

FAP WAKMET Bodzanów 75	OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks	Issue: 3 Page: 1 Pages: 8 Date: 2019-03-18
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OPERATING AND MAINTENANCE MANUAL

Settlers **straight, angular and oblique**

Table of Contents:

1. General information
2. Technical description
3. Application
4. Transport and storage of fittings
5. Preparation for installation on the plant
6. Installation on the plant
7. Preparation for trial start-up
8. Maintenance and operation
9. Detailed description of the construction
10. Spare parts during the period of exploitation
11. Detailed disassembly and assembly
12. Security and warranty

<p style="text-align: center;">FAP WAKMET Bodzanów 75</p>	<p style="text-align: center;">OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks</p>	<p>Issue: 3 Page: 2 Pages: 8 Date: 2019-03-18</p>
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1. GENERAL INFORMATION

This "Operation and Maintenance Manual" applies to all straight, angle and inclined settling tanks manufactured by FAP Wakmet, with nominal pressure of PN16, 40, 63, 100 and 160 bar and nominal diameter of DN10-300.

The design, production and testing of settling tanks is carried out in accordance with the Quality Assurance System according to ISO 9001:2000 and the European Pressure Directive No. 2014/68/EU.

Proper installation, use and repair will ensure proper operation of the settling tanks. The manufacturer will not assume any liability if the instructions contained in this document are not followed.

Straight, angle and inclined settling tanks can only be operated within the range of permissible temperatures and pressures.

Using settling tanks outside the permissible range of parameters can cause serious damage to them.

The descriptions and instructions in this document apply to standard products, but are also applicable to variant products.

The instructions in this document do not take into account:

- any events that may occur during installation, use and repair,
- local regulations; the user must ensure that these regulations are strictly followed by everyone, including the personnel performing the installation.

The fittings must be operated by properly trained personnel. Improper use of sediment traps can have a significant impact on the entire system such as leakage of refrigerant, restriction in system operation, etc.

This manual complies with the requirements of Directive 2014/68/EU.

2. TECHNICAL DESCRIPTION

Settling tanks, made with a filter cartridge, are used to protect the equipment included in the installation, from the harmful effects of mechanical impurities contained in the working medium.

The body and cover are made of carbon steel, or alloy or austenitic steel. The joint between the body and the lid is protected against leakage by an asbestos-free seal.

The design of the settling tanks has been subjected to an analysis of the risks arising from the impact of all internal factors, external factors, handling, unintended actions, and impacts on the human environment.

3. APPLICATION

As a standard, the settling tanks are designed for water, steam and other non-flammable, non-aggressive chemical agents and can operate in temperature ranges: from -20°C to 450°C (or from -20°C to 560°C - depending on material execution)

Pressure and temperature relationships for individual types of settling tanks are specified in the relevant data sheets.

NOTE: For settling tanks with rubber seals, the temperature of the medium must not exceed 120°C (393K), and with Teflon seals up to 200°C (473K).

Application to other media, parameters involves a change in materials to ensure safe use and requires agreement with FAP WAKMET.

Do not use the above fittings contrary to the guidelines of this manual.

Any deviation from this can risk loss of health and even life.

<p>FAP WAKMET Bodzanów 75</p>	<p>OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks</p>	<p>Issue: 3 Page: 3 Pages: 8 Date: 2019-03-18</p>
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4. TRANSPORTATION AND STORAGE OF FITTINGS

The settling tanks are delivered ready for use. The inlet and outlet are secured with caps. Appropriate safety measures should be taken to protect the fittings from damage during transportation.

Heavy fittings should be transported using ropes hooked behind the top flange. The weight of the fittings is given in the data sheets. After delivery to the site and before installation, fittings should be checked for damage during transport.

Fittings should be stored in such a way that their subsequent use is not affected. It should be protected from the harmful effects of moisture, dust, corrosion, etc. Storage of fittings can be carried out in dry places and protected from the harmful effects of precipitation and the effects of chemical substances or gases.

Sludge tanks stored for more than 4 months, before installation, should be visually inspected paying special attention to:

- Preservation of interior surfaces,
- The quality of the paint coating,
- blanking controls,
- checks on other security features,
- Inspection documents attached to the fittings;

Using the recommendations listed above, fittings can be stored for up to 12 months. If the storage period exceeds 1 year - fittings should be deconserved, pressure tested, and then preserved again.

5. PREPARATION FOR INSTALLATION ON THE PLANT

Before proceeding with the installation of fittings:

- carry out identification of fittings with documentation,
- carry out a check on the connections of fittings whether they correspond to the assumed dimensions,
- carry out an examination of the completeness of fittings and the required technical documentation, acceptance protocols, quality certificates, etc,
- Deconstruct the surfaces and connections that are subject to welding,
- Remove safety features and caps,
- check that the faces are undamaged and metallic clean - free of paint and corrosion,
- Check the inside of the settling tank and pipeline to make sure it is free of any impurities.

6. INSTALLATION ON THE PLANT

Proper installation has a major impact on the functioning of the fixtures. Installation work must be carried out by qualified personnel who are familiar with the application and purpose of the settling tanks. Installation work must be carried out under supervision, observing health and safety regulations.

Fittings before installation on the system are not subject to disassembly.


The settling tanks should be placed between the ends of the pipeline so that the direction of flow is in accordance with the marking on the body.

Installation of flanged fittings should be carried out so that the holes on the flanges and counter-flanges are located opposite each other. The required gasket must be inserted between the flanges, paying special attention to ensure that the gasket between the flanges is properly centered. When

FAP WAKMET Bodzanów 75	OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks	Issue: 3 Page: 4 Pages: 8 Date: 2019-03-18
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attaching fittings to the pipeline, all bolt holes located on the flange must be used. Installation of screws must be carried out with the principle of screwing in two opposite screws. Tighten the bolts crosswise with the appropriate torque, as described in Table 1

Table No. 1 Tightening torque of mounting screws [Nm].

Size thread	Hexagon 	Strength classes of bolts					
		5,6	5,8	6,8	8,8	10,9	12,9
M5	8	2,8	3,7	4,5	6,0	8,5	10
M6	10	4,8	6,4	7,7	10	14	17
M8	13	12	16	19	25	35	41
M10	17	23	31	37	49	69	83
M12	19	40	54	65	86	120	145
M14	22	64	86	105	135	190	230
M16	24	98	130	155	210	295	355
M18	27	135	180	215	290	405	485
M20	30	190	255	305	410	580	690
M22	34	260	345	415	550	780	930
M24	36	330	440	530	710	1000	1200
M27	41	490	650	780	1050	1500	1800
M30	46	660	880	1050	1450	2000	2400
M33	50	900	1200	1450	1900	2700	3250

The bolts, nuts and washers used for fastening must be made of suitable and certified materials, with the required strength class.

Welded connections may be made only by qualified personnel, using appropriate equipment. The responsibility for this and for any necessary heat treatment rests with the owner (user) of the pipeline. When welding, special care must be taken not to contaminate the settling tank and the pipeline.

Fittings must not be installed in a way that will cause axial stresses and torques in the pipeline.

When cleaning the installation before operation, protect the sealing rings from dirt.

7. PREPARATION FOR TRIAL START-UP

Before the test startup, check all connections and seals, eliminate inadequacies.

Check the fixation and support of the settling tank.

Carry out the necessary inspection of the given cut and pipeline. Carry out control moments and start-up tests taking into account the user's instructions. Carry out commissioning tests with neutral medium. During the test, check the tightness of the fuselage, lid and fuselage seals, flange-to-flange connections and welded joints. If there are leaks, tighten the connecting bolts of the cover flange connections. After completion of commissioning tests, drain the plant and prepare it for operation.

8. OPERATION AND MAINTENANCE

During operation, the settling tank should be inspected. Frequency of inspection not less than every 4 months. The inspection is subject to the tightness of the inter-flange connections and the tightness between the body and the cover.

<p>FAP WAKMET Bodzanów 75</p>	<p>OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks</p>	<p>Issue: 3 Page: 5 Pages: 8 Date: 2019-03-18</p>
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If there is a leak, if possible, tighten the connection screws of the hull and cover.

Before doing any work on the fitting, or before removing it from the pipeline, make sure that there is no pressure and the fitting is cooled down.

If the medium is toxic or flammable, the fittings must be drained and then flushed or blown out.

FAP WAKMET's settling tanks are designed to minimize maintenance. However, to ensure their long and reliable operation and reduce repair costs, they should be inspected regularly, especially those that are rarely used and those that are difficult to access.

The user of the installation is responsible for establishing regular inspections, the frequency of which depends on the operating conditions of the fittings.

The proper functioning of the fittings can be prolonged by replacing the flat gasket [13] at the appropriate time

Each time, when removing and installing the settling tank, replace the gasket. If it is necessary to replace components, use parts recommended by the manufacturer.

Before being put on the installation, the settling tank should be checked for leaks.

9. DETAILED DESCRIPTION OF THE CONSTRUCTION

Sediment traps, with regard to the direction of flow, are divided into: straight, angular and oblique (Figure No. 1), while with regard to the type of connection into: flanged sediment traps and those with welding ends.

Due to the multiplicity of options for the design of settling tanks, and thus the large number of dimensional parameters, these sizes (listed in Figure 2) are not cited in this manual, but are contained in the relevant data sheets.

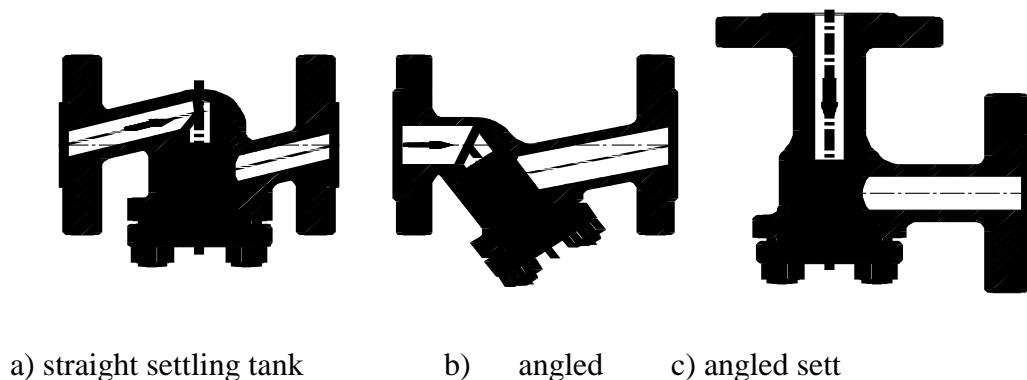


Figure No. 1 Types of settling tanks: straight, angled, angled

The basic element of the settling tank (Figures 2a, 2b) is the hull [01]. It has a seat on the diaphragm, in which a reinforced sieve [85] is seated (sheet-reinforced mesh filter perforated) made of acid-resistant steel. On the other side (from the bottom) the sieve is pressed by a cover [03], made of carbon steel or cast steel.

The hull and cover subassembly is assembled with studs [18] and nuts [19]. This system is sealed by a flat gasket [13].

*) A drain plug [43] screwed into the cover and a plug gasket [39] in various types and sizes are used on special request.

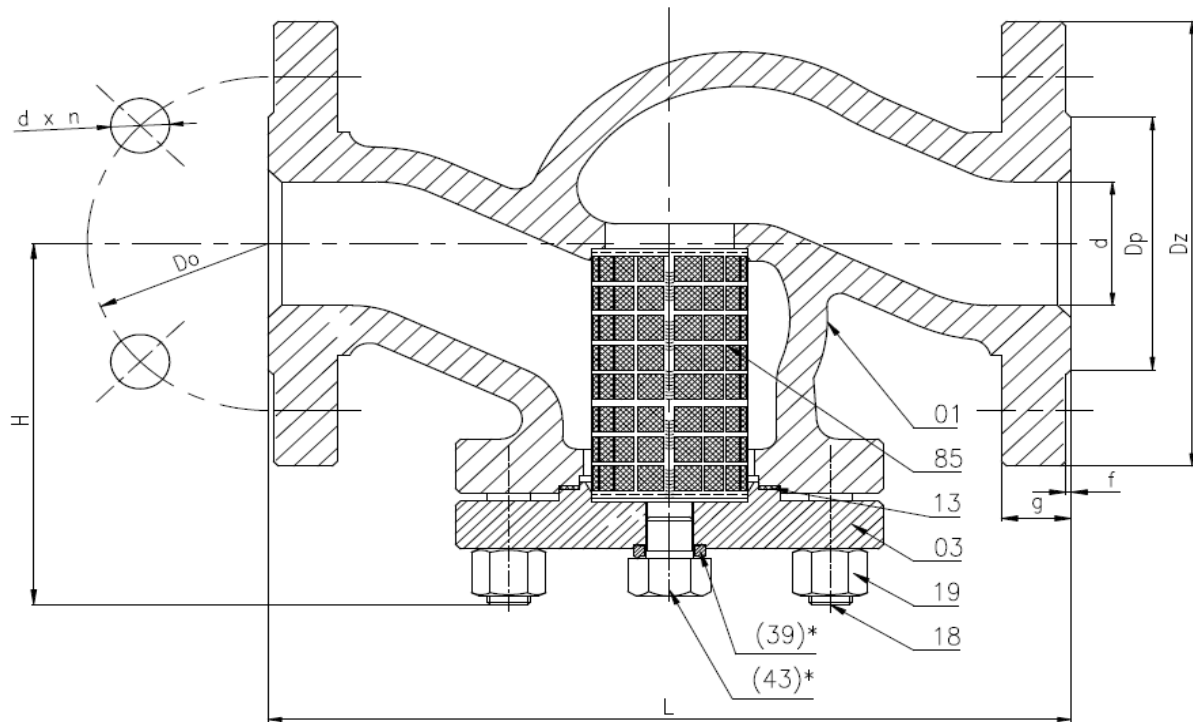


Fig. no. 2a. Straight flanged settling tank

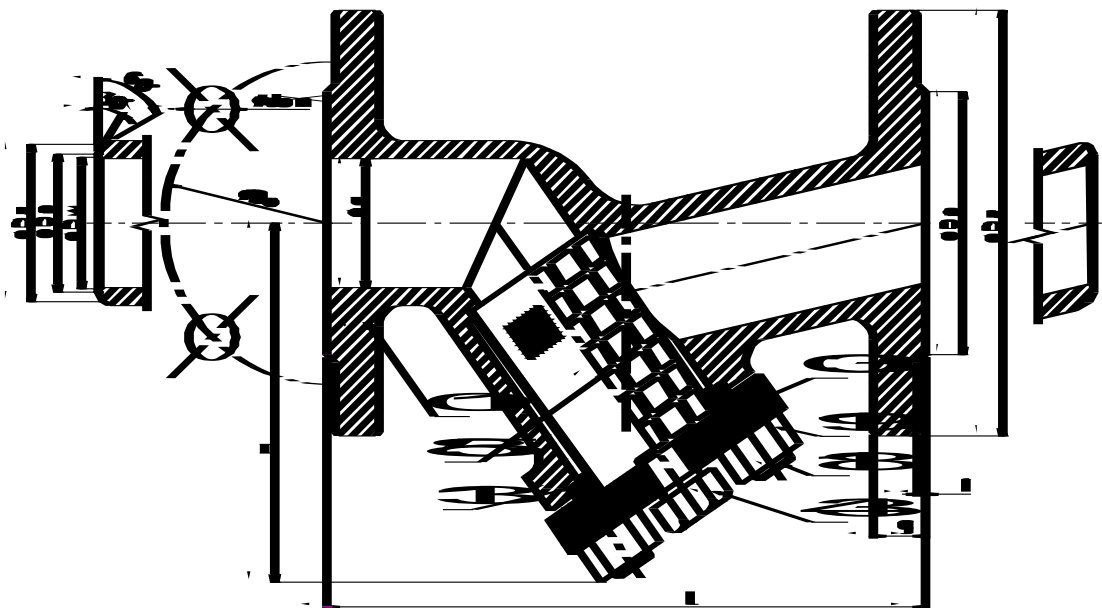


Figure 2b. Flanged inclined settling tank and welding ends

This manual contains basic recommendations that must be followed during installation, operation and repair work. Fitters and operating personnel should read it and understand it well before the installation is put into operation. All personnel involved in the installation, operation, supervision and service of the fixtures should be qualified. The competence and responsibility of personnel must be clearly and unambiguously defined by the user of the installation.

Failure to follow the instructions can lead to damage and even destruction of the fixture and cause danger to personnel and the environment.

<p>FAP WAKMET Bodzanów 75</p>	<p>OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks</p>	<p>Issue: 3 Page: 7 Pages: 8 Date: 2019-03-18</p>
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Any modification of the supplied fittings is possible only with the approval of the manufacturer.

To ensure safety, use only original spare parts.

Warranty claims will not be accepted if unsuitable replacement parts and materials are used. Claims regarding the functionality and safety of the settling tank will be considered only if the maximum permissible operating parameters have not been exceeded (see data sheet). This manual contains basic recommendations that must be followed during installation, operation and repair work. Installers and operating personnel should read it and understand it well before the installation is put into operation. All personnel involved in the installation, operation, supervision and service of the fixtures should be qualified. The competence and responsibility of personnel must be clearly and unambiguously defined by the user of the installation.

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10. LIFETIME SPARE PARTS

- a set of seals,
- Optional reinforced mesh filter.

11. DETAILED DISASSEMBLY AND ASSEMBLY

❖ DEMONSTRATION

1. Fix the settling tank (immobilize) with the lid upward.
2. Disconnect the cover subassembly [03] from the fuselage [01] by unscrewing the nuts [19] from the studs [18].
3. From the fuselage you can remove the screen [85], the flat gasket [13] and remove the studs [18].

❖ MONTAGE

1. Fix the fuselage [01] in a vise (in the case of large flights set on stands - prisms). Screw in the studs [18] of the hull. Insert the gasket [13] into the lock.
2. Insert the screen [85] into the lock.
3. Put the cover on the hull Pay special attention to ensure that the protruding end of the screen is in the seat (lock) of the cover. In addition, also make sure that the marking cast, or forged, on the hull and the lid are on the same side of the valve.
4. Screw on the nuts [19] (alternately - crosswise), and then check that the parallelism of the flanges of the cover and fuselage is maintained with a minimum gap between them of about 0.5 mm.

<p>FAP WAKMET Bodzanów 75</p>	<p>OPERATING AND MAINTENANCE MANUAL NR QT-2/108 straight, angle and inclined settling tanks</p>	<p>Issue: 3 Page: 8 Pages: 8 Date: 2019-03-18</p>
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12. SECURITY AND WARRANTY

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Failure to follow the instructions can lead to damage and even destruction of the fixture and cause danger to personnel and the environment.

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