STANDING TECHNICAL COUNCIL FOR CONSTRUCTION

Specialized Group no. 5: 'Products, processes and equipment for installations related to the construction of: heating, air conditioning, ventilation, sanitary, gas, electrical systems' within the Research Institute for Construction Equipment and Technology ICECON S.A., after reviewing the documentation for requesting technical approval submitted by the company S.C. TE-MA ROMÂNIA S.R.L. and registered under no. 21.01.038.016 dated 26.01.2021, referring to " MULTILAYER PPR PIPES WITH DIAMETERS: 20, 25, 32, 40, 50 AND 63 mm, WITH THE TRADE NAME STRONG PIPES", hereby issues the present TECHNICAL APPROVAL no. 016-05/3856-2021, in compliance with the Romanian technical documents related to the reference field valid on this date.

1. Brief definition

1.1. Brief description

The range of multilayer PPR pipes (isotactic cross-linked polypropylene) with the trade name STRONG PIPES is manufactured by the company TE-MA ROMÂNIA S.R.L., on the automated manufacturing line.

The multilayer pipes consist of 2 inside and outside layers of white PPR and an intermediate layer of red composite material, consisting of polypropylene and fiberglass. The range of pipes includes the nominal diameters of 20, 25, 32, 40, 50 and 63 mm. For SDR 7.4 pipes, the nominal pressure is 20 bar and for SDR 6 pipes, the nominal pressure is 25 bar.

The standard delivery length is 4m and other dimensions can be made on request, as well.

The products are presented in Chapter 4 – Annexes of this agreement.

1.1. Identification of products

The pipes shall be individually encoded by automatic printing on manufacture, with a distinctive colour, indicating:
- manufacturer's name and brand;
- manufacturing line code;
- batch number and manufacturing date;
- technical characteristics of the product (nominal diameter, composition of the layers - PPR/GF/PPR, nominal pressure, maximum temperature of the heat agent, etc.).

The packaging of the products is customized and labelled and the following information is specified on the labels:
- manufacturer's name and brand;
- number of manufacturing batch;
- data on type, dimensions, quantity and length;
- manufacturing line code.

The delivery of the products will be accompanied by the Sanitary Permit, declaration of conformity and storage instructions, transport and commissioning, in the Romanian language.

2. Technical Approval

2.1. Accepted field of use in construction

According to the manufacturer's documentation and after ICECON S.A. has performed the laboratory tests, it is specified that the multilayer PPR pipes can be used to make:

- *installations for the supply of cold water/ hot water (drinking water);*
- *heating installations inside buildings.*

For drinking water supply installations where pipes come into direct contact with water, the holder of the technical approval must hold a Sanitary Permit released in compliance with the regulations issued by the Ministry of Health.

2.2. Product ratings

2.2.1. Ability to operate in constructions

In compliance with the technical data contained in the TECHNICAL FILE and ICECON controls, the products subject to this technical approval have performances corresponding to the field of use presented in section 2.1 and the 7 fundamental requirements established by Law 10/1995 on quality in constructions, republished, with subsequent amendments and completions, as follows:

- ***Mechanical strength and stability***

Multilayer PPR pipes, reinforced with fiberglass in the intermediate layer, give the products mechanical strength, corrosion resistance and stability under normal operating conditions.

- ***Fire safety***

No tests have been carried out to determine the performances to fire reaction.

- ***Hygiene, health and environment***

PPR/GF/PPR pipes do not pose a danger to the environment or to the health of the population when used under normal conditions.

The products meet the conditions stipulated by the legislation in the field, namely: Law on Occupational Safety and Health no. 319/2006 (amended by Law no. 198/2018), Environmental Protection Law no. 265/2006, with subsequent amendments and additions, Law on waste regime no. 211/2011 (republished in 2014), Law on insurance for work accidents and occupational diseases no. 346/2002 (amended by G.E.O. no. 103/2017), Hygiene and public health rules on the living environment of the population, published in the WHO no. 119/2014 (amended by WHO no. 994/2018), WHO no. 275/2012 on the approval of the 'Sanitary regulatory procedure for the placing on the market of products, materials, chemicals / mixtures and equipment used in contact with drinking water'.

For this purpose, the components of the materials from which the products are made do not contain carcinogenic or potentially toxic substances, harmful to human health or the integrity of the environment.

After commissioning, any debris and/or packaging will not be thrown into the water or sewers.

- ***Safety and accessibility in operation***

The products do not present the risk of accidents when used under normal operating conditions, they do not corrode or change their properties in contact with water.

The products installed do not create risks of injury to the users, if the intended field of use are observed.

