A R M A T U R E S T O J A N O V I Ć

ARMAS

PRODUCT CATALOG

Quality solutions,
permanent certitude.

Quality solutions, permanent certitude.

The aim of this catalog is to acquaint you with equipment produced by ARMAS which is applied for construction works (new investments) and reconstructions of pipelines, for daily maintenance of pipeline systems, and also for repairs of pipeline damages.

The ARMAS production program is derived from years of experience in design of water supply equipment, planning, construction and utilizing of waterworks objects. By cooperation with design and contractor companies, and also with final users, we recognized a lack of connection elements in the field of construction and exploitation of pipeline systems. Those elements should significantly unify and facilitate installation, handling and utilization of various pieces of equipment, as well as repairing of water supply network.

As the result of this cooperation, ARMAS joints are made with the idea of lowering investment costs needed for construction of large pipeline systems, and to enable fast and reliable repairs of all possible damages during maintenance works.

Alongside production of classic joints for all pipe types, we are also manufacturing numerous special joints, which are used for quick, easy and efficient repairing of leakages at the existing pipe joints and for connecting new pipelines to the existing water supply network, all that without pipe cutting or consumers being cut-off.

Company ARMAS was founded in 1998. We are very proud of the fact that during our perennial existence we had oportunity to work with very large number of clients and that there is no major water supply company in Serbia with whom we haven't established cooperation. Our joints are being successfully installed in water supply systems throughout the country.

During our existence, we have also established international cooperation, mainly with partners from Montenegro and Federation of Bosnia and Herzegovina, as well as North Macedonia and Hungary.

Company ARMAS has Quality Management System, which is in compliance with the ISO 9001 standard, for design and production of armature for pipeline systems.

We are regular exhibitor at Belgrade's Water Fair and frequent participant of major symposiums regarding water, both in Serbia and the region.

For any additional information we suggest that you take a look at our website: www.armas.co.rs. We are inviting all interested parties to contact us, we will be happy to meet your request.

With desire to deepen our existing and make new cooperation,

Slobodan Stojanović
dipl.ing.maš.
owner

SERTIFIKOVAN SISTEM MENADŽMENTA
StandCert
QS-0350
ISO 9001

ARMATURE STOJANOVIĆ
armas

PROGRAM
PRODUCTION
ALFA
ALFA FIX
ALFA SPECIAL
BETA
COMBI
DUO
EXTRA
LONG EXTRA
LONG EXTRA+
LONG EXTRA SPECIAL
LONG EXTRA ULTRA
LINK
MDK
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REDUCER FLANGE
ADJ. FLANGE GASKET - PPZ
ADJ. FLANGE RING - PPP
MULTIAXIS ADAPTER
UNIVERSAL
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LONG UNIVERSAL FIX
ARMAS SYSTEM
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ARMAS PRODUCTION PROGRAM

All ARMAS products are made from cast iron EN-GJS-400 (GGG40) or EN-GJS-500 (GGG50) according to the SRPS EN 1563 standard, from cast iron EN-GJL-250(GG25) according to the SRPS EN 1561 standard and from steel S235JRG2 according to the SRPS EN 10027-1.

Dimensions of flanges, alongside the arrangement of holes for flange connections, are made according to the SRPS EN 1092-2 standard.

All ARMAS products are protected against corrosion by plastification with epoxy powder with minimal thickness of 250 µm, RAL 5010 colour, with bolt goods protected by galvanization, or made from stainless steel.

Gaskets for ARMAS joints are made from EPDM, according to the SRPS EN 681-1 stand., with needed firmness and resilience to ageing, which enables reliable and permanent sealing.

All ARMAS products have *Health Certificate* which guarantees that all products or parts of products which are in direct contact with drinking water fulfill health and safety criteria, issued by the domestic accredited laboratory (according to the requests made by the SRPS ISO/IEC 17025 standard).

Delivered ARMAS products are accompanied by the *Quality Certificate*, alongside *Manual and Installation Instructions*, *Guarantee*, as well as the *Test Report of strength and sealing of the casing under pressure*, according to the SRPS EN 12266-1 standard, issued by the domestic accredited laboratory (according to the requests made by the SRPS ISO/IEC 17025 standard).

In the following table ARMAS products are listed, alongside with the short description of each product and its particular use.

a	ALFA	Joint for connection between flange and the end of certain pipe, regardless of material of the pipe which are being connected to the flange. There are numerous versions of these joints.
a	ALFA FIX	Joint for connecting flange of the shutter or some fitting with pipes of any material with the same nominal diameter, while the connection is secured against pipe's axial movement.
a	ALFA SPECIAL	Joint for connecting flange to the end of certain pipe, when, due to the leakage, the E-piece is removed and it is necessary to install new one, while both pipe and flange are immovable.
b	BETA	Joints for mutual connecting polyethylene and PVC pipes. If two PE pipes are connected they're called BETA-PE, while for connecting two PVC pipes BETA-PVC are used.
c	COMBI	Joint for connecting two pipes made of different materials and/or with big difference in outer diameters. Very wide range of possible diamaters to mutually connect.
d	DUO	Simplified and fast-installing joint for pipe ruptures, which can make repairing done without pipe cutting. Intended primarily for pipes with smaller diameters. Consists of only two pieces.
e	EXTRA	Joint for repairing pipe ruptures without pipe cutting or consumers being cut-off. Large range of allowed angular deviation. There can be three types: EXTRA, EXTRA-C and EXTRA-D.
le	LONG EXTRA	Joint for repairing pipe ruptures of greater lengths, from 300 to 500 mm, and even more by request. The repair is always being done without pipe cutting or consumers being cut-off.
le+	LONG EXTRA+	These joints are used for connecting one or two new secondary pipes to the primary pipeline, which can be newly formed or already in exploitation. There are several types of these joints.
le+	LONG EXTRA-P	Joint for connecting new pipe to the existing pipeline without installing T, F-F or E pieces, and without pipe cutting or consumers being cut-off. Most common type of LONG EXTRA+.

