USER MANUAL FOR SUBSEA AX-VX CLEANING TOOL

Document title	:	*UMA-7144-001 Subsea AX-VX Cleaning Tool*
IKM TECHNOLOGY AS ref.	:	*P7144*
Customer ref.	:	*Subsea Tool*

IKM Technology AS

Rev.	Date	Reason For Issue	Prepared	Checked	Approved
01	25.08.13	Issued for use	EN	JHR	EN
02	14.06.16	Update	KF	RH	KF
03	21.12.2020	Include Acid Cylinder	OG	TSH	BØ

1 GENERAL INFORMATION

This manual is a user manual for the IKM Technology 18-3/4" Cleaning tool system.

The Cleaning Tool is designed for cleaning 18 ¾"AX / VX Wellhead seal surfaces. Designed for operations with and without tubing hanger installed.

The Cleaning Tool consists of a main frame with a hydraulic driven cleaning disk.

Handling of the Cleaning tool is designed for a ROV equipped with a 7 function manipulator, typical Schilling T4. The frame is not certified for lift by wire from surface.

1.1 Abbreviations

HPU	Hydraulic Power Unit
ROV	Remotely Operated Vehicle
kg	Kilo gram
mm	Milli meter
BSP	British standard pipe
JIC	Joint industry council
CCM	Cubic centimeter
LPM	Liter per minute
Nm	Newton meter
CCW	Counter clockwise

1.2 References

Doc nr	Description	Rev.	Issued	Can be found
7144-001	Drawing of AX-VX Cleaning Tool	03	17.03.15	Appendix A
7144-120	Cleaning Cloth	02	16.09.13	Appendix B
IKM-6004510, (7363-001)	Acid Injection Cylinder 7363-001	02	11.12.13	Appendix C
7144-003	18 ¾" Cleaning disc w. motor	01	12.07.13	Appendix D

2 TECHNICAL SPESIFICATION

The Cleaning tool is designed to be used on an 18-3/4" Wellhead with or without tubing hanger installed.

Hydraulic supply and control of the Cleaning Tool is by means of and through the ROV system. When hydraulic system pressure is sullied to the hydraulic motor, the cleaning disk will start to turn.

The Cleaning tool is also fitted with an option to connect an acid injecting system to the Cleaning Tool.

Cleaning Tool:
Weight:
In Air 58 kg
In Water 35 kg

Maximum dimensions:
Width 847 mm
Height 816 mm (w/ fishtail handle)

Hydraulic:
Working pressure 97 bar (103 max).
Flow: 7 LPM.

If the cleaning tool is used with the acid tank, this will have the following main data:
Acid Cylinder:
Weight:
In Air 30 kg
In Water 14,3 kg

Maximum dimensions:
Length: 820 mm
Height 415 mm

Hydraulic:
Working pressure 100 bar (140 max).
Flow: 7 LPM.

3 SAFETY

3.1 General - Operations

Only authorised people and qualified personnel should work on the system, and take suitable precautions to prevent any potential injuries. Always adhere to authorised working practices, and use the correct tools for the job. To facilitate this, make sure that these are available before commencing the test.

Ensure that the working area is kept clear and uncluttered.

3.2 General – Hydraulic

Do not work on pressurised systems. Hydraulic systems contain a large amount of stored energy when pressurised, therefore the system (including any accumulators) should be de-pressurised, and the power pack switched off, prior to working on the system. Exceptions to this would be system adjustments to components requiring the presence of pressure and/or flow.

Any personnel authorised to work on the system must have a complete understanding of the operation of the hydraulic system, so that they will be aware of any system liable to remain pressurised or hazardous in any other way. Ensure that all personnel are clear of any mechanical/hydraulic system likely to move if pressure to system actuators is released or applied.

Do not attempt to tighten any leaking fittings whilst under pressure. A hose/fitting rupture could result, leading to injury from flying components and/or oil jets.

Regularly inspect fittings and pipe-work for mechanical damage. If any such damage is found, the item must be repaired or replaced as necessary before pressure is applied to the system. Do not allow damaged fittings to remain in service.

Take care when inspecting, commissioning, repairing or maintaining the system to avoid jets of oil issuing from open orifices; pipe ends etc. if pressure is applied. Particular care should be taken to protect the eyes.

Hydraulic components may be heavy and slippery when covered in oil. Ensure that adequate protective clothing and footwear is used.

Any moving component should be treated with caution when the system is pressurised during operation, and especially during on-deck testing and repair. Keep clear of all moving components, and take all necessary precautions to avoid injury when working on these systems by preventing movement of any components likely to cause injury.

3.3 General – Mechanical

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Beware of and keep clear of all moving components. Do not work on the system whilst power is applied, or if there is any potential for components to move.

Ensure that all load bearing components are adequately and regularly inspected. If damage is found the component must be repaired/replaced as necessary. Do not allow damaged components to remain in service.

Always ensure that items are correctly and adequately supported before removal, and that authorised lifting equipment and procedures are used.

Note: trying to lift heavy components in an awkward position by hand without the assistance of correct lifting equipment, or lifting any component without adopting the correct stance, can lead to serious injury.

Ensure that when working within or underneath the machine that your presence is known to your supervisor. If working underneath the machine, always ensure that there are no loose or unsupported assemblies, components or tools above.

4 OPERATIONAL DESCRIPTION

The following description is a generic description of preparation and use of the Cleaning tool. Customers are advised to adapt the following information to their own specific operations and specific work area.

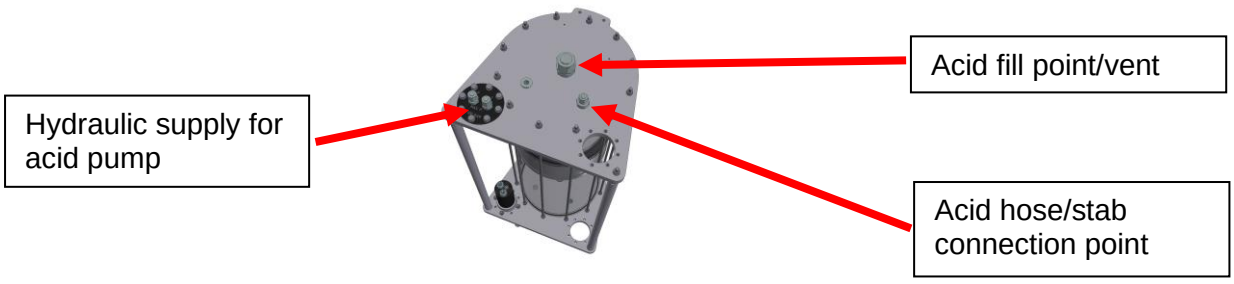
4.1 Preparation on the vessel prior to operations

- Unpack all parts and check for transport damages
- Verify all parts on equipment list is present
- Check hydraulic hoses, bolts, etc.
- Direction of rotation to be clockwise.
- Check that the 3M cleaning cloths are in place and in good shape.
- Connect the hydraulic hoses/stab systems to the ROV, check for correct direction of rotation.