- ***Protection against noise***

Products do not affect this requirement.

- ***Energy saving and thermal insulation***

It is provided a lower production energy consumption than that for the manufacture of classical metal installations.

The pipes are thermally insulated to avoid condensation for cold water installations or against heat loss in the case of hot water and heating installations.

- ***Sustainable use of natural resources***

Both waste and finished products can be recycled.

It is applied pursuant to Law no. 10/1995 on quality in constructions, republished, with subsequent amendments and completions.

2.2.2. Durability (reliability) and maintenance of the product

The solutions adopted in the design of the STRONG PIPES multilayer pipes, the quality of the materials used in the manufacture of the products, as well as the production control allow the manufacture of products with a high durability of 50 years, without any special maintenance measures.

The guarantee granted by the manufacturer is 2 years from the date of delivery, according to the regulations in force.

2.2.3. Manufacture and control

The multilayer PPR pipes (cross-linked polypropylene) with the trade name STRONG PIPES are manufactured by the company TE-MA ROMÂNIA S.R.L., on automated manufacturing lines.

S.C. TE-MA ROMÂNIA S.R.L. has certified the Quality Management System according to the requirements of the SR EN ISO 9001:2015 standard, certificate no. 11937, issued by SRAC CERT S.R.L., 14 Vasile Pârvan street, first district, Bucharest, Romania (valid until 20.10.2022).

The inner and outer layers of the STRONG PIPES multilayer pipes are made of cross-linked polypropylene PPR 100 (LyondellBasell – Hostalen PP H5416; Sabic Vestolen P 9421), colored with white pigment in the proportion of 1-1.5%. The intermediate layer consists of a mixture of 20% fiberglass with cross-linked polypropylene PPR 100 (SABIC PPcompound G 1620B) and 1-1.5% red pigment (if applicable, any other color). The raw material delivered in the form of granules feeds the automatic extrusion line. The obtained pipes are cut, stacked automatically, checked, packaged in customized foils and labeled.

Pipes with the following characteristics are being manufactured:
- SDR 7.4 (PN 20 bar) with Dn 20, 25, 32, 40, 50 and 63 mm, wall thicknesses 2.8÷9.6 mm;
- SDR 6 (PN 25 bar) with Dn 20, 25, 32, 40, 50 and 63 mm, wall thicknesses 3.4÷11.7 mm.

The maximum operating pressures and temperatures are compliant with the PN, SDR and the classes of use declared by the manufacturer, but not exceeding 80 °C.

The constant quality of the products is ensured and guaranteed by the manufacturing company that checks the following, by internal control:
- appearance, by visual inspection. The pipes must be free from traces, scratches, deformations, they must be uniform

colours, without colourless portions or without being excessively coloured;
- dimensions, by measuring the diameter, of the wall thickness, the thickness of the pipe layers and the length of the cut segments.

2.2.4. Commissioning

The commissioning of the pipes is carried out in compliance with the assembly instructions provided by the manufacturer and in compliance with the provisions of the technical regulations I 9-2015, I 13-2015 and NP 084-2003.

The joining between the pipes is made by welding (junction), in compliance with the manufacturer's working instructions and the parameters indicated by it (insertion depth, heating time, cooling time).

Welds will not be performed at ambient temperatures below 5 °C.

For the surface assembly of the pipes, the coefficient of thermal expansion shall be taken into account.

The assembly operations must be performed only by qualified, experienced persons and in compliance with the installation instructions prepared by the manufacturer in compliance with the requirements of the Romanian regulations in force.

After the assembly is finished, the pressure and tightness tests are performed, under the conditions indicated by the regulations I 9-2015 and I 13-2015.

2.3. Technical specifications book

2.3.1 Conceptual phase

When elaborating the manufacturing technology, it was taken into account the obtaining and constant preservation of the properties and characteristics of the products. In this respect, the quality checking rules declared by the manufacturer in the Quality Management System will be observed.

The performance of the products are adequate for the intended use, based on the satisfaction of the fundamental requirements applicable to the construction in which the products are to be used, pursuant to the provisions of Law no. 10/1995 on quality in constructions, republished, with subsequent amendments and additions.

2.3.2. Manufacturing conditions

The constancy of the quality of the STRONG PIPES products is ensured and guaranteed by the manufacturer through its internal and external control, according to the execution procedures related to the Quality Management System of the company TE-MA ROMÂNIA S.R.L.

2.3.3. Delivery terms

PPR pipes are delivered in the form of bars with lengths of 4 m packed in polyethylene sheet, the number of pipes varying depending on the diameter.