l_e^s	LONG EXTRA SPECIAL	Joint for repairing leakage at the joint when there is damage of the pipe and/or existing joint (*Dalma*, *Gibault*, *Beto*), and it's requested that joint remains and no consumers being cut-off.
l_e^u	LONG EXTRA ULTRA	Joint for repairing leakage at the joint when there is damage on the connection between pipes of different outer diameters and it is requested that no consumers are being cut-off .
l	LINK WITH SINGLE SEALING	Joints for stopping leakage at the existing pipe connections, without pipe cutting or consumers being cut-off. Offered types are LINK-LG-O, LINK-LG-ŽI, LINK-BETON and LINK-PVC.
l	LINK WITH DOUBLE SEALING	Joints for stopping leakage without pipe cutting or consumers being cut-off on connections between asbestos-cement pipes LINK-AC(-ŽIBO) and for PE and polyester pipes LINK-PE(S).
m	MDK	Classic detachable joint with three standard flanges, for easy installation and removal of various pipeline armature into waterworks systems.
m	MDK-OPTIMA	Classic detachable joint with three flanges and all needed bolts, while not all of them are of maximum length, which lowers installation time and enables bigger angular movement.
m	MDS	Detachable joint for easy installation and removal of pipeline armature. These joints are 40% lighter and half the length, compared to the usual types of detachable joints.
m	MDS-MZ	Detachable joint for easy installation and removal of pipeline armature. It is used during the installation of interpreter shutters into the pipeline system.
m	MDS-OP	Detachable joint for reconstruction of node connections, when the old, oval shutters, are replaced with new, flat ones, which have smaller installation lengths. Difference is covered by joint.
μ	MIKRO	Detachable joint with very small installation length. Primarly intended for installation in cases of extremely limited space and/or difficult possibilities to approach the location.
r	REDUCER FLANGE	Joints which are used as the substitution for FFR fittings, when smaller installation lengths are required, which is in the range between 20 and 50 mm for our joints..
p	ADJUSTABLE FLANGE GASKET - PPZ	Specially designed and manufactured gasket for flange connection, which covers axial shuffling from 0 to 8°. Regulation of axial shuffling is done instantly and simply.
p'	ADJUSTABLE FLANGE RING - PPP	Specially designed and manufactured metal ring for flange connection, which covers axial shuffling from 0 do 6°. Regulation of axial shuffling is done instantly and simply.
a	MULTIAXIS ADAPTER	Specially designed and manufactured solution which enables connecting two pipes which are not in the same axis. With the increase in pipe diameter also increases the off-axis range.
U	UNIVERSAL	Universal joints for pipe breakage, for connecting pipes of the same or different material. Used in cases when the size of pipe rupture makes it necessary to cut pipe and put a new piece.
U	UNIVERSAL FIX	Joint for mutually connecting pipes of any material with the same nominal diameter, while the connection is secured against pipe's axial movement with the special metal fixers.
Ü	LONG UNIVERSAL	Universal joint for pipe breakage, when it is necessary to cut pipe. By installing this one joint, repair is made on the rupture up to 600 mm by default, and up to 2 m on request.
Ü	LONG UNIVERSAL FIX	Universal joints for pipe breakage, identical by characteristics to LONG UNIVERSAL joints, with the difference that they have special metal fixers in order to prevent pipe's axial movement.

ALFA

ALFA joints are used for connecting the end of a specific pipe with flange of shutter, fitting, cast iron or steel pipe.

ALFA joints are divided into two generations, based on their constructive solutions: first (I) and second (II). The main difference between these two generations lies in tendency of constructor to reach full universality, so that second generation ALFA joints are actually upgraded version of the first generation ALFA joints, with all the features and advantages of the first generation.

ALFA I generation joints are made separately for different types of pipe's material, as specified: AC - for asbest.-cement pipes, Č - for steel pipes, LG - for cast iron pipes, PE - for polyethylene pipes, PES - for polyester pipes, PVC - for PVC pipes (table 3 on page 35).

Main advantages of using ALFA I generation joints are:
- very simple installation and removal of the joint, with added advantage of deep pipe insert;
- specially constructed massive gaskets which enable reliable sealing at the connection point;
- possibility of gasket tightening in case that, from whatever reason, leakage occurs.

ALFA I generation

Examples of installation of the joints:

ALFA-AC DN350 - *Topola*

ALFA-Č DN800 - *Pančevo*

ALFA-AC DN500 - *Novi Pazar*

ALFA-PVC400 DN400 - *Knjaževac*

Primarily for installation in pipelines with nominal diameter over DN350, where universality is not a must and lower weight making installation easier.

ALFA II generation joints are completely universal and connect flange and pipe of any material with the same nominal diameter. There is a difference with second generation ALFA-PE joint which are made for dimensions of polyethilene pipes and have less range which is being covered by every joint, and they have rubber gasket with toothed ring, which is also the case in the first generation.

ALFA II generation

DN	OD range	Flange drilling	Bolts	Max AE	B
50	58 - 76	PN10/PN16	4 x M12	130	160
65	63 - 86	PN10/PN16	4 x M12	130	170
80	84 - 107	PN10/PN16	4 x M16	170	210
100	107 - 133	PN10/PN16	4 x M16	210	240
125	132 - 158	PN10/PN16	4 x M16	180	270
150	158 - 193	PN10/PN16	4 x M16	250	310
200 A	198 - 230	PN10 or PN16	4 x M16	230	350
200 B	218 - 256	PN10 or PN16	4 x M16	260	370
250	266 - 310	PN10 or PN16	6 x M16	280	430
300	315 - 356	PN10 or PN16	6 x M16	300	480

Example of installation of ALFA II generation *joints:*

Primarily for installation in pipelines with nominal diameter from DN50 to DN300, where universality is very important, whereby one joint covers all pipe types, even the class D of asbestos-cement pipes.

ALFA (266-310) DN250 - *Belgrade*

Examples of installation of ALFA special construction *Φ*1400mm for DN1200 pipe - *Belgrade*

Special construction of these ALFA joints prevented the wall of concrete pipe to erode thus solving very big and important issue.

ALFA FIX

ALFA FIX joints are based on existing production program developed for ALFA joints, with the distinction that, instead of usual flanges, there are special flanges with unique toothed metal fixers which are used for securing the connection against the axial movement of the pipe.
All installation ranges (table on page 7) and other general characteristics which are stated for the ALFA joints, are also valid for ALFA FIX joints.

Three special and unique advantages of the constructive solution with separate fixers are:
- metal fixers are fasten on their own, thus making possible to have separate thightening of the rubber gasket, which makes the sealing. This allows to apply different amount of force for fixers and gasket, so the gasket can be tightened with a much larger force, in order to facilitate reliable sealing, while the fixers can be tightened with smaller force to protect fragile types of pipes;
- each fixer has its own, rather large, tightening scope, which successfully deals with problems of pipe ovality, which is a common thing with pipes that have long been in exploitation;
- axis of the fixers are not perpendicular to the pipe axis, thus maximizing the applied torque.

