

Certifying Institution Centralny Ośrodek Badawczo-Rozwojowy Techniki Instalacyjnej „INSTAL” PL 02-656 Warszawa ul. Ksawerów 21 Tel/Fax: (022) 843-71-65	TECHNICAL CERTIFICATE	Number: AT/97-01-0293-01
	Name of product: BALL COCKS DZT	
	Applicant: BROEN-DZT S.A. ul. Pieszycza 10 58-200 Dzierżoniów	Pages: 10 Page 1/10

A. ACCEPTATION

On the basis of decree of Ministry of Internal Affairs of August 5-th, 1998 on acceptations and technical criteria as well as single use of construction engineering (Dz. U. 107 of 1998, item 679 with subsequent changes in Dz. U. no. 8 of 2002, item 71), in the certification process carried out in Centralny Ośrodek Badawczo-Rozwojowy Techniki Instalacyjnej INSTAL

**It is certified the usability of construction product in building industry under the name:
Ball cocks DZT**

produced by:

**BROEN-DZT
ul. Pieszycza 10
58-200 Dzierżoniów**

presented in the following certificate in part B, point 1, with purpose, range and conditions of using according to part B, point 2. Production place (a) to which this Technical Certificate applies was presented in part C (point 5).

Technical Certificate is not a document accepting a product to use in building industry in Poland. It only constitutes the basis to issue such documents according to settlements in part B, point 5.1.1. of this Technical Certificate.

This Technical Certificate contains 10 pages and can be accessible only as a whole with maintenance formal settlements presented in part B, point 5.2. It is allowed to make use of first page reproductions of the Certificate for promotion aims by Supplier. The reproduction does not supersede complete Certificate.

Expiry Date

**Technical Certificate COBRTI INSTAL No. AT/97-01-0293-01
is valid till December 29, 2007.**

DESCRIPTION

1. Subject of Acceptation

1.1 General, technical characteristics

The subject of acceptance are ball cocks of reduced flow, in the range of nominal diameters DN 10 to DN 500 and nominal pressures to $p_{nom} = 4,0$ MPa, allowable working temperatures to $t_p = 200$ ° C, are designed for heat distribution networks and heating installations.

Assortment of cocks contains the following types:

Specification of cocks covered by acceptance

Table 1

Cock type	Type of connection	DN	Declared work parameters	
			P_{nom} [MPa]	t_p [°C]
to be welded	to be welded from both sides	10; 15; 20; 25; 32; 40; 50	4,0 2,5 1,6	200
		65; 80; 100; 125; 150; 200; 250; 300; 350; 400; 500	2,5 1,6	
with flanges	flanges from both sides	10; 15; 20; 25; 32; 40; 50	4,0 2,5 1,6	
		65; 80; 100; 125; 150; 200; 250; 300; 350; 400; 500	2,5 1,6	
threaded	internal thread from both sides PN-ISO 7-1 R_p 3/8 – R_p 2	10; 15; 20; 25; 32; 40; 50	4,0 2,5 1,6	
		10; 15; 20; 25; 32; 40; 50	4,0 2,5 1,6	
threaded to be welded	external thread PN-ISO 7-1 R_p 3/8 – R_p 2/ to be welded	10; 15; 20; 25; 32; 40; 50	4,0 2,5 1,6	

Cocks have got a welded housing, painted with water soluble acrylic paint.

The closing element is a ball of corrosion resistive steel of reduced flow, initially pressed during assembling, seated springy in gaskets (inlet, outlet).

The seat of ball form spring gaskets of polytetrafluoroethylene reinforced with graphite (PTFE+C), which are supported in housing seats by metal mounting and disk springs (for $DN \leq 200$). Spring gaskets in cocks of $DN > 200$ have got an additional O-ring placed on circumference.