4.1.1 Use of Acid Cylinder

- Require hydraulic supply to acid pump motor, LF directional valve, 100 Bar work pressure.
- Hydraulic connection point and Acid fill and vent points is as described on figure 4.1.1. below.
- Acid supply hose is connected to the acid receptacle on the cleaning tool by means of the supplied stab system.

Figure 4.1.1:



4.2 Step by Step Procedure

4.2.1 General

Perform SJA/Toolbox talk for the operation as required by client/ROV contractors own procedures.

4.2.2 Operation

The following steps are to be regarded as guidelines for operation. Operator of the tooling must adapt the steps into their own operations procedure.

- Maneuver ROV to worksite
- Stabilize ROV at worksite and in good position for commencing work
- Verify visual by means of ROV camera that the Wellhead is clear and un-obstructed, and the cleaning tool can be lowered in position.
- Lower the Cleaning tool over the Wellhead, until the frame is positioned on top of the Wellhead.
- If acid cylinder is used; start the acid pump and verify acid flow.
- When tool is confirmed in correct and engaged position, start the hydraulic motor.
- Run the cleaning tool as required
- Inspect after cleaning.
- Restart cleaning if inspection does not give acceptable results.

5 MAINTENANCE

After use:
Clean tool with fresh water followed with a protective coat with WD40 or equal to keep the equipment in good condition.

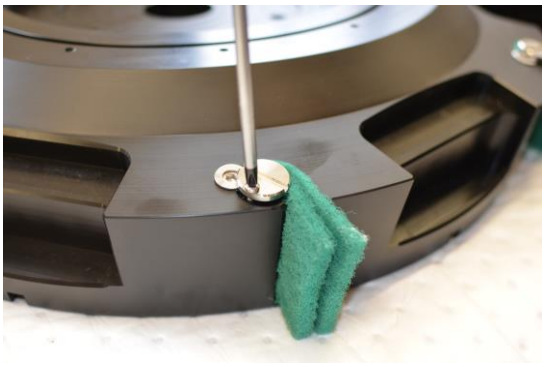
General:
Maintenance of the Cleaning tool is limited to flushing hydraulic circuits with clean oil after use and external corrosion protection.

Hoses and fitting must be carefully inspected prior to use and after operations. Cut or sharp bends indicates that the hoses should be replaced.

Check the cleaning disc and that the 3M cleaning cloths are in place and in good shape.

5.1 Step-by-step changing brush.

- Remove screw as shown on picture below.



- Use a flat screwdriver to lift up the brush holder.

- The brush is now ready to be lifted up.

- Picture shows Cleaning Cloth wrapped around bolt.

For installation of the brush, reverse the operation.

- Turn the main screw clockwise until the small screw hits the bore in the cleaning disc.

6 SPARE PART LIST

- 3M cleaning cloths.
- Hydraulic hoses and connections.
- Nuts and bolts.
- Motor.
- Cleaning disc.

7 REVISION CHANGES

Revision	Procedure change	Author
01	*Original version*	EN
02	*Update*	KF
03	*Include Acid Cylinder*	OG

8 CONTACT INFORMATION

All enquiries relating to the tooling should be addressed to:

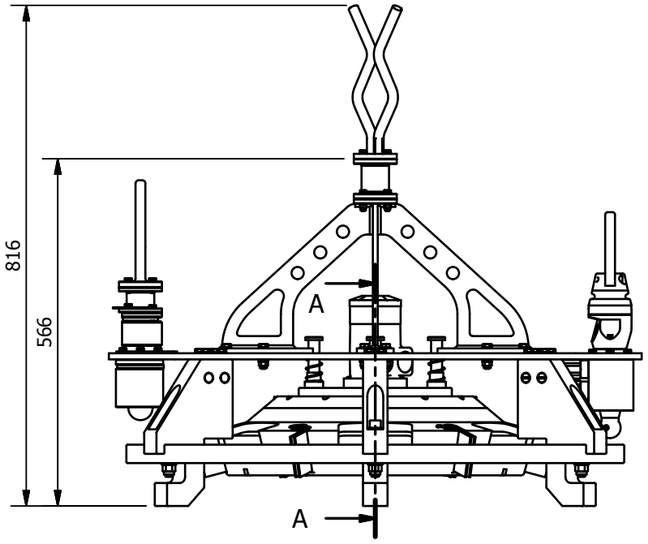
IKM Technology AS
Nordlysveien 7,
N-4340 Bryne
Norway

Phone, 24/7 : +47 51 80 05 20
Mail : IKMtechnology@IKM.no

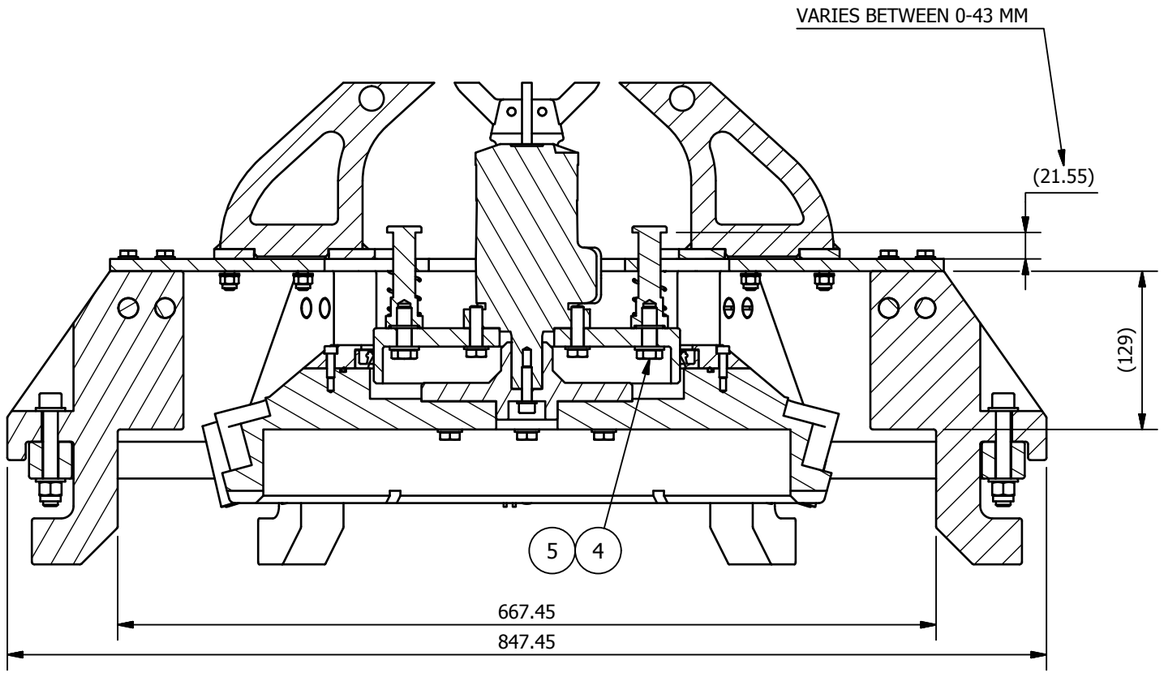
9 APPENDIX

	Doc number	Description	Rev
Appendix A	*7144-001*	*Drawings of AX-VX Cleaning Tool*	*03*
Appendix B	*7144-120*	*Cleaning Cloth*	*02*
Appendix C	*IKM-6004510*	*Acid Injection Cylinder 7363-001*	*02*
Appendix D	*7144-003*	*18 ¾" Cleaning disc w. motor*	*01*