ALFA FIX joints are, like ALFA joints, part of ARMAS SYSTEM (page 34).

ALFA FIX, with display of fixer in contact with the pipe

Examples of installation of the joints:

ALFA FIX DN200 - *Foča*

ALFA FIX DN450 - *Bor*

ALFA FIX DN700 - *Novi Sad*

ALFA SPECIAL

ALFA SPECIAL joint is used for connecting flange and the end of certain pipe in case when, due to leakage on the connection, existing E-piece has been removed and a new one is needed to be installed in conditions when both the pipe and the flange are immovable, and there is very limited space for installation.

For installing ALFA SPECIAL joint it is necessary to provide only 50 to 60 mm of space between the flange and the end of the pipe, in order to facilitate inserting parts of the joint and making connection. Joint itself consists of parts, including the main body of the joint which is detachable, in order to make insertion of parts in limited space and making connection as easy as possible.

ALFA SPECIAL joints are developed based on ALFA I generation joints, with all stated advantages, characteristics and installation scopes which have been designed and applied.

ALFA SPECIAL

Example of installation of the joint (and repairing failure in steps):

1

2

3

4

5

6

7

8

ALFA SPECIAL DN300 - *Šid*

b BETA

BETA joints are used for mutual connection between polyethylene pipes and PVC pipes. If the joint is connecting two polyethylene pipes it is marked BETA-PE while in case when connecting two PVC pipes it is marked BETA-PVC (table 3 on page 35).

These joints have wide application in repairing failures on PVC pipelines and as an alternative for jaw couplings, thanks to its constructive advantages, of which the most important are:

- in case of BETA-PE joints, diameter of the toothed ring which fix position of polyethylene pipe is adjustable, so that is possible to choose depth of ring engravement into the pipe wall, and sealing is not achieved on toothed part, but with a rubber gasket which has adjustable overlap;
- thanks to the mentioned construction of the ring, during the installation of the joint (no matter what the outer diameter of pipe is) there is no need for heating, nor the curvature of pipe can be a problem during the installation;
- in case of BETA-PVC joints, size of the overlap, i.e. specific pressure of the gasket on pipe, is adjustable with the possibility of gasket tightening in case that, for some reason, leakage occurs, while width of the gasket is very large which obstructs the axial movement of the PVC pipe.

BETA-PE

BETA-PVC

*In case there is a damage of PE pipe, leakage on welded joint or on connection with a jaw coupling, by using **one BETA-PE** joint, the failure is repaired fast and reliable, by removing the damaged part of the pipe and installing joint.*

Demonstration of fast repairing of damages on polyethylene pipes by using BETA-PE joints

Example of installation of the joints:

BETA-PE400 DN400 - *Sjenica*

C COMBI

COMBI joints enable connecting pipes made from different materials and/or with large deviation in size of outer diameters. These joints are being used in cases when joints with the usual range of diameters can not be used for connecting pipes with great difference in outer diameters.

Looking at constructive solution, COMBI joints are similar to first generation UNIVERSAL joints, difference being that they are not symmetrical and cover very different diameters on each side, thus enabling connection without any other piece(s) of armature.

COMBI

The table presents part of the diameter scopes, with gradation between nominal diameters (DN), which are covered, by default, using COMBI joints, if the hydraulic circumstances allow it.

DN	DN200	DN200 C	DN200 D	DN250	DN250 C	DN250 D	DN300	DN300 C	DN300 D	DN350	DN350 C	DN350 D	DN
DN200	219-234	224-242	240-258	267-284	280-296	302-317	315-330	342-357	360-375	374-394	398-412	419-435	DN350 D
DN200 C	224-242	240-258	267-284	280-296	302-317	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	DN400
DN200 D	240-258	267-284	280-296	302-317	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	DN400
DN250	267-284	280-296	302-317	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	DN400 C
DN250 C	280-296	302-317	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	DN400 D
DN250 D	302-317	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	DN450
DN300	315-330	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	DN450 C
DN300 C	342-357	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	*540-556*	DN450 D
DN300 D	360-375	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	*540-556*	*496-512*	DN500
DN350	374-394	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	*540-556*	*496-512*	*523-540*	DN500
DN350 C	398-412	419-435	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	*540-556*	*496-512*	*523-540*	*568-582*	DN500 C
DN350 D	*419-435*	*398-412*	*419-435*	*456-470*	*480-498*	*496-512*	*508-526*	*540-556*	*496-512*	*523-540*	*568-582*	*600-616*	DN500 D
DN	DN350 D	DN400	DN400	DN400 C	DN400 D	DN450	DN450 C	DN450 D	DN500	DN500	DN500 C	DN500 D	DN

*All nominal diameters and their ranges which form one assembly in a straight line are possible combinations, so that make posible to combine all diameters in the DN350-500 range, for example.

d DUO

DUO joints are being used for repairing damage due to the pipe bursting without pipe cutting on pipes with smaller diameters. They consist of only two parts, in order to accelerate installation.

DUO

EXTRA

EXTRA joints make possible to repair pipe ruptures without cutting pipes or without consumers being cut-off. These joints can also be used as a substitution for an existing joint if there is some leakage on the previously made connection.
We offer three types of these joints: EXTRA, EXTRA-C and EXTRA-D (table on page 35). When EXTRA joints are being used they can make repair on steel, cast iron, PVC or asbestos-cement pipe type B (both processed and crude diameter), while by using EXTRA-C or EXTRA-D joints repairs are being made on corresponding class of the asbestos-cement pipe (C or D).

Basic advantages of using EXTRA joints are:
- repair is made without pipe cutting or consumers being cut-off on lengths up to 200 mm;
- for repair of one failure one joint is enough;
- if there is a damage on sealing surface of the pipe at the place where *Gibault*, *Vitlak*, *Dalma* (or some other) joint was, failure is repaired without cutting that part of the pipe;
- the allowed angular deviation of connecting pipes is up to 8°.

