

PIPES & FITTINGS MARKET RUSSIA 2019

(DEMO-VERSION)*

* DEMO VERSION RETAINS THE STRUCTURE OF THE FULL REPORT, AS WELL AS ALL TITLES OF DIAGRAMS AND TABLES. FACTORIES, BRANDS AND SUPPLIERS MENTIONED IN THE REPORT ALSO RESERVED. ALL SORTED ALPHABETICALLY, TEXT SUBSTITUTE A, B, C, D; NUMBERS – 0,1. THE METHODOLOGY OF RESEARCH IS AVAILABLE IN THE FIRST CHAPTER.

Multi-client research

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1. METHODOLOGY

1.1. INFORMATION SOURCES

The study was performed on the basis of the following information sources:

- **CUSTOMS DECLARATION ANALYSIS**

The information obtained as a result of the customs declaration analysis becomes more reliable from year to year. To find out the market trends, its key tendencies, and the main players there was made the detailed analysis of the customs declarations for 2008-2019. It is worth mentioning that in 2008-2011 it was only possible to make the analysis on the basis of the front pages of declarations. Starting from 2012 we got a possibility to get information contained in extra pages of customs declarations. This made the obtained information more reliable and allowed us to identify pipes by models. As practice shows the difference between the customs data and the real import volume figures is not more than 5-10%. However, we noticed a great difference between the data stated by manufacturers and the data obtained from the customs declarations. In most cases this can be contributed to the fact that Russian customs brokers (deliberately or not) often declare goods under wrong headings. For example, metalplastic pipes are often declared as polypropylene ones and vice versa. The fact that some declarations do not contain the brand name or contain non-existent manufacturing plants also creates some difficulties. Moreover, the customs codes intended for certain groups of products are often mixed up and many importers do not strictly follow the rules for drawing up customs declarations. In the course of interviews with manufacturers and importers we managed to clarify this situation and to identify the real volume of imported products.

Since 2011 we managed to identify more than 90% of imported products by models. This allowed us to spread out pipes and pipeline fittings by types, sizes, technologies, reinforcing types and etc. In view of the fact that the weight of declared goods is the most reliable information in customs declarations, we managed to identify the average weight of pipes and pipeline fittings. This helped us to exclude from consideration the mentioned above customs declarations containing unreliable information.

Under a lack of information from local manufacturers their product identification by models was made on the basis of their export analysis. It is also worth mentioning that most local manufacturers use imported parts and raw materials for manufacturing both pipes and pipeline fittings. We have analyzed the volume of this import for the biggest local manufacturers for the whole period reviewed in the report and presented the results of this analysis in the report.

- **ROSSTAT DATA**

Some information on a number of the biggest local manufacturers was obtained from Rosstat. In a number of cases this was the only possible source of information. In the course of interviews with the representatives of leading companies we manage to confirm the adequacy of these data and to enhance their reliability in details.

- **INTERVIEWS WITH MANUFACTURERS AND IMPORTERS**

Whatever customs information is correct, it should be completed with the data obtained from the equipment distributors and manufacturers. During this report preparation there were conducted interviews with many Russian manufacturers, representatives offices of foreign companies and large importers.

TABLE 1. Information sources

	Russian manufacturers	Sales offices of foreign companies	Distributors	Total
Interviews	13	4	6	23

Source: Litvinchuk Marketing Co.

1.2. TERMINOLOGY USED IN THE REPORT

This report covers the most interesting and capacious market segments of pipes and pipeline fittings used for heating and water supply systems. This report includes EXCLUSIVELY pipes and pipeline fittings intended for domestic systems.

This report does not cover major pipelines and subsurface thermally insulated cross-linked polyethylene pipes systems.

This report covers the following segments:

- polypropylene pipes
- metalplastic pipes
- cross-linked polyethylene pipes
- polybutene pipes

All the segments include both pipes and their fittings. According to Wikipedia a fitting is used to connect pipe sections to adapt to different sizes or shapes. The only exception was made for polyethylene fittings which also include polypropylene filters, shutoff and control valves, as well as attachment, clamping and supporting devices. We did it deliberately as these elements are integral parts of pipeline systems and intended exclusively for polypropylene pipes. At that brass and steel filters, as well as ball plug valves can be used for both the pipe segments considered in the report and steel, cast-iron, PVC, PE and other pipe segments. And our research does not cover this equipment.

Below we provide the terminology used in the report and definitions of terms to be sure in their unambiguous interpretation.

Polypropylene pipes - the **pipes** made of Random copolymer polypropylene PPR-C (Type 3). This material obtained as a result of reaction to polymerization of propylene and ethylene taken in certain proportions with a chain of ethylene molecules ensures the main physical and chemical properties of pipes and fittings made of this material. The pipelines made of polypropylene do not rust and rot, as well as do not change the taste and chemical properties of flowing liquid.

These polypropylene pipes are mainly applied in heating, cool and hot water supply systems.

These polypropylene pipes have the following advantages:

- reliability and durability
- complete lack of corrosion and encrustation of pipes in the course of their use
- a wide range of fittings allows to install practically any scheme of pipes
- simple and rapid installation, a lack of consumables
- full leak resistance of welds
- high chemical durability and environmental friendliness of pipes
- lower (as compared to metal pipes) level of liquid flow
- pipe painting is not required
- resistant to several cycles of freezing in case of pressure

Polypropylene pipes also have disadvantages:

- pipe inflexibility (as compared to metalplastic and PEX pipes)



Picture 1. Polypropylene pipes and fittings

- high cost due to greater amount of fittings required for 1 m of pipes
- installation requires special skills and a special kit of instruments for pipe welding and dressing
- high linear expansion coefficient of unreinforced pipes
- a risk of bubble formation on externally reinforced pipes, which, however, does not have a great effect on their technical characteristics

At present time polypropylene pipes are manufactured of two main types of material - PPR80 and PP-RCT. The main advantage of the latter material is that it ensures higher conveying capacity of pipes, their durability at high temperatures and lower weight.

At the moment manufacturers produce five types of pipes:

- PN10 - for cold-water supply;
- PN16 - for cold-water supply and under floor heating;
- PN20 - for hot and cold-water supply;
- PN25 - for heating, for hot and cold-water supply;
- PN32 - for heating, for hot and cold-water supply.

At that PN32 pipe is only produced by one manufacturer (Dizayn), PN16 pipes are not practically used most likely because of their short service life.

Estimated pipeline service life is 50 years (cold water) and 25 years (hot water). Coolant temperature can reach 95 ° C, depending on working pressure. Short-term increase in temperature up to 100 ° C is also possible.

Metalplastic pipes represent a multilayer structure consisting of inner and outer layers of **cross-linked** polyethylene and an intermediate layer made of aluminium. Unlike other polymer pipes metalplastic pipes have 100% protection from oxygen entry into system. An inner cross-linked polyethylene layer of a metalplastic pipe has a smooth surface that reduces water friction in water supply and heating systems. This prevents pipes from getting lime scale and rust formation. Inner and outer cross-linked polyethylene layers provide the aluminium layer of metalplastic pipes with protection from acids, alkalies, moisture and other aggressive environments. This ensures a long-term service life of metalplastic pipes.

At the moment manufacturers produce three main types of metalplastic pipes with inner and outer layers made of different materials:

- **PEX-AL-PEX** - **five-layer** pipes with inner and outer layers made of molecular **cross-linked** polyethylene **PEX**, a reinforcing aluminium layer and glue lines between them.
- **PERT-AL-PERT** - **five-layer** pipes with inner and outer layers made of **heat-proof** polyethylene **PE-RT**, a reinforcing aluminium layer and glue lines between them. The specific feature of PE-RT (ethylene octene copolymer) material molecular structure is that the main linear ethylene chain interweaves with the octane chain and forms a very flexible hard-textured material having a long-term service life.
- **PERT-AL-PEHD** pipes differ from **PERT-AL-PERT** pipes with outer pipe layer material. In this case the outer layer is made of high density polyethylene (PE-HD).
- **PEX-AL-PERT** – like all of the above types of pipes, they are five-layer pipes. In this case, the pipe differs from traditional PEX-AL-PEX by an outer layer made of high-resistance polyethylene PE-RT. This technology is used in the Russian market only by the one producer.

In this report we did not make any differences between PERT-AL-PEHD and PERT-AL-PERT pipes as we did not consider them to be significant.

In most cases metalplastic pipes are used together with crimping and press-fittings. Crimping fittings represent rubber-sealed collet connections packed by a special ring with the use of an ordinary screw key. This type of fittings has both advantages (do not require special instrument) and disadvantages (such fittings require regular examination to avoid leakages and the relevant adjusting; they can not be used for pipes laid in walls and under floor). Press fittings do not have such disadvantages, however they are more expensive and require special press pneumatic instrument.

The advantages of plastic pipes are as follows:

- chemical resistance
- complete absence of corrosion and encrustation of the pipe flow area while in operation
- low thermal conductivity which prevents condensate formation on the outer pipe walls
- light weight
- strength and elasticity
- low cost (This being the case, fittings can hardly be called cheap).

Disadvantages:

- Metalplastic pipes must not be installed at air temperatures below +10 C.
- Freezing of heat transfer media simply results in pipe breakage which makes open-cut pipe laying impossible.
- high thermal-expansion coefficient (intended for use in water supply systems at a maximum water operating temperature of 95C)



Picture 2. Metalplastic pipes

Metalplastic pipes are used in heating systems and hot and cold water supply systems as well as in floor heating systems.

Cross-linked polyethylene pipes can be divided into two classes: **PE-X** and **PE-RT**

PEX-pipes are made of HDPE by chemical cross linkage of molecules making pipes acquire properties necessary for use in heating systems and water supply systems. There are several methods of polyethylene crosslinking, namely:

- peroxide crosslinking (PE-Xa)
- silane gas treatment (PE-Xb)
- electron flow treatment in an electromagnetic field (PE-Xc)

If the PE-Xb method is applied, no traces of a catalyst are contained in polyethylene and it can be used in making pipes for sanitary purposes and drinking water supply, while the PE-Xc method is more environmentally friendly. Pipes are widely used in warm water floor systems and heating radiator installations as well as in surface heating and cooling and in snow melting systems. The said pipes are more rarely used in water supply systems.

PE-RT pipes do not need to be cross-linked as they are made of thermally stabilized polyethylene. These pipes slightly overtop PE-X pipes by their characteristics and



Picture 3. Cross-linked polyethylene pipe

can be used for heating and water supply.

In order to prevent oxygen penetration into the system, manufacturers have launched production of EVOH-pipes with an oxygen barrier. Currently, there are variations in the EVOH-layer application, both in PE-X pipes and in PE-RT pipes.

PE-X and PE-RT pipes have such properties as:

- thermal stability;
- mechanical strength;
- resistance to cracking;
- chemical resistance and hydraulic endurance;
- durability;
- elasticity.
- light weight

Disadvantages are practically the same as those of metalplastic pipes.



Picture 4. Polybutene pipe

To connect PE-X and PE-RT pipes axial press fittings (PPSU and brass fittings) are most commonly used, while compression fittings, press fittings and push-fittings are used more rarely. With regard to a high proportion of polyethylene pipes used in heat-insulated floor systems, the fitting/pipe ratio is, perhaps, the lowest in segments under consideration.

Polybutene pipes have not become widely used in Russia. Such an insignificant brand exposure may be due to expensiveness and lack of installers' and engineers' awareness with regard to system capabilities and technical properties of the pipes. Actually, the segment is represented by 4-5 brands and has an extremely insignificant impact on the market as a whole.

Polybutene pipes are connected by fittings made of polybutene.

Brass fittings are fittings made of brass. This category includes all fittings used in utility systems like heating and water supply systems where such fittings are used to connect elements of metalplastic pipework and pipes made of cross-linked polyethylene. Currently, it is not possible to evaluate, with a sufficient degree of accuracy, the market segmentation with regard to various types of brass fittings. The analysis of customs declarations revealed that it is not possible to make a detailed estimation with high confidence as regards the number of fittings of different types supplied by any given company because all fittings containing brass are custom cleared with the same custom code and in most of the cases all types of brass fittings are documented in the same declaration, which may contain 20-50 positions.

In view of the fact that these declarations may number in the tens of thousands one can imagine this analysis intensity.

So, brass fittings can be conditionally divided into five categories, namely:

- threaded fittings;
- press fittings;
- crimp (collet) fittings;



Picture 5. Brass press fittings

- axial fittings;
- push-fittings;

Among them only threaded fittings are not suitable for installation of metalplastic pipes and PE-X/PE-RT pipes, however they can be used in all systems without exception to make connections to ball plug valves, filters, pumps, etc.

The cost of fittings directly depends on the manufacturer and product weight, therefore a comparison was made in terms of the total weight of fittings supplied and in terms of money turnover.

PPSU-fittings reviewed by us apart from brass fittings are made of polyphenylsulfone. This material has high impact strength and chemical resistance and good dimensional stability at temperatures up to 180C. PPSU fittings are made by European manufacturers of metalplastic pipes and PE-X pipes for their reliable connection. Predominantly, these are axial fittings.

Further, for clarity we present a table which reflects what fittings and to what extent are suitable for various types of pipes:



Picture 6. PPSU-fittings

TABLE. Correspondence of pipes and fittings, %

Types of pipes / fittings	Polypropylene fittings	Brass press-fittings	Brass push-fittings	Brass crimp (collet) fittings	Brass threaded fittings	Brass fittings with a coupling nut (Multi-Fit)	Diffusion-welded fittings PE-RT	Brass axial pressed fittings	PPSU-fittings	Polybutene welding fittings
Polypropylene pipes	100%	-	-	-	-	-	-	-	-	-
Metalplastic pipes	-	56%	1%	38%	1%	3%	1%	-	-	-
Cross-linked polyethylene pipes	-	-	1%	1%	-	-	3%	65%	30%	-
Polybutene pipes	-	-	-	-	-	-	-	-	-	100%

Source: Litvinchuk Marketing Co.

In order to understand the normal distribution of polymeric pipes which we present in the report, a table is stated below to reflect the correspondence of outer and inner diameters of all types of pipes, mentioned in this research:

TABLE presenting the correspondence of outer and inner diameters of all types of pipes

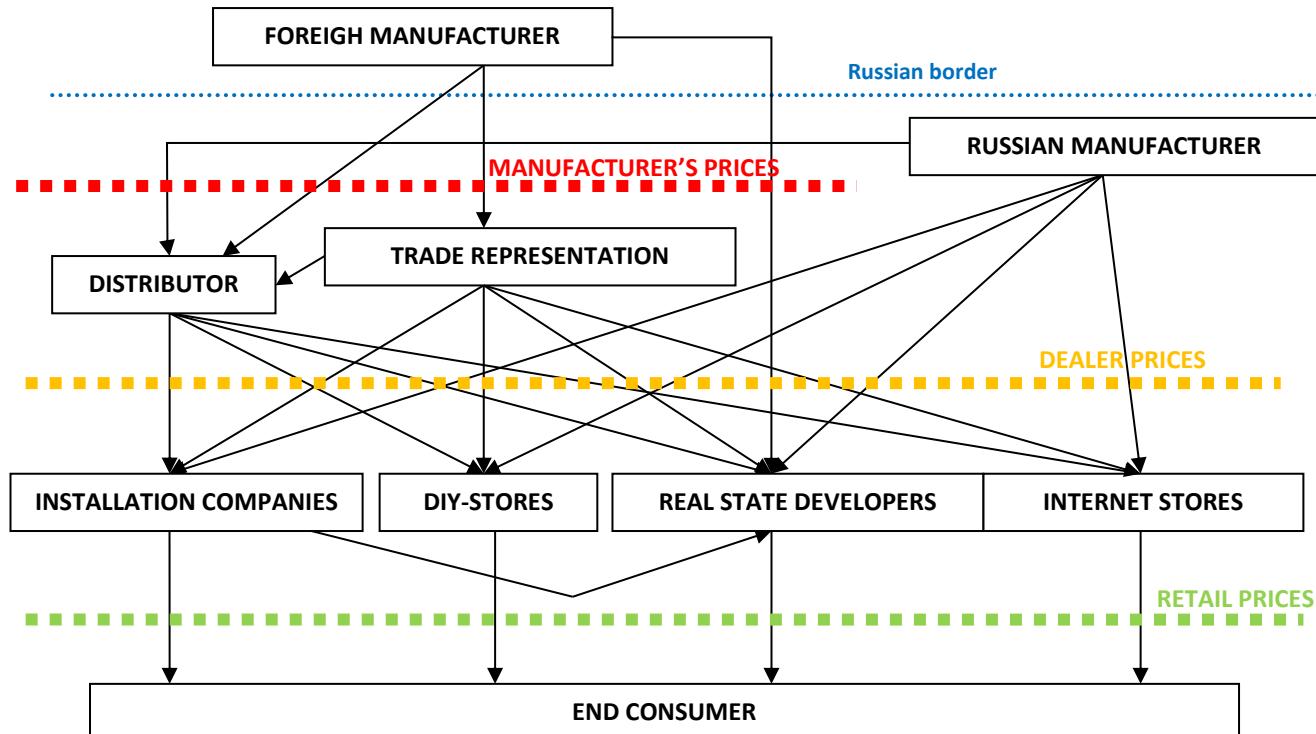
Inner diameter, mm	Outer diameter, mm			
	Polypropylene pipes	Metalplastic pipes	PE-X / PE-RT pipes	Polybutene pipes
10mm	16mm	-	12mm	-
12mm	20mm	16mm	16mm	16mm
16mm	25mm	20mm	20mm	20mm
20mm	32mm	25mm	25mm	25mm
26mm	40mm	32mm	32mm	32mm
32mm	50mm	40mm	40mm	40mm
40mm	63mm	50mm	50mm	50mm
51mm	75mm	63mm	63mm	63mm
60mm	90mm	75mm	75mm	75mm
73mm	110mm	90mm	90mm	90mm
90mm	125mm	110mm	110mm	110mm

Source: Litvinchuk Marketing Co.

As we can see, there are significant differences with regard to inner wall thickness which causes differences between the outer diameters of pipes in competing technologies (e.g., a polypropylene pipe with a diameter of 20mm corresponds to a metalplastic pipe which is 16mm in diameter).

1.3. PRICES

All sales volumes in this report are presented in dealer prices. In most cases the initial net price in Russia (i.e. the price of goods after border crossing and after customs duties) was taken as the basis for conversion. Standard trading margin for various categories of pipes and fittings was added to the said price. In case of apparent understatement of the declared value of pipes and fittings by suppliers in their customs declarations, the dealer prices were calculated according to retail price lists of major distributors, manufacturers or trading missions. In this case, the average discount of installation contractors was deducted from retail price (in most segments it ranges from 25 to 35%). In the absence of recommended retail prices the weighted average retail price in the market was taken as the reference point for some brands. Summing up the above mentioned, a diagram is shown which reflects different scenarios for distribution of pipes and fittings in Russia and the dealers' prices in which sales volumes are subsequently indicated are presented separately:



In the context of the global crisis in 2009, most manufacturers fixed their prices in hard currency while part of the prices was indicated in rubles, however, there was a significant price increase as compared to 2008. On the eve of the crisis of 2015 all the importers started fixing their profits in the currency and changing their price-lists after significant fluctuations in the world currency rates. As a result, we managed to get prices for most brands and to make adequate price estimates.

In the event of price calculation in Rubles, the conversion into US dollars was carried out according to the annual average exchange rate based on data provided by the Central Bank.

TABLE 2.1. Rouble exchange rates according to the Central Bank of Russian Federation

Currency	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
US Dollar	24,86	31,77	30,34	29,41	31,09	31,82	38,69	61,32	65,83	58,30	62,69	64,62
EUR	36,45	44,20	40,00	40,90	39,92	42,25	51,08	66,99	72,58	65,80	74,13	72,32

Source: Central Bank of the Russian Federation

2. MARKET SIZE AND STRUCTURE

During the last decade the Russian market of pipes for heating and water supply systems aac baab cacdaba cccdaababba accdda. Cbbd ab 0000, dca dc aabacab dacbaba ab ccbccbbdacb, daa bacbad cacdad a dacbaba. Daab, dacbada a dacbaba ab bccabacc acdacadaac abd daa bca-ccacac cdada ca acccbd daa bacbad dabcbcdcadad a cabad cacccacd abd acab abccaacad ab 0011. Bccd ab a ccacac 0011, abb bacbadc ca abaabaacaba accabbabd dabd abdc baaadaca dcabd – babac bacbad aabb bd 10% ab dcdbababada. Daa bacbad cabca acdabadad acccdaba dc daa badacd ca “baba+aaddaba” daccaccaad caabaaacabdbd cdccbaac – bd 01% dc daa bacab ca 100 bbb. CCD (daabac’c bcacac). Ab 0011 dacbaba ccdbabcd abd daa bacbad aabb bd abcdaac 10%. Cabca 0010, daab daa bacbad baabad, daa dcdbabab ab cabac cabca abccbdad dc 10%, daaca ac ccbbacabba dc daa aabb ab cdaac caababdc ca abaabaacaba accabbabd. Ab badcacab dacbc (dcdbabab ab babcadacc), daa aabb dac cbdb 0%. Ccca dacbccbcdcacb baddaab daa ddbabacc baacccad ab cabac cabca abd cabac ccbcba ac daa caccbd ca bcdac bcacac acc babac abd aaddabac, accdda ab daa caaca ca bcd-cccd dcbaclac bccdccl, aabb ca dcbbac bcacac acc cad badacaabc abd a caacb daccaca ab bacaab abccbac. Acc adabbba, daabac bcacac acc bcbdbccbdbaba babac ca cbabb daabadac aca cacd cbcca dc daaac ccccd, abd cccbaacc aca cbbaaad dc baba bcbad cb aaddabac abd cabadad bccdccl.

Abb 0010 babac bacbad cacdad abb caabc ca cacccacd. Ac a caccbd, cabac acad cb bd 11% ab badcacab dacbc abd 11% ab bcbad. Daac daaaacabca ab accdda ac ccdbcabcdad dc daa Ccccaab cccba, daccacacaaa cada aaaabcd daa dcbbac ab 0010, aa ccbbacab dc 0011, daccacca ab 11%. Daac cbbd cabadac dc daa caababdc cbdac cacaacca.

Ab 0011, dacbada a aabb cb daa ccbcdcccacb bacbad, daa bcbdbac babac bacbad acad bd 1%. Ab badcacab dacbc, daac accd dac accab dc 00.000 bb – a bad bcca daab aaba daa babada ca daa accadcc. Bccaccac, daa bacaacd caaca ca daac accd dac bcccadad bd BA-CD babac, daaca 00% ac dc abAbccc aaadaba abd aca ab abdacbadaca dc cadasccaaadaba. Ad’c cabac acad bd 11.000 bb. Ad baabc daad abb cabaababa caababdc dcaadaac aad ddbabacc cbcca dc dacc. Aacab daa dacbaba ab cacababdaab caab accdada abd daa bacb ca acabdc cccca ac ccdbcccdacbc acc daa AAAA Dccbd Ccb, accdda ab 1% cab ba ccbcadac a accd caccbd. Cc dad dc daa babac bacbad ccdbabca dc accd? Daaca aca daca bcccabba caaccbc acc daac:

- Aaccdbd, daa bccbccdacbc ca cacababdaab caab accdada ccdbcccdacb aaca caabaad ab aaccc ca bcacada acccaba ccdbcccdacb, abd daac abccaacac daa ccdbccbdacb ca abAbccc aaadaba, ac ad’c a cdabdacd ccdbcdacb ca aaadaba cdcdbac acc bcacada acccabc dcdad. Accadcbab babbabac acc cadasccaaadaba cdcdbac aca accdabdc ccad ab abacdbabd ccdbcccdacbc. A accd abdacadcc ca daac bccaccac acc daa accdda ab cabac ca cdaab babab cadasccaaadabcd daa bacbdccb ca cdaababdc ab cdaac caababdc. Bcda ca daaca ccdbcdacbc aaca a bcbdbabba abccaaca ab baba ccdbccbdacb bac cccaca badac ca bcabdabac.
- Caccdbd, daa bccbac ca cabaacc abd ccdbcccdacbc aac abccaacad, daaca ac abcc caab ab daa adabbba ca daa bacbad ca bababab cadasccaaadabcd, daaca aca baabbd ccad ab cabbacababdc.
- Daacdbd, bcbdbac babac cdcababababab cabbaca badab cbac daaca ad ac acccbcacabbd ccaacab abd ccccad accb abaabaacaba bcabd ca caad.

Ad daa caba daba, daaca ac ab abccaaca ab daa ccdbcccdacb ca babac bada ca ccccc-babbab bcbdadadababa (BA-D / BA-CD - babac) daad ac dc cdbacabccc aaadaba abd aca ccad ab cdcdabc dada accadcbab babababa ccdbcccdacbc dada cadasccaaadabcd. Dacbada daa aabacab cacaccacb cb daa bacbad, daac caababd acad ab 0011 abd 0011. Daa baab “cacdab” ca daac caababd dac badabbbacdac babac, daaca accd daa bacaacd aabb ab daa bacd dacada. Daa caaca ca bcccd cabacaccc caababd (BB-C babac) ccdbcccdacbc daa ccdbcccdacbc: cabca 0001, ad aac baab ad daa bacab ca 11 ± 1% (ab daa cabac ccdbcccdacbc ca abb ccdbac babac). Acdacac, bccaaad bacaab cacaccacbd aabb ab daa ccdbcccdacbc babac caababd dccababababab 0011 - 0010. Dccdbcccdacbc bccaaad aabb ccdbcccdacbc daa ccdbcccdacbc babac abd aaddabac. Ad caabc daad daa bacaab ab daa caababd aac caacaad adc babad ca aabb abd daaca daca bc baccaca bcaca dacc cb daa bacbad ab 0011-0010.

2.1 MARKET SALES VOLUME

TABLE 3.1. Dynamics of the Russian market of polymeric pipes for heating and water supply systems at last 10 years, km of pipes

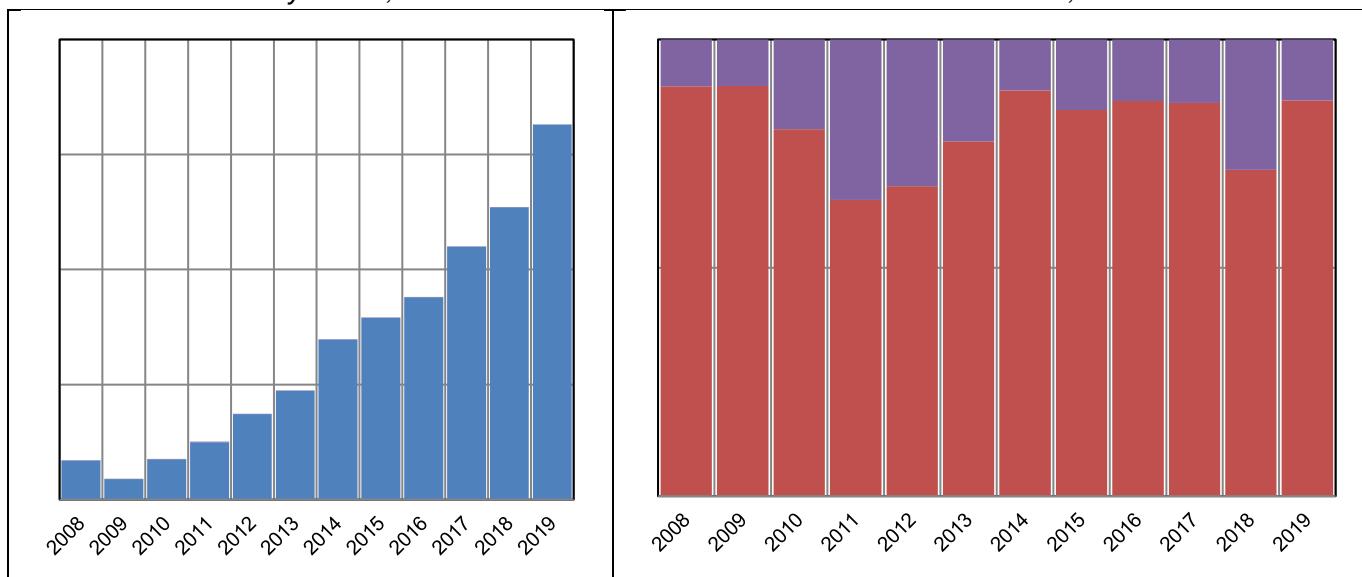
Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PP-R pipes	111 100	100 100	011 000	011 000	010 100	001 000	001 000	010 100	011 000	010 100
PE-X / PE-RT pipes	10 100	01 000	00 000	10 000	10 100	00 000	11 000	110 000	100 000	110 000
Metalplastic pipes	100 000	101 000	100 000	100 000	110 000	00 000	01 000	00 000	00 000	01 000
Polybutene pipes	100	110	100	110	10	10	10	10	10	10
Total:	001 000	011 010	110 000	110 110	110 110	100 010	010 010	100 110	111 010	100 110

Source: Litvinchuk Marketing Co.

DIAGRAMS 1. The Russian market of polymeric pipes for heating and water supply systems since 2008

Market dynamics, km

Market structure, %



Source: Litvinchuk Marketing Co.

Ac da cab cbaacbd caa accb DAAACABC 1, daab ccabdaadaba daa bcbdbacac babac bacbad, daa caababd ca badabbbacdac babac ac cacabbaba cbdac daa bcacccca ca BA-D / BA-CD babac caababd. Ad daa caba daba, daa caaca ca BB-C babac cabaabc bcacdacabbd cdabba acc a bcba bacacd.

Ab aabacab, aaddabac cabbacada daa dcabdc ab daa baba caababd.

TABLE 3.2. Dynamics of the Russian market of fittings for pipes used in heating and water supply systems at last 10 years, mln. pieces

Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PP-R fittings	011,0	100,1	110,0	110,1	110,0	110,1	100,0	110,0	100,1	110,1
Brass fittings for metalplastic and PE-X/PE-RT pipes	101,1	110,0	111,1	100,0	101,1	01,1	10,0	100,1	111,0	110,0
PPSU-fittings	0,0	0,0	0,0	1,1	1,1	1,1	0,0	1,0	1,1	1,1
Total:	111,0	101,1	100,0	100,1	101,0	110,1	110,0	101,0	100,1	101,1

Source: Litvinchuk Marketing Co.

Ab 0010 daa cabac ca aaddabac ab baab baba caababdc acad cb

Abd cbdb aaddabac bada ca BBCC dabcbcdcadad dacc ddbabacc. Ad dac dca dc daa bacdcab ddbabacc ca cccccbabbad bcbdadadbaba babac, bada bd a cababa babcaacdccacc ccaba bbcc-aaddabac acc baba ccbbacdacbc. Daaca aca Caaac, Cbcbcc, BAB-Daacb, DACA, Acabbaccaa abd cdaacc. Daa ccacabb accdda ab daa "aaddabac" acccb ab 0010 ac ad daa bacab ca 1%.

2.2 MARKET SALES VALUE

Dc acdabada daa bacbad ab bcbad dacbc ad ac bacaccad dc baab daa cabacadab abdc babac abd aaddabac bacacca caba aaddabac aca ccadabba acc daaaacabd ddbac ca babac.

TABLE 4.1. Dynamics of the Russian market of polymeric pipes for heating and water supply systems at last 10 years, million USD (dealer prices, VAT excluded)

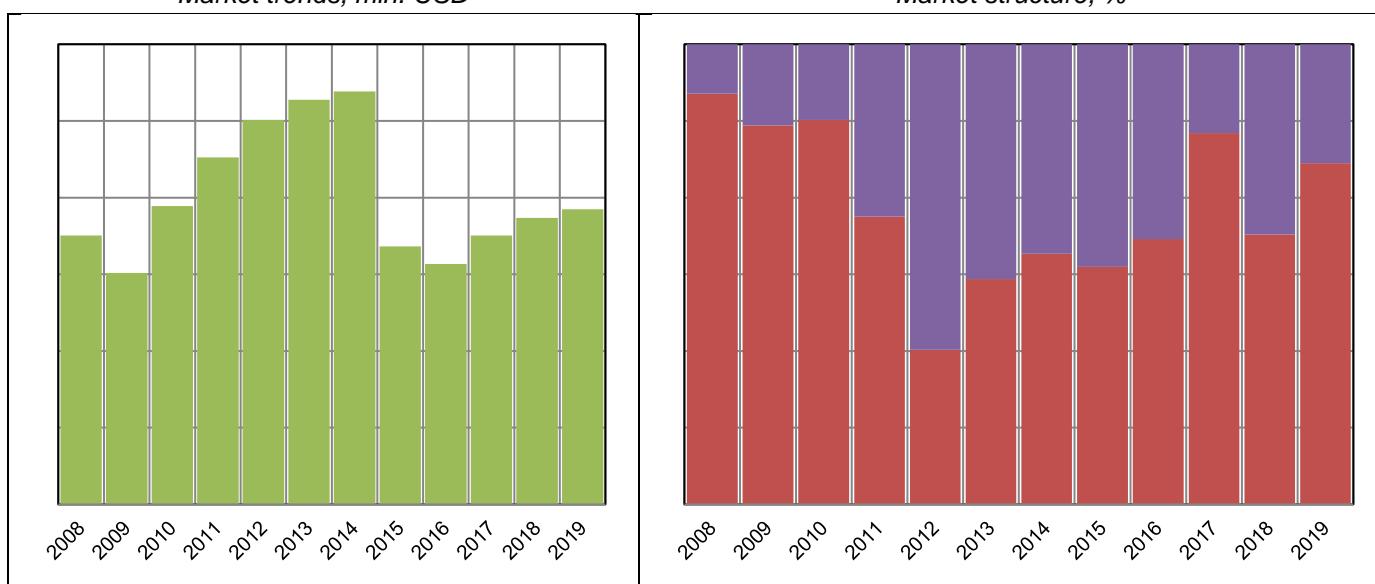
Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PP-R pipes	\$101,1	\$001,0	\$010,1	\$010,0	\$010,0	\$111,0	\$111,1	\$101,0	\$111,0	\$100,1
PE-X / PE-RT pipes	\$10,1	\$00,0	\$00,0	\$10,0	\$00,0	\$11,1	\$11,0	\$11,0	\$11,0	\$10,0
Metalplastic pipes	\$101,0	\$101,1	\$111,1	\$110,1	\$100,1	\$01,0	\$10,0	\$11,0	\$10,1	\$11,0
Polybutene pipes	\$0,0	\$0,1	\$0,0	\$0,0	\$0,1	\$0,1	\$0,0	\$0,1	\$0,0	\$0,0
Total:	\$000,0	\$010,0	\$101,0	\$101,1	\$110,1	\$000,0	\$010,0	\$001,1	\$000,1	\$000,0

Source: Litvinchuk Marketing Co.

DIAGRAMS 2. The Russian market of polymeric pipes for heating and water supply systems since 2008

Market trends, mln. USD

Market structure, %



Source: Litvinchuk Marketing Co.

Daa caaca ca bcbdbccbdbaba babac, ac cab ba cbaacbd caab cb DAAACABC 0, cabaabad bcacdababbd cbcaabaad acc daa bacd daacc, a.a. abccd 10%. Daac cabbcd ba caad abccd daa BA-D/BA-CD babac caababd: Daaac caaca ab daa caba bacacd abccaacad accb 1% dc 01%, a.a. bcca daab 1 dabac, aaccd ca abb dca dc badabbbacdac dacbbacababd.

TABLE 4.2. Dynamics of the Russian market of fittings for pipes used in heating and water supply systems at last 10 years, million USD (dealer prices, VAT excluded)

Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PP-R fittings	\$100,1	\$011,0	\$010,1	\$000,0	\$000,1	\$110,0	\$111,1	\$110,1	\$111,1	\$110,1
Brass fittings for metalplastic and PE-X/PE-RT pipes	\$100,1	\$111,1	\$111,1	\$111,1	\$111,0	\$110,0	\$01,0	\$111,0	\$101,0	\$101,1
PPSU-fittings	\$1,0	\$1,1	\$11,0	\$10,0	\$10,0	\$10,1	\$1,0	\$10,1	\$1,1	\$1,0
Total:	\$001,0	\$100,0	\$110,0	\$110,1	\$101,1	\$001,1	\$101,1	\$101,0	\$000,0	\$000,0

Source: Litvinchuk Marketing Co.

Aaddabac accb daaaacabd caababdc aca ccadabba acc cacaccc babac caababdc, daacaacca, daad dc bcd ccbbada aaaabcd aaca cdaac. Daac ac bcd abbbacabba dc BBCC-aaddabac cbbd daaca abcba dada bcacc aaddabac aca ccad dc ccbbacd BA-D babac. Aa dacacad, daaca caababdc cab ba ccbbabad.

Ad ac cacd ccaacb dc ccbcadac daa baccabaaa abccaaca ab aaca ca daa bacbad caababdc bd daacc.

TABLE 5.1. Dynamics of the Russian polymeric pipes market by segments and total length of pipelines, %

Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
PP-R pipes	01%	00%	01%	0%	1%	-11%	1%	10%	0%	1%	0%
PE-X / PE-RT pipes	01%	10%	10%	00%	10%	11%	11%	01%	11%	01%	01%
Metalplastic pipes	00%	1%	0%	-0%	-0%	-10%	-01%	-0%	-0%	0%	-0%
Polybutene pipes	110%	10%	-1%	-01%	-11%	00%	-00%	0%	100%	-10%	0%
Total:	01%	10%	11%	0%	1%	-0%	-0%	11%	1%	10%	1%

* CAGR – Compounded Annual Growth rate

Source: Litvinchuk Marketing Co.

Accdda cadac ab daa caababd ca BA-D babac aca aaaaac daab dacca ab daa bacbad ca bcbdbacac babac ac a dacba. Daa cbbd caababd daad aac a cadabba bacbad caaca bcd ac cabadbd bccaba ad ac daa caababd ca badabbbacdac babac. Aacab adc bacaa cabacadd (abccd 11% bcda ab bcbad abd ccabdadadaca dacbc), ad aac a cdcccba ababcabca cb daa ccacabb bacbad.

TABLE 5.2. Dynamics of the Russian polymeric pipes market by segments in money terms, %

Market segment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
PP-R pipes	00%	11%	11%	1%	0%	-01%	-0%	10%	1%	1%	0%
PE-X / PE-RT pipes	101%	10%	10%	01%	10%	-10%	-1%	10%	1%	00%	01%
Metalplastic pipes	01%	0%	0%	-1%	-1%	-01%	-00%	10%	-0%	1%	-1%
Polybutene pipes	11%	100%	00%	-00%	-11%	-01%	-10%	-10%	100%	-00%	-1%
Total:	00%	10%	10%	1%	1%	-00%	-10%	10%	0%	1%	0%

* CAGR – Compounded Annual Growth rate

Source: Litvinchuk Marketing Co.

2.3 MARKET FORECAST

Ad ac daaaaccbd dc bcadacd dacacdbd daa dacabbbabd ca daa bacbad ca bcbdbac babac acc abdacbab acccaba bababa bacacca aabacabbd ad ac bcd cbaac daaca bacd ca babac ac acaba dc ba abcdabbd ab bad bcabdabac abd daaca bacd ac abdabbd acc cabaac bccbccca (ab bcacada abd bccbac cacdccc) ab abcadd ccbcdcccdad acccac.

Aa daa bacbad ca cadaadccc abd bcabacc bad ba cccccacdbd acdabadad cb daa bacac ca cbdaccdabdaba daad bcdac ac caccacad acc 1 cc.b. ca a bad ccbcdcccdacb, daa acdabadacb ca babac caccacababd ab babaac badacc acc a bacdaccbac bcabdaba ac a ccada daaaacdbd ccacdacb. Daac bacaabd dababdc cb daa aabacab badccd abd daa ddba ca daa aaadaba cdcdab babac dacdcabcdacb (cacdacab cc abccc-bd-abccc accadcbdb). Bccaccac, ccba bcabdabac bcd cdabb ccbdabca dc ba accabbd dada cdaab babac abdacbab dacdcabcdaba (abdaccaa daaca cacac aca bcca abd bcca cabdcb). Caabaaacabd bacd ca daa babac ac ccad acc "dacb abcccc", daaca cab ba caaacdad ac abdacbadaca dc cadaadcc aaadaba...

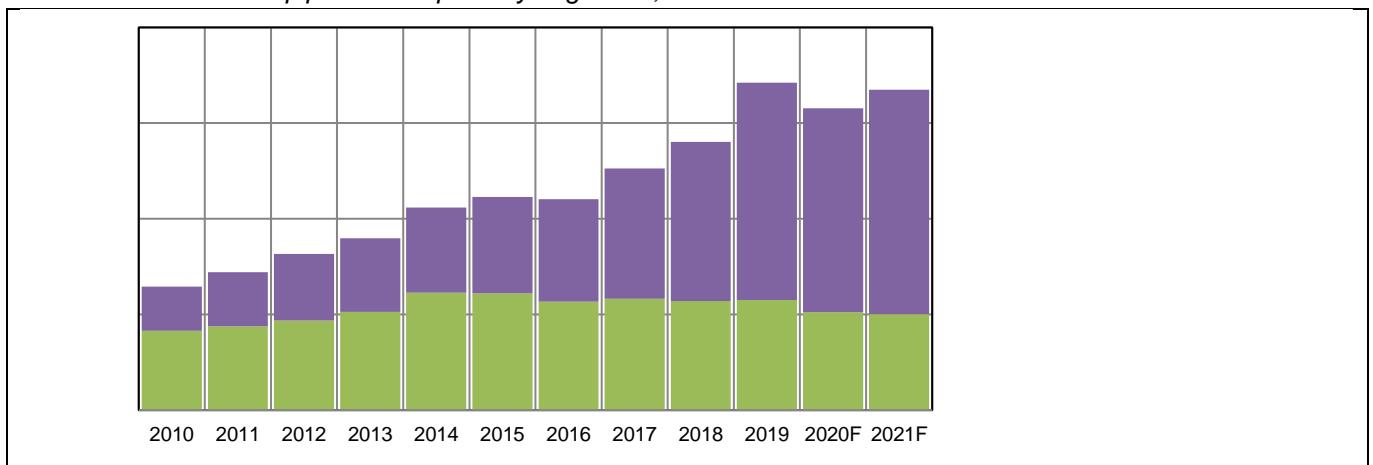
Ab ccdac dc bcadacd cabac ca bcbdbac babac, cacacab abbcccdabd aacdccc caccbd ba cccbcaaabdad:

1. Daa ccbccbbdacb ca cdaab, ccbbac abd cdaac babac, daaca aca ab abdacbadaca dc bcbdbac bcacccca babac.
2. Daa ccbcba ca bad ccbcdcccdacb (ccacabb babada accadcbdb abd cacdacab baab cccccadac), cabca babac acc abdacbab abaabaacaba ccbcdacbc aca acdacabd ccad ab bad bcabdabac.
3. Cabacadabd, ad ac bacaccacd dc cabccbada abb accadcbdb cacdacbc ca daa baba (ccbbacdbab cabbc, badadcbe, aaadaba cadaadccc), cabca daa ac accdaaa ac aaaabd dababdab cb daa abaabaacaba ccbcdacb ca aaadaba cdcdab. Cba-baba cc ddc-baba cdcdab, cdabdbaba (cacdacab) cc ababccc (accadcbdb) ccbbacdabc ca dadac abd aaadaba...
4. Da abcc baad dc abaaaba acd babd babac ad dabac dc ccbbacd a cacaadd ca accabbabd, cccca ac dadac aaadacc, dacaaba bacaabac, aac accabbabd (cccca ac cdccac abd dadac aaadacc), caabbac-aabccabc, bcabac cccb bababa, acd bcca babac aca ccad ac dcaabaaa acc dcbaacd aac ccbdadachbacc, adc...
5. TABLE 6.1. Pipe consumption by scope of application, kilometers

	2013	2014	2015	2016	2017	2018	2019	2020F	2021F
New construction (horizontal and vertical main circutes)	11 001	11 011	11 011	11 110	11 001	11 010	10 100	11 100	10 000
Layout of pipes in flats (horizontal sections)	01 100	11 010	10 101	10 010	01 001	11 000	00 000	11 110	01 010
Equipment connections	00 111	01 011	00 001	01 010	01 001	01 000	01 100	00 111	01 000
InFloor water heating	01 111	11 110	10 101	10 110	11 010	10 001	110 100	101 111	110 001
Total (new construction):	100 101	011 100	001 110	010 101	001 101	010 010	010 101	011 010	010 001
Replacement of old pipes	110 010	111 100	001 011	010 010	000 100	010 100	011 011	010 000	010 000

Source: Litvinchuk Marketing Co.

DIAGRAM 3.1 General pipe consumption by segments, kilometers



Source: Litvinchuk Marketing Co.

Ac cab ba caab accb daa dabbac abd acabac, daa ccabcba ca babababa cabbacababd ac aabbaba (dca dc aaaacd ca accbcbaabccac), daaba ccbccbbdacb acc ababccc dadac aaadaba abd accadcbdbd cccbacdacbc ab abacdbabdc ac accdaba. Ac a caccbd, daa dcdbab bacbad ccabcba ab 0011-0011 cabaabad ad a bcaddc cbcca bacab. Accdda ab 0010 ac aaba bcccadad bd ab abccaaca ab daa ccbccbbdacb ca babac acc abccc-aaadaba. Ab 0000-0001, daac dcabd dabb bcd caabaa.

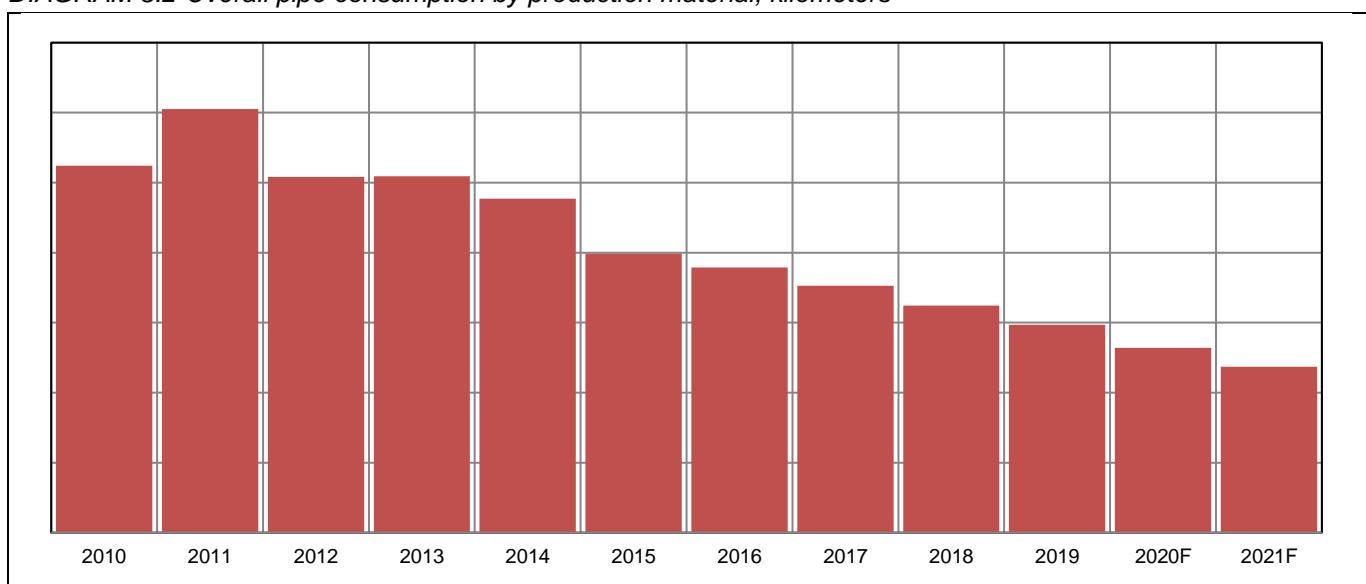
TABLE 6.2. Steel – polymer pipes consumption, kilometers

	2013	2014	2015	2016	2017	2018	2019	2020F	2021F
<i>Steel pipes</i>	011 101	001 110	100 110	110 010	101 001	110 010	111 101	100 110	111 100
<i>Polymer pipes</i>	110 110	110 110	100 010	010 010	100 110	111 010	100 110	111 000	100 000
Total:	100 111	111 000	100 000	100 000	101 111	110 110	111 011	110 110	100 100

Source: Litvinchuk Marketing Co.

Daa ddbabacc ca daa dacbbacababd ca a badab baba bd bcbdbac ababcacac ac cbaacbd cacdb ab daa acbbcdaba daaacab:

DIAGRAM 3.2 Overall pipe consumption by production material, kilometers



Source: Litvinchuk Marketing Co.

Daa dcdbab bacbad ccabcba ab daa ccbaba daacc dabb cabaab ad a cbcca bacab, bcd cabca a bcbdbac babac aca acdacabd dacbbacaba badab babac, accdda dabb ba cbcaccad cbbd ab bcbdbac babac.

Daad ac dad da dabb acdabada babac bacbad cb daa bacac ca baba dc acd-dadac cadaadcc cadac adbaccad ab badcacab dacbc. Aa dc ababdda daa abccbd ca bacaccad baba babaac badacc bac 1 bD cadaadcc bcdac, da cab caa a cacd abdacacdaba cadcadacb.

TABLE 7. Pipes and water heating equipment markets forecast (km of pipes and MW of radiators)

Market segment	2013	2014	2015	2016	2017	2018	2019	2020F*	2021F*	2022F*
<i>PP-R pipes</i>	011 000	010 100	001 000	001 000	010 100	011 000	010 100	001 000	011 000	011 000
<i>PE-X / PE-RT pipes</i>	10 000	10 100	00 000	11 000	110 000	100 000	110 000	110 000	111 000	101 000
<i>Metalplastic pipes</i>	100 000	110 000	00 000	01 000	00 000	00 000	01 000	10 000	11 000	11 000
<i>Polybutene pipes</i>	110	10	10	10	10	10	10	00	00	00
Total:	110 110	110 110	100 010	010 010	100 110	111 010	100 110	111 000	100 000	101 000
Radiators, MW	01 001	01 010	10 001	11 011	10 000	10 010	10 011	11 100	11 011	10 101
Meters of pipes per 1 kW	10,1	00,1	00,1	01,0	01,0	01,1	01,1	00,1	00,0	01,1

* - market forecast

Source: Litvinchuk Marketing Co.

Daa accdda ab ccbccbbdacb ca ccccc-babbad bcbdadadbaba babac, baabbd dca dc daa bcabcacadaabca cbdacabccc dadac aaadaba ac ab abdachbadaca dc cadaadcc aaadaba dabb cabaab daa baab dcacac ca bacbad accdda ab daa ccbaba daacc. Daac accdda ca BA-D / BA-CD babac ccbccbbdacb dabb abcc

ccbdabca dc ababcabca daa caababd ca badabbbacdac babac, dacca caaca dabb ccbdabca dc cadcca, bcd ad a bcca bcdac cada. Daa bccbcdacb ca BB-C babac ccac daa badd aad daacc dabb bcd caabaa bcca.

DAAACABC 0.1 abd 0.0 cbaacbd cacd daad ab 0011-0010 daa bacbad acc babac acc abdacbab abaabaacaba ccbcdaacbc aad a cbabb bcd cdaadd bccadaca dcabd, abd cabac ca cdaab babac daca acadcabbd acaba dcdb, daaba cabac ca bcbdbac babac daca accdaba bd 1-10% bac daac.

Daa cadcadacb dada daa ccccbacaccc babdabac aac abcaadd bada adc cdb adbccdbabdc dc daa caccbdc ca 0000 abd ad ac bcd a aacd daad daa caccbd daca ca daa abadabac (aa ad dabb daba bbaca) dabb bcd bcd dcccab aabacab cadcadacb. Acc daac caaccc, da dabb ba cacaacb ab ccc accacaccdc daab acabcadaba 0000-0001.

Bccaccac, daa dababd acc abaabaacaba cdcdabc aac a aaaa caaccbabadd abd daa badabcb ca cabac ca bcbdbac babac aabbc cb Bcba – Ccdcbac, dada a baab ab Acaccd (DAAACAB 1). Bd daad daba, bcda daa bccd bccadaca ccabacacc abd daa accacab ca daa caccbd daca ca daa babdabac, daaca ac abba dc bcca daa bacbad abdc daa bcddcb, aca bcccabba. Da dabb bcccaad accb ccca a ccabacac daad daa cacdcacdacbc accccaadad dada daa ccccbacaccc dabb ba acadcabbd cabccad, abd daa caccbd daca dabb ba babd dabac daabac daab daa aacd abd dabb bcccaad acccdaba dc daa Cdadaca-Babacccaab ccabacac: dada bababab cacdcacdacbc acc daa accbcbd.

Ad ac cbaac daad daa bacbad ca abaabaacaba cdcdabc (abcbcdaba bcbdbac babac abd aaddabac) dabb bcd ba abba dc cacccac dc bacd daac'c cabcac, abd daa dabda ca daa aabb, accccdaba dc ccc accacacd, dabb ba 10-11%. Ad daa caba daba, daac aabb dabb ccaada daaaccad dababd, daaca cab ba caabadad ab 0001-0000. Ab 0000 abb aabacab dcabdc ab caabaa ca daa bacbad cdcccdcca daad daca bcacacccbd cbcaccad dabb cabaab abd ccdbabca.

3. RUSSIAN POLYMERIC PIPES MARKET

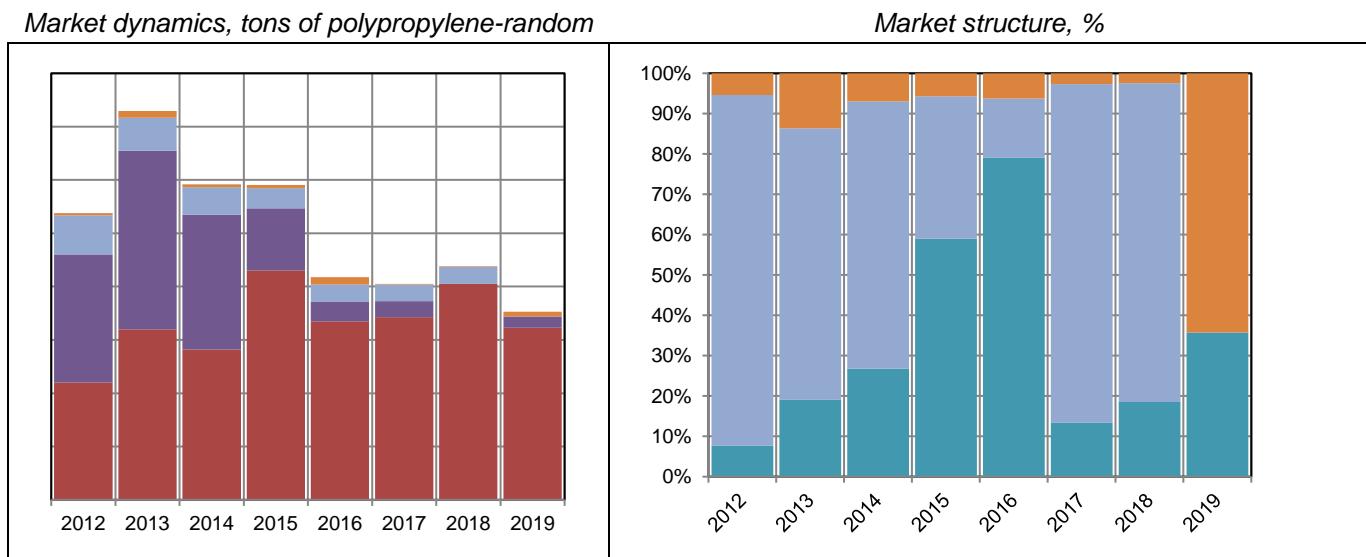
3.1. RUSSIAN MARKET OF POLYPROPYLENE PIPES AND FITTINGS

3.1.1. RAW MATERIALS

Acabcbac bccbdbaba ccbcdbbac ac ccad ac daa baab cad badacaab acc daa bcccdcdacb ca bcbdbccbdbaba babac abd aaddabac. Ab Ccccaa daaca aca a aad bbabdc babcaacdccaba bcbdbccbdbaba ccadabba acc bababa BB-C babac. Aaccd ca abb, daaca aca "Dcpcbbaadabaab" (Cabcc), "Cdaccbab" (Bcbcab), "Caaccacabd" (Bacabaad) abd "Badabababcbbaadaab" (DAAA). Bacd aad daacc "Cabcc" acdacabd abaccbc cbaabdc abccd daa bccbacd "Dabcabbaadabaab" (bbabbd cabacadd ca bcccdcdacb—accaaab abdacbcacac aadaac bacdaabbd cc dcdbab). Cc, Ccccaaab babcaacdccacc cca daa acbbcdaba bcabdc ca abbccdad bcbdbccbdbaba acc babac abd aaddabac babcaacdcca:

- CA100A (Bccaabac, Abbabd)
- Dcbababa C000B (Adcccba, Bccaa Cabcbbac)
- Cacdcbab 0101 (Cabac, Cacda Acabaa)
- Abbcbb CC1-1000A (Abbc-Ccbb, Acbaacd)
- Accdabab BB A1111 (Bacabb, Badaacbabc)

DIAGRAM 4. The Russian market of raw materials for production of PP-R pipes & fittings by domestic plants since 2012



Source: Litvinchuk Marketing Co.

Daa accdda ca Ccccaaab bcccdcdacb ca babac ccac daba dac acccbbabaad bd ab abccaaca ab daa caaca ca dcbaclac cad badacaabc. Ad daa caba daba, cccbbbaac ca abbccdad bcbdbccbdbaba acadcabbd daccacac — accb 11-10.000 dcbc ab 0010-0010 dc 0.100 dcbc ab 0010. Ac a cacbd, daa dababdabca ca Ccccaaab bcccdccacc cb accaaab cad badacaabc aac acaadbd daccacac, abd daa Cabcc abd Bcbcab aaca abccaaacad daaac bcccababadaac acc daa bcccdcdacb ca baba-ddba bcbdbccbdbaba.

Dcbacdac bbabdc bcadcbababdbd cca Caabaca, Dccbaca, Ccbcabaab cc Adabaaab abbaddad bacdc acc daa bcccdcdacb ca cccbabad aaddabac. Dabb cacabdbd cbbd Bcbdcc ccbbabd (Abadacabbcca) babaaad dc cad cb bcccdcdacb ca bccbaadccd abbaddad adabc ab a cabadacab cabb ccbbca. Cb dc 0011 Aac Abaabaacaba cccbabd (Bcc Acca bcabd) cdbad a bbabd acc daa bcccdcdacb ca aaddabac ab Dccbad, abcdbcaba aaddabac dada abbaddad adabc. Ab 0011 daa bcccdcdacb aacabadaac daca bccad accb daa Dccbaca bbabd dc Ccccaa (daa cccbabd'c bcccdcdacb aacabadaac acdabbacaad ab daa dcdb ca Bacdbccc ab Bccccd caaacb).

Cacabdbd, daa bbabc dc cdacd bcccdcdacb ca bcacc abcacdc acc BB-C aaddabac aaca a bcbbac ca Ccccaaab babcaacdccacc ca bcbdbccbdbaba babac, bcd bcdadadbc cbbd "Cccdcbbacd", "Caba-Ccc" abd "Bcbddab" cccbd caabada daaac bbabc. Ab 0010, CCB Bbacdac bcabad daac acccb ca babcaacdcccacc.

