

An-Najah National University

Department of Chemical Engineering

Graduation Project (2)

Modification of Hot Water Polyethylene Pipes

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To our parents, family, and friends.



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Abstract

Polyethylene is a versatile polymer used many applications, but because of its physical and mechanical properties, there are many restrictions to use it in certain fields or applications as transferring hot water in heating and plumping systems.

To overcome this problem polyethylene can be modified by cross-linking methods which are suitable to produce polyethylene pipes for such applications.

Cross-linking is spread in the whole world generally, and in Palestine particularly by Plastic Industrial Company Limited (PPIC) – LADAEN with a trade name PAL-PEX, however; the product has faced many problems such as: high selling price and bad repetition in some cases which affect adversely its market share pipes.

The aim of this project is to decrease the production cost of PAL-PEX pipes and to increase some of their properties required by standards. Different thermo plastic polymers were introduced into the blends.

It's noticed that cross linking percentage increases by increasing the percentages of two types of thermoplastics.

Also the effect of curing time (for 6 and 8 hours) was studied and observed that as curing time increases the cross linking percentage increases.

Another parameter was studied which is curing temperature (75, 85, 95°C) and as temperature increases the cross linking percentage increases.

For the samples prepared many standard tests were done, and they were acceptable according to the ISO (2505, 10147, 18553) such as cross linking, carbon distribution content and longitudinal reversion.



Table of content

| Content | Page number |
|---|-------------|
| Chapter 1 : Introduction | 1 |
| Chapter 2 : Cross- linked Poly Ethylene (PEX) | 4 |
| Chapter 3:Experimental Work | 10 |
| Chapter 4: Result and Discussion | 20 |
| Conclusion | 38 |
| Recommendation | 39 |
| References | 40 |



List of Tables:

| Table (2-1): Comparison between cross –linking methods. | 7 |
|--|----|
| Table (2.2): Comparison of Different Silane Cross-linking process. | 8 |
| Table (3.1A): Mechanical properties of poly-link HDPE. | 11 |
| Table (3-1B): physical properties of poly-link HDPE. | 11 |
| Table (3-2): physical properties of Catalyst used for hot water pipe. | 12 |
| Table (3-3): physical properties of Thermoplastic polymers. | 12 |
| Table (3-4): The original mixture. | 13 |
| Table (3-5): Blending with 10% of different thermoplastics (1, 2, and 3). | 13 |
| Table (3-6): Blending with 20% of different thermoplastics (1, 2, and 3). | 13 |
| Table (4-1): Standard Deviation of Diameter. | 21 |
| Table (4-2): percentage of cross-linking for samples cured by steam and | 21 |
| water for 8 hr. | |
| Table (4-3): Percentage of cross-linking for samples cured by water for 8 | 22 |
| and 6 hours at 95 °C. | |
| Table (4-4): Percentage of cross linking for samples cured by water for 6 | 22 |
| hours at 95, 85, 75 °C. | |
| Table (4-5): Weight of Meter for all samples. | 23 |
| Table (4-6): The horizontal test (curing 8 hour by using water 95 $^{\circ}$ C). | 23 |
| Table (4-7): The horizontal test (curing 6 hours by using water 95 $^{\circ}$ C). | 24 |
| Table (4-8): Results of horizontal test (curing 6 hour by using water 85 $^{\circ}$ C. | 24 |
| Table (4-9): Results of horizontal test (curing 6 hour by using water 75°C). | 24 |
| Table (4-10): the vertical test (curing 6 hour by using water @ 95° C). | 25 |
| Table (4-11): The vertical test (curing 6 hour by using water @95 $^{\circ}$ C). | 25 |
| Table (4-12): The vertical test (curing 6 hour by using water @ 85 $^{\circ}$ C). | 25 |
| Table (4-13): The vertical test (curing 6 hour by using water @t 75° C). | 26 |
| Table (4-14): Results of longitudinal Reversion test. | 26 |
| Table (4-15): Results of Carbon Distribution test | 27 |



List of Figures:

| Figure (2.1): Cross –linking methods. | 6 |
|--|----|
| Figure (3.1): Raw material. | 13 |
| Figure (3.3): Cooling by air at room temperature and pressure. | 14 |
| Figure (3.4): Cooling in water. | 16 |
| Figure (3.5): Cooling by air the second time. | 16 |
| Figure (3.6): Rolling of water. | 16 |
| Figure (3.7): Cutting the pipe. | 17 |
| Figure (3.8): Curing using hot water the pipe. | 17 |
| Figure (4.1): Percentage of cross-linking for samples cured by steam and | 28 |
| water for 8 hours. | |
| Figure (4.2): Percentage of cross-linking for samples cured by water for 8 and | 30 |
| 6 hours at 95 °C. | |
| Figure (4.3): Percentage of cross-linking for samples cured by water for 6 | 31 |
| hours at 95, 85, and 75 °C. | |
| Figure (4.4): Horizontal test for samples curing for 8 hour with using water @ | 32 |
| 95° C | |
| Figure (4.5): Horizontal Test for samples cured for 6 hours @ 95 $^{\circ}$ C | 33 |
| Figure (4.6): Horizontal test for samples cured for 6hours @ 85 $^{\circ}$ C | 33 |
| | |
| .Figure (4.7) : Horizontal Test for samples cured for 6hours @ 75 $^{\circ}$ C | 34 |
| Figure (4.8): The vertical test (curing 8 hour by using water @ 95 °C). | 35 |
| Figure (4.9): Vertical test for samples curing for 6 hour with using water | 35 |
| 95°C. | |
| Figure (4.10): Vertical test for samples curing for 6 hours with using water | 36 |
| 85°C. | |