EXTRA

Examples of installation of the joints (and repairing failure in steps):

1 2 3

EXTRA DN350 - *Topola*

EXTRA-B DN500 - *Knjaževac* EXTRA-C DN600 - *Bojnik* EXTRA-C DN500 - *Prigrevica*

LONG EXTRA

LONG EXTRA joints are used for repairing of pipe failures in cases when pipe rupture occurs, or as a substitution for existing joint if there is a leakage on the connection. These joints are used for major ruptures (300-500 mm, depending on pipe's nominal diameter) and are ideal solutions for repairing the damages of larger lengths, such as longitudinal ruptures of pipes.

Basic advantages of using LONG EXTRA joints are:
- repair is made without pipe cutting (for small leakages even without consumers being cut-off);
- for repair of one failure one joint is enough;
- with one joint you can repair pipe failure on pipe with the same nominal diameter regardless of the pipe's type of material since one joint covers large diameter range (table on page 15);
- if there is a damage on sealing surface of the pipe at the place where *Gibault*, *Vitlak*, *Dalma* (or some other) joint was, by installing LONG EXTRA joint the failure is repaired, without cutting that part of the pipe, because distance between gaskets in this case is greater than in stated joints;
- the allowed angular deviation of connecting pipes is up to 5°.

LONG EXTRA

Examples of installation of the joints (and repairing failure in steps):

1 2 3

LONG EXTRA DN400 - *Bela Crkva*

LONG EXTRA DN500 - *Knjaževac* LONG EXTRA DN200 - *Šid* LONG EXTRA DN500 - *B. Luka*

LONG EXTRA+

LONG EXTRA+ joints are used for connecting one or two secondary pipelines on the primary pipeline, while primary pipeline can be already in exploitation or in the process of construction like the secondary pipeline(s).

LONG EXTRA+ joints replace certain fittings and E-pieces in installation, while the installation of joint is made without pipe cutting and, under specific conditions, without consumers being cut-off.

Depending on the number of secondary pipelines, and their position in relation to the primary pipeline, there are following types of joints:

- LONG EXTRA-P
- LONG EXTRA-P45
- LONG EXTRA-P/P
- LONG EXTRA-P/P45
- LONG EXTRA-P45/P45

Basic advantages of using LONG EXTRA+ joints are represented in fact that during the installation of secondary pipeline(s), pipe of the primary pipeline is not being cut, which makes forming the pipe connection, i.e. installation of the joint, simple, fast and easy.
With this way of installing, every possibility for water power stroke is eliminated (because there is no pipe cutting during the installation of the joint, so there is no opportunity for air to enter the pipe), and advantage of installation without turning off the water is that after the installation of the pipeline there is no blurred water, nor are possible consumers cut-off during the installation.

LONG EXTRA+ joints are part of ARMAS SYSTEM (page 34).

LONG EXTRA-P

LONG EXTRA-P45

LONG EXTRA-P/P

LONG EXTRA-P/P45

LONG EXTRA-P45/P45

Examples of installation of the joints (and solving problem in steps):

1

2

3

LONG EXTRA-P DN400/DN100 - *Lazarevac*

1

2

LONG EXTRA-P DN400/DN150 - *Pančevo*

LONG EXTRA-P DN200/DN80
Knjaževac

Although LONG EXTRA-P joints are the most common type of LONG EXTRA+ joints, other are also very interesting and useful when there is desire to connect new pipeline(s) easily and fast. For further details look at the page 34 of this catalog.

Example of connection made with LONG EXTRA-P and ALFA joint

Table shows application scopes for LONG EXTRA and LONG EXTRA+ joints, as well as the part of possible connections for secondary pipeline(s) for LONG EXTRA+ joints (primarily listed some of the possible connections for cast iron variant, while significantly more options are available in case when joints are made as welded constructions, when there is also no limitation for linkage between nominal diameters of connected pipes).

LONG EXTRA, LONG EXTRA+			Possible secondary pipeline(s) for LONG EXTRA+					
DN	PN	Application scope	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300
100	10/16	110 - 128	O	O				
150	10/16	158 - 176	O	O				
150	10/16	176 - 194	O	O				
200	10/16	219 - 234	O	O	O			
200	10/16	236 - 254	O	O	O			
250	10/16	266 - 284	O	O	O	O		
250	10/16	280 - 296	O	O	O	O		
300	10/16	315 - 332	O	O	O	O	X	
300/350	10/16	342 - 360	O	O	O	O	X	
350/400	10/16	398 - 416	O	O	O	O	X	X
350/400	10/16	419 - 436	O	O	O	O	X	X
400/450	10/16	456 - 472	O	O	O	O	X	X
450/500	10/16	496 - 512	O	O	O	O	X	X
450/500	10/16	519 - 536	O	O	O	O	X	X
500	10/16	568 - 583	O	O	O	O	X	X

O - possible flanges for secondary pipeline(s) in standard, cast iron, variant
X - possible flanges for secondary pipeline(s) in case of welded construction

LONG EXTRA SPECIAL

LONG EXTRA SPECIAL joints are used to repair pipe failures when there is a need for sanation of leakages at pipe connections alongside damage of pipe or connecting joint ("Dalma", "Vitlak", "Gibault", "Beto") or other connecting element, upon request of not turning off the water.

By installing LONG EXTRA SPECIAL joint the existing connection joint is not removed, so there is no pipe cutting or consumers being cut-off.

LONG EXTRA SPECIAL

Schematic display and view of the damage

Examples of installation of the joints (and repairing failure in steps):

1 2 3

LONG EXTRA SPECIAL (LES) DN500 - *Zaječar*

LES DN700 - *Užice* LES DN350 - *Topola* LES DN600 - *Vranje*

LONG EXTRA ULTRA

LONG EXTRA ULTRA joints are upgraded version of LONG EXTRA SPECIAL joints, which are used for sanation of leakages at connections, alongside damage of the connecting joint, upon request that should be no water turning off. The main characteristic of LONG EXTRA ULTRA joint is the possibility of covering very large differences in pipe diameters of the connected pipes.

By installing LONG EXTRA ULTRA joint the existing connection joint is not removed, so there is no pipe cutting or consumers being cut-off.

LONG EXTRA ULTRA

Examples of installation of the joints (and repairing failure in steps):

LONG EXTRA ULTRA DN600 - *Novi Sad*

LONG EXTRA ULTRA DN700 - *Zrenjanin*

LINK

The main purpose of LINK joints is to stop leakage on the existing connection of pipes without pipe cutting and without consumers being cut-off. Thanks to perennial experience and feedback from our customers, we've been able to develop a large production program for these joints.