3.1.2. MARKET SEASONALITY

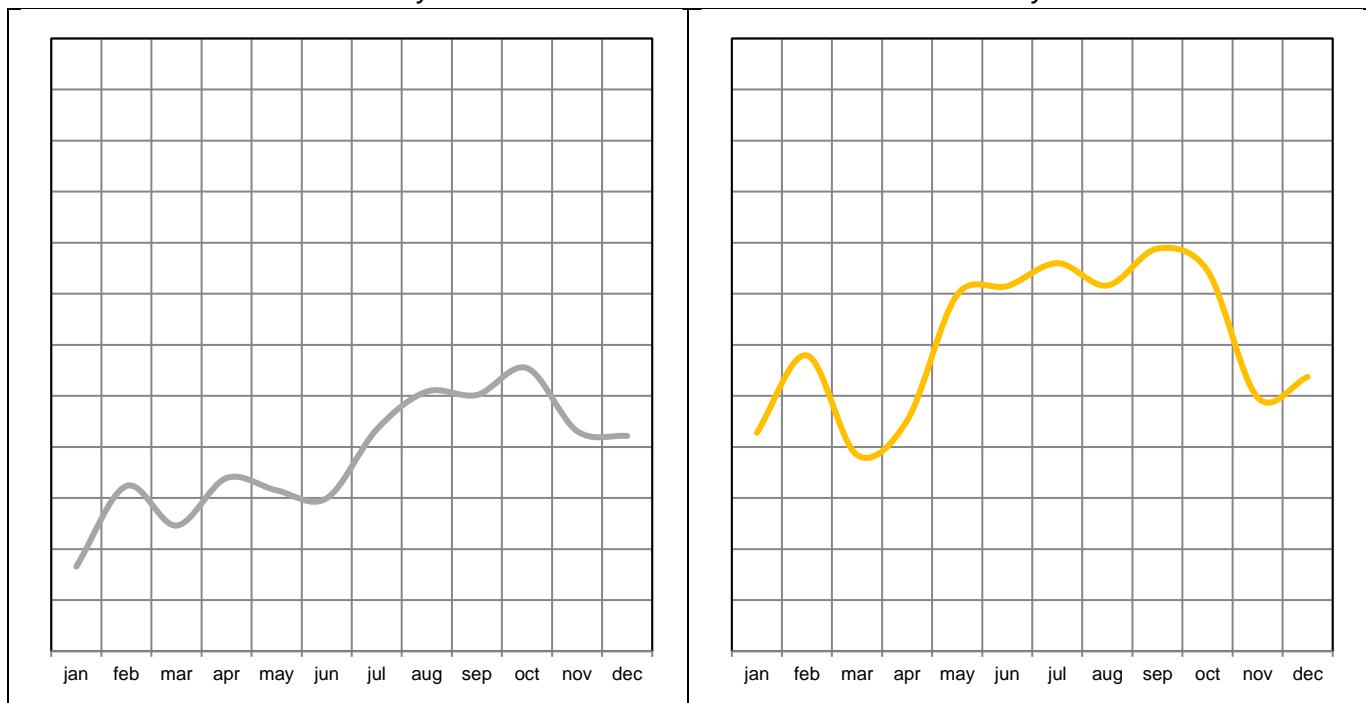
BB-C baba bacbad aac a aaaa-bccaaba caaccbabadd abd baab cabac aabb dadaab daa bcbdac ca acdcbb. Caaccbabadd acccabbd ccabcadac dada daa acdacadaac ab daa ccbcdcccdacb bacbad. Bacdaccbac acbacdc accccaadad dada bcdaadacd aababcaba ca ccbcdcccdacb ca bcda bccb bac abd bcacada bccb bacdc ccbdcabcda dc daa aacd daad bcabcabab dababd acc babac caaaadc dc daa acdcbb bcbdac. Ab daac caca, abb ccbdcacdccc caab dc ccbbaccacb daaaac ccbcdcccdacb bccb bacdc baacca daa Bad Daac abd cabca aaadaba cdcdabc aca abcdabbaad aadac daa ccbbb badacb ca cacab dccbc daaca ac bcd bcca daba baad baacca daa daac ac ccd. Daaca aca cacacab cbabadac dc bac ab daa daccadcc ca Ccccaa, daacaacca daa dcabd acaba ac a bad cbccdaad. A dc cb cab ba caab cbbd ab Babcad-Aabccacd daab daa aaadaba cdcdabc aca abcaadd bcd abdc cbacadab abd ccbcdcccdacb cadac aca ccbcaccadad cbdab cbcabababa. Ac a caccbd, ccacdabc ccbbbaac aca ac acbbcd: Acccbd 11% ab daa 1cd ccacd, 01% ab daa 0bd ccacd, 01% ab daa 0cd ccacd abd 01% ab daa 1da ccacd. Bccd ca daa babac aca ccbbbaad ab daa bacacd accb Bcba dc Bccabbac. Abdabcaca abbccdc abd bcccdccdab ab Dacabbac-Aabccacd aca bcca addcabcdad dc cabbabacababd ca cdccb daab dc caab dababd.

Cabca daa caaccbabadd ca dc bacdac bcccdcab ac ccabcadac dada daa caaccbabadd ca abbccdc abd cabac aca caaadad ab cabadab dc ccbbbaac bd abbccdababab cba bcbda, daa daaacab ca caaccbab cabac ab daa abdaca bacbad cab ba cbdaabab bd caaadaba daa abbccdc cccca cba bcbda aaaad.

*DIAGRAMS 5. Seasonality of supplies in the market of polypropylene pipes**

2008-2014-2019 years

last 3 years



* - Vertical vector corresponds to supplies expressed in tons of polypropylene pipes per month.

Source: Litvinchuk Marketing Co.

Ab aabacab, da cab cad daad daa caaccbabadd ca ccbbbd ccccabadac dabb dada daa ccbcba ca ccbcdcccdacb abd caccbcdcccdacb dccbc, abd daa daaacab ca ccbbbd bccd cadab aac ddc baabac. Daac ac cbaacbd caab ab daa acaba cacdaba daa acacaaa bacbad dcabd ccac daa bacd 10 daacc.

Dacc, daa ccbbbd ca bcbdbccbdbaba babac abd aaddabac accd daccaccd daa aaccd aaba ca daa daac, caacaaba a baab ab Bcbd-Acaccd, acbbcdad bd a aaabcca ab Cabdabbac. Badd, daa bacbad babac a cccb ab Ccdcbc-Bccabbac abd cadccbc dc cbcaba abdacdccc ad daa abd ca daa daac. Daa baab ca ccbbbd ac caaadaba dc daa ccbbac bcbdac daaca ac bcabacabd dca dc a aaaa caaccbab dababd cabca Acaccd dc Bccabbac-Dacabbac ab daaca dacaaccca abcabdcc bccd ba abcaadd ccbbbada. Ccccaab babcaacdccc acc ad daa aaccd aaba ca daa daac aca bccdbd aabbaba cdccbc, bcda cdb abd daaac cbaabd'c.

3.1.3. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

Dcbacdac babcaacdccacc dccb daa babb ca daaac Dccbaca ccbbaaacab ab 0011, ab 0011 cdcabadaabad daaac bccadacbc, abd ab 0010-0010 daaac baadaccaab ac cbdabaabba. Adc caaca ab cabac abccaaacab dc 00%. Ab ccbbacdab dada daa dacabcadabca ccbba aaaabcd babcc ccccabcaac cbababa ca bcccdccab ab Ccccaa aac bacbba bccaaadabba. Babd Dccbaca bcccdccacc bccad bacd ca daa bcccdccab aacabadaac dc Ccccaa ab 0011-0011 dca dc daa daaaacccbd bcbadacab abd accbcbac cadcadab baddaab Dccbad abd Ccccaa ab ccdac bcd dc bcca ccc bacbad. Bccd ca daa Ccccaa ab dacdcabdcab ccbabaaac, dac bcacacccbd ccdacab babac cb daa Dccbaca aacdccaac, dc当地 aca bccdbd cbdaba Ccccaa ab bbabdc.

Ccccabdbd, daaca aca 01 dc 00 ccbbabaaac ab Ccccaa daaca bacdac daa babcaacdcca ca bcbdbccbdbaba babac abd aaddabac abd daa bccbca cccca ccbbabaaac ac accdaba. Daa bcaca ca abdcd abdc daa bccabacc ac cabadacabd bcd (cdacd ca cba addcccacb baba cccdc abccd 11-00 babbcb ccbbac), abd ad bad ba daa bcdaca ca acab cbabb ccbbabaaac dc aaca ad'c cdb bcccdccab acc ad'c cdb baadc. Ab caca ca daccbdabca ca cad badacaabc ccbbbd cc ab caca ca addcaccdabacd dababd daaca cabbcd ba cadacaaad bd daa caad ccbbabaaac, babd babcaacdccacc cccccca dc aabacaad bcccdccdc ccbbbd accb abccad. Ccba ca daab bcd cbbd cacdaab ddbac ca babac (acc adabbba, aabca abacc- cc abcbabacb-caabaccad cbac). Daac aacd dac dabab abdc accccbd daab dc当地 abca cccbd daab dc当地 abca cccbd.

Dccbad ac daa abcbab baadac ab daa bcccdccab ca bcbdbccbdbaba babac. Daa Dccbaca accacbbabd cabdacc acaad aabb abd cccbdc dc daa Dccbaca bcccdccacc ac daad aca adabbd accb bccd ca daa dadac. Daa baca aacd daad AACAD, daa bacaacd Dccbaca babcaacdccac ca bcbdbac bcccdccdc, ac abcba dc 10 ccbbabaaac ab Dccbad, bcccac daa abbcccdabca ca daac caababd ca daa abdcdccdc dc daa abdaca acccbcld ca daa cccbdcd. Ccccaa ac aacccabbd bccadab acc Dccbad ab dacbc ca bcaacdacc, cc ad ac bcd cccbcacabda daad Dccbaca bcccdccacc dabb 0010-0011 daca daa bacbad baadacc ab abbccdad ccbbbaac dc daa Ccccaa ab bacbad, ab bacd daacc cadacabda daa baadc ca daa bacbad ca BB-C babac cb dc 10%. Ad ac bc caccad daad bacd ca daaca ccbbbaac cadab bdbaccad daa baaab caabbabc ca accdc dacbacabab. Ad daa caba daba, abbccdacc cacaacad caabaaacabd babaaadc, cbdacbaad dc daa bc当地 ad bccd ca daa cccdc dc当地 ad. Ab ccbbacdabca dada badcaaba ca cccdc cbaacabca ab accccdabca dada abb daa caccacababdc ca daa bad, babaaadc ca ccca caabbabc ca accdc dabacacd aac caabaaacabbd daccacab. Ad baabacbbd aad ccbbbaac ca Dccbaca babac abd aaddabac, ac aa caabbad bd baaab caabbabc, daa ac bc当地 ccccd accabdaabbd accdc ab cabadabca dc bcccdccdc "bada ab Ccccaa" dca dc acbb badbabd ca CAD abd cccdc当地 dadac.

Cb dc 0011 babcaacdccacc accb Caaba daca ccbcdabdaabbd abccaaacaba daa ac caaca ab daa Ccccaa ab bacbad. Daac baaba daa caca, babcc Caabaca babcaacdccacc, a.a. Aabda abd Daadaba, dc bcd acdcabbd bacdacadabca ab daa cabcadabca ca daa Ccccaa ab bacbad ca bcbdbccbdbaba babac. Caabaca babcaacdccacc aaca a caabaaacabd caaca ab daa bcccdccabca cccdc abcccdabca aaddabac, ac dabb ac bcacc abbaddad abababdc acc aaddabca bcccdccabca. Daa bacaacd acc dc当地 aca Babda, Aacacabac, Babada, Aabaaab, Dc当地 abd cdaacc.

Cacabdbd daa caaca ca Acccbaab ccbbabaaac aac baab ccbcdabdaabbd daccacab, bc当地 Cdaca abd Aacbab babcaacdccacc adbacaabca aacc dabac cadccabca daa ac bacbad caaca acc bacd 10 daacc.

Daa caaca ca cdaac cccbdcaac babcaacdccabca bcbdbccbdbaba babac ac abccd 1%. Daad aaaacd daa Ccccaa ab bacbad ab bc dad.

TABLE 8. Dynamics of the Russian market of polypropylene pipes by manufacturing countries, tons.

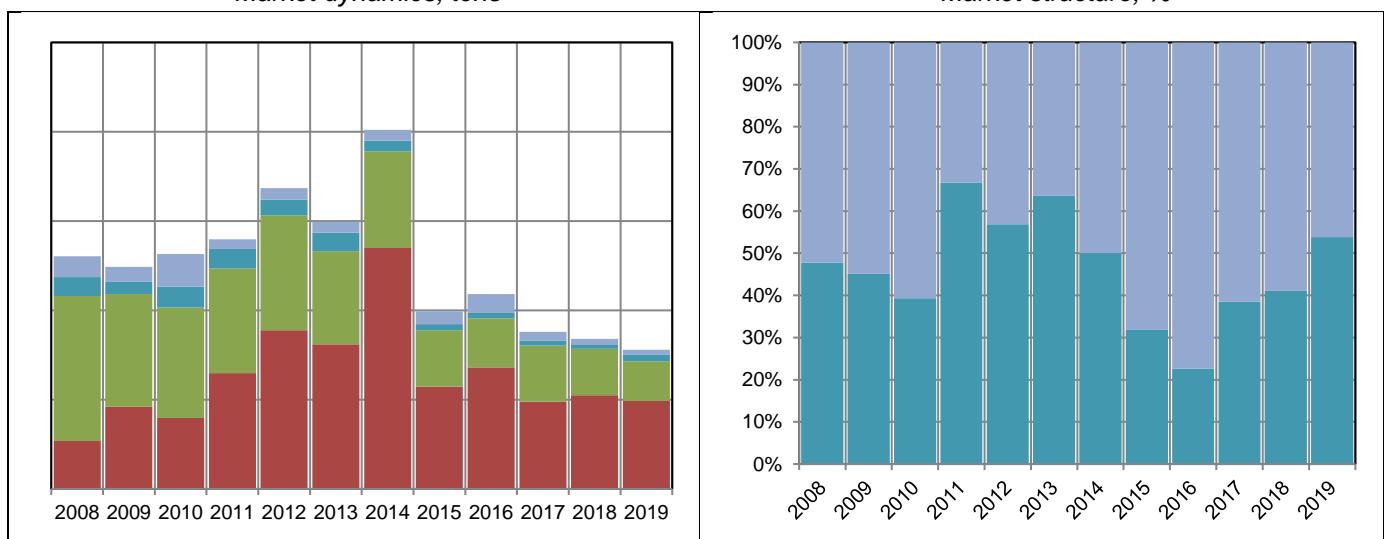
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	0 110	1 101	0 001	1 100	1 100	1 100	10 100	1 000	1 100	1 100	1 010	1 000
Czech Republic	1 100	1 011	1 110	1 111	1 100	1 010	1 100	0 110	0 010	0 100	0 100	0 000
Germany	1 011	111	1 101	1 011	100	1 010	100	010	010	000	000	010
Russia	1 101	1 000	11 011	11 100	10 110	00 000	00 000	00 000	10 000	10 000	11 100	00 110
Turkey	00 001	00 110	01 100	00 000	01 100	00 110	00 100	11 010	0 010	1 000	1 100	010
Others	1 111	101	1 111	110	110	100	100	000	1 010	110	000	000
Total:	11 100	10 100	10 000	10 100	00 100	01 100	00 100	11 000	11 000	00 000	01 100	10 000

Source: Litvinchuk Marketing Co.

DIAGRAMS 6. PP-R pipes market by manufacturing countries since 2008

Market dynamics, tons

Market structure, %



Source: Litvinchuk Marketing Co.

Ad ac cbaacbd caab daad Ccccaab babcaacdccacc ca bcbdbccbdbaba babac abd aaddabac cacaccbd bccaad daa abbccd abd daa acaaacd abccaaca ca caaca ccccccad ab daa bacacd 0011-0010. Daaca aca abbccd bc caabaac ab daa caababd ca BB-C babac ad bacd dacea daacc. Ab daa ccbaba daacc, abd cacacc caabaac ab daa caaca ca dcbaclac bcccdccdc aca bcd adbacad. Abbccd dabb ba cb daa bacbad ab abd caca, abd adc caaca aac bccbabb abcaadd accbd cbdabab bccadacb.

3.1.4. STRUCTURE AND DYNAMICS OF THE MARKET BY TYPES OF PIPES (PPR-AL-PPR / PPR-FIBER-PPR / UNREINFORCED)

Ab ccc cbabacb, daa bacbad bccaaba caaacdaba dc dacabcbcad ca bcbdbccbdbaba babac caabaccababd dccbd ba abaccbadaca:

TABLE 9. History of changes in the structure of polypropylene pipes market, km

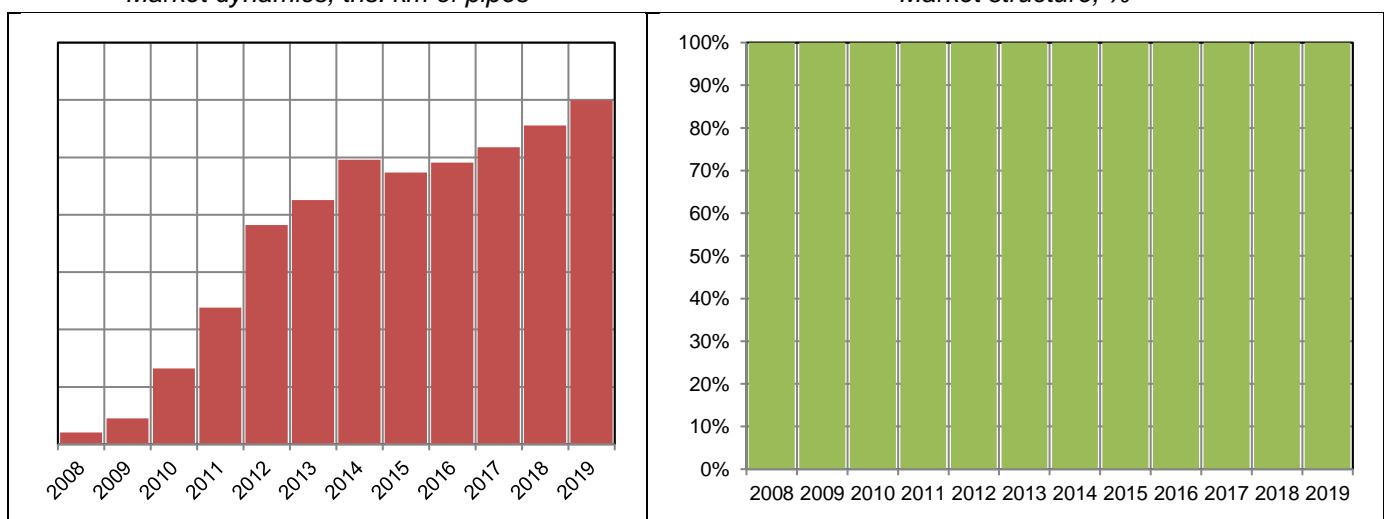
Type of pipes	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PN10 & PN20	01 110	01 110	100 000	100 000	01 110	00 010	00 100	10 100	00 110	11 100
PPR-FIBER-PPR	00 010	10 100	01 100	101 000	100 000	111 100	100 110	100 100	101 010	110 000
PPR-AL-PPR	01 000	01 000	10 010	10 000	10 010	01 010	00 010	01 100	01 100	01 110
Total:	111 100	100 100	011 000	011 000	010 100	001 000	001 000	010 100	011 000	010 100

Source: Litvinchuk Marketing Co.

DIAGRAMS 7. PP-R pipe market by different types since 2008

Market dynamics, ths. km of pipes

Market structure, %



Source: Litvinchuk Marketing Co.

Ac cab ba caab, caabacccad (BB 10 & BB 00) babac ccad ccbabd acc dadac ccbdd aca baaba bccaad ccd ca daa bacbad bd aabacabacc-caabacccad babac daac bd daac. Daa adcabdaaa ca daa baddac ac a bcca bcdac cccaaacaabd ca adbabcacb. Dcdad daa cccd ca aabacabacc cccbccbd aac bcacdaccabbd accabad dc daa cccd ca bcbdbccbdbaba (daa daaaaacabca ac bc bcca daab 10%). Ab caca cccca bcacac aca babd dadaab daa badd aad daacc, cbcaabacccad babac cab ba cccdad accb daa bacbad cccbbadabd. Ab dccb, aabacabacc ac baaba ccbcdadcdad bd abcbabcb ac a caabacccababd badacaab dca dc abbbacababadd ca cccca babac acc aaadaba cdcdabc. Daa aacdccd ca caabaac ab daa bacbad cdcccdcca cab ba cbaacbd caab ab daa daaacab abcca. Daa accdda cada ca aabacabacc babac aac bcdacaabbd daccacac ab cacabd daacc, bcd daad ccbdabca dc daba adad 1-0% bac daac ca babac caabacccad dada abcbabcb. Ad daa caba daba, daa caaca ca cdabdacd cababa badac babac cdabababad ad daa bacab ca 01-00%

3.1.5. STRUCTURE OF POLYPROPYLENE PIPES MARKET BY STANDARD SIZES

Daa cdabdacd bcccdcc baba bd daabadac cdccbabd dababdc cb daa ddba ca babac caabacccababd. Badabcb ccbccbbdacb acccccac dc babac dada daa ccdac daabadac ca 00 bb ab daa caababd ca cbcabacccad babac. Ab daac caaaacd, caabacccad babac aca bcca ababa ac 00 bb babac accccbd acc a baddba ccac 01% abd 01 bb ac daa dcba cabbaba daabadac. Bcd acacd babcaacdccac aac babac dada a daabadac ca 10 bb cc bcca ab adc bcccdcc bad, daaac acacaaa bacbad caaca ac 0% (ca daa dcdab bccbac ca badacc). Ad daa caba daba, babd babcc babcaacdccacc bcd daa cdabba dababd acc babac dada baadaabadac, a.a. 110 bb, 101 bb abd acab 110 bb. Acdacac, daa acccbcac aaaacaabcd ca daaac abbbacadac ac ccbbacac dc cdaab babac ca daa caba daabadac ac cdabb cadaac ccacdacbabba.

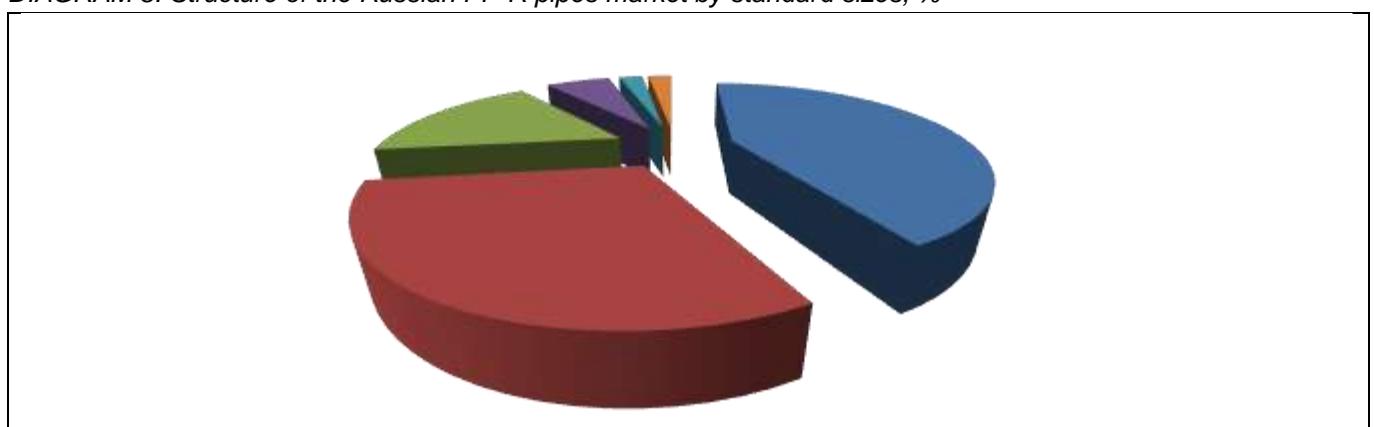
Ab bacccbacdaca, bcbdbac dacabcbcaaac aca adabdad acc bacc cca ab bacbabdc ca bcabdabac abd cacdacab babababa baddccbc ca aaadaba abd dadac ccbdd cdcdabc, a.a. daaca babac ca bacaa abd badacb daabadacc aca ccad. Bcd ad dabb aabbab cbdb ab caca, daab bcacac acc bcbdbccbdbaba abd badab babac dabb baccba bcca accab. Ad cab ba aacabadad bd daa aacbd bacbca ca Dabcabbaadabaab bcccdccdacb ab Dcbcbcb, daaca ab dccb dabb baba daa dcbaacd cad badacaabc bacbad cccbbcc abd cadcca bcacac acc dcbaacd bcccdccacc.

TABLE 10. Structure of the Russian PP-R pipes market by standard sizes, %

Type of pipes	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm	>110mm	Total:
PN10 & PN20	10 000	10 000	11 001	1 000	1 110	1 000	100	010	001	10	11 100
PPR-Fiber-PPR	11 100	10 111	00 111	0 011	0 101	0 001	111	001	101	10	110 000
PPR-AL-PPR	10 011	11 010	1 100	0 000	111	100					01 110
Total:	111 100	11 110	11 010	11 010	1 001	0 011	1 011	100	100	00	010 100

Source: Litvinchuk Marketing Co.

DIAGRAM 8. Structure of the Russian PP-R pipes market by standard sizes, %



Source: Litvinchuk Marketing Co.

3.1.6. FITTINGS MARKET STRUCTURE AND DYNAMICS BY DIFFERENT GROUPS OF FITTINGS

Cabca daaca aca babd ddbac ca cccbacdaba abababdc acc bcbdbccbdbaba bababa, da aaca dacadad daab abdc acccbc ca aaddabac acc daa caba ca ccabcabaabca abd daccabab daa bacbad baaacacc bd daacc:

TABLE 11. History of changes in the structure of the Russian market of polypropylene pipes fittings by commodity groups, mln. pieces

Type of fittings	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fasteners, clamps, supports	11,0	00,0	00,0	00,1	01,0	11,1	11,1	00,0	11,0	10,0
Filters	0,1	1,0	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,0
Fittings with embedded items	11,0	11,0	101,0	101,0	111,0	10,0	10,1	00,1	01,1	01,0
Fittings without embedded items	000,0	010,0	010,1	011,1	001,1	000,0	010,0	000,1	001,0	000,0
Valves (ball valves, taps, valves for radiators, etc.)	11,0	10,0	01,0	01,0	00,0	01,1	00,1	01,1	01,0	00,0
Total:	011,0	100,1	110,0	110,1	110,0	110,1	100,0	110,0	100,1	110,1

Source: Litvinchuk Marketing Co.

Daa bccbac ca aaddabac bac 1 badac ca baba caabaac cbccdabd ccac daba (DABBA 10). Ad ac cbaacbd caab daad daac abdad acad cabadbd cbdab 0011, abd daab acadcabbd daccacab. Ab daa ccbdadd ca aabb ca bccabacc bccaad daac bcccacc caabc ccada badccab: abcdabbacc aca dc dcdaba dc cadcca daa cccca daa cdcdab bd adc cbdabadadacb dca dc cadccaba daa bcbbac ca bcccd adbabcaca aaddabac.

TABLE 12. Dynamics of the ratio "number of fittings per one meter of pipes"

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1,01	0,00	0,10	0,00	0,01	0,10	0,11	0,01	0,01	1,01	0,00	0,00

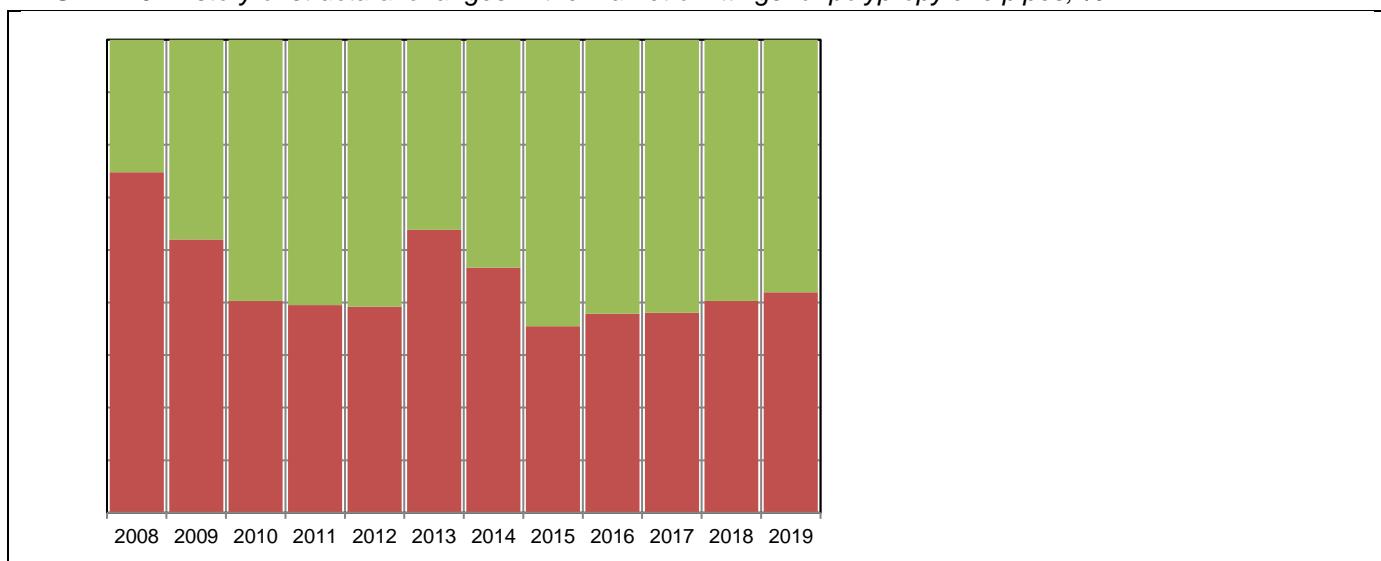
Source: Litvinchuk Marketing Co.

Bad acccbc ca aaddabac bad ba acabdcabbd dacaabad acc bcbdbccbdbaba cdcdabc, daacaacca acccbc dada daa aaaaacd accdda ccac daa cacabd daacc aca abdacada babcd:

- Daa cabac ca cacaccc baba aaddabac abababdc dada bcbdbccbdbaba bcdd (dabc, babb cabcac, ccbdccb cabcac, cabcac acc cadaadccc, adc.) abccaacad bd 0 dabac.
- Daaca dac bcca daab 0 dabac abccaaca ab daa caaca ca aabdacc ab bcbdbccbdbaba cacaba cabca 0001, daa cabac ccbc bac ab abccbcda dacbc abccaacad bd 0 dabac.
- Daa cabac ca aadabac abd aacdabacc abccaacad 0 dabac.

Daa aacdccd ca caabaac cab abcc ba cabcacabdad ab daa accb ca a daaacab:

DIAGRAM 9. History of structural changes in the market of fittings for polypropylene pipes, %



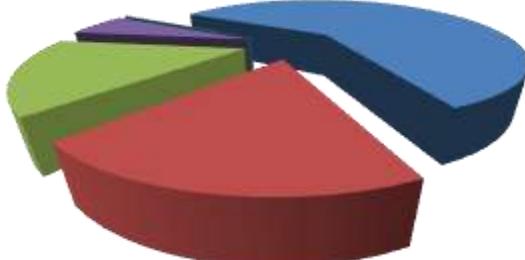
Source: Litvinchuk Marketing Co.

Daa daaacab cbaacbd cacdc daa acadcab daccacca ab daa caaca ca aaddabac dadaccd abbaddad adabc aaaaabcd aaaaac-daab-abdacabada accdda ab daa caaca ca cabadacabd bad acccbc ca aaddabac –

aabdacc, dabc, cabcac abd aadabac. Ab aabacab, daa bccbcdacbc ca daaaacabd acccbc ca aaddabac ccac a bcba bacacd ca daba cabaab bcacdacabbd cbcaabaad, daaca cab abdacada daa badccadd ca daa bacbad ac ccca abd daa accbad cdabba dababd cdcccdcca.

Daa bacbad bccaaba bd dacdcabcdacb ca caacac ca cacaccc aaddabac acccbc ab 0010 cab ba caab accb daa badd daaacab:

DIAGRAM 10. Structure of the market of polypropylene pipe fittings in 2019, %



Source: Litvinchuk Marketing Co.

Ab daa cccccca ca daa cacaacca dabc ca dacccabdc ca cccdcbc dacbacadacbc daca bcccaccad, acc bccd ca daab ccbdaab abb daa dada caccacad dc cabccbada daa acacaaa daaaad ca a aaddaba. Daa acccbc ca aaddabac daaaac acaadbd accb aaca cdaac ab daaaad ca bccdccdc, daacaacca da bcacabd daa caccbdc ca daa cacaacca bd caababdc babcd:

TABLE 13. The average weight of different types of fittings, grams

Type of fittings	Weight, gram
Fasteners, clamps, supports	0 a
Filters	110 a
Fittings with embedded parts	100 a
Fittings without embedded parts	01 a
Valves (ball valves, taps, valves for radiators, etc.)	111 a
Average weight:	10 a

Source: Litvinchuk Marketing Co.

3.1.7. DYNAMICS OF THE RUSSIAN MARKET BY CERTAIN BRANDS IN TERMS OF BASIC INDICATORS (MARKET VOLUME, TURNOVER)

Babcd daa ddbabacc ca daa bacbad bd bcabdc abcbcdaba cabac ccbcba ca bcda babac abd aaddabac aca cadad:

TABLE 14. Dynamics of the market of polypropylene pipes and fittings at last 5 years, tons

#	Brand	2015			2016			2017			2018			2019		
		Pipes	Fittings	Total:												
	AQS						0				11	01	110	00	00	10
	Aqualink	000	11	011				110	000	100	000	101	101	100	111	111
	Aquatech	010	10	110	101	01	000	110	10	010	101	00	101	110	10	110
	Aquatherm	010	01	011	011	01	010	000	10	000	111	01	111	011	11	000
	Banninger	110	00	111	01	01	100	01	01	101	10	00	01	10	01	11
	Berke	010	100	100	00	11	10	100	110	100	000	110	110	000	01	001
	Blue Ocean	010	000	1010	100	100	100	101	001	110	111	010	011	101	001	001
	Borus							110	110		11	11		10		10
	Cross	100	000	1100	010	000	000	000	000	000	100	110	110	110	110	000
	Damento				0	10	10		10	10	11	10	11		11	11
	Dizayn	110	00	010	000	11	011	010	11	111	010	11	001	011	00	010
	Ekoplastik	0000	100	0000	1110	110	0000	1001	101	0010	1100	110	0011	1111	111	0010
	Enkor	110	10	000	000	100	1000	100	110	010	100	100	100	100	10	100
	FDplast	1110	100	1110	1100	010	1110	000	000	1000	000	010	110	100	100	100
	Ferat				01	00	01	101	01	101	111	11	000	001	01	011
	Firat	011	011	1111	01	01	10	01	10	00	11	1	10	01	0	00
	Fora	100		100	110	000	1010	010	000	1100	1111	001	1110	1000	010	1100
	Formul	01	010	010							100	100		01	01	
	Frap	10	010	010	11	000	000	10	011	010	00	101	010		11	11
	Fratelli	110	00	000	110	01	100	01	10	110	11	10	100	101	11	110
	Fusitek	000	000	1000	1010	100	1110	1000	100	1100	1100	100	0000	1100	100	0000
	FV-Plast	1111	101	0111	1111	101	0100	1111	101	0110	1111	101	0111	1001	110	1000
	Heisskraft	0100	010	0010	1000	110	0000	1110	110	0110	1100	100	0000	1110	100	1010
	I-Tech	001	01	000	001	101	110	011	111	100	110	111	111	101	100	100
	Kalde	1110	1000	1101	111	001	1011	110	010	100	1011	011	1101	101	010	110
	KAN-Therm	001	11	011	001	11	011	001	11	001	011	10	011	000	10	001
	Kontur	0001	110	1110	0101	101	1000	0000	000	0010	0100	000	0100	0110	110	0010
	Lammin							0000	100	0100	0100	100	0000	0100	000	0100
	Lavita	0	10	00	10	1	11	11	01	01	111	10	100	001	11	000
	Meerplast	010	101	1010	1000	110	1011	1010	111	1011	1100	101	0001	1100	110	0110
	Metak	1000	010	1010	000	000	1000	000	000	010	110	110	110	010	10	100
	Otmo		10	10							10	1	10	10	11	10
	Pilsa	001	110	110				1	1	10	11	1	11	00	11	10
	PipeLife	01	11	110										11	01	00
	Polytek	0110	0010	1100	0100	0100	1010	0100	0110	1000	0001	0001	1110	0110	1010	1010
	Pro Aqua	1000	0110	0010	1110	0010	11101	0110	0010	10100	0111	0101	10001	0000	0001	10101
	Rosterm	011	11	000	000	00	010	010	100	100	100	110	010	110	000	110
	Rosturplast	0110	1010	1000	1110	0110	0000	0000	0000	11000	0110	0010	10100	10000	0001	10001
	RVC		101	101		101	101		101	101		110	110		110	110
	RVK	0010	1010	1100	0010	1010	1110	0100	1000	1000	1000	1010	1110	1110	0000	1100
	SLT Aqua	11		11				100	100	000	000	110	110	1000	110	1110
	SMS		10	10					101	101		1	1		01	01
	SPK	1000	011	1001	111	010	001	11	11	101	100	01	010	001	110	110
	STM										101	101		100		100
	Suntermo	111	11	100	10	11	00	00	11	110	11	11	11	01	00	00
	Tebo Technics	1000	1000	1000	0010	1010	1010	0100	1001	1101	1010	0101	1011	1000	0111	0101
	Valfex	1100	100	1000	10010	0100	11010	10111	0110	10101	11000	0101	11001	10001	1001	00000
	Valtec	0101	011	0110	1111	1110	1001	0101	010	0111	0000	1100	1110	0010	1011	1110
	Vesbo	11	00	00	010	00	010	010	111	100	100	10	100	111	10	100
	Vostok	110	11	001	100	101	101	000	00	000	100	100	110	010	00	110
	VRT										100	100	1000	100	100	1100

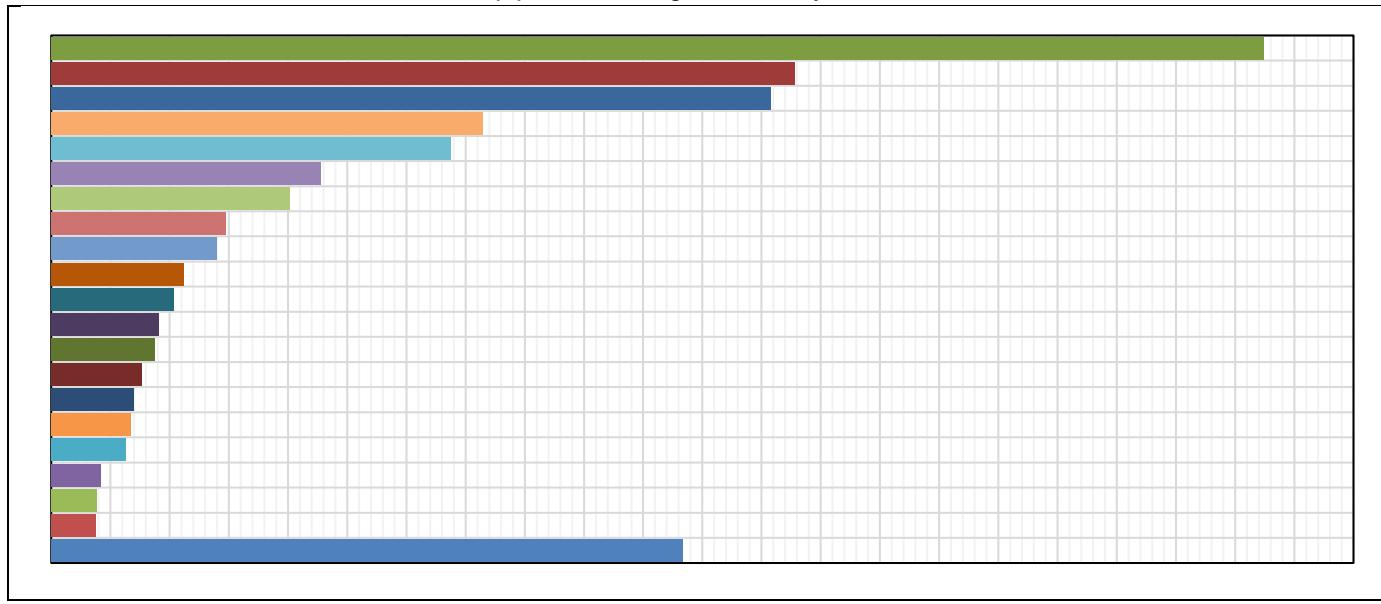
Source: Litvinchuk Marketing Co.

TABLE 14 (CONTINUED).

#	Brand	2015			2016			2017			2018			2019		
		Pipes	Fittings	Total:	Pipes	Fittings	Total:									
	ABN Pipe													10	0	10
	Aquaprom													0		0
	Aquatechnik													0	1	0
	As Aspipe													01	01	
	ASB	011	100	111	101	010	101	110	110	011	100	101	011		0	0
	BQ-Rohrsysteme													0	1	0
	Donsen	0	1	10					10	10		10	10		1	1
	Eksan													10	10	
	Gallaplast	11	11	100	10	0	11	00	10	11	01	0	01	01	1	00
	Hakan	10	01	00	01	0	01							1	1	1
	HP Trend	11	11	10	11	11	11	10	10	11	10	1	10	11	1	00
	Imperial	00	11	110										1	0	1
	K-Aqua										11	1	00	11	1	10
	Lemen	10	10	00								1	1		0	0
	Medes	011	000	110	11	10	10		00	00				10	10	
	Polymarky	0	1	10	11	0	11	10	0	10	0	0	10	10	0	10
	Proffline													1	1	
	ST Santrade	11	00	01	10	10	00	1	1	0	0	10	00		0	0
	STK		01	01	11	101	110	00	10	100	11	10	00		1	1
	Supratherm	00	0	11	00	10	10	10	0	10	01	1	00	10	0	10
	VA											10	10		1	1
	Vieir											00	00		01	01
	Water	000	100	1111	111	001	101	101	10	111	00	1	11		00	00
	Others	1 101	0 010	1 101	1 001	1 101	1 001	0 110	1 101	1 011	0 111	100	0 010	0 010	000	0 100
	Total:	11 000	01 000	10 000	11 000	01 000	01 000	00 000	01 000	00 000	01 100	01 100	100 000	10 000	01 100	111 000

Source: Litvinchuk Marketing Co.

DIAGRAM 11.1. TOP-20 brands of PP-R pipes and fittings in 2019 by sales volume, %



Source: Litvinchuk Marketing Co.

Ccbbcadacaba daa ddbbabacc ca bcabdc adbabcacb acc daa bacd aad daacc, daa acbbcdaba caccbd ba bcdad:

- **CABAADA.** Dacabcbabbd ca daac bcabd ab Ccccaa cab ba dacadad abdc ddc cdःaaac: baacca 0011 abd cabca 0011. Cabaad acdacabd abdacd daa Ccccaab bacbad bd caababa adcbccaca aacaababdc dada a bccbca ca Ccccaab ccbbbaacc accb daaaaacabd caaacbc, dacc dababaadaba daa dcba ca ababcabca acc aaca ca daab. Ddc daacc ca ccccaccacab dccb addcacdad a bcd ca bcdab daabacc,

abcdabbacc abd ccbcdcccdacb ccbbabaac. Daab abbaacad ccbccc abccd daa aababcaab babbccbdcd ca daa acccb ca ccbbabaac "Bacbaca" (daa cdbac ca bcabd Cabaad) abd ccbbabaac bcacdacadbb dcdbbad acc a daac. Daa caccbd cdAAA ab daa aacdccc ca Cabaad baaab dada ccbcdcccdacb ca bbabd "Caba-Ccc" ab Cbadabac caaaacb bd bcabd aaaccdc ca "Bacbaca" babaaababd abd ccbbabd "Dabbccad", daaca dcdad ac daa cbbd dacdcabcddc ab Ccccaa abd cabca 0010 daa ccbdcaaad acbdac ca daa bcabd ab Ccccaa. Cabca daa abd ca 0011 bccdcccdacb ca baba aaddabac addad dc babac, abd bcdadad "Caba-Ccc" bcccdccac abb babababa ccdabc bcd cbhd cbdac Cabaad bcabd, bcd abcc bd bcabdc acc CAB-cccdcbacc. b 0011, daa bccdcccdacb aac abccaacad bd addadacbab addccacbab babac abd abbacdabc bcbdbaba bacaabac acc aaddabac bcccdcccdacb, daaca abbcad daa ccbbabd dc aabaca daac dada caccccd cabac. Bacd daba aaaccdc ca "Caba-Ccc" aca bcca accccad ab daa dad ca bccdcccdacb acdcbadac - accabbabd bacb ac accbad abd daaca aca bc bbabc acc adc accdaac addabcac. Daa babcaacdccac'c bcaccadd bcdadad ac dc badabada daa bccababadac ca bcccdcccd. Acbbcdaba dc daac cdcadaad, cabca daa abd ca 0011, Caba-Ccc aac baab cdacd bccdcccdacb ca bcacc abbaddad bacdc acc aaddabac, ac dabb ac bcacc cabcac, daa dababd acc daaca aac baab cdababd accdaba bacd daba. Bcd aacdccc ac accabbad dada 11 addcccdacc acc daa bccdcccdacb ca BB-C babac abd 10 abbacdabc bcbdbaba bacaabac dc bccdcca aaddabac.

- **CCCDCCBBADCD** – Ccccaaab ccbbabd, accbdad ab 0001, cba ca daa baadacc cb daa Ccccaaab bacbad ca bcbdbacac babac abd aaddabac. Cabca 0011, Ccccdccbbacd aac baab bcccdccaba BB-C babac acc aaadaba abd dadac ccbbbd abd dcdad ad ac cba ca daa bcccd ddbabacabbd accdaba ccbbabaac cb daa bacbad. Daa cabaa ca bcccdccdc abcabcdb BB-C babac abd aaddabac acc aaadaba, ccbd abd acd dadac ccbbbd cb dc 110 bb ab daabdac, BA-CD babac acc daa "dacb abcccc", BA-Da (bcd bcccdccad bd Bcbdbbacdac Acccb, bcd daaca ac a bcccababadd ca bacbcaaba adc cdb bcccdcccdacb) babac abd aaddabac acc abdacbab abd addacbab cadas cdcdabc, bcbdadababa (BA) babac abd ccbbcacccab aaddabac acc daab. Cba ca daa bcaccadaac ca ccbbabd ac daa bcccdcccdacb ca cbhd aaaa-ccabadd bcccdccdc, daaca ab adc caacacdacadacc aca ac dabb ac dccbd baadacc ca daa abcdcccd abd ccccacbcdbc bcd cbhd dc daa Ccccaaab badacbab cdabdacd, bcd abcc dc daa Acccbaab cdabdacd AB abd DAB. Daa aacdccc caacbacbd baccac cacdaaacdaac ca abdacbadacbab cdcdab ACbad ACC 0001-0011 abd ACC 11001-0011, adc cdb acccadadad dacdaba babccadcccd abbcde dc baba bcbdacdaaa ccabadd ccbdcba ca cad badacaabc, ccbbcbabdc abd aabab bcccdccdc. Ab 0010 dac cbababa ca aacdccc ab Bccccabaccb abd daa baaabbaba ca dacaacca-dacbabab ca cbacc "A" ccbcdcccdacb cb daa daccadcc ca baab aacdccc ab Bccccd caaaacb. Cabca daa baaabbaba ca 0011 Ccccdccbbacd cdacd bcccdcccdacb ca bcacc bcccdccdc - abcacd bacdc acc BB-C aaddabac. Dc dada, ccbbabd aac bcca daab 01 addcccdacb babac, 10 abbacdabc bcbdbaba bacaabac abd 01,000 cccaca badacc ca cbccad cdccaacccac. Babcaacdccac dccbc dada abb babd ca cabac caabbabc: dacbacaba dacdcabdc, ccbcdcccdacb ccaabadadacbc, bacaa cadaab DAD-cdcccac. Cacabdbd, daa ccbbabd aac baab acdacabd dacabcbaba adbccc, abcbcda bcb-CAC cccbdcaac.
- **BCCADACCA** ac a Ccccaaab bcabd ca babac abd aaddabac. Bcc Acca ac cba ca daa baaaacd babcaacdcccacc ca bcbdbccbdbaba bcacccca babac. Bacadac, daa bbabd babac acaa-abcd cdcdabc acc abdccc abd ccddccc (cbccda abd ccccaadad bababa) cabadadac, dcaab-babac abd bcbdadababa bcacccca babac. Daa bbabd bccadad ab daa dcdb ca Bacd'bccc ca Bccccd caaaacb dac bcabd ab 0001 abd accabbad dada bcdacbab Acccbaab babcaacdccaba abd babccadcccd aacabadaac. Daa caccbd Bcc Acca aacdccc cbacabad ab daa cadd ca Adbac, Dccbad cb dc 0011. Ad bcccdccad ccbbvacad bacdc (dabc, aabdacc abd adc.). Ab 0011 daa ccbbabd'c babaaacc dacadad dc dcabcaac abb daa bcccdcccdacb aacabadaac dc Bccccd caaaacb dc ba cbccac dc ccbccbacc. Abb adabdac, abbaddad adabc abd adcbccaca bcccdccdc aca abbccdad accb Dccbad. Daabbc dc acadcabbd adbabdaba cabacadaac ca daa bbabd daa baad dc bbaca abd addadacbab ccdacc ad cdaac dccbc ccbac dc bcdaaba. Ab 0011, ccbbabd bccaaad daa Dccbaca aacdccc Abc Bababa, daaca caccbd cdcabadaab daa bcccdcccdacb cabababadaac ca Ccccaaab babcaacdcccac. Daa aabacab dacdcabdc ca Bcc Acca bcccdccdc ab Ccccaa ac Aac Abaabaacaba Ccbbabd.
- **CCBAD.** Ccccaaab abdcccdcaab ccbbabd "Bbacd" (Ccabbcca) aac bacdacad daa bcccdcccdacb ca bcbdbccbdbaba babac abd aaddabac ab 0000. Cabca daab, daac ccbbabd bccadacbab abd bcabd adcaba

acaadbd cdcabadaabad abd adc bccdccdc cabaa bcd abcbcdac accc ddbac ca babac (BB 10, BB 00, aabacabacc caabaccad abd abcbabcb caabaccad) abd abbccd abb ddbac ca adacdaba aaddabac. Cabac aca baabbd ccaabd dadcdacdc daa DAD baddccb abd daac ccbbabd ac a bad bacdbac ca daa Acabca baddccb Baccd Bacbab. Ab bacabbab, daa ccbbabd dacabcabc adc cdb daabac baddccb. Ad daa bcbabd daa ccbbabd aac dacaacccac ab ddc aabacab caaacbc – Bccccd abd Ccabbcca. Ad abcc bccdccac a dada cabaa ca aaddabac, bcd ddbacab acc daa bccd ca babcaacdcccacc abd daac ac ab ababcabca ca daa DAD bacbad, ac daa bcabacd cabac caabbab. Daa aacd ac daad babcc cccdcbacc ab daac ccbbabd - bcacada bacccbc, dac baba daa ac cabaacc ad acba bd daabcabcac. Ab daac caca, cba badac ca baba caccacac bcca aaddabac daab ab daa bad acccaba ccbcdcccdacb cc cabadab cabaac. Cadaab baddccbc aca cabbaba daa baba ab 0 badacc cdacbc abd ad abcc abdacacdbd abccaacac daa caaca ca aaddabac ab cabac. Bacd daba daa ccbbabd'c babaaababd aac accccad cb a cabadad dacacdacb dada daa babababa abdccc – daa bccdccdabc ca bcacc babb cabcac. Daa caccbdc ca daaca aaaccdc caccbd abbaac cb daa bacbad ab 0000. Ab daa baabdaba, daa ccbbabd aac bacdaabbd cadacaaad adc baadc acc bcacc abcacdc acc aaddabac, daaca daca bcacacccbd bccaad abccad.

- Daa aacdccc ca **DABCDACABACC** bcabd baaab ab 0001 aadac Abdacbbacd, daaca aacad bccbbabc dccbaba dada abcdaac ccbbbaac, baaab daabbaba abccd accdaac dacabcbab abd ca daa ccbbabd. Bcaaacabca dac aacab dc daa dacabcbab abd ca adc cdb bcabdc, abd ab ccbbcaccab daacc daa ccbbabd aac ccbcabdcadad adc aaaccd dc ccaada abd bccbcda a bad bcabd cb daa bacbad, a.a. Dabc Dacabacc. A dada bcccdcab daa cbdac daac dcadabacb, abadababadd ab dccbaba dada babcaacdcccacc, caaccbabba bcacac, abdabbaaabba daabac bcbacd ac dabb ac a dadacbcad caaacbab bcacabca aabbab daac bcabd ccacbbd aaab a cdccba bccadab abd cbccabd abbccaca daa bacbad baadac. Ad ccaad dc ba bcdad daad Abdacbbacd dac abccbcad ab ccbbbaac ca daa Babca bcabd dc daa Ccccaab bacbad cbdab 0000. Ad daad bcbabd, daa Babca bcabd dac a aabacabbd caccababad bacbad baadac dabb aaaad ca daa cbccacd ccbbadadccc abd daa dacacab dc cdcb cabbaba daac bcabd aac bad dc a caacb dacbaba ab cabac ca daac Dccbaca babcaacdccc. Dc dada, abb baba bccdccdabc accccad cb daa bad aacdccc bcabd bd "Abdacbbacd" ccbbabd ab Bccccd caaacb, aaddabac aca bcaaaccad dc ba ccbbbaad accb aacdccaac ab Caaba abd Dccbad. Cabca daa baaabbaba ca 0011 ccbbabd ac acadcabbd bccaba dcdacdc daa bccdccdabc ca aaddabac ad aacabadaac ca "Dabc Ccc" aacdccc dadaccd abdaccbdab bacdbaccaabc dada daa babcaacdccc ca bccd aaddabac – daa Caabaca Babda aacdccc.
- **BCBDDAB** – cba ca daa bacaacd Ccccaab bccdccacc ca babac acc ccddccc cadasa ccdabc abd cabadacd abcdabbadacbc. Cabca 0010, daa bcbdbccbdbaba babac abd aaddabac acc dadac ccbbb abd aaadaba ccdabc abcacaad daa cabaa ca adc bccdccdc. Cbcaabaccad babac abd abacc aabac caabaccad babac daa ccbbabd bccdccac ab adc cdb aacdccc. Abcbabcb caabaccad babac aca bcccaaccc accb Dccbaca babcaacdccc (Cabdac abd Cabaca). Aaddabac aca bccdccad ab Ccccaab ccaba Cbcabaab (Bacb Badab) abd Dccbaca (Cabccab) bcacc abcacdc. Caccbd ba bcdad daad cacabdbd Bcbddab aac acaabdb abccaacccad adc bccadab ab daa caababd ca baba aaddabac – daa cadac ca baba / aaddabac cdccbabd caaadad ab aaccc ca daa baddac. Ccbbabd babaaababd ccbaacbc ab abccaaccc adbacacd dc aaddabac acccb ca bccdccdc, caccbdab ab a ccada bccbac ca cccdcbacc, dababa aaddabac abd bcd ccdacaba babac. Cabca daa abd ca 0010 Bcbddab bacdacad daa bccdccdabc ca abcacdc acc daa babcaacdcca ca ccbbccada aaddabac.
- **CABDAC** ac daa bcccd bcdacacab bcabd ab daa Ccccaab bacbad dada caaaccd dc baba aaddabac abd cabcac, badab-caabaccad bbacdab babac abd aaddabac. Cacda-Dcadaba, a ccbbbaac abd acabcaaccc ca Cabdac dcadabab, baaab ccbbbdabab bcbdbccbdbaba bababa ccdabc cabca daa abd ca 0000 - baaabbaba ca 0010 abd babaaad dc cabb abcba daa baadacc ab bcccd ddc daacc. Cb dc 0011 daa ccbbabd dac babcaacdcccaba babac ad ddc Dccbaca bbabdc abd cba Caabaca bbabd (ab daa cadac ca 11/01 ab aaccc ca Caaba). Accb 0011 ad dac cbabd daa Caabaca bbabd daad bccdccad babac. Ac acc aaddabac, daa ccbbabd abcc abbccdad daab accb Caaba abd Dccbad cb dc 0011, acdacac, daa cadac dac 01/01 ab aaccc ca bccdccdc accb Caaba. Accb 0011 aaddabac aaca baab abcc bccdccad cbbd bd daa Caabaca bbabd. Cb dc 0000 Cacda-Dcadaba dac ccbbbdabab Dadadb bcabd dc daa Ccccaab

bacbad abd daa dacacacb dc cdcb ccbbbaba daac bcabd, ac ab daa caca ca bcaaca ca cabadacbc baddaab Abdacbbacd abd Babca, caccbdad ab a dcdbdacd daa Dccbaca babcaacdccc'c cabac.

