Secoroc Rock Drilling Tools

Secoroc COP W4

– taking geothermal and water well drilling to all new depths

Atlas Copco

Secoroc COP W4

Proof of productivity – greatly increased market share

After three years of research and development, Atlas Copco Secoroc's new COP W4 DTH hammer is a proven success. More than 250 000 meters have been test drilled. And the limited product release on the Scandinavian market during 2016 resulted in an outstanding increase in market share.

Lightweight

Secoroc COP W4 has a whole new design. It uses special purpose, high-class steel. It's smaller and more compact, it has fewer parts, and as a result it is much lighter than other geothermal and water well DTH hammers. At a mere 36.5 kg, COP W4 can easily be handled by one man.

Strikes at high frequency

One of the key features of COP W4 is a smaller and lighter piston. This lighter weight means that the hammer strikes the rock at a slightly lower energy than before, but at a higher frequency – 2 520 strikes per minute at 35 bar pressure. At the end of the day, this results in much more impact force hitting the rock, while at the same time saving the equipment.

Easy to service

Fewer parts mean that COP W4 is easy to service. The hammer can also be re-built with an economy kit (exchangeable casing, backhead and chuck) without any loss in productivity.

Outstanding service life

The lower impact force and higher strike frequency saves the equipment and gives the hammer a much longer service life. Tests show that the average service life at 35 bar working pressure is 3 700 meters. At 25 bar, another 500 meters of service life is added.

Energy efficient

Secoroc COP W4 is optimised to the Atlas Copco 35 bar high pressure compressor and to resist the water backpressure during drilling.
The air consumption is significantly reduced, and thanks to its design it can be maintained throughout the lifetime of the hammer. As a result, the diesel consumption is even lower than expected. Depending on working

pressure and type of rock, we have seen diesel use reductions of up to 20 %.

Great savings every meter drilled

Compared to competing hammers, Secoroc COP W4 will offer you great savings. Productivity is up to 10 % better. Energy consumption up to 20 % lower and the service life of the hammer is up to 10 % longer. If you look for the lowest cost per meter drilled, we think these numbers speak for themselves.

No compromises

When designing COP W4, we really got to the bottom of water well and geothermal hammer technology. We talked to a large number of customers to find out their needs. And we went through even more field reports. This structured work was the basis for a thorough research effort using our 100 year's experience and all the best simulation tools available.

Development criteria

Our new DTH hammer needs to meet tough requirements. It should be easy to use, easy to adjust, and easy to service. For geothermal and water well drilling it should offer great penetration rate also at water influx of up to 30 000 liters per hour. The productivity should be at least 45 meters per hour at 35 bar working pressure. Service life should exceed 3 200 meters. And the cost of drilling should be greatly reduced.

Optimised design

Computerised simulations and optimisation of working pressure, air flow, impact energy, impact frequency and piston weight led to a number of new features for COP W4.

New technologies

Effective economy kit

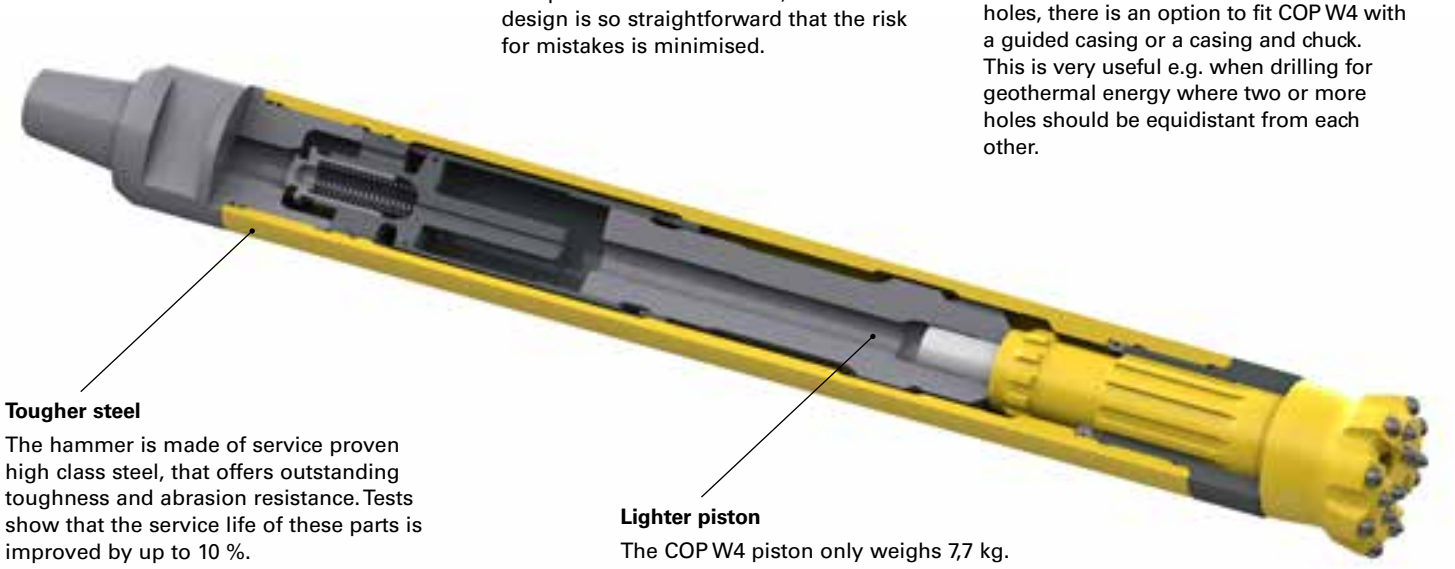
When servicing the COP W4 hammer, the economy kit offers interesting opportunities. With the e-kit, you can replace the worn external parts while the interior parts can be re-used. This means maintained productivity at considerably lower cost.