External sealing of a cock on a spindle is made of double O-ring type gaskets of EPDM as well as gaskets of polytetrafluoroethylene reinforced with graphite (PTFE+C). The cocks have got drive in the form of hand one-arm lever (DN 10 – DN 150), and cocks of diameters DN 200-500 are equipped with mechanical gear.

Rys. 1 Fig. 1

Cock to be welded DN 100 (1 housing; 2 ball; 3 spring ring of a ball; 4 stud to be welded; 5 spindle; 6 disk spring; 7 o-ring type gaskets of EPDM; 8 gasket of PTFE; 9 nut; 10 one-arm lever; 11 metal mounting of a ball gasket).

1.2 Marking

Marking must contain:

- name: ball cock DZT
- cock type;
- nominal diameter;
- nominal pressure.

An instance of DZT cock marking with welded connection of nominal diameter DN 50, for nominal pressure $p_{nom} = 4,0$ MPa

Ball cock DZT to be welded, DN 50; $p_{nom} = 4,0$ MPa

1.3 Product code

PKWiU 29.13.13.-73.15

2. Purpose, range and conditions of use

Ball cocks are designed to use in central heating installations and heating networks as blocking fittings to open and close water flow.

Declared work parameters of cocks are presented in Table 1.

NOTE: detailed ranges of detailed work parameters gives the Producer on a graph of pressure and temperature dependence.

Maximal pressures in heat distribution networks and heating installations should be taken according to Polish Standards and technical conditions of production and acceptance the networks and installations.

Ball cocks may be situated in any place in inlet channel axis: in vertical, horizontal direction or at the angle, with place left for handling the drive lever. Cocks can work in two positions of closing element: total closing or total opening.

Cock assembling should assure safe work in piping system. It means a cock should be placed in relieved places of a pipe, ie. in such places, where forces acting from pipes should be taken over by blocking constructions independent of a housing or in other conditions that assure work without special relieving.

Water in central heating installations shall conform to requirements of PN-93/C-04607.

Water in heat distribution network shall conform to requirements of PN-85/C-04601.

During mounting the "Instruction of safe operation, work and assembling the BROEN DZT SA ball cocks" worked out by BROEN DZT SA in Dzierżonów shall be complied with.

3. Properties and control

3.1 Material and subassemblies

3.1.1 Description

List of materials used to produce ball cocks are given in table 2.

Materials used in ball cocks

Table 2

Part	Material
housing	carbon steel St 37.0 acc. to DIN 1629
flange	carbon steel St 3 s acc. to PN-88/H-84020
ball	corrosion resistive steel X6CrNiTi 18 10 acc. to PN-EN 10088-1
gasket of ball	PTFE + 20 % C
mounting of ball gasket	corrosion resistive steel X6CrNiTi 18 10 acc. to PN-EN 10088-1
spring	spring steel Ck 75 acc. to DIN 17222
stud	alloy steel X20 Cr 13 acc. to PN-EN 10088-1
stud gasket	PTFE + 20 %C; EPDM 70 ° SHORE
lever	carbon steel St 2 or St 3 acc. to PN-88/H-84020, zinc coated and covered with a coat of plastic
nut	carbon steel St2 zinc coated

3.1.2 Formal requirements

Each delivery of materials and subassemblies shall be identified by means of labels or tabs on package. The label or tab shall contain at least the following information:

- name of subsupplier;
- name and symbol of the product;
- number of the lot and date of production;
- quantity in one package;
- mark of subsupplier's quality service;

For each supply of materials and subassemblies the inclusion of quality control certificate is necessary. The producer is obliged to keep quality control certificates of materials and subassemblies in its archive.

3.1.3 Requirements subject to delivery check

Each lot of delivery is checked according to quality control instructions. Checking of the lot consists in checking the following:

- documents identifying delivery;
- quality certificates;
- state of package;
- checking according to table 3.