Due to a large number of materials from which connected pipes are made, and their connection possibilities, we manufacture following types of LINK joints (table 3 on page 35):

1) LINK-AC - for stopping leakage on the existing connection of asbestos-cement pipes, when the connection is made by using *Vitlak*, *Dalma* or some similar joint;
2) LINK-AC-ŽIBO - for stopping leakage on the connection of asbestos-cement pipes when the connection is made by using *Gibault* (*Žibo*) joints;
3) LINK-BETON - for stopping leakage on the connection between pipes made from concrete, when sealing is made with lead or rubber gasket;
4) LINK-LG-O - for stopping leakage on the sleeve of cast iron pipe on which sealing is with lead;
5) LINK-LG-ŽI - for stopping leakage on the sleeve of cast iron pipe on which sealing is made by the "ŽI (*Železara Ilijaš*)" connection;
6) LINK-LG-TYTON - for stopping leakage on the sleeve of cast iron pipe on which sealing is made by the "TYTON" connection;
7) LINK-LG-UNION - for stopping leakage on the sleeve of cast iron pipe on which sealing is made by the "UNION" connection;
8) LINK-PES - for stopping leakage at the connection between polyester pipes;
9) LINK-PVC - for stopping leakage at the connection between PVC pipes (sleeve);
10) LINK-PE - for stopping leakage at the connection between polyethylene pipes.

Some types of LINK joints

As the additional partition, with purpose of clear classification and easier finding of the desired product by our customers, LINK joints are divided in two groups:
- LINK WITH SINGLE SEALING;
- LINK WITH DOUBLE SEALING.

LINK WITH SINGLE SEALING joints are used with intention to stop leakages on the existing pipe connections without pipe cutting or consumers being cut-off, in those cases when pipes are made of PVC (LINK-PVC ⑨), concrete (LINK-BETON ③) and cast iron (depending on the way pipes are connected, there are: LINK-LG-O ④, LINK-LG-ŽI ⑤, LINK-LG-TYTON, LINK-LG-UNION).
LINK WITH DOUBLE SEALING joints are used for stopping leakages, without pipe cutting or consumers being cut-off, on connections of asbestos-cement pipes, over the existing joints of several types (LINK-AC ①), while in cases when the existing joint is of *Gibault* (*Žibo*) type, joints LINK-AC-ŽIBO ② are being used. In this group of LINK joints there are also LINK-PES ⑧ joints, for polyester pipes, as well as LINK-PE joints, which are being used for polyethylene pipes.
We manufacture LINK-AC and LINK-AC-ŽIBO joints in B, C and D type, depending on the class of asbestos-cement pipes for which they are intended (table 3 on page 35).

As a rather innovative solution, regarding the LINK joints for asbestos-cement pipes, we produce LINK-AC-ŽIBO joints, which are being installed over the existing *Gibault* (*Žibo*) type joint, without the need to remove it, or to cut pipe or cut-off consumers. This is made possible by using special constructive features of our joint to be able to absorb elements of the existing *Žibo* connection.

LINK-AC-ŽIBO

Another quite represented group of the LINK joints is the one dedicated for the cast iron pipes. Depending on the way pipes are connected, we offer LINK-LG-O joints (in cases when sealing is made by lead) and LINK-LG-ŽI (when sealing is made by the ”ŽI” connection), while also successfully resolving cases when sealing is made by *TYTON*, as well as *UNION* connection.

LINK-LG-O

Very represented are also LINK-PVC joints, which are used for leakages on sleeve of PVC pipes.

LINK-PVC

For all the types of LINK joints, as well as all products from the range of EXTRA, LONG EXTRA, LONG EXTRA+, LONG EXTRA SPECIAL and LONG EXTRA ULTRA joints, we have developed an innovative and advanced way of forming the reliable sealing, by using ready-made gaskets.

Old method of installing required that gasket for the primary sealing was to be cut to adequate measure of the pipe in place of installation. This task, although not that challenging, sometimes proved to be a burden, especially to inexperienced workers, and furthermore for the pipes of big dimensions. Most common mistakes were that gasket was being cut short or sideways.
In order to eliminate possibility of error, we have developed special device that allows the gasket, which is supplied as part of a ready-to-assemble coupling, to consist of ready-made segments that have special "jigsaw" edges for interlocking, allowing them to be unambiguously and clearly inserted or ejected as needed, which allows the gasket to be of completely adequate dimensions for reliable sealing, without the need for any cutting during the assembly process. This solution is being called EXTRA LINK GASKET.

It is also important that material of the gaskets which are being used, their shape, dimensions and other characteristics have not been changed in comparison with time-tested standards, while the only difference being the stated way of inter-locking of the parts, which represents significant innovation and provides additional guarantee in assuring secure connection and reliable sealing.

Examples of installation of the joints (and repairing failure in steps):

1 2 3

LINK-AC DN350 - *Topola*

LINK-AC-C DN200 - *Rožaje*

LINK-BETON DN900 - *Belgrade*

LINK-AC DN500 - *Knjaževac*

1 2 3

LINK-AC-ŽIBO DN350 - *Bela Crkva*

LINK-LG-TYTON DN300 - *Belgrade*

LINK-BETON DN800
Aleksinac

LINK-LG-TYTON DN500 - *Mladenovac*

LINK-BETON DN600
Aleksandrovac

MDK

MDK joint, made by ARMAS, is a classic detachable piece with three flanges, for easy and fast installation and removal of pipeline armature in waterworks systems.

MDK

MDK-OPTIMA

MDK-OPTIMA joint is a facilitated version of MDK joint, delivered with all the needed bolt goods for installation, while not all of the bolts being in full length, which lowers installation time and allows bigger angular movement of the connected armature.

MDK-OPTIMA

MDS-MZ

MDS-MZ joint is a detachable piece, with two flanges, which is used during the installation of interpreter shutters into the pipeline system.

MDS-MZ joint and schematic of the connection

MDS

Basic purpose of MDS joints is easy and simple installation and removal of pipeline armature in waterworks systems.
Detachable joints - MDS, made by ARMAS, are lighter from the usual detachable joints 30 to 40 percent, and have installation length lowered up to 50% when compared to the usual detachable joints, which all have a significant effect on the size decrease of the maintenance hole.

Beside already mentioned, other advantages of using MDS joints are:
- there are only two flanges (in contrast with other products which have three or four) so there are less nuts to tight, which affects the time of installing and removal of the pipeline armature;
- small installation length influence that MDS joint successfully connects flanges of armature and fitting even in cases when there are small angular deviations;
- smaller installation length (in comparison with usual detachable elements) provides easier and less challenging working conditions in limited space.

