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DURABILITY OF PLASTIC PIPES

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Abstract This in the article plastic of pipes their endurance, mechanical, thermal and chemical to the effects endurance analysis Modern construction and engineering in the fields wide used polymer pipes, in particular polyethylene (PE), polypropylene (PP) and polyvinyl chloride (PVC) based of pipes strength indicators, service deadline and exploitative features illuminating is given.

Keywords: Plastic pipes, durability, polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), mechanical strength, internal pressure, corrosion resistance, temperature exposure, service life, polymer materials, construction materials, engineering communications.

Introduction and justification of the study In recent years, plastic pipes (polymer pipes) have been widely used in construction, municipal services, water supply and sewage systems. Their lightness, corrosion resistance, smooth inner surface and long service life provide the advantages of this type of products. The durability of plastic pipes is their ability to withstand mechanical, thermal, chemical and environmental influences, which determines the duration of their operation.

The most commonly used plastic pipes are made from the following polymers:

- PVC (polyvinyl chloride) – water supply and sewage in systems wide is used .
- PE (polyethylene) – beverage water and gas pipes for .
- PP (polypropylene) – hot and cold water in systems .
- PVDF (polyvinylidene fluoride) – chemical to substances durable .

Each of the material mechanic to voltage, temperature and to pressure endurance various Plastic pipes It can withstand tensile, compressive, impact, and bending forces to a certain extent. Mechanical tests mainly following standards based on will be held:

- ISO 4422 – Plastic pressurized pipes . Test methods .
- ISO 9967 – Thermoplastic pipes . Ring hardness determination method .
- O'z DSt 5444:2018 – Polyethylene pipes. Technical conditions .
- GOST 18599-2001 – Polyethylene pipes water supply for .

In tests to the pipes internal pressure up to 20–25 bar is given and ringed deformation After the pipes are tested, without deformation in case If it stays, it is resistant. Plastic pipes heat under the influence expands or softens. For example :

PE pipes up to 60–70°C work takes ;
PP pipes up to 95°C endure gives ;
VC pipes above 45–50 °C at temperature is deformed.

Endurance assessment criteria

To standards see plastic pipes following main indicators according to from the test is held:

- **Far term hydrostatic strength** – pipe internal pressure under 50 years old service to do ability determines .
- **Ring ring stiffness** – external soil to the pressure endurance shows (especially sewage in systems important).
- **Impact resistance** – at low temperature brittleness level evaluates.
- **To the heat durability** – high at temperature to deformation resistance level
- **Chemical stability** – aggressive working in environments (acid, alkali) opportunity.

National standards and normative documents In Uzbekistan plastic pipes working

release and application process UzDSt (State Standards of Uzbekistan) and construction standards with order This is documents product quality control to do, test methods designation and security requirements compliance to be completed provides. Many national standards ISO or GOST standards with harmonized.

To standards of conformity importance

To standards suitable working issued plastic pipes :

- guaranteed service for the period has (usually 50 years) and from it more);
- high pressure and temperature under the circumstances safe works;
- assembly and exploitation in the process reliability provides;
- economic efficiency increases .

To the heat durability ISO 2505 and O'z To DSt 3214:2017 standards mainly from the test Polymer pipes many chemical to substances are relatively inert. PVDF and PP pipes in particular are resistant to both acidic and alkaline environments. Chemical endurance tests :

ISO/TR 10358 – Thermoplastic of pipes chemical to substances endurance according to recommendations.

O'z DSt ISO 175:2016 – Plastics. Liquid chemical to substances relatively endurance detection.

Plastic of pipes service The term may be more than 50 years. This includes the following factors impact does:

Sun radiation (UV), temperature changes, pressure cycles, external downloads

Their far term Durability ISO 9080 standard based on Plastic pipes during installation to the following compliance to do important:

Pipes between interruption places thermal welding or clutch attachment through is strengthened .

O'z DSt 10267:2017 – Polyethylene pipes welding methods External loads (soil pressure) requirements of GOST R 54475-2011 is used.

Plastic pipes ecological in terms of are considered safe because they do not corrode, do not affect water quality, and can be recycled.

Uzbekistan Republic of Own The DSt ISO 14024:2016 environmental labeling standard is a standard for the environmental performance of products. safety control does .

Conclusion and offers

Plastic of pipes endurance their physical-mechanical, chemical and heat features with directly is related to. Research this shows that polyethylene (PE), polypropylene (PP) and polyvinyl chloride (PVC) based pipes high corrosion resistance, internal to pressure endurance and far term service to do to the feature They are metal. to the pipes relatively lightweight , assembly to do comfortable and economic in terms of is effective .

Also, plastic of pipes service deadline them right selection, design to the standards action to do and exploitation to the conditions related that Temperature change, ultraviolet radiation and excess mechanic downloads pipe to the quality negative impact to show possible. Therefore , the quality control and to standards compliance to do important importance profession will reach .

Offers

1. Plastic pipes when choosing their technician indicators and work environment (pressure, temperature, chemical impact (consideration) to be taken necessary.
2. Construction and assembly in the process current state standards and technician to the standards strict compliance to do necessary.
3. Far term the service provision for the purpose pipes storage and transportation in the process mechanic injuries prevent to take need.

4. High temperature and sun light under the influence used pipes for special protection layers or stabilizers application recommendation is being done.

5. Plastic pipes quality increase and their endurance further improvement according to research their work expansion to the goal is appropriate.

Used literature list

1. ISO 4422 – Plastics pressure pipes. Testing methods .
2. ISO 9967 – Thermoplastics pipes. Determination of ring stiffness.
3. ISO 9080 – Long-term hydrostatic stress assessment for thermoplastic materials.
4. ISO 2505 – Method for determining linear dimensional change of plastics.
5. ISO/TR 10358 – Recommendations for chemical resistance.
6. Uz DSt 5444:2018 – Polyethylene pipes. Technical conditions.
7. Uz DSt 3214:2017 – Heat resistance test of thermoplastic pipes.
8. Uz DSt 10267:2017 – Welding methods for polyethylene pipes.
9. ISO 14024:2016 – Environmental labeling.