Range of delivery control

Table 3

Item	Constructional element or technological service	Range of control
1	Housings, studs, flanges	random control acc. to material certificates
2	Gaskets	control of material certificates
3	Machining of balls	control of diameters and sphericity
4	Spindle	control of dimensions
5	Lever	control of dimensions

3.2 Product

Table 4

List of usable and technical properties concerning the basic requirements

Item	Usable and technical properties	Requirements acc. to	Methodology of tests acc. to
1	External appearance	3.2.1.1	3.2.3.1
2	Marking	3.2.1.2	3.2.3.2
3	Dimensions	3.2.1.3	3.2.3.3
4	External tightness	3.2.1.4	3.2.3.4
5	Sealing of closing (internal)	3.2.1.5	3.2.3.5
6	Functioning ¹⁾	3.2.1.6	3.2.3.6
7	Durability	3.2.1.7	3.2.3.7
8	Hydraulic characteristics	3.2.1.8	3.2.3.8
9	Resistance against bending and axial forces ²⁾	PN-EN 488, point 4.1.6	PN-EN 488 point 5.2.1.3 and 5.2.1.5
¹⁾ Measurement of torque is carried out only during type testing			
²⁾ concerns only cocks to be welded intended to use in heat distribution networks preisolated			

3.2.1 Requirements

3.2.1.1 External appearance

Surfaces shall be smooth, clean, without defects or shortcomings. Protective coats shall be uninterrupted, well bound with ground, permanent. Lacquered coats shall have the adhesion coefficient not lower than 2 in basic scale according to PN-80/C-81531.

Sharp edges shall be blunted or rounded. Gaskets are not allowed to protrude into inside of flow channel.

Cock surface coat shall assure good readability of markings and inscriptions.

3.2.1.2 Marking

On a cock there shall be placed in a permanent and readable way the following data:

- Producer's marking DZT
- mark and value of nominal pressure for instance. PN 25
- dimension f. i. DN 100
- month/year of production f.i 07/2

3.2.1.3 Dimensions

Cock dimensions and their components shall comply with construction documentation of Producer. Connecting threads shall comply with requirements of PN-ISO 7-1. Threads shall be clean, without breaks, corrosion or spikes. Dimensions and tolerances of flanges shall be according to PN-ISO 7005-1.

3.2.1.4 External tightness

Ball cocks tested from the point of external tightness shall not show any symptoms of lack of tightness. Test conditions shall be according to table 5.

Conditions of tightness test

Table 5

Tightness	Trial pressure	Water temperature	Time of test	
			Type test	Acceptation test
		°C	s	s
external	1,5 p _{nom}	5-25	3600	15
closing	DN 10 – DN 100 – 1,0 p _{nom} > DN 100 – 1,1 p _{nom}			

3.2.1.5 Closing tightness (internal)

Cock balls tested from the point of closing tightness shall keep tightness in conditions defined in table 5.

3.2.1.6 Functioning

Turn of a spindle shall be limited to 90°. In the extreme positions of spindle turn the cock must be completely opened or closed. Fluent turn of a spindle without jamming or stops shall be in the full range of work parameters (pressure and temperature), under influence of torque caused by force applied to the end of hand lever mounted on a cock spindle. Torques during opening and closing of cocks shall not exceed values given in table 6.

Table 6

Torques of ball cock opening at nominal pressure difference $\Delta p = 2,5$ MPa

DN	10	15	20	25	32	40	50	65	80	100	125	150	200	250
Torque [Nm]	10	10	15	20	25	40	60	90	120	190	395	550	600	1600
DN	300	350	400	500										
Torque [Nm]	2400	3700	6500	19000										

Twice as higher torque value of starting is allowed.

3.2.1.7 Durability

Cocks after making the number of opening/closing cycles defined in table 7 at frequency not exceeding 10 cycles per minute shall be tight.