Fewer parts

COP W4 is built with fewer parts than before. This means a cleaner, more robust hammer that is easy to use and service. No special tools are needed, and the design is so straightforward that the risk for mistakes is minimised.

Option for less hole deviation

When there is a need for extra straight holes, there is an option to fit COP W4 with a guided casing or a casing and chuck. This is very useful e.g. when drilling for geothermal energy where two or more holes should be equidistant from each other.



Tougher steel

The hammer is made of service proven high class steel, that offers outstanding toughness and abrasion resistance. Tests show that the service life of these parts is improved by up to 10 %.

Lighter piston

The COP W4 piston only weighs 7,7 kg. This lighter piston weight allows a higher strike frequency with less strain and wear on the hammer. It also means more stable drilling, reducing the need for drilling speed adjustments.

Specifications

General specifications		
Drill pipe connection	API 2 ⅜" Reg. Pin	
Bit shank code/type	TD 40	
Length without drill bit	928 mm	36.5 in
Length excl. thread	851 mm	24.5 in
Outside diameter	102 mm	4 in
Top sub thread (std) API Reg	2 ⅜ in	
Wrench flat on top sub	65 mm	2 ½ in
Rec. bit size	115–130 mm	4 ½–5 ⅛ in
Weight without drill bit	36,6 kg	81 lb
Piston diameter	82 mm	3 ¼ in
Piston weight	7,7 kg	17 lb
Working pressure, max	35 bar	508 psi

Drilling parameters				
Pressure	**Air consumption, liter/s**	**Impact frequenzy, strokes/min**	**Weight on bit, kg**	**Rotation speed, RPM**
15 bar/217 psi	147	1750	670 ± 10 %	72 ± 10 %
20 bar/290 psi	216	1900	900 ± 10 %	81 ± 10 %
25 bar/362 psi	285	2100	1100 ± 10 %	92 ± 10 %
30 bar/435 psi	365	2350	1350 ± 10 %	102 ± 10 %
35 bar/508 psi	429	2520	1600 ± 10 %	110 ± 10 %

Case

Sörmlands Brunnsborrning, Flen, Sweden

For a full year, Sörmlands Brunnsborrning has had the opportunity to test Atlas Copco Secoroc's new COP W4 hammer for water well and geothermal drilling. The experiences are more than positive — this new DTH hammer has proven to be very reliable, easy to adjust and, most importantly, it has offered great cost savings.

Better than expected

”This hammer is the best product improvement we have seen so far”, says Per Swartling, CEO, Sörmlands Brunnsborrning. With a large compressor and 35 bar pressure, they drilled 60 meters per hour on average, using 1.9 to 2.0 litres per hour. Even more interesting are the results with a smaller compressor — at 25 bar pressure, 40 to 45 meters could be drilled at a diesel consumption of 1.5 to 1.6 liters per meter, which is a saving of approximately 0.8 to 1.0 liter per three-meter rod. ”For us, diesel consumption is more important than the number of meters drilled per hour. Normally, we dedicate one day per job, and diesel is often a bigger cost than the driller's salary”, continues Per Swartling.

> *”This hammer is the best product improvement we have seen so far.”*

The hammer of choice

During this test year, COP W4 has proven to be extremely reliable for Sörmlands Brunnsborrning. So far, there has not been a single broken drill bit or foot valve. ”Everything is really robust, the hammer is easy to adjust to the rock and it does not need as much monitoring as earlier equipment – our guys quite simply don't want any other hammer”, summarises Per Swartling.

Per Swartling, CEO, Sörmlands Brunnsborrning.