Appendix A



FRONT VIEW



A-A
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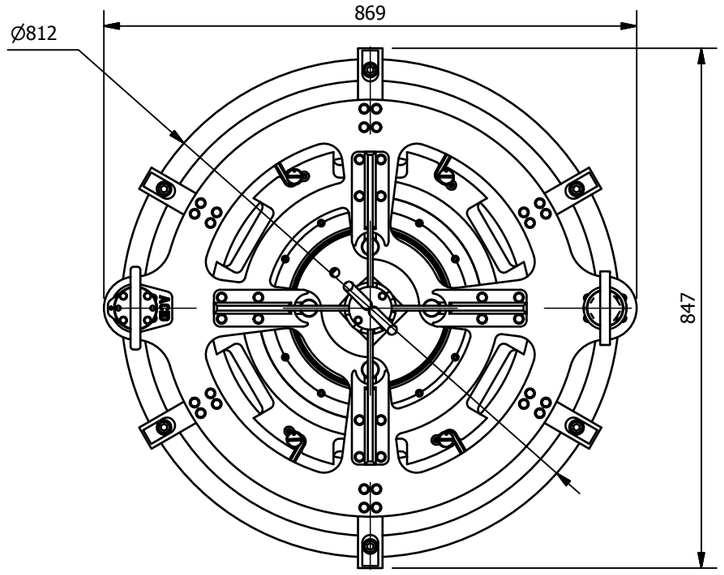
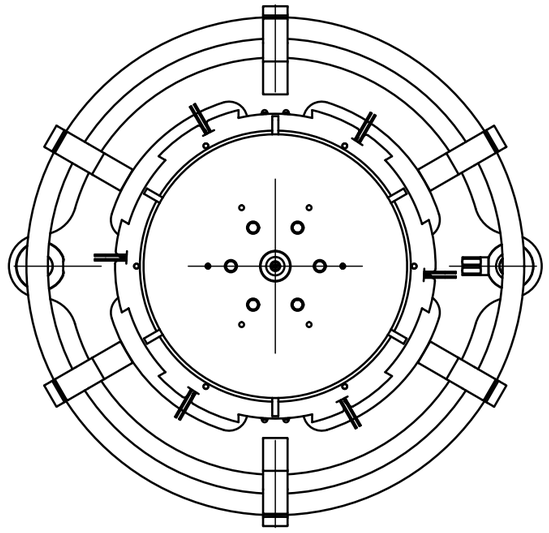


TOP VIEW



B

REV	DATE	DESCRIPTION	BY	CHKD	APPD
03	17.03.2015	RE-ISSUED FOR CONSTRUCTION	AH	RH	AH
02	16.09.2013	AS BUILT	JKK		
01	12.07.2013	FOR CONSTRUCTION	JKK	EN	JKK

WEIGHT:
IN AIR: 58 kg
IN WATER: 35 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

IKM TECHNIQUE AS
Torneroseveien 12, 4315 SANDNES
Tel.: 51 80 05 20
E-mail: ikmtechnique@IKM.no
Web: www.IKM.no

