope of Line	=	-43.80
Constant Term	=	131.90
Lower Confidence Valve (LCV)	=	736 psi
LCV as Percentage Extrapolated Stress	=	93.2%

Excluding last two non-failure points:

Number of points	=	18
Extrapolated Stress at 100,000 hrs	=	792 psi
Slope of Line	=	-45.17
Constant Term	=	135.95
Lower Confidence Valve (LCV)	=	721 psi
LCV as Percentage Extrapolated Stress	=	91.1%

Project 2327297

No tests were performed. Change in submittor ownership /address only.

APPENDIX A

MASTER CONTRACT: 218080
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Silane-grafted HDPE and PE based Catalyst masterbatch

There shall be adequate facilities for producing subsequent products identical to the product tested herein, and provision for tests and inspection to ensure continuing compliance with the requirements of the CSA Standard.

Certification of the products covered by this Report is contingent upon the following minimum Quality Control (QC) being exercised on the products under the direction of Mr. S.H. Lee (Korean Factory), Mr. H.D. Chun (Chinese Factory) (1).

Minimum QC Requirements (2), (3)

<u>Component</u>	<u>Property Tested</u>	<u>Frequency</u>	<u>Test Method</u>
Silane-grafted HDPE	M.I	5 hr	ASTM D1238
	Degree of Cross-Linking	12 hr	CSA B137.5
	Moisture Content	5 hr	SKTM-JC-002
	Black spot	5 hr	SKTM-JC-007
PE based Catalyst MB	M.I	5 hr	ASTM D1238
	Moisture Content	5 hr	SKTM-JC-002
	Black spot	5 hr	SKTM-JC-007

Notes:

- (1) If the QC supervisor is changed, CSA is to be informed and supplied with the name of the supervisor and his or her background as applicable to CSA Certification requirements. (*Note: Q.C. Supervisors report to Mr. M.S. Lee who is located in SK's research Center.*)
- (2) These minimum requirements are subject to review and modification as product requirements change or as additional experience is acquired. The quoted frequencies are for production under stable operating conditions. Testing during "start-up" periods must be more frequent.
- (3) Documented records covering the above tests must be maintained and made available for review by CSA inspectors.