MDS

In order to alleviate to the maximal extent the usage of MDS joints, there is a schematic of the established connection, with all the most important installation measures, with the purpose of having the correct information about possibilities of these joints. Installation measures are being given for the range of most commonly-used nominal diameters from our production program.

DN	L_1	L_2	L_3
80	90	110	200
100	100	120	225
125	110	130	225
150	110	130	235
200	120	140	250
250	120	140	250
300	120	140	265
350	130	160	300
400	130	160	330
450	140	170	350
500	140	170	350
600	150	180	380

Schematics of the connection made with MDS joint and table of installation lengths

MDS-OP

MDS-OP joints are made as a result of need to solve potential problems during the reconstruction of pipeline networks and changing shutters.

As it is well-known, old oval shutters, which are being replaced, have larger installation length in comparison to new flat ones, resulting that after replacing shutters there is empty space between free flange of the shutter and the flange of the F-F piece.
Because there were no conventional products for mentioned problem, we have made MDS-OP joints which, by installing, render replacing shutters fast and efficient.

MDS-OP

Installation lengths of the MDS-OP joints are calculated in such way that they cover exactly that space which originates from the removal of the old oval shutter.

MDS-OP DN300 - *Šid*

Example of installation of the joint (and solving problem in steps):

1 2 3 4

MDS-OP DN400 - *Lazarevac*

μ MIKRO

The basic purpose of MIKRO joints is easy installation and removal of pipeline armature in pipeline systems with desire to have the smallest possible installation length.
ARMAS produce wide range of detachable joints, but what puts MIKRO joint apart from all the others is its installation length, which has been reduced to minimal, without compromising the functionality of it in any segment of application.

MIKRO joints have smaller installation lengths than even MDS joints, which were the shortest detachable pieces in our production range until now. This makes MIKRO joints unparallel solution for installation in tight spaces.

Additional advantage of using MIKRO joints is that it has its own independant system for making connections and does not use any other part of exisiting flange connection, which additionally makes their application easier and faster. This feature is made possible by innovative approach during construction of these joints and special way of making connections between its parts.

MIKRO joint and a view of the detachable connection it creates

r REDUCER FLANGE

REDUCER FLANGE, made by ARMAS, is the joint which is used as the substitution for FFR fitting, in cases when a lower installation length of the connecting piece is needed.
Installation length of REDUCER FLANGE from our production program is 20-50 mm, depending on the flange connection which is planned on each side of the flange (DN and PN parameters).

Considering that we manufacture these products for all combinations of diameters up to DN800, and due to such a large number of different products, these joints are made primarily by request.

REDUCER FLANGE

ADJUSTABLE FLANGE GASKET

ADJUSTABLE FLANGE GASKET - PPZ, made by ARMAS, is specially designed and produced gasket for flange connection which covers axial shuffling from 0 to 8°.

Regulation of axial shuffling is done instantly and simply, by twisting one half of the gasket relative to the other half of the gasket.

Outstanding use of PPZ is especially evident in easy solving the problem of tilting hydrants during the installation, when it is often necessary to correct axial shuffling of the hydrant, which occurs because of imperfections in pipe positioning into the grid.

Another very useful application of PPZ is evident during the reconstructions of pipelines, where it is often present angular deviation between old pipelines, which are being reconstructed. By simply twisting one half of the PPZ to another, any angular deviation up to 8° is resolved instantly.

ADJUSTABLE FLANGE GASKET - PPZ

ADJUSTABLE FLANGE GASKET - PPZ is made from EPDM, as well as the all other gaskets made by ARMAS, according to the SRPS EN 681-1 standard, with needed firmness, resistance to ageing, and with all the applicable certificates, including the Health certificate.
Special manufacturing process provides reliable sealing with the possibility of twisting one part of the gasket in relation to the other half and finding the corresponding angular deviation.

ADJUSTABLE FLANGE GASKET - PPZ production scope is from DN80 to DN200, while for the larger pipes we offer a solution of the same purpose, but made from two connected metal parts with rubber gasket between - ADJUSTABLE FLANGE RING - PPP (page 26).

ADJUSTABLE FLANGE GASKET - PPZ DN100

Examples of possible flange connections achieved by using PPZ
and a display of covered angular deviations

ADJUSTABLE FLANGE RING

ADJUSTABLE FLANGE RING - PPP, made by ARMAS, is specially designed and manufactured armature for flange connection which covers axial shuffling from 0 to 6°.

Regulation of axial shuffling is done instantly and simply, by twisting one half of the ring relative to the other half of the ring, which easily solves the problem(s) of axial shuffling of various armature which occurs because of imperfections in pipe positioning into the grid.

Special attention was given in order to make operational use as simple as possible, because of the scale of products and their large weights, so there are special elements for product movement and its placing into the correct position, as well as for the adjustment of the needed angle.

ADJUSTABLE FLANGE RING - PPP

ADJUSTABLE FLANGE RING - PPP production scope is from DN250 to DN1000, while for the smaller pipes we offer a solution of the same purpose, but made from EPDM rubber, with needed firmness and resilience to ageing - ADJUSTABLE FLANGE GASKET - PPZ (page 25).

PPP DN250 - Display of possible connections and covered angular deviations

Examples of installation of the joints:

PPP DN500 - *Belgrade*

PPP DN300 - *Despotovac*

MULTIAXIS ADAPTER

MULTIAXIS ADAPTER, made by ARMAS, is a unique solution that enables connection between pipes which are not in the same axis. This was made possible for wide range of off-axis positions, while increase in pipe diameter also increases the stated range which is being covered.

For nominal diameters up to DN300 covered range of off-axis deviation is up to 20 mm by side, i.e. 40 mm if installation is made in pair. For diameters between DN350 and DN600 gross covered deviation is 60 mm, and in range from DN700 to DN1000 gross covered deviation is 80 mm.

MULTIAXIS ADAPTER

When combining MULTIAXIS ADAPTER - VA with ADJUSTABLE FLANGE GASKET - PPZ or ADJUSTABLE FLANGE RING - PPP there is a complete solution for connecting two pipelines, regradless of discrepancies in axis and alignment deviations between them - ARMAS CONTACT.

ARMAS CONTACT

ARMAS CONTACT is a unique platform for pipeline connections and is the result from decades of work in finding new and innovative solutions which would enable installing of pipeline armature in water supply systems as fast and as easy as possible.

