



TECHNICAL REPORT

SAFETY TOOLS ALLMET AS

ASSESSMENT OF ROTATING CUTTING DISC AND
WELD CUTTER
EN 13463-1 & EN 13463-5

REPORT No. 2007-3186

REVISION No. 03

DET NORSKE VERITAS



TECHNICAL REPORT

Date of first issue: 2007-05-11	Project No.: PRJC-03897-2007-PRC-NOR
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Client: Safety Tools Allmet AS	Client ref.: Tonny Egil Berge

DET NORSKE VERITAS
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Summary:

This technical report is based on GexCon report No. GexCon-07-F44065-RA-1 dated 2007-03-23, GexCon-09-F44091-TN-2 dated 2009-04-23 and assessment of the tools.

The equipment fulfils the requirements of the standards EN 13463-1 and EN 13463-5.

Type Examination Certificate: DNV-2007-OSL-ATEX-3195.

Marking: II 2 G c T4, II 2 D c T101°C

Report No.: 2007-3186	Subject Group:	
Report title: Assessment of rotating cutting disc and weld cutter EN 13463-1 & EN 13463-5		
Work carried out by: Håkon S. Håkonsen		
Work verified by: Ståle Sandstad		
Date of this revision: 2010-02-18	Rev. No.: 03	Number of pages: 18

Indexing terms

Key words ATEX	Service Area
	Market Sector
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1 SCOPE OF WORK

The rotating cutting and weld cutter tool, has been assessed and tested according to EN 13463-1 and EN 13463-5

The purpose of the assessment was to qualify the rotating grinding tools for Type Examination according to directive 94/9/EC (ATEX).

2 CLIENT/MANUFACTURER

	Client/Manufacturer
Name	Safety Tools Allmet AS
Address	Idrettsveien Straume Næringspark 5353 Straume Norway

3 EQUIPMENT UNDER TEST

Equipment submitted for test

Overall designation of system/product:

See description of equipment on page 17 of this report.

The above will be referred from now as **EUT (Equipment Under Test)**.

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Photos



Cutting disc Atlas Copco air tool with water cooling



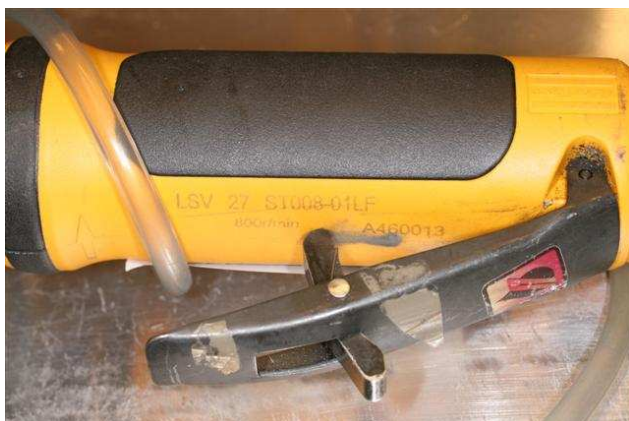
Cutting disc



Atlas Copco pressurised air tool



Water cooling with valve



Model LSV 27 ST008-01LF, 800rpm



Cutting disc

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Atlas Copco pressurised tool with Weld cutter



Model LSV 28-ST-008-01 800rpm



Water cooling with valve



Weld cutter grinding disc



Water and pressurised air controller

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Water and pressurized air controller



Water and pressurized air controller



Pressurised air hose



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Pressurised air coupling



Pressurised air coupling



Pressurised air hose marking



Pressurised air hose marking



Type WC-502 cutting disk Cuttingdisk Ø110
5mm thick mounted on FCD-10X-52 1000rpm



Model FCD-10X-52, 1000rpm



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4 CHECK LIST**EN 13463-1: 2001**

Non-electrical equipment for potentially explosive atmospheres – Part 1: Basic method and requirements

EN 13463-5: 2003

Non-electrical equipment intended for use in potentially explosive atmospheres – Part 5: Protection by constructional safety

Possible test case verdicts: **P** = Pass, **F** = Fail, **N** = Not applicable. Placed in the column “Verdict”.

EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
1	Scope	The equipment is covered by this standard.	N
2	Normative references	This clause contains no requirements.	
3	Terms and definitions		N
4	Equipment categories and explosion groups		
4.1	Equipment category	II 2	P
4.2	Explosion groups (subdivisions)		
4.3	Specific explosive atmosphere	No specific atmosphere	P
5	General		
5.1	General requirements	The equipment comply with this standard and EN 13463-5. All intended service conditions for the equipment is specified by the manufacturer and included in the required instruction for safe use. The ignition hazard assessment include relevant testing conclude that the equipment does not contain any effective ignition sources during expected malfunctions.	P
5.2	Ignition hazard assessment		
5.2.1	Formal analysis	All equipment and parts is subjected to hazard analyses. See 5.2.3.2 in this report.	P
5.2.2	Assessment for equipment–group I		



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EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
5.2.2.1	Group I, category M1	Group II, category 2	N
5.2.2.2	Group I, category M2	Group II, category 2	N
5.2.3	Assessment for equipment-group II		
5.2.3.1	Group II, category 1	Group II, category 2	N
5.2.3.2	Group II, category 2	Pressurized air tool instruction and GexCon report No.: GexCon-07-F44065-RA-1 and GexCon-09-F44091-TN-2	P
5.2.3.3	Group II, category 3	Group II, category 2	N
5.2.4	Assessment with faults	The assessment include malfunction. See 5.2.3.2 of this report.	P
5.2.5	Establishing the maximum surface temperature	Maximum temperature of the equipment is +40°C + max temp. rise 56K= 96°C at expected use of the tool.	P
5.2.6	Dust deposits and other material in the gap of moving parts	No dust deposits.	N
5.2.7	Ignition hazard assessment	Ignition hazard assessment report see 5.2.3.2 of this report.	P
5.2.8	Ignition hazard assessment report	Ignition hazard assessment report see 5.2.3.2 of this report.	P
5.3	Openings of enclosures	No ignition sources in the enclosure.	P
5.4	Category 1 equipment	Category 2 equipment	N
5.5	Category M1 equipment	Category 2 equipment	N
6	Temperatures		
6.1	Maximum surface temperature		
6.1.1	Equipment-group I	Equipment of group II	N
6.1.2	Equipment-group II G	Equipment of group II G Classified in a temperature class T4	P
6.1.3	Equipment-group II D	Equipment of group II G	N
6.1.4	Design temperatures	The design temperature is -20°C to +40°C no additional marking required.	P



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EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
7	Non metallic parts of the equipment		
7.1	General	Only metallic parts	N
7.2	Specification of the materials		N
7.3	Thermal endurance		N
7.4	Electrostatic charges of parts of the equipment		
7.4.1	General		N
7.4.2	Occurrence of highly efficient charge generating mechanisms (leading to propagating brush discharges on non-conductive layers and coatings)		N
7.4.3	Equipment-group I		N
7.4.4	Equipment-group II	2mm max thickness of plastic materials Additional test done according to annex C.	P
8	Equipment containing light metals		
8.1	Equipment-group I	Equipment group II	N
8.2	Equipment-group II	Light metals	N
9	Removable parts	Level of protection not relevant to any parts.	N
10	Materials used for cementing	No materials used for cementing	N
11	Connection facilities for earthing conducting parts	Earthing connection is through the hose of type 714-06, manufactured by Active Service or of a hose of equal design.	P
12	Light transmitting parts	No light transmitting parts	N
13	Verification and tests		
13.1	General	Relevants test carried out by Gexcon. GexCon report No. GexCon-07-F44065-RA-1 and GexCon-09-F44091-TN-2	P
13.2	Technical documentation	The manufacturer's technical documentation gives a full and correct specification of the explosion safety aspect	P
13.3	Tests		



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EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
13.3.1	General		P
13.3.2	Mechanical tests		
13.3.2.1	Tests for resistance to impact	Not relevant for this type of design.	N
13.3.2.2	Drop test	Not relevant for this type of design.	N
13.3.2.3	Required results	Damage will not degrade the level of protection.	N
13.3.3	Measurement of the maximum surface temperature	Maximum temperature with fault condition. +96°C at +40°C ambient.	P
13.3.4	Test of non-metallic parts of the equipment relevant to the level of protection		
13.3.4.1	Ambient temperature during tests	No non-metallic parts relevant to the level of protection. Only charging test	N
13.3.4.2	Tests of non-metallic parts of the equipment relevant to the level of protection		N
13.3.4.3	Thermal endurance to heat		N
13.3.4.4	Thermal endurance to cold		N
13.3.4.5	Resistance to chemical agents for Group I equipment		N
13.3.4.6	Mechanical tests		N
13.3.4.7	Surface resistivity test of non-conductive parts of the equipment relevant to the level of protection		N
13.3.5	Thermal shock test	No glass parts or windows	N
14	Marking		
14.1	General		P