Secoroc COP W4

Secoroc COP W4		
Product No.	**Product code**	**Description**
89012204	9704-WW-00-10P-64-000	API 2 3/8" Reg. Pin
89012330	9704-WW-00-10P-64-00G	API 2 3/8" Reg. Pin with guided casing*
89012319	9704-WW-00-10P-64-G0G	API 2 3/8" Reg. Pin with guided casing and guided chuck*

* Outer diameter 114 mm

E-kit		
Product No.	**Product code**	**Connection**
89012218	9704-WW-00-10P-64-000-K40	API 2 3/8" Reg. Pin

Secoroc COP W4 drill bits (with TD 40 shank)												
Diameter		**Product No.**	**Product code**	**No. of buttons × button diameter, mm (inch)**					**Gauge buttons angle**			
mm	**inch**			**Outer**	**Outer**	**Inner**	**Front**	**Cone**	**Outer**	**Middle**	**Inner**	**Cone**
FLAT FRONT												
110	4 5/16	90516005	100-5110-64-1210,10-20	8x14,5 (9/16)			7x12,7 (1/2)		35°			
115	4 1/2	90516006	100-5115-64-1210,10-20	8x14,5 (9/16)			7x12,7 (1/2)		35°			
120	4 3/4	90516506	100-5120-64-1210,10-20	8x14,5 (9/16)			8x12,7 (1/2)		35°			
125	4 15/16	90516227	100-5125-64-1210,10-20	8x14,5 (9/16)			10x12,7 (1/2)		35°			
130	5 1/8	90516007	100-5130-64-1218,10-20	8x15,8 (5/8)			8x14,5 (9/16)		35°			
140	5 1/2	90516447	100-5140-64-1218,10-20	8x15,8 (5/8)			10x14,5 (9/16)		35°			
152	6	90516446	100-5152-64-1217,10-20	8x15,8 (5/8)			8x15,8 (5/8)		35°			
SPEEDBIT												
110	4 5/16	90003521	100-5110-64-1250,10-20	8x14,5 (9/16)			8x12,7 (1/2)		35°			
115	4 1/2	90516008	100-5115-64-1250,10-20	8x14,5 (9/16)			8x12,7 (1/2)		35°			
115	4 1/2	90516450	100-5115-64-12H8,10-20	8x15,8 (5/8)			6x12,7 (1/2)		35°			
120	4 3/4	90516516	100-5120-64-1250,10-20	8x14,5 (9/16)			8x12,7 (1/2)		35°			
125	4 15/16	90516364	100-5125-64-1250,10-20	8x14,5 (9/16)			10x12,7 (1/2)		35°			
130	5 1/8	90516365	100-5130-64-1250,10-20	8x14,5 (9/16)			10x12,7 (1/2)		35°			
CONCAVE												
115	4 1/2	90003644	100-5115-64-0210,10-20	8x14,5 (9/16)			4x12,7 (1/2)	2x12,7 (1/2)	35°			-20°
115	4 1/2	90029091	10b-5115-64-0210,10-20	8x14,5 (9/16)			4x12,7 (1/2)	2x12,7 (1/2)	35°			-20°
115	4 1/2	90029164	100-5115-64-0227,10-20	8x15,8 (5/8)			4x15,8 (5/8)	3x15,8 (5/8)	35°			-20°
130	5 1/8	90029022	100-5130-64-0218,10-20	8x15,8 (5/8)			4x14,5 (9/16)	3x14,5 (9/16)	35°			-20°
CONVEX FRONT BALLISTIC												
127	5	90029253	100-5127-64-2359,10-20	7x14,5 (9/16)		4x14,5 (9/16)	3x14,5 (9/16)		40°		20°	
ROCKET BIT BALLISTIC												
110	4 5/16	90516010	100-5110-64-623A,10-20	8x12,7 (1/2)	4x12,7 (1/2)	2x12,7 (1/2)	2x12,7 (1/2)		40°	30	15°	
115	4 1/2	90516011	100-5115-64-623A,10-20	8x12,7 (1/2)	4x12,7 (1/2)	2x12,7 (1/2)	2x12,7 (1/2)		40°	30	15°	
ROCKET BIT SPHERICAL												
110	4 5/16	90003709	100-5110-64-6210,10-20	8x14,5 (9/16)	4x12,7 (1/2)	2x12,7 (1/2)	2x12,7 (1/2)		40°	30°	15°	
115	4 1/2	90516012	100-5115-64-6210,10-20	8x14,5 (9/16)	4x12,7 (1/2)	2x12,7 (1/2)	2x12,7 (1/2)		40°	30°	15°	
FLAT FRONT X-TRA BIT, SPHERICAL PCD												
115	4 1/2	90029239	100-5115-64-1210,10-B1	8x14,5 (9/16)			7x12,7 (1/2)		35°			
Foot valve		90516004	9115									
Assembly tool		90516013	9141									

Sustainable Productivity

We stand by our responsibilities towards our customers,
towards the environment and the people around us.
We make performance stand the test of time.