ARMAS CONTACT enables connecting two pipelines which are not on the same axis, with the addition of them not being parallel. The combination of these factors is common and represents rather serious issue, for which we created easy, fast and efficient solution.

ADJ. FLANGE GASKET - PPZ
solves angular deviation

MULTIAXIS ADAPTER - VA
solves off-axis positioning

ARMAS CONTACT

U UNIVERSAL

UNIVERSAL joints are made for pipe failures and are universal, i.e. connect pipes made from same or different material. These joints are used for repairs of pipeline failures, when a pipe rupture is of such a length that pipe cutting and inserting a new piece of pipe is necessary.

UNIVERSAL joints are divided into two generations based on their constructive solution: first (I) and second (II).

Regarding the UNIVERSAL first generation joints, we manufacture three types of these joints: UNIVERSAL, UNIVERSAL-C and UNIVERSAL-D (table 2 on page 35).
It is important to mention that during the selection of diameter scope which is covered by each of these joints, special attention was made in order to make possible repairing failures on the asbestos-cement pipes, types C and D, by inserting pipe part made of steel, cast iron or plastic, in case that providing appropriate asbestos-cement pipe is not possible.

UNIVERSAL I generation

Examples of installation of the joints:

UNIVERSAL DN350 - *Topola*

UNIVERSAL DN300 - *Knjaževac*

UNIVERSAL DN600 - *Krivaja*

UNIVERSAL DN500 - *Lazarevac*

Primarily for installation in pipelines with nominal diameter over DN350, where universality is not a must and lower weight making installation easier.

UNIVERSAL II generation joints are upgraded version of first generation UNIVERSAL joints, with all the features and advantages of the first generation, while having larger installation lengths and a much wider diameter scope which is covered by one joint, as shown in the table below. UNIVERSAL II gen. connect pipes with the same nominal diameter, regardless of the materials.

DN	OD range	Flange drilling	Bolts	Max AU	B
50	58 - 76	PN10/PN16	8 x M12	190	160
65	63 - 86	PN10/PN16	8 x M12	190	170
80	84 - 107	PN10/PN16	8 x M16	240	210
100	107 - 133	PN10/PN16	8 x M16	260	240
125	132 - 158	PN10/PN16	8 x M16	280	270
150	158 - 193	PN10/PN16	8 x M16	330	310
200 A	198 - 230	PN10 or PN16	8 x M16	340	350
200 B	218 - 256	PN10 or PN16	8 x M16	350	370
250	266 - 310	PN10 or PN16	12 x M16	370	430
300	315 - 356	PN10 or PN16	12 x M16	390	480

Primarily for installation in pipelines with nominal diameter from DN50 to DN300, where universality is very important, whereby one joint covers all pipe types, even the class D of asbest.-cement pipes.

UNIVERSAL II generation

Example of installation of the joints:

UNIVERSAL DN300 - *Jagodina*

As an additional example of innovative application of UNIVERSAL I generation joints for solving of various pipe failures, there is the stated one in which it was needed to fix the damage on the spot where *Gibault* (*Žibo*) joint was located, with extremely limited space for installation, as in pictures.

UNIVERSAL FIX

UNIVERSAL FIX joints are based on the existing production program developed for UNIVERSAL joints with the distinction that, instead of usual flanges, there are special flanges with toothed metal fixers which are used for securing connection against the axial movement of the pipe.
All installation ranges (table on page 29) and other general characteristics which are stated for the UNIVERSAL joints, are also valid for UNIVERSAL FIX joints.

Three special and unique advantages of the constructive solution with separate fixers are:
- metal fixers are fasten on their own, thus making possible to have separate thightening of the rubber gasket, which makes the sealing. This allows to apply different amount of force for fixers and gasket, so the gasket can be tightened with a much larger force, in order to facilitate reliable sealing, while the fixers can be tightened with a smaller force so that pipes made from more fragile materials would not be damaged;
- each fixer has its own, rather large, tightening scope, which successfully deals with problems of pipe ovality, which is a common thing with pipes that have long been in exploitation;
- axis of the fixers are not perpendicular to the pipe axis, thus maximizing the applied torque.

UNIVERSAL FIX, with display of fixer in contact with the pipe

Examples of installation of the joints:

UNIVERSAL FIX DN100 - *Smederevska Palanka*

UNIVERSAL FIX DN200 - *Ljig*

LONG UNIVERSAL

LONG UNIVERSAL joints are based on the existing program of UNIVERSAL joints, but they are used for repairing of pipe breakages with greater lengths. By installing one LONG UNIVERSAL joint, pipe breakage up to 600 mm is solved by default, and up to 2 m on request.

All other general characteristics and installation ranges (table on page 29) which are stated for the UNIVERSAL joints, are also valid for LONG UNIVERSAL joints.

LONG UNIVERSAL

LONG UNIVERSAL FIX

LONG UNIVERSAL FIX joints represent the pinnacle of development based on the UNIVERSAL joints and their special branch - LONG UNIVERSAL joints.

They are used in cases when it is necessary to, apart from fixing the pipe's failure, secure the connection from axial movement. They are based on the existing program of LONG UNIVERSAL joints with the distinction that, instead of usual flanges, there are special flanges with toothed metal fixers which are used for securing connection against the axial movement of the pipe.
By installing one LONG UNIVERSAL FIX joint, pipe breakage up to 600 mm is solved by default, and up to 2 m on request.

All other general characteristics and installation ranges (table on page 29) which are stated for UNIVERSAL and LONG UNIVERSAL joints, are also valid for LONG UNIVERSAL FIX joints.

LONG UNIVERSAL FIX

ARMAS UNIQUES

ARMAS UNIQUES is a collective name for unique products and solutions which we were able to develop and produce during these decades of existence, with only a small portion shown here.

Most of these constructions were made just once and for a specific case. Although most of our products have started their production path as a solution for dedicated problem which occured with our clients and then became part of our standard production program thanks to their many advantages, products displayed on these pages were developed for such outstanding problems which were never replicated since, for now. We have, however made an effort to give name to each of them and to present them with the place in lasting legacy of innovation and excellence.

ALFA SPECIAL ADAPTER

Using these joints the problem of angular deviation of 15° between two connecting pipelines was successfuly solved. This was managed by unique construction of the joint, in which there is an angle of 7,5° betwen the axis of the flange and the axis of pipe entrance in the joint. By using pair of these joints it was possibe to overcome faced angular deviation and to ensure connection.