Table 7

Number of work cycles

DN	10,15	20,25	32,40	50,65	80,100	125-200	250	300	350	400	500
Minimal number of cycles	15 000	10 000	7 000	5 000	1 000	750	450	350	300	250	250

3.2.1.8 Hydraulic characteristics

Table 8

Nominal coefficient of cock's K_{vs} [m^3/h] flow

DN	10	15	20	25	32	40	50	65	80	100	125	150	200	250
K_{vs}	7	7	15	27	40	69	110	168	288	417	669	1046	1500	2770
DN	300	350	400	500										
K_{vs}	4620	7250	10540	11780										

3.2.2 Program of testing

3.2.2.1 Kinds of tests

- the aim of **type test** is confirmation that ball cocks comply with all requirements defined in technical certificate. Type tests are carried out before introduction the cocks to production in the case of constructional and technological changes as well as periodically every three years;
- **acceptation tests** are carried out during current control of cock quality.

Range of tests is presented in table 9.

Table 9

Program of control tests of ball cocks

Item	Usable and technical properties	Test of	
		type	acceptation
1	External appearance	+	+
2	Marking	+	+
3	Dimensions	+	+
4	External tightness	+	+
5	Closing tightness (external)	+	+
6	Functioning	+	+
7	Durability	+	-
8	Hydraulic characteristics	+	-
9	Resistance against bending and axial forces	+	-

3.2.2.2 Taking samples and quality control

Taking samples and quality control during production is carried out according to Producer's procedures. Before testing the cocks must be divided on lots consisting of one type and the same dimensions. Number of lots shall not exceed 10 000 items or one-month production.

Samples shall be taken randomly according to PN-83/N-03010.

3 items from each lot shall be tested.

Acceptation tests according to point 3,4,5 and 6 of table 9, 100 % of cocks are subject to tests.

Then, out cocks lot whose test results were positive according to point 3,4,5 and 6 the samples for further tests shall be taken – points 1, 2 of table 9.

Acceptation test is carried out according to quality control program worked out by Producer.

3.2.3 Test methods

3.2.3.1 External appearance

Check of external appearance shall be carried out by visual inspection with an eye. If there a need, the cock must be disassembled in a range necessary to check it. Check of painted coats shall be carried out according to PN-80/C-81531.

3.2.3.2 Marking

Check consists in visual inspection with an unarmed eye and finding incompleteness, readability and as well as durability of marking. Marking must be recognized to be durable if it is readable after all tests and allows to identify the product.

3.2.3.3 Dimensions

Dimension checks shall be carried out by means of universal devices assuring required dimension accuracy, or by means of gauges. In acceptance tests of external and connections dimensions of cocks as well as flow channel dimensions are subject to checks.

3.2.3.4 External tightness

Ball cocks tested from the point of external tightness during water test carried out according to point 3.2.1.4 shall not show symptoms of lack of tightness. Test results are defined in PN-85/M-75002, PN-90/M-75003, ZAT/97-01-011 and ZAT/99-02-012.

3.2.3.5 Closing tightness (internal)

Test conditions carried out in Poland are defined in PN-85/M-75002, PN-90/M-75003 as well as ZAT/97-01-011. During acceptance tests water test can be replaced by test of compressed air at pressure equal $(0,6 \pm 0,15)$ MPa.

3.2.3.6 Functioning

Check consists in at least twice complete opening and closing of the cock in ambient temperature without contribution work factor. Turning angle of a spindle shall be measured with accuracy of 1° , checking visually alignment of flow holes in a position of completely opened cock. Measurement of torque shall be with accuracy $\pm 5\%$.

3.2.3.7 Durability

Checking shall be carried out by hand or mechanically by complete opening and closing the cock mounted on test stand. After making required number of tests of opening and closing cycles according to point 3.2.1.7 tightness shall be checked according to points 3.2.3.4 and 3.2.3.5.

3.2.3.8 Hydraulic characteristics

Measurement of factor K_{vs} shall be carried out according to methodics of requirements of PN-83/M-74201 point 5.3.8.

3.2.4 Evaluation of test results

Lot of products shall be found as satisfied when all test results are positive.