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EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
14.2	Marking of equipment complying with this standard	<p>The marking shall include:</p> <p>a) Safety Tools Allmet AS, Idrettesveien, Straume Næringspark, 5353 Straume, Norway</p> <p>b) The type of pressure tools and related parts marked.</p> <p>c) marked on the pressure tools.</p> <p>d) Ex II 2 G, Ex II 2 D</p> <p>e) c</p> <p>f) -</p> <p>g) T4, T101°C</p> <p>h) -</p> <p>i) Serial No. marked on the pressure tools and suitcase with a suitcase No.</p> <p>j) DNV-2007-OSL-ATEX-3195</p> <p>k) -</p> <p>l) -</p> <p>m) -</p>	P
	On very small equipment where there is limited space	<p>a)</p> <p>b)</p> <p>c)</p> <p>d)</p> <p>e)</p>	N
14.3	Examples of the full marking	No requirements	
14.4	Further examples of the ignition protection marking only	No requirements	
15	Information for use	Slipeprosedyre/Bruksanvisning	P
ANNEX A, Methodology for confirming the category			
A.1	Methodology for confirming the category of Equipment-group I		
A.1.1	Category M1 Equipment		N



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EN 13463-1: 2002			
Clause	Requirement - test	Result	Verdict
A.1.2	Category M2 Equipment		N
A.2	Methodology for confirming the category of Equipment-group II		
A.2.1	Category 1 Equipment		N
A2.2	Category 2 Equipment	No effective ignition sources are identified. Temperature classified T4	P
A.2.3	Category 3 Equipment		N
ANNEX C, Charging tests with non-conductive material			
C.1	Introduction	No non-conductive materials	P
C.2	Principle of the test		P
C.3	Samples and apparatus	The air tool	P
C.4	Procedure		P
C.4.1	Conditioning		P
C.4.2	Determination of the most efficient charging method.		
C.4.2.1	Rubbing with a pure polyamide cloth		N
C.4.2.2	Rubbing with a cotton cloth		N
C.4.2.3	Charging with a DC high voltage power supply	Only charging with a DC high voltage power supply. 30kV for 60 seconds on different plastic materials.	P
C.4.2.3	Assessment of discharge	Highest charging on plastic grip fixed at the head of the air tool. 7,3 nC.	P



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EN 13463-5: 2002			
Clause	Requirement - test	Result	Verdict
1	Scope	The equipment is covered by this standard.	P
2	Normative references	This clause contains no requirements.	
3	Terms and definitions		P
4	General		
4.1	Determination of suitability	Subjected to a ignition hazard assessment	P
4.2	Parts of equipment	All parts and interconnecting parts are capable of functioning in conformity with the operational parameters established by the manufacturer.	P
4.3	Ingress Protection	The degree of ingress protection not relevant for this type of equipment.	N
4.3.1	General		N
4.3.2			N
4.3.3			N
4.3.4			N
4.3.5			N
4.4	Seals for moving parts		
4.4.1	Unlubricated gaskets, seals, sleeves, bellows and diaphragms	Unlubricated seals which are subjected to rubbing contact in normal operation . Ok according to ignition hazard assessment of the pressure tools	P
4.4.2	Stuffing box seals	No stuffing box seals	N
4.4.3	Lubricated seals	No lubricated seals	N
4.5	Equipment lubricants/Coolants/Fluids		
4.5.1		Lubricants or coolants required for the prevention of potential incendive hot surfaces or mechanical sparks is specified in the instruction for the air tools. Running time between each control of lubricant is specified in the instruction of the air tool.	P
4.5.2			N
5	Requirements for moving parts		