ALFA SPECIAL ADAPTER DN1100 - *Belgrade*

LINK SPECIAL

By using this joint one long-lasting problem was solved without pipe cutting or turning off water. This was made possible by product's innovative solution of using some of the existing connection parts to make secure bond and sealing while product parts being inserted in a very tight space.

LINK SPECIAL DN600 - *Požarevac*

LINK SPECIAL ADAPTER

By using this joint very complex problem was solved which occured on pipe connection between the main pipeline DN1000 and the secondary pipeline DN500. In this spot there was damage and significant leakage occured. By using uniqely designed joint this problem was resolved, without pipe cutting or consumers being cut-off, while the fixers made sure there were no movement.

LINK SPECIAL ADAPTER DN1000 - *Banja Luka*

LONG EXTRA SPECIAL ADAPTER

This solution could be considered to be our most innovative and unique, while also the problem being almost certainly the most complex one, which we ever came across.
In the stated case there was an angular deviation of 11° between the pipes at the point of axis shiffting, and on that point leakage occured. Pressure during installation was of an apex working conditions of 12 bar and there was no possibility of reducing it.
Our solution was to cover the whole existing connection with one joint, made from multiple parts (in this case six parts of the joint's body and four parts of pressure rings). In this way the problem was solved without pipe cutting or consumers being cut-off, under peak working conditions.

LONG EXTRA SPECIAL ADAPTER DN350 - *Topola*

ARMAS SYSTEM

ARMAS SYSTEM is based on intention to offer a combined solution which will enable to work on construction of new pipeline networks, and also maintenance and reconstruction of existing, as fast, efficient and cheap as possible. The main objective is to use some of the numerous solutions from LONG EXTRA+ family of products to make connections to one or two secondary pipelines, while using different types of ALFA joints to actually connect them.

In cases when it is necessary to add security against axial movement of the connection it is advisable to use, instead of more typical ALFA joints, ALFA-PE joints (if secondary pipeline is made of polyethylene) or ALFA FIX joints with uniquely-made fixers and total universality, i.e. possibility to be used for any type of pipes.

All joints from LONG EXTRA+ family of products are being installed without pipe cutting or consumers being cut-off.

For more information about all joints which create ARMAS SYSTEM see pages 6, 7 and 8 (for ALFA joints), i.e. 14 and 15 (for all LONG EXTRA+ joints) of this Catalog.

APPLICATION AREAS OF ARMAS JOINTS

ALFA (II gen.), UNIVERSAL (II gen.), ALFA FIX, UNIVERSAL FIX, LONG UNIVERSAL, LONG UNIVERSAL FIX

1

DN	PN	Application range
50	10/16	58 - 76
65	**10/16**	**63 - 86**
80	10/16	84 - 107
100	**10/16**	**107 - 133**
125	10/16	132 - 158
150	**10/16**	**158 - 193**
200A	10/16	198 - 230
200B	**10/16**	**218 - 256**
250	10/16	266 - 310
300A	**10/16**	**315 - 356**
300B	10/16	342 - 372
350A	**10/16**	**368 - 410**
350B	10/16	398 - 440

DN	PN	Application range
400A	**10/16**	**398 - 440**
400B	10/16	425 - 470
450A	**10/16**	**448 - 496**
450B	10/16	498 - 538
500A	**10/16**	**498 - 538**
500B	10/16	546 - 585
600A	**10/16**	**608 - 640**
600B	10/16	654 - 700
700A	**10/16**	**710 - 742**
700B	10/16	764 - 814
800A	**10/16**	**812 - 846**
800B	10/16	872 - 930

EXTRA, UNIVERSAL (I gen.)

2

DN	EXTRA UNIVERSAL	EXTRA-C UNIVERSAL-C	EXTRA-D UNIVERSAL-D
50	60 - 74	60 - 74	60 - 74
65	**75 - 88**	**75 - 88**	**75 - 88**
80	88 - 106	88 - 106	98 - 110
100	**110 - 128**	**110 - 128**	**128 - 142**
125	139 - 156	139 - 156	155 - 169
150	**159 - 176**	**168 - 185**	**185 - 202**
200	219 - 234	224 - 242	240 - 258

DN	EXTRA UNIVERSAL	EXTRA-C UNIVERSAL-C	EXTRA-D UNIVERSAL-D
250	**267 - 284**	**280 - 296**	**302 - 317**
300	315 - 330	342 - 357	360 - 375
350	**374 - 394**	**398 - 412**	**419 - 435**
400	398-412 / 419-435	456 - 470	480 - 498
450	**496 - 512**	**508 - 526**	**540 - 556**
500	496-512 / 523-540	568 - 582	600 - 616

OUTER PIPE DIAMETERS

3

DN	ASBESTOS-CEMENT PIPES						LG (cast iron)	Č (steel)	PVC	PE
	B	B+	C	C+	D	D+				
50	68	(74)	68	(74)	68	(74)	66	60,3	63	63
65	78	(84)	78	(84)	78	(84)	82	76,1	75	75
80	98	(104)	98	(104)	102	(107)	98	88,9	90	90
100	118	(124)	120	(126)	128	(132)	118	108 114,3	110 125	110 125
125	143	(150)	147	(154)	155	(158)	144	133 139,7	140	140
150	168	(175)	176	(183)	186	(193)	170	159 168,3	160 180	160 180
200	224	(232)	232	(240)	248	(254)	222	219,1	200 225	200 225
250	276	(284)	286	(294)	302	(310)	274	267 273	250 280	250 280
300	330	(339)	342	(351)	360	(371)	326	323,9	315	315
350	384	(394)	398	(408)	420	(430)	378	355,6 368	355	355
400	438	(448)	456	(466)	480	(490)	429	406,4 419	400	400
450	492	(503)	512	(523)	540	(551)	480	457,2 480	450	450
500	546	(557)	568	(579)	600	(611)	532	508 530	500	500

+ - outer (crude) diameter of the appropriate asbestos-cement pipe (given that these dimensions are not given by standard, values in brackets are approximate, because they differ depending on the company that made specific pipe)

Quality solutions, permanent certitude.

A R M A S

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25+ years

We have celebrated our first 25 years of work in 2023, with hope that the next 25 years will be even more successful and that we will always be alongside You, as a reliable cooperator and trusted support.

Innovative, since 1998