4. Principles concerning package, storage and transporting.

4.1 Package

After checking the work of cock, holes in studs are secured against intrusion of undesirable substance, and lever is placed in position "closed". Then, cocks DN 10 – DN 150 are packed in foil bags and cardboard boxes. In particular cardboard boxes cocks of one type are packed. Cocks DN 10 – DN 150 are placed on wooden palettes, secured with corrugated cardboard or separators of foamed plastics and fastened with plastic tape.

Another way of packing, agreed with a customer is allowed.

4.2 Storage

Cocks have to be stored in package in dry stores, secured against atmospheric and other corrosive conditions.

4.3 Transport

Cocks have to be transported in covered means of transport. Packages shall be secured against displacement and mechanical damages.

5. Legal provisions

5.1 Delivery conditions

5.1.1 Technical Certificate is not a document accepting usage in building industry or in turnover on territory of Poland.

Technical certificate is a reference document defining set of requirements for a product to which it concerns. Building product to which the Technical Certificate COBRTI INSTAL concerns can be introduced to a trade turnover and used to building works understood according to article 3 of Building Law, if for the mentioned product the test of conformance with this Technical Certificate have been carried out and Conformance Certificate have been issued according to article 10 of Building Law, section 2, point 1 b.

5.1.2 Product shall be delivered to a customer with observation conditions concerning packing, storage and transport presented in point 4 of this Technical Certificate. The condition is compulsory for all suppliers in all stages of product distribution from a producer to a final customer.

5.1.3 For a product quality of each lot and single products to which this Certificate concerns the Supplier is responsible.

5.1.4 The Supplier, on the basis of other regulations, is obliged to issue warranty on a building product, to which concerns this Technical Certificate.

5.2 Use of Technical Certificate

5.2.1 Supplier who has been issued Technical Certificate COBRTI INSTAL is obliged to refer to this Technical Certificate in the contents of documents concerning the introduction to a trade turnover and use of a subject of Technical Certificate, giving each time number and expiry date of Technical Certificate. Text and figures in catalogs, folders and other publications concerning the product shall be inconsistent with this Technical Certificate.

5.2.2 Technical Certificate COBRTI INSTAL does not replace other permissions from building authorities necessary to run building works.

The authenticated copy of this Certification or COBRTI INSTAL publications must be presented on request of building authorities, customer and other interested parties.

5.2.3 Technical Certificate must be presented to interested parties only as a whole. It is allowed to use reproductions of first page of this Certificate by Supplier only in promotional aims. Such reproduction does not replace complete Certificate. Other reprints Certificate's part are forbidden.

5.2.4 COBRTI INSTAL issues and circulates Technical Certificate. Reprints and copies of the Certificate without previous agreement of COBRTI INSTAL are forbidden.

5.3 Protection of exclusive rights

This Technical Certificate does not violate rights of third parties resulting from regulations of Industrial Propriety Law, and particularly announcement of the Prime Minister of March 17, 1993 on announcement uniform text of Law of October 19, 1972 on inventions (Dz.U no. 26, section 117) as well as the Law of January 31, 1985 on trademarks (Dz. U no. 5, section 17). Assurance of these rights is the obligation of Producer and Distributors making use of technical improvement objectified in the product being the subject of this Technical Certificate COBRTI INSTAL.

5.4 Changes and supplements of Technical Certificate

5.4.1 Requirements of Technical Certificate can be changed by Institution which have issued it, after application submitted by Producer who is going to make material, constructional, technological changes that can influence significantly the product usage properties or extension of use range.

Change of requirements of Technical Certificate takes place in the procedure of Certificate change, on passing certification procedure appropriate to the changes.

5.4.2 Date of expiry of Technical Certificate COBRTI INSTAL presented in point A of Certificate cannot be extended without carrying out certification procedure, if applicant or legal successor submits its application to COBRTI INSTAL not later than 3 months before the expiry date of the Certificate.