On delivery, the products must be accompanied by:
- Sanitary Permit issued in compliance with the regulations issued by the Ministry of Health;
- declaration of conformity of the supplier, along with the Technical Approval issued for these products, according to SR EN ISO/CEI 17050-1:2010 standards 'Conformity assessment. Supplier's declaration of conformity. Part 1: General requirements' and SR EN ISO/IEC 17050-2:2005 -'Conformity assessment. Supplier's declaration of conformity. Part 2: Supporting documentation';

- instructions for use, transport, storage and commissioning, in the Romanian language.

2.3.4. Conditions for commissioning

Commissioning of the products which are subject to this technical approval shall be carried out in compliance with the manufacturer's prescriptions and the following technical regulations:

- *I 9-2015 'Regulation regarding the design, execution and operation of installations related to buildings';*
- *I 13-2015 'Regulation for the design, execution and operation of central heating installations';*
- *NP 084-2003 'Regulation for the design, execution and operation of sanitary installations, as well as water supply and sewerage systems using plastic pipes'.*

The following technical regulations shall also be taken into account upon commissioning:

- *C 56-1985 'Regulation for quality control and acceptance of construction works and related installations';*
- *C300-94 'Regulation for fire prevention and extinguishing during the execution of construction works and installations related thereof'.*

Conclusions

Overall assessment

*The use of the products 'MULTILAYER PPR PIPES WITH DIAMETERS: 20, 25, 32, 40, 50 AND 63 mm, WITH THE TRADE NAME STRONG PIPES' in the accepted fields of use is **assessed favorably**, under the specific conditions in Romania if the provisions of this technical approval are observed.*

For the use in contact with drinking water of the pipes, the holder must possess a sanitary permit issued by the National Institute of Public Health, in compliance with the regulations issued by the Ministry of Health.

Requirements

- *The quality of the products covered by this technical approval has been checked and found compliant by ICECON S.A. and must be maintained to this standard throughout the validity of this approval.*
- *By granting this approval, the Standing Technical Council for Construction does not get involved in the presence and/or absence of legal rights of the company to sell, assembly or maintain the product.*
- *Any recommendation for the safe use of these products, which is contained in, or relates to such technical approval shall be the minimum requirements necessary for their commissioning.*
- *ICECON is responsible for the accuracy of the data entered in the Technical Approval and for the tests that formed the basis of such data.*
- *The Technical Approval does not absolve the suppliers and/or the users of their responsibilities according to the legal technical regulations in force.*
- *Checking the maintenance of the ability to use the products will be carried out based on the schedule established by ICECON S.A. and will consist of:*

- checking the preservation of geometrical characteristics (inner and outer diameter of the pipe, thickness of the pipe wall) and mechanical (breaking resistance and elongation, resistance to hydrostatic pressure, dimensional stability, impact strength) for the products subject to this technical approval, 24 months after the issuance of the Technical Approval, the results being presented in a technical report.

- checking the conditions of behavior in operation and presentation of references for at least 3 constructions for which these products have been used in Romania, 24 months after the issuance of the Technical Approval.

- *The actions included in the program and their way of implementation will comply with the legislative acts and technical regulations in force.*
- *ICECON S.A. will inform the Standing Technical Council for Construction about the result of the controls and, if they do not prove the maintenance of the ability to use, it will request MDLPA to cancel the technical approval.*
- *Cancellation of the approval will also be made in case of finding, by controls, carried out by market surveillance bodies, of the non-compliance with the constant maintenance of the requirements of manufacture and use of the products.*
- *If the holder of the technical approval does not comply with the provisions of this technical approval, ICECON S.A. will request the withdrawal of the technical approval and the cancellation from the MDLPA database.*

Technical approvals drawn up previously:

Validity: *22.07.2024*

The extension of the validity of the technical opinion/approval must be requested at least three months before its expiry date.
In case of non-extension of the validity of the technical opinion, the technical approval shall be cancelled by itself.
The amendment/extension of the technical approval will be made in compliance with the original validity term.

For specialized group no. 5
President
Eng. Cătălin Zaharia

President –General Manager
Honoured PhD Prof. Eng,
Polidor BRATU
Permanent Member of the Academy of Technical Sciences in Romania

3. Complementary remarks of the specialized group no. 5

On 25.02.2021, a team of specialists from ICECON S.A. - Bucharest performed an audit at the production unit of S.C. TE-MA ROMÂNIA S.R.L. and checked the technical capacity of the manufacturer in terms of quality assurance for the products that are subject to this Technical Approval, finding the fulfillment of the minimum mandatory requirements for the products subject to approval.