PROJECT TITLE: P7144

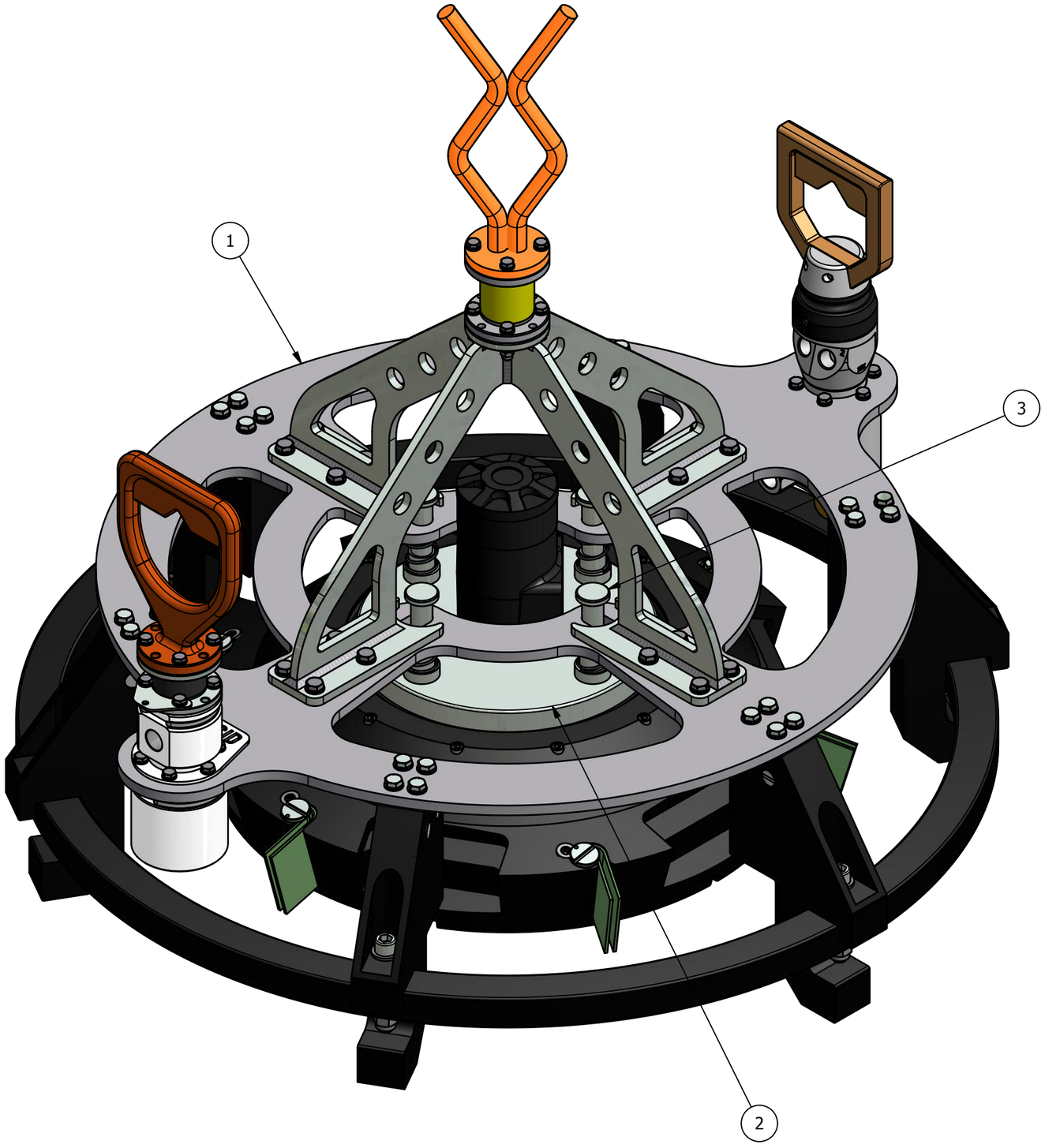
DRAWING TITLE: 18-3/4" CLEANING TOOL

SHEET SIZE: A3 | SHEET NO.: 1 OF 2 | SCALE: 1:10

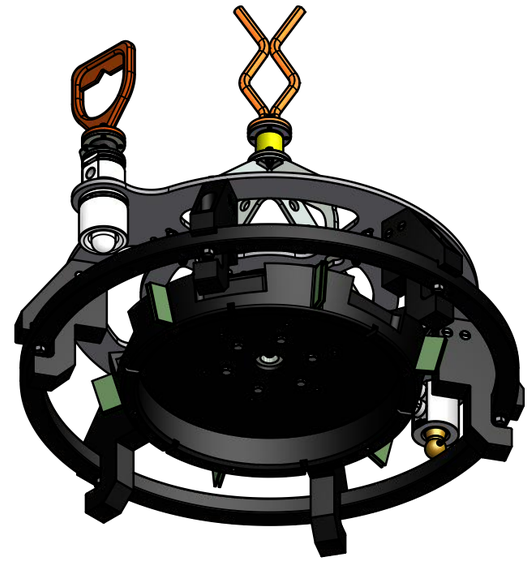
DRAWING NO.: 7144-001 | LATEST REV.: 03

PARTS LIST

ITEM	QTY	PART NUMBER	MATERIAL	MASS	DESCRIPTION
1	1	7144-002	SEE DRAWING 7144-002	26.36 kg	
2	1	7144-003	SEE DRAWING 7144-003	30.56 kg	
3	4	7144-007	SEE DRAWING 7144-007	0.22 kg	
4	4	ISO 4017 - M12 x 35	Stainless Steel, 440C	0.05 kg	Hexagon head screws
5	4	ISO 7089 - 12 - 140 HV	Stainless Steel	0.01 kg	Plain washers - Normal series - Product grade A



ISOMETRIC VIEW
(1 : 4)



BOTTOM ISOMETRIC VIEW

WEIGHT:
IN AIR: 58 kg
IN WATER: 35 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

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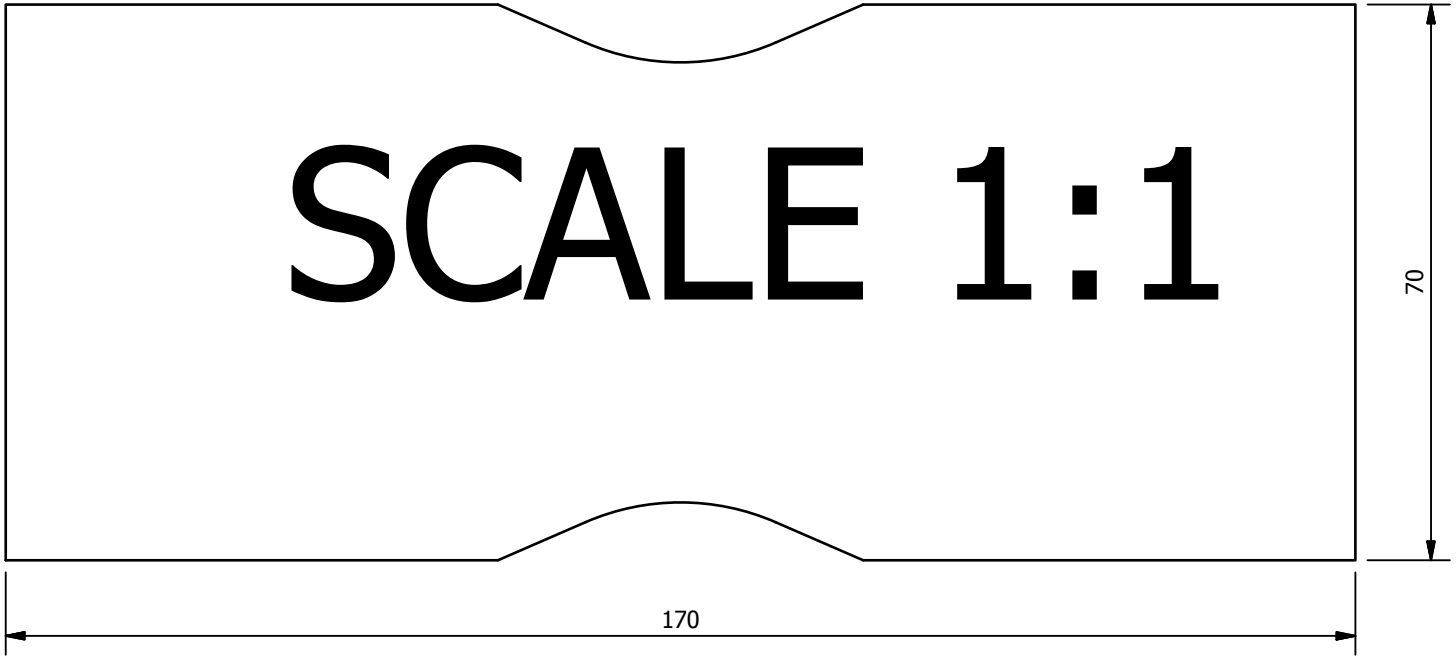
PROJECT TITLE: P7144
DRAWING TITLE: 18-3/4" CLEANING TOOL
SHEET SIZE: A3 | SHEET NO.: 2 OF 2 | SCALE: 1:10
DRAWING NO.: 7144-001 | LATEST REV.: 03

Appendix B

PARTS LIST					
ITEM	QTY	PART NUMBER	MATERIAL	MASS	DESCRIPTION
1	1	7144-120	As Supplied	0.15 kg	Cleaning Bruch



REV	DATE	DESCRIPTION	BY	CHKD	APVD
02	16.09.2013	AS BUILT	JKK		
01	16.02.2012	For Information	Eirik Nilsen		

WEIGHT:
IN AIR: 0,145 kg
IN WATER: 0 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 c
ANGULAR: ISO 2768-1 c
EDGES: ISO 2768-1 c