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EN 13463-5: 2002			
Clause	Requirement - test	Result	Verdict
5.1	General	The ignition hazard assessment by Atlas Copco conclude no ignition source during the lifetime of the equipment.	P
5.2	Vibration	No vibration	N
5.3	Clearance	Clearance not relevant	N
5.4	Lubrication	No moving parts depend on the presence of a lubricating medium	N
6	Requirements for bearings		
6.1	General	Rolling element bearing.	P
6.2	Lubrication	Heat should not occur even if the tool is used at no load without lubricating	N
6.3	Chemical compatibility		N
7	Requirements for power transmission systems		
7.1	Gear drives		
7.1.1		Can not be a ignition source	N
7.1.2		Can not change gear ratio	N
7.2	Belt drives		
7.2.1		No belt drives	N
7.2.2			N
7.2.3			N
7.2.4			N
7.2.5			N
7.2.6			N
7.3	Chain Drives	No chain drives	N
7.4	Other Drives	No other drives	N
7.5	Hydrostatic/Hydrokinetic/pneumatic-equipment		
7.5.1		Pneumatic equipment does not produce hot surfaces exceeding T4.	P
7.5.2		Not hydrostatic or hydrokinetic	N
7.5.3		Comply with the requirements of EN 983	N
7.5.4		No power transmission fluid	N



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EN 13463-5: 2002			
Clause	Requirement - test	Result	Verdict
7.5.5		No power transmission fluid	N
7.5.6		Air compressors used for pneumatic equipment shall: -incorporate a filter on the intake system - contain lubricant which are resistant to carbonisation	P
8	Requirements for clutches and couplings		
8.1		No clutches	N
8.2			N
8.3			N
9	Requirements for brakes and braking systems		
9.1	Brakes used only for stopping emergency	No brakes	N
9.2	Service brakes (including friction brakes and fluid based retarders)		N
9.3	Parking brakes		N
10	Requirements for springs and absorbing elements	No springs and absorbing elements	N
11	Requirements for conveyor belts		
11.1		No conveyor belts	N
11.2			N
11.3			N
11.4			N
11.5			N
12	Additional Marking	“c”	P
ANNEX B, Test requirements			
B.1	“Dry run” test for lubricated sealing arrangements	No lubricated sealing arrangements	N



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EN 13463-5: 2002			
Clause	Requirement - test	Result	Verdict
B.2	Type test for determining the maximum engaging time of clutch assembly		
B.2.1	Apparatus		
B.2.1.1		No clutch assembly	N
B.2.1.2			N
B.2.1.3			N
B.2.1.4			N
B.2.1.5			N
B.2.1.6			N
B.2.2	Procedure		
B.2.2.1			N
B.2.2.2			N
B.2.2.3			N
B.2.2.4			N
B.2.3	Results		N
B.2.4	Reporting		N



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5 DESCRIPTION OF EQUIPMENT:

Wolfram carbide cutting disc and weld cutter for use with specified air tools and adaptors. All parts included in the certificate are delivered in a safety-suitcase. The air tool must only be supplied from the water and pressurised air controller of type STA. When supplied from the controller the air tool can only operate when water pressure is within set values. This water cooling system is taken into consideration for the temperature classification of the equipment.

The air tool must be earthed by the supply air hose of type 714-06, manufactured by Active Service or an air hose of equal design. The maximum temperature on cutted or grinded material can be + 96 °C at an ambient temperature of +40°C and at maximum force for a long period. The equipment is for use in Zone 1 and Zone 2 areas.

The cuttingdisk WC-502 shall only be used with an air tool with max 1000RPM and can only be used against the following listed materials; stainless steel Grade 316, Steel ST52, Titanium, ASTM B265 Titanium and Austenitic stainless steel 6MO. The maximum temperature on material under test without cooling was for cuttingdisk WC-502 175°C.

Type Identification

Type (V.nr.)		
LSV28-ST-008-01	800 rpm	Air tool (Atlas Copco)
LSV27-ST-008-01 LF	800 rpm	Air tool (Atlas Copco)
WC. A-0-502		Cutting disc Ø 110mm, 5mm thick
WC. A-503		Weld cutter Ø 110mm, 10mm thick
STA		Water cooling cabinet
FCD-10X-52	1000 RPM	Air tool (Fuji Air Tools) Corner drill

Descriptive documents

Number	Title	Rev.	Date
68174-02	Vann og luft controller	C	-
1.09A	Platefile – Cutterdisk Ø110	-	2007-10-19
-	Radiusplatefile	Rev. 2	2004-01-11
9835 1426 00	Spare part list Atlas Copco	4 pages	1999-04
9836 2580 00	Spare part list Atlas Copco	3 pages	2006-01
D-120-A73-00	Corner drill	-	2007-08



6 REVISION HISTORY

This revision 02 of the technical report includes a new air tool, update of cutter disc drawing and change of address.

This revision 03 of the technical report added D for dust without any further assessment.

Temperature measured to 96°C for dust the marking will be T101°C.