5.5 Cancellation of Technical Certificate

5.5.1 Technical Certification may be cancelled by certifying institution which issued it, in the case of changes in separate regulations, Polish Standards in force, other standards and regulations passed by international organizations, if it results from agreements, significant changes in scientific knowledge, practical knowledge and lack of confirmation during use positive usefulness of a product.

5.5.2 Technical Certificate may be cancelled by COBRTI INSTAL on its initiative or on request of Chief Inspector of Building Supervision after explanation procedure with Applicant's contribution and receiving satisfied opinion of Technical Certificates Committee.

C. ADDITIONAL INFORMATION

1. Information on Technical Certificate

This Technical Certificate cancels and replaces Certificate AT/97-01-0293.

Compared with AT/97-01-0293 the assortment have been extended to cocks of diameters DN 10; DN 200; 250; 300; 350; 400; 500 and two new types: threaded /to be welded, the formal records have been updated according to legal-standard regulations in force and the date of expiry have been extended.

2. Information on conditions product' use in building industry

Product must be used according to objectives to be used during design and instructions of assembling, worked out by the producer after taking into account the contents presented in table B, point 2 of this Certificate. Product covered by this certificate shall be marked with building mark B, according to decree of Ministry of Internal Affairs of July 31, 1998 on systems compatibility, sample of conformity declaration and way of building materials marking accepted to trade turnover and common use in building industry (Dz.U no. 113, section 728, 1998).

3. Related standards documents

PN-88/H-84020	Constructional alloy steel of general use – grades
PN-EN 10088-1:1998	Corrosion resistive steels – grades
PN-ISO 7005-1:1996	Metal flanges – steel flanges
PN-85/C-04601	Water for energetic purposes. Requirements and quality tests of water for water boilers and closed heat circulation systems
PN-93/C-04607	Water in heating installations. Requirements and tests concerning water quality
PN-80/C-81531	Defining of coat adhesion with ground and interlayer adhesion
PN-83/M-74201	Control valves. Requirements and tests
PN-85/M-75002	Flow fittings of water supply installations. Requirements and tests
PN-90/M-75003	Central heating fitting. General requirements and tests
PN-83/N-03010	Statistic quality control. Random selection of product units to be tested
PN-76/M-75001	House network fittings. Requirements and tests
PN-EN 488:1999	System of preisolated pipes for underground water heating networks. Fittings for steel supply pipes with thermal isolation made of polyurethane and covering shell made of polyethylene.
PN-ISO 7-1:1995	Pipe threads of connections with tightness received on thread. Dimensions, tolerances, marking.
ZAT/97-01-011	Recommendations for issuing technical certificates. Ball cocks DN 10 – DN 100 for water supply installations and water heating.
ZAT/99-02-012	Recommendations for issuing technical certificates. Ball cocks DN 125 – DN 600 for water supply installations and water heating.
DIN 1629:1984	Seamless circular unalloyed steels tubes subject to special requirements, technical delivery conditions
DIN 17222:1979	Cold rolled steel stripes for springs. Technical conditions of delivery Instruction of handling, operation, and mounting ball cocks produced by BROEN DZT S.A., worked out by BROEN DZT S.A Dzierżoniów.

4. Documents used in acceptance procedure (including list of product test results)

- Report on ball cocks BROEN DZT DN 250-500 tests carried out in Broen laboratory in Assens, Denmark of November 28, 2002;
- Report ball cocks DN 200 tests carried out in producer's laboratory of September 2002;
- Instruction in the range of tightness control in water-air testing stand at producer's premises;
- Instruction of final control of cocks carried out at producer's premises;
- Catalog cards of DZT cocks;
- Construction documentation;
- Material certificates.

5. Information on production place**BROEN-DZT S.A.****ul. Pieszycza 10****58-200 Dzierżonów****6. Checked****7. Translated by:****Tłumaczenie Języka Angielskiego****Emil Mizgalski****ul. Senatorska 13/27****58-314 Wałbrzych**

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