

Sudan University of Science and Technology
College of Postgraduate Studies

**Study of Pressure Drop and Losses in
Poly Propylene Pipes**

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لأنابيب البولي بروبيلين**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
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الآية

بِسْمِ اللَّهِ الْعَزِيزِ الْحَمِيدِ
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ الْعِزُّ الْحَمِيدُ
مَا لَكَ يَوْمَ الدِّينِ أَيَاكَ نَعْبُدُ وَإِيَّاكَ
نَسْتَعِينُ اهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ صِرَاطَ
الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ غَيْرِ الْمَغْضُوبِ
عَلَيْهِمْ وَلَا الضَّالِّينَ

Dedicateion

To our parents with all our love

To our sisters

, our brothers

& our teachers who help us...

To our colleagues....

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I would like to express my gratitude to Dr . Arman Mohammed Abdalla , my advisor , for his constant guidance and constructive criticism which have helped me to accomplish this work and improve my technical abilities.

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ABSTRACT

While transporting liquid in pipes, energy loss due to friction between pipe wall and liquid molecules all through the pipe and also with the sudden change in flow direction which happen because different fluid tools such as elbows and vulves.

This work deals with finding coefficient of energy losses for PPR pipes locally manufactured and adopted by the design of the experimentally form which has two branches A , B.

Branch A consist of 16 elbows and was intended to account minor losses, and the value which was obtained is $K=29.32$.

Branch B consist of 16 elbows and 8.5 meter from the length of the pipe in order to obtain the experimental friction factor $k=.03$

. B was intended to get the major losses to the length of the pipe using the values of branch A

The experimental friction factor has been used to find the pipe roughness which equal $=0.004$.This roughness has been confirmed using the equations from the references.

المستخلص

عند انتقال السوائل خلال المواسير يحدث فاقد في الطاقة نتيجة الاحتكاك بين سطح الماسورة وجزيئات السائل علي طول الانبوب وكذلك عند التغير المفاجئ في اتجاه السريان الناتج عن مختلف الادوات الاخرى لانتقال الموائع مثل الاكواع والبلوفة .

يتناول هذا العمل ايجاد معامل فاقد الطاقة لمواسير ppr المصنعة محليا واعتمد تصميم نموذج عملي يتكون من فرعين A,B .

الفرع A يتكون من 16 كوع وكان الهدف منه حساب الفقدوات الصغرى للكوع الواحد وتم الحصول علي قيمة $K=29.32$, اما الفرع B فيتكون من 16 كوع وطول 8.5m من الماسورة ويهدف للحصول علي الفقدوات الكبرى لطول الماسورة بغرض الحصول علي معامل الاحتكاك العملي لجدار الماسورة وكان 03.

استخدم معامل الاحتكاك العملي لاجاد خشونة الماسورة بناحية عكسية والتي كانت 004. كما تم التأكد من هذه الخشونة بواسطة المعادلات التجريبية في المراجع .

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List of Symbols and abbreviations

Symbol	Description
μ	Viscosity of fluid
h_f	Frictional head loss
h_m	Major head loss
H_L	Head loss
ρ	Density
G	Acceleration due to gravity
Q	Volumetric flow rate
H	Efficiency
ε	the pipe roughness
V	Velocity of fluid
A	Cross-sectional area of pipe.
D	Internal diameter of pipe
F	Frictional factor
Re	Reynolds number
L_e	is the equivalent length
L_e/D	ratio for different devices
ε/D	Relative surface roughness