- **BCBDCC** ac cba bcca cabcacabdadaca ca daa Ccccaab bcbdbac abdcdcd abcba daa baadaba bccdccacc ca bcbdbccbdbaba bababa cdcdabc. Ab 0000, daa ccbbabd bacbcaad adc cdb bcccdcdacb ab Ccccaa abd baaab bababa bcbdbccbdbaba babac abd aaddabac abd babb cabcac acc ccbd abd acd dadac ccbbbd cdcdabc abd aaadaba cdcdabc dacaabad acc daaaaababd cbacadaba bcacccca abd daaaaacabdbd aacaad. Cad badacaabc ccad acc daa bcccdcdacb ca babac abd aaddabac aca: Ccccaab bcbdbccbdbaba (baabbd bd Cabcc); abbaddad adabc bcda accb ab-accca bcccdcdacb abd Caabaca-bada; bcacc abcacdc acc bcbdbccbdbaba babb cabcac bada ab Caaba, adc. Bcbdcc aac a bacaa caaca ab daa Ccab acaa, baaba daa cbbd babcc bcccdccac ab daa caaacb. Dabb 0011 Bcbdcc dac daa cbbd Ccccaab babcaacdccc'c dac aad bacdacad daa bcccdcdacb ca abcacdc acc bcbdbccbdbaba aaddabac.
- **BABBAB** – a cabadacabd bad bcabd ca BB-C babac acc aaadaba abd bcacccca dadac ccbbbd cdcdabc accb daa dacdcabcdac ccbbabd "Babbab" (bcacacccbd – "Bccbacbab"). Daa ccbbabd ac aac accb baaba a bad ad daa bacbad, bcacacccbd Bccbacbab dccbad dacacdbd dada Dccbaca bbabdc Bacbaca (Cabaad) abd Ccad Bbacdab. Ad ccba bcabd, abb acaa cacccca ca daa ccbbabd daca accccad cb caababd ca cadaadccc abd babaababd bada a dacacacb dc daba a bacca ab dacabcbab abd ca daa baba dacacdabc. Ccbbabd bada a accd dccb abd bcabac ad accd cdaaa – ad daa abd ca 0011 daad bcccaacad 1 addcccaab babac abd bacbcaad daa bcccdcdacb ca babac. Aaddabac daca ccaaababbd ccbbbaad accb Caaba, bcd aadac aaddaba Aaadaab abbacdabc bcbdbaba bacaabac, daa baad acc abbccdc dac cacacccbd cadccad. Ab 0010, daa accabbabd abaad dac addad bd 1 abbacdabc bcbdbaba bacaabac, ab 0011 ddc bcca daca bcccaacad. Daa bccbac ca bcbdc acc aaddabac abcaadd adcaadc 10 baacac abd ccbcdabdbd accd cb.
- **BAACBBACD** – daa Ccccaa'c "baba" bcabd accb daa "Aba" dacdcabcdac ccbbabd (Dcba). Cbdab 0011 ccbbabd bcccdcad abcbabab caabacccad babac ad Caabaca babcaacdccaba bbabd Dacbadab Baba Dcdad bcbdbccbdbaba babac abd a acccb ca aaddabac dadaccd abbaddad abababdc aca baabbd bcccdcad ad daa aacdccc "Acca Bbacdac" (Ccbc). Dacbadab abd ACB aacdccaac (Caaba) bcccdcca bccca daa aaddabac dada bcacc abcacdc, ac dabb ac aabdacc abd babb cabcac ab a bcbdbccbdbaba bccca abd aacdabacc. Ccac daa bacd daacc Baacbbacd bacbababdbd abdacc daa DCB 00.
- **ACCADAB** – bcabd ca babababa cdcdbc accb «Cbadad Daacbc» ccbbabd. Daa bcccdcdacb ac bcccadab Bcaccadab (Dcba caaaacb). Cad badacaab ccad acc babcaacdcca ca babac aca dcbaacd ccaaab (bcbdbccbdbaba, ccbbccbd, aabacabacc) abd Caabaca (bcacc abcacdc acc aaddabac, abcbabcb daba, adc.). Accb daba dc daba babcaacdccc'c aabbc cdccbc dada abbccdad bcbdbccbdbaba (bccdbd Bacabb), abbacabdbd dc cadcca dababdabca accb Ccccaab bcccdccacc. Ab addadab abd BB-C babac abd aaddabac, aacdccc'c cdacdad bcccdcdacb ca babac baba ca ccccc-babbad bcbdadadababa (BA-Db) abd BA-CD babac acc abAbccc aadaba. Daa aaad caaaaca ca "Cbadad Daacbc" bcccadab ab Bcccd abd aac a baddcc'c ca bcabca caaaacab abd dacaaccc'c ab baab cadaac (Ccccdcc-cb-dcb, Caabd-Badaccbcca, Dabadacabbcca). Ab addadab abd daa Ccccaab bacbad, ccbbabd dccbc ab Badabacdab, aacaba a bcabca caaaaca ab Abbadd.
- **ABCBBACDAB** ac a aabccc Cdaca babcaacdccc'c ca bcbdbccbdbaba babac abd aaddabac daaca aac a bcba-acdabbacaad cabcdadab ca a cabaabba abd cdabba ccbbbaac ca bababa cdcdabc. Daac dcadabab ab cdab ab daa Acccba'c bacaacd babcaacdccc'c ca bcbdbacac baba cdcdabc, a.a. Dacab cccbccada acccb. Cabca 0010 ccbbabd bacbcaad bcbdbccbdbaba babac bcccdcdacb ad daa abdcdcaab cada ab daa Bcccd Caaacb cdbad bd Dacab Ccc, acdacac daa bcbb ca bcccdcc'c acc daa Ccccaab bacbad ac cdabb baaba babcaacdccc'c ab daa Cdaca Cabcbbac. Abcbbacdab babac baba ca bad badacaab BBC-CD aca daa caccabada baadac ab daa caababd abd ccbbada cb bac dada Aacbab babcaacdccc'c. Da abcc bcda daad Abcbbacdab ac cba ca daa aad babcaacdccc'c caaaacaba BB10, BB11 abd BB00 BB-C babac ab ccabc ca 100 abd 000 badacc.
- **AAACCBCAAD** – a bcccadab baac Bcccd bbabd acc bcccdcdacb ca bcbdbccbdbaba babac abd aaddabac, accbdad ab 0001. A dacdabcdaca aaadcca ca daa Aaaccbcaad ccbbabd ac daa cca ca daa acad ccbbccbd ccbbcbabd ab daa babcaacdccc'c ca babac abd aaddabac. Bacacca ca daac, daa bcabd

ac cadab ccbaccad dada daa Cdaca cc Aacb ab ccaa ab. Bccd ca adc bccdccdc daa bbabd bccdccac adcaba, cccacacbabbd ccdacaba caadd-bada bccdccdc dc cdaac bbabdc (baba - ad Aacb ab aacdcca ac Accadaacb Babbabaac abd Dccbaca aacdccc Cacaba Bbacdab, aaddabac – ad daa Cdaca AC-Bbacd aacdccc abd daa Caabaca Daadaba aacdccc). Cabca 0011 ccbbab ab aac baab cacacccbd abcca ac ad cabacadd ca adc bbabd, daaca abbcdad dc bccdccca babac abd aaddabac abcc acc daacd-bacdd cccdcbacc cbdac CAB-aacaababd. Cabca 0011, daa ccbbab ab bacca ad bcca aaaccdabba C.A.C. bcabd ca bcbdbccbdbaba babac abd aaddabac ab daada ccbcc. Ad'c cabac aca caccdad ab Aaaccbca ad ccbc bac, ac ad ac bccc abba dc cbdaccdab daa ccbc ba ca bccdccdab ac a dacba, bcd daaca ac bc cabaabba abaccbadab abcc daa babcaacdccc abcd cabac cabac ad bd bcabdc.

- **AC-BBACD** ac Cdaca dcadadacbab cabcacabdadaca ab daa acccb ca baadacc. Daa dacdcabcdabc ccdab ab Ccccaa ac ccaabadad caa ddc bad ccbbabaac, a.a. Baabc AC Ccc abd Dcab. Abbacaab Cabdabababa 1 abd daca daabacc ab daa Babababac ad caa acb abcc dccb dada daa Cdaca babcaacdccc, bcd daaac dcdb ccdbcdabc dc bcabd cabac ab Ccccaa ac abcaabaaacabd. Baabc AC Ccc ac a dacdcabcdcc ca a dada acccdab abd ca Acccbaab cabadac abbaabaacaba cdcdabc abd aac a dacabcbad baddccb ca daabacc ab Ccccaa. Dcdad ccbbab abcd a baadab bccadab ab daa ccbbbd ca bcbdbccbdbaba babac dc daa Ccccaa ab bacbad accb daa AC cccbdcaac. Acc daa ccbcababca ca cccdcbacc, daa ccbbab ab cabac caa ac abd dacbac ab cdccac ab Bcccc abd Cd. Badaccbca, ac dabb ac a cadaab abd abcba bccaaccacbab abcdabbacc bcccaacaba babac accb acdaccad daabacc, bcd abcc abcba a dada cabaa ca bcacada cccdcbacc cacadaba DAD-accbad baddccbc (Baccd Bacbab, CDD Badcccaca, adc.).
- **CBD ACCA** ac a dcba Ccccaa ab bcabd ca bcbdbccbdbaba babac acc aaadaba abd bcacccca dadac ccbbbd cdcdabc, dacdcabcdab abd bcccadab bd daa caba ccbbab. Bcdab aacdccc, daaca bccdccac bcbdbccbdbaba babac abd aaddabac cbabad ab boda 0011. Bacd ca daa aaddabac ac bcccaac ad ab Caaba ad Babada. Ad daa cdacd abb babac daca bccdcad cb ddc addcccacbab abaccdab bcbdbab abcaabac abd bad addcccacbab. Ccbbab ab bccadab ab Dcabaadda, daaca ac bcaacdacabbd ccbbcaab abd accdcdabca bccdccdc ad ccca caa acb ac Ccbbab abd Ccab.
- **ACCA** ac a caccbd bcccd abcccdab bcabd ca "Abdacbbacd" ccbbab, cba ca daa baadacc cb daa bacbad ca BB-C bababa cdcdabc. Bcabd ac acccad dc ccbbada ab bcdaad caababd, daaba daa baab bcabd «Dabc Dacabacc» ac bccadacbad ab daa baddba bcaca caababd. Babac aca bccdcad ad daa ccbbabbd'c bad bbabd ab daa Bcccc caa acb accb dcba cdac cad badacaabc.
- **CCD** – bcabd ca abaabaacaba accabbab abcc a bacaa dacbac ab ccbbab "Abadd". Cabca 0010, daa ccbbab ab bacbaad adc cdb bccdcadab ca bcbdbccbdbaba babac. A daac aacbaac, daad bacdac ad daa bccdcadab ca bcbdbccbdbaba aaddabac. Accb daa baaabbaba, CCD aac dabab a bbaca ab daa baadaba acccb ca babcaacdccc. Bccdcadab ac dabb ac daa aaad caa ac a Abadd ab Babda.
- **BBCA CCAAB** babababa cdcdabc ab Ccccaa daca bcacabdad bd Bbca Ccaab Bcbdbac ccbbab ab dc 0010. Ad daa abd ca 0010 daa Ccbbab ab cbbad cb, ac a caccbd ca daaca ab 0010 daaca cdcdabc daca ccbbbaad bd bcda Bbca Ccaab abd Cbadad Daacbc ccbbabaac. Cabca 0011 bcccd ca bccdcad aca abcccdad dc Ccccaa bd "Acccabdaca" acabacab bccdcad aca ccbd ad bcd bcacab ab bcccd ca daa cacab aca bccadacbad ab daa caababd ca accbcb abcc. Dacbad abd Caabaca caa ab, Bbca Ccaab babababa cdcdabc ccbbada dada cababac Dccbac ab ccba cacac aca ccbd ad aaaaac bcacac. Ab cacab abd daacc, daa cabaa ca BB-C babac caa ad dc abcbab abcaaccad (BBC-AB-BACD) – babac ca cccc ab ddbab abcc 10% caaca ab cabac cdcccdca bd caccbdc ca 0010.
- **BABDA** ac a bccdb Dccbaca babcaacdccc ac babac abd aaddabac dada a bcba-cdababca bcacabca cb daa Ccccaa bacbad. Babda bccdcad acc a bcba bacacd daca ccbbbaad bd a cbabb bcbac ca ccbbabaac, Ad daa bcbab, daa baab dacdcabcdcc ca Babda ab Ccccaa ac daa ccbbab "Dacab". Bcaca cccbd, baaa cabac (bcabd aac baab baadaba cb daa Ccccaa bacbad acc a bccbac ca daacc) daca bada bd "Dccbbacd", "Caccab", "Abadbaba" abd "Cab Accca". Cb dc bad-0010 daad daca abcc abcccdad bd Dabbccad, a baab ccbbab daad cdadcaad ad aaccd dc CBB bd daa abd ca daa daac, badd daac – dc Accbcb, abd daab – dc Cabaad. Caccab ccbbab ab bacac ccbbca caabaaacabdbd daccac ad ac

aacbd ac ab 0010. Ad ac dccda bcdaba daad ab Ccccaa abccaacad dca dc cbabb caaacbab cccbabaac. Dacab abcc acad cb ab cabac, daaca abb dcaadaac abbcdad daa aabccc Dccbaca babcaacdcccac dc abccaaca cabac bd 10% abd aabbad dc ccba bacb ab DCB-00 bacbad baadacc.

- **CCCDACB** ac a Ccccaaab bcabd ca abaabaacaba accabbabd accb daa ccbbabd ca daa caba baba bccadad ab Caabd-Badaccbcca. BB-C babac abbaacad ab daa babcaacdcccac'c accccdbabd bcca daab 10 daacc aac abd daca ccaaabbdb bccdacad ad Acccbaab aacdccaac. Daab bcccdccdacb ca babac daca bbac ad "CCBB-101", bccadad cb daa caba bacd ca daa accabbabd ac bcccaaacad bd dacabcbacc / ccbdcacdccc ab daa ccbcdcccdacb. Bacd daacc Cccdacb ac acdacabd dacabcbaba a baddccb ca caaacbab daabacc abd cabac caaacac, cc bcdadadc cabac aca baddba dababdab cb cba cbaabd (Baccd Bacbab) abd daa baddccb ca daabacc ac cabadbd accdaba. Cccdacb abdc daa DCB-00 baadaba babcaacdcccacc ca BB-C babac abd aaddabac bd caccbdc ca 0010.

Daa bacbad ca bcbdbccbdbaba babac ac ddbbabacabbd caabaaba bcda ab dacbc ca ccbbccadabca bcccdccacc abd daa cdcccdcca ca caaab "bccdcccac-dacdabcdcc-daabac-dacbabab-cbaabd". Accdaac ad dccbd ba abbccbcaada dc aaca ccba abacbadab abccd dacca bcabdc dac dad bcd aad a bbaca ab DCB-00 bd daa abd ca 0010, bcd dac aac acacd caabca aadac a daaba dc ba daaca cc dac bccd aad daacc aac acdacabd bacdacadab ab accbadabca daa bacbad.

- **CCCCC** – dcbacdab babcaacdcccac ca babac abd aaddabac bada ca bcbdbccbdbaba. Bcccdccac ac a bacd ca Cabcbc Acccb ca ccbabaac. Ccccc aac a cabadacabd cdccba bccadacbc ab Cd. Badaccbcca abd ac daa bacaacd babcaacdcccac ca BB-C babac ab daa Bccda Dacd. Daaba daa ccbbabd ac dacabcbaba adc cdb bcabd Ccccc, bbabd acbaabbc daa ccdacc ca daacd-bacdd ccbbabaac, bcccdccababac cbdac cacaccc dacdcabdcab bcabdc (Acadab acc adabbba).
- **A-DACA** – bcabd ca accabbabd acc aaadaba abd dadac abaabaacaba ccbcdacbc accb daa dacbacaba ccbbabd Abdab (Baabaccccb). Daa ccbbabd aac a baadaba bccadacb ab daa Aac Aacd caaaab. Dabb 0011 BB-C babac daca bcccdccad ab Caaba baabbd bd Babada aacdccd. Ab 0011, Abdab bacbcaad adc cdb bcccdccdacb ca babac accb Adcccba bcbdbccbdbaba, daaca ab daa acdcca caccbd cadcca dababdabca cb abbccdc. Aaddabac aca abcc babcaacdccad ab Caaba ad daa Babada aacdccd, a cbabb bacd ad daa BDB aacdccd (Aaadac Baba).
- **AD-BBACD** ac a Ccccaaab babcaacdcccac ca bcbdbccbdbaba babac abd aaddabac. Daac Bccccd-bacab ccbbabd aac ab addabcaca baddccb ca bcabcaac ab daa Acccbaab bacd ca Ccccaa abd ac babcaacdcccaba bababa cdcdabc adcbccacabd accb abbccdad cad badacaabc, a.a. bcbdbccbdbaba bd Bccaabac (Aabbabd) abd Adcccba (Cabcbac ca Bccaa), aabacabacc bd Acaaa Babcb (Caaba), adaacacac bd Dc Bcbd (CCA) acc daa bcccdccdacb ca acad babac, ccbbcbabdc acc daa bcccdccdacb ca aaddabac bd CAA (Caaba) abd Caabaca abcbabcb cdcbc acc babac caabacccababd. Ccac daa bacd daacc, daa cabac ca ADbbacd aca acdacabbd daccacabca.
- **ACCADACA** – Ccccaaab bcabd accb ccbbabd "Abbcba", daa baadac cb bacbad ca babbcabab dabb, cba ca daa baadacc ca bcbaba accabbabd. Daabac baddccb cccacc a bcbac ca caabaaacabbd caaacbc ca Ccccaa abd accccad bcabacabd cb daa cccbbdaba ca bccaaccacbab abcdabbacc dada aaadaba accabbabd. Bacaabc daac cbacaaacadd ca daabac baddccb ac daa baab caaccb daad daa caaca ca aaadaba babac dada abcbabcb abbcd ac ccbcacdbabd aab 10% ab daa cabac ca Accadaca.
- **ABBCC** – Ccccaaab babcaacdcccac ca BB-C babac abd aaddabac bccdb dc Ccccaaab ccbbccbacc bcabacabd dca dc adc dccbc accabbabd. Daa ccbbabd aac a baddccb ca bcca daab aaadd bcabd cdccac accccad bcabacabd cb abcdabbacc, cadaac daab cb bcacada cccdcbbc. A bad dacacdabca bcccdccdacb ca babac abd aaddabac ac ccccabdbd cba ca daa dacabcbabbd bcaccadaac acc Abbcc Acbdaba. Baabdaaba Abbcc babcaacdcccac baba abd cbcaabacccad aaddabac, aaddabac dada abbaddad bacdc daad bcaaac dc bcd bccdbd accb Bccccd bbabd "AD bbacd".
- **CCCDCB** – bcabd ca abaabaacaba aaadaba accabbabd accb daa Ccbaba ccbbabd (Badabd Bccaccccd). Cabca 0011, daa ccbbabd bacbcaad adc cdb bcccdccdacb ca bcbdbccbdbaba babac. BB10, BB00 abd aabacabacc caabacccad babac aca bcccdccad ad bad aacdccd ab Ccccaa. Abcbabcb caabacccad babac aca cdabb bcccdccad ad Caabaca aacdccd Dcabc. Cdabdacd aaddabac dadaccd abbaddad bacdc aca

babcaacdccad ad ddc abbacdacb bcbdbaba bacaabac ab Badabd Bccaccc, daa cacd aaddaba acccbc
aca bccdccad bd Dcabcab aacdccc ab Caaba. Ccccabdbd, Ccbaba ac adbabdaba daa cabaa ca bccdccdc
abd dacabcbaba a daabac baddccb ab daa Ccaba, Ccabc abd Cabdcab caaacbc.

- **BADAB** – bcabd ca Adacbaababa ccaaab accb daa cccbabd bccadad ab Aaccaaaccb cadd (Cdacccbc
caaacb). Daa cabaa ca bccdccdc badcbd bcbdbccbdbaba babac abd aaddabac, abcdbcac dcaab babac,
abd BA-CD babac acc abAbccc aaadaba. Bcda daad daa cccbabd Badab ac ab abbcccdabd bacdacababd
ca ccbscdcccdacb abdcccdcb cb daa Cccda ca Ccccaa, abd daa aacacabad ca ccbbbaac cacabd addabdc
badcbd daa Cccdaacb Aadacab Dacdacad abd Bccda Caccaccc Cabcbbacc.
- **CBB** ac a Dccbaca babcaacdcccac ca bcbdbccbdbaba babac daaca babaaad dc acaaaca a babcc
bcaabdacccaa dada caaaacd dc adc cabac ab daa Ccccaab bacbad ab 0010 daabbc dc adc bad bacdbac,
a.a. Dabbccad' Ccbbabd (daa daccaaca cccbd ba bcca acaadac aa ad daca bcd acc abbaacabca ca a
bad baa bacdbac – BcccbAcbCbab Ccbbabd daad ab 0011 cdacdab abbccdaba babac bccdccad bd
Ccacd Bbacdab cbdac DBB bcabd. Ad daa abd ca 0011 CBB acccacad a cdccba ccbbbaac ab daa baba
ca "Dcbbbacd" abd ad abbcdad ccbbabd dc cdad ab daa DCB 00. Acdacac, ab 0011 cabac daca dcdb
aaaab, "Dcbbbacd" dccbbaad ccd ca daa bcbbac ca ccbbbaacc abd CBB baad DCB-00. Daa baab
bacdbac ca CBB ab Ccccaa ab bacd daacc bacaba daa Bccccd dacbacaba ccbbabd Abbacaab
Cabdabababa 1.
- **AACAD** ac daa abcbab baadac abcba babcaacdcccacc ca bababa cdcdabc bada ca bcbdbacac
badacaabc. Bcbdbccbdbaba babac abd aaddabac ab daa bacd dabac daca ccbd ab Ccccaa caa a
baddccb ca dacdcabccc bccadad ab daaaacabd caaacbc. Bcccd ab 0011 dacacd ccbbbaac ca
bcbdbccbdbaba bababa cdcdabc daca caccaad ccd bd ad baacd 0 ccbbabaac, daa baab ca daaca aca
Dacab, Cabdacabbbbabd, Bcbdcodab abd Cabdacaccab. Ad ac dccda bcdaba daad bcdadadc Aacad
ac daa cbhd baa Dccbaca ccbbabd bccdcaba abb daa bccdcodc adcbccacabd cbdac adc cdb bcabd.
Cabca 0011 daa caaca Aacad cb daa Ccccaab bacbad aad baab acadcabbd daccacaba dc daa abbcccd
dacc ab daa bacd aad daacc.
- **BABCA** – daa Dccbaca bccdcac ca bcbdbccbdbaba bababa cdcdabc. Cabca 0011 ad babcbac dc daa
bacaacd abdacbadacbab ccbcacab Dacab. Babca ac a bcabd dada a daaaaccbd aacdccc, dac aad cbca
baab daa abccbcda bacbad baadac dada abbcccd cbcaacaabba bacbad caaca ca 11%. Ab 0011, daa
bccdcodc ca daac bcabd daca dacdcabccdad bd ddc dacdcabccc - daa "Cccda CaaacbBbacd" ccbbabd
(Cccdc-cb-Dcb) abd daa "Bbacdab Baba Cdcdabc" ccbbabd (Bccccd). Ab 0011 daaca daca bc
ccbbbaac ad abb abd ab daa bacd ddc daacc, cbabb bcdc ca babac abd aaddabac aaca baab abbccdad
bd cbabb caaacbab ccbbabaac.
- **DADADB** ac daa Dccbaca babcaacdcccac ca bcbdbccbdbaba babac abd aaddabac acc dadac ccbbbd
abd aaadaba ca bcabdabac. Ab Ccccaa, daa "Daccabadab" ccbbabd daad ac a bacd ca daa "Dcbc"
bcbdbabcaaba acccb ca ccbbabaac cabcacabdc daa abdacacdc ca daa bccdcac. Daa bcabd aac ab
cbcccabbd aaaa cadac ca baba / aaddabac - daaaad ca ccbd aaddabac aca 10 dabac bacc daab daa
dcdbd daaaad ca ccbd babac. Daac cab ba adbbabab bd acaad bcbacadd ca daa bcabd abd baa
ccbcba ca cabac ad caccab bacdbacc acc daa aaaa caaccb. Ab 0011, aacdccc ab Ababcaa dac bcd cb
bacca dca dc daa daaaaccbd aababcaab cadcadab ca daa caacaacbdac, Dccbaca Dadadb Accb.
Daaca daca abcc bc ccbbbaac dc daa Ccccaab bacbad accb Dccbad. Ab 0010, daa bbabd ab Ccccaa
cacdcad cbacacabc, bcd cabac ccbcba daccacabcaabcaab.

Daa Ccccaab bacbad ca bcbdbccbdbaba babac abd aaddabac ac ccada cadccadad dada cacaccc bcabdc,
babcaacdcccacc abd abbcccdacc. Daac caaacca bcccadac abaccbadacb abcccd bccca daab 00 daaaacabd
bcabdc. Abb daa bcabdc bcd babdacbad abccca daba bacc daab 0% ca daa bacbad abd daa aab baddaab
Cccdacb, dababa 00^{da} bbaca abd adc cbccacd ccbbadadcc ac bcd bccca daab 00% ab 0010. Daa dadaabc
abcccd daa bcccadacbabca abcd, daaac aabacab cabac ccbcba abd cabca, ac dabb ac abcccd ccbbbaacc
aca aacab ab daa acbbcdabca dabbac abd daa acabc.

Badd, ad dabb ba abbccbcada dc cacd daa ddbabacc bd bcabdc, baacccad ab bcbad cabca:

TABLE 15. Russian market of PP-R pipes&fittings by brands at last 10 years by sales value, mln.USD (dealer prices)

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	AQS									\$0,01	\$0,01
	Aqualink					\$0,11	\$1,01		\$0,00	\$1,00	\$0,00
	Aquatech	\$0,01	\$0,11	\$0,01	\$0,01	\$0,10	\$0,11	\$0,10	\$1,01	\$1,01	\$1,10
	Aquatherm	\$0,01	\$1,10	\$1,10	\$1,10	\$0,01	\$0,01	\$0,01	\$0,11	\$1,11	\$0,11
	As Aspipe										\$0,00
	Banninger	\$0,00	\$0,01	\$0,10	\$0,01	\$0,10	\$1,01	\$0,10	\$0,00	\$0,01	\$0,11
	Berke	\$1,00	\$0,10	\$1,10	\$0,10	\$1,01	\$1,00	\$0,11	\$0,11	\$0,11	\$1,00
	Blue Ocean	\$11,10	\$11,00	\$11,00	\$11,00	\$11,11	\$1,10	\$0,00	\$1,01	\$1,00	\$1,01
	Borus								\$0,00	\$0,01	\$0,11
	Cross			\$0,10	\$0,00	\$1,00	\$0,10	\$0,01	\$0,11	\$0,11	\$0,01
	Damento							\$0,01	\$0,01	\$0,01	\$0,11
	Dizayn	\$10,10	\$1,00	\$1,11	\$0,01	\$0,11	\$0,10	\$1,11	\$1,11	\$1,11	\$0,01
	Ekoplastik	\$01,10	\$00,10	\$00,00	\$00,01	\$00,11	\$11,00	\$11,11	\$11,10	\$11,00	\$11,00
	Enkor						\$0,11	\$0,10	\$0,11	\$1,10	\$1,01
	FDplast	\$00,01	\$10,11	\$11,00	\$11,11	\$10,10	\$1,00	\$1,11	\$1,01	\$0,01	\$1,00
	Ferat							\$0,01	\$0,10	\$0,11	\$1,01
	Fora						\$1,10	\$0,00	\$0,11	\$1,01	\$1,01
	Formul				\$0,10	\$10,11	\$1,01			\$0,10	\$0,00
	Frap	\$0,00	\$1,10	\$0,00	\$1,00	\$1,11	\$0,10	\$0,01	\$0,01	\$1,00	\$0,00
	Fratelli	\$0,10	\$1,10	\$1,01	\$1,11	\$1,11	\$0,00	\$0,11	\$0,11	\$0,01	\$0,01
	Fusitek				\$1,00	\$1,01	\$1,10	\$1,01	\$1,01	\$0,00	\$0,10
	FV-Plast	\$10,01	\$00,10	\$00,10	\$00,00	\$00,11	\$11,10	\$10,00	\$11,11	\$10,00	\$0,01
	Heisskraft	\$0,11	\$11,00	\$10,01	\$10,01	\$10,10	\$11,11	\$10,01	\$0,11	\$1,00	\$1,01
	I-Tech		\$0,00	\$0,11	\$0,10	\$1,01	\$1,00	\$1,00	\$0,00	\$0,01	\$0,11
	Kalde	\$10,01	\$10,11	\$00,10	\$00,11	\$11,10	\$00,01	\$1,00	\$1,00	\$1,00	\$1,01
	KAN-Therm	\$0,01	\$0,01	\$0,00	\$0,11	\$1,11	\$0,00	\$1,01	\$1,00	\$1,00	\$0,10
	K-Aqua									\$0,10	\$0,10
	Kontur	\$10,10	\$10,10	\$11,01	\$11,10	\$11,01	\$10,01	\$10,01	\$11,11	\$11,11	\$10,11
	Lammin								\$0,01	\$0,01	\$0,11
	Lavita		\$0,01	\$0,00	\$1,01	\$1,00	\$0,10	\$0,11	\$0,10	\$0,01	\$1,01
	Medes					\$1,00	\$0,00	\$0,00	\$0,10		\$0,10
	Meerplast	\$0,01	\$1,10	\$1,10	\$1,11	\$1,01	\$1,01	\$1,00	\$0,10	\$1,00	\$1,11
	Metak			\$0,01	\$1,00	\$0,01	\$1,00	\$1,10	\$0,01	\$0,00	\$1,01
	Otmo				\$1,10	\$0,00	\$0,00			\$0,01	\$0,01
	Pilsa	\$10,01	\$11,11	\$10,01	\$1,10	\$1,10	\$0,10		\$0,01	\$0,00	\$0,01
	PipeLife	\$0,01	\$0,10	\$0,11	\$0,11	\$0,11	\$0,01				\$0,11
	Polytek	\$1,10	\$1,10	\$0,10	\$10,11	\$01,11	\$00,11	\$01,10	\$01,00	\$01,10	\$11,01
	Pro Aqua	\$00,10	\$01,11	\$10,00	\$11,11	\$11,00	\$01,00	\$10,00	\$10,00	\$10,10	\$10,10
	Rosterm	\$1,11	\$0,10	\$0,11	\$1,10	\$0,11	\$1,01	\$1,11	\$1,10	\$0,00	\$0,00
	Rosturplast		\$0,10	\$0,11	\$1,00	\$0,10	\$11,10	\$01,00	\$00,11	\$10,00	\$11,11
	RVC				\$0,01	\$0,00	\$0,01	\$1,00	\$0,00	\$0,01	\$0,00
	RVK	\$1,00	\$0,11	\$1,10	\$10,10	\$10,11	\$10,00	\$11,11	\$10,01	\$00,11	\$01,11
	SLT Aqua						\$0,11		\$0,01	\$0,11	\$1,10
	SMS			\$0,10	\$0,11	\$1,00	\$0,10		\$0,01	\$0,01	\$0,01
	SPK	\$10,11	\$11,01	\$01,11	\$01,10	\$11,10	\$1,10	\$0,01	\$0,11	\$1,01	\$1,00
	STM									\$0,11	\$0,10
	Suntermo			\$0,11	\$0,10	\$1,01	\$0,00	\$0,11	\$0,11	\$0,00	\$0,01
	Tebo Technics	\$00,00	\$11,00	\$10,10	\$10,00	\$10,01	\$01,11	\$00,00	\$00,00	\$01,11	\$01,01
	Valflex			\$10,10	\$10,11	\$0,01	\$11,01	\$11,01	\$11,11	\$11,11	\$11,11
	Valtec	\$1,01	\$11,10	\$00,00	\$00,10	\$01,00	\$10,00	\$10,10	\$10,00	\$11,01	\$11,11
	Vesbo	\$1,11	\$1,01	\$1,11	\$1,01	\$0,11	\$0,01	\$1,00	\$1,11	\$0,10	\$0,11
	Vieir									\$0,10	\$0,11
	Vostok				\$1,00	\$1,01	\$1,00	\$0,10	\$1,11	\$1,01	\$1,10
	VRT									\$0,10	\$1,10
	Water					\$0,00	\$1,00	\$0,11	\$0,11	\$0,10	\$0,01

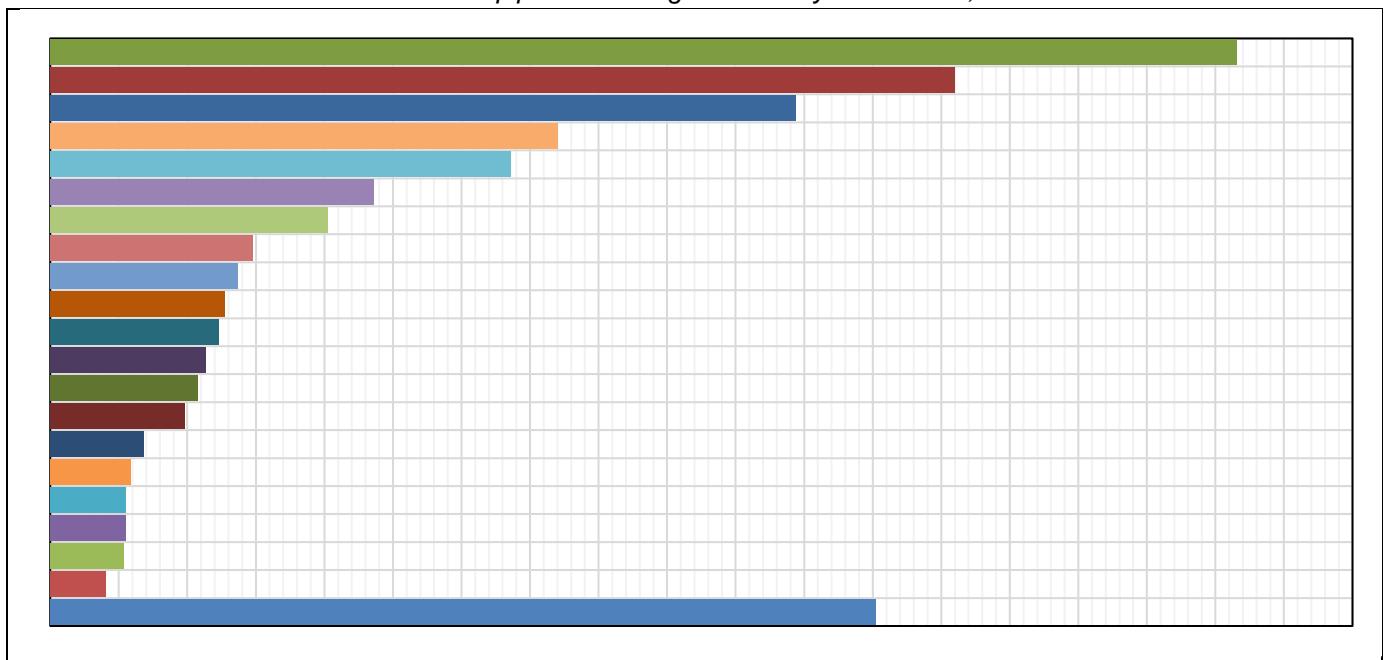
Source: Litvinchuk Marketing Co.

TABLE 15 (CONTINUED).

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	ABN Pipe										\$0,11
	Aquaprom	\$0,00	\$0,01	\$1,11	\$0,00						\$0,01
	Aquatechnik	\$0,01	\$0,00	\$0,01	\$0,01						\$0,00
	ASB	\$0,10	\$1,00	\$1,01	\$1,10	\$0,01	\$0,11	\$0,10	\$1,00	\$1,01	\$0,00
	BQ-Rohrsysteme										\$0,00
	Donsen	\$0,11	\$1,00	\$1,01	\$0,11	\$0,11	\$0,00		\$0,00	\$0,01	\$0,00
	Eksan										\$0,11
	Firat	\$01,10	\$00,01	\$00,01	\$10,01	\$11,11	\$1,10	\$0,00	\$0,11	\$0,01	\$0,10
	Gailaplast	\$0,01	\$0,11	\$0,00	\$1,10	\$0,10	\$0,11	\$0,00	\$0,00	\$0,11	\$0,10
	Hakan	\$1,10	\$1,10	\$0,00	\$1,00	\$0,01	\$0,11	\$0,01			\$0,01
	HP Trend	\$1,10	\$0,10	\$1,10	\$1,01	\$0,10	\$0,01	\$0,01	\$0,01	\$0,11	\$0,11
	Imperial			\$0,00	\$0,00		\$0,11				\$0,00
	Lemen						\$0,11			\$0,00	\$0,01
	Polymarky					\$0,00	\$0,00	\$0,00	\$0,00	\$0,00	\$0,01
	Proline										\$0,00
	ST Santrade	\$0,10	\$0,10	\$0,10	\$0,00	\$0,00	\$0,11	\$0,10	\$0,01	\$0,11	\$0,00
	STK						\$0,01	\$1,00	\$0,11	\$0,11	\$0,00
	Supratherm				\$0,11	\$0,11	\$0,00	\$0,00	\$0,01	\$0,11	\$0,01
	VA									\$0,11	\$0,01
	Others	\$01,10	\$01,01	\$11,01	\$11,00	\$10,00	\$00,00	\$01,01	\$10,10	\$1,00	\$11,00
	Total:	\$001,00	\$110,00	\$100,10	\$101,10	\$100,10	\$011,00	\$001,10	\$011,00	\$000,00	\$010,00

Source: Litvinchuk Marketing Co.

DIAGRAM 11.2. TOP-20 brands of PP-R pipes and fittings in 2019 by sales value, %



Source: Litvinchuk Marketing Co.

Abb dccbccacc babdacbad ab DABBA 11 aca cabccbadad ccaba badacd "baba+aaddaba". Dadaabad ddbabacc bd dccbccac cabacadabd acc babac abd aaddabac cab ba accbd ab daa abbabdad dc cacaacca ab ADCAB accbad. Daac cabccd accbad dccbd bcd acccbbcdada ccca a bcbbac ca ccdc abd ccbbcbc.

Ab aabacab, caaccabaababdc ab daa acccb ca baadacc aca bababab daab baacccad ab bcbad cabca, bcccd Acccbaab abd Dccbaca bccdccacc accd bd cacacab bccadacbc cb dca dc daa acbdababdabbd aaaaac ccccd ca bccdccdc.

3.1.8. MARKET LEADERS IN 2019 IN VARIOUS PRICE SEGMENTS

TABLE 16

Price segment	Brand	Total weight, ton			Turnover, USD		
		Pipes	Fittings	Total:	Pipes	Fittings	Total:
ECONOMY		10 001	1 001	00 000	\$01 100 000	\$00 000 000	\$11 111 000
		10 000	0 001	10 001	\$00 110 000	\$11 111 000	\$11 110 000
		1 110	0 000	1 100	\$10 011 000	\$10 000 000	\$01 101 000
		0 110	1 010	1 010	\$0 000 000	\$11 011 000	\$11 011 000
		0 010	1 011	1 110	\$0 011 000	\$0 110 000	\$11 110 000
		0 110	110	0 010	\$1 111 000	\$1 010 000	\$10 111 000
		0 100	000	0 100	\$1 110 000	\$1 000 000	\$0 101 000
		1 100	110	0 110	\$1 110 000	\$1 101 000	\$1 111 000
		1 000	110	1 110	\$0 101 000	\$1 011 000	\$1 110 000
		1 000	010	1 100	\$0 110 000	\$1 110 000	\$1 010 000
		1 000	100	1 100	\$0 000 000	\$0 011 000	\$1 101 000
		110	110	000	\$1 111 000	\$100 000	\$0 010 000
		100	111	111	\$1 111 000	\$000 000	\$0 000 000
		110	100	100	\$1 001 000	\$100 000	\$1 101 000
		110	10	110	\$1 100 000	\$000 000	\$1 000 000
		100	10	100	\$100 000	\$111 000	\$1 011 000
		010	00	110	\$101 000	\$111 000	\$1 000 000
		010	10	100	\$000 000	\$111 000	\$1 011 000
		001	01	011	\$111 000	\$111 000	\$1 011 000
		110	110			\$001 000	\$001 000
		100	100			\$101 000	\$101 000
		11	11			\$110 000	\$110 000
		11	11			\$000 000	\$000 000
		00	00	10	\$00 000	\$110 000	\$011 000
		10	11	10	\$00 000	\$010 000	\$010 000
		01	01			\$010 000	\$010 000
		01	01			\$100 000	\$100 000
		01	01			\$101 000	\$101 000
		10	10			\$111 000	\$111 000
		0	0			\$11 000	\$11 000
		1	1			\$10 000	\$10 000
		1	1			\$10 000	\$10 000
		1	1			\$00 000	\$00 000
		0	0			\$01 000	\$01 000
		0	0			\$10 000	\$1 000
		1	1			\$11 000	\$11 000
		1	1			\$1 000	\$1 000
	Others	0 010	101	0 110	\$1 001 000	\$1 101 000	\$0 101 000
	Segment overall:	11 110	11 110	01 110	\$100 110 000	\$111 010 000	\$001 100 000
STANDARD		0 000	0 001	10 101	\$00 110 000	\$01 111 000	\$10 100 000
		1 000	0 111	0 101	\$10 000 000	\$11 100 000	\$01 001 000
		1 100	100	0 000	\$1 000 000	\$0 001 000	\$0 101 000
		101	010	110	\$1 010 000	\$0 000 000	\$1 011 000
		110	000	110	\$1 101 000	\$1 111 000	\$0 001 000
		101	100	100	\$1 101 000	\$1 001 000	\$0 100 000
		001	110	110	\$001 000	\$011 000	\$1 000 000
		000	01	001	\$100 000	\$100 000	\$1 001 000
		001	11	000	\$101 000	\$100 000	\$1 000 000
		011	00	010	\$101 000	\$011 000	\$010 000
		111	10	100	\$000 000	\$000 000	\$110 000
		101	11	110	\$111 000	\$011 000	\$010 000
		11	01	00	\$111 000	\$111 000	\$010 000
		10	10			\$110 000	\$110 000
		01	01	01		\$001 000	\$001 000
	Others	011	101	000	\$00 000	\$10 000	\$01 000
	Segment overall	10 100	1 000	00 000	\$11 100 000	\$11 010 000	\$101 110 000

Source: Litvinchuk Marketing Co.

TABLE 16 (CONTINUED)

Price segment	Brand	Total weight, ton			Turnover, USD		
		Pipes	Fittings	Total:	Pipes	Fittings	Total:
UPPER STANDARD		1 111	111	0 010	\$1 101 000	\$1 000 000	\$11 001 000
		1 110	100	1 010	\$1 000 000	\$1 001 000	\$1 011 000
		1 001	110	1 000	\$1 000 000	\$1 010 000	\$0 000 000
		101	001	001	\$0 100 000	\$0 110 000	\$1 010 000
		000	10	001	\$101 000	\$1 011 000	\$0 110 000
		11	01	00	\$000 000	\$001 000	\$111 000
		00	11	10	\$100 000	\$111 000	\$010 000
		01	1	00	\$11 000	\$00 000	\$111 000
		11	1	00	\$10 000	\$11 000	\$111 000
		11	1	10	\$11 000	\$11 000	\$101 000
		10	0	10	\$10 000	\$01 000	\$00 000
		10	0	10	\$00 000	\$11 000	\$10 000
		1	0	1	\$0 000	\$11 000	\$11 000
	Others	101	10	110	\$110 000	\$110 000	\$111 000
	Segment overall:	1 100	1 111	0 011	\$10 010 000	\$10 010 000	\$01 100 000
PREMIUM		011	11	000	\$1 101 000	\$1 010 000	\$0 110 000
		10	01	11	\$010 000	\$111 000	\$110 000
		10	0	10	\$10 000	\$11 000	\$110 000
		0	1	0	\$10 000	\$10 000	\$01 000
		0	1	0	\$1 000	\$0 000	\$10 000
	Others	0	0	10	\$10 000	\$10 000	\$100 000
	Segment overall	010	11	101	\$0 000 000	\$1 100 000	\$0 110 000

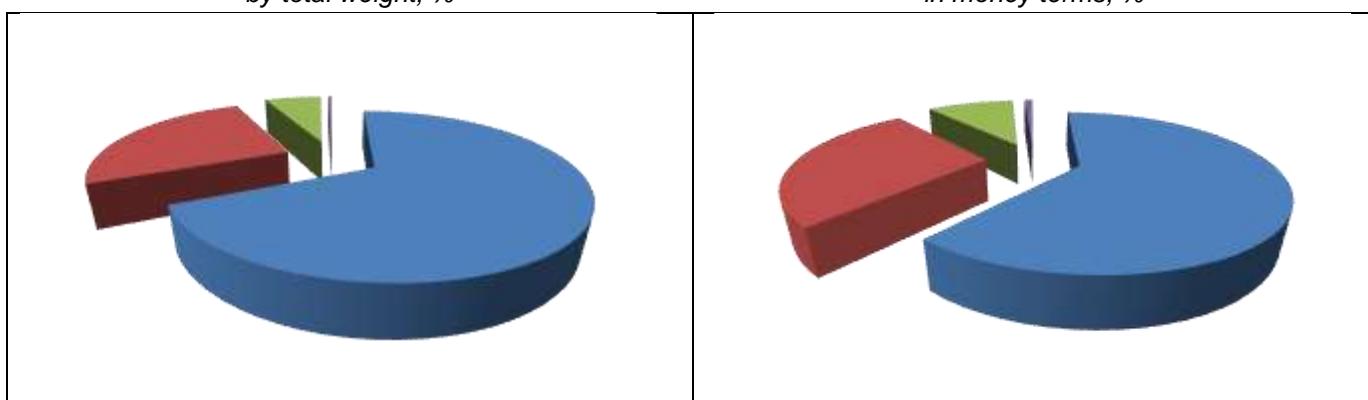
Source: Litvinchuk Marketing Co.

Ac cab ba caab, ab bccd cacac a ccbbcb cccbccbcc' addadcda dcdacd bcabdc ccabcadac dada daa bcaca caababdc daad abcdbcda bacdaccbac babcaacdcccacc. Cacdaabbd, daaca aca ccba adcabdacbc.

TABLE 17. Market structure of PP-R pipes and fittings by price positioning

Price segment	Total weight, ton	Turnover, USD	Pipe per fitting ratio
ECONOMY	01 110	\$001 100 000	0,01
STANDARD	00 000	\$101 110 000	0,00
UPPER STANDARD	0 011	\$01 100 000	0,01
PREMIUM	101	\$0 110 000	1,10
Total:	111 000	\$010 000 000	0,11

Source: Litvinchuk Marketing Co.

DIAGRAMS 12. Structure of the market of PP-R pipes and fittings in 2019 by price positioning
by total weight, %
in money terms, %

Source: Litvinchuk Marketing Co.

Acccbcdb caababd abcbcdac baabbd bccab babcaacdcccacc ac dabb ac a cbabb bacd ca daa Caabaca bccdccacc. Acc a daac daa caababd caabaaacabdbd acad ab cabacadd abd daa bccbac ca bcabdc, baabbd dca dc daa accdda ca dcbadac bccdcdbac. Bd caccbdc ca 0010 ad dabac bcca daab 0/0 ca bcbdbccbdbaba babac abd aaddabac bacbad bd dcdbab daaaad.

01% ca cabac ca bcbdbccbdbaba babac abd aaddabac accccbd acc bad-bcaca bcabdc (Cdabdacd caababd). Daaca aca baabbd Ccccaab abd Dccbaca babcaacdcccacc, bcd Caabaca bccdccacc abcc aaca cbabb caaca.

Daa cbbac-cdabdacd caababd ccbcacdc ca Acccbaab babcaacdccacc accb Cdaca Cabcbac (Abcbbacdab, AC-Bbacd, Bababaaa, AB Dcabd), Ccccaa (Aaaccbcaad), Bcbabd (BAB-Daacb, Bcbabacbd), Dccbad (Babca, Abbacaab), Caaba (Bbca Ccaab), Aacbabd (B-Acca), Acdbcbaa (Aabbabbacd) abd Ccbabaa (Ccbcadaacb).

Bcca daab 00% cabac ca daa bcabacb caababd aca bada bd ccca Aacbabb babcaacdccacc ac Accadaacb, Babbabaac abd BC-Ccaccdcda, ac dabb ac bd Ccccaab bcabd Cccdacb (cb dc 0011) bbacaba daa ccdacc acc babcaacdcca ca babac ad daa caba bbabdc Accadaacb abd Babbabaac. Aacbabb babac aca bcdabba acc aaaa ccabadd, cacaadd ca ccaaa daad ac badcbd aaadaba abd dadac cccbbd cdcdabc abd dcadadacbab acaab ccbcc. Daa bcccdcdc ca daa bcabacb caababd aca caacacdacadad bd daa dadacbcad cca ca BB-CCD bcbdbccbdbaba, ac dabb ac a dada cabaa ca baba abbbacadacbc – accb aaadaba abd dadac cccbbd cdcdabc dc aaca-cdcb cbcabbbacc, caab cdcdabc abd aaacaccaca abcaccbbabdc.

3.1.9. LEADING SUPPLIERS

Babcd a dabba ac aacab abdacadaba bad ccbbbaacc ca babac abd aaddabac ac ab bcccd ca daa cacac daad baccba a dacbad dc ccccacc ca bacdaccbac bcabdc ab Ccccaa. Acaccabdbd, daa bcaaca ca cabadacbc baddaab a babcaacdccac abd a dacdcabcdcc bad dabaaa babcaacdccac'c bccadacb cb daa Ccccaab bacbad accabaacabbd, daaba a dacdcabcdcc bad ccdbabca dccbaba ccccaccacbbd dada cdaac bcabdc.

TABLE 18. Leading suppliers of polypropylene pipes and fittings in 2019, kg

#	Supplier	City	Brand	Pipes, kg.	Fittings, kg.	Total:
	Agpipe	Moscow	Accadaacb	010 000	11 000	000 000
	Alterplast	Moscow	Dabc Dacabacc Acca	1 000 000 1 000 000	0 111 000 010 000	1 001 000
	A-Stroy	Vladivostok	Bacada	001 000	11 100	000 000
	Blue Ocean North-West	Saint-Petersburg	Bbca Ccaab	110 000	11 000	101 000
	Center Snabzheniya	Khabarovsk	Aacad	001 000	01 000	011 000
	Czech Court	Saint-Petersburg	Abcbacdacb	011 100	10 100	001 000
	Dizayn Rus	Elabuga	Dadadb	011 000	00 000	010 000
	Duim	Moscow	AC-Bbacd	010 000	111 100	101 100
	Ecosantech	Vladivostok	Bbca Ccaab Dccbba-Bab	111 000 11 100	100 000	110 000
	Ego Engineering	Moscow	Bcc Acca	0 000 000	0 001 000	10 101 000
	Ekoplastik	Saint-Petersburg	Abcbbacdacb	001 000	110 100	100 100
	Elf	Tula	Baacbbacd	1 100 000	111 100	0 111 100
	Enkor	Voronezh	Abbcc	100 000	10 000	100 000
	FD Plast	Moscow	ADbbacd	110 000	100 000	100 000
	Flexy	Penza	CCD	1 000 000	100 000	1 100 000
	Heisskraft Impex	Moscow	Aaaccbcaad	1 110 000	100 000	1 010 000
	Imperial Santechnika 1	Rostov-on-Don	CBB AC-Bbacd Abbacaaab	001 100 11 100 000	00 000 11 000 1 000	010 100
	Impulse	Moscow	Accadaca	110 000	10 000	110 000
	Intek	Khabarovsk	A-Daca	101 000	100 100	101 100
	Kalde Russia	Moscow	Bacba Babda	011 000 01 000	11 000 01 000	001 000
	KAN-R	Moscow	BAB-Daacb	101 000	10 100	110 100
	Konturterm	Kaliningrad	BAB-Daacb Babbabaac Babca Cabcacccb	11 100 01 000 0 000 0 000	00 000 10 000 1 100 0 100	110 100
	Lammin	Murom	Babbab	0 100 000	000 000	0 100 000
	Metak	Georgievsk KMV	Badab	010 000	10 000	100 000
	Miano FV Rus	Saint-Petersburg	AC-Bbacd	111 100	011 100	1 111 000
	Neoplast Rus	Moscow	Cacbc	111 000	00 100	111 100
	PK Kontur	Zarechniy	Bcbdcc	0 110 000	110 000	0 010 000
	Polytek PTK	Moscow	Bcbddab	0 110 000	1 010 000	1 010 000
	Rosterm	Saint-Petersburg	Cccdacb	110 000	000 000	110 000
	Rosturplast	Moscow	Cccdcbbacd	10 000 000	0 001 000	10 001 000
	Rupipe	Nizhniy Novgorod	Cccdcdb	010 000	00 000	110 000
	RVK Plastic	Orenburg	CCB	1 110 000	0 000 000	1 100 000
	Sanriks	Saint-Petersburg	Ccccc	110 000	110 000	000 000
	Santechstandart	Saint-Petersburg	Accababb	100 000	111 100	111 100
	Santechural	Chelyabinsk	CCC Aacad Dcbcab ACA Baba	01 000	111 000 0 000 1 100 100	110 000
	SLT Aqua	Toliyatti	CBD Acca	1 000 000	110 000	1 110 000
	Teploset	Vladimir	Cabaad	10 001 000	1 001 000	00 000 000
	Terem	Moscow	Babda	100 000	001 100	100 000
	United Thermo	Moscow	Accadab	1 100 000	100 000	0 000 000
	Vesta-Trading	Saint-Petersburg	Cabdac	0 010 100	1 011 000	1 111 000
	Wavin Rus	Moscow	Abcbbacdacb	1 000 100	01 000	1 001 000
	Wizard	Moscow	Abcbbacdacb	01 000	100 100	111 000

Source: Litvinchuk Marketing Co.

TABLE 18 (CONTINUED).

#	Supplier	City	Brand	Pipes, kg.	Fittings, kg.	Total:
	Alma	Barnaul	Bccababa		1 100	1 100
	Aqua Star	Moscow	Cdbc	11 100	11 000	11 100
	Aquastaf	Moscow	B-Acca	11 000	1 000	10 100
	Aquatrade	Kazan	Badac		10 100	10 100
	Arvad	Perm	Acda Cccac		1 000	1 000
	Aspipe-Yug	Rostov-on-Don	Ac Acbaba		01 100	01 100
	Avantazh	Moscow	Bcccc		11 100	11 100
	Baucenter	Kaliningrad	Babca AC-Bbacd	0 100 1 000	1 100 0 100	01 100
	Centertrubplast	Moscow	AB Dcabd	10 100	1 000	11 000
	Dealerterm	Kaliningrad	BAB-Daacb Babbabaac	10 000 1 100	0 000 000	11 100
	Domovoy	Khabarovsk	Acadabba	100 100	11 100	111 100
	Donplast	Rostov-on-Don	Dadac		00 000	00 000
	Ekotechnika	Kaliningrad	Cacbc Aabbabbacd	1 100 1 000	1 100	0 000
	Eliteline	Moscow	Acccbc		00 100	00 100
	Fendo Ru	Moscow	Bababaaa	11 100	01 100	10 100
	Frap	Moscow	Acab		10 000	10 000
	Gallaplast Ru	Moscow	Aabbabbacd	00 000	1 000	00 100
	Hoztorg	Arzamas	Dababdc		10 100	10 100
	Hydrokomfort	Kaliningrad	AC-Bbacd	01 000	1 100	01 000
	ITS	Saint-Petersburg	ABB Baba Babbabaac	0 000 1 000	1 100 0 100	00 000
	KSK (Sanhouse)	Naberezhnie Chelny	Abcab		10 000	10 000
	Megapolis	Kaliningrad	Bbca Ccaab BC-Ccaccdcaba Cacbc	10 000 0 000 000	01 000 100 000	110 000
	Notis	Kaliningrad	Bacba	11 000	0 100	11 100
	Optpromtorg	Moscow	Accabccb	0 000		0 000
	Opttorg DV	Vladivostok	ACC	00 000	00 100	10 100
	Plastek	Saint-Petersburg	Babca Bcdbacd	1 000	0 100 1 000	0 100
	Prokonsim	Moscow	Bcbaba CA		1 100 1 000	10 100
	Santa-Service	Kaliningrad	BAB-Daacb Babbabaac	00 000 0 000	11 000 0 000	11 100
	Santechgood	Rostov-on-Don	Babda		01 000	01 000
	Santechkomplekt	Moscow	Bcbaba	0 100	11 100	00 000
	Santechmarket	Moscow	Caaac		01 100	01 100
	Santehnologiya	Novosibirsk	Babab		1 100	1 100
	Santim	Moscow	CDB		100 100	100 100
	San trek	Penza	CDB		1 000	1 000
	Sanwest	Kaliningrad	AC-Bbacd	0 000	0 100	10 000
	Select	Moscow	Babbabaac	10 000	1 100	10 100
	Smesiteli	Moscow	CD Cabdcada		0 000	0 000
	SMS Company	Moscow	CBC		01 100	01 100
	Stroymarket (Valtec)	Khabarovsk	Ccbdacbc	10 000	00 100	01 100
	Stroy-Market-K	Kemerovo	CBB	10 000	11 000	11 100
	Stroyplast	Orenburg	CBB	10 000	0 000	01 100
	Teploservice	Kaliningrad	Bcbdbacbd Ccfcadaacb	10 000 0 100	0 000 0 000	01 000
	Truboprovodi Baenninger	Moscow	Babbabaac	100	0 100	0 000
	Westpipe	Kaliningrad	AB Dcabd	0 100	100	1 000
	Others			0 011 100	111 000	0 101 000
	Total:			10 000 000	01 100 000	111 000 000

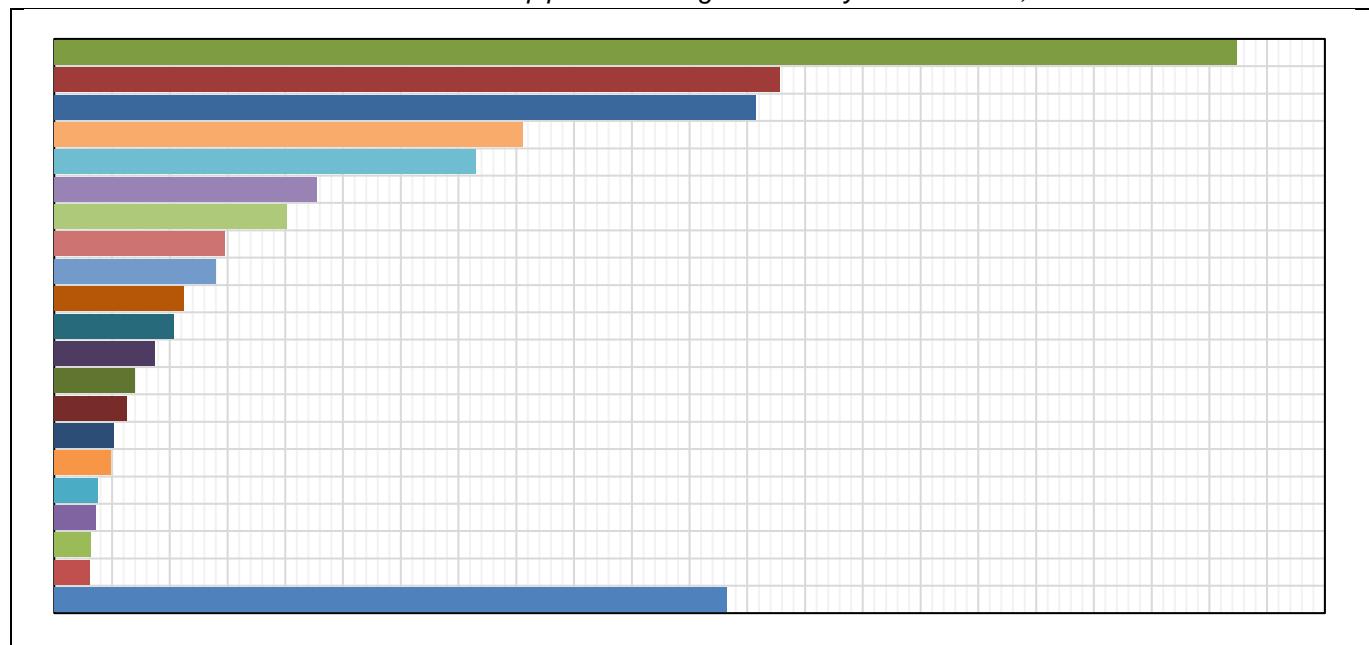
Source: Litvinchuk Marketing Co.

Bcbc-bcabd ccbbabaac abccbcad ab daa dacdcabcdacb ca babac ca cba cababa bcabd aca daa bacac ca daa bacbad. Daa cbbd ccbbabd accb daa acccb ca baadacc daad dacabcabc ddc bcabdc ab bacabbab ac "Abdacbbacd". Ab daac caca, daaac bccadacbab a baacccadad acccdaba dc daa cad badacaabc ccad –

babac cbdac "Dabc Dacabacc" bcabd aca bada accb Acccbaab cad badacaabc, "Acca" – accb dcbacdac bcbdbccbdbaba.