The controls carried out by the ICECON-TEST Laboratory confirm the main characteristics declared by the manufacturer for these products.

The products covered by this technical approval have appropriate characteristics for their use in constructions, in compliance with the data contained in the TECHNICAL FILE.

During the validity of this technical approval, the holder of the technical approval, namely the company S.C. TE-MA ROMÂNIA S.R.L. is required to ensure the monitoring of the behavior in operation of the approved product and the data, as well as the results obtained are to be presented to the developer of the technical approval, in order to conclude on the behavior in time of the products.

Any change in the manufacturing technology, of introducing new raw materials and materials, shall be notified to the developer of the technical approval to be taken into account and shall be requested by the holder of the technical approval to extend/modify the technical approval.

The Technical Approval is a neutral document, prepared by a body neutral towards the manufacturer.

The characteristics of the products checked by laboratory tests are set out below in Table No. 1 in the form of the synthesis of test reports.

Summary of test reports

Table no. 1

Crt. No.	***Characteristic***	***Test method***	***M.U.***	***Value***		***Performer***
				Reference levels	***Average performance achieved***	
0	*1*	*2*	*3*	*4*	*5*	*6*
Multilayer PPR/GF/PPR pipes, with a nominal diameter of 20 mm						
1	*Pipe inner diameter*	*SR EN ISO 15874-2*	*mm*	*13,8÷14,7*	*14,1*	*ICECON-TEST Laboratory*
2	*Pipe outer diameter*		*mm*	*20,2÷20,3*	*20,3*	*ICECON-TEST Laboratory*
3	*Pipe wall thickness*		*mm*	*2,8÷3,2*	*3,2*	*ICECON-TEST Laboratory*
4	*Density*	*SR EN ISO 1183-1*	*g/cm^3*	*0,91*	*0,91*	*ICECON-TEST Laboratory*
5	*Breaking strength*	*SR EN ISO 6259-1*	*MPa*	*20*	*22*	*ICECON-TEST Laboratory*
6	*Breaking elongation*		*%*	*600*	*1153*	*ICECON-TEST Laboratory*
7	*Resistance to hydrostatic pressure for 1 h at 20 °C, water-in-air method*	*SR EN ISO 15874-2*	*bar*	*20*	*56*	*ICECON-TEST Laboratory*
8	*Dimensional stability at 135 °C*	*SR EN ISO 2505*	*%*	*≤ 2*	*0,7*	*ICECON-TEST Laboratory*
9	*Impact strength at temperature of 0 °C*	*ISO 9854-1*	*%*	*< 10*	*0*	*ICECON-TEST Laboratory*

- Specialized group no. 5 of ICECON S.A. acquires the results obtained at the tests performed by ICECON-TEST Laboratory within ICECON S.A.

4. Annexes

4.1 Presentation of products

Fig. 1 - Multilayer PPR pipes with trade name STRONG PIPES

Fig. 2 – Pipes packed and labelled

4.2 Excerpts from the minutes dated 05.03.2021 of the deliberation meeting of the Specialized Group no. 5

Specialized group no. 5: 'Products, processes and equipment for installations related to the construction of: heating, air conditioning, ventilation, sanitary, gas, electrical systems' consisting of:

- *President:Eng. Cătălin Zaharia*
- *Rapporteur: EngD Oana Tonciu*
- *Members: EngD Reader Ovidiu Vasile*
  Eng. Marinela Ghiţă

*Following the review of the application for technical approval no. 21.01.038.016 of 26.01.2021, regarding '**MULTILAYER PPR PIPES WITH DIAMETERS: 20, 25, 32, 40, 50 AND 63 mm, WITH THE TRADE NAME STRONG PIPES**' performed by the company TE-MA ROMÂNIA, along with the technical documentation provided by the beneficiary, Specialized Group no. 5 proposes:*

*- approval of the issuance of technical approval no. 016-05/3856-2021, for '**MULTILAYER PPR PIPES WITH DIAMETERS: 20, 25, 32, 40, 50 AND 63 mm, WITH THE TRADE NAME STRONG PIPES**' with a validity term until 23.03.2024, in the areas of use referred to in section 2.1 of the agreement.*

- ***Holders of the technical approval:*** *-*
- ***Technical file of technical approval no. 016-05/3856-2021 containing 50 tabs, is an integral part of this technical approval.***

Rapporteur of the specialized group no. 5: *EngD Oana Tonciu*

Members of the specialized group: *EngD Reader Ovidiu Vasile*
Eng. Marinela Ghiţă