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

IKM TECHNIQUE AS
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Tel.: 51 80 05 20
E-mail: ikmtechnique@IKM.no
Web: www.IKM.no

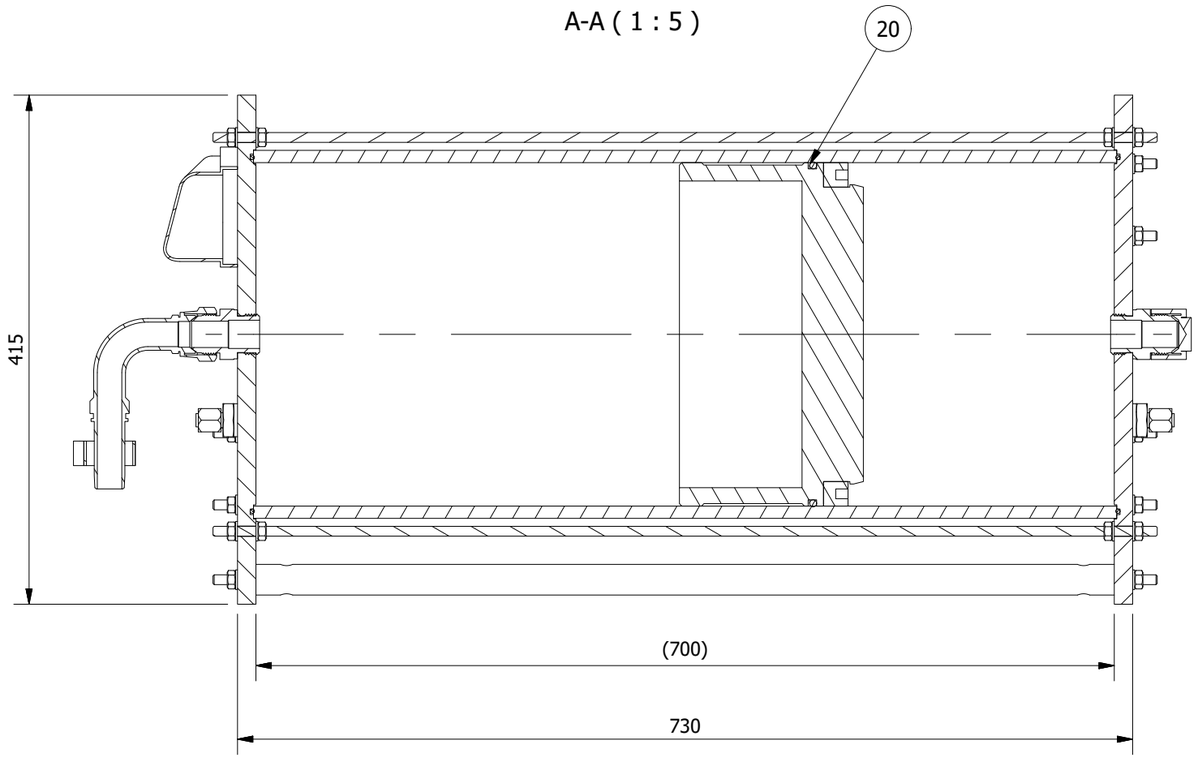
PROJECT TITLE: P7144

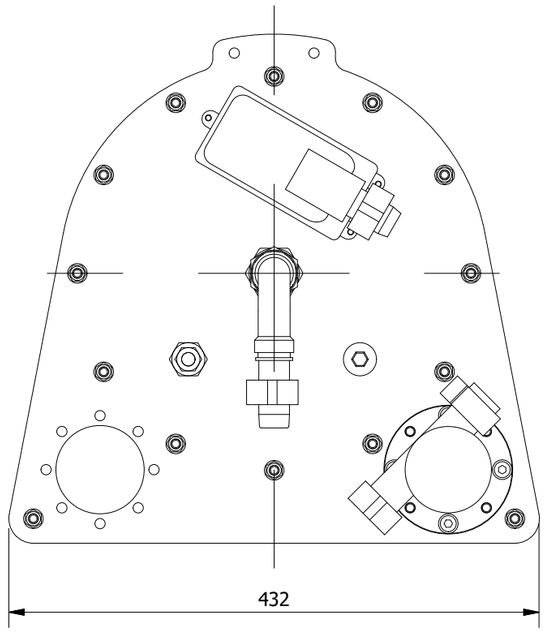
DRAWING TITLE: Cleaning Cloth

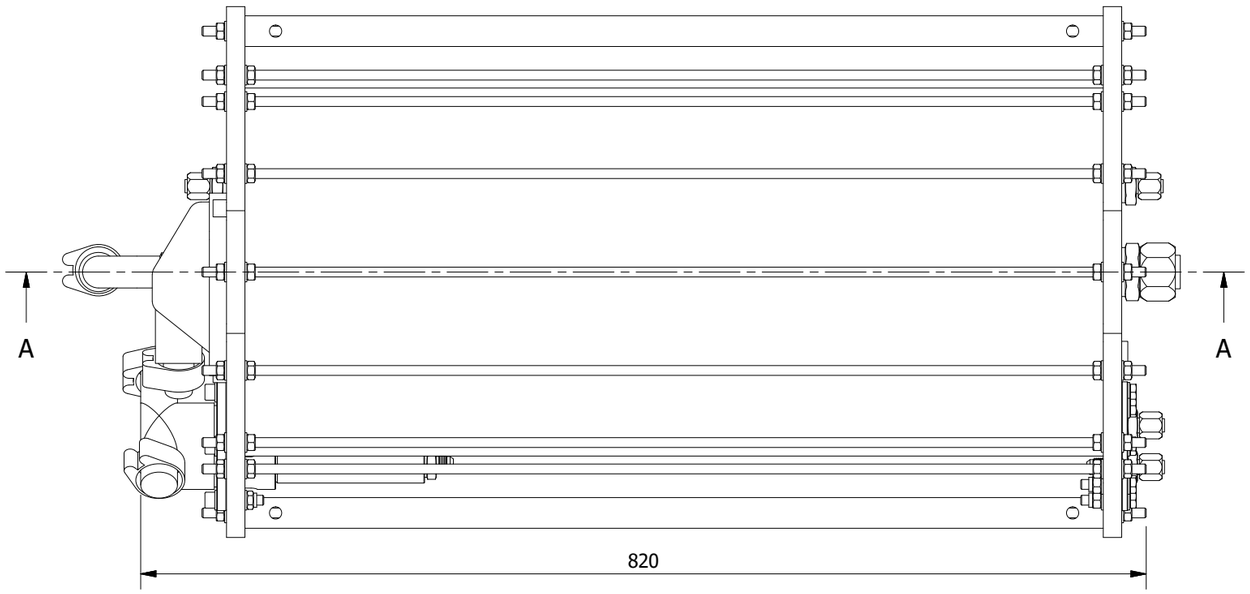
SHEET SIZE: A4 | SHEET NO.: 1 OF 1 | SCALE: 1:1

DRAWING NO.: 7144-120 | LATEST REV.: 02

Appendix C







NOTES:

VOLUME: CA 30 LITER

REV	DATE	DESCRIPTION	BY	CHKD	APPD
02	11.12.2013	AS BUILT	JKK		
01	01.10.2013	FOR INFORMATION	JKK		

WEIGHT:
IN AIR: 30 kg
IN WATER: 14,3 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

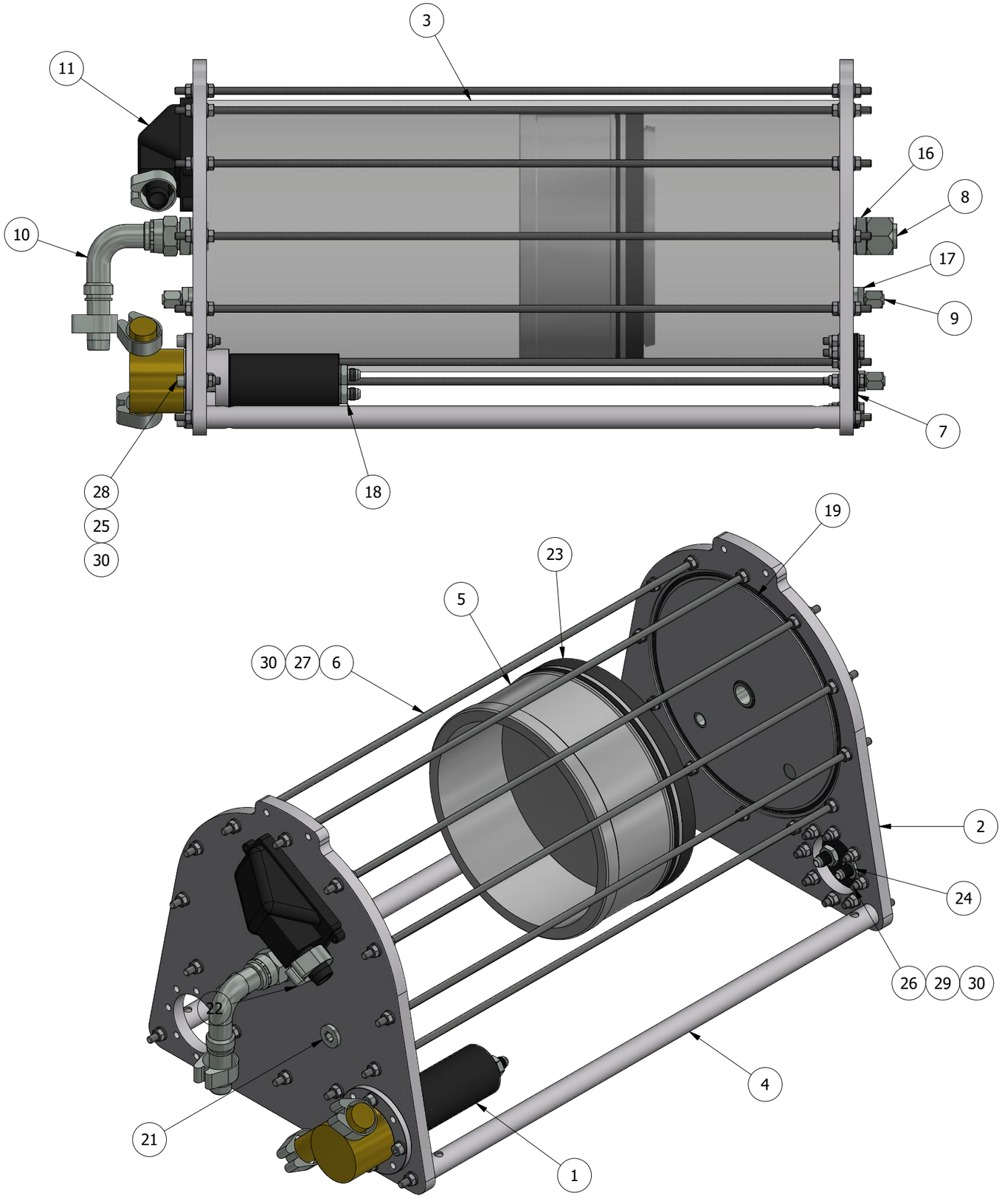
IKM TECHNIQUE AS
Torneroseveien 12, 4315 SANDNES
Tel.: 51 80 05 20
E-mail: ikmtechnique@IKM.no
Web: www.IKM.no

PROJECT TITLE:

DRAWING TITLE: ACID INJECTION CYLINDER - 7363-001

SHEET SIZE: A3 | SHEET NO.: 1 OF 2 | SCALE: 1:5

DRAWING NO.: IKM-6004510 | LATEST REV.: 02



PARTS LIST

ITEM	QTY	PART NUMBER	MATERIAL	MASS	DESCRIPTION
1	1	7363-002		0.7 kg	
2	2	7363-101	Aluminium, 6082-T6	5.02 kg	
3	1	7363-102	PMMA (Polymetylmetakrylat)	7.63 kg	
4	2	7363-105	Aluminium, 6082-T6	0.28 kg	
5	1	7363-106	PEHD 1000 (natural / white)	3.44 kg	
6	14	7363-107	Stainless Steel	0.31 kg	
7	1	7363-108	Aluminium, 6082-T6	0.11 kg	
8	1	7363-Blind Nut JIC 1 5_16	Stainless Steel, AISI 316L	0.2 kg	Blind Nut JIC 1 5/16-12
9	4	7363-Blind Nut JIC 9_16	Stainless Steel, AISI 316L	0.03 kg	Blind Nut JIC 9/16-18
10	1	7363-Coupling JIC 90-1 5_16	Stainless Steel, AISI 316L	0.42 kg	Coupling JIC 90° 1 5/16-12 to hose 1"
11	1	7363-Filter	As Supplied	0.06 kg	JABSCO 25 mm (29290-1000)
16	2	7363-Nipple JIC 1 5_16-1 BSP	Stainless Steel, AISI 316L	0.23 kg	Straight Nipple ext G 1" - JIC 1 5/16-12
17	2	7363-Nipple JIC 9_16-1_2 BSP	Stainless Steel, AISI 316L	0.07 kg	Straight Nipple ext G 1/2" - JIC 9/16-18
18	2	7363-Nipple JIC 9_16-3_8 BSP	Stainless Steel, AISI 316L	0.05 kg	Straight Nipple ext G 3/8" - JIC 9/16-18
19	2	7363-O-ring	As Supplied	0.01 kg	Ø=5,7 mm, Di=269,8 mm
20	1	7363-O-ring 2	As Supplied	0.02 kg	Ø=3,53 mm, Di=284,8 mm
21	2	7363-Plug	Stainless Steel, AISI 316L	0.05 kg	Allen Plug G 1/2" with seal
22	4	7363-Power Clamp	Stainless Steel, AISI 316L	0.08 kg	
23	1	7363-Sealing	NBR 90 (Shore)	0.24 kg	UM 280x240x20
24	2	7363-Straight Bulkhead JIC 9_16	Stainless Steel, AISI 316L	0.07 kg	Straight Bulkhead JIC 9/16-18
25	4	DIN 985 - M8	Stainless Steel	0.01 kg	Hex Nut
26	8	ISO 4014 - M8 x 40	Stainless Steel, 440C	0.02 kg	Hexagon head bolt - product grades A and B
27	52	ISO 4032 - M8	Stainless Steel, 440C	0.01 kg	Hexagon nuts, style 1 - Product grades A and B
28	4	ISO 4762 - M8 x 40	Stainless Steel, 440C	0.02 kg	Hexagon Socket Head Cap Screw
29	8	ISO 7041 - M8	Stainless Steel	0.01 kg	Prevailing torque type hexagon nuts (with non-metallic insert) style2 - property class 9 and 12
30	76	ISO 7089 - 8 - 140 HV	Stainless Steel	0 kg	Plain washers - Normal series - Product grade A

WEIGHT:
IN AIR: 30 kg
IN WATER: 14,3 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

IKM TECHNIQUE AS
Torneroseveien 12, 4315 SANDNES
Tel.: 51 80 05 20
E-mail: ikmtechnique@IKM.no
Web: www.IKM.no

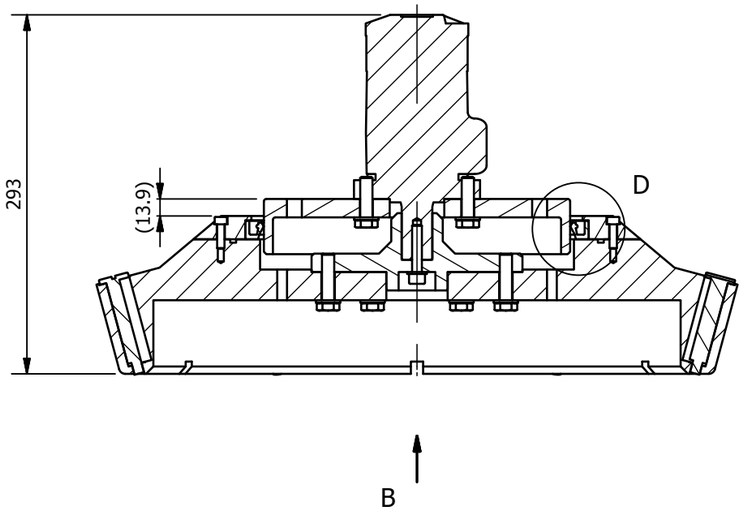
PROJECT TITLE:

DRAWING TITLE: ACID INJECTION CYLINDER - 7363-001

SHEET SIZE: A3 | SHEET NO.: 2 OF 2 | SCALE: 1:5
DRAWING NO.: IKM-6004510 | LATEST REV.: 02

Appendix D

A-A (1 : 5)



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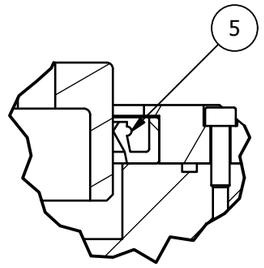

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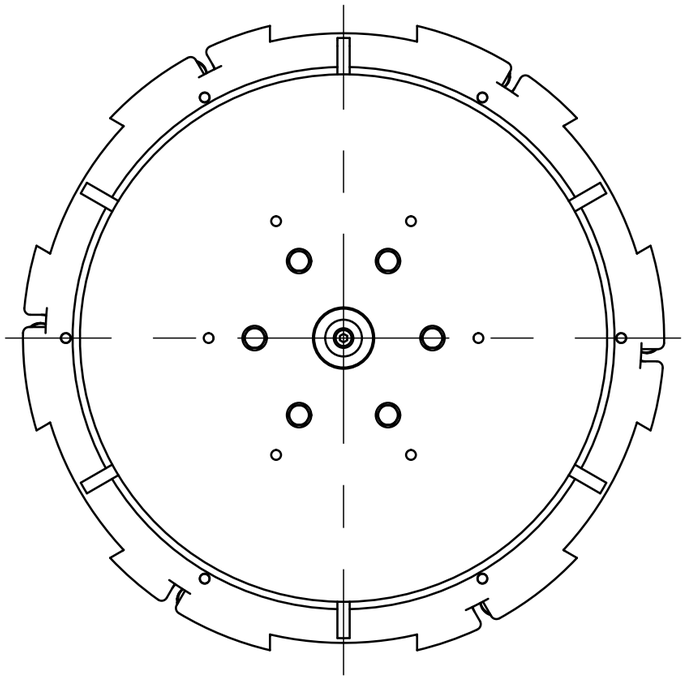

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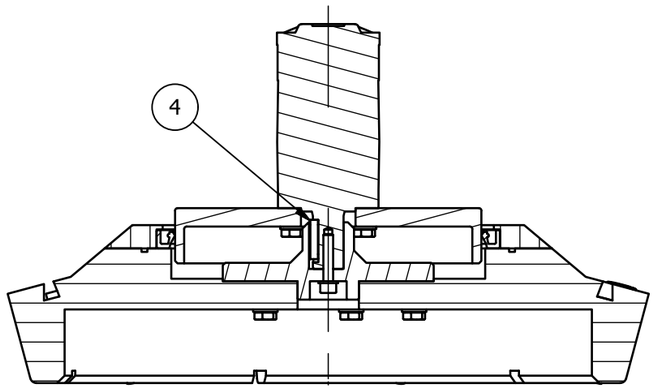
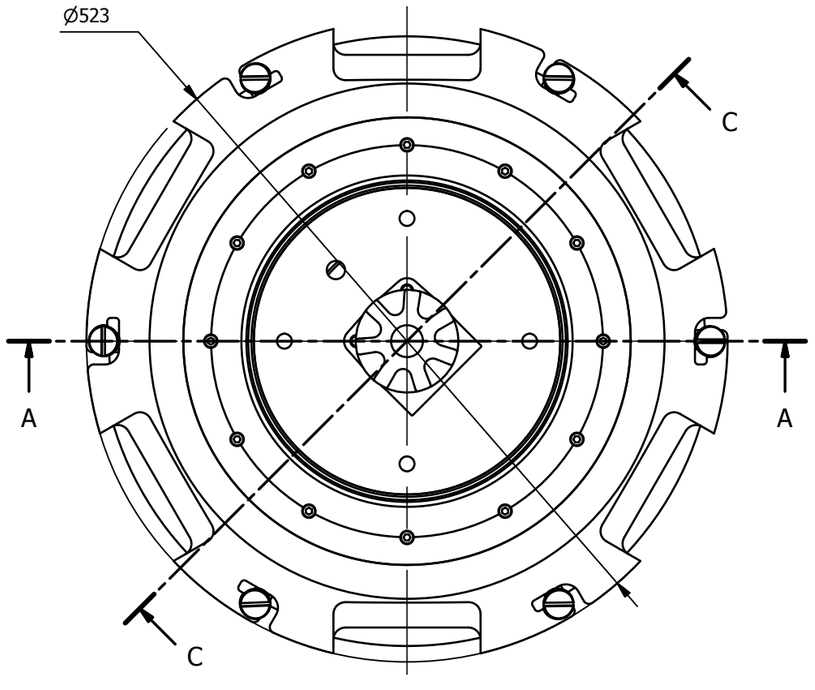




REV	DATE	DESCRIPTION	BY	CHKD	APPD
01	12.07.2013	FOR CONSTRUCTION	JKK	EN	JKK

WEIGHT:
IN AIR: 30 kg
IN WATER: 19,1 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

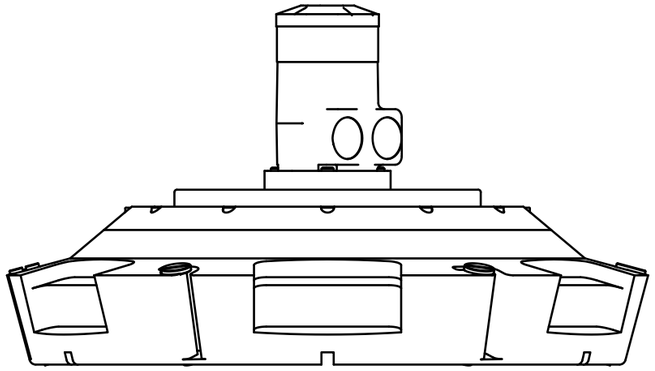
IKM TECHNIQUE AS
Torneroseveien 12, 4315 SANDNES
Tel.: 51 80 05 20
E-mail: ikmtechnique@IKM.no
Web: www.IKM.no

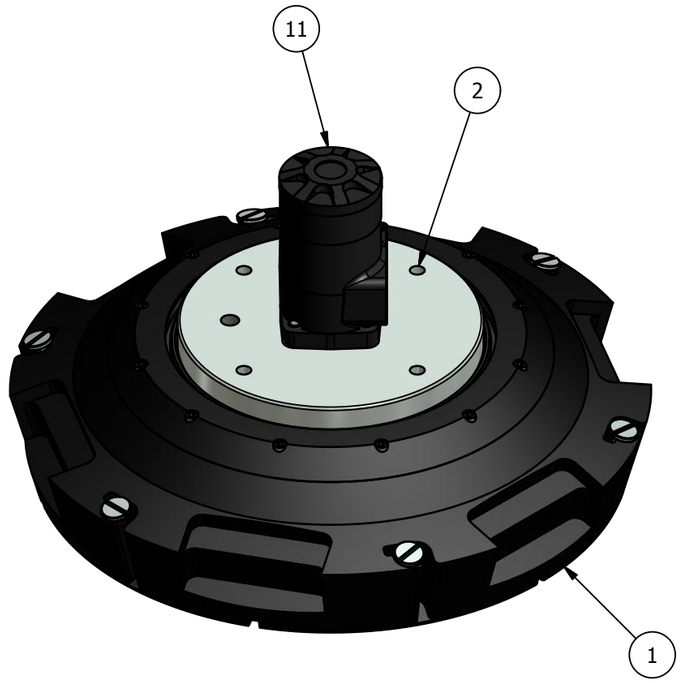
PROJECT TITLE: P7144

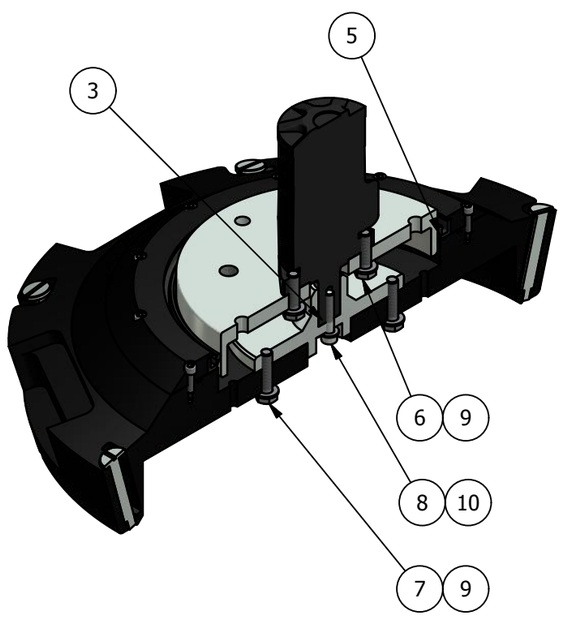
DRAWING TITLE: 18-3/4" CLEANING TOOL DISC W MOTOR

SHEET SIZE: A3 | SHEET NO.: 1 OF 2 | SCALE: 1:5

DRAWING NO.: 7144-003 | LATEST REV.: 01







PARTS LIST

ITEM	QTY	PART NUMBER	MATERIAL	MASS	DESCRIPTION
1	1	7144-009		13.03 kg	
2	1	7144-105	Stainless Steel, AISI 316L	6.91 kg	
3	1	7144-106	Stainless Steel, S165M	3.03 kg	
4	1	7144-Parallel key	Stainless Steel	0.01 kg	Parallel key, A4, DIN6885 FORM A 8x7x32
5	1	DIN 3760 - A - 250 x 280 x 15 - NBR	Rubber	0.09 kg	Shaft Seal Ring
6	4	ISO 4017 - M10 x 35	Stainless Steel, 440C	0.03 kg	Hexagon head screws
7	6	ISO 4017 - M10 x 40	Stainless Steel, 440C	0.03 kg	Hexagon head screws
8	1	ISO 4762 - M8 x 40	Stainless Steel, 440C	0.02 kg	Hexagon Socket Head Cap Screw
9	10	ISO 7089 - 10 - 140 HV	Stainless Steel	0 kg	Plain washers - Normal series - Product grade A
10	1	ISO 7089 - 8 - 140 HV	Stainless Steel	0 kg	Plain washers - Normal series - Product grade A
11	1	M0H11R24E2000A0J	As Supplied	6.78 kg	Char-Lynn H Series, 185cm³

WEIGHT:
IN AIR: 30 kg
IN WATER: 19,1 kg

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES

TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m

REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

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PROJECT TITLE: P7144

DRAWING TITLE: 18-3/4" CLEANING TOOL DISC W MOTOR

SHEET SIZE: A3 | SHEET NO.: 2 OF 2 | SCALE: 1:5

DRAWING NO.: 7144-003 | LATEST REV.: 01