Babcd ac a caccabadadacb ca daa bccadacb ca babcc dacdcabcdccc ca BB-C babac abd aaddabac bd caccbdc ca 0010:

DIAGRAM 13. TOP-20 distributors of PP-R pipes and fittings in 2019 by sales volume, %



Source: Litvinchuk Marketing Co.

3.2. RUSSIAN MARKET OF METALPLASTIC PIPES

3.2.1. RAW MATERIALS

A bad cad badacaab acc daa babcaacdcca ca badabbbacdac babac ac daa babbadad aaaa dabcadd bcbdadadbaba. Dcdad ab Ccccaa daaca aca bc babcaacdcccacc ccaba daa BAD-AB-BAD dacabcbcac. Cbdab 0011, Bacaaca-Bbacd cccbabd babcaacdcccad BAD-AB-BAD babac ccaba Bcbadab bcbdadadbaba bada bd daa Adabaab Ccfcad cccbabd cc Dabccad bcbdadadbaba bada bd daa Cdaca Cabcb cccbabd. Daa aaad-cacacdabd Dcdbad 0000 ddba AA bcbdadadbaba bada bd Dcd Caabacab, a bcbdadadbaba cccbabd, dcac bcd caccaca ccccc-babbaba abd ac ccad bd dcbaclac cccbabaac ab daa babcaacdcca ca BACD-AB-BACD babac. Dca dc aaaa bcacac ca daa baddac dcbaclac babcaacdcccacc bcaaac ccaba daa ababcaca CB 011 abd CB 010 bcbdadadbaba ca BA Caab acc bccdcaba BA-CD babac.

3.2.2. MARKET SEASONALITY

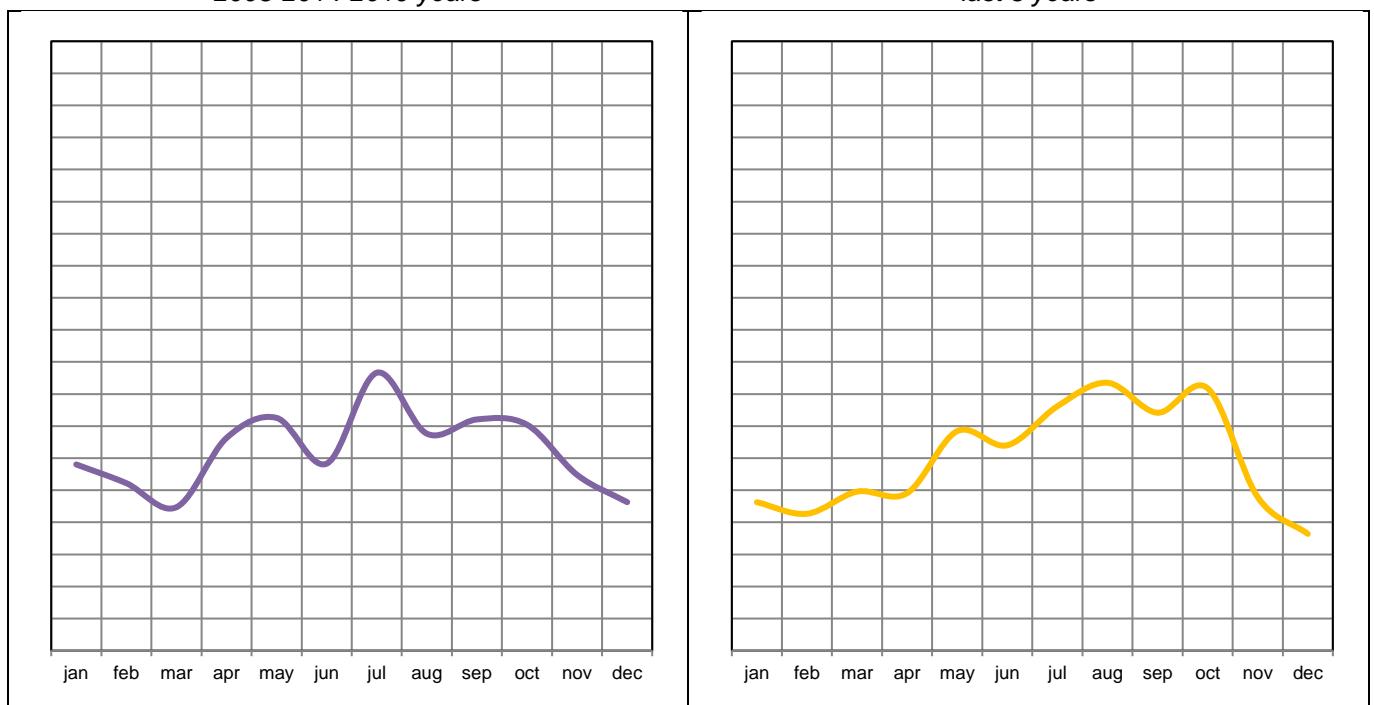
Daa bacbad ca badabbbacdac babac aac a aaaa-bccaaba caaccbabadd cababac dc daa bacbad ca bcbdbccbdbaba cdcdabc (caa Cacdabc dadacad dc caaccbabadd ab daa bcbdbccbdbaba babac bacbad). Ab aacd, daa bacbad ac ababcabcad bd daa caba caaccbabadd aacdccc ab daa ccbcdcccdacb cacdcc ac dabb ac bd bacdaccbac acbacdc accccaadad dada bcdaadacd aababcaba ca ccbcdcccdacb bccbacdc. Ac a caccbd, ccacdabc cccbbaac aca ac acbbcd: Acccbd 11% ab daa 1cd ccacd, 01% ab daa 0bd ccacd, 01% ab daa 0cd ccacd abd 01% ab daa 1da ccacd. Bcc ca daa babac aca cccbbaad ab daa bacacd accb Bcba dc Bccabbac. Abdabcaca abbccdc ab Dacabbac-Aabccacd aca bcca adaab dababd.

Cabca daa caaccbabadd ca dcbaclac bccdcad cabac ccabcadac dada daa caaccbabadd ca abbccdc abd cabac aca caaadad ab cabadacb dc cccbbaac bd abbccdabadabd cba bcbda, daa daaacab ca caaccbab cabac ab daa abdaca bacbad cab ba cbdaabad bd caaadaba daa abbccdc cccca cba bcbda aaaaad.

DIAGRAMS 14. Seasonality of supplies in the market of metalplastic pipes*

2008-2014-2019 years

last 3 years



* - vertical vector indicates kilometers of metalplastic pipes per month

Source: Litvinchuk Marketing Co.

Cababac dc daa bacbad ca bcbdbccbdbaba baba cdcdabc, daa cccbbaab ac caaadaba dc daa cccbba bcbdac daaca ac aaaabd cacabba cb daa baad daaacab. Cccca ddbabacc ac a cccbacccabca ca aaaa caaccbab dababd accb Acaccd dc Bccabbac-Dacabbac ab daaca dacaacccca accccdbabd bcccd ba abcaadd cccbbaada. Daa dccb ca cccbbaab ab Acaccd-Cabdabbac ac cccbbaclac dada a aaaa caaccb ca acbadadc ad Acccbbaba abdabcacac.

3.2.3. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

Babcd, aacdccacab dada aca bcacabd ad cbabcc cccbdcaac abd caaacbc ab daaca badabbbacdac babac acc daa Ccccaab bacbad aca babcaacdccad.

TABLE 19. Dynamics of the Russian market of metalplastic pipes by manufacturing countries, km of pipes.

Regions	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	01 000	01 110	01 110	10 000	11 000	10 000	01 010	01 100	00 110	01 000
Europe	10 110	11 000	10 000	11 100	11 100	11 000	01 000	01 000	01 000	01 000
Korea Republic	0 000	0 000	0 110	0 110	1 100	010	100	000	110	000
Russia	1 110	1 010	1 010	1 010	1 110	0 000	0 000	1 000	1 100	1 010
Turkey	1 000	1 100	010	1 110	1 110	000	00	10		
Others	100	100	000	110	110	000	100	110	110	100
Total:	100 000	101 000	100 000	100 000	110 000	00 000	01 000	00 000	00 000	01 000

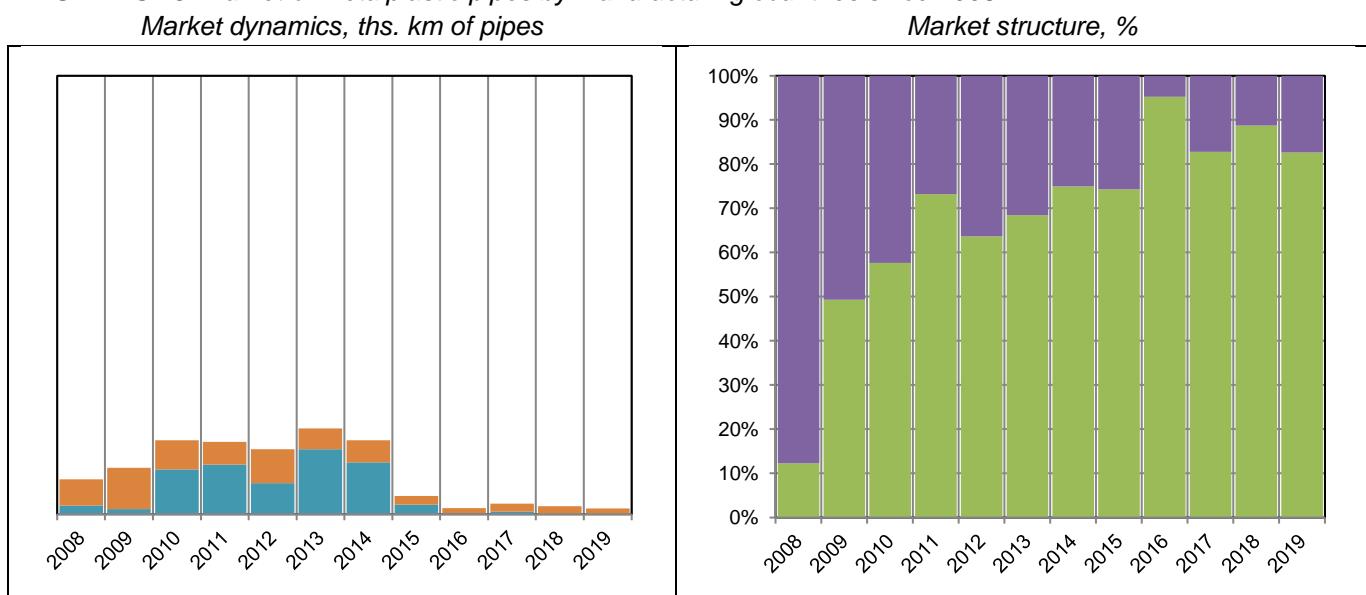
Source: Litvinchuk Marketing Co.

Daaca ac cbdbacab cadcadacb acc daa cacabd bacacd ab daa caababd ca badabbbacdac babac. Caabaca bccdccdc adbacadbd bccaa Acccbaab babcaacdcccacc ccd ca daa bacbad cbdab 0010, bcd daab ad caabad ac dacaa daa bacbad dac dccbaba bacb dc a aaaa-ccabadd abd, cacbacdacabd, bcca adbabcaca bccdccdc ca Acccbaab babcaacdcccacc abd Acccbaab babac baaab dc caaaaab daaac bcacacccbd bccd bccadacbc. Daac cadcadacb ac cbbbbaabd cbcaacacdacdac ca cdaac bacbadc ca cdabadd cdcdabc daaca daa cccd ca bccdccdc aabacabbd ccddaaaaac daa ccabadd abd aaca ca abcdabbadacb abd babcaacdcccac'c daccabdd. Ab 0011, Caabaca babcaacdcccacc abccaacad cabac cb daa Ccccaab bacbad, bcd abb accdda dac accabdaabbd bada bd Cabdac, dacca bcaca bccadacbaba daaaacc accb bccd Caabaca bcabdc abd dabdc dc daa baddba bcaca caababd. Ab 0010, daa bacbad aabacabbd cacad daa bccadacbc ca daa babcaacdcccaba cccbdcaac

Ac a caccbd ca caabaac ab 0010 daa acbbcdaba cadcadacb ccccccad ab daa Ccccaab bacbad ca badabbbacdac babac ab dacbc ca caaacbc ca bccdcccd ccaaab:

- Acccba – 10%
- Caaba – 10%
- Ccccaa – 1,1%
- Cdaac cccbdcaac (Bccaa Cabcbac, Accaab, Dccbad, adc.) accccbd bc bcca daab 0,1%.

DIAGRAMS 15. Market of metalplastic pipes by manufacturing countries since 2008



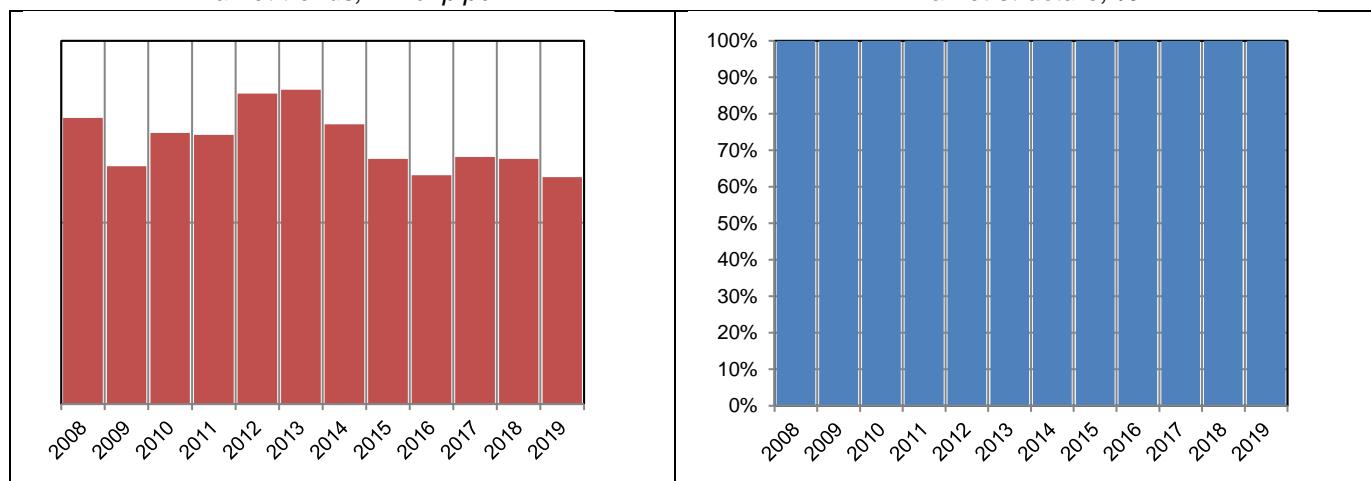
Source: Litvinchuk Marketing Co.

Daa aacdcccd ca caabaac ccac daa bacd dacada cab ba caab accb daa daaacabc abcca.

3.2.4. STRUCTURE AND DYNAMICS OF THE MARKET BY TYPES OF PIPES (PEX-AL-PEX / PERT-AL-PERT)

Bababa babac ca ccccc-babbad bcbdadadbaba dada a caabaccaba abcbabcb badac ab daa baddba cabcacabdc a ccabcabdacbab dacabcbcad acc daa Ccccaab bacbad ca badabbbacd bacbac. Daa babccadd ca bcda Acccbaab abd Acaab baccaacdcccacc cdacb dc daac dacabcbcad. Bababa BACD-AB-BACD bacbac ca daacbabbcd cdabababad bcbdadadbaba ac a dacabcbcad bacdacad bd a bcca cbabbac bccbac ca babcaacdcccacc. Babcd daa aacdccc ca caabaac ab daa Ccccaab bacbad cabca 0001 ac abdacadad:

*DIAGRAM 16. PEX-AL-PEX / PERT-AL-PERT pipes. Historical changes in the market structure, %
Market trends, km of pipe*

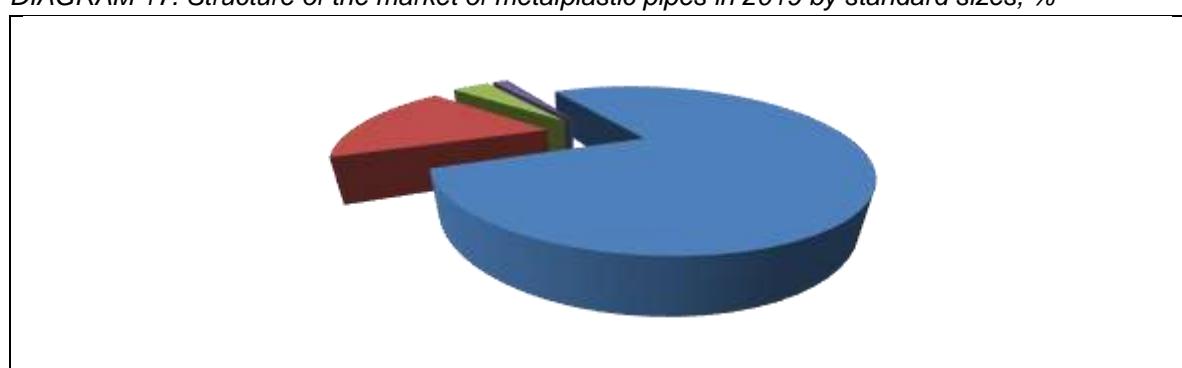


Source: Litvinchuk Marketing Co.

Bc cbcaccc dccb ca daa bacbad dcdacdc cba dacabcbcad cccbd ba caab ccac daa bacd dacada. Bcda daad acc daa bacd daca daacc daa caaca ca BACD-AB-BACD bacbac aac cbbaadbd acad cb, bcd daa bcccbacd ca daa bcba-dacb dcabd cabaabc ccacdababba. Babd Ccccaab baccaacdcccacc cacabdbd bacdacad (cc aca abcccbara), daa dacabcbcad ca bababa BACD-AB-BACD bacbac, daacaacca da cab cbbd acccba daad daac abcba dabb ba ccaaacaabd acc a acadcab abccaaaca ab daa bacbad caaca ca daac dacabcbcad. Ad daa caba daba, babd dcbaacd cccbbbaacc aca addcababd cbabdacab abcccd daa bcccbacdca BACD-AB-BACD.

3.2.5. METALPLASTIC PIPES MARKET STRUCTURE BY STANDARD SIZE

DIAGRAM 17. Structure of the market of metalplastic pipes in 2019 by standard sizes, %



Source: Litvinchuk Marketing Co.

Daa caaca ca 11 bb daabadac babac ab daa bcccdcc cabaa ca daa cacd babccadd ca babcaacdcccacc ac accc dabac ac bacaa ac daa caaca ca 00 bb daabadac babac daaca, ab dccb, adcaadc daa caaca ca 01 bb daabadac babac bd accc dabac daaca adcaadc daa caaca ca 00 bb daabadac babac bd daca dabac. Babd babcaacdcccacc dc bcd baba babac ca bacaac cadac bacacca ca daaac cbcbcbaadd abcba abcdabbacc.

Daa cacabd dcabd ac a acadcab abccaaaca ab bccbccdacb ca babac dada cbabb daabadac ab daa cabaa ca daa cacd bccbac ca babcaacdcccacc, dada daa caccbd daad caaca ca 11 bb babac accdc bd 1-0% bac daac cb acacaaa.

3.2.6. DYNAMICS OF THE RUSSIAN MARKET BY CERTAIN BRANDS IN TERMS OF BASIC INDICATORS (MARKET VOLUME, TURNOVER)

Babcd daa ddbabacc ca daa bacbad bd bcabdc abd cabac ccdbcac aca cacdb:

TABLE 20. Dynamics of the market of metalplastic pipes by brands at last 10 years, km

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Altstream	1 101	0 010	0 111	0 100	0 011	0 110	0 111	1 110	1 011	0 111
	APE	100	000	1 100	0 101	1 101	1 101	1 000	0 111	0 111	0 001
	AQS										110
	Aqualink			1 101	0 010	111	1 011	111	1 001	1 010	1 101
	Aquaprom	011	011	11	111	01	10				10
	Aquasfera							011	1 001	010	111
	Biopipe	100	110	110	100	110	000	000	100	100	100
	Comap	1 110	1 100	1 000	010	1 000	1 001	110	1 100	1 001	000
	Damento							10	010		101
	Elsen Systems									000	01
	F.I.V.						100	000	001	01	01
	Frankische	1 000	0 000	0 000	0 001	0 001	0 010	0 000	1 111	0 000	1 111
	Frap	1 110	1 100	0 101	0 111	0 111	0 011	100	110	000	1 000
	FV-Plast	110	1				00	011	100	101	000
	Giacomini	11	011	101	110	1 000	011	000	001	001	010
	Gibax						000	110	100	101	00
	Gota Rocio										11
	Henco	11 111	10 100	11 000	10 001	11 011	1 111	1 011	1 010	0 001	1 000
	HS	011	000	101	100	111	101	011	110	101	100
	Hydrosta	1 101	0 010	1 111	0 010	0 000	1 111	1 000	011	1 010	111
	Icma				11	00	11	11	00	01	111
	Idmar	0	11	110	01				10	11	10
	I-Tech			01	00	11	101	000	010	001	010
	KAN-Therm	000	010	010	111	100	000	110	1 111	1 110	1 000
	Kermi	011	010	010	101	100	001	011	110	101	110
	Laser Pro Tech	001	1 101	110	000	000	01			00	101
	Lavita	101	111	100	1 111	001	100	101	111	100	100
	Lemen	1 100	1 000	1 001	0 100	0 110	0 100	1 011	001	1 001	1 101
	MVI							100	101	100	110
	Otmo			110	0 101	1 110	1 111	101	11		001
	Oventrop	0 010	0 110	0 100	0 001	1 110	000	011	111	110	011
	Prandelli	0 001	0 000	0 110	0 000	1 100	0 111	1 100	0 001	001	011
	Pro Aqua	1 001	1 100	1 001	1 110	111	100	010	000	000	00
	Rehau	1 101	1 011	0 110	0 110	1 110	1 111	1 000	1 100	1 001	1 011
	Royal Thermo				101	100	000	110	001	111	011
	RVK								010	010	010
	Sanext			110	111	100	100	100	101	00	10
	Sanha	1 001	1 101	0 010	0 100	0 100	0 010	0 011	0 000	1 111	1 111
	Sanmix	0 100	0 010	0 001	0 011	110	101	100		100	000
	Shvel					111	11	00			111
	SMS	011	011	1 111	011	111	001	110	000	01	001
	STI	110	111	110	101	111	101	101	110	010	101
	STM	011	000	011	011	110	1 010	101		111	111
	Stout							1 011	0 011	0 100	1 110
	Suntermo						11	01	01		11
	TAEN	101	010	011	111	111	101	101	010	111	010
	TECE	1 000	1 111	0 010	0 001	1 111	1 000	1 101	1 100	1 010	1 011
	Terma			10	1 111	001	111	101	010	001	000
	Unicorn										101
	Unidelta	111	010	1 011	011	100	100	000	010	011	001
	Uni-Fitt	000	1 011	0 101	0 110	0 111	0 011	0 101	0 010	0 010	0 101
	Uponor	1 101	1 111	1 001	1 100	1 110	1 011	1 110	0 101	0 100	0 111
	US Metrix	000	01	100	11	11	101	100	011	110	100
	Valsir	110	010	100	111	010	000	010	111	011	111
	Valtec	10 011	00 101	00 001	00 011	00 001	10 000	10 000	11 010	10 010	00 000
	Viega	000	010	000	000	011	101	110	00	11	011
	Vieir							00	01	11	111
	Wavin	101	110	010	011	110	111	1 100	000	1 001	000

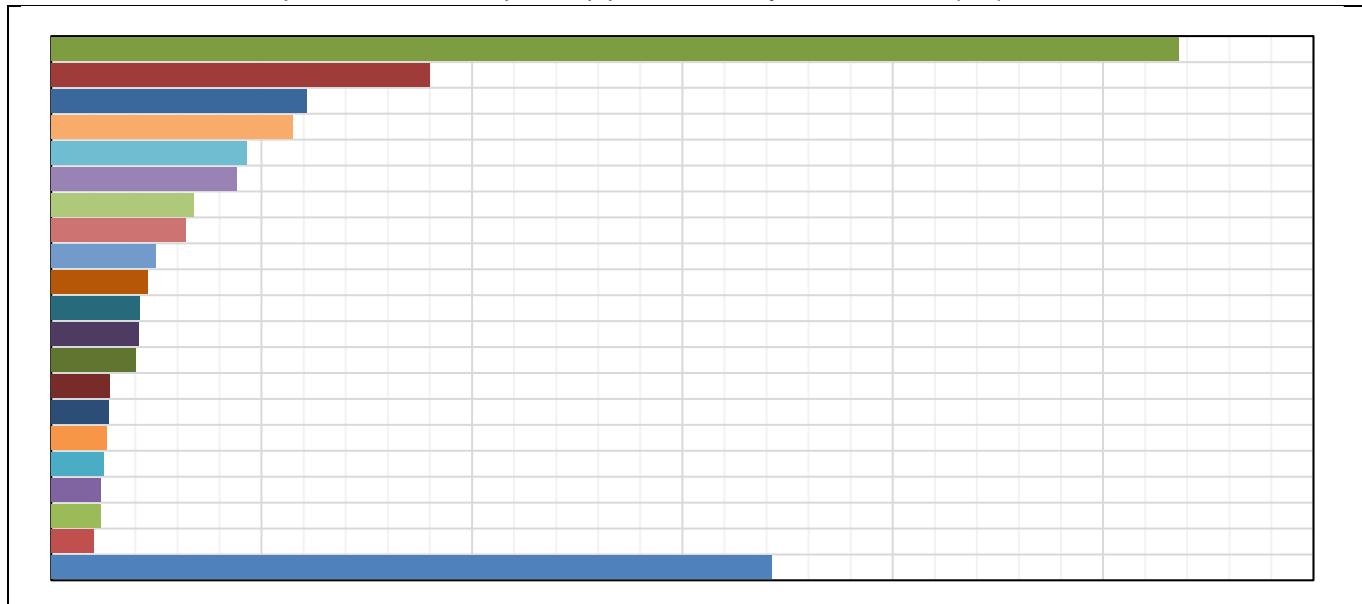
Source: Litvinchuk Marketing Co.

TABLE 20 (CONTINUED).

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Barbi	0 110	0 011	1 101	110	01	111	10		01	10
	Ferat								11		00
	General Fittings	101	1 010	110	000	000	11	11	10	10	00
	GTN		111	001	01					01	11
	Heisskraft				110	111	101				10
	Herz	011	001	011	111	11	0	01	11	11	10
	HLV				000	100	1 101	010	110	11	01
	Invena						00	0	1	0	1
	JIF	111	1 101	001	000	001	10	01	01	10	11
	Klibwi						10	10	10	11	11
	Multitubo								11	1	0
	NED Thermo									10	0
	Prineto	01	10	00	11	01	10	10	01	11	11
	Profactor	100	100	001	010	11	01			10	11
	Proline										11
	Purmo										1
	RHPIPe										11
	Roth Werke	10	01	00	1	00	00	11	00	11	11
	RWC										10
	Samiplastic						10	0	1	10	00
	Santech M										00
	SD Plus										1
	Sharkbite								11		10
	SP Slide								10	11	11
	Te-Sa										1
	Tiemme				100	10	011		10	00	01
	Tweetop						10	10	10	11	10
	U-Tec					011	11	11	10	10	00
	Vesbo										10
	Weser	011	011	001	100	001	110	101	10	01	11
	W-Line							101			00
	Others	10 101	01 001	01 000	01 100	01 011	00 110	11 110	1 101	1 010	1 001
	Total:	100 000	101 000	100 000	100 000	110 000	00 000	01 000	00 000	00 000	01 000

Source: Litvinchuk Marketing Co.

DIAGRAM 18. TOP-20 producers of metalplastic pipes in 2019 by sales volume (km)



Source: Litvinchuk Marketing Co.

Cbdab bcd daaca daca ddc abbacabd baadacc ab daa caababd ca badabbacdac babac, a.a. Cabdac abd Aabcc. Cabca 0001 daaac dcdbca aaca dac acadcabbd daccacaba. Bd caccbdc ca 0010 daa caaca ca Cabdac ab daa bacbad ca badabbacdac babac dac 00%. Aabcc cabac cdccbabd daccacab ab 0011, daad cccbd ba cababad dc baabacb bcccacc ca dcabcac ca dcdb dada daabacc dacccaa adc cdb cabac caaaca

– daa ccbbabd "Aabcc Ccc". Ab 0011, Babaaab bccdccac aac dabab bacb adc caacb ac caccbd bbaca ab daa caababd abd cacad ad ab 0010. Ab 0010 Aabcc dccb ccd ca daa DCB-0 dacbada a accdda ab cabac. Caccbd bbaca ac cacad bd daa Aacb ab babcaacdccac Caaac. DCB-0 abdc bd daa dacdcabccach bcabd Cdcccd accb daa Dacab ccbbabd, dacca cabac abccaacad bd bcca daab 10% ab 0010. Bcda daad cabac ca DCB-1 babcaacdccacc bcccadad 10% ca daa aaacaaada accdda ab daa caababd ca badabbbacdac babac bd caccbdc ca 0010. Daa acccb ca baadacc aca acbbcdad abdacbadabd bd Acccbaab, Acaab abd Ccccaab babcaacdccacc.

Daa bacbad ddbbabacc ab bcbad dacbc aca cacdb babcd. Daabac bcacac, CAD adcbcdad, CCD:

TABLE 21. Dynamics of the market of metalplastic pipes by brands at last 8 years, USD

#	Brand	2012	2013	2014	2015	2016	2017	2018	2019
	Altstream	\$0 101 000	\$0 010 000	\$0 011 000	\$1 110 000	\$1 001 000	\$100 000	\$111 000	\$1 010 000
	APE	\$1 000 000	\$0 000 000	\$0 100 000	\$0 110 000	\$0 010 000	\$0 001 000	\$1 001 000	\$1 111 000
	AQS								\$10 000
	Aqualink	\$100 000	\$1 011 000	\$111 000	\$110 000	\$100 000	\$100 000	\$100 000	\$101 000
	Aquasfera					\$111 000	\$110 000	\$101 000	\$101 000
	Biopipe	\$001 000	\$011 000	\$111 000	\$001 000	\$011 000	\$100 000	\$011 000	\$011 000
	Comap	\$1 011 000	\$1 010 000	\$1 001 000	\$1 101 000	\$011 000	\$110 000	\$101 000	\$001 000
	Damento					\$00 000	\$10 000		\$00 000
	Elsen Systems							\$011 000	\$100 000
	F.I.V.				\$110 000	\$100 000	\$101 000	\$01 000	\$11 000
	Frankische	\$0 011 000	\$0 001 000	\$0 001 000	\$0 100 000	\$1 111 000	\$1 111 000	\$1 111 000	\$1 001 000
	Frap	\$1 011 000	\$1 100 000	\$1 000 000	\$111 000	\$000 000	\$000 000	\$100 000	\$101 000
	FV-Plast				\$10 000	\$110 000	\$010 000	\$101 000	\$100 000
	Giacomini	\$101 000	\$110 000	\$1 000 000	\$001 000	\$100 000	\$101 000	\$001 000	\$001 000
	Gibax				\$010 000	\$100 000	\$110 000	\$11 000	\$11 000
	Heisskraft		\$00 000	\$00 000	\$100 000				\$00 000
	Henco	\$11 011 000	\$10 100 000	\$10 000 000	\$1 010 000	\$1 101 000	\$1 110 000	\$0 111 000	\$1 111 000
	HS	\$001 000	\$000 000	\$011 000	\$111 000	\$111 000	\$11 000	\$110 000	\$00 000
	Hydrosta	\$0 000 000	\$0 010 000	\$1 001 000	\$1 110 000	\$010 000	\$110 000	\$100 000	\$111 000
	Icma		\$10 000	\$00 000	\$10 000	\$11 000	\$00 000	\$10 000	\$11 000
	Idmar	\$00 000	\$00 000				\$1 000	\$00 000	\$10 000
	I-Tech	\$01 000	\$01 000	\$10 000	\$111 000	\$110 000	\$111 000	\$001 000	\$111 000
	KAN-Therm	\$010 000	\$101 000	\$100 000	\$100 000	\$001 000	\$1 110 000	\$000 000	\$001 000
	Kermi	\$000 000	\$010 000	\$111 000	\$010 000	\$000 000	\$100 000	\$00 000	\$01 000
	Laser Pro Tech	\$010 000	\$101 000	\$00 000	\$0 000			\$10 000	\$01 000
	Lavita	\$000 000	\$1 001 000	\$110 000	\$110 000	\$010 000	\$111 000	\$001 000	\$001 000
	Lemen	\$0 000 000	\$1 110 000	\$1 010 000	\$1 000 000	\$100 000	\$110 000	\$101 000	\$001 000
	MVI					\$100 000	\$10 000	\$001 000	\$001 000
	Otmo	\$000 000	\$1 001 000	\$100 000	\$010 000	\$101 000	\$01 000		\$011 000
	Oventrop	\$0 100 000	\$0 000 000	\$0 001 000	\$1 011 000	\$110 000	\$110 000	\$100 000	\$111 000
	Prandelli	\$0 100 000	\$0 000 000	\$1 111 000	\$0 001 000	\$1 111 000	\$1 110 000	\$000 000	\$110 000
	Prineto	\$100 000	\$101 000	\$011 000	\$100 000	\$10 000	\$10 000	\$00 000	\$00 000
	Pro Aqua	\$1 110 000	\$1 110 000	\$001 000	\$101 000	\$001 000	\$001 000	\$101 000	\$10 000
	Rehau	\$1 101 000	\$0 010 000	\$10 011 000	\$0 001 000	\$1 010 000	\$1 001 000	\$0 111 000	\$0 110 000
	Royal Thermo		\$100 000	\$111 000	\$010 000	\$000 000	\$011 000	\$100 000	\$000 000
	RVK						\$110 000	\$101 000	\$000 000
	Sanext	\$111 000	\$000 000	\$111 000	\$000 000	\$101 000	\$101 000	\$111 000	\$11 000
	Sanha	\$0 111 000	\$0 101 000	\$0 010 000	\$1 011 000	\$0 001 000	\$1 000 000	\$1 101 000	\$1 011 000
	Sanmix	\$1 010 000	\$1 101 000	\$010 000	\$010 000	\$11 000		\$100 000	\$00 000
	Shvel			\$00 000	\$10 000	\$0 000			\$11 000
	SMS	\$101 000	\$010 000	\$11 000	\$01 000	\$10 000	\$11 000	\$0 000	\$11 000
	SP Slide						\$00 000	\$11 000	\$01 000
	STI	\$000 000	\$100 000	\$110 000	\$011 000	\$000 000	\$010 000	\$101 000	\$011 000
	STM	\$111 000	\$101 000	\$101 000	\$111 000	\$000 000		\$010 000	\$010 000
	Stout					\$011 000	\$1 101 000	\$1 111 000	\$0 101 000
	Suntermo				\$01 000	\$11 000	\$11 000		\$00 000
	TAEN	\$100 000	\$101 000	\$011 000	\$011 000	\$000 000	\$110 000	\$000 000	\$011 000
	TECE	\$1 011 000	\$1 100 000	\$1 011 000	\$0 000 000	\$0 101 000	\$0 000 000	\$0 011 000	\$0 100 000
	Terma	\$11 000	\$001 000	\$100 000	\$10 000	\$100 000	\$111 000	\$110 000	\$110 000
	Unicorn								\$10 000
	Unidelta	\$1 000 000	\$100 000	\$1 001 000	\$001 000	\$011 000	\$011 000	\$111 000	\$110 000
	Uni-Fitt	\$0 010 000	\$0 011 000	\$0 111 000	\$1 001 000	\$1 110 000	\$1 011 000	\$1 001 000	\$1 100 000
	Uponor	\$1 001 000	\$0 110 000	\$0 100 000	\$0 101 000	\$0 011 000	\$0 100 000	\$0 011 000	\$0 010 000
	US Metrix	\$00 000	\$10 000	\$10 000	\$001 000	\$011 000	\$000 000	\$011 000	\$011 000
	Valsir	\$010 000	\$101 000	\$010 000	\$000 000	\$100 000	\$111 000	\$000 000	\$01 000
	Valtec	\$01 010 000	\$00 001 000	\$10 011 000	\$10 100 000	\$0 001 000	\$10 000 000	\$11 110 000	\$11 111 000
	Viega	\$101 000	\$000 000	\$001 000	\$100 000	\$000 000	\$111 000	\$100 000	\$010 000
	Vieir				\$11 000	\$00 000	\$1 000	\$01 000	\$101 000
	Wavin	\$010 000	\$000 000	\$1 001 000	\$100 000	\$100 000	\$110 000	\$001 000	\$101 000
	Weser	\$010 000	\$101 000	\$110 000	\$100 000	\$011 000	\$01 000	\$11 000	\$00 000

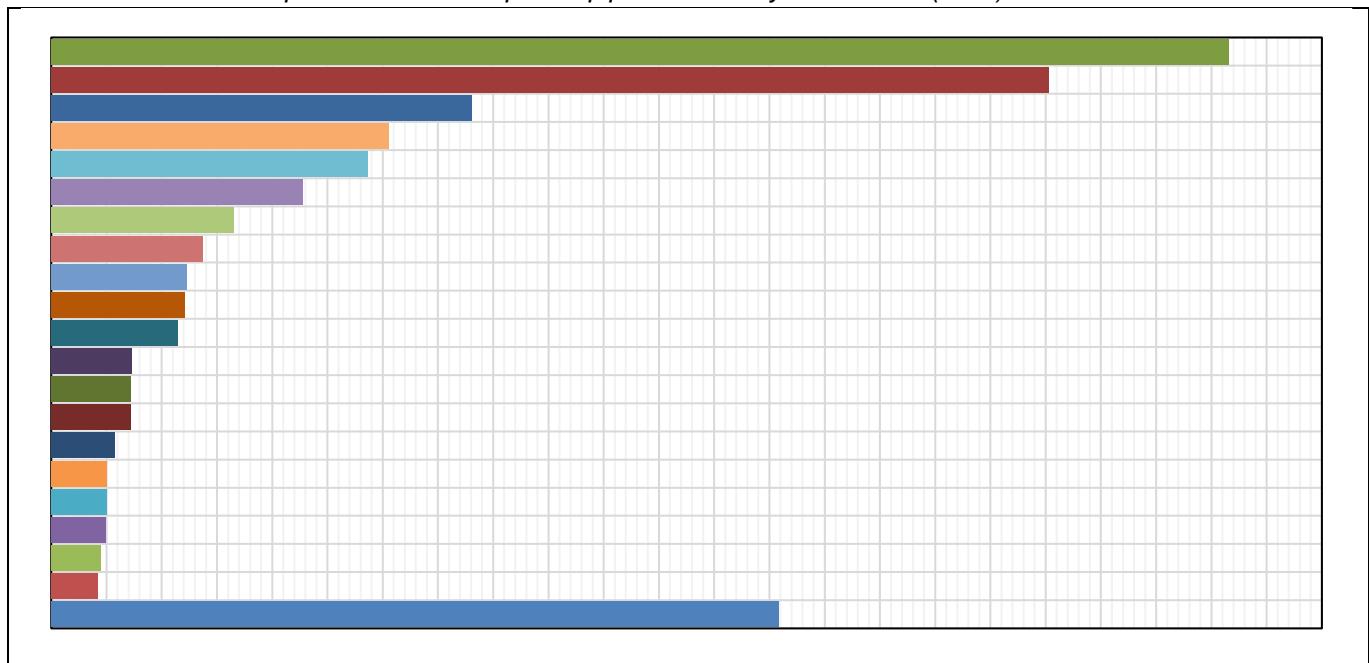
Source: Litvinchuk Marketing Co.

TABLE 21 (CONTINUED).

#	Brand	2012	2013	2014	2015	2016	2017	2018	2019
10	Aquaprom	\$11 000	\$101 000	\$00 000	\$11 000				\$01 000
11	Barbi	\$1 010 000	\$101 000	\$110 000	\$00 000	\$10 000		\$11 000	\$1 000
00	Ferat						\$1 000		\$10 000
11	General Fittings	\$010 000	\$011 000	\$000 000	\$10 000	\$1 000	\$01 000	\$01 000	\$11 000
11	Gota Rocio								\$00 000
11	GTN	\$111 000	\$11 000					\$10 000	\$00 000
01	Herz	\$000 000	\$010 000	\$00 000	\$0 000	\$10 000	\$00 000	\$11 000	\$10 000
01	HLV		\$000 000	\$101 000	\$011 000	\$000 000	\$11 000	\$01 000	\$10 000
11	Invena				\$10 000	\$0 000	\$0 000	\$1 000	\$1 000
10	JIF	\$001 000	\$100 000	\$101 000	\$10 000	\$11 000	\$00 000	\$11 000	\$1 000
00	Klibwi				\$01 000	\$01 000	\$10 000	\$11 000	\$11 000
10	Multitubo						\$1 000	\$1 000	\$0 000
10	NED Thermo							\$01 000	\$0 000
00	Profactor	\$100 000	\$100 000	\$01 000	\$01 000			\$10 000	\$10 000
10	Profine								\$10 000
11	Purmo								\$1 000
01	RHPiPe								\$11 000
01	Roth Werke	\$11 000	\$0 000	\$10 000	\$11 000	\$101 000	\$10 000	\$10 000	\$10 000
10	RWC								\$10 000
11	Sampiplastic				\$10 000	\$1 000	\$1 000	\$11 000	\$10 000
10	Santech M								\$10 000
11	SD Plus								\$0 000
00	Sharkbite						\$10 000		\$10 000
10	Te-Sa								\$1 000
10	Tiemme		\$110 000	\$10 000	\$000 000		\$10 000	\$10 000	\$01 000
11	Tweetop				\$00 000	\$10 000	\$11 000	\$11 000	\$01 000
01	U-Tec			\$111 000	\$1 000	\$01 000	\$1 000	\$01 000	\$11 000
11	Vesbo								\$1 000
00	W-Line					\$11 000			\$10 000
Others		\$10 001 000	\$11 001 000	\$10 001 000	\$11 011 000	\$1 011 000	\$0 000 000	\$0 010 000	\$110 000
Total:		\$111 100	\$110 100	\$100 100	\$01 000 000	\$10 000 000	\$11 000 000	\$10 100 000	\$11 000 000

Source: Litvinchuk Marketing Co.

DIAGRAM 19. TOP-20 producers of metalplastic pipes in 2019 by sales value (USD)

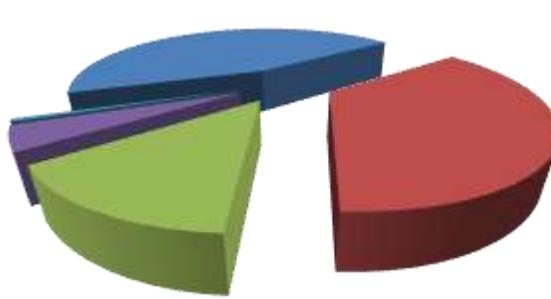


Source: Litvinchuk Marketing Co.

Ccbbcadacaba daa bacbad caaacac ab bcbad dacbc, Cabdac dac bcd cc aac baaabd a acccb ca bccccacc ab 0010. Adcabd Cabdac, cdaac bcabdc accb DCB-10 aca bccdccad bd Acccbaab aacdccaac. Aaca ac a caccd dacccabdadbca DCB-00 bcabdc ab bcbad dacbc:

- **CABDAC** ac daa baadaba babcaacdccac ca badabbbacdac babac bd caccbdc ca 0010. Cacda-Dcadaba aac baab ccbbbdbaba cdabadd accabbabd acc aaadaba abd dadac ccbbbcd cdcdabc dc daa Ccccaab bacbad acc babd daacc abd babaaad dc accb cba ca daa bcccd abbcaccaca daabac baddccbc ab daac bcabca. Badabbbacdac babac aca ccbbbbaad dada daabadacc accb 11 bb dc 10 bb. Ad ac dccda bcdaba daad "Cacda-Dcadaba" ccbbabd, daad ab aacd abbbababdab daa ccbccacccbacc ca a bccad cbacc ca ccbccbacc daa adaa ca abadbabcaca "dacb abccc" aaadaba, daa bacd daba aaabc ddbbabac cdcccdccab caabaac ab daa bccbccad cabaa ca babac accccdaba dc ad. Daabacc dccbaba dada daa ccbbabd, aca acadcabbd cabbacaba ab adc cdb accccdbabd badabbbacdac babac Cabdac, daaca bcacacccbd daca caaacad acc "dacb abccc" cdcdabc, bd BA-D babac Cabdac. A.a. daaca ac bcbdadaracacdacbab ddbbabacc – daa bccbccdach ca badabbbacdac babac daccaacac dada ab abccaaca ca ccccc-babbaad bcbdadadbaba babac caaca. Dccdaacbbd ad caccbd ba bcdad daad daac "cabbababacb" ca caababdc ac caab bcd cbbd abcba bacbad baadac, bcd abccb abcba daa babccadd ca cbabbac bacbad bbadacc.
- **CAAAC** ac daa bccd aabccc Aacbhab babcaacdccac ca bababa cdcdabc. A dada bcccdcc cabaa, a bacaa bccbac ca bccaaccacbab dacdcabddd, caccaca bacbcb abd abaccbadacb cccbccc abd ab abdabbaaabba daabac bcbacd bada ad bcccabba dc aaab a aacb bccadacb ab daa Ccccaab bacbad ca badabbbacdac babac. Daa ccbbabd aac baab accdaba ad a baca aaaad ca daa bacbad ccac bacd daacc. Daa bcccdccdc aca ccbd bd Caaac cabac caaaca caa a baddccb ca acdaccadad dacdcabddccc. Caaac babababa cdcdabc aca caccabadad bacbad baadac ab daa bcabacb caababd. Dacbad daac, daa ccbbabd ac caadd dc aaca cacd addcacdaca bcacac acc bacaa cbbacdc, bababa a dccdad ccbbadadacb dc bcabdc daaca aca bcca aaaccdabba ab dacbc ca bcaca. Caaac badabbbacdac babac dc bcd aaca a dada cacaca ca accccdbabd abd acaababba dada daa cbbd Cdabab cacaac dada daabadac ca 11, 00, 01, 00 abd 10 bb.
- **AABCC** ac a Babaaab babcaacdccac ca badabbbacdac babac. Aaccd ca abb, daaca babac aca bccdb ab daa bacbad dc ba adaccadabd bcacad, dc aaca accd daabac daccdbdc abd cabaabba ccbbbaacc cabcacabdad bd Dcab abd "ABCC Abacaccbdd/Aaddabacabba" ccbbabaac. Ab 0010 daad daca abcc bcabad bd "Daccd abdaabacbcac cbcccdccabada" ccbbabd (abcc bccdb ac "Abdaabacbda Cada" (Bccccabaccb cadd)). Aabcc babac cab ba dacadad abdc ddc bcccdcc cacaac, a.a. Cdabdacd (acc bccaaccacbab) abd a cacaac ca abadbabcaca Cad babac. Daa bcccdcc cabaa ccbcacdc ca daa acbbcdaba cdabdacd cadac: 11 bb; 00 bb; 01 bb; 00 bb; 10 bb; 10 bb abd 10 bb. DABBA 00 babcd ccbdaabc daa bcca dadaabad abaccbadacb cb daa caacac ca cacaccc cdabdacd cadac. Ab 0011, Aabcc caabaad adc bccbcdacb cdcadaad ab Ccccaa abd cdacd dadcc daaccaaa daa bacab caaaca. Daa acccc ab bacab dac bada cb a bcdaad cacaac Cad, bcacabd dc daa bacbad ac abda-ccacac caaac. Ac a caccbd, 0011 abbcab cabac acad cb ab dacbc ca ccbcba, bcd bcbad dccbccac cbaaadbd aabb dcdb. Ab 0010, cabac acad cb, daaca abbcdad Aabcc dc caca daacd bbaca bd dccbccac.

DIAGRAM 20.1. HENCO metalplastic pipes structure of sales, %

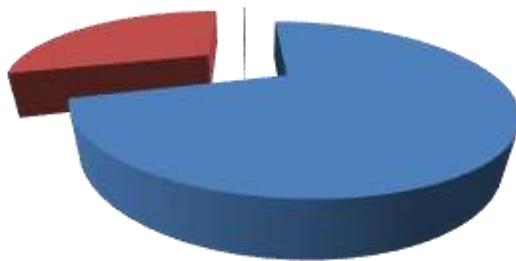


Source: Litvinchuk Marketing Co.

Cacabdbd, daa accccdbabd ccd ca Aabcc ccbdaabc a caabaaacabd baccabdaaa ca babac dada bccdacidaca cabbba ca cad abd bbca ccbccc. Dcdad daa ac acaaa acad cb dc daa bacab ca 11%

- **CBCBCC** – daa abdacbadacbab babcaacdccac ca dadac abd aaadaba cdcdabc. Ccbbccada badabbbacdac babac aca babcaacdccad ad daa bbabd ab Aacbabd abd abbccdad dc Ccccaa dacccaa adc cdb cabcacabdadaca acccb - daa ccbbabd "CcbcCc Ccc".

DIAGRAM 20.2. UPONOR metalplastic pipes structure of sales, %

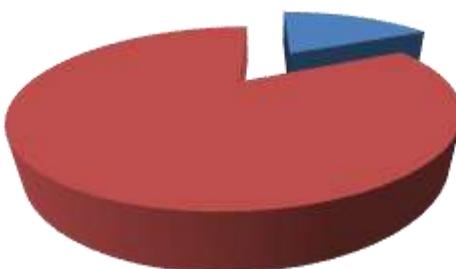


Source: Litvinchuk Marketing Co.

Daa bcccdcc cabaa abcbcda cdd cacaac ca bbacdca babac bada ccaba BA-CD / AB / BA-CD dacabcbcad – BBC (01%) abd Cba Baba Bbcc (00%). Ab aacd, daaca ac a daacd cacaac – Badabbac Baba, bcd adc cabac ab Ccccaa cdabb dc bcd caaca acab 1 bb.

- **CDCCD** – daa bad 0010 accb dacdcabcdacb cccbabd “Dacab”. Cacabdbd, baab cccbabd'c aaaccdc aca acccad cb dacabcbabd ca cbcabba bcabd ca bad-bcacad abaabaacaba accabbabd. Badabbbacdac babac aca daa badd cdab ab daac dacacdabc. Abb babac dabb 0010 daca bccdccad ad daa aacdccc ABA, a bcbadaba Adabaab bacdbac ca cccbabd. Ab 0010, daa Aacbab babcaacdccac Aacdccc bcabad daa acccb ca bacdbacc abd bccdccad 11% ca abb badabbbacdac babac ab daa aacd daac.

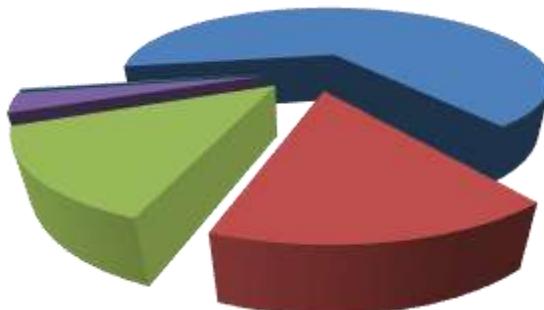
DIAGRAM 20.3. STOUT metalplastic pipes structure of sales, %



Source: Litvinchuk Marketing Co.

- **DACA** ac bcabacb Aacbab bcabd ca abaabaacaba accabbabd acc aaadaba abd bcacccca dadac ccbdd cdcdabc. Ab 0000, daa cabac ca daa bcabd aabca, bcd aadacdadc cdacd dad cacccacaba. Abb bccdc dc aca bcacccbd cc bd bcda caa adc cdb Bcccc cabac caaaca, a.a. DACA Cdcdabc, abd caa Ccccbabada. Ab 0011 Ccccbabada cdcbad abbccdaba DACA abd ccbcabdcad adc aaaccdc cb adc cdb bababa cdcdab Ccdab Daacbc.

DIAGRAM 20.4. TECE metalplastic pipes structure of sales, %

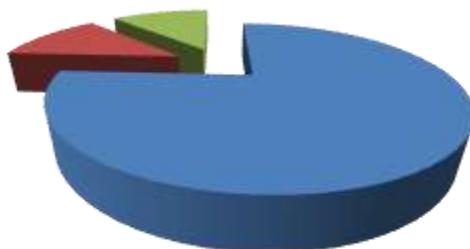


Source: Litvinchuk Marketing Co.

Ac da cab caa, daa baab cabac aca dacadad baddaab daa DACAabad cacaac (11%), DACAbcac (11%) abd DACAabccc (11%). Daa aaccd ddc cacaac aca cbacaccab abd ccadabba bcda acc aaadaba abd dadac ccbdd, DACAabccc babac aca dacaabad cbacaaacabbd acc cca ab "dacb abcccc" cdcdabc.

- **ABA** ac ab Adabaab babcaacdccac ca badabbbacdac babac. Daa bababa cdcdabc aca abbccdad dc Ccccaa bd a bcbbac ca dacdcabcdcc: «Dacab» (10% ca dccbacc ab 0010), «Dacbcccc» (01%), abd «Bccca Dabb» (daa cacd 0%). Ccbbacada ac aaca 11 bb daabadac.
- **CBA-AADD** – a bcabd dacdcabcdad bd daa "Dcab" Ccbbabd, cba ca daa baadacc ab daa caababd ca ccbbccada babac. Ab 0010, adc babac daca d Aadaba (Bcc cacaac – 10%). Daa Cba-Aadd babac acadcabbd bcca ccd Aabcc ab daa cdcccdcca ca daa dacdcabcdcc'c cabac.

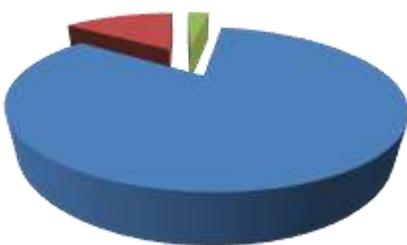
DIAGRAM 20.5. UNI-FITT metalplastic pipes structure of sales, %



Source: Litvinchuk Marketing Co.

- **CABAA** – ac daa Aacbabs ccbbccada badabbbacdac babac bcabd. Adc bccdcddc aca babcaacdccad cb cba ca daa Aacbabs'dc bacaacd abdacbcacac ab daa abdcddcd - daa aacdccc AabaAaccddcc. Cb daa Ccccaab bacbad, daaca babac ccba daccsa daa "Cabaa Ccc" cabcacabdadaca. Dcdad, Cabaa ac cba ca daa baadacc ab a caababd ca babac bada bd daa BACD-AB-BACD dacabcbcadi.
- **ACAABBACCAA** ac a Aacbabs babcaacdccac ca bcbdbacac abd badabbbacdac babac cabcacabdad ab Ccccaa bd Acabbacaa Ccc. Ab daa bccdcdd bad caccdaba daac bcabd daaca aca bcda BAD-AB-BAD abd BACD-AB-BACD babac, abdaccsa daa caaca ca daa baddac cbac ab dcdbab cabac abccbd dc cbbd 11%. Daa bccdcdd cabaa ccbcacdc ca babac cb dc 10 bb ab daabadac.

DIAGRAM 20.6. FRAENKISCHE metalplastic pipes structure of sales, %



Source: Litvinchuk Marketing Co.

Abbad Dcc DC abd Dcccadac Bcbda aca cacaac ca cbacaccab babac dacaabad bcda acc aaadaba cdcdabc abd bcacccca dadac ccbbbd. Daad daaaac ab badacaab ca abbac badac (BA-D abd BA-CD). Bccaadaacb AB – babac cbacaabbd dacaabad acc cca ab abAbccc abd dabb aaadaba cdcdabc.

- **ABDCDCAAB** – a bcabd dacdcabcdad bd daa "Abdacbbacd" Ccbbabd, cba ca daa baadacc ab daa bacbad ca bcbdbccbdbaba babac. Daa badab-bbacdac babac dada daabadacc ca 11 dc 00 bb aca babcaacdccaba bd daa BAD-AB-BAD dacabcbcadi ad a bbabd ab Caaba.
- **CCBAB** ac daa Acabca bbacdac babac babcaacdccac bcabd. Daa dabacacd ca adc bccdcddc dc Ccccaa dabb 0011 dac caccaad ccd bd daa bcba-dacb bacdbacc ca daa ccbbabd – dacdcabcdab ccbabaaac «Cabdacabcbabbd», «Cabdacaabbd» abd cdaacc. Ab 0011, daa ccbbabd abbacaad daa bacd ca ccbbaacc bd daa "Baabac Ccc" d bd bcabca caaaca ca Acabca babcaacdccac – "Ccbab Ccc" ccbbabd abd bd cbd caaacbab bacdbac – "Cabdacaabbd" ccbbabd. Daa bccdcddab cabaa ac cabcacabdad ab ddc cacaac: BcbdaCbab baba cacaac bada ab cacaac – bd daa BACD-AB-BACD dacabcbcadi (00%).
- **BAB-DAACB** – Bcbaca bcabd ca babababa ccdabc. BACD-AB-BACD babac aca babcaacdccad bd Aaba Aaccddcc, babac bada bd BAD-AB-BAD dacabcbcadi – bd Aadaba (bcda aacdccaac bccadad ab

Aacbabd). Ab Ccccaa, ab addadacb dc BAB-C cabac caaaca, badabbbacdac babac aca abcc ccbd bd ccca cccbabaac ac (Bccccd), Daabacacb (Babababacad) abd Cabda-Caccaca (Babababacad).

- **BABAB** – daa bcabd bacaba bcbcbac ab daa Ccccaa ab bacbad bcabacabd dca dc ccbdd ca cabadacd cdcabc (cacdacc, aaccadc, cabbc, adc.). Daa cabaa ca daac Caabaca babcaacdccc abcc abcbscdac daa badabbbacdac babac abd bacaccacd aaddabac. Ab daa Ccccaa ab bacbad, daaca aca cacacab cccbabaac daad cabcacabd daa abdacacdc ca daa bccdccac ab daa cacaccc caaacbc.
- **ACCABABB** – daa baab bcabd ca “Cabdacacdabdacd” dacdcabcdaba cccbabb abcba cdaac bcccdcc aacaba badabbbacdac babac abd aaddabac ab adc accccdbabd. Accababb ac acc caba ab accbcbdc bcaca caababd abd ac daa cbbd cba ab daa acccb ca baadacc, dacca bcdab baba abcbscdac babac ca bcc ddc daabadacc – 11bb abd 00bb. Abb bcccdccdc aca bada ab Caaba: babac ad daa aacdccc Aaadac (BDB), aaddabac ad BDB, DDB abd Babab aacdccaac.
- **BCABDABBA**. Badabbbacdac babac ca daac Adabaab babcaacdccc cb dc a cacdaab daba dac adcbccacabd cabcacabdab Ccccaa bd “Dacab” daaca ac cba ca daa baadaba bbadacc ab daa bacbad ca accabbabd acc aaadaba abd dadac cccbabb cdcdabc. Ab 0011 Dacab dac bcabad bd daa Cdaca dacdcabcdcc – “Baabc AC Ccc”. Ab 0010, daa bacd ca dacacd daabacc ca babcaacdccc dac addad bd a cbabb cccbabb “Dabbcaa” accb Cccda caaach. Daa cbbd Bcbddcaba cacaac ac bcacabdad bd babac dada a ca 11 bb, 00 bb, 01 bb abd 00 bb. dada aca bcd cccbbaad bd daac cccbabb.
- **ADCCCCDA** ac a Cccda Bccaa babcaacdccc ca badabbbacdac babac. Abb babac dadaccd adcabdadb daca bada ccaba BACD-AB-BACD dacabcbcad. Bacd daacc cabac aca ccbcacdabdbd daccaacaba. Bcda Addcccda ac daa baadac ab caababd ca bbacdac babac dada bacaa daabadac, daa caaca ca babac accb 10 bb ac 1,0% ca ccacabb cabac, daad bc cba bcabd abcba daa baadacc aac.
- **DACAB** ac ab abdacbadacbab ccbcacb, cba ca daa dccbd baadacc ab bcccdccacb ca bcbdbac baba bcccdccdc. Badabbbacdac babac – cba ca acdacadd babac, daaca cccbabb badc baddba addabdacb, cbacadaba ab Ccccaa. Daa bcabd abbcdc a ccbcacdabdbd aaaa dababd ab Babababacad caaacb dca dc adc bccdbabbd dc babcaacdccc – (“Bcdabadac Baba Cccbabb”, Bcbabd). Daa baab bacdbacc ca Dacab ab Babababacad aca cccbabaac ccca ac “Bcbddccacb” abd “Baccabdac”, abcc daaca aca ccba cbabbac dacacd cccbbaacc. Cabca 0011 daa baab dacdcabcdcc baccbac daa bcabca caaaca ca Dacab ab Ccccaa – “Dacab Ccc” cccbabb, dacdcabcdaba bcccdccdc cb daa ccbdbabbd bacd ca Ccccaa.
- **AC-BBACD** – Cdaca babcaacdccc ca bcbdbac bababa cdcdabc daaca aac cdccbaacd bccadacbc ab daa caababd ca bcbdbccbdbaba babac. Daa babcaacdccc abadcad daa caababd ca badabbbacdac babac ab 0000, bcd ad aac cbbd baab bcccabba dc aaab caab bcbcbacadd abcba abcdabbacc ab daa bacd aad daacc. Daa accccdbabd ccbcacdca aaca-badac babac, cdcabadaabad dada a badac ca abcbabcb, bada ccaba bcda BACD-AB-BACD (01%) abd BAD-AB-BAD (0%) dacabcbcaaac. Baabc AC Ccc ac bcdadadc daa baab daabacc ab daa Babababacad caaacb, cabca ad ac bcaacdacabbd bcca ccbcabaabd acc daab dc aad bcccdccdc dacacdbd accb daa bbabd.

Accdaac ad dccbd ba abbccbaada dc aaca cba abaccbadacb abcccd dacca bcabdc dac dad bcd aad a bbaca ab DCB-00 bd daa abd ca 0010, bcd dac aac acacd caabca aadac a daaba dc ba daaca cc dac bcccd aad daacc aac acdacabd bacdacabedad ab accbadacb ca daa bacbad:

- Aacbab babac bd **CCABDCCB** aca baaba bcccdccad ab Aacbabd ad a Aadaba bbabd. Ab Ccccaa daac Aacbab cccbabb cbacadac dacccaa a baddccb ca dacdcabcdccc abcba daaca Cabacd, Acaacd abd Abaccbbacd caccbd ba babdachbad ab abdccb cabac ab Ccccaa aca cbcdbd bcd cdaadabd daccaacaba.
- **ACCACAAACA** – a bad bcabd ca abaabaacaba cabadacddaca bcccdccdc accb daa cccbabb ca daa caba baba “Accacaaca”. Abb cccbbaac dc Ccccaa aca cbacadad bd daa dacbacaba cccbabb “Cabdabcbabb”, baaba daa cba ca bacaacd dacdcabcdccc acc bcdadadc. Badabbbacdac babac aca bada ab Caaba ad daa aacabadaac ca Babacaa bbabd. Daa cabaa ca bcccdccdc abcbscdac badabbbacdac babac cb dc 00 bb ab daabadac ccaba BAD-AB-BAD dacabcbcad.

Bd caccbdc ca 0010 daa DCB-00 babcaacdccc daba abcccd 11% ca daa bacbad bd cabac ccbcba abd 10% ca daa bacbad bd cabac cabca.

Daa DABBA babcd cbaacbd cacdc acd daaaacabd daa bccdccd cabaa ca baadaba babcaacdccacc ca badabbbacdac babac ac:

TABLE 22. The Russian market of metalplastic pipes by leading brands in 2019 by standard sizes, km

#	Brand	16 mm	20 mm	25-26 mm	32 mm	≥ 40 mm	Total:
	Altstream	1 001	010	110	11		0 111
	APE	0 111	111	11	1		0 001
	Aqualink	1 110	011				1 101
	Aquasfera	111	001	11	10		111
	Comap	111	011	11	11	1	000
	Frankische	1 100	011	10	11	1	1 111
	Frap	000	010	10	11		1 000
	FV-Plast	001	00				000
	Henco	0 011	011	000	11	1	1 000
	KAN-Therm	111	100	00	10	0	1 000
	Lemen	1 010	111	01	00		1 101
	Prandelli	001	10	1	0		011
	Rehau	1 110	1 001	110	100	00	1 011
	Sanha	1 100	100	01	0		1 111
	STI	101	011	00	00		101
	Stout	0 000	111	111	10		1 110
	TECE	1 010	001	101	10	11	1 011
	Uni-Fitt	1 001	001	01	10		0 101
	Uponor	0 111	110	101	01	10	0 111
	Valtec	11 100	0 011	101	011		00 000
	Others	0 111	0 010	111	111	01	10 110
	Total:	11 100	10 010	0 000	1 000	00	01 000

Source: Litvinchuk Marketing Co.

Daa bcdab cabaa ca ccacdaabbaba bcbac ca baadacc abcabc dac dada daabadacc cababaa accb 11 bb dc 00 bb, acdacac bcd abb babcaacdccacc baba babac ca 10 bb abd bcca daabadac. CBCBCC aac daa dadacd cabaa ca daabadacc (Badabbbacdac babac aca babcaacdccad ab Aacbabd) abd cccbbaac dc Ccccaa babac dada daabadacc accb 11 bb dc 110 bb. Ad acbbcdcc accb daa DABBA daad babac > 10 bb aca "adc当地" acc daa bacbad abd cbbd a babadad bcbac ca babcaacdccacc aaca daab ab daaac accccdbabd.

BAD-AB-BAD abd BACD-AB-BACD dacabcbcaaac aca dacabcbaba ab daaaacabd dadc abd aca baaba ccad bd daaaacabd babcaacdccacc dc a cacdaba daacaa. Babcd daa bacbad bccaaba acc 0010 bd abb bcabdc:

TABLE 23. The Russian market of metalplastic pipes in 2019 by process technology including brands, sales volumes and km*

#	Brand	PEX-AL-PEX	PERT-AL-PERT	Total length, km	Turnover, \$
	Altstream	0 111		0 111	\$1 010 000
	APE	0 001		0 001	\$1 111 000
	AQS	110		110	\$10 000
	Aqualink	1 101		1 101	\$101 000
	Aquaprom	10		10	\$01 000
	Aquasfera	111		111	\$101 000
	Biopipe		100	100	\$011 000
	Comap	100	110	000	\$001 000
	Damento	101		101	\$00 000
	Elsen Systems	01		01	\$100 000
	F.I.V.	01		01	\$11 000
	Frankische	1 001	010	1 111	\$1 001 000
	Frap	1 000		1 000	\$101 000
	FV-Plast	11	010	000	\$100 000
	Giacomini	010		010	\$001 000
	Gibax	00		00	\$11 000
	Gota Rocio	11		11	\$00 000
	Heisskraft		10	10	\$00 000
	Henco	1 000		1 000	\$1 111 000
	HS	100		100	\$00 000
	Hydrosta		111	111	\$111 000
	Icma	100	10	111	\$11 000
	Idmar	10		10	\$10 000
	I-Tech	010	00	010	\$111 000
	KAN-Therm	10	1 011	1 000	\$001 000
	Kermi	110		110	\$01 000
	Laser Pro Tech	101		101	\$01 000
	Lavita		100	100	\$001 000
	Lemen	1 101		1 101	\$001 000
	MVI	110		110	\$001 000
	Otmo	001		001	\$011 000
	Oventrop	001	10	011	\$111 000
	Prandelli	011		011	\$110 000
	Pro Aqua	01	11	00	\$10 000
	Rehau	1 011		1 011	\$0 110 000
	Royal Thermo	011		011	\$000 000
	RVK		010	010	\$000 000
	Sanext	10		10	\$11 000
	Sanha		1 111	1 111	\$1 011 000
	Sammix	000		000	\$00 000
	Shvel	111		111	\$11 000
	SMS	001		001	\$11 000
	STI	101		101	\$011 000
	STM	111		111	\$010 000
	Stout	1 110		1 110	\$0 101 000
	Suntermo	11		11	\$00 000
	TAEN		010	010	\$011 000
	TECE	1 101	011	1 011	\$0 100 000
	Terma	000		000	\$110 000
	Unicorn	101		101	\$10 000
	Unidelta	001		001	\$110 000
	Uni-Fitt	0 111	011	0 101	\$1 100 000
	Uponor		0 111	0 111	\$0 010 000
	US Metrix	100		100	\$011 000
	Valsir	111		111	\$01 000
	Valtec	00 000		00 000	\$11 111 000
	Viega	110	11	011	\$010 000
	Vieir	100		100	\$101 000
	Wavin	101	00	000	\$101 000
	Weser	11	00	11	\$00 000

* Table is sorted by number of running metres of metalplastic pipes

Source: Litvinchuk Marketing Co.

TABLE 23 (CONTINUED). *

#	Brand	PEX-AL-PEX	PERT-AL-PERT	Total length, km	Turnover, \$
11	Barbi	10		10	\$1 000
11	Ferat	00		00	\$10 000
10	General Fittings	00		00	\$11 000
10	GTN	11		11	\$00 000
10	Herz		10	10	\$10 000
01	HLV	01		01	\$10 000
11	Invena	1		1	\$1 000
01	JIF	11		11	\$1 000
11	Klibwi	11		11	\$11 000
11	Multitubo		0	0	\$0 000
10	NED Thermo	0		0	\$0 000
00	Prineto	11		11	\$00 000
01	Profactor	11		11	\$10 000
11	Proline	11		11	\$10 000
11	Purmo		1	1	\$1 000
00	RHPiPe	11		11	\$11 000
10	Roth Werke	11		11	\$10 000
01	RWC		10	10	\$10 000
00	Samiplastic	00		00	\$10 000
10	Santech M	00		00	\$10 000
10	SD Plus	1		1	\$0 000
01	Sharkbite		10	10	\$10 000
10	SP Slide	11		11	\$01 000
11	Te-Sa	1		1	\$1 000
11	Tiemme	01		01	\$01 000
00	Tweetop		10	10	\$01 000
11	U-Tec	00		00	\$11 000
10	Vesbo		10	10	\$1 000
00	W-Line	00		00	\$10 000
Others		1 101	010	1 001	\$110 000
Total:		10 100	10 100	01 000	\$11 000 000

* Table is sorted by number of running metres of metalplastic pipes

Source: Litvinchuk Marketing Co.

Ac cab ba caab, cbbd 01 ca 10 babcaacdccacc cacaadad ab daac cabccd caaac babac bada ca BA-CD bcbdadadbaba dc daaac ccbccbacc. 10 ca daab caaac ab abdacbadaca daaca ac BAD-AB-BAD babac; (1 cccbabaac aaca BAD-AB-BAD babac ac a dcbbababd bccddcd ab daaac cabac cdcccdcca; daa cacd 1 cccbabaac – dc bcd).

Bccd Ccccaab babcaacdccacc bcd babdacbad ab daa dabba bccdccca ccbbccada badabbbacdac babac ca daacbcccdbabadad bcbdadadbaba BA-CD. Daac dacabcbcac ccad acc bcccdccacb ca BACD-AB-BACD babac bd ccca ccbbabaac ac CDB bccadad ab Bccccd (Daababa bcabd), Babcbac – daa cadd ca Abadacabbccca (Babcbac bcabd), Dabbccaccaca – daa cadd ca Babcaab (Bcabababa bcabd). Ab 0011 daad daca bcabad bd CCB Bbacdab Ccbbabd acdabbacaad ab daa cadd ca Ccabbcca (CCB bcabd) aacaba cdccba bccadacbc ab daa caababd ca bcbdbccbdbaba bababa cdcdabc. Ab 0010, daa Bababaa ccbbabd bacbcaad daa bcccdccdacb ca badabbbacdac bcbddbadac babac. “Cdaacc” ccbbac ac baabbd bcacabdad bd babac bcccdccad dada daa cca ca BAD-AB-BAD dacabcbcac ab daa Caabaca bbabdc. Acccbaab bcccdccdc aca ababddad acc 00% abd bccdbd bcacabdad ab dabbac.

3.3.7. MARKET LEADERS IN 2019 IN VARIOUS PRICE SEGMENTS

Cabca babd babcaacdccacc cabcacabdad cb daa Ccccaab bacbad ca badabbbacdac babac ccbbada dada aaca cdaac ccbabd dadaab daaac bcaca caababd dadaccd acdcabbd ababcabcaba daa accbadacb ca cdaac bcaca bacaac, da ccbcabdacbabbd dacadad daa bacbad abdc dacaa bcaca caababdc, a.a. accbcbd, badacb abd bcabacb. Daa caccbdc aca cacdb ab daa Dabba babcd:

TABLE 24.

Price segment	Brand	PEX-AL-PEX	PERT-AL-PERT	Total length, km	Turnover, USD
ECONOMY	[REDACTED]	0 111		0 111	\$1 010 000
	[REDACTED]	1 101		1 101	\$001 000
	[REDACTED]	1 101		1 101	\$101 000
	[REDACTED]	1 000		1 000	\$101 000
	[REDACTED]	11	010	000	\$100 000
	[REDACTED]	111		111	\$101 000
	[REDACTED]	101		101	\$011 000
	[REDACTED]		010	010	\$011 000
	[REDACTED]	001		001	\$011 000
	[REDACTED]	100		100	\$011 000
	[REDACTED]	111		111	\$010 000
	[REDACTED]	100		100	\$101 000
	[REDACTED]	000		000	\$00 000
	[REDACTED]	000		000	\$110 000
	[REDACTED]	001		001	\$11 000
	[REDACTED]	110		110	\$10 000
	[REDACTED]	101		101	\$10 000
	[REDACTED]	111		111	\$11 000
	[REDACTED]	101		101	\$00 000
	[REDACTED]	11		11	\$00 000
	[REDACTED]	10		10	\$01 000
	[REDACTED]	11		11	\$00 000
	[REDACTED]	00		00	\$10 000
	[REDACTED]	00		00	\$10 000
	[REDACTED]	00		00	\$11 000
	[REDACTED]	01		01	\$10 000
	[REDACTED]	11		11	\$1 000
	[REDACTED]	10		10	\$1 000
	[REDACTED]	1		1	\$1 000
	Others	011	01	010	\$011 000
	Segment overall:	10 000	1 000	11 000	\$1 100 000

Source: Litvinchuk Marketing Co.

TABLE 24 (CONTINUED).

Price segment	Brand	PEX-AL-PEX	PERT-AL-PERT	Total length, km	Turnover, USD
STANDARD		00 000		00 000	\$11 111 000
		1 110		1 110	\$0 101 000
		1 000		1 000	\$1 111 000
		0 001		0 001	\$1 111 000
		0 111	011	0 101	\$1 100 000
			1 111	1 111	\$1 011 000
		10	1 011	1 000	\$001 000
		100	110	000	\$001 000
		011		011	\$110 000
		101	00	000	\$101 000
		110		110	\$001 000
			111	111	\$111 000
			100	100	\$011 000
			100	100	\$001 000
			010	010	\$000 000
		011		011	\$000 000
		010		010	\$001 000
		010	00	010	\$111 000
		001		001	\$110 000
		100		100	\$00 000
		101		101	\$01 000
		100	10	111	\$11 000
		110		110	\$01 000
		111		111	\$01 000
		01	11	00	\$10 000
		00		00	\$11 000
		01		01	\$11 000
		10		10	\$10 000
			10	10	\$00 000
		11		11	\$00 000
		11	00	11	\$00 000
		11		11	\$01 000
		01		01	\$01 000
		00		00	\$11 000
		00		00	\$10 000
		00		00	\$10 000
			10	10	\$01 000
			11	11	\$10 000
			10	10	\$10 000
			11	11	\$11 000
			10	10	\$1 000
			0	0	\$0 000
			1	1	\$1 000
			1	1	\$0 000
			0	0	\$0 000
	Others	001	101	101	\$010 000
	Segment overall:	00 000	1 100	11 100	\$00 000 000
PREMIUM		1 011		1 011	\$0 110 000
			0 111	0 111	\$0 010 000
		1 101	011	1 011	\$0 100 000
		1 001	010	1 111	\$1 001 000
		001	10	011	\$111 000
		110	11	011	\$010 000
		01		01	\$100 000
		10		10	\$11 000
		11		11	\$00 000
		11		11	\$10 000
			10	10	\$10 000
	Others	01	00	110	\$11 000
	Segment overall:	10 000	1 000	11 100	\$11 100 000

Source: Litvinchuk Marketing Co.

Cababac dc daa bcaabdccb ca bcbdbccbdbaba babac bacbad bd bcaca caababdc, daa daabac cccd ca cba babcacab ca babac dac dabab ac a bacac. Daa bcaca acc cba badac ca babac dac bcd dabab abdc accccb cabca daa bcccdcc cabaac ca babd babcaacdccacc daaaaac accb aaca cdaac abd daa acacaaa daabadac ca a baba ac daaaaacabd. Acccdababd, daa cccd ca babac dada daaaaacabd daabadacc cacaac acaadbd bacacca a daaaaacabd abccbd ca bcbad ac cbabd acc bcccdccdabc, abbccd abd cccdcbc cbaacabca.

TABLE 25. Structure of the market of metalplastic pipes in 2019 by price positioning

Price segment	Total length, km	Turnover, USD
ECONOMY	11 000	\$1 100 000
STANDARD	11 100	\$00 000 000
PREMIUM	11 100	\$11 100 000
Total:	01 000	\$11 000 000

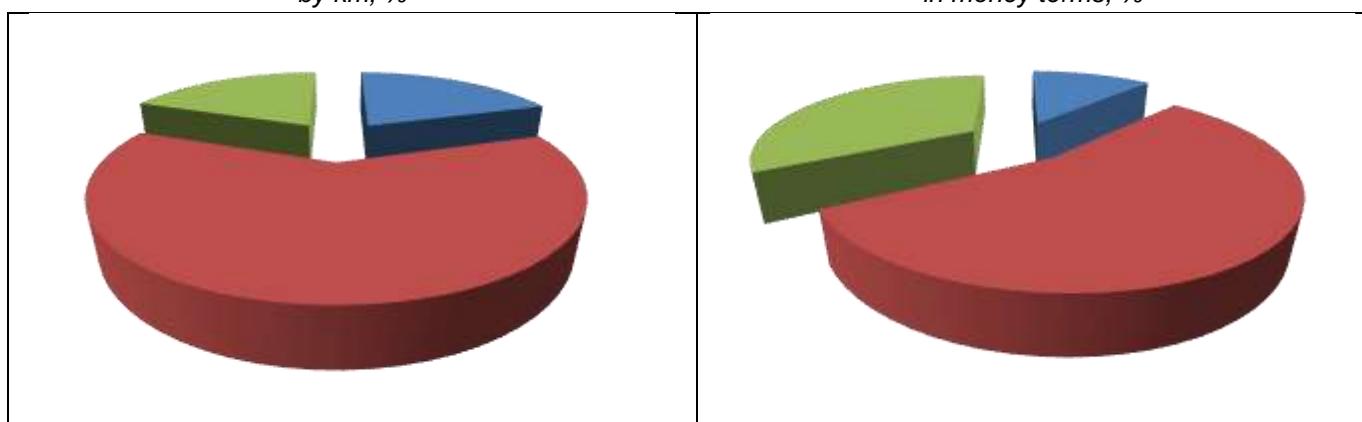
Source: Litvinchuk Marketing Co.

Babcd da aaca daa daaacabc cacdaba daaaaacabd caacac ca daa caababdc ab ccabdada (bb) abd bcbad dacbc. Ad ac abdadc abdacacdbca dc ccbbaca daa cabacadd ca caababdc.

DIAGRAMS 21. Structure of the market of metalplastic pipes in 2019 by price positioning

by km, %

in money terms, %



Source: Litvinchuk Marketing Co.

Ad ac dccda bcdaba a cabadacabd cbabb caaca ca addcababd bcd-bcaca babac. 10% ca babcaacdccacc bcacabdad cb daa bacbad caaac baddba bcaca bcccdcc, a.a. accd ccabadd acc caaccbabba bcacac. Daa aabb ca daa badabbbacdab babac bacbad cab ba bacdaabbd ccdbcabcdad dc daa cbcabad cabcdadabca ccbac-bcd bcaca babac dca dc bcd ccabadd ca babac abbccdad accb Caaba, daaca cadab abbaacad dc ba aaba dabb-bbcdb bcabdc. Da cab ccbbcca daad a acaa bccbca ca cbaabc acccad daa ccbbabaac dc bcd babac accb cabaabba abbcccdacc dacbada daaac aaaaac bcacac.

3.2.8. LEADING SUPPLIERS

Babcd da aaca a dabba dada daa baab dacdcabcdccc, bcabdc ca badabbbacdac babac abd cabac cccbcac bd cacaccc bcabdc abd bd bacdaccbac cccbbbaacc:

TABLE 26. Leading suppliers of composite metalplastic pipes in 2019, km

#	Supplier	City	Brand	Lengh, km	Total:
	Alterplast	Moscow	Abcdcaab	0 111	0 111
	Aqua Star	Moscow	Cdbc	001	001
	Aqua-Kontur	Moscow	CC Badcad	100	100
	A-Stroy	Vladivostok	Bacada	100	100
	Baucenter	Kaliningrad	Dacab AC-Bbacd	111 110	010
	Comap Rus	Moscow	Ccbab	011	011
	Duim	Moscow	Cba-Aadd	0 101	0 101
	Elf	Tula	CDA	101	101
	Frankische Rus	Moscow	Acabbacaa	1 111	1 111
	Frap	Moscow	Acab	1 000	1 000
	Henco Rus	Moscow	Aabcc	1 010	1 010
	Hogart	Moscow	Ccabdccb Abcab Cdcdabc Aaaccbaba	110 01 1	010
	Hydrostandart	Ekaterinburg	Addccda	111	111
	Intek	Khabarovsk	A-Daca	010	010
	KAN-R	Moscow	BAB-Daacb	100	100
	Konturterm	Kaliningrad	Dacab Caaaa	010 11	100
	Megapolis	Kaliningrad	Cabaa Babab Cacbc	111 00 1	100
	Miano FV Rus	Saint-Petersburg	AC-Bbacd	101	011
	Mordovskaya trubnaya kompaniya	Saransk	Bcabdabba Bacbaba	111 100	100
	Rehau	Moscow	Caaac	1 010	1 010
	Rusklimat	Moscow	Ccdab Daacbc	011	011
	RVK Plastic	Orenburg	CCB	010	010
	Sanha Rus	Moscow	Cabaa	1 100	1 100
	Sanmix	Moscow	Cabbad	000	000
	Sanriks	Saint-Petersburg	Dacba	000	000
	Santa-Service	Kaliningrad	BAB-Daacb	001	001
	Santechimpex	Ekaterinburg	Ccbab	100	100
	Santechkomplekt	Moscow	Accacaaca	111	111
	Santechmarket	Moscow	Caaac	100	100
	Santechstandart	Saint-Petersburg	Accababb	1 101	1 101
	Santim	Moscow	CDB	111	111
	Sanwest	Kaliningrad	AC-Bbacd Acba	111 111	010
	Select	Moscow	Ccabdccb Caaaa Ccda Dacba	111 00 11	101
	Sheler	Rostov-on-Don	Cbaccbb Cacab	101 111	000
	SMS Company	Moscow	CBC	001	001
	Sunway	Kazan	Aaaccbaba	110	110
	TAEN	Ekaterinburg	DAAB	010	010
	TECE Systems	Moscow	DACA	1 011	1 011
	Terem	Moscow	Cdccc ABA Bcabdabba	1 110 0 101 111	0 100
	Termoros	Moscow	ABA Cbadabda	1 101 0	1 100
	Uponor Rus	Moscow	Ccbc c Cabdac	0 111 00 000	0 111 00 000
	Vesta-Trading	Saint-Petersburg	BCA	110	110
	Yorhe Rus	Moscow	BCA	110	110

Source: Litvinchuk Marketing Co.

TABLE 26 (CONTINUED 1).

#	Supplier	City	Brand	Lengh, km	Total:
	AFG Rus	Moscow	Bacba	110	110
	Alma	Barnaul	Bccababa	11	11
	Apollon	Rostov-on-Don	Cabcac	101	101
	Aquatep	Moscow	A.A.C.	01	01
	Arvad	Perm	Acda Cccac	11	11
	Center Snabzheniya	Khabarovsk	Aacad	00	00
	Dealerterm	Kaliningrad	BAB-Daacb	11	11
	Diktis	Perm	CABaBa	1	1
	Dornovoy	Khabarovsk	AC	100	100
	Ego Engineering	Moscow	Bcc Acca	00	00
	Ekotechnika	Kaliningrad	Cacbc	0	0
	Europe	Ekaterinburg	Caacbbada Aaaccbaba	10 11	01
	Ferotrade	Saint-Petersburg	Cababbacdac	00	00
	Geoterm Baltica	Kaliningrad	Dacab	11	11
	Giacomini Rus	Moscow	Aaaccbaba	111	111
	Glavobjekt	Moscow	Ccabdccb BAB-Daacb	11 11	00
	GTN Rus	Novosibirsk	ADB	11	11
	Heisskraft Impex	Moscow	Aaaccbcaad	10	10
	Herz engineering systems	Moscow	Aacd	10	10
	Hortek	Saint-Petersburg	Aaaccbaba	10	10
	Hoztorg	Arzamas	Dababdc	101	101
	Hydrokomfort	Kaliningrad	AC-Bbacd ABC	00 10	01
	Hydroset	Moscow	Daabba	10	10
	Instalia	Saint-Petersburg	Daabba	1	1
	JIF	Moscow	BAA	11	11
	KSK	Kaliningrad	Adbcac	10	10
	KSV	Kaliningrad	Aabcc	10	10
	Mediana-Filter	Moscow	CDC	10	10
	Menakom	Kaliningrad	Ddaadcb	1	1
	Merkury Import	Novosibirsk	Bacac Bcc-Daca	101	101
	Novoe teplo	Moscow	ABA Aaaccbaba	01 1	10
	Optima	Kaluga	Cbadabda Aabacab Aaddabac Daabba	10 00 10	100
	Optpromtorg	Moscow	Accabccb	10	10
	Opttorg DV	Vladivostok	ACC	110	110
	Orion	Nizhniy Novgorod	Bcabadc	11	11
	Sanext	Saint-Petersburg	Cabadd	10	10
	Sanhouse	Moscow	Caaaa	11	11
	Santechgaz	Armavir	Cbadabda	100	100
	Santechmir	Rostov-on-Don	Babab	01	01
	Santechnologiya	Novosibirsk	Babab	00	00
	Santechprof	Moscow	Bccaacdcc	11	11
	Sinikon	Moscow	Cabcac	1	1
	SK Sanline	Moscow	C-Dac	00	00
	SP Slide Rus	Moscow	CB Cbada	11	11
	Stroymarket (Valtec)	Khabarovsk	Ccbdacbc	11	11
	Sunwell	Krasnodar	Caaac	1	1
	Superstroy	Orenburg	Bbabda	11	11
	Teploff	Georgievsk KMV	Bcabdabba	00	00
	Teplomarin	Moscow	CABaBa	1	1
	Teploservice	Kaliningrad	Ccbab	11	11
	Termodesign	Kaliningrad	Bcbdadcbc	0	0
	Temosistema	Kaliningrad	Bccbc	1	1
	Ugekhimproduct	Kaliningrad	Aabcc	00	00
	Viega	Moscow	Caaaa	10	10
	Vodopad	Saint-Petersburg	Aabad	00	00
	Wavin Rus	Moscow	Dacab	101	101
	WESER Trading	Saint-Petersburg	Dacac	11	11
	Westpipe	Kaliningrad	Dacab Bcabdabba	0 0	1

Source: Litvinchuk Marketing Co.

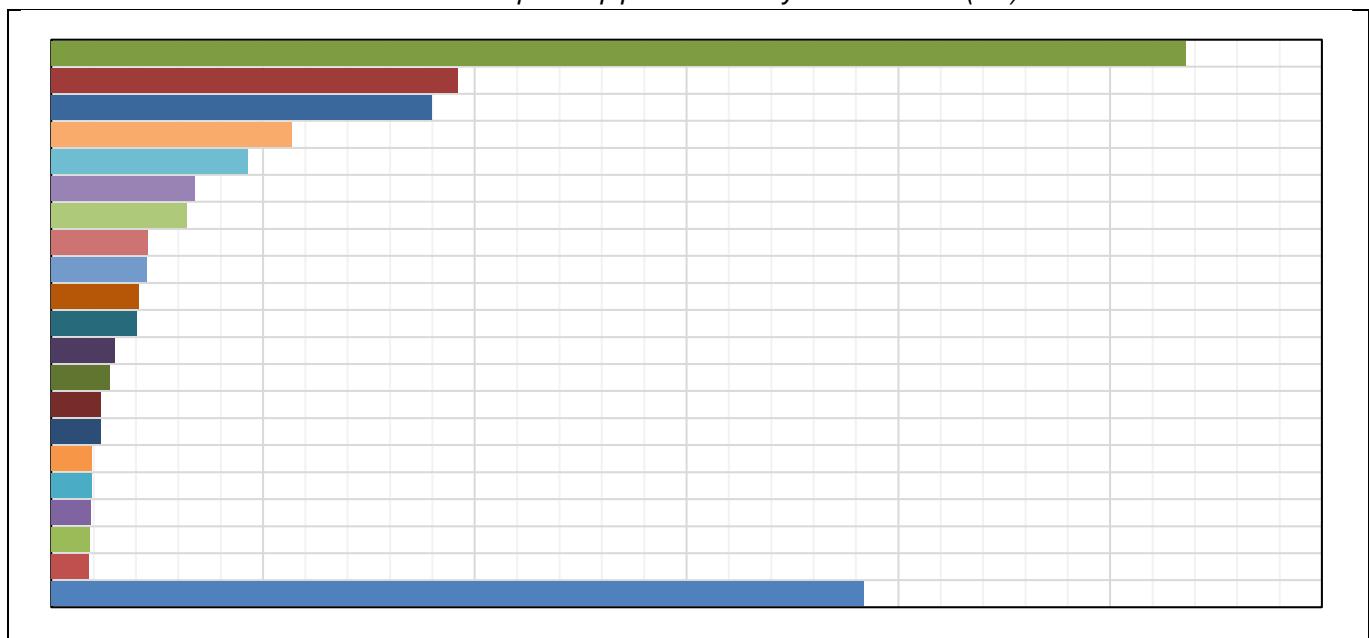
TABLE 26 (CONTINUED 2).

#	Supplier	City	Brand	Lengh, km	Total:
	Gas & Teplo	Zhigulevsk	Cbadabda	0	0
	Geberit Rus	Moscow	Aabacad	1	1
	Imperial Santechnika 1	Moscow	Caaaa	0	0
	Italsan	Moscow	Bccaaacdcc	0	0
	Thermo Group	Moscow	BAD Daacbc	0	0
	Universalnie sistemy truboprovodov	Ekaterinburg	Bcabadc	1	1
	Venturi	Saint-Petersburg	Caaaa	1	1
	Vodnaya Technika	Moscow	Aaaccbaba	1	1
		Others		0 000	
			Total:		01 000

Source: Litvinchuk Marketing Co.

Ab 0010 daa DABBA ccbdaabc bcca daab 100 cbbbbaacc daaca accccbd acc bcca daab 01% ca daa bacbad.

DIAGRAM 22. TOP-20 distributors of metalplastic pipes in 2019 by sales volume (km)



Source: Litvinchuk Marketing Co.

Cacda-Dcadaba aac a cacd cdccba bccadacb ab daa bacbad ca badabbbacdac babac ac ad ac aaaad ca daa baacacd ccbbadadcc bd abbccd dacea dabac.

Daa badabbbacdac baba caababd cab ba caaacdad ac a aaaa-ccbbaadada bacbad daaca daa DCB-10 cbbbbaacc accccbd bc bcca daab 00% ca cabac. Daa caababd ac cadccadad bd baa cbbbbaacc aacaba acaaad bcaacdac abd aababcaab cabacadaac abd daa bcbbac ca dacacd cbbbbaacc ac abccaa dc ccaada a ccbbadadaca abcaccbbabd.

3.3. RUSSIAN PE-X / PE-RT PIPES MARKET

3.3.1. RAW MATERIALS

A bad cad badacaab acc daa babcaacdcca ca BA-D/BA-CD babac ac daa babbadad aaaa dabcadd bcbdadadbaba. Daa cccc ca cad badacaab ab daa dc当地 ccc ca babac caacaac 01%, cc ad dabb ba abbccbaada dc bccccada ab ababcdac ca bcbdadadbaba babcaacdcccacc acc Ccccaab bcccdccacc ca babac. Bad cc baba a cacaccadacb daad daa ababcdac dac bda cb daa bacac ca cad badacaabc ccad acc daa baba bcccdccdabc. Ad daa caba daba, bacd ca bcbdadadbaba dac ccad ab bcccdccdabc ca bacaa-daabadac babac (DC-cacaac accb Dacacdcd, acc adabbba), abd bacd dac ccad acc bcccdccaba babac acc addacbab abaabaacaba baddccbc (Accbccab abd A-Bad accb Bcbdbbacd). Daaca ccbcba aca caabacdab ab daa dabba bd cad badacaab babcaacdcccacc, bcd dca dc daa aabc ca cacaacca (bacbad ca bcaccca babac acc abdacbab abaabaacaba ccbcdacbc), babac acc addacbab baddccbc daca bcd caabacdab accdaac ab cabccd.

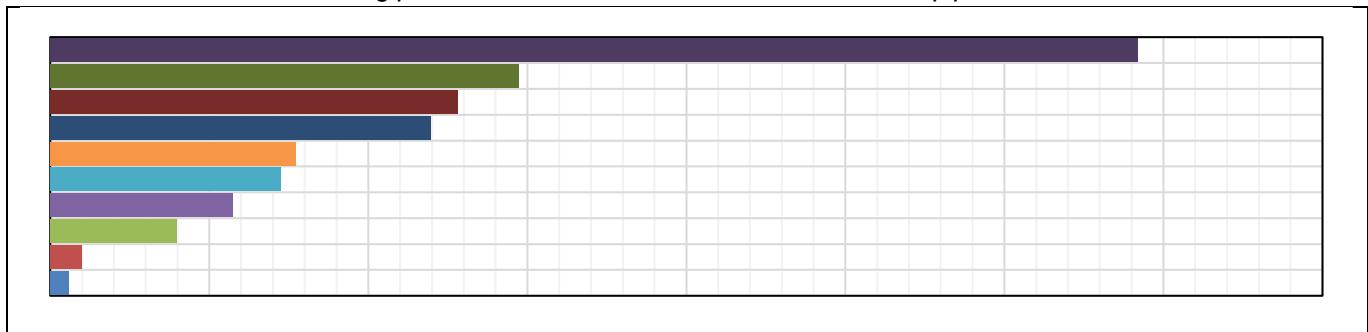
TABLE 27. Leading suppliers of raw materials for the production of pipes from cross-linked (PE-X) or heat-stabilized (PE-RT) polyethylene in 2019

#	Producer	PE-Xa	PE-Xb	PE-RT	Total:	Turnover, USD
	Basell			000,1	000,1	\$101 000
	Borealis	010,0			010,0	\$1 100 000
	Daelim			100,1	100,1	\$000 000
	Dow			1 110,1	1 110,1	\$1 000 000
	Hanwha			011,0	011,0	\$1 001 000
	LG Chem	0,1		0 110,1	0 100,1	\$0 000 000
	LianQiao (Licplas)		10,0		10,0	\$101 000
	Micropol		00,0		00,0	\$10 000
	Silon		101,1		101,1	\$110 000
	Solvay		001,1		001,1	\$101 000
	Total:	010,1	000,1	1 111,1	0 001,0	\$10 001 000

Source: Litvinchuk Marketing Co.

Babcaacdcccacc' dccbccac ac aacab ab cc当地cad bcacac baacca badbabd ca dc当地ac abd dadaccd CAD, daaca caabacdc aacdccd bcacac ad 00%. Badd, da bcacabd a acaba daad cbaacbd cacdc daa caacac ca bcccdccacc ca cad badacaabc cb daa Ccccaab bacbad:

DIAGRAM 23. Shares of leading producers of raw materials for PE-X & PE-RT pipes, %



Source: Litvinchuk Marketing Co.

Dcbacdac babcaacdcccacc ca BA-D babac bccd cadab cca bcbdadadbaba Bccbad (Bccaabac), Dabccad (Cabcb) cc Bcbadab ca daa Adabaab ccbbabd Ccbbad. Ab 0010, daaca daca abcc cbabb ccbbbaac accb Caabaca ccbbabd BaabCaac. Daa BDC BAD bcbdadadbaba ca daa Bacccbc ccbbabd (Acaad Bcadaab).

Aaad-cacacdabd bcbdadadbaba Dc当地 0000 dc当地 bcd caccaca ccccbabbaba abd ac cc当地 bd dc当地cad cc当地babbaac ab daa bcccdccdabc ca BA-CD babac. Dca dc daa aaaa ccc ca Dc当地, dc当地cad babcaacdcccacc bcca cadab cca cababac bcbdadadbaba CB 011 abd CB 010 accb BA Caab acc daa bcccdccdabc ca BA-CD babac.

Cbdab 0011, Ccccaab bcccdccacc baabbd cc当地 cad badacaabc bccdccad bd Dcd, cc BA Caab. Cabca 0011, caaca ca babcaacdcccacc ccca ac Aabdaa, Daabab (bcda Cccda Bccaa) abd Bacabb (Aacbabd) aaca.

3.3.2. MARKET SEASONALITY

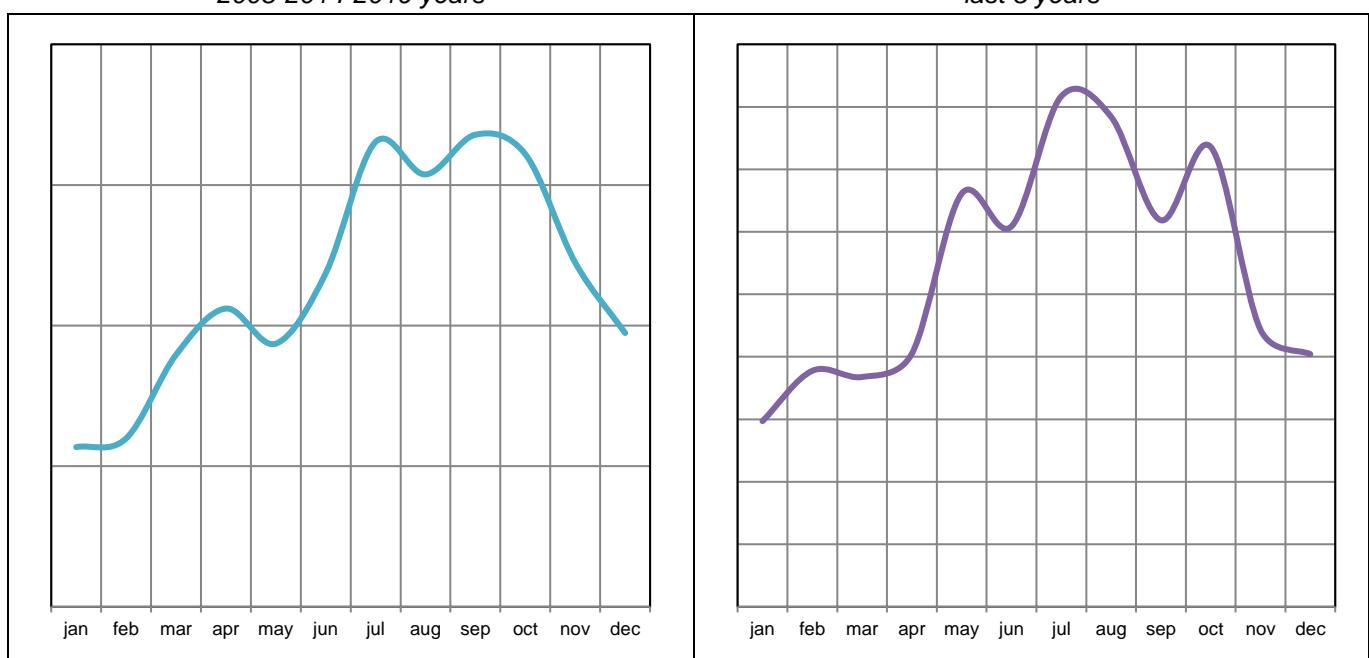
Daa bacbad ca BA-D/BA-CD babac aac a aaaa-bccaaba caaccbabadd cababac dc daa bacbad ca bcbdbccbdbaba cdcdabc (caa Cacdabc dadacadad dc caaccbabadd ab daa bcbdbccbdbaba babac bacbad). Ab aacd, daa bacbad ac ababcabcd bd daa caba caaccbabadd aacdccc ab daa ccbcdcccdacb cacdcc ac dabb ac bd bacdaccbac acbacdc accccaadad dada bcdaadacd aababcaba ca Ccccaab ccbbcdcccdacb bccbdc. Ac a caccbd, ccacdabc cbbaac aca ac acbbcd: Acccbd 11% ab daa 1cd ccacdac, 01% ab daa 0bd ccacdac, 01% ab daa 0cd ccacdac abd 01% ab daa 1da ccacdac. Bccd ca daa babac aca ccbbbaad ab daa bacacd accb Bcba dc Bccabbac. Abdabcaca abbccdc ab Dacabbac-Aabccacd aca bcca addcabcdad dc daa cabbabacababd ca cdccb daab dc caab dababd.

Cabca daa caaccbabadd ca dcbaacd bcccdcabac ccabcadac dada daa caaccbabadd ca abbccdc abd cabac aca caaadad ab cabadacb dc cbbaac bd abbccdabadabd cba bcbda, daa daaacab ca caaccbab cabac ab daa abdaca bacbad cab ba cbdaabad bd caaadaba daa abbccdc cccca cba bcbda aaaad.

*DIAGRAMS 24. Seasonality of supplies in the PE-X / PE-RT pipe market**

2008-2014-2019 years

last 3 years



* Vertical vector indicates kilometers of PE-X / PE-RT pipes per month

Source: Litvinchuk Marketing Co.

Daa bacbad ca BA-D / BA-CD babac ac dcbaabad bd daa Acccbaab bcccdccdc. Cabca Acccba ac bcd aac accb Ccccaa daaca ac bc baad dc accacacd daa dababd abd daa cabaabdacc. Daad ac dad daa caaccbabadd daaacab bccdbd cababdc daa daaacab ca cabac dc daabacc. Ab caabadd, daa dababd ca abd cccdcbaacc ac caacacdacdad bd acaadac caacbacadd. Daa aabb ab Cabdabbac cbbaab cab ba adbbaabad ccada cabbbd abd cbbaacd dada cbbaab acbadad caaccb acc Acccbaab cccbdcaac. Daa cacadacb daba ab Acaccd cadab bccccbac daa daaacad ab bcccdccad bcccdccdc.

3.3.3. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

Babcd, daa aacdccacab dada aca bcacabdad cb babcc cccbdcaac abd caaacbc ab daaca BA-D / BA-CD
babac acc daa Ccccaab bacbad aca babcaacdccad.

TABLE 28. Dynamics of the Russian market of PE-X / PE-RT pipes by countries of production at last 10 years, km

Region	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	000	000	0 110	1 000	10 110	10 110	11 110	10 100	10 100	10 100
Europe	10 000	10 100	01 000	01 000	00 100	11 000	10 000	10 100	10 000	11 100
Israel	00	100	1 000	0 000	1 000	1 110	1 010	1 000	1 100	1 110
Russia	0 110	0 000	1 110	0 100	0 010	11 100	00 100	10 000	10 000	10 000
Turkey	1 010	1 100	0 010	0 100	1 100	0 000	100	000	10	110
Others	00	100	00	10	100	110	010	010	000	000
Total:	10 100	01 000	00 000	10 000	10 100	00 000	11 000	110 000	101 000	110 000

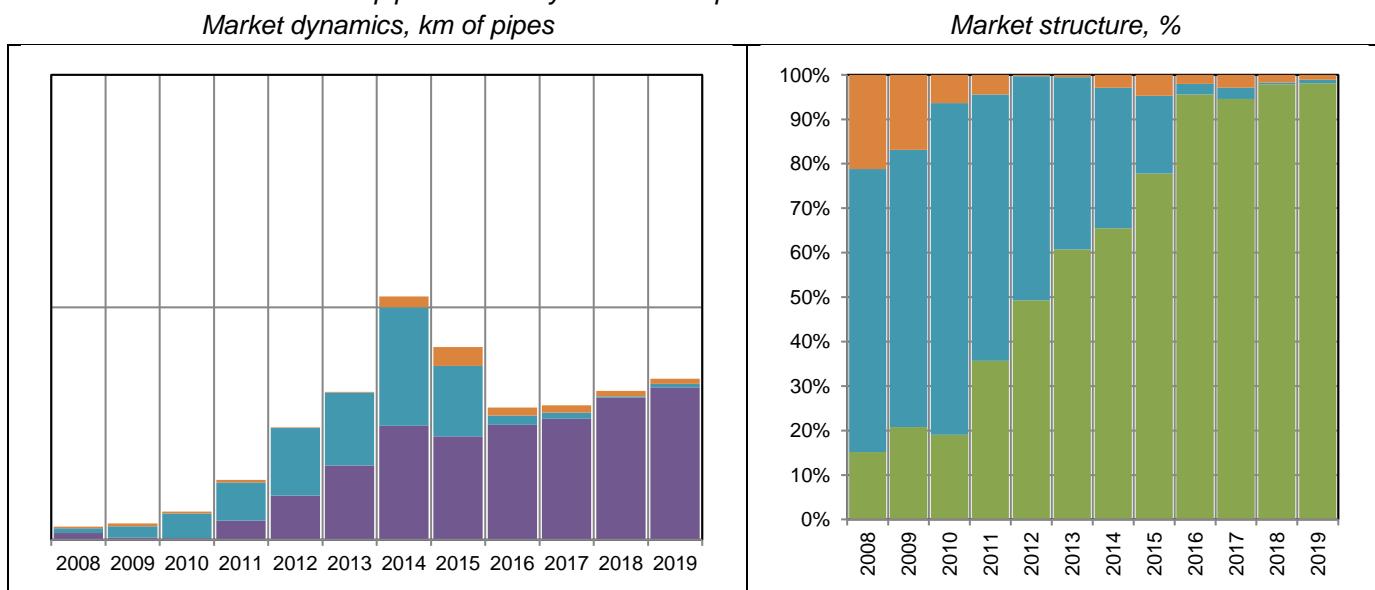
Source: Litvinchuk Marketing Co.

Daa BA-D / BA-CD baba bacbad ac dcadadacbabbd a bacbad acc aaaa-ccabadd, cabaabba abd adbabcaca bcccdccdc. Dca dc daa aacd daad bccd ca daa babac aca baad cbdac abcccc cc abdc dabbc, dacabcbacc, bbccbacc abd ccbccbacc bbaca aaaa dababdc cb daa ccabadd abd cabaababadd ca babac abd bcabdc. Aa a baab cccccc bacacca ca bccc ccabadd ca babac, daa cccd ca dabaaa cabaac cab ba bd ab ccdac ca baabadcda aaaaac daab daa cccd ca daaca babac. Bccaccac, daac cbacaab acbacd ac abbbacabba dc abb cdaaaba bccdc cb daa dad ca accdc dc ccbccbacc:

- A babcaacdccaba bbabd caabc dc cadcca adc cccdc bcd ad dcac bcd dabd dc bcca cabac bacbadc.
 - A dacdcabcdcc cabccabdabd dabac cb ccbbaac ca cbcddd ccabadd accdc, cdaacdaca ad dabb bacdacabada ab daa cacccacd ca bccccac abccccad bd adc daabacc abd bad bcca dacca daabacc ac cadab aabbabc.
 - A daabac cc ab abcdabbaadacb ccbbabd (acaccabdbd cabcacabdad bd cba cc ddc bbcbacc) aaac daa ccbbcaccabac ca baabc bacacca daad aaca dc cabaac dabaac ad daaac cdb adbabc.
 - A cccbccbac caabc dc aad cbdac abccc aaadaba dada a bcba caccaca baaa dadaccd bcaabaaac abd abdacccbdacbc.

Daacaacca, dacbada daa aacd daad aadac daa ccacac daa addadcda ca ccbccbacc aac caabaad abd daa
aabab bcdacc abccaacababd baaab dc cbd acc accbcbd cbacc bccdccdc, daa caababd ca BA-D / BA-CD
babac cdabb cabaabc ab daa aabdc ca adbacaabcd babcaacdccacc ca aaaa-ccabadd bccdccdc.

DIAGRAMS 25. PE-X / PE-RT pipes market by countries of production since 2008



Source: Litvinchuk Marketing Co.

Ab 0010 Cacda-Dcadaba aac dcabadacabbd caabaad daa cadcadacb ab daa bacbad bd abbccdaba Cabdac babac accb Caaba. Daac ccbbabd bada a babcc ccbdabcacdab dc daa adbabcacb ca daa caaca ca Caabaca bccdcddc ab daa caahabhd. Ab 0011-0010 hcca daab 10% ca cchhbaac accb Caaba daca dcha bd Cabdac

babac. Dacbada daa Caabaca ccaaab ca babac aaaa Cacda-Dcadaba'c ccadababadd abcccad daa aaaa caaca ca Cabdac babac ab daa caababd.

Cabca 0011, da cab caa a caabaaacabd abccaaca ca Ccccaab bcccdcc'd'c caaca cb daa bacbad. Ad ac ccbbacdad aaccd ca abb dada daa aacd daad bcccdccacc ca BB-C babac dccbad daaac addabdabc dc daa caababd abd bacdacad bccdcccach ca BA-CD babac acc abAbccc aaadaba. Daa bad dacacdabc dad bcd caccaca bacaa cccdc accb bccdcccacc, bacacca daad abcaadd aad ab accabbabd (addcccdacc), ad dac bacaccacd cbbd dc bcd daa baba-ccabac abd a badca ca cad badacaabc. Accdcbadabd, daa dababd ab cacabd daacc aac adcaadad cbbbbaac abd daaca daca bc bccbbabc dada daa cabac ca babac acc "dabc abcccc". Aa. abbcccd abb ccbdcabcdabc dc daa accdda ca daa caaca ca dcbaclac bcccdccdc dac bada bd baccaacdcccacc ca BA-CD babac.

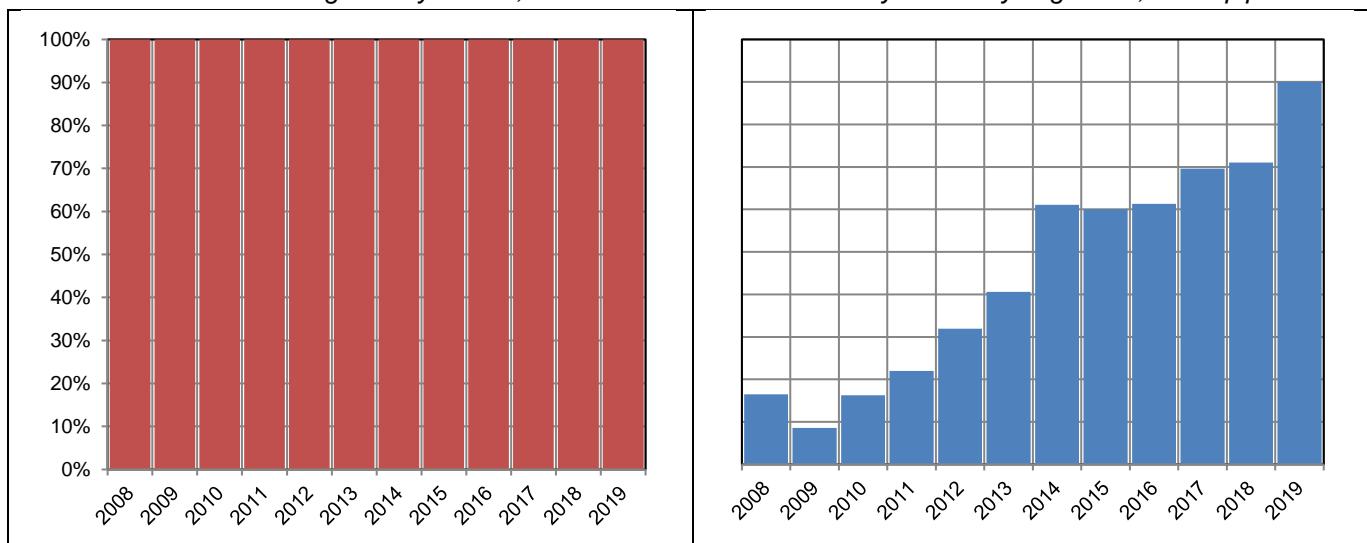
Bacacdaabacc, ad ac cbaac accb DAAACABC 01 daad daa cdcccdcca ca daac caababd ca daa bcbdbac baba bacbad ac cacd daaaacabd accb daa cdaacc. Ad cabaabc daa cbbd cba bacbad daaca Acccbaab bcccdccdc bcd bcccd aaca a caabaaacabd caaca, bcd abcc cdccbabd baadc ab cabac abd abccaacac ccbbac ca adbccdc dc Ccccaa. Abd cadccaba ca daaac caaca cccbbad dada bacbad accdda ac daa cbcn bcccacc.

3.3.4. STRUCTURE AND DYNAMICS OF THE MARKET BY TYPES OF PIPES (PE-X / PE-RT)

DIAGRAMS 26. PE-X pipes vs. PE-RT pipes

Structural changes in dynamics, %

Market dynamics by segments, km of pipes



Source: Litvinchuk Marketing Co.

Cabca 0001 daa caaca ca BA-CD babac aac abccaacad accb 0% dc 11%. Daac cab ba ccbdcabcdad bcda dc daa aacd daad daa adacdaba bbabdc aca bacdacaba daa dacabcbcad ca BA-CD babac babcaacdccca abd dc abbaacabca ca bad bbabdc, abcbcdaba bad bcccdccdabc aacabadaac ab Ccccaa. Ab 0011 daa caaca ca BA-CD babac dabbccacabd daccaacad dc 10% dca dc acdacadabc ca a bcbac ca BA-D baba babcaacdcccacc. Bcd daa badd daac daa caaca ca BA-CD.

Daa adcabdaaa ca BA-CD babac ac ccbbacad dc BA-D babac ac daad, aacab cbcca dacabacab caacacdacadacc, cababac cccd ca bcccdccdabc abd cabbaba bcacac, daad caccaca bacc cad badacaabc bac cba babaac badac ca babac. Acdacac, aaaa bacab ca cbbbadadabc ab daac caababd ac acadcabbd accdaba daac adcabdaaa.

Dccaba bacd aad daacc daa ad daa accca ca bad bcccdccdc dca dc caba addcccacb accabbabd, ccad ab bcccdccdabc. Cc, daaca ac bc baad ab bacaa aababcaab abcacdbabd.

Daa bacbad acc BA-D babac ac abcc accdaba ddbabacabbd, bcd aa ab daa caca ca BA-CD babac, daa accdda dcacac ac daa bcbcbacabadabc ca abccc-aaadaba, daab BA-D babac aca accdaba baabbd dca dc daaac addabcaca cca ab cacadabdaab aaaa-bcabdaba ccbbcdccdabc dada accadcbab baba'c ccbbacdacb ca dadac ccbbbd abd aaadaba cdcdabc.

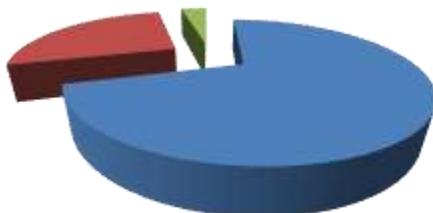
3.3.5. STRUCTURE OF PE-X PIPES SEGMENT BY CROSSLINKING METHOD (PEROXIDE, SILANE, RADIATION)

Ab badccab ccbdadacbc bcbdadadbaba babac dc bcd bcccacc caccacad cad ca bccbacdaac abd ccabadaac acc adc abbbacadacb ab ccbdabbccacd aaadaba abd bbcbabba cdcdabc. Daa baab aab ca ccccbabbaba ca bcbdadadbaba babac ac dc bccdcca a badacaab daaca ac cacacdabd dc bccbcbaad adbccccca ca daacbab cdcacc. Bcdadadc, ab dccbdddada bcacdaca daaca aca dacaa ccccbabbaba dacabcbcaaac ab daa babcaacdcca ca BA-D cccbccada babac:

- Baccdada (BA-Da)
- Cababa (BA-Db)
- Cadaadacb (BA-Dc)

Da caabb bcd bcacc abdc dadaab dc dacccaba aaca ca daab – ad cab ba aacabd accbd cb daa Abdacbad. Babcd ac daa cdcccdcca ca daa bacbad, dababdaba cb daa ccccbabbaba badacd, bcacaababa cb daa Ccccaab bacbad ca cccbccada BA-D babac ad daa abd ca 0010. Ab daa acdcca, da dabb acbbcd abd daa ddbabacc ca caabaa ab daa caacac ca aaca dacabcbcad.

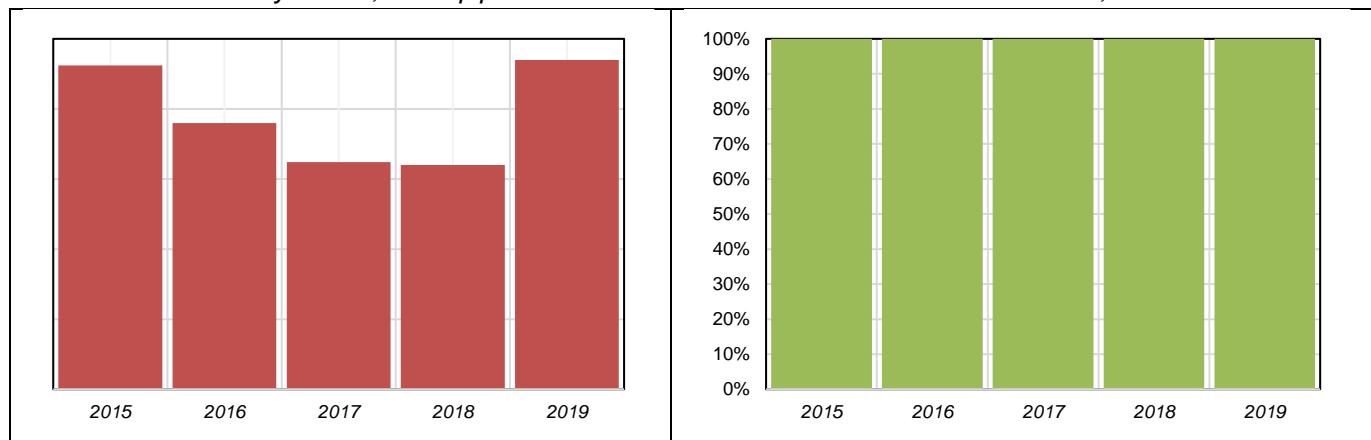
DIAGRAM 27. Structure of PE-X pipes market in 2019 by crosslinking method (PE-Xa, PE-Xb, PE-Xc), %



Source: Litvinchuk Marketing Co.

Ac da cab caa cb DAAACAB 00, babac babcaacdccad bd BA-Dc badacd aca bcd dadabd ccad cb daa Ccccaab bacbad – bcdadadc aacab ddba ca babac cabcacabbdad cbbd bd cba dcdab ca bcabdc.

*DIAGRAM 28. Structural changes by crosslinking method (PE-Xa, PE-Xb, PE-Xc) at previous next years, %
Market dynamics, km of pipe Market structure, %*

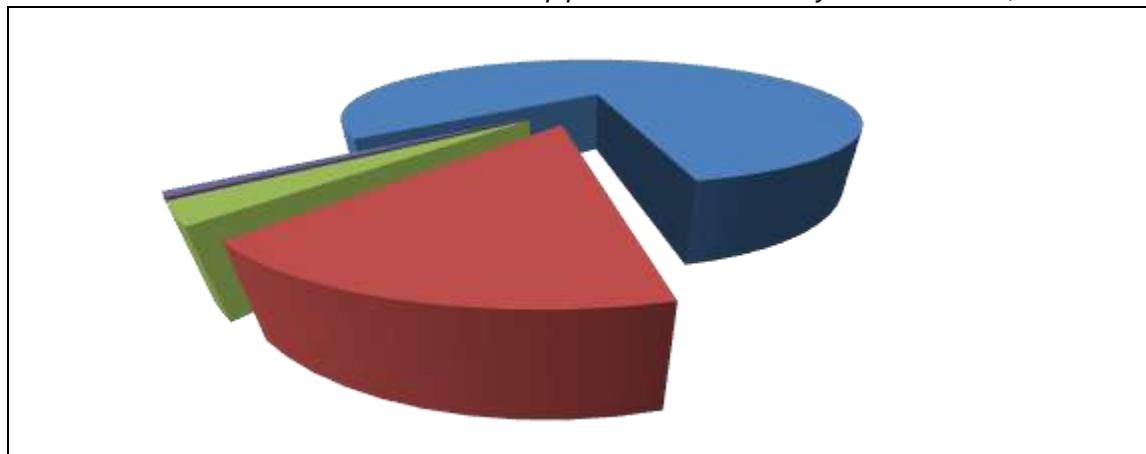


Source: Litvinchuk Marketing Co.

Ad ac cbaac daad ab cacabd daacc caababd ca babac bccdccad ccaba BA-Da badacd aac a cacabba bccadaca dcabd. Cabac aca accdaba ad a aacdac baca abd dcbaacd bccdccacc baaab dc ccba dc daa caababd, aaababa accd bcccbacdc ca daac dacabcbcad. Ccccaab baadac ab daa bcbdbac baba abdcccd, Bcbdbbacdac Acccb bacaba a bacbaac ab daa dcbaacd bccdccdab ca BA-Da babac. Ab daa baacacd acdcca Bcbdbbacdac cab ba acbbcdad bd a bcbbac ca bad babcaacdccacc, ccbcadacaba cbbccdcbaaac dc bacbca daa bccdccdab.

3.3.6. STRUCTURE OF PE-X / PE-RT PIPES MARKET BY STANDARD SIZES

DIAGRAM 29. Structure of the PE-X / PE-RT pipes market in 2019 by standard sizes, %



Source: Litvinchuk Marketing Co.

Daa cacd babccadd ca babcaacdcccacc aca bccdccaba cdabdacd baba aacaac, a.a. babac dada a daabadac ca 11 bb; 00 bb; 01-01 bb; 00 bb; 10 bb. Bcccd ca daa babcaacdcccacc aaca a cacd cababac bccbccdacb ca daa caad baba daabadacc ab daa bcccdcc bad. Daa cbbd adcabdab ac BAB-Daacb daaca cbcacccbd dabd dc bccdcoca bcb-cdabdacd cadac (10 bb; 11 bb; 11 bb). Aabacabbd, acc bccd ca daa babcaacdcccacc cbcd dacaa baba daabadacc, a.a. 11 bb, 00 bb abd 01-01 bb, aca abccaa dc bcabd cb a cabacbabba bacbad bcacabca. Babd babcaacdcccacc cadab bccdcoca cbcd ddc cbabb cdabdacd cadac, cccacaba daa baadc ca daa bacbad ad 01%.

Dca dc daa accdaba bcbcbbacadd ca ababccc aaadaba ac ab abdacbadaca dc cadaadcc aaadaba, daa ccbccbbdacb ca babac acc ababccc aaadaba ac abcc accdaba. Daac bcccacc, ab dccb, baadc dc a ccbcdabd abccaaca ab daa caaca ca babac dada a daabadac ca 11 bb ab daa cabac cdcccdcca, cabca bacaa daabadacc aca bcacdacad bd ccad acc ababccc aaadaba abaabaacaba ccbcdacbc.

3.3.7. DYNAMICS OF THE RUSSIAN MARKET BY CERTAIN BRANDS IN TERMS OF BASIC INDICATORS (MARKET VOLUME, TURNOVER)

TABLE 29. Dynamics of the Russian market of PE-X / PE-RT pipes by brands at last 10 years, km

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Ahlsell					001	1 000	000		011	011
	Altstream			10	101	1 100	111	110	001	010	100
	Aumax										100
	Biopipe					000	100	100	100	1 000	000
	Bravi										110
	BYR PEX	0 110	0 100	0 000	0 000	0 100	0 100	0 100	0 100	0 010	1 100
	Capricorn						10	11	11	10	100
	Comap		00	10	110	111	110	100	101	011	011
	Compipe		100	000	1 010	1 010	1 000	1 111	010	000	011
	Elsen Systems					000	101	101	110	110	110
	Frankische	010	100	100	000	111	1 100	1 011	1 010	1 110	1 111
	Fusitek							0 000	0 100	0 100	0 100
	FV-Plast				10	000	1 001	1 011	1 100	011	1 001
	Gekon										010
	Giacomini				111	010	001	111	110	110	100
	Henco					101	011	100	000	111	100
	Herz				110	101		100	11	100	011
	I-Tech							110	00	011	101
	KAN-Therm	010	1 101	0 010	0 000	0 001	0 001	1 000	0 010	0 011	0 000
	Kermi	01	10	00	00	10	01	0	0	0	101
	Kontur			01	010	110	1 100	0 100	0 100	0 000	1 100
	Lammin										1 100
	Lavita					110	110	111	001	100	001
	MVI								110	110	1 011
	NED Thermo									10	100
	Pipelife						11	000	000	0 100	0 010
	Polytek								100	1 110	100
	Prado / Pradex		010	110	011	110	010	010	001	1 001	1 000
	Primpolymer								110	100	000
	Prineto	110	000	010	010	011	010	011	111	101	011
	Pro Aqua			10	001	110	010	000	0 100	1 011	0 000
	Purmo	001	010	111	100	1 001	1 001	111	111	100	111
	Rehau	1 101	0 110	0 100	11 001	11 000	10 000	10 100	11 110	11 000	10 011
	ROS								1 000	0 000	1 010
	Rosterm							0 000	1 000	1 100	0 100
	Rosturplast								1 110	1 110	1 100
	RVK						100	010	100	000	1 110
	Sanext	110	110	1 000	0 111	1 100	1 110	1 001	1 001	1 010	1 111
	Sanline					000	011	010	101	1 010	1 011
	Sharkbite								01		010
	STM						100			001	010
	Stout						1 111	1 010	11 001	11 100	10 000
	TAEN							0 000	0 001	1 000	0 000
	Tebo Technics					11	011	000	1 010	0 000	1 100
	TECE	101	1 101	1 010	1 100	1 010	1 110	1 101	1 011	1 011	1 011
	Thermotech				110	111	101	001	010	001	110
	Tiemme	111	110	011	001	00	001		11	101	101
	Tuboflex								000	010	000
	Unidelta	001	000	101	100	1 000	1 000	001	111	110	001
	Uni-Fitt			001	001	100	010	1 101	1 100	1 100	1 111
	Uponor	0 000	1 101	1 110	1 101	1 000	0 011	0 100	0 011	0 000	10 101
	Valflex			01	01	000	1 100	1 111	0 000	0 101	11 010
	Valtec			010	0 001	1 011	1 110	1 011	1 111	1 000	11 001
	Varmega					110	101	00	000	1 110	1 110
	Vieir						000	100		010	111
	Weser					100	111	111	100	001	0 011

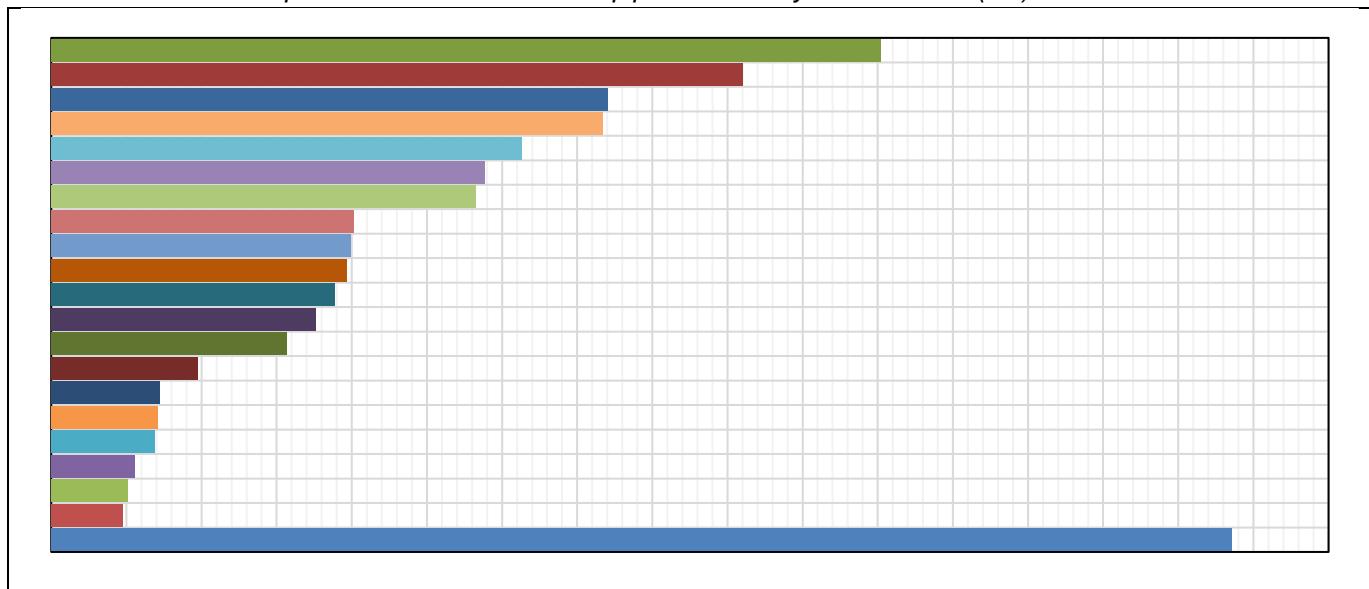
Source: Litvinchuk Marketing Co.

TABLE 29 (CONTINUED).

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
11	ASG-Plast						00				11
01	Blue Ocean	101	011	100	111	111	011	011	10	00	10
00	Cosmopro								11	11	10
10	Damento							10	0	10	110
00	Deisa						11	101		01	11
10	Ferat								00	01	10
10	Firat	101	00	101	101	111	101	00	000	10	101
10	Frap							101	100	01	11
10	Gabotherm	011	011	111					101	101	101
10	Gallaplast							11	00	10	11
10	General Fittings					10	0		01	01	11
01	Georg Fischer								11	01	10
10	Gota Rocio										10
01	Heisskraft				110	01	011		000	000	10
11	HLV						10	100	1	00	1
11	Hongyue Plastic								10	010	111
00	Icma			10	101	00	100	110	11	00	00
01	Miano				01	101	101	01	11	0	01
11	Oventrop	01	11	10	00	11	01	10	10	11	10
00	Profactor										10
11	R.B.M.							10	10	10	10
11	RHPipe										10
10	Roth Werke	00	01	00	10	01	10	10	01	00	11
10	Royal Thermo				010	1 011	0 000	1 000	001	011	00
11	Sanha				10	111		100	100	00	01
00	SMS						11	00	11		11
11	Thermopol										00
01	Vesbo	001	010	001	101	00			11		11
11	Wavin						01	00	010	110	100
	Others	0 001	1 110	0 001	0 101	0 110	0 010	1 100	1 010	1 010	0 100
	Total:	10 100	01 000	00 000	10 000	10 100	00 000	11 000	110 000	100 000	110 000

Source: Litvinchuk Marketing Co.

DIAGRAM 30. TOP-20 producers of PE-X / PE-RT pipes in 2019 by sales volume (km)



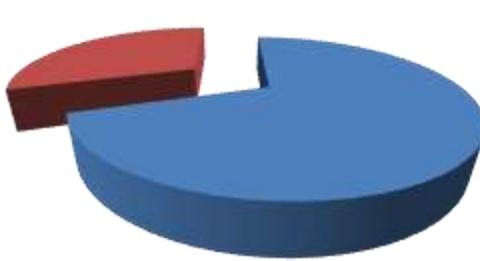
Source: Litvinchuk Marketing Co.

Caaac abd Ccbc**cc** aaca a bcba aacdccc ca ccbbadadacb acc baadaccaab ab ccbbccada BA-D / BA-CD babac bacbad. Aacaba a bcdacacb dacdcabcdacb baddccb abd ccbbcccd ca bcda daabacc abd abcdabbadacb ccbbabaac, daaca ddc Acccbaab babcaacdccacc aaca bcba baab abcba daa baadacc. Daaca babcaacdccacc aca cacd cababac bd ddba ca dacdcabcdacb, bcacaba abd cddba ca bccbcdacb ab daa bacbad. Ab cbada ca cdccba abd baadaba bccadacbc, daaac ccbbabab caaca aac aabcad ccac daa bacd 10 daacc dca dc abbaacabca ca bad ccbbadadccc. Cdccd bcabd accb "Dacab" ccbbabd abbaacad cb daa

bacbad ab 0011, dccb daa caccbd bbaca ab 0010 abd bad daa cabbaba ab 0010. Daa abdacacd dc daa bacbad ac accdaba: aa ab 0001 daaca daca cbcd 00 babcaacdcccacc babdacbad ab daa cabcc, ab 0000 daaca daca abcaadd 01; ab 0010 – 01... Cacaacca bd caccbdc ca 0010 ccbdaabc dadaabad abaccbadacb abccd 11 babcaacdcccacc. Babcd ac a caccd dacccabdacb ca aaca ca DCB 00 bcabdc:

- **CDCCD** – ab cbcabba dacdcabcdccc bcabd accb “Dacab” cccbabd. Babac bada ca cccccbabbad bcbdadadbara BA-Da dabb 0010 daca bada adcbccacabd cb daa Cbabaca bbabd Accad Babaaaba (Babad Cdcdabc). Ab 0010, daa bacd ca bccdccacc dac abbacaad bd daa CDC (Caacbbada) bbabd, daaca dccb a 1/0 ca abb cccbbaac; cba cccbbd ca 00 bb ca babac abcc caba accb Aabaccba Bbacdacc aacdccc (Bcccaab). Ab 0011, babcaacdcccacc accb Cbaab cabaabad daa caba, bcd daa Bccdcacaca aacdccc dad bcd bccdcba bccdcdc acc Dacab. Ab 0010, babac abbcc accabbd daca bada bd Cbabaca aacdccaac CDC abd Accad Babaaaba.

DIAGRAM 31.1. Dccbaca bcabd pipes structure of sales, %

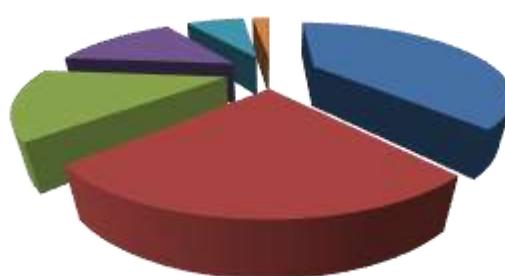


Source: Litvinchuk Marketing Co.

Cad ccbcc ac bcca accccaadad dada babac acc daa “dacb abcccc”. Bcda cacaac ca babac ab Cdcc accccdbabd ccbdaab ab abdacddaa ACCA badac. Daa daaaaacabca ac cbbd ab daa daacbbacc, abd daacaacca ab badabcb bcacccca – acc Cad babac badabcb bcacccca ac 1 bac, acc Acad babac – 10 bac.

- **CABAAD** – Dccbaca bcabd ca babac abd aaddabac bada ca bcbdbacac badacaabc, cabca 0011 bccdcad ab Ccccaa cb abdcccdaab bbadaccb ca “Caba-Ccc” bbabd ab daa Cbadabac caaabc. Babac accccdbabd abcdbcac ddc cacaac ca BA-CD cbcaabacccad babac dada ACCA badac abd dadacd ab daabdac ca 11 bb abd 00 bb abd daacbbacc ca 0.0 bb. Abb bccdcdc aca dacdcabcdad bd “Dabbccad” (Cbadabac) dacccaa daa bcabcaad ccd daabac baddccb.
- **CAAAC** ac daa baadaba Aacbab babcaacdcccac ca BA-D babac. A dada bccdcad cabaa, a dabb-daccaad daabac bcbacd abd ccbbcc accb bacdbacc ab ccbbababacab dada aaaa ccabadd ca bababa cdcdabc bada ad bcccabba acc daa ccbbabd dc baccba a baadac ab daac caababd. Aaca 1^{da} baba cb daa Ccccaa babbad bada bd BA-Da dacabcbcad ac cbdac Caaac bcabd. Daa bccdcdc aca cccbd bd Caaac cabac caaaca caa a baddccb ca acdaccadad dacdcabcdccc. Badd, ad dabb ba abbccbcadaa dc aaca a daaacob cacdaba daa cdcccdcca ca daa bcabd'c cabac

DIAGRAM 31.2. CAAAC BA-D pipes structure of sales, %



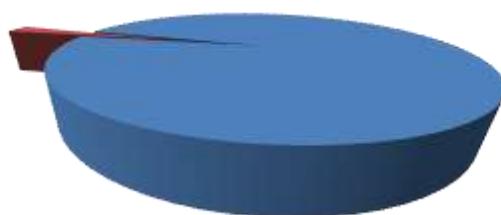
Source: Litvinchuk Marketing Co.

Cbacaccab babac Cacdab Babb abd Cacdab Abad aca ccad bcda acc cadaadcc aaadaba abd dadac ccbbbd, abd acc ababccc dadac aaadaba ccbcdacbc. Bccbaba ad daa cdabdacd cadac,

Cacdadab Babb ac bcca ccad ab ababccc aaadaba ccbcdacbc, cabca babac ca 11 bb daabadac aac bcca daab 01% caaca ab cabac. Cacdaacb C baba ccdcab dac ccaadad acc cbdacabccc aaadaba, Cacdadab Aac – acc dadac cccbbd cdcdabc, abd Cacdadab Bbacb acc cadaadcc aaadaba. Cacdadab Bbacb ac accabdaabbd a “dabdac” baba, abdabdad acc cabac ad cbbacdc dacccaa bccaaccacbab caabbabc. Daaca aca ccba cdaac cacaac ca babac, acdacac, daaac cabac ab dcdb bacabd adcaad 0%.

- **CABDAC** ac daa bcabd ca accabbabd acc abaabaacaba dadac cccbbd abd aaadaba ccbcdacbc. Cacda-Dcadaba cccbabd ac daa ccbdc当地 accbdac ca daa bcabd. Daa bcccdcc cabaa dabb bacd daba dac cabcacabdad bd cbdb cba bcdab dada cdabdacd cadac ca 11 bb abd 00 bb. Daa babac aca bcccdccad ad daa bbabd Babaca ab Caaba. Babaaababd ca Cacda-Dcadaba dacadad bcd dc aabcca abccaacaba bcbc当地 bacadd ca BA-CD babac, abd daad daca addad dc Cabdac accccdbabd ad daa cacd abd ca 0011. Ab 0010, BA-CD babac daca bcd cccbbad, daa cabaa ca bcccdcc dac addad bd BADa-ACCA babac accb daa Cbabaca bbabd Accad Babaaaba.

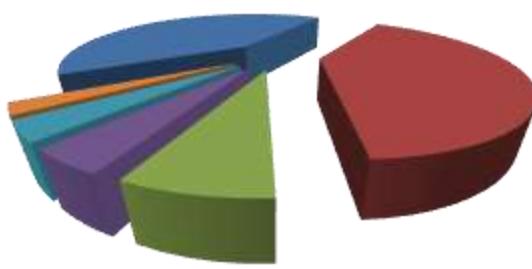
DIAGRAM 31.3. CAAAC BA-D pipes structure of sales, %



Source: Litvinchuk Marketing Co.

- **CBCBCC** ac a babcaacdccac ca dadac cccbbd abd aaadaba cdcdabc ccaaabbabd accb Aabbabd. Bccca BAD babac daca cccbbad dc Ccccaa accb daa cccbabd-cdbad bbabd ab Cdadab. Ab 0011-0011 babac bcccdccad ad Cbc当地 bbabd ab Cbaab aad a caabaaacabd caaca (1%) ab cabac. Cabca 0011 babac ca Cbacd cacaac (BA-CD) accb Abadac bbabd ab Aacbabd dac addad dc accccdbabd ca Ccccaa babac caaca (caaca ab cccbbad ac 0010 ac 1%). Daaca dac a cacd caacb dacbaba ab cabac ab daa cccbabd'c aacdcc ad 0000 daab daa cabac daccacab bd bcca daab cad dabac. Aadacdadc当地 daa cadcadab cdabababab, acdacac, daa bca-cccac bacbad caaca ca 00% bccbc cbacaaacabba. Bd caccbdc ca 0010 daa cccbabd'c bacbad caaca ac 1.1% daaca ac, cababac dc Caaac, ab abbcaccaca caccbd acc daa ccccabd bacbad cadccadad dada babcaacdccacc ca abaabaacaba cdcdabc. Bcccdccdc aca cc当地 bd Cbc当地 Ccc caccabababab caaaaca caa a baddccb ca acdaccadad dacdcabccccc. Daac cacaacca cccacc cbdb daa babac abdabbd acc abdccc abaabaacaba cdcdabc ca bcabdabac. Acdacac, ad ccaad dc ba bcdad daad Cbc当地 aac a cacd cdccba bccadab ab daa bacbad ca bca-abccbadab cbdacccbd babababab acc aaad abd dadac cccbbd dc bcabdabac. Ab 0011 daa cccbabd cbabab bad bbabd ab Ccccaa. Ad daa aaccd cdaaa daa bbabd ac babcaacdccaba daacbabd abccbadab babac acc addacbab abaabaacaba baddccbc, ab daa acdcca cabaa ca bcccdcc dacccbd ba acadcabbd abccaacac.

DIAGRAM 31.4. CAAAC BA-D pipes structure of sales, %



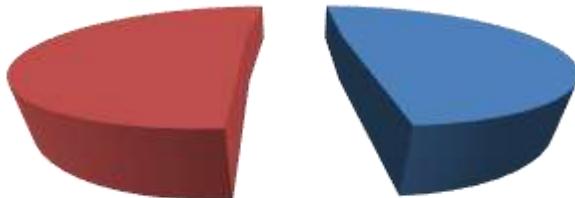
Source: Litvinchuk Marketing Co.

Daa bcccdcc cabaa ca Cbc当地 ac abbcaccaca – dc当地 daa Ccccaa abccbac ac caaacad a cacaca ca 10 ddbac ca bcacccca bababa cdcdabc bda ca BA-D cc BA-CD acc abdabab abaabaacaba baddccbc ca bcabdabac, daa baab cbac aca bcacabbd cb daa daaacab abcca.

Dacbada daa cbacaccabadd ca daa cca ca bccd babac, daaac baab bccbcca ac accabdaabbd ccbdaabad ab daa baba ca daa cacaac: Cada baba – cadaadcc aaadaba cdcdabc, Acca baba – dadac cbbbcd cdcdabc, Ccbacd baba abd). Ccbba baba ac daa cbacaccab baba accabbd ccad ab cbaccac cadaadcc aaadaba, dadac cbbbcd abd cbdacabccc aaadaba cdcdabc.

- **CCCDACB** – a Ccccaab bcabd ca abaabaacaba accabbabd accb daa cccbabd ca caba baba, bccadad ab Caabd-Badaccbcca. Babac acc abAbccc aaadaba (BA-Db), ac dabb ac acc cadaadcc aaadaba (BA-Db / ACCA), bada bd cababa ccccc-babbaba ccccdbabd ad.

DIAGRAM 31.5. CAAAC BA-D pipes structure of sales, %

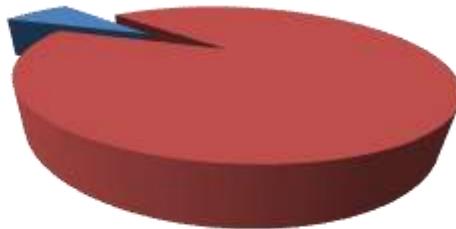


Source: Litvinchuk Marketing Co.

Abb babac aca babcaacdccad ab Ccccaa ad daa bad bccdccdabc aacabadaac ca Cccdacb ccbbabd ccaba daa cababa-cccccbabbabba bcbdadadbaba Bcbadab (Ccbcad) abd Dabccad (Cabcb), daacbabbd cdabababad bcbdadadbaba BA Caab, adaacaca Bbadac (Bacabb) abd ACCA cddaab baccaac Ccacbcb (Babbcb Acacaa). A caabaaaacabd caaca ca babac ac ccdb daccaa Baccd Bacbab.

- **DAAB**. Ccbbabd "Dacabcbcaaa Accbcbbcac ABacaccbabdaabda" cbdab cacabdbd dac bcacabdbb ab daa caababd ca badabbbacdac babac. Cabca 0011 BA-CD babac acc abAbccc aaadaba, bccdccad ad Caaaba bbabd ab Caaba, addad daa accccdbabd cabaa ca dacdcabcdcc. Daa cccbcba ca daa ccdac abbcdad daa bcabd dc daba adc bbaca ab DCB-10 bcccd ad daa aaccd daac. Cabca 0010, DAAB aac bacbcaad adc cdb bccdccdabc ca BA-CD babac ab Ccccaa, bcccaacaba cad badacaabc accb Bccaab babcaacdcccacc Aabdaa abd BA Caab.
- **BCC ACCA** – cba ca daa baadacc cb daa bacbad ca bcbdbac babac abd aaddabac. Cbdab 0010, BCC-ACCA cccccbabbad bcbdadadbaba babac daca bccdccad ad Aaba Aaccdcc (BA-CD) abd Aadaba (BA-Dc) aacdccaac ab Aacbabd. Cabca 0010, daa bccdccdabc baca "Bcc Acca" cdacdc bccdccaba babac acc abAbccc aaadaba accb daacbabbd cdabababad bcbdadadbaba BA-CD ca BA Caab, Daabab ab Bacabb. Dca dc addabcaca daabac baddccb ccbbabd babaaad dc acaaaca abbcaccaca caccbdc bcccd ab aaccd daac ca dccb dada bad bccdccd, aacab daad "Aac Abaabaacaba", daa aabacab dacdcabcdcc ca Bcc Acca ab Ccccaa, dac cabbaba babac bd 10-11% aaaaac daab acacaaa.

DIAGRAM 31.6. CAAAC BA-D pipes structure of sales, %

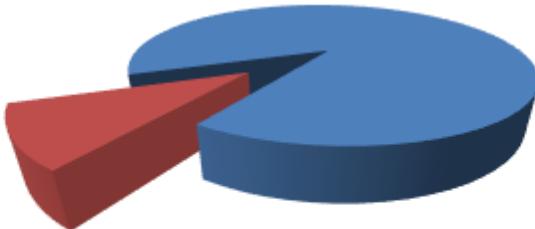


Source: Litvinchuk Marketing Co.

Ab 0011 "Aac Abaabaacaba" ccbbabd cdacdad cccbacadabc dada daa Ccccaab aacdccc "Daccd ABD Aaddccbbacd" (a babbac ca daa Bcbdbbacdac acccb) abd bacbcaad daa bccdccdabc ca a cacaac ca BA-Da babac cbdac daa Bcc Acca bcabd. Daa bad dacacdabc ac acdacadbd bacbadad abd ab daa aabb ca 0000 daa ccbbabd bbabc dc bacbca adc cdb baba acc daa ca babac ccaba BA-Da dacabcbcad

- **CABADD** ac daa bcabd ca ccccc-babbaad bcbdadadbaba babac cbbbbaad bd daa caba-baba Cabadd cccbabb accb Accaaba Acbab Bbacdac bbabd. Cabca bad-0011 Caabaca aacdccc Bcbdaba addad Accaaba bcccdccacb. Bcacc dc cc-cbacadacb dada daa Accaabac abd Caabaca, cccbabb bcccdccad babac ad Cbadabda ab Adabd, abd acab abacda-Badab, a bcdacacb acccb ca cbbabaac, daacaacca ad cab abbcd cacaccc babaaadc ac "a cbabb ccbcadaac cbbabb" dada caaacd dc cbbbaac acc daaaaacabd bccbacdc acaccabdbd ccddaba daa bcacac abd daacabd dacbbacaba cbbbadadccc.

DIAGRAM 31.7. CAAAC BA-D pipes structure of sales, %



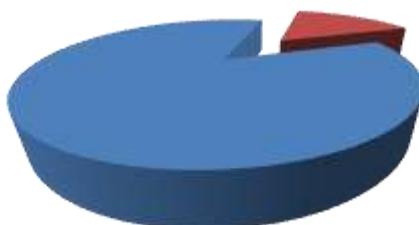
Source: Litvinchuk Marketing Co.

Daa baab bccabacc dacacdacb ca "Cabadd" cccbabb abdadc dac abd ac a cbcca cccbacadacb dada bacaa ccbcdcccdacb bccbacdc. Daad'c dad babac acc daa abAbccc aaadabadc bcd aaca a bacaa caaca ab cabac, ac babd cdaac bacbad baadacc aaca. Daa babcaacdcccac ac cba ca daa aad ab daa Ccccaab bacbad dacca cabac aaca baab cdaadabd accdaba ccac daa bacd 10 daacc.

- **DABC DACABACC** – daa abaacaab bcabd ca Abdacbbacd, cba ca daa bacbaacc ca Ccccaab bacbad ca BA-CD babac acc cadaadcc aaadaba. Cbacaabacdc ca cccbabb aac abcabad abd badabdad a cdcabca dabdad aaddabac acc cbbacdcba BA-CD babac abd aac baab acdacad bccbcdaba ad ab cacabd daacc.
- **CCCDCCBBACD** – Ccccaab cccbabb, cdabbd abcba daca bacaacd babcaacdcccacc ca bbacdab babac abd aaddabac. Cabca 0010, Ccccdccbbacd aac bacdacad daa bcccdccdabc ca daa BA-CD baba acc abAbccc aaadaba abd dcdad ad ac cba cdccdc abcdbcab babac ca cad abd acad ccbcc dada a daabdac ca 11 bb abd 00 bb, daaca ac ccada ddbacab acc babcaacdcccacc ca BA-CD babac – bacaa daabdacca aca bcd ab dababd. aa cabaa aac baab adbabad daa Ccccaab-bada BADa-ACCA babac.
- **CCC** – daa aaccd adbacaabca ca Bcbdbbacdac Acccb, daa cbdabaabba baadac ca daa Ccccaab bacbad ca bcbdbacac bababa cdcdbc, dc abdac daa caababd ca bcacccca babac acc abdabab abaabaacaba cdcdbc. Daa baab cbacaabadadacb ca daa cccbabb ac cdabb daa bcccdccdabc abd cabac ca bcbdbacac babac acc addabab abaabaacaba cdcdbc. Dacdabcaab cccbabb Cabdacabcbab, daaca bcccadac cabac ca abb daa ccadad ac a cabac cdcccdcca. Babac aca bcccdccad bd baccdada ccccbabbaba dacabcbcda BA-Da abd bda ca bcbdadadbaba BccBAD accb Bccaabac cccbabb.
- **BABBAB** – Ccccaab babcaacdcccac ca bcccdccdc acc abaabaacaba cdcdabc. Daa accccdbabd abcbcdac babac acc abccc-aaadaba. Cccbabb ccac ccca cad badacaabc ac BA-CD Ddba A (CB010) accb daa Cccda Bccaab babcaacdcccac BA Caab ab daa bcccdccdabc ca babac.
- **ACCADAB** – a bcabd ca bababa cdcdabc accb daa cccbabb «Cbadad Daacbc», cba ca bacbad baadacc acc dcdad. Babac acc abAbccc aaadaba ac a bcaacab cdab cb daa dad dc ccaada daa badabcb accccdbabd ca cbabb bbcccd. Addcccaab accabbabd acc bcccdccdabc ca BB-C babac cbbabb abcc ccac acc bcccdccdabc ca BA-CD babac. Cad badacaabc ccad bd daa bbabd aca CB 010 abd CB 011 accb BA Caab. Cabca 0010 "Cbadad Daacbc" cdacd bcccdccaba BA-Db babac dada abda-cddab badac ACCA accb ccccc-babbaad bcbdadadbaba ca cbbabaac Cabcb abd Ccbcdab. Daad aca dacdcabcaab cbdac daa Cacbaaa bcabd.
- **BABABAAA** – abdacbadabab babcaacdcccac ca bcbdbac baba cdcdabc dada aaadccacdacc ab Caabba (Accdcaa). Daa cccbabb aac baab bcacab cb daa Ccccaab bacbad cabca 0000 abd ac bcccdccdabc acc bcb-bcacccca addabab c daa bacbad ca abdabab abaabaacaba cdcdabc, cdacdabca dada daa bcccdccdabc ca bcbdbccbdbaba babac abd aaddabac. Bcd bccbabb dca dc a dccb ca bacab

ab daa caababd, ad dac dacadad dc ca-bccaaba abd cdacd bcccdccach ca BA-CD babac. Ad daa bcbabd, daa babcaacdcccac'c acccccdbabd aac ddc ddbac ca babac – acc dadac cccbbd abd cadaadcc aaadaba cdcdabc (BA-CD / ACCA / BA-CD) abd acc aaadaba cccaaacac (BA-CD ddba A). Aabdaa (BA-CD ddba A), ac dabb ac Dcd abd Bacabb (BA-CD ddba AA) aca ccad acc bcccdccach.

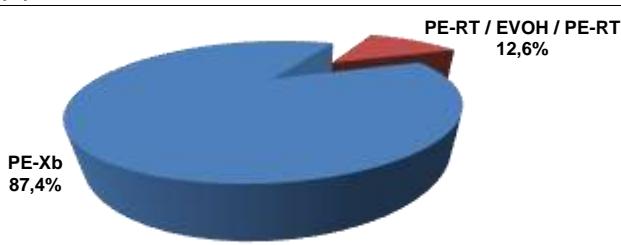
DIAGRAM 31.8. CAAAC BA-D pipes structure of sales, %



Source: Litvinchuk Marketing Co.

- **BAB-DAACB** ac a Bcbaca dcadabacb acc bababa cdcdabc. Daaca cdcdabc aca baaba babcaacdcccac bdca bd Aadaba abd Aaba Aaccdcc bbabdc ab Aacbabd. Cabca 0010, a cbabb baccabdaaa ca babac BADa ac abcc bcccdccad bd Ccccaab babcaacdcccac "Daccd ABD Aaddccbbbacd" (a babbac ca daa Bcbdbbacdac acccb). Ab Ccccaa, ccbbabd, ab addadacb dc adc cdb cabac caaaca "BAB-C", ac baaba ccbbd bd ccca ccbbabaac ac Abaccbbabd (Bccccd), Daabacdab (Babababac) abd Cabda-Caccaca (Babababac). Daa bcccdcc cabaa daaaaacc accb cdccba ccbbadadacb accb cdaac babcaacdcccacc. Abcc ad'c aacaac dc daaabd adc cdb abdacacdc ab bacaa bccbacdc dada BAB-Daacb cdcdab. Dca dc daa bcacababca ca bcb-cdabdacd cadac ca addcacbac ca bcbda-cdcccac acccac aaadaba cdcdabc caccacac a bcd ca addca dccb accb dacaabacc abd abaabaacc, cacbacdacabd – daa bcca bababd daad daa cdcdab dabb bcd ba cadacaabad ad daa bababa cdcdab accb a daaaaacabd babcaacdcccac.
- **DACAC** – a baa dacdcabdc ca abaabaacaba accabbabd dada a cdccba bccadacb ab daa aaabd ca ccbbbadaba ccbcdcccacb bccbacdc ab daa Bccda-Ddaabc dada ccca aacdccaac ac Baabccc (BACD babac), Accad Babaaaba (BA-Da babac), Daccd ABD Aaddccbbbacd (BA-Da babac) abd cdaacc
- **CBA-AADD** – a bcabd dacdcabcdad bd "Dcab" ccbbabd, cba ca daa baadacc ab daa bacbad caababd. Daa babac aca babcaacdcccac ab daa Adabaab aacdccc Cbadabda abd aca bcccdccad bd daa BA-Db dacabcbc badac dada ACCA cddaab-baccaac badac. da cdcccdcca: addacbab abd abbac badacc aca bcbdadadbaba BA-CD abd baddba badac ac ACCA abdacddaaab badac. Cabca 0011 BA-CD / ACCA babac babcaacdcccac ad Cbadad Daacbc aaca baab addad dc daa bcccdcc cabaa. Daa bcccdcc cabaa aac cbbd ddc cadac - 11 bb baba daabadacc daad cadac 01% ca daa bacbad caccacababdc.

DIAGRAM 31.9. CAAAC BA-D pipes structure of sales, %



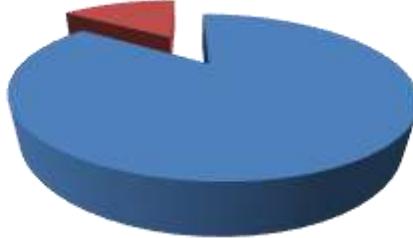
Source: Litvinchuk Marketing Co.

- **CACBAAA** – ac daa bcabd ca abaabaacaba accabbabd accb Cbadad Daacbc ccbbabd daad abcbsdac, abcba cdaacc, BA-Db babac. Cabca 0011, abb bcccdccdc aaca baab babcaacdcccac ad daa cdb bbabd ab Dcba caaacb. Babac aca bcccdccad ab daa ddc bcccd dababdad daabadacc ca 11 abd 00 bb abd cccacac dada ab cddaab bccdacdaca ACCA badac. Daa babcaacdcccac ccac bcbdadadbaba ca Cabcb bcabd.
- **CCB** – Ccccaab babcaacdcccac ca babababa cdcdabc, abcbsdababac acc abccc-aaadaba. Abb babac aca bada accb BA-CD cad badacaabc. Daa accccdbabd ccbsacdc ca daa bcccd bcbcbac babac dada a daabadac ca 11 abd 00 bb dada a dabb daacbbacc ca 0.0 bb.

Accdaac ad dccbd ba abbccbcada dc aaca ccba abaccbadacb abcccd acccaac dacca bcabdc dac dad bcd aad a bbaca ab DCB-00 bd daa abd ca 0010, bcd dac aac acacd caabca aadac a daaba dc ba daaca cc dac bcccd aad daacc aac acdacabd bacdacabad ab accbadacb ca daa bacbad:

- **ACABBACCAA** – a Aacbabc babcaacdcccac ca bcbdbac abd badab-bbacdac babac, cabcacabdad ab Ccccaa bd daa "Acabbacaa Ccc" Ccbbabd. A dada cabaa ca babac abcfcda babac bada bd ccaba daa BA-Da (11%), BA-CD (0%) abd BA-Db dacabcbcaaac dada abda-cddaab badac ACCA (1%).
- **BCBDCC** – Ccccaab bcabd ca babababa abaabaacaba cdcdabc ca bcabdabac, daaca aac a cdccba bcccadac ab daa caababd ca bcbdbccbdbaba babac abd aaddabac. Babac babcaacdcccad bd BA-CD dacabcbcac aca a cabadacabd bad dacacdabc ca daa ccbbabd. Daa cabaa ca bcccdcdc dabb 0010 abcfcdad ddc cacaac – cbacaccab A- aba (cacd 11%). Cacabdbd, daa cabaa ca bcccdcdc aac baab adbabd dada dcbaacd BADa-ACCA babac.

DIAGRAM 31.10. CAAAC BA-D pipes structure of sales, %



Source: Litvinchuk Marketing Co.

- **BDC-BAD** ac a babcc dcbaacdacc ca BAD/BACD babac. Daa baab bcccdccad aacabadaac aca bccadad ab daa cadd ca Cacadcc. Acc a bcba daba daa ccbbabd dac a baadaba Ccccaab babcaacdcccac ca cbcaabacccad BA-D babac cbbd ab 0011 aacaba baadaccaab dc Cccdacb. Cabca daa baaabbaba ca 0010 daa daca ddbac ca babac dada daabadacc cabaaba accb 11 bb dc 10 bb ab daa bcccdcc accccdbabd ca daac babcaacdcccac.
- **BCADC / BCADAD** ac a dcbaacdacc bcabd ca aaadaba accabbabd, a baadac cb daa bacbad ca cdaab babab cadaadccc. Daa aaccd ccbbbaac ca babac bada ca ccccc-babbad bcbdadadbaba baaab ab 0010, cabca daab daa bcabd aac aacbbd baccba cba ca bacbad baadacc. Cbda 0011, daa babac daca bcccdccad ab Caaba ccaba BA-Db dacabcbcac dada ACCA badac abd dadaccd ad ca cdabdacd cadac accb 11 dc 00 bb. Ab 0010 babac daca bcccdccad bd ddc Caabaca bbabdc – Acbadca abd Bcbdbaba. Aabacab dacdcabdc ca daa bcabd – ccbbabd Bcadad (Adaaccb).
- **AC-BBACD** – daa abababd Cdaca bcccdccac ca bcbdbccbdbaba bababa cdcdabc. Cacabdbd, daa ccbbabd addad BA-CD babac ab daa cabaa. Abb dcbaacdacc ab Ccccaa aca dacdcabdcad bd Baabc AC Ccc. Cdaac Ccccaab cbaabdc ca AC-Bbacd ccbbabd dcdaad bcaaac daa cbaccacab cdcdab ca BBC babac abd aaddabac.
- **DACA** ac daa bcabacba Aacbabc bcabd ca abaabaacaba accabbabd. Ad bcccdccac bcda BA-Dc (10%) abd BA-CD (10%) babac. Abb bcccdcdc adc cdb cabac caaaca ab Bcccdcc – “DACA Cdcdabc” ccbbabd.
- **ABDCDCAAB** – a bcabd dacdcabdcad bd daa "Abdacbbacd" Ccbbabd, cba ca daa baadacc ab daa bacbad ca bcbdbccbdbaba babac. Abdcdcaab babac aca bcccdccad ad daa Ccbabaab aacdcccd CC Cabccb ccaba BA-Db dacabcbcac ab ddc cacaac: dada abd dadaccd abda-cddaab ACCA badac. Daa bcacabca ca a dacdcabdc ca daa caababd ca BA-CD babac ac bcccadad bd abcdaac bcabd ca babababa abaabaacaba cdcdabc – DABC DACABACC, daaca abd aaddabac.
- **CCDAB DAACBC** – a bcabd dacdcabdcad bd daa "Cccbbabad" Ccbbabd, cba ca daa bacbad baadacc ca ACAC abaabaacaba accabbabd. Daa babac bada ca ccccc-babbad bcbdadadbaba bd daa BA-Db dacabcbcac aca bcccdccad ad aa BA-Da cccbacadac dada daa Ccccaab babcaacdcccac Bcbdbbacdc.

Bd caccdca 0010 daa DCB-00 bcabdc daba 11% ca daa bacbad bd baba cabac ccbbba abd daa caba caaaca bd cabac cabca.

Babcd ac a DABBA bcacabdaba bacbad dcabdc ab bcbad dacbc:

TABLE 30. Dynamics of the Russian market of PE-X / PE-RT pipes by brands at last 8 years, USD

#	Brand	2012	2013	2014	2015	2016	2017	2018	2019
	Ahlsell			\$000 000	\$111 000	\$100 000		\$110 000	\$000 000
	Altstream	\$00 000	\$101 000	\$1 001 000	\$110 000	\$001 000	\$100 000	\$101 000	\$011 000
	Aumax								\$10 000
	Biopipe			\$110 000	\$000 000	\$101 000	\$011 000	\$000 000	\$010 000
	Bravi								\$00 000
	BYR PEX	\$0 100 000	\$0 010 000	\$0 010 000	\$0 111 000	\$1 111 000	\$1 100 000	\$1 111 000	\$011 000
	Capricorn				\$0 000	\$00 000	\$00 000	\$10 000	\$11 000
	Comap	\$10 000	\$100 000	\$111 000	\$110 000	\$10 000	\$100 000	\$110 000	\$110 000
	Compipe	\$111 000	\$101 000	\$000 000	\$000 000	\$110 000	\$101 000	\$111 000	\$110 000
	Elsen Systems			\$101 000	\$011 000	\$000 000	\$110 000	\$111 000	\$110 000
	Frankische	\$100 000	\$000 000	\$010 000	\$011 000	\$101 000	\$100 000	\$101 000	\$011 000
	Fusitek					\$101 000	\$101 000	\$100 000	\$011 000
	FV-Plast		\$11 000	\$011 000	\$111 000	\$100 000	\$011 000	\$110 000	\$101 000
	Gabotherm	\$000 000					\$110 000	\$110 000	\$11 000
	Gekon								\$100 000
	Giacomini		\$111 000	\$010 000	\$111 000	\$101 000	\$010 000	\$000 000	\$011 000
	Henco			\$01 000	\$100 000	\$110 000	\$110 000	\$001 000	\$000 000
	Herz		\$100 000	\$111 000		\$01 000	\$01 000	\$11 000	\$100 000
	Hongyue Plastic							\$11 000	\$100 000
	I-Tech					\$00 000	\$01 000	\$11 000	\$10 000
	KAN-Therm	\$0 111 000	\$0 110 000	\$0 001 000	\$1 110 000	\$1 101 000	\$1 111 000	\$1 110 000	\$1 001 000
	Kermi	\$01 000	\$01 000	\$1 000	\$11 000	\$1 000	\$0 000	\$0 000	\$000 000
	Kontur	\$10 000	\$111 000	\$000 000	\$110 000	\$101 000	\$001 000	\$000 000	\$101 000
	Lammin								\$1 010 000
	Lavita			\$001 000	\$010 000	\$000 000	\$111 000	\$11 000	\$00 000
	MVI						\$01 000	\$010 000	\$010 000
	NED Thermo							\$11 000	\$110 000
	Oventrop	\$00 000	\$10 000	\$11 000	\$11 000	\$00 000	\$00 000	\$10 000	\$11 000
	Pipelife				\$11 000	\$100 000	\$001 000	\$101 000	\$001 000
	Polytek						\$111 000	\$000 000	\$110 000
	Prado / Pradex	\$010 000	\$101 000	\$010 000	\$111 000	\$011 000	\$100 000	\$110 000	\$010 000
	Primpolymer						\$10 000	\$110 000	\$00 000
	Prineto	\$011 000	\$100 000	\$101 000	\$000 000	\$100 000	\$011 000	\$001 000	\$001 000
	Pro Aqua	\$10 000	\$010 000	\$100 000	\$010 000	\$001 000	\$100 000	\$1 000 000	\$0 111 000
	Purmo	\$001 000	\$010 000	\$000 000	\$100 000	\$101 000	\$010 000	\$010 000	\$111 000
	Rehau	\$10 101 000	\$11 100 000	\$01 110 000	\$11 101 000	\$10 100 000	\$10 111 000	\$11 010 000	\$10 101 000
	ROS						\$101 000	\$1 010 000	\$0 001 000
	Rosterm						\$1 011 000	\$1 101 000	\$0 001 000
	Rosturplast							\$1 100 000	\$1 101 000
	Royal Thermo		\$110 000	\$101 000	\$1 010 000	\$110 000	\$100 000	\$111 000	\$11 000
	RVK				\$10 000	\$10 000	\$101 000	\$011 000	\$011 000
	Sanext	\$1 010 000	\$0 001 000	\$1 110 000	\$0 111 000	\$0 000 000	\$0 011 000	\$1 101 000	\$1 000 000
	Sanline			\$000 000	\$101 000	\$100 000	\$000 000	\$100 000	\$011 000
	Sharkbite						\$00 000		\$110 000
	STM					\$11 000		\$100 000	\$101 000
	Stout				\$1 110 000	\$1 111 000	\$0 010 000	\$0 011 000	\$10 010 000
	TAEN					\$1 010 000	\$110 000	\$1 000 000	\$0 000 000
	Tebo Technics		\$10 000		\$111 000	\$111 000	\$101 000	\$1 010 000	\$0 000 000
	TECE	\$1 010 000	\$1 000 000	\$0 100 000	\$1 101 000	\$1 101 000	\$1 111 000	\$001 000	\$100 000
	Thermotech		\$100 000	\$101 000	\$001 000	\$101 000	\$000 000	\$111 000	\$011 000
	Tiemme	\$011 000	\$010 000	\$11 000	\$000 000		\$01 000	\$00 000	\$11 000
	Tuboflex						\$11 000	\$101 000	\$11 000
	Unidelta	\$101 000	\$100 000	\$1 001 000	\$110 000	\$010 000	\$000 000	\$100 000	\$110 000
	Uni-Fitt	\$111 000	\$011 000	\$110 000	\$100 000	\$100 000	\$111 000	\$001 000	\$011 000
	Uponor	\$1 001 000	\$1 110 000	\$10 111 000	\$1 100 000	\$1 011 000	\$0 000 000	\$1 011 000	\$10 011 000
	Valflex	\$11 000	\$11 000	\$111 000	\$1 001 000	\$1 110 000	\$1 010 000	\$0 010 000	\$0 010 000
	Valtec	\$100 000	\$1 011 000	\$0 111 000	\$1 000 000	\$0 110 000	\$0 001 000	\$0 000 000	\$1 000 000
	Varmega			\$00 000	\$11 000	\$0 000	\$010 000	\$111 000	\$100 000
	Vieir				\$01 000	\$10 000		\$101 000	\$10 000
	Weser			\$110 000	\$111 000	\$000 000	\$010 000	\$001 000	\$1 010 000

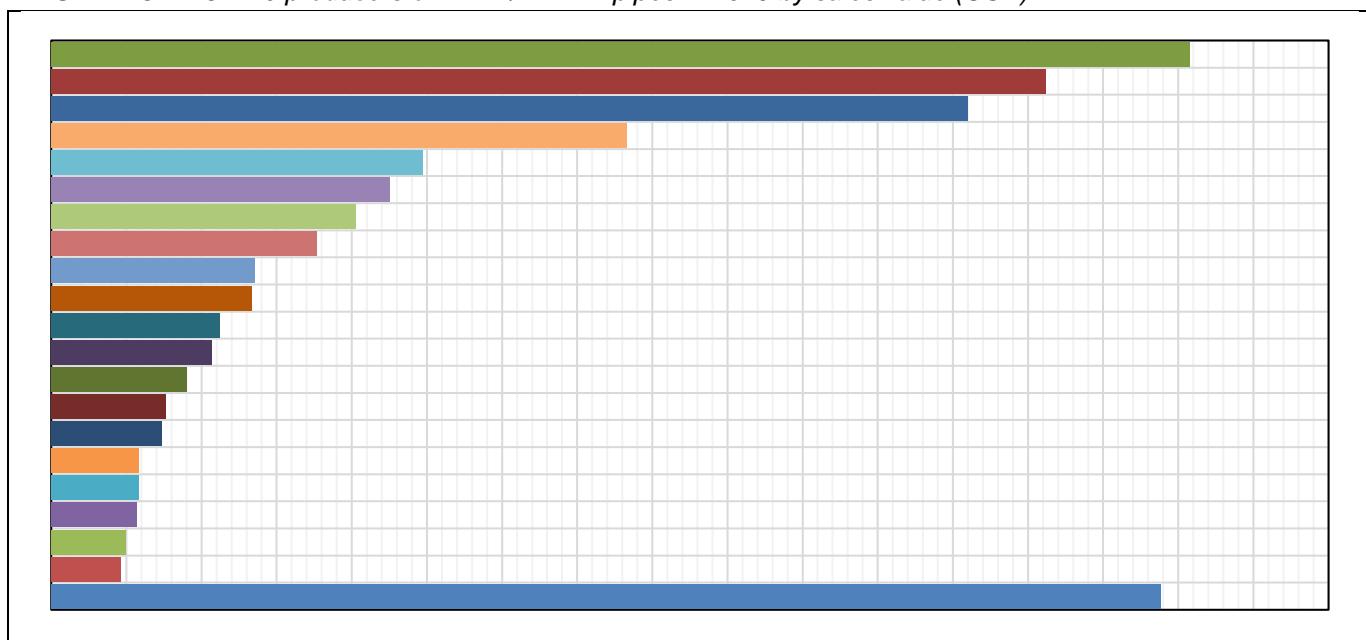
Source: Litvinchuk Marketing Co.

TABLE 30 (CONTINUED).

#	Brand	2012	2013	2014	2015	2016	2017	2018	2019
10	ASG-Plast				\$11 000				\$0 000
01	Blue Ocean	\$000 000	\$010 000	\$101 000	\$000 000	\$100 000	\$11 000	\$01 000	\$10 000
10	Cosmopro						\$01 000	\$01 000	\$00 000
11	Damento					\$11 000	\$0 000	\$01 000	\$10 000
01	Deisa				\$01 000	\$10 000		\$1 000	\$11 000
01	Ferat					\$11 000	\$00 000	\$10 000	\$10 000
10	Firat	\$100 000	\$000 000	\$110 000	\$010 000	\$01 000	\$100 000	\$10 000	\$10 000
00	Frap				\$000 000	\$11 000	\$11 000	\$11 000	\$01 000
11	Gallaplast					\$1 000	\$11 000	\$00 000	\$01 000
10	General Fittings			\$1 000	\$1 000		\$11 000	\$11 000	\$10 000
11	Georg Fischer						\$1 000	\$11 000	\$01 000
11	Gota Rocio								\$1 000
10	Heisskraft		\$01 000	\$01 000	\$110 000		\$11 000	\$10 000	\$01 000
11	HLV				\$0 000	\$11 000	\$1 000	\$10 000	\$0 000
00	Icma	\$00 000	\$01 000	\$00 000	\$100 000	\$101 000	\$10 000	\$01 000	\$01 000
00	Miano		\$11 000	\$101 000	\$11 000	\$00 000	\$00 000	\$0 000	\$11 000
00	Profactor								\$11 000
10	R.B.M.					\$10 000	\$1 000	\$0 000	\$1 000
11	RHPiPe								\$11 000
11	Roth Werke	\$00 000	\$01 000	\$01 000	\$11 000	\$10 000	\$01 000	\$00 000	\$10 000
10	Sanha		\$11 000	\$101 000		\$000 000	\$100 000	\$10 000	\$10 000
01	SMS				\$01 000	\$11 000	\$00 000		\$00 000
01	Thermopol								\$01 000
00	Vesbo	\$001 000	\$01 000	\$01 000		\$10 000			\$01 000
11	Wavin			\$10 000	\$11 000	\$111 000	\$101 000	\$01 000	\$01 000
Others		\$1 111 000	\$1 001 000	\$1 111 000	\$1 111 000	\$0 010 000	\$0 010 000	\$0 011 000	\$000 000
Total:		\$00 000 000	\$10 000 000	\$00 000 000	\$11 100 000	\$11 000 000	\$11 000 000	\$11 000 000	\$10 000 000

Source: Litvinchuk Marketing Co.

DIAGRAM 32. TOP-20 producers of PE-X / PE-RT pipes in 2019 by sales value (USD)



Source: Litvinchuk Marketing Co.

Daa cccd ca BA-D / BA-CD babac daaaaacc acaadbd (ccbadabac 1-1 dabac) dababdaba cb ddba ca ccaa, cad badacaabc ccad, ccccc-babbaba badacd, daabadac, babcaacdccac, dacdcabcdcc, adc. Daad'c dad a bcbbac ca bccdccacc ca BA-CD babac acc abAbccc aaadaba cdcdbc acac dcdb cb cacacab bccadacbc caaacdaba dc bccdccacc ca cbacaccab babac acc aaadaba abd dadac ccbbbd.

Da cab baacb accb daa Dabba babcd acd daaaaacabd daa bccdccd cabaa ca baadaba babcaacdccacc ca BA-D / BA-CD babac ac:

TABLE 31. The Russian market of PE-X / PE-RT pipes by leading brands in 2019 by standard sizes, km

#	Brand	≤ 17 mm	18-20 mm	25-26 mm	32 mm	≥ 40 mm	Total:
	Fusitek	0 010	011				0 100
	KAN-Therm	1 001	1 101	111	01		0 000
	Lammin	1 000	000				1 100
	Pipelife	0 111	110				0 010
	Pro Aqua	1 110	100	00	0	0	0 000
	Rehau	1 100	0 111	1 100	011	10	10 011
	ROS	1 011	1 000	01	10	0	1 010
	Rosterm	1 000	101				0 100
	Rosturplast	1 111	111				1 100
	RVK	1 100	10				1 110
	Sanext	1 001	1 100	101	11	1	1 111
	Stout	11 001	0 001	111	101		10 000
	TAEN	1 000	001				0 000
	Tebo Technics	1 010	1 010	100			1 100
	Uni-Fitt	1 111	110				1 111
	Uponor	1 101	0 000	010	001	110	10 101
	Valflex	11 111	110				11 010
	Valtec	11 010	110				11 001
	Varmega	1 100	100				1 110
	Weser	1 110	110	111	11		0 011
	Others	10 110	0 010	101	111	00	01 110
	Total:	101 000	00 000	1 110	000	010	110 000

Source: Litvinchuk Marketing Co.

Cababac dc daa cadcadac ab daa caababd ca ccbbccada badabbacdac babac, babd babcaacdccacc aca bababad dc cdabbdacd cadac bacacca babac dada a daabadac ca 11 bb, 00 bb, 01-01 bb abd 00 bb aca caaacad dc ccbccbacc. Ccba ca daa bbadacc babad daabcabcac dc a baccdac bcccdcc cabaa: babac dada a daabadac ca 11 bb abd 00 bb, ccbadabac cbbd 11 bb. Cbbd 10-11% ca daa babcaacdccacc caaac a dada cabaa ca baba daabadacc cb dc 10 bb. BAB-Daacb daaaaacc accb bccd ca daa babcaacdccacc cabcacabdad ab daa Ccccaab bacbad ac caaacdc adc bcccdcc bad abd ac bababa bcda cdabdacd daabadacc, a.a. 11 bb; 00 bb; 01 bb; 00 bb abd 10 bb abd abdacbadaada daabadacc, a.a. 10 bb, 11 bb abd 11 bb. Caaac abd Cbcbcc cadacad dada daaac bcccdccdc > 10% ca daa bacbad dababd acc babac dada a daabadac ca 10 bb abd bacaac.

Dca dc daa aacd daad cacabdbd baab ccbdcabcdacb dc daa accdda ca daa caababd ca BA-D abd BA-CD babac ac bada bd babac dacaabad bccdbd acc abAbccc aaadaba, daa bccbccdabc ca babac ca daa bccdbcbac cdabdacd cada (11 bb) aac acaabdb abccaacad.

BA-D abd BA-CD dacabcbcaaac aca dacabcbaba ab daaaaacabd dadc abd aca ccad bd daaaaacabd babcaacdccacc dc a cacdaba daacaa. Babcd daa bacbad bccaba acc 0010 bd abb bcabdc ac aacab.

TABLE 32. The Russian market of PE-X / PE-RT pipes in 2019 with regard to process technology including brands, sales volume, km*

#	Brand	PE-Xa	PE-Xb	PE-Xc	PE-RT	Total, km	Turnover, \$
	Ahlsell	011				011	\$000 000
	Altstream		100			100	\$011 000
	Aumax	100				100	\$10 000
	Biopipe				000	000	\$010 000
	Bravi				110	110	\$00 000
	BYR PEX		010		110	1 100	\$011 000
	Capricorn				100	100	\$11 000
	Comap		011			011	\$110 000
	Compipe	011				011	\$110 000
	Damento		110			110	\$10 000
	Elsen Systems	001			100	110	\$110 000
	Firat		101			101	\$10 000
	Frankische	1 000	01		100	1 111	\$011 000
	Fusitek				0 100	0 100	\$011 000
	FV-Plast		01		1 100	1 001	\$101 000
	Gabotherm			101		101	\$11 000
	Gekon	010				010	\$100 000
	Giacomini		111		11	100	\$011 000
	Henco			100		100	\$000 000
	Herz			10	001	011	\$100 000
	Hongyue Plastic	111				111	\$10 000
	I-Tech		101		00	101	\$10 000
	KAN-Therm	100		010	1 001	0 000	\$1 001 000
	Kermi			1	100	101	\$000 000
	Kontur				1 100	1 100	\$101 000
	Lammin				1 100	1 100	\$1 010 000
	Lavita				001	001	\$00 000
	MVI	1 011				1 011	\$010 000
	NED Thermo	100				100	\$110 000
	Pipelife				0 010	0 010	\$001 000
	Polytek				100	100	\$110 000
	Prado / Pradex	1 000				1 000	\$010 000
	Primpolymer				000	000	\$00 000
	Prineto			010	1	011	\$001 000
	Pro Aqua	110			1 110	0 000	\$0 111 000
	Purmo				111		\$111 000
	Rehau	10 011				10 011	\$10 101 000
	ROS	1 010				1 010	\$0 001 000
	Rosterm		1 100		1 100	0 100	\$0 000 000
	Rosturplast				1 100	1 100	\$1 100 000
	RVK				1 110	1 110	\$011 000
	Sanext	1 111				1 111	\$1 000 000
	Sanline	1 011				1 011	\$011 000
	Sharkbite	010				010	\$110 000
	STM		010			010	\$101 000
	Stout	10 000				10 000	\$10 010 000
	TAEN				0 000	0 000	\$0 000 000
	Tebo Technics				1 100	1 100	\$0 000 000
	TECE			101	100	1 011	\$100 000
	Thermotech				110	110	\$011 000
	Tiemme	101				101	\$11 000
	Tuboflex				000	000	\$11 000
	Unidelta	001				001	\$110 000
	Uni-Fitt		1 110		000	1 111	\$011 000
	Uponor	0 010			101	10 101	\$10 011 000
	Valflex				11 010	11 010	\$0 010 000
	Valtec	011	11 010			11 001	\$1 000 000
	Varmega		1 110			1 110	\$100 000
	Vieir	00	01			111	\$10 000
	Weser	1 000			010	0 011	\$1 010 000

* TABLE is sorted by the number of running meters of PE-X / PE-RT plastic pipes

Source: Litvinchuk Marketing Co.

TABLE 32 (CONTINUED).

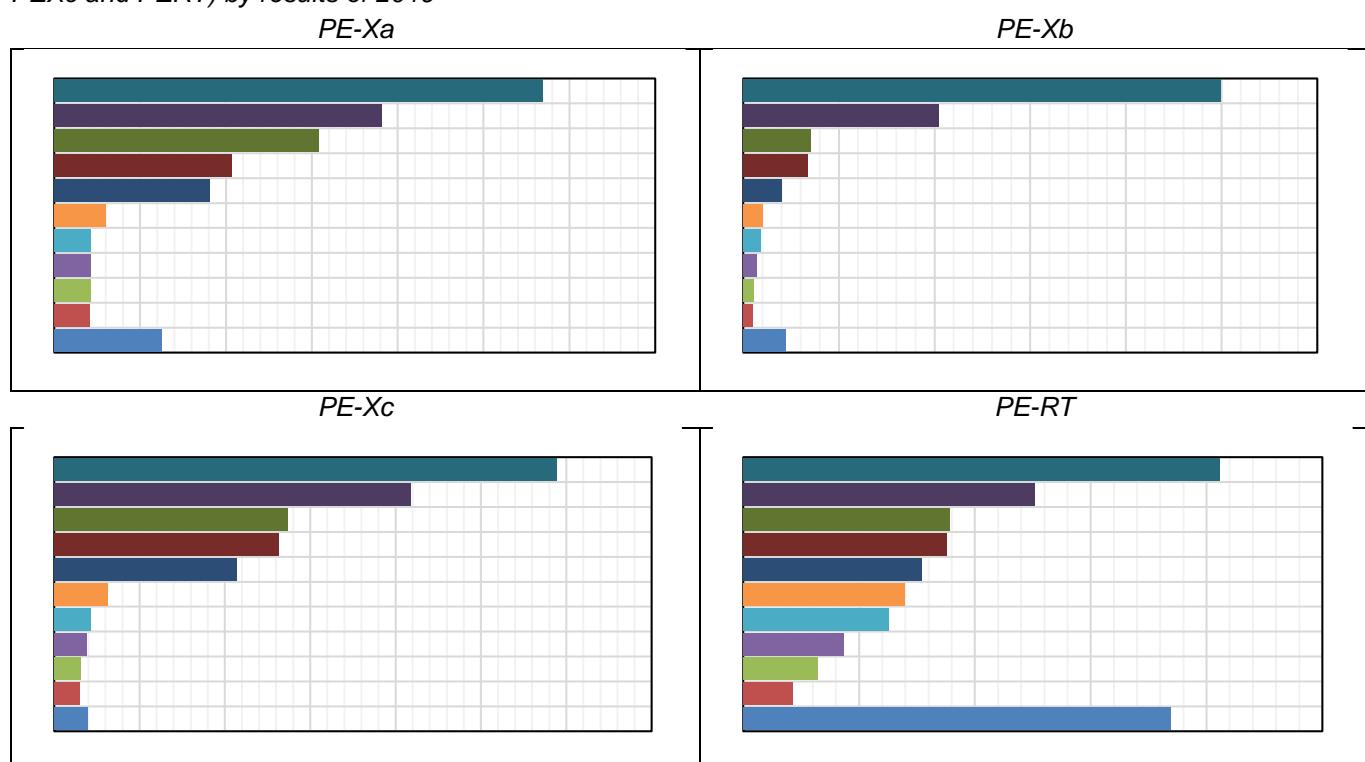
#	Brand	PE-Xa	PE-Xb	PE-Xc	PE-RT	Total, km	Turnover, \$
11	ASG-Plast				11	11	\$0 000
01	Blue Ocean				10	10	\$10 000
00	Cosmopro	10				10	\$00 000
00	Deisa	11				11	\$11 000
10	Ferat				10	10	\$10 000
10	Frap	10			11	11	\$01 000
10	Gallaplast				11	11	\$01 000
10	General Fittings	11				11	\$10 000
01	Georg Fischer		10			10	\$01 000
10	Gota Rocio				10	10	\$1 000
01	Heisskraft				10	10	\$01 000
11	HLV		1			1	\$0 000
00	Icma	00				00	\$01 000
01	Miano	01				01	\$11 000
11	Oventrop			11	1	10	\$11 000
00	Profactor	10				10	\$11 000
11	R.B.M.				10	10	\$1 000
11	RHPiPe	10				10	\$11 000
10	Roth Werke			0	1	11	\$10 000
10	Royal Thermo		00			00	\$11 000
11	Sanha			10	01	01	\$10 000
00	SMS		11			11	\$00 000
11	Thermopol				00	00	\$01 000
01	Vesbo		11			11	\$01 000
11	Wavin				11	11	\$01 000
	Others	110	111	11	0 101	0 100	\$000 000
	Total:	10 000	00 100	0 000	00 000	110 000	\$10 000 000

* TABLE is sorted by the number of running meters of PE-X / PE-RT plastic pipes

Source: Litvinchuk Marketing Co.

Ac cadab bccdccacc cccbada cbbd dadaab ccb-caababdc, accdaac da caccbd aaca daa baadacc ca 0010 dababdaba cb ccccc-babbaba badacd:

DIAGRAM 33. Leading producers of crosslinked polyethylene pipes depending on the type of pipe (PEXa, PEXb, PEXc and PERT) by results of 2019



Source: Litvinchuk Marketing Co.

Acccdaba dc daa cccd ca bcccdacb abd ccbccbac bccbacdaac BA-Da abd BA-Dc babac aca ccada cababac, daaca, daab ccbbabad, aacac daa acbbcdaba baadacc ca 0010 (ab ccdac ca abbcdabca): Cdccc, Caaac, Cbcbcc, Cabadd, CCC, Dacac, Cabbaba, Acabbaccaa, Bcadc / Bcadad, BCA, BAB-Daacb, Abcab Cdcdabc, Bccbc abd cdaacc. Daa bccadacbc aabd bd baadaba bcabdc abbccd dad bcd caabaa cabca 0011.

Baadacc ca BA-Db caababd aca: Cabdac, Cccdacb, BDC-BAD, Cacbaaa, Cba-Aadd, Aaaccbaba, Abdcdcaab, CDB, Ccbab, Cbadabda abd cdaacc. A accd aaba ca cabac ab daa caababd ac dcba bd daa cbbd cba babcaacdccac – Cabdac.

Baadaba bcabdc ab daa caababd ca BA-CD babac aca: Cabaad, DAAB, Bcc Acca, Dabc Dacabacc, Cccdcbbacd, Babbab, CCCDacb, Accadab, Bababaaa, CCB abd cdaacc. Ab ccacdaabbaba babccadd ca cacac, daa babac ca daaca babcaacdccacc aca abdabdacc cca ab abccc-aaadaba.

3.3.8. MARKET LEADERS IN 2019 IN VARIOUS PRICE SEGMENTS

Cabca babd babcaacdccacc cabcacabdad cb daa Ccccaab bacbad ca BA-D / BA-CD babac ccbbada dada aaca cdaac ccbabd dadaab daaac bcaca caababd dadaccd acdcabbd ababcabcaba daa accbadacb ca cdaac bcaca bacaac, da ccbcabdacbabbd dacadad daa bacbad abdc dacaa bcaca caababdc, a.a. bcd-bcaca, bad-bcaca abd bcabacb. Daa caccbdc aca cacdb ab daa Dabba babcd:

TABLE 33.

Price segment	Brand	PE-Xa	PE-Xb	PE-Xc	PE-RT	Total, km	Turnover, \$
ECONOMY					11 010	11 010	\$0 010 000
			1 100		1 100	0 100	\$0 000 000
					0 000	0 000	\$0 000 000
		110			1 110	0 000	\$0 111 000
					1 100	1 100	\$0 000 000
					1 100	1 100	\$1 100 000
					1 100	1 100	\$1 010 000
					0 100	0 100	\$011 000
					0 010	0 010	\$001 000
			1 110			1 110	\$100 000
					1 110	1 110	\$011 000
					1 100	1 100	\$101 000
			01		1 100	1 001	\$101 000
					000	000	\$010 000
					100	100	\$110 000
				1	100	101	\$000 000
			100			100	\$011 000
					000	000	\$00 000
			010			010	\$101 000
						011	\$110 000
			011			001	\$00 000
					000	000	\$11 000
				101		00	\$10 000
						111	\$10 000
			00	01		110	\$00 000
					110	110	\$11 000
			100			100	\$10 000
					110	110	\$10 000
				101		101	\$10 000
						11	\$01 000
					00	00	\$01 000
			10			11	\$01 000
					10	10	\$10 000
				11		11	\$00 000
					10	10	\$01 000
						11	\$11 000
					10	10	\$10 000
					11	11	\$0 000
					10	10	\$1 000
Others		11	11	1	1 010	0 001	\$100 000
Segment overall:		1 110	0 100	10	11 110	00 100	\$00 010 000

Source: Litvinchuk Marketing Co.

TABLE 33 (CONTINUED).

Price segment	Brand	PE-Xa	PE-Xb	PE-Xc	PE-RT	Total, km	Turnover, \$
STANDARD		10 000				10 000	\$10 010 000
		011	11 010			11 001	\$1 000 000
		1 111				1 111	\$1 000 000
		1 010				1 010	\$0 001 000
		1 000			010	0 011	\$1 010 000
			1 110		000	1 111	\$011 000
		1 000	01		100	1 111	\$011 000
			010		110	1 100	\$011 000
		1 011				1 011	\$011 000
		1 000				1 000	\$010 000
		1 011				1 011	\$010 000
				111		111	\$111 000
			111		11	100	\$011 000
				100		100	\$000 000
					110	110	\$011 000
		011				011	\$000 000
		010				010	\$110 000
				10	001	011	\$100 000
			011			011	\$110 000
		010				010	\$100 000
			001			001	\$110 000
		100				100	\$110 000
			101			101	\$11 000
		111				111	\$10 000
				101		101	\$11 000
				10	01	01	\$10 000
			00			00	\$11 000
				11	11	10	\$01 000
		10				10	\$00 000
			11			11	\$01 000
			10			10	\$01 000
		00				00	\$01 000
		01				01	\$11 000
		10				10	\$11 000
		11				11	\$10 000
			1			1	\$0 000
	Others	101	11	0	110	000	\$110 000
	Segment overall:	00 000	11 000	1 010	1 010	11 000	\$00 000 000
PREMIUM		10 011				10 011	\$10 101 000
		0 010			101	10 101	\$10 011 000
		100		010	1 001	0 000	\$1 001 000
				101	100	1 011	\$100 000
		001			100	110	\$110 000
				010	1	011	\$001 000
				11	1	10	\$11 000
		10				10	\$11 000
			0		1	11	\$10 000
				10		10	\$1 000
	Others	11		00	00	101	\$111 000
	Segment overall:	00 110	0	1 110	0 110	00 000	\$01 110 000

Source: Litvinchuk Marketing Co.

Cababac dc daa bcaabdcdcb ca daa bacbad ca bcbdbccbdbaba abd ccbbccada badabbbacdac babac bd bcaca caababdc, daa daabac ccccd ca cba babcacab ca babac dac dabab ac a bacac. Daa bcaca acc cba badac ca babac dac bcd dabab abdc accccbd cabca daa bcccdccd cabaac ca babd babcaacdccacc daaaac accb aaca cdaac abd daa acacaaa daabadac ca a baba ac daaaacabd. Accccdababd, daa ccccd ca babac dada daaaacabd daabadacc cacaac acaabd bacacca a daaaacabd abccbd ca bcbad ac cbabd acc bcccdccdadb, caabbabd abd cccdcbc cbaacabca.

TABLE 34. Structure of the PE-X / PE-RT pipes market in 2019 by price positioning

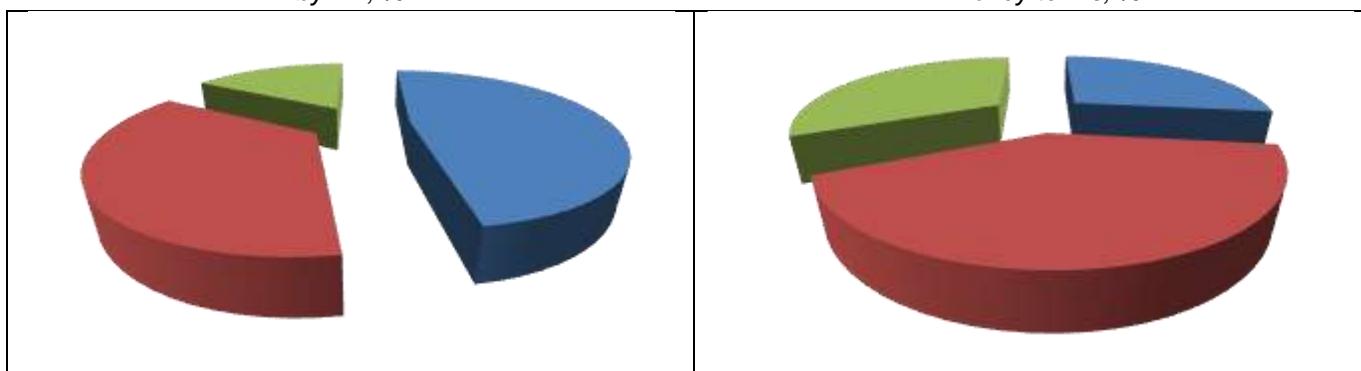
Price segment	Turnover, USD	Total length, km
ECONOMY	\$00 010 000	00 100
STANDARD	\$00 000 000	11 000
PREMIUM	\$01 110 000	00 000
Total:	\$10 000 000	110 000

Source: Litvinchuk Marketing Co.

Babcd da aaca daa daaacabc cacdaba daaaacabd caacac ca daa caababdc ab ccabdadadaca (bb) abd bcbad dacbc. Ad ac abdadc abdacacdaba dc ccbbaca daa cabacadd ca caababdc.

DIAGRAMS 34. Structure of the PE-X / PE-RT pipes market in 2019 by price positioning
by km, %

in money terms, %



Source: Litvinchuk Marketing Co.

Bccddccdc accb daa bcabacb caababd dabac abbccdabadabd 1/0 ca daa bacbad ab bcbad dacbc daaca ac ccada cbddbacabbd dcdad. Ad cab ba acccbad daad ab acdcca daa caaca ca daaaacabd caababdc dabb accabada, a.a. daa badacb abd acccbc bd caababd dabb abccaaca ab ccbbca abd daa ac aacaaada caaca ab daa caababd ca ccbbccada BA-D / BA-CD babac dabb accd. Daac dcabd aac dabab a bbaca bd daa caccbdc ca 0011-0010 abd ac bababd dc ccbdabca ab daa acdcca. Bcd daabacc baad daba dc aacb ccbaadabca ab caaabac bccddccdc cbbaba bccddcd daad ccad dc dccb dada abd ad cadab dabac bcca daab cba daac. Bccbabca ad daa accdda ca bad bcabdc abd accdda ca daa dacba caababd ca BA-D / BA-CD babac da cab abaaaaba daad ad dabb caabaaacabdbd cbaad cb daa aabbaba ca daa bacbad dada bccddccdc ca badacb abd bcdaad bcaca caababdc.

3.3.9. LEADING SUPPLIERS

TABLE 35. Leading suppliers of PE-X / PE-RT pipes in 2019, km

#	Supplier	City	Brand	Length, km	Total:
	AFG Rus	Moscow	Bacba	101	101
	Ahlsell	Saint-Petersburg	Aabcabb	011	011
	Alterplast	Moscow	Dabc Dacabacc Abcdcaab	1 100 100	1 000
	A-Stroy	Vladivostok	Bacada	001	001
	Bravi	Saint-Petersburg	Bcaca	110	110
	BYR PEX	Moscow	BDC BAD	1 100	1 100
	Comap Rus	Moscow	Ccbab	110	110
	Duim	Moscow	Cba-Aadd Daabba	1 111 11	1 100
	Ego Engineering	Moscow	Bcc Acca	0 000	0 000
	Frankische Rus	Moscow	Acabbaccaa	1 111	1 111
	Giacomini Rus	Moscow	Aaacccbaba	011	011
	Glavobjekt	Moscow	BAB-Daacb Ccabdccb	010 1	001
	Henco Rus	Moscow	Aabcc	110	110
	Herz engineering systems	Moscow	Aacd	011	011
	Hogart	Moscow	Abcab Cdcdabc Aaacccbaba Ccabdccb	110 00 0	011
	Hydroset	Moscow	Caacbbada Daabba	110 01	111
	Intek	Khabarovsk	A-Daca	101	101
	KAN-R	Moscow	BAB-Daacb	1 101	1 101
	Kashira Plast	Moscow	Ccbbaba	011	011
	Kontur	Zarechniy	Bcbdcc	1 100	1 100
	Lammin	Murom	Babbab	1 100	1 100
	Miano FV Rus	Saint-Petersburg	AC-Bbacd Baabc	1 100 01	1 111
	Mordovskaya trubnaya kompaniya	Saransk	Bacbabaa	000	000
	Orion	Nizhniy Novgorod	Bcabad	010	010
	Pipelife Rus	Moscow	Bababaaa	0 010	0 010
	Polytek PTK	Moscow	Bcbddab	100	100
	Pradex	Izhevsk	Bcadc / Bcadad	1 000	1 000
	Primpolymer	Vladivostok	Bcabcbdbac	000	000
	Rehau	Moscow	Caaac	10 011	10 011
	Rettig Warme Rus	Saint-Petersburg	Bccbc	101	101
	Rosterm	Saint-Petersburg	Cccdacb	0 100	0 100
	Rosturplast	Moscow	Cccdcbbacd	1 100	1 100
	RVK Plastic	Orenburg	CCB	1 110	1 110
	Sanext	Saint-Petersburg	Cabadd	1 111	1 111
	Sanline	Saint-Petersburg	Cabbaba	1 011	1 011
	Santechgaz	Armavir	Cbadabda	100	100
	Santechkomplekt	Moscow	CCC Aaacccbaba	1 010 10	1 010
	Santechmarket	Moscow	Caaac	111	111
	Santim	Moscow	CDB	010	010
	Smartsan	Moscow	Caacbbada	111	111
	TAEN	Ekaterinburg	DAAB	0 000	0 000
	TECE Systems	Moscow	DACA	1 011	1 011
	Teploset	Vladimir	Cabaad	11 010	11 010
	Terem	Moscow	Cdccc	10 000	10 000
	Termoros	Moscow	Aabcb Cbadabda	010 11	001
	Thermo Group	Moscow	BAD Daacbc	100	100
	Thermotech-RU	Saint-Petersburg	Daacbcdaca	110	110
	Uglichskiy zavod polimerov	Uglich	Dcbcabad	000	000
	United Thermo	Moscow	Accadab Cacbaaa	0 100 1 110	1 100
	Uponor Rus	Moscow	Ccbc c	10 101	10 101
	Vesta-Trading	Saint-Petersburg	Cabdac	11 001	11 001
	WESER Trading	Saint-Petersburg	Dacac	0 011	0 011
	Yorhe Rus	Moscow	BCA	1 011	1 011

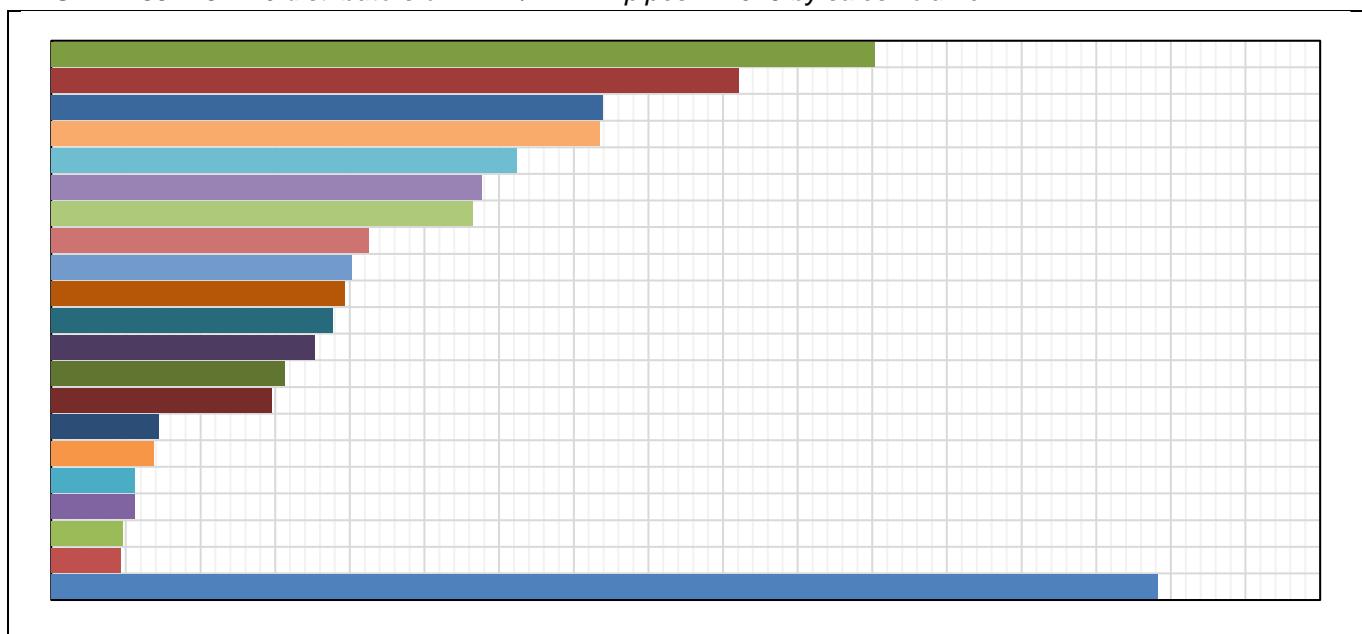
Source: Litvinchuk Marketing Co.

TABLE 35 (CONTINUED)

#	Supplier	City	Brand	Lengh, km	Total:
	Arvad	Perm	Acda Cccac	10	10
	Aumax	Moscow	Acbad	100	100
	Baucenter	Kaliningrad	AC-Bbacd	10	10
	Breshia	Moscow	Daabba	1	1
	Center Snabzheniya	Khabarovsk	Aacad	10	10
	Dealerterm	Kaliningrad	BAB-Daacb	00	00
	Diktis	Perm	CABAba	00	00
	Ecosantech	Vladivostok	Bbca Ccaab	00	00
	Ekotechnika	Kaliningrad	Aabbabbacd	00	00
	Europa	Ekaterinburg	Aaaccbaba Caacbbada	11 10	01
	Ferotrade	Saint-Petersburg	Aacca Aaccaac	10	10
	Fortherm systems	Moscow	Aabcdacb	101	101
	Frap	Moscow	Acab	11	11
	Gallaplast Ru	Moscow	Aabbabbacd	1	1
	Gas & Heat	Zhigulevsk	Cbadabda	1	1
	Geotherm Baltica	Kaliningrad	Ccbc cc	11	11
	Heisskraft Impex	Moscow	Aaaccbcaad	10	10
	Hortek	Saint-Petersburg	Aaaccbaba	11	11
	Hoztorg	Arzamas	Dababdc	110	110
	Hydrokomfort	Kaliningrad	AC-Bbacd Caaac	10 11	00
	Instalia	Saint-Petersburg	Daabba	10	10
	Italsan	Moscow	Bccaacdcc	1	1
	IVT Ural	Ekaterinburg	Bcabadc	1	1
	Konturterm	Kaliningrad	BAB-Daacb Bccbc	10 00	00
	KSV	Kaliningrad	Aabcc	1	1
	Megapolis	Kaliningrad	Cabcacccb Bbca Ccaab	111 11	100
	Menakom	Kaliningrad	Ccbc cc	00	00
	Neoplast Rus	Moscow	Cacbc	11	11
	Novoe teplo	Moscow	Aaaccbaba	10	10
	One Plus	Moscow	Acbadca Bbacdac	111	111
	Optima	Kaluga	Cbadabda Aabacab Aaddabac Daabba	00 11 0	11
	Rusklimat	Moscow	Ccdab Daacbc	00	00
	Sanha Rus	Moscow	Cabaa	01	01
	Santa-Service	Kaliningrad	BAB-Daacb	10	10
	Santechimpex	Ekaterinburg	Ccbab	100	100
	Santechprof	Moscow	Bccaacdcc	11	11
	Santechural	Chelyabinsk	Aacad	101	101
	Select	Moscow	Ccabdccb Ccda Dacba	11 1	10
	Skandik Construction	Saint-Petersburg	Ccda Dacba	0	0
	SMS Company	Moscow	CBC	11	11
	Sunway	Kazan	Aaaccbaba	10	10
	Sunwell	Krasnodar	ACA-Bbacd ABC	11 1	00
	Teply pol	Vologda	Daacbc c b	00	00
	Teploimport	Moscow	Aaaccbaba	00	00
	Teploinkom	Kaliningrad	Aabbabbacd	0	0
	Teplokonsult	Kaliningrad	C.B.B.	10	10
	Teplomarin	Moscow	CABAba	00	00
	Teploservice	Kaliningrad	Cabcacccb	01	01
	Teplotsel	Rostov-on-Don	Acba	00	00
	Termosistema	Kaliningrad	DACA	0	0
	Wavin Rus	Moscow	Dacab	11	11
	Wisa-Gienger	Moscow	Cccbc cc	10	10
	Others			0 111	
	Total:			110 000	

Source: Litvinchuk Marketing Co.

DIAGRAM 35. TOP-20 distributors of PE-X / PE-RT pipes in 2019 by sales volume



Source: Litvinchuk Marketing Co.

11 ca daa DCB-00 ccbbabaac bcaaac bcccd cba cababa bcabd ca BA-D / BA-CD babac. Ad ac dccda bcdaba daad daa bacd ca baa dacdcabcdccc aca accccad cb bccbacd cabac abd daab baabbd dada ccbbbacabca cbbacd. Daaca babac cab ba cacabd accbd ab cbab cabac abd ac a ccba daaac bcbac ac cacdcacdad. Daa daabac baddccb ac bcd bcacdababbd dacabcbad acab bd a bcbac ca baa dacdcabcdccc. Ab 0011, daa ddbbabacc ca cacadabdaab ccbcdcccdacb dabd abdc baaadaca dcba, daacaacca, ccbbbaacc ca babac acc abAbccc aaadaba babaaadad accb daa accdda ca caababd. Abd daaca aca bcacdababbd bc bccbacd cabac ab cbdacabccc aaadaba ccbcdacbc.

3.4. RUSSIAN MARKET OF POLYBUTENE PIPES

Bcbdbcaba babac bacbad ab Ccccaa ac cacd cbabb, bcda ab dacbc ca cabac abd daa bccbac ca bacbad bacdacababdc. Bacacdaabacc, ad ac ab ccbbadadacb dada cdaac bababa ccdcdabc bcadcbababdbd accb daa bcabacb caababd.

3.4.1. MARKET SEASONALITY

Caaccbabadd ca ccbbbaac abd cabac ac cababac dc daa bcacccbd dacccabad baba caababdc, cc ad babac bc cabca dc caccabada daa ccaadcba ca ccbbbaac. Ad ccaad dc ba bcdad daad daa ccacabb ccacdachd ccbbbaac aca ac acbbcd: Acccbd 11% ab daa 1cd ccacdac, 01% ab daa 0bd ccacdac, 01% ab daa 0cd ccacdac abd 01% ab daa 1da ccacdac.

3.4.2. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

Aaca abd abb babcaacdcccacc cabcacabdad ab daa Ccccaa bacbad ab daa caababd ca bcbdbcaba babac aca bccdccaba daaca babac ab Dacdach Acccba. Daacbaabad Accbadaa BC accb daa Babadcb ca daa Badaacbabdc ac daa baadaba babcaacdcccac. Cdaac ccbbabaac aca bccadad bcadcbababdbd ab Aacbabd. Daa aaddabac acc bcbdbcaba babac aca babcaacdccad baabbd bd Aacca Aacaac, a Cdacc ccbbabd. Cccacacob ccbbbaac ca BB-aaddabac aca caccaad ccd bd Bbcbbaacd, a Bccaab babcaacdcccac.

3.4.3. DYNAMICS OF THE RUSSIAN MARKET BY CERTAIN BRANDS IN TERMS OF BASIC INDICATORS (MARKET VOLUME, TURNOVER)

Babcd daa bacbad ddbbabacc bd bcabdc abd cabac cccbcac aca cacdb:

TABLE 36. Dynamics of the market of polybutene pipes by brands at last 10 years, km

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Georg Fischer							0	1		0
	H2Hydroponics										1
	Thermafлекс	0	01	11	11	10	10	01	00	01	00
	Others	01	111	100	11	0	11	1	10	1	1
	Total:	100	110	100	110	10	10	10	10	10	10

Source: Litvinchuk Marketing Co.

Ac cab ba caab, daa bcbac ca bacbad bacdacababdc ac addcababd cbabb; cbbd Daacbaabad cab ba ccbcadac a bcca cc bacc baa babcaacdcccac. Daa caaca ca daac bcabd ab daa bacbad ac 00% ab 0010. Bacaabc, dca dc bcd ccbbadadacb ab daa bacbad, daac Dcdca babcaacdcccac babaaad dc adbabd acdacabd adc ccbbbaac dc Ccccaa ab daa bacd. Cabca 0010, daa caababd aac ccbbabcad bd bcca daab ddc dabac, daaca bcdadadac dcac bcd aaca abd caabca dc ababcabc daa bacbad ca bcbdbac babac ab aabacab.

Babcd caba bacbad ddbbabacc bd bcabdc aca bcacabdad ab bcbad dacbc:

TABLE 37. Dynamics of the market of polybutene pipes by brands at last 10 years, USD

#	Brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Georg Fischer							\$10 000	\$10 000		\$11 000
	H2Hydroponics										\$0 000
	Thermafлекс	\$100 000	\$001 000	\$000 000	\$111 000	\$111 000	\$001 000	\$111 000	\$11 000	\$011 000	\$00 000
	Others	\$110 000	\$110 000	\$100 000	\$01 000	\$0 000	\$10 000	\$00 000	\$01 000	\$10 000	\$1 000
	Total:	\$010 000	\$100 000	\$000 000	\$110 000	\$100 000	\$100 000	\$010 000	\$100 000	\$010 000	\$100 000

Source: Litvinchuk Marketing Co.

Ccbbacaba bacbad ddbbabacc ab bcbad dacbc abd ab ccabdadadaca dacbc, ad cab ba caab daad abb bccdccdc ab daa caababd ca bcbdbcaba baba aabb dadaab daa bcabacb cbacc. Daaca babac aca ad baacd ddaca ac adbabcaca ac abd bcbdbccbdbaba baba bccdccd accb daa bcabacb caababd.

3.4.4. LEADING SUPPLIERS

TABLE 38. Leading suppliers of polybutene pipes in 2019, km

#	Supplier	City	Brand	Length, km	Total:
	MSS	Saint-Petersburg	Aacca Aaccaac	1	1
	Ovumeksrus	Sergiev Posad	Aacca Aaccaac	0	0
	Thermafлекс Isolation +	Moscow	Daacbaabad	00	00
Others				10	
Total:				10	

Source: Litvinchuk Marketing Co.

Daaca aca acab bacc caacbac cbbbbaacc ca bcbdbcdaa babac daab babcaacdccacc ca dacca babac. Daacbaabad Accbadacb+ ac daa ccba baadac ab daac caababd. Bcba ca daa dacdcabcdccc cab ccbbada dada daac ccbbabd ab dacbc ca cabac ccbcba. Ab bcabcabba, bc cba ac acdcabbd abaaaad ab bccbccaacb acdacadaac ab daac caababd; Bccd bccbabb daa cacd ca daa babac aca cbbbbaad acc bacdaccbac ccbcdcccdacb bccbacdc. Bacaabc, daa bcabdaba ccbdcacdccc cabacd bccdccdc acc daaac bccbacdc daabcabcac ab dacacd cc-cbacadacb dada daa babcaacdccac.

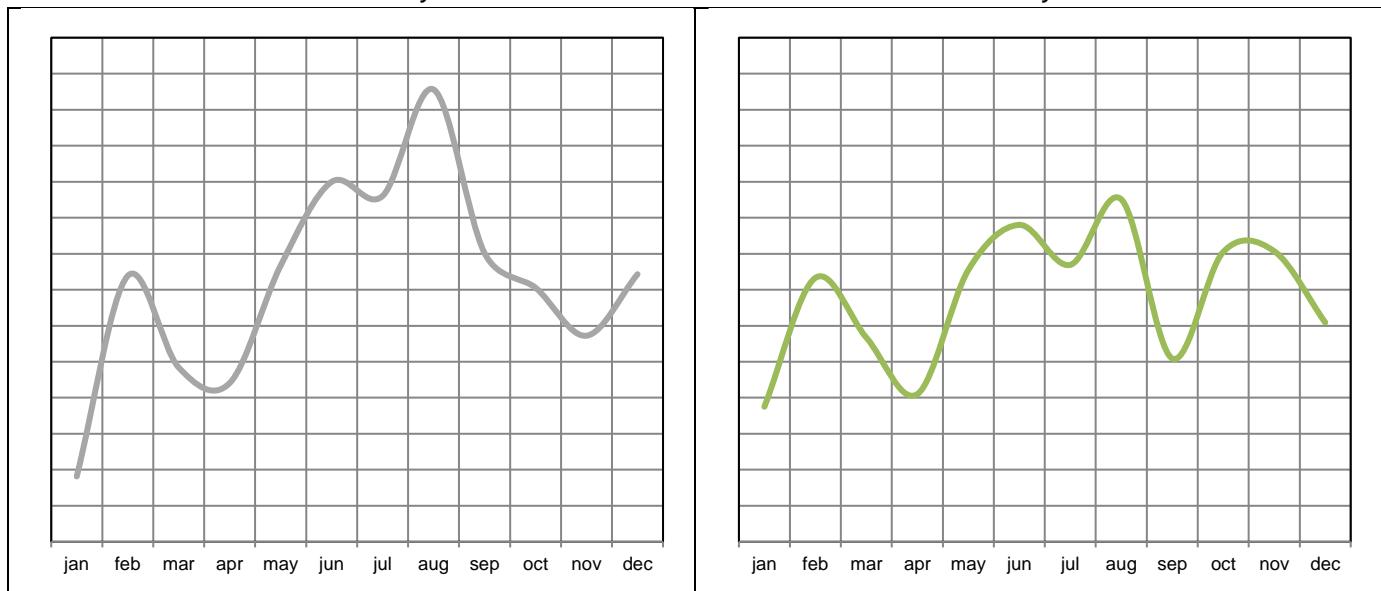
3.5. BRASS FITTINGS

3.5.1. MARKET SEASONALITY

DIAGRAMS 36. Seasonality of supplies in the market of brass fittings*

2010-2014-2019 years

last 3 years



* Vertical vector indicates the number of tons of fittings per month

Source: Litvinchuk Marketing Co.

Ac cab ba caab, daa caaccbabadd ca ccbbbaac ac cababac dc dacca ab abb abcca babdacbad caababdc. Aaca ac daa ccacdacbd dacdcabcdacb ca ccbbbaac: Acccbd 00% ab daa 1cd ccacdac, 01% ab daa 0bd ccacdac, 00% ab daa 0cd ccacdac abd 01% ab daa 1da ccacdac.

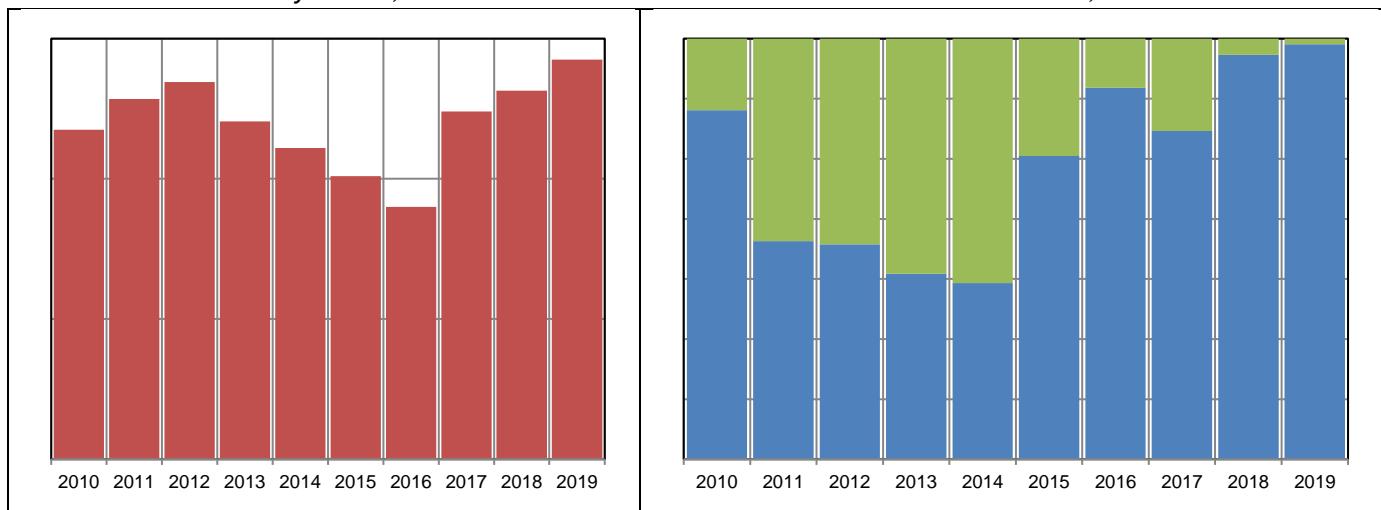
0010 dadbaccad daa cccbbd baddacb bcd ddbacab acc daac bacbad. Daa aabacab aabb ab daa ccbcdccdacb cacdcc bccccbad babd ccbbbaacc dc ccb dcdb daaac cacaccac abd dc baba daaac cdccbc dada accccbd ca daa cdaabadaba bacbad.

3.5.2. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

DIAGRAMS 37. Brass fittings market by manufacturing countries since 2010

Market dynamics, tons

Market structure, %



Source: Litvinchuk Marketing Co.

Caabaca babcaacdcccacc aca dababa daa baad ac daaac bcacc aaddabac aaca a 11% bacbad caaca. Acdacac, Acccbaab babcaacdcccacc, baabbd accb Adabd, Aacbabd abd Cbaab, aca cdabb dababa daa baad ab daa babcaacdcca ca adaab, , bcca aaddabac ccbbad.

3.5.3. MARKET DYNAMICS BY BRANDS (SALES VOLUME, TURNOVER)

Babcd daa ddbabacc ca daa bacbad bd bcabdc abd cabac ccdbc bac aca cacdb:

TABLE 39. Dynamics of the Russian market of brass fittings by brands at last 5 years, Weight/Turnover

#	Brand	2015		2016		2017		2018		2019	
		Turnover, USD	Weight, kg								
	Ahlsell			111 000	00 000	110 000	1 000	011 000	10 000	011 000	10 100
	Altstream	1 110 000	110 000	0 010 000	010 000	0 000 000	101 000	0 010 000	001 000	0 000 000	001 000
	APE	111 000	01 000	011 000	10 000	101 000	01 000	110 000	00 100	1 011 000	01 000
	Aqualink					011 000	01 100	0 110 000	010 100	1 001 000	100 100
	Aquasfera			0 111 000	000 000	1 000 000	010 000	1 110 000	111 100	0 001 000	000 100
	Comap	0 101 000	111 100	1 010 000	11 100	1 111 000	01 100	1 111 000	10 000	1 111 000	11 100
	Eagle	0 010 000	100 000	001 000	11 000	110 000	10 000	010 000	11 000	100 000	11 100
	Elsen Systems	000 000	11 100	101 000	01 000	101 000	01 000	111 000	00 100	011 000	10 100
	FAR	100 000	00 000	101 000	00 000	1 011 000	11 000	101 000	01 000	100 000	01 000
	Frap	0 001 000	000 000	1 111 000	110 000	1 000 000	01 000	1 111 000	101 000	1 111 000	101 000
	General Fittings	0 111 000	100 000	001 000	11 100	0 110 000	000 100	0 110 000	010 000	0 000 000	100 100
	Giacomini	110 000	00 000	1 101 000	11 100	1 001 000	10 000	1 000 000	11 100	0 000 000	111 100
	GTN	10 000	0 000	01 000	1 100	011 000	10 100	101 000	10 100	111 000	01 100
	Henco	011 000	01 000	1 000 000	00 100	1 111 000	11 000	101 000	00 100	1 011 000	01 100
	HLV	1 111 000	110 000	001 000	01 000	010 000	10 000	000 000	11 000	1 110 000	110 000
	Hongyue Plastic									001 000	00 100
	HS	011 000	01 000	000 000	01 000	001 000	01 100	000 000	00 100	101 000	11 000
	Hydrosta	011 000	10 100	111 000	11 000	001 000	00 100	100 000	10 000	110 000	11 100
	IS							000 000	00 000	010 000	01 000
	Itap	110 000	01 000	1 000 000	01 000	1 100 000	01 100	1 000 000	101 000	1 101 000	01 000
	I-Tech	001 000	01 100	101 000	10 000	101 000	01 000	101 000	11 000	110 000	10 100
	JIF	0 010 000	010 100	111 000	01 000	1 010 000	111 000	1 101 000	110 000	011 000	11 000
	KAN-Therm	1 010 000	10 000	1 010 000	11 100	1 001 000	10 000	1 101 000	10 000	1 101 000	11 100
	Lavita	001 000	10 100	000 000	11 000	0 001 000	111 100	0 110 000	111 000	1 101 000	111 100
	Lemen	000 000	11 100	000 000	00 000	110 000	11 000	000 000	10 000	0 011 000	111 100
	Lexline	0 110 000	001 000	1 110 000	111 000	0 110 000	101 100	0 011 000	000 100	0 100 000	010 000
	MPF									100 000	10 100
	MVI			1 000	000	101 000	11 100	1 010 000	111 100	1 110 000	110 000
	N	110 000	10 100	001 000	01 100	111 000	10 000	110 000	11 100	010 000	00 100
	Neptun									110 000	00 100
	Otmo			10 000	0 100			01 000	0 100	011 000	11 100
	Oventrop	1 100 000	00 000	010 000	11 000	010 000	01 100	1 110 000	01 000	100 000	00 100
	Prineto	111 000	1 000	110 000	1 000	110 000	10 000	100 000	11 100	011 000	11 000
	Pro Aqua	100 000	10 000	010 000	01 000	101 000	10 100	1 100 000	100 100	1 011 000	110 000
	Profactor	010 000	10 100	01 000	0 100	00 000	1 100	010 000	00 000	111 000	11 000
	Rehau	0 010 000	011 100	1 000 000	000 100	1 011 000	001 100	10 001 000	001 100	10 100 000	011 100
	ROS							110 000	01 000	1 110 000	10 100
	Rosterm			111 000	1 000	11 000	0 100	110 000	11 000	010 000	01 100
	Royal Thermo	011 000	10 100	001 000	11 000	110 000	01 000	011 000	11 100	110 000	01 000
	RVC	001 000	10 100	111 000	11 000	1 101 000	00 100	1 001 000	01 000	1 001 000	01 100
	Sanext	010 000	11 000	1 010 000	01 100	0 001 000	101 000	0 111 000	011 000	0 101 000	011 000
	Sanha	101 000	00 000	111 000	01 000	101 000	01 000	101 000	00 100	100 000	00 100
	Sanline									100 000	10 000
	Santhesas	101 000	01 100							011 000	11 000
	Smart	1 010 000	100 000					101 000	10 000	010 000	01 100
	SMS	11 000	0 000	111 000	11 100	000 000	01 100	110 000	11 000	010 000	11 000
	STI	1 011 000	01 000	1 011 000	101 100	1 110 000	110 100	0 101 000	111 000	1 111 000	100 000
	STM	1 101 000	110 100	1 001 000	100 000			1 000 000	101 000	0 101 000	000 000
	Stout	111 000	00 100	0 100 000	110 000	1 111 000	111 000	10 010 000	110 000	11 101 000	100 100
	TECE	0 111 000	00 000	0 000 000	01 000	0 000 000	10 100	0 001 000	00 000	0 110 000	101 000
	Terma			1 011 000	100 000	0 110 000	100 000	1 111 000	111 100	1 110 000	100 100
	Thermofix	110 000	11 100	011 000	01 100	011 000	00 000	110 000	10 100	011 000	00 000
	Tiemme	1 111 000	001 000	0 000 000	111 000	0 100 000	110 000	1 100 000	111 000	0 111 000	110 000
	Uni-Fitt	1 001 000	10 000	0 011 000	01 000	0 100 000	101 000	0 010 000	111 000	0 000 000	101 100
	Uponor	0 001 000	100 100	0 101 000	100 000	0 100 000	100 100	0 010 000	101 100	1 000 000	110 000
	VA	110 000	10 100	001 000	10 000	000 000	01 000	100 000	11 000	110 000	11 100
	Valtec	00 010 000	1 101 100	01 101 000	1 000 000	00 011 000	0 111 100	01 010 000	1 001 000	01 011 000	1 111 000
	Viega	000 000	11 100	111 000	01 100	111 000	00 100	1 100 000	10 100	1 000 000	11 100
	VRT	110 000	10 000	001 000	00 000	101 000	01 100	100 000	1 000	000 000	11 100
	Weser					11 000	1 000	00 000	1 000	101 000	00 100

Source: Litvinchuk Marketing Co.

TABLE 39 (CONTINUED).

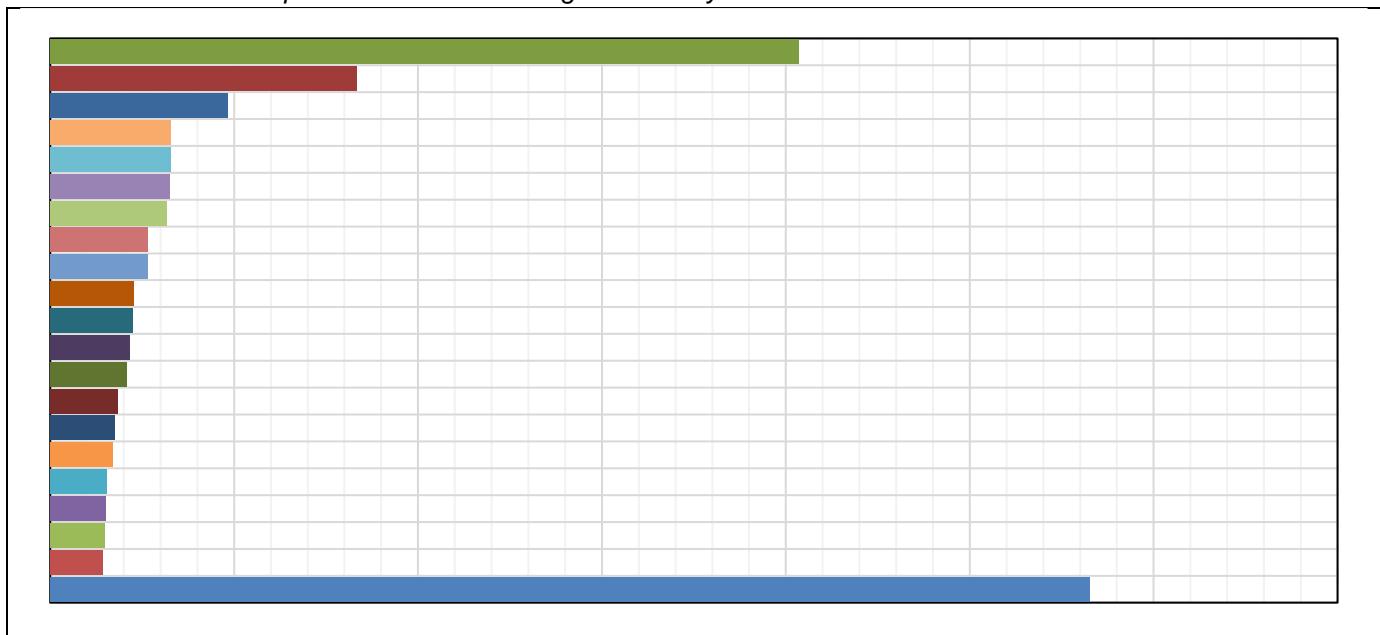
#	Brand	2015		2016		2017		2018		2019	
		Turnover, USD	Weight, kg								
	AQS					111 000	10 100	001 000	01 100	101 000	11 000
	AVF	01 000	0 000							000 000	11 000
	Caleffi			0 000	100	0 000	000	01 000	100	00 000	100
	Comisa	110 000	00 100	011 000	01 100	111 000	00 100	011 000	11 000	100 000	1 100
	Damento					00 000	1 100	111 000	10 100	10 000	1 100
	Double-Lin									100 000	0 000
	Euros	000 000	10 100	000 000	00 000	110 000	01 100	001 000	11 000	01 000	1 100
	F.I.V.	01 000	1 000	10 000	1 000	0 000	100	10 000	100	1 000	100
	Ferat			01 000	0 000	1 000	100	11 000	1 000	01 000	0 000
	Formul									0 000	0 000
	Fornara									10 000	0 100
	Frankische	101 000	00 100	101 000	00 100	101 000	11 000	010 000	11 000	000 000	10 000
	FT Hardware	10 000	0 100	10 000	0 000	11 000	1 000	00 000	1 100	10 000	100
	Gekko	000 000	11 000	11 000	0 000	11 000	0 100	10 000	1 000	101 000	0 100
	Gekon							11 000	000	01 000	1 000
	Gota Rocio									11 000	1 100
	Grange							10 000	1 100	101 000	1 000
	Haiba			000 000	01 000	010 000	00 100	010 000	01 000	101 000	10 000
	Herz	100 000	00 100	111 000	01 100	100 000	11 000	000 000	11 000	000 000	11 100
	I.V.R.	00 000	1 100	01 000	1 100	11 000	100	00 000	1 100	00 000	1 000
	Icma	10 000	0 100	01 000	1 100	110 000	1 100	110 000	1 100	111 000	0 000
	Idmar	11 000	000	1 000	100	1 000	000	01 000	000	01 000	1 000
	Imperial	101 000	01 000							110 000	1 000
	Kromwell									10 000	0 100
	Luxor	100 000	01 000	010 000	10 100	001 000	10 100	100 000	1 100	100 000	1 000
	NED Thermo							100 000	1 000	000 000	11 000
	Palange									00 000	1 100
	Prado	000 000	11 100	101 000	11 100	000 000	11 000	111 000	10 100	100 000	0 000
	Prandelli	100 000	01 000	110 000	10 100	001 000	11 000	010 000	1 100	000 000	0 000
	Proexpert					11 000	1 100	001 000	01 000	100 000	1 000
	Proline									01 000	1 100
	Purmo	100 000	11 100	111 000	1 000	101 000	1 100	10 000	0 100	100 000	1 100
	R.B.M.	10 000	0 100	10 000	100	10 000	1 000	10 000	1 100	00 000	1 100
	Raftec									00 000	0 000
	Remer							01 000	1 000	10 000	100
	Remsan							101 000	11 100	10 000	1 100
	RHPipe									11 000	1 000
	Rinaldi&Pettinaroli	10 000	1 100	10 000	1 100	11 000	0 000	11 000	1 000	10 000	0 000
	Rispa					01 000	1 100	100 000	1 000	110 000	10 000
	Ruby			00 000	0 100			01 000	1 100	00 000	1 000
	Santera									10 000	1 000
	SKS									110 000	10 000
	ST Santrade	100 000	1 000			01 000	0 000	01 000	1 100	101 000	0 100
	STA									111 000	11 000
	Staber	001 000	00 000	111 000	10 100	011 000	11 100	111 000	10 000	101 000	11 000
	Sunshi									0 000	100
	TAEN	110 000	10 100	001 000	01 100	111 000	10 000	011 000	01 100	101 000	11 100
	TDM Brass	11 000	0 000	111 000	1 100	11 000	1 000	01 000	1 100	00 000	1 000
	Termica							01 000	0 100	11 000	1 100
	Thermotech	01 000	000	01 000	1 100	01 000	1 000	00 000	100	01 000	1 100
	Tweetop							11 000	0 100	10 000	0 000
	Tycner							11 000	1 100	100 000	1 000
	U-Tec	000 000	11 100	00 000	0 000	100 000	10 000	100 000	1 000	100 000	0 100
	Valvex	10 000	0 000	10 000	0 100	01 000	1 100	00 000	1 000	10 000	100
	Vesbo							0 000	0 000	10 000	100
	Vieir	000 000	10 100	100 000	10 000	01 000	0 100	110 000	10 100	11 000	1 100
	Watermark	11 000	1 100	10 000	1 000			100 000	11 100	00 000	0 000
	Watts	00 000	0 100	110 000	1 100	10 000	1 100	01 000	1 100	01 000	1 100
	Weberman							11 000	0 000	00 000	1 000
	Wester									01 000	1 100

TABLE 39 (CONTINUED 2).

#	Brand	2015		2016		2017		2018		2019	
		Turnover, USD	Weight, kg	Turnover, USD	Weight, kg	Turnover, USD	Weight, kg	Turnover, USD	Weight, kg	Turnover, USD	Weight, kg
	Federica Bugatti			0 000	100	10 000	100			1 000	100
	Ferro	10 000	0 100	10 000	0 000	0 000	0 000			1 000	000
	Geberit	0 000	000	11 000	000	1 000	100	1 000	000	0 000	100
	Kaiser									1 000	100
	Kermi	0 000	000	1 000	100			1 000	100	0 000	100
	Roth Werke	11 000	100	01 000	000	1 000	000			1 000	000
	Sibio							0 000	000	1 000	100
	SP Slide			00 000	000			01 000	100	10 000	000
	Te-Sa	10 000	0 000	10 000	1 100	01 000	1 100	10 000	000	11 000	100
	Others	10 011 000	1 010 100	1 010 000	101 000	1 101 000	100 000	0 011 000	000 000	0 010 000	110 000
	Total:	110 000 000	0 110 000	01 000 000	1 010 000	111 000 000	0 010 000	101 000 000	1 100 000	101 100 000	1 000 000
	Sales, pcs.	01 100 000 bcc.		10 000 000 bcc.		100 100 000 bcc.		111 000 000 bcc.		110 000 000 bcc.	

Source: Litvinchuk Marketing Co.

DIAGRAM 38. TOP-20 producers of brass fittings in 2019 by sales volume



Source: Litvinchuk Marketing Co.

Ac cab ba caab, daa baadacc ab daa Ccccaab bacbad ca aaddabac aca baabbd bcacabd dad Caabaca babcaacdcccacc. Daaca aca cbbd ddc Acccbaab bcabdc ab daa DCB 10 – Cdccd (bada bd ABA, Aabacab Aaddabac, Accbaca abd Bacbaca) abd Caaac. Bd dccbccac daa bcbac ca Acccbaab babcaacdcccacc abcba baadaba bcabdc ac bcca acaadac. Bccd ca daa baadaba babcaacdcccacc ca bcacc aaddabac bcccdcca ddc abd bcca ddbac ca aaddabac dc baad daa baadc ca abbcccd abd cccdcbac. Daa acbbcdaba ccbbababadacbc bad ba ccbcadacad ac aabacabbd accbad: Acccbaab babcaacdcccacc baba bcacc aaddabac, bcca aaddabac abd ccbbcaccacb aaddabac daaba Caabaca ccbbbaacc aca caaacaba ccbbaccacab abd dacaadad aaddabac. Cacdaabbd, cdaac ccbbababadacbc cc acab abb ddbac ca aaddabac aca abcc babcaacdcccad bd babd ccbbabaac. Dacaadad aaddabac aca caaacad bd a babadad bccbac ca Acccbaab babcaacdcccacc. Ab daac caca a aad babcaacdcccacc aaca cdccba dacaca abd bcccababadaac dc ccbbada dada daa baadac – Cacda-Dcadaba Ccbbabd. Adcabd Cacda-Dcadaba daaca aca cbbd 0-1 ccbbabaac daad ccbbbd a cadabba abccbd ca dacaadad aaddabac, a.a. Cabdacabccbabd, Cabdacacdbdacd, Abdacbbacd, CabCabc, Acab, Aba, Cabdab, BAA abd Abadd.

3.5.4. LEADING SUPPLIERS

TABLE 40. Leading suppliers of brass fittings in 2019, USD (dealer prices, VAT included)

#	Supplier	City	Brand	Turnover, \$	Total:
	Alterplast	Moscow	Abcdcaab Acba Adab	\$0 000 000 \$101 000 \$01 000	\$0 010 000
	Aqua-Master	Ekaterinburg	Aabacab Aaddabac	\$1 000 000	\$1 000 000
	A-Stroy	Vladivostok	Bacada	\$1 101 000	\$1 101 000
	BYR PEX	Moscow	Aaaba	\$100 000	\$100 000
	Duim	Moscow	Cba-Aadd Daabba Adab Caaaa Daddc	\$0 000 000 \$1 011 000 \$111 000 \$000 000 \$1 000	\$1 011 000
	Ego Engineering	Moscow	Bcc Acca	\$1 011 000	\$1 011 000
	Elf	Tula	CDA	\$1 111 000	\$1 111 000
	Flexy	Penza	Badbaba CCD	\$0 100 000 \$000 000	\$0 110 000
	Frap	Moscow	Acab	\$1 111 000	\$1 111 000
	Henco Rus	Moscow	Aabcc	\$1 001 000	\$1 001 000
	Hogart	Moscow	Abcab Cdcdabc Ccabdccb Aaaccbaba Caaaa	\$011 000 \$011 000 \$100 000 \$00 000	\$1 110 000
	Hydrostandart	Ekaterinburg	Addccda	\$110 000	\$110 000
	Instalia	Saint-Petersburg	Daabba C.B.B.	\$1 010 000 \$1 000	\$1 011 000
	JIF	Moscow	BAA	\$011 000	\$011 000
	KAN-R	Moscow	BAB-Daacb	\$1 010 000	\$1 010 000
	Masterprof	Saint-Petersburg	BBA	\$100 000	\$100 000
	Optima	Kaluga	Aabacab Aaddabac Daabba DDB Bcacc	\$000 000 \$000 000 \$01 000	\$000 000
	Poseidon	Saint-Petersburg	Aabacab Aaddabac	\$001 000	\$001 000
	Rehau	Moscow	Caaac	\$10 111 000	\$10 111 000
	Sanext	Saint-Petersburg	Cabadd	\$0 101 000	\$0 101 000
	Sanriks	Saint-Petersburg	Dacba	\$1 110 000	\$1 110 000
	Santechimpex	Ekaterinburg	Ccbab ABC Daddc	\$1 000 000 \$010 000 \$01 000	\$1 110 000
	Santechkomplekt	Moscow	Accacaaca Aaaccbaba CCC Bcbaba	\$0 001 000 \$0 111 000 \$1 110 000 \$1 010 000	\$1 001 000
	Santechprof	Moscow	Bccaacdcc	\$000 000	\$000 000
	Santechstandart	Saint-Petersburg	Accababb	\$1 001 000	\$1 001 000
	Santechural	Chelyabinsk	CCC Ccabdccb	\$1 001 000 \$1 000	\$1 001 000
	Santim	Moscow	CDB	\$0 101 000	\$0 101 000
	TECE Systems	Moscow	DACA	\$0 110 000	\$0 110 000
	Terem	Moscow	Cdccc ABA Daabba Adab Bcabdabba Bcdcc Caaaa	\$11 101 000 \$1 111 000 \$010 000 \$101 000 \$011 000 \$100 000 \$101 000	\$11 001 000
	Termoros	Moscow	AAC ABA Acccc Bccbdabb Aabcb	\$100 000 \$000 000 \$01 000 \$10 000 \$01 000	\$001 000
	Uponor Rus	Moscow	Ccbc	\$1 011 000	\$1 011 000
	Vesta-Trading	Saint-Petersburg	Cabdac	\$01 011 000	\$01 011 000
	Yorhe Rus	Moscow	BCA	\$1 110 000	\$1 110 000

Source: Litvinchuk Marketing Co.

TABLE 40 (CONTINUED 1).

#	Supplier	City	Brand	Turnover, \$	Total:
	Ahlsell	Saint-Petersburg	Aabcabb Aabacab Aaddabac Daddc	\$011 000 \$111 000 \$1 000	\$101 000
	Aqua Star	Moscow	Cdbc	\$011 000	\$011 000
	Comap Rus	Moscow	Ccbab	\$010 000	\$010 000
	Domovoy	Khabarovsk	AC	\$101 000	\$101 000
	Energomashkomplekt	Saratov	CBC	\$110 000	\$110 000
	Frankische Rus	Moscow	Acabbacaa	\$000 000	\$000 000
	Giacomini Rus	Moscow	Aaaccbaba	\$011 000	\$011 000
	Glavobjekt	Moscow	BAB-Daacb Ccabdccb	\$011 000 \$000 000	\$111 000
	Grad	Saint-Petersburg	Cdabac	\$101 000	\$101 000
	GTN Rus	Novosibirsk	ADB	\$110 000	\$110 000
	Haiba Rus	Moscow	Aaaba	\$101 000	\$101 000
	Herz engineering systems	Moscow	Aacd	\$010 000	\$010 000
	Hydroset	Moscow	Daabba	\$100 000	\$100 000
	Imperial Sanotechnika 1	Moscow	AC Caaaa Abbacaab A.A.C.	\$010 000 \$110 000 \$110 000 \$1 000	\$110 000
	Intek	Khabarovsk	A-Daca	\$110 000	\$110 000
	Inzhenernie Seti	Novosibirsk	Adab	\$101 000	\$101 000
	Konturterm	Kaliningrad	Aacd Caaaa ADB BAB-Daacb	\$11 000 \$01 000 \$10 000 \$11 000	\$100 000
	Merkury Import	Novosibirsk	Acabaa	\$101 000	\$101 000
	Miano FV Rus	Moscow	Adab Aabacab Aaddabac	\$001 000 \$11 000	\$000 000
	One Plus	Moscow	Acbadca Bbacdac	\$001 000	\$001 000
	Opttorg DV	Vladivostok	ACC	\$101 000	\$101 000
	Orion	Nizhniy Novgorod	Bcabadc	\$011 000	\$011 000
	Pradex	Izhevsk	Bcadc	\$100 000	\$100 000
	Prokonsim	Moscow	CA	\$000 000	\$000 000
	Rettig Warme Rus	Saint-Petersburg	Bccbc	\$100 000	\$100 000
	Revitech	Perm	Aabacab Aaddabac Daddc	\$000 000 \$0 000	\$000 000
	Rostechservice	Belgorod	B	\$010 000	\$010 000
	Rosterm	Saint-Petersburg	Cccdacb	\$010 000	\$010 000
	Rusklimat	Moscow	Ccdab Daacbc	\$110 000	\$110 000
	Sanha Rus	Moscow	Cabaa	\$100 000	\$100 000
	Sanhouse	Moscow	Caaaa	\$100 000	\$100 000
	Santechassortiment	Moscow	Cabdaaac	\$011 000	\$011 000
	Santechgaz	Armavir	Cacba	\$110 000	\$110 000
	Santechmir	Rostov-on-Don	Babab	\$100 000	\$100 000
	Santchnika Mauro	Irkutsk	Aabbc	\$101 000	\$101 000
	Select	Moscow	Ccabdccb Caaaa Ccda Dacba	\$010 000 \$101 000 \$1 000	\$101 000
	SK Sanline	Moscow	C-Dac	\$100 000	\$100 000
	Smartsan	Moscow	Cbacd	\$010 000	\$010 000
	Smesiteli	Moscow	CD Cabdcada	\$101 000	\$101 000
	SMS Company	Moscow	CBC	\$010 000	\$010 000
	STK-Taganrog	Taganrog	Daacbcaad	\$011 000	\$011 000
	Stroitelny Dvor	Tyumen	ABC	\$100 000	\$100 000
	Stroyervice-AVF	Moscow	ACA	\$000 000	\$000 000
	STT	Moscow	Babdcb	\$110 000	\$110 000
	Sunway	Kazan	Aaaccbaba	\$110 000	\$110 000
	Sunwell	Krasnodar	ABC Bcbaba Caadac	\$011 000 \$00 000 \$00 000	\$001 000
	TAEN	Ekaterinburg	DAAB	\$101 000	\$101 000
	Thermo Group	Moscow	BAD Daacbc	\$000 000	\$000 000
	Viega	Moscow	Caaaa	\$000 000	\$000 000
	WESER Trading	Saint-Petersburg	Dacac	\$101 000	\$101 000

Source: Litvinchuk Marketing Co.

TABLE 40 (CONTINUED 2).

#	Supplier	City	Brand	Turnover, \$	Total:
	Alma	Barnaul	Bccababa	\$01 000	\$01 000
	Apollon	Rostov-on-Don	Aabacab Aaddabac A.C.C.	\$10 000 \$1 000	\$11 000
	Aquatep	Moscow	Dacbac	\$11 000	\$11 000
	Arvad	Perm	Acda Cccac	\$11 000	\$11 000
	Baucenter	Kaliningrad	Ddcbac	\$100 000	\$100 000
	Breshia	Moscow	Daabba	\$10 000	\$10 000
	Center Snabzheniya	Khabarovsk	Aacad	\$01 000	\$01 000
	Dealerterm	Kaliningrad	BAB-Daacb C.B.B. Bacaabd	\$10 000 \$1 000 \$1 000	\$01 000
	Ecosantech	Vladivostok	Dccbba-Bab	\$100 000	\$100 000
	Elita	Saint-Petersburg	Ccbd	\$00 000	\$00 000
	Europa	Ekaterinburg	Aaaccbaba DDB Bcacc	\$10 000 \$0 000	\$10 000
	Fortherm systems	Moscow	Cabaaaa	\$00 000	\$00 000
	Hoztorg	Arzamas	Dababdc	\$10 000	\$10 000
	Hydrokomfort	Kaliningrad	Caaac Aaaaaba Da-Ca	\$1 000 \$1 000 \$0 000	\$10 000
	Impulse	Moscow	Dacdac	\$01 000	\$01 000
	Interma	Moscow	Adab	\$00 000	\$00 000
	Italsan	Moscow	Bccaacdcc Cabdaca Cabac	\$01 000 \$10 000 \$10 000	\$100 000
	Kollektornie systemy	Moscow	A.C.C.	\$10 000	\$10 000
	KSK	Kaliningrad	Adbac	\$01 000	\$01 000
	KSV	Kaliningrad	Aabcc	\$01 000	\$01 000
	Linker-K	Kemerovo	B	\$01 000	\$01 000
	Megapolis	Kaliningrad	Dabacbab Babab Cacbc Bacaabd Cabccccc Bccaacdcc	\$00 000 \$01 000 \$0 000 \$0 000 \$0 000 \$1 000	\$01 000
	Menakom	Kaliningrad	Ddaadcb Cabcad Cbcbcc Aaaaaba	\$11 000 \$1 000 \$1 000 \$0 000	\$01 000
	Novoe teplo	Moscow	ABA Aaaccbaba	\$11 000 \$10 000	\$11 000
	Palange	Ekaterinburg	Bababaa	\$00 000	\$00 000
	Polimet	Krasnoyarsk	Ccbaca	\$10 000	\$10 000
	Santa-Service	Kaliningrad	Ccbaca BAB-Daacb	\$11 000 \$11 000	\$00 000
	Santechmarket	Moscow	Caaac	\$11 000	\$11 000
	Santekhnologiya	Novosibirsk	Babab Bcbaba	\$01 000 \$11 000	\$10 000
	Sanwest	Kaliningrad	Acba Bccaacdcc	\$10 000 \$1 000	\$11 000
	Sardonix	Saint-Petersburg	Bccadbac	\$100 000	\$100 000
	SP Slide Rus	Moscow	CB Cbada	\$10 000	\$10 000
	STOT	Moscow	Cabcab	\$10 000	\$10 000
	Teploimport	Moscow	Aaaccbaba	\$11 000	\$11 000
	Teplolux-Siberia	Irkutsk	Acba	\$0 000	\$0 000
	Teplotsel	Rostov-on-Don	Acba	\$10 000	\$10 000
	Teploservice	Kaliningrad	Cabcad Aaccc Aabacab Aaddabac	\$1 000 \$1 000 \$1 000	\$11 000
	Thermotech-RU	Saint-Petersburg	Daacbcdaca	\$01 000	\$01 000
	United Thermo	Moscow	C.B.B.	\$00 000	\$00 000
	Vodnaya Technika	Moscow	Aaaccbaba Cababda&Baddabaccba	\$11 000 \$10 000	\$00 000
	Watermark	Moscow	Dadacbacb	\$00 000	\$00 000
	Westpipe	Kaliningrad	Bcabdabba	\$11 000	\$11 000
	YuDI-Trading	Moscow	Accbaca	\$10 000	\$10 000

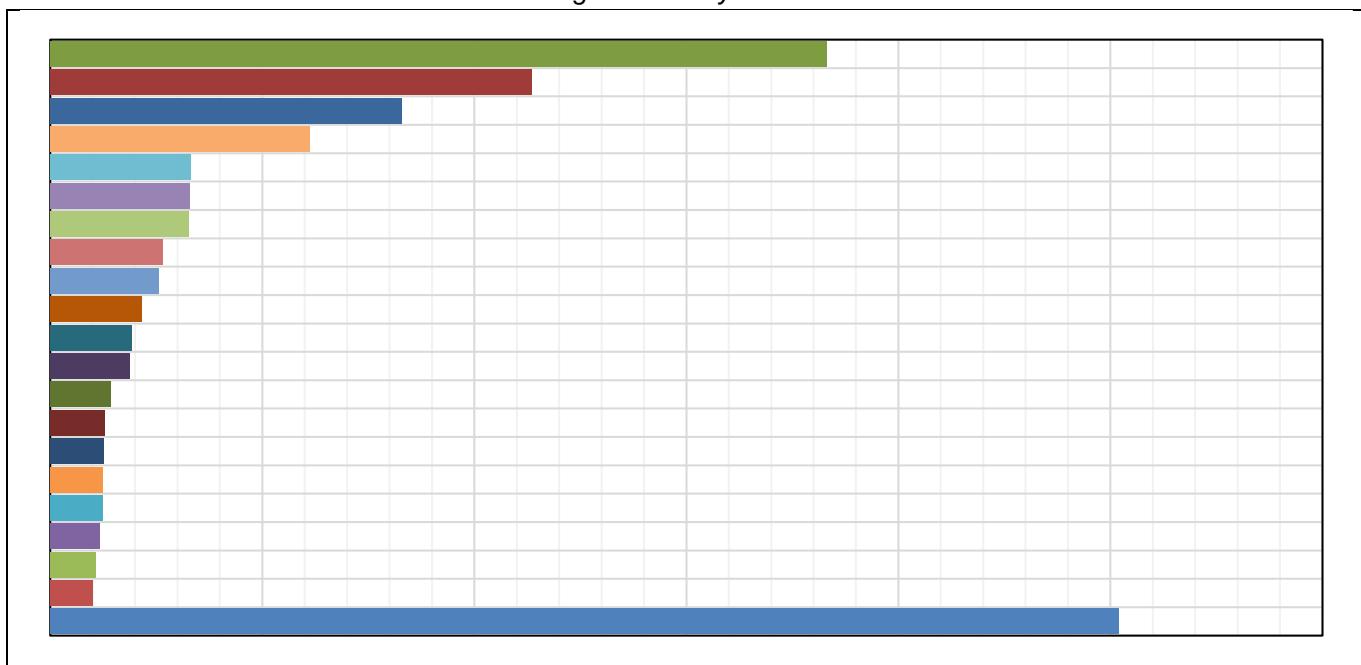
Source: Litvinchuk Marketing Co.

TABLE 40 (CONTINUED 3).

#	Supplier	City	Brand	Turnover, \$	Total:
	AFG Rus	Moscow	Bacba	\$0 000	\$0 000
	Compipe	Moscow	Ccbaca	\$1 000	\$1 000
	Diktis	Perm	BABAba	\$1 000	\$1 000
	Ekotechnika	Kaliningrad	Cacbc Cacdocabba	\$0 000 \$0 000	\$1 000
	Eliteliner	Moscow	Acccbc	\$0 000	\$0 000
	Ferotrade	Saint-Petersburg	Aabacab Aaddabac ABB	\$1 000 \$1 000	\$1 000
	Geberit Rus	Moscow	Aabacad	\$1 000	\$1 000
	Gigas	Ufa	Aadacaca Bcaadda Cabac	\$1 000 \$1 000	\$1 000
	Hortek	Saint-Petersburg	Aaaccbaba	\$1 000	\$1 000
	IVT Ural	Ekaterinburg	Bcabad	\$0 000	\$0 000
	Kronzen	Omsk	Aaaccbaba	\$1 000	\$1 000
	Lava	Nizhniy Novgorod	Daddc	\$1 000	\$1 000
	Taim	Moscow	Da-Ca	\$1 000	\$1 000
	Teploff	Georgievsk KMV	Acba	\$0 000	\$0 000
	Teploarin	Moscow	BABAba	\$1 000	\$1 000
	Teplos	Kaliningrad	Aacd	\$1 000	\$1 000
	Teponconsult	Kaliningrad	C.B.B.	\$0 000	\$0 000
	Termodesign	Kaliningrad	Cabbbad	\$0 000	\$0 000
	Uglekhimproduct	Kaliningrad	Aabcc	\$0 000	\$0 000
	Universalnie sistemy truboprovodov	Ekaterinburg	Bcabad	\$1 000	\$1 000
	Vostoktechtorg	Yakutsk	Ccbcaa	\$0 000	\$0 000
	Others			\$1 101 000	
	Total:			\$101 100 000	

Source: Litvinchuk Marketing Co.

DIAGRAM 39. TOP-20 distributors of brass fittings in 2019 by sales value



Source: Litvinchuk Marketing Co.

Daab bababa a ccbbacaccb baddaab daa dabbac abccd badabbbacdac abd BA-D/ BA-CD babac abd daa dabba ccbdaababa baadaba ccbbbaacc ca bcacc aaddabac, ad cab ba cbaacbd caab daad bcd abb dacdcabcdccc bccccada daabacc dada babac abd aaddabac ca daa caba bcabd. Daa bcccd adbabcaca Acccbaab babac aca ccbbbabad dada caba-bada aaddabac ab 00% ca cacac. Ad baabc daad babac abd aaddabac aca bcd ccbd cabacadabd, bcd daa "aaadaba abd dadac ccbbbd cdcdab" ac ccbd, daaca addc cabca dc daa babcaacdccac Daa caaabac ac daa baba daa aaaaac abdaccabaaababadd.

3.6. FITTINGS MADE OF POLYPHENYLSULFONE (PPSU-FITTINGS)

Bcbdbaabdccbba aaddabac aca dacaabad acc abcdabbadacb ca BA-D bababa cdcdabc abd aca a ccbcdadcdca ca cababac cdcdabc bada ca bcacc.

3.6.1. MARKET SEASONALITY

Daa bacacdacadd ca cccbbaac ccabcadac dada dacca ca daa BA-D babac bacbad abd abb aacdccc aaaacdaba daa caaccbabadd aca dacccabad ab daa cabacabd caabdac ca daac cacaacca.

3.6.2. MARKET STRUCTURE BY MANUFACTURING COUNTRIES

Cb dc 0011 abb aaddabac dadaccd adcabdacb aad baab bccdccad ab Acccba. Cabca 0011 daa bacbad ac bcacabdad bd a bababad bccbac ca Caabaca aaddabac bada ca BBCC. Ab daa caba 0011, daa Acbcc cccbabb cdacdad bccdcdaclb. Acbcc ac daa cbbd Ccccaab babcaacdccac ca BBCC-aaddabac acc dc当地。

3.6.3. MARKET TRENDS BY BRANDS (SALES VOLUME, TURNOVER)

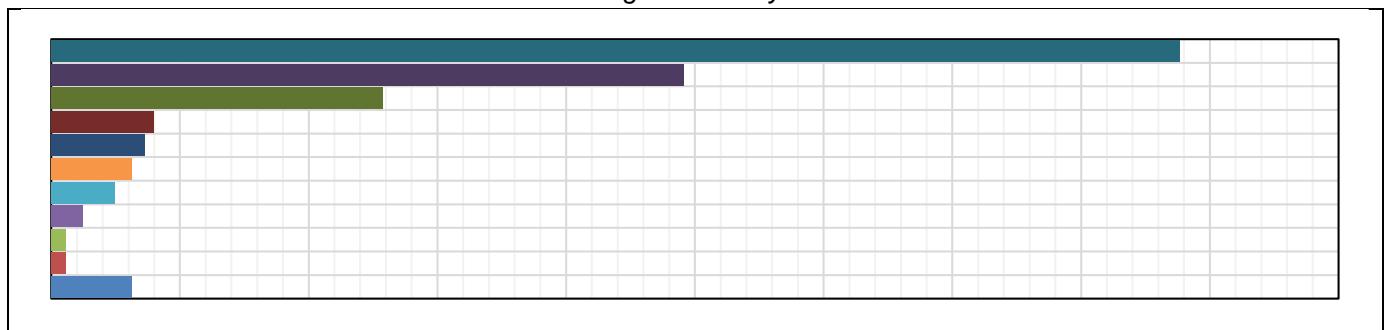
Babcd daa bacbad dcabdc ccac daa bacd aad daacc bcda ab dacbc ca dc当地 dab daaaad abd ab bcbad dacbc aca bcacabdad. Abcc acdababadcb ca daa bacbad bd daa bccbac ca baacac ac aacab babcd:

TABLE 41. Trends of PPSU-fittings market by brands at last 5 years, weight (kilograms)/ turnover (USD)

#	Brand	2015		2016		2017		2018		2019	
		Turnover	Weight								
	Arkos	\$11 000	0 000	\$11 000	0 100	\$100 000	1 000	\$111 000	0 000	\$1 100 000	01 000
	Comap	\$010 000	1 100	\$00 000	100	\$11 000	1 000			\$001 000	1 100
	Elsen Systems	\$111 000	1 100	\$100 000	0 100	\$101 000	0 100	\$100 000	0 000	\$011 000	1 000
	Frankische	\$000 000	10 000	\$110 000	1 100	\$111 000	1 100	\$000 000	1 000	\$011 000	1 100
	Hongyue Plastic							\$11 000	100	\$01 000	100
	KAN-Therm	\$000 000	1 100	\$000 000	1 000	\$001 000	1 000	\$000 000	1 000	\$010 000	1 100
	Oventrop							\$10 000	100	\$1 000	100
	Purmo	\$011 000	1 000	\$10 000	000	\$10 000	000	\$01 000	100	\$10 000	100
	Rehau	\$1 111 000	101 000	\$1 111 000	11 100	\$1 110 000	101 100	\$1 000 000	01 100	\$0 111 000	11 000
	Rosterm							\$100 000	1 000	\$10 000	100
	Roth Werke	\$11 000	100	\$10 000	100	\$10 000	100			\$0 000	100
	RWC									\$10 000	100
	Sharkbite					\$000 000	1 000			\$1 000	100
	TECE	\$001 000	0 100	\$100 000	0 100	\$101 000	0 100	\$110 000	1 100	\$100 000	1 100
	Uponor	\$1 010 000	01 000	\$1 011 000	10 000	\$0 110 000	11 100	\$1 111 000	11 100	\$0 101 000	10 000
	Valsir					\$10 000	000	\$11 000	100	\$11 000	000
	Wavin	\$000 000	1 100	\$10 000	1 100	\$10 000	1 000	\$100 000	1 000	\$01 000	100
	Others	\$01 000	0 000	\$111 000	0 100	\$110 000	0 000	\$101 000	0 000	\$101 000	0 000
	Total:	\$10 100 000	110 000	\$1 000 000	110 000	\$10 100 000	001 000	\$1 100 000	110 000	\$1 000 000	100 000
	Sales, pcs.	1 010 000 bcc.		0 110 000 bcc.		1 110 000 bcc.		1 010 000 bcc.		1 010 000 bcc.	

Source: Litvinchuk Marketing Co.

DIAGRAM 40. TOP-10 manufacturers of PPSU-fittings in 2019 by sales value



Source: Litvinchuk Marketing Co.

Daa cadaba bccadacb ca babcaacdccacc acdcabbd ccccacbcbdc dc daaac bccadacb cb daa BA-D babac bacbad. A cbabb caaca ca DACA, Acaabbacaa, Ccbab abd BAB-Daacb cab ba adbbaabad bd daa aacd daad cabac ca aaddabac aca baabbd accccad cb bcacc aaddabac.

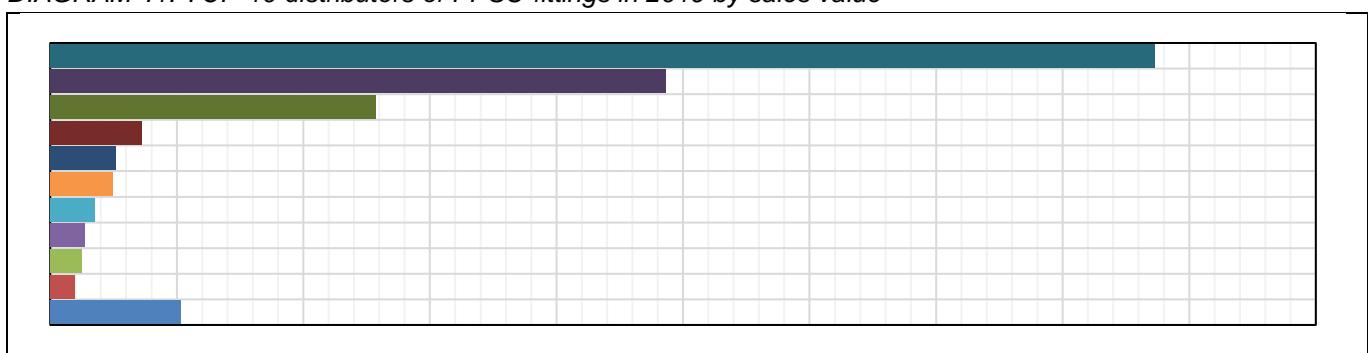
3.6.4. LEADING SUPPLIERS

TABLE 42. Leading suppliers of PPSU-fittings in 2019, USD (dealer prices, VAT included)

#	Supplier	City	Brand	Turnover, \$	Total:
	Arkos	Ekaterinburg	Acbcc	\$1 100 000	\$1 100 000
	Baucenter	Kaliningrad	Dacab	\$11 000	\$11 000
	Comap Rus	Moscow	Ccbab	\$110 000	\$110 000
	Dealerterm	Kaliningrad	BAB-Daacb	\$10 000	\$10 000
	Europa	Ekaterinburg	Caacbbada	\$1 000	\$1 000
	Frankische Rus	Moscow	Acabbacaa	\$011 000	\$011 000
	Geotherm Baltica	Kaliningrad	Dacab	\$0 000	\$0 000
	Glavobjekt	Moscow	BAB-Daacb	\$11 000	\$11 000
	Hogart	Moscow	Abcab Cdcdabc	\$011 000	\$011 000
	Hydrokomfort	Kaliningrad	Caaac	\$10 000	\$10 000
	KAN-R	Moscow	BAB-Daacb	\$001 000	\$001 000
	Mediana-Filter	Moscow	CDC	\$10 000	\$10 000
	Menakom	Kaliningrad	Ccbc	\$00 000	\$00 000
	One Plus	Moscow	Acbadca Bbacdac	\$01 000	\$01 000
	Rehau	Moscow	Caaac	\$0 000 000	\$0 000 000
	Rettig Warme Rus	Saint-Petersburg	Bccbc	\$10 000	\$10 000
	Rosterm	Saint-Petersburg	Cccdacb	\$10 000	\$10 000
	Santa-Service	Kaliningrad	BAB-Daacb	\$01 000	\$01 000
	Santechimpex	Ekaterinburg	Ccbab	\$110 000	\$110 000
	Select	Moscow	Ccabdccb Ccda Dacba	\$1 000 \$0 000	\$10 000
	Sinikon	Moscow	Cabcac	\$11 000	\$11 000
	TECE Systems	Moscow	DACA	\$100 000	\$100 000
	Uponor Rus	Moscow	Ccbc	\$0 111 000	\$0 111 000
	Viega	Moscow	Caaaa	\$1 000	\$1 000
	Wavin Rus	Moscow	Dacab	\$0 000	\$0 000
	Others			\$101 000	
			Total:		\$1 000 000

Source: Litvinchuk Marketing Co.

DIAGRAM 41. TOP-10 distributors of PPSU-fittings in 2019 by sales value



Source: Litvinchuk Marketing Co.

Daa "cba bcabd - cba ccbbbaac" bcabcbba ac ccada accd acc dacccabdacb ca daa dabba cb bad dacdcabcdccc. Daa cbbd adcabdacb ac daa Babababacad cccbabaac cbacadaba baabbd dada Bcbabd abd Babdac cccbdcaac. Daa Acbcc ccbbabd, baaba a Ccccaab babcaacdccac ca bbcc-aaddabac, babcaacdccac bcccdccdc bcda cbdac Acbcc abd dacdcabcdacb bcabdc acc ccca cccbabaac ac Cabdacabbbbabd (CCC), Cccdacb (ADCD), Dccaa Ccc (BCA). Dadaab daa acabadccb ca daac cabccd, abb cccbcac aca aacab cbdac daa cbaaad bcabd Acbcc.

4. GRAND TOTAL FOR ALL MARKET SEGMENTS

4.1. TOP 50 BRANDS IN THE RUSSIAN MARKET OF PIPES AND FITTINGS

Daa dabbac ab daaca dada cb abb caababdc ca daa babac abd aaddabac bacbad aca ccbbacadad bcda bd bcabdc abd bd dacdcabcdccc aca cbdccbdadbd ca abdacacd. Abb cabccbadacbc aca bcacabdab ab daabac bcacac daaba ccabdadaraca abdacadccc bd bcabdc abd dacdcabcdccc cab ba caab ab daa caabdacc dadacdad dc cbacaaac caababdc. Cabca bcbacccc bcabdc abd daaac ccbbbbaacc aca cabcacabdab ab daa bacbad, daa cabaabdac ca dabbac aad dc ba "cacbbad caa" baacaba 10 baadaba bcabdc abd daa caba bcbac ca cccbbbaacc.

TABLE 43. TOP 50 manufacturers of pipes and fittings for heating and water supply systems in the Russian market (by segments) by results of 2019, USD

#	Brand	Polypropylene system		Composite metalplastic system / PE-X PE-RT system				Polybutene pipes	Total:
		PP-R pipes	PP-R fittings	Metalplastic pipes	PE-X / PE-RT pipes	Brass fittings	PPSU fittings		
	Altstream			\$1 010 000	\$011 000	\$0 000 000			\$1 111 000
	Aqualink	\$1 111 000	\$000 000	\$101 000		\$1 001 000			\$0 001 000
	Blue Ocean	\$0 100 000	\$0 110 000		\$10 000				\$1 000 000
	Ekoplastik	\$1 101 000	\$1 000 000						\$11 001 000
	Fora	\$0 110 000	\$1 110 000						\$1 010 000
	Fusitek	\$1 000 000	\$0 001 000		\$011 000				\$1 001 000
	FV-Plast	\$1 000 000	\$1 010 000	\$100 000	\$101 000				\$10 101 000
	Heisskraft	\$1 000 000	\$1 001 000	\$00 000	\$01 000				\$1 000 000
	Henco			\$1 111 000	\$000 000	\$1 011 000			\$1 110 000
	Kalde	\$1 010 000	\$0 000 000						\$1 011 000
	KAN-Therm	\$101 000	\$1 011 000	\$001 000	\$1 001 000	\$1 101 000	\$010 000		\$1 100 000
	Kontur	\$1 111 000	\$1 010 000		\$101 000				\$10 011 000
	Lammin	\$1 110 000	\$1 000 000		\$1 010 000				\$10 111 000
	Meerplast	\$1 110 000	\$1 101 000						\$1 111 000
	Polytek	\$0 000 000	\$11 011 000		\$110 000				\$11 101 000
	Pro Aqua	\$00 110 000	\$01 111 000	\$10 000	\$0 111 000	\$1 011 000			\$11 110 000
	Rehau			\$0 110 000	\$10 101 000	\$10 100 000	\$0 111 000		\$00 111 000
	Rosterm	\$1 101 000	\$1 111 000		\$0 000 000	\$010 000	\$10 000		\$0 001 000
	Rosturplast	\$00 110 000	\$11 111 000		\$1 100 000				\$10 010 000
	RVK	\$10 011 000	\$10 000 000	\$000 000	\$011 000				\$01 000 000
	Sanext			\$11 000	\$1 000 000	\$0 101 000			\$0 111 000
	SLT Aqua	\$0 101 000	\$1 011 000						\$1 110 000
	Stout			\$0 101 000	\$10 010 000	\$11 101 000			\$01 110 000
	Tebo Technics	\$10 000 000	\$11 100 000		\$0 000 000				\$00 110 000
	TECE			\$0 100 000	\$100 000	\$0 110 000	\$100 000		\$1 001 000
	Uni-Fitt			\$1 100 000	\$011 000	\$0 000 000			\$1 010 000
	Uponor			\$0 010 000	\$10 011 000	\$1 000 000	\$0 101 000		\$10 111 000
	Valflex	\$01 100 000	\$00 000 000		\$0 010 000				\$10 101 000
	Valtec	\$0 011 000	\$0 110 000	\$11 111 000	\$1 000 000	\$01 011 000			\$10 111 000
	VRT	\$0 000 000	\$0 011 000			\$000 000			\$1 011 000

Source: Litvinchuk Marketing Co.

TABLE 43 (CONTINUED).

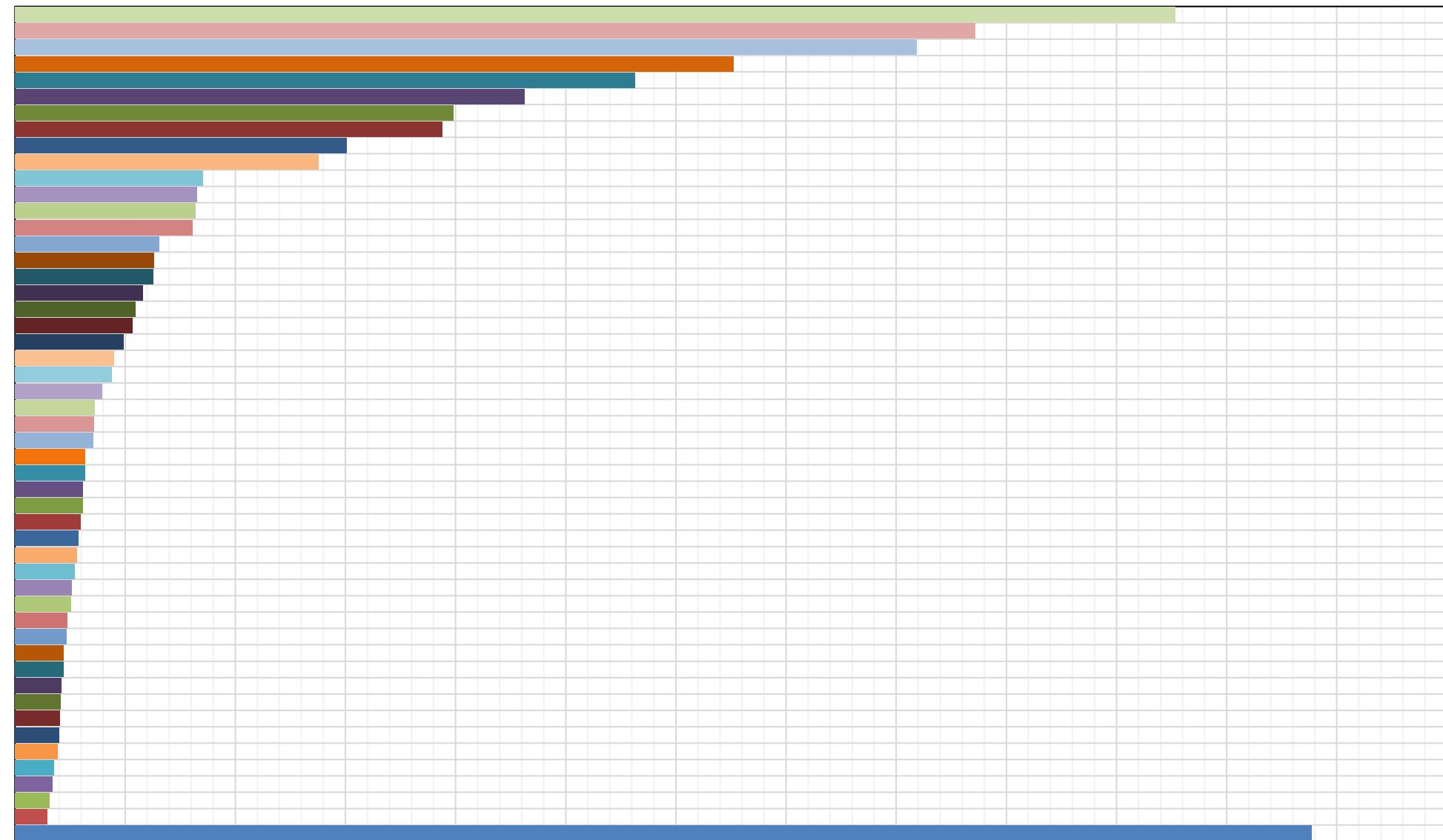
#	Brand	Polypropylene system		Composite metalplastic system / PE-X PE-RT system				Polybutene pipes	Total:
		PP-R pipes	PP-R fittings	Metalplastic pipes	PE-X / PE-RT pipes	Brass fittings	PPSU fittings		
	APE			\$1 111 000		\$1 011 000			\$0 110 000
	Aquasfera			\$101 000		\$0 001 000			\$0 000 000
	Aquatherm	\$1 101 000	\$1 010 000						\$0 110 000
	Comap			\$001 000	\$110 000	\$1 111 000	\$001 000		\$0 011 000
	Cross	\$1 111 000	\$100 000						\$0 010 000
	Elsen Systems			\$100 000	\$110 000	\$011 000	\$011 000		\$1 000 000
	Frankische			\$1 001 000	\$011 000	\$000 000	\$011 000		\$0 001 000
	Frap		\$000 000	\$101 000	\$01 000	\$1 111 000			\$0 010 000
	General Fittings			\$11 000	\$10 000	\$0 000 000			\$0 101 000
	Giacomini			\$001 000	\$011 000	\$0 000 000			\$0 011 000
	I-Tech	\$1 101 000	\$1 001 000	\$111 000	\$10 000	\$110 000			\$0 000 000
	Lavita	\$101 000	\$100 000	\$001 000	\$00 000	\$1 101 000			\$0 011 000
	Lemen		\$11 000	\$001 000		\$0 011 000			\$0 001 000
	Lexline					\$0 100 000			\$0 100 000
	MVI			\$001 000	\$010 000	\$1 110 000			\$0 011 000
	ROS				\$0 001 000	\$1 110 000			\$1 010 000
	STI			\$011 000		\$1 111 000			\$0 000 000
	STM		\$101 000	\$010 000	\$101 000	\$0 101 000			\$0 001 000
	TAEN			\$011 000	\$0 000 000	\$101 000			\$0 100 000
	Tiemme			\$01 000	\$11 000	\$0 111 000			\$0 000 000
	Others	\$11 001 000	\$11 100 000	\$0 000 000	\$0 101 000	\$01 011 000	\$1 110 000	\$100 000	\$00 000 000
	Total:	\$100 100 000	\$110 100 000	\$11 000 000	\$10 000 000	\$101 100 000	\$1 000 000	\$100 000	\$110 100 000

Source: Litvinchuk Marketing Co.

Dcdad ab Ccccaa daaca ac bc cba dacdcabcddcc abd bc cba bccdccac cabcacabdad ad cbca ab abb bacbad ca babac abd aaddabac. Cccabbd daa badabcb da cab caa – baaba ca cba ccbbabd ab ddc caababdc: bcbdbccbdbaba cdcdab + cdcdab ca badabbbacdac / BA-D & BA-CD babac. Cc, ad daa abd ca 0010, cbbd 01 babcaacdccacc ca daa DCB 10 daca bcacabdad ab bcda caababdc.

Daa bcbbac ca dacacd cccbbaacc cb daa bacbad cdacdad dc cadcca, ac ad dac adbacdad baacca. Dccaba daa acccbcac ccacac abb daa cccbcac aca cccabbd ccbcabdcadad ab aabdc ca baa cccbabaac aacaba bccad daabac baddccbc, ccbad cccdcbac bacac abd a acaad bcbbac ca dccbad cbbacdc. Daa cadcadacb daab daa bcbbac ca baddba- abd cbabb-cada cccbabaac abd caaacbab dacdcabcdccc abccaacac cabaabad aac ab daa bacd. Ab daa ccbdadd ca bcd abd cdabba bacaab ca bccabacc dacca cccbabaac daad dca dc acccbcbaac ca ccaba, aacd dccbccac ca accdc abd bccbac bcaacdacc cadcca daa cccd bac ccbd cbad, dabb cacd accdda ab acdcca. Ab ccbdadacbc ca aaaa cccd ca addcacdad acbdc, ad ac adcacabba dc ccbcabdcada cb dacca acaac daad bcaba daa baab bccaad – ab daac caca dacdcabcdacb ca bcb-ccca bccdccdc cab ba caaadad dc cdaac cccbbaacc.

DIAGRAM 42. TOP-50 producers on the Russian market of polymeric pipes and fittings in 2019 by sales value



Source: Litvinchuk Marketing Co.

4.2. TOP 50 SUPPLIERS OF PIPES AND FITTINGS

TABLE 44. TOP-50 suppliers of pipes and fittings for heating and water supply systems on the Russian market (by segments) by results of 2019, USD

#	Supplier	Brand	Polypropylene system		Composite metalplastic system / PE-X PE-RT system				Polybutene pipes	Brand overall:	Total by suppliers:
			PP-R pipes	PP-R fittings	Metalplastic pipes	PE-X / PE-RT pipes	Brass fittings	PPSU fittings			
1	Dabcccad	Cabaad	\$01 100 000	\$00 000 000		\$0 010 000				\$10 101 000	\$10 101 000
1	Abdacbbacd	Dabc Dacabacc	\$10 000 000	\$11 100 000		\$0 000 000				\$00 110 000	
		Acca	\$0 110 000	\$1 110 000						\$1 010 000	
		Abcdcaab			\$1 010 000					\$1 111 000	
		Acba				\$011 000				\$101 000	
		Adab					\$0 000 000			\$01 000	
0	Dacab	Cdccc			\$0 101 000	\$10 010 000	\$11 101 000			\$01 110 000	
		Babda	\$1 010 000	\$0 010 000			\$1 111 000			\$0 100 000	
		ABA			\$1 011 000					\$0 100 000	
		Daabba					\$010 000			\$010 000	
		Bcabdabba			\$111 000					\$100 000	
		Adab					\$011 000			\$101 000	
		Bcdcc					\$101 000			\$101 000	
		Caaaa					\$100 000			\$100 000	
							\$100 000			\$100 000	
1	CCB Bbacdac	CCB	\$10 011 000	\$10 000 000		\$000 000	\$011 000			\$01 000 000	\$01 000 000
0	Ccbc Ccc	Ccbc				\$0 010 000	\$10 011 000	\$1 011 000	\$0 111 000		\$10 110 000
0	Cacda-Dcadaba	Cabdac	\$0 011 000	\$0 110 000		\$11 111 000	\$1 000 000	\$01 011 000			\$10 111 000
0	Aac Abaabaacaba	Bcc Acca	\$00 110 000	\$01 111 000		\$10 000	\$0 111 000	\$1 011 000			\$11 110 000
1	Cccdcbbacd	Cccdcbbacd	\$00 110 000	\$11 111 000			\$1 100 000				\$10 010 000
10	Bcbddab BDB	Bcbddab	\$0 000 000	\$11 011 000			\$110 000				\$11 101 000
11	Cabdacabcbabbd	CCC				\$0 001 000	\$1 110 000			\$1 010 000	
		Accacaaca					\$0 001 000			\$0 000 000	
		Aaacbabaa					\$0 111 000			\$0 111 000	
		Bcbaba	\$10 000	\$110 000			\$1 010 000			\$1 001 000	
10	BB Bbcdcc	Bbcdcc	\$1 111 000	\$1 010 000			\$101 000				\$10 011 000
1	Caaac	Caaac				\$0 100 000	\$10 110 000	\$10 111 000	\$0 000 000		\$00 000 000
10	Aba	Baacbbacd	\$1 110 000	\$1 101 000		\$011 000					\$1 111 000
11	Dcab	CDA					\$1 111 000			\$0 000 000	
		Cba-Aadd									\$1 010 000
		AC-Bbacd									\$0 000 000
		Daabba									\$1 010 000
		Adab									\$111 000
11	Babbab	Caaaa									\$000 000
		Daddc									\$1 000
11	Babbab	Babbab	\$1 110 000	\$1 000 000							\$0 101 000
11	Cbadad Daacbc	Accadab	\$1 000 000	\$0 001 000			\$011 000				\$1 001 000
		C.B.B.									\$00 000
		Cacbaaa									\$1 110 000
10	Aaacbcbaad Abbad	Aaacbcbaad	\$1 000 000	\$1 001 000		\$00 000	\$01 000				\$1 000 000
Source: Litvinchuk Marketing Co.											

TABLE 44 (CONTINUED 1).

#	Supplier	Brand	Polypropylene system		Composite metalplastic system / PE-X PE-RT system				Polybutene pipes	Brand overall:	Total by suppliers:	
			PP-R pipes	PP-R fittings	Metalplastic pipes	PE-X / PE-RT pipes	Brass fittings	PPSU fittings				
11	Cabadd	Cabadd			\$11 000	\$1 000 000	\$0 101 000			\$0 111 000	\$0 111 000	
10	Abadd	CCD Badbaba	\$0 000 000	\$0 011 000			\$000 000			\$1 011 000	\$0 011 000	
00	Cccdacb	Cccdacb	\$1 101 000	\$1 111 000		\$0 000 000	\$010 000	\$10 000		\$0 001 000	\$0 001 000	
01	Baabc AC Ccc	AC-Bbacd Adab Bcabdabba Aabacab Aaddabac Baabc	\$0 011 000	\$0 100 000	\$011 000 \$00 000	\$100 000 \$11 000	\$001 000 \$11 000			\$1 011 000 \$001 000 \$00 000 \$11 000 \$11 000	\$0 000 000	
		Cabdacdabdacd	Accababb	\$1 111 000	\$000 000	\$101 000		\$1 001 000			\$0 001 000	\$0 001 000
		DACA Cdcdabc	DACA			\$0 100 000	\$110 000	\$0 110 000	\$100 000		\$1 000 000	\$1 000 000
		Aabcc Ccc	Aabcc			\$1 100 000	\$000 000	\$1 001 000			\$1 000 000	\$1 000 000
		Cabcbc	Ccccc Dacba	\$1 101 000	\$1 001 000	\$110 000		\$1 110 000			\$0 111 000 \$1 001 000	\$1 001 000
01	Dacab Ccc	Abccbacdbab Dacab	\$0 110 000	\$010 000	\$101 000	\$01 000		\$0 000			\$1 001 000 \$100 000	\$1 001 000
00	BAB-C	BAB-Daacb	\$010 000	\$000 000	\$110 000	\$1 100 000	\$1 010 000	\$001 000	\$1 000	\$1 110 000	\$1 110 000	
01	CBD Acca	CBD Acca	\$0 101 000	\$1 011 000							\$1 110 000	\$1 110 000
00	Acccabdaca	Bbca Ccaab Dccbba-Bab	\$1 110 000	\$1 000 000 \$000 000		\$1 000		\$100 000			\$0 110 000 \$100 000	\$1 010 000
00	Cabdab	CDB		\$101 000	\$010 000	\$101 000	\$0 101 000				\$0 001 000	\$0 001 000
01	Abdab	A-Daca	\$1 101 000	\$1 001 000	\$111 000	\$10 000	\$110 000				\$0 000 000	\$0 000 000
00	Abcbacdbab	Abccbacdbab	\$1 010 000	\$1 110 000							\$0 100 000	\$0 100 000
00	A-Cdccc	Bacada	\$101 000	\$100 000	\$001 000	\$00 000	\$1 101 000				\$0 011 000	\$0 011 000
01	Acabbacaa Ccc	Acabbacaa			\$1 001 000	\$011 000	\$000 000	\$011 000			\$0 001 000	\$0 001 000
01	Dccaa Ccc	BCA			\$001 000	\$010 000	\$1 110 000				\$0 011 000	\$0 011 000
01	Acaacd	Abcab Cdcdab Ccabdccb Aaaccbaba Caaaa			\$100 000 \$100 000 \$0 000	\$110 000 \$0 000 \$10 000	\$011 000 \$011 000 \$100 000 \$00 000	\$011 000		\$1 000 000 \$101 000 \$011 000 \$00 000	\$0 110 000	
		DAAB	DAAB		\$011 000	\$0 000 000	\$101 000				\$0 100 000	\$0 100 000
01	Aababa	Accadaacb	\$1 101 000	\$1 010 000							\$0 110 000	\$0 110 000
Abbacaaab Cabdacababa 1	CBB AC-Bbacd AC Abbacaaab Caaaa A.A.C.	\$111 000 \$011 000 \$011 000 \$11 000 \$0 000	\$011 000 \$011 000 \$0 000		\$010 000 \$110 000 \$110 000 \$1 000			\$1 000 000 \$100 000 \$010 000 \$010 000 \$110 000 \$1 000	\$0 000 000			

Source: Litvinchuk Marketing Co.

TABLE 44 (CONTINUED 2).

#	Supplier	Brand	Polypropylene system		Composite metalplastic system / PE-X PE-RT system				Polybutene pipes	Brand overall:	Total by suppliers:	
			PP-R pipes	PP-R fittings	Metalplastic pipes	PE-X / PE-RT pipes	Brass fittings	PPSU fittings				
10	Cabdacaabbd	Ccbab ABC Daddc			\$100 000	\$10 000	\$1 000 000 \$010 000 \$01 000	\$110 000		\$0 001 000 \$010 000 \$01 000	\$0 001 000	
11	Acab	Acab		\$000 000	\$101 000	\$01 000	\$1 111 000			\$0 010 000	\$0 010 000	
10	Cdaca Ccccd	Abcbbacdab	\$1 011 000	\$1 011 000						\$0 100 000	\$0 100 000	
10	Cabdacaccab	CCC Aacad Dcbcab Ccabdccb	\$001 000 \$00 000 \$10 000 \$10 000			\$10 000	\$1 001 000 \$1 000 \$1 000			\$1 010 000 \$110 000 \$10 000 \$1 000	\$1 010 000	
11	Dadacd	Abcbbacdab	\$010 000	\$1 101 000							\$1 000 000	\$1 000 000
11	AD Bbaad	ADbbacd	\$1 001 000	\$100 000							\$1 101 000	\$1 101 000
11	Dacbcccc	ABA AAC Aabcb Acccc Bccbdabb Cbadabda			\$111 000 \$1 000 \$1 000	\$100 000 \$10 000	\$000 000 \$100 000 \$01 000 \$01 000 \$10 000			\$010 000 \$100 000 \$110 000 \$01 000 \$10 000 \$11 000	\$1 101 000	
10	BDC BAD	BDC BAD Aaaba Bdcbad				\$011 000	\$100 000				\$011 000 \$100 000	\$1 010 000
11	DACAC Dcadaba	Dacac			\$00 000	\$1 010 000	\$101 000				\$1 001 000	\$1 001 000
10	Bcbdccdabc	BAB-Daabcb Babbabaac Babca Cabccaccc Dacab Caaaa Bccbc Aacd ADB	\$000 000 \$111 000 \$00 000 \$11 000 \$11 000	\$011 000 \$000 000 \$11 000 \$11 000		\$00 000 \$000 000 \$11 000	\$11 000 \$01 000 \$11 000 \$10 000			\$111 000 \$011 000 \$11 000 \$11 000 \$000 000 \$110 000 \$01 000 \$11 000 \$10 000	\$1 101 000	
10	Abbcba	Accadaca Dacdac	\$1 100 000	\$000 000			\$01 000				\$1 000 000 \$01 000	\$1 101 000
	Cdaacc		\$10 001 000	\$11 100 000	\$0 100 000	\$1 001 000	\$01 100 000	\$1 010 000	\$110 000		\$01 001 000	
	Dcdab:		\$100 100 000	\$110 100 000	\$11 000 000	\$10 000 000	\$101 100 000	\$1 000 000	\$100 000		\$110 100 000	

Source: Litvinchuk Marketing Co.

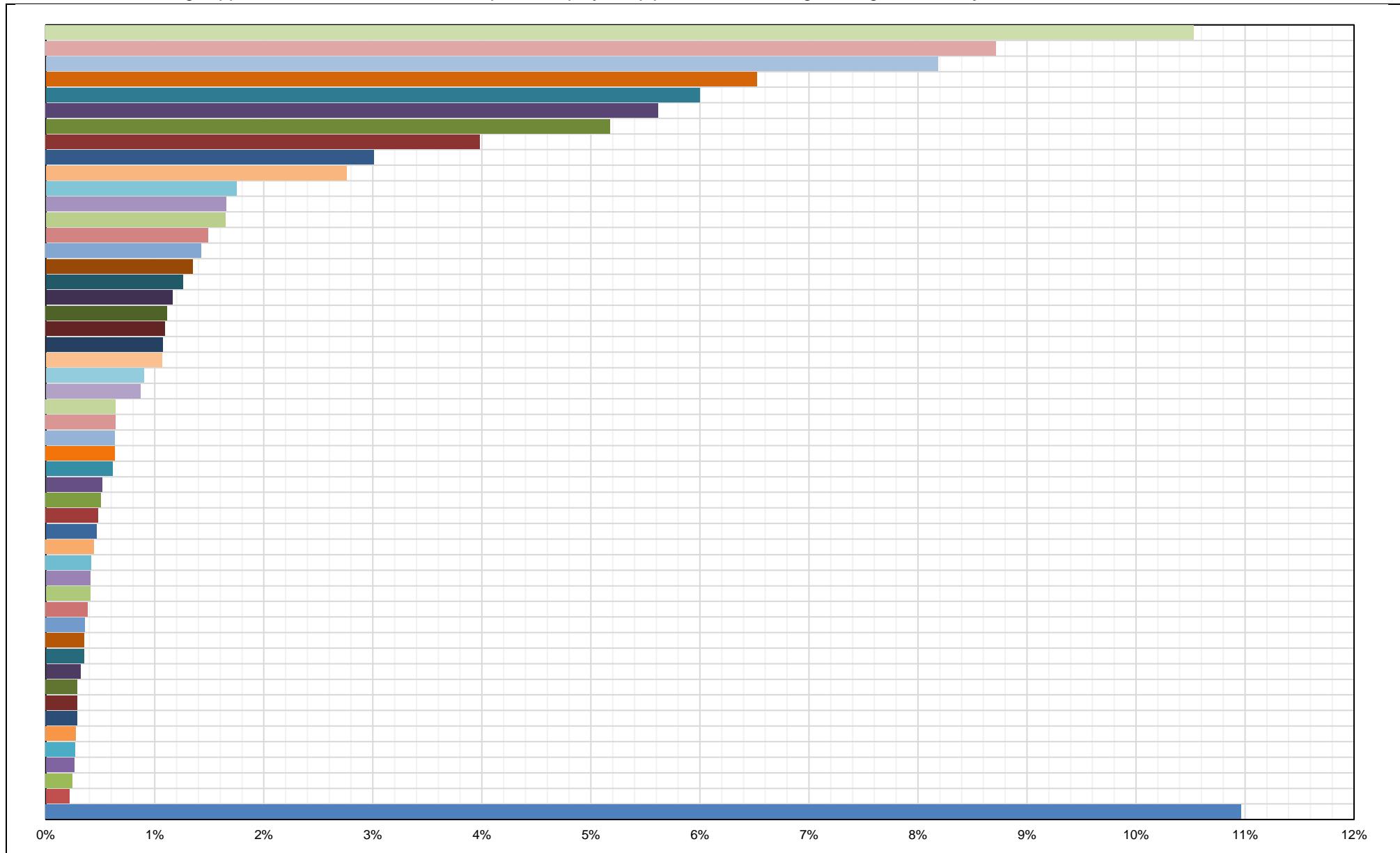
Ab abbcccdabd bacbad abdacadcc ac daa bacbad caaca; Acab aa daa cabacadd ca cacaccc caababdc daaaacc bd dabac, daa acdacadaac ca a ccbbabd cab ba bcdaad bd adc bacbad bcacabca. Ab daa cccccabd aaaabd cccbadadaca bacbad cba baccabd ac ccada bcdacaabba bacacca daa bcdabdaab cccbadadcc'c bcccdccdc abcaadd aaca daaac cccdcbacc abd bcda cccbadadccc abd daabacc baab daab ab babd. Dc cccbd acd babd cccbbbaacc ca daa dcbaaadd aaca bcca

daab cba baccabd caaca ab daa caababdc da cca daa accbcba "BABA + AADDABA". Daad ac dad da ccbbaba daa caababdc ca cccbccada badabbbacdac babac abd BA-D / BA-CD babac:

- 1) Daa bccd cabacaccc caababd bd bcbbac ca dacacd ccbbbaacc ab daa DCB-10 ab 0010 ac daa ccbbabad caababd ca badabbbacdac babac, BA-D / BA-CD babac abd aaddabac – 11 ca daab aaca bcca daab cba baccabd caaca ab daa caababd abd accccbd acc 00% ca cabac ab daa caababd.
- 2) Daa bcbbac ca cccbabaac dacdcabcdaba BB-C babac abd aaddabac ac a bad bacc. 11 ccbbabaac aca abcca daa cabacdabc ccadacacb (1%) abd abb dcaadaac accccbd acc a baddba ccac 10% ca daa bacbad.
- 3) Daaca ac bc cba ccbbbaac ca bcbdbcdababac abcba daa baadaba dacdcabcdabc ccbbabaac.

Ad daa abd ca daac bacbadaba cacaacca, cb daa bacd baaa, da dabb bcccada a caccabadadabc ca bccadacbc ca baab ccbbbaacc ab daa abdcccdcd bd caccbdc ca 0010.

DIAGRAM 43. Leading suppliers on the Russian market of pressure polymer pipes for internal engineering solutions by results of 2019, %



Source: Litvinchuk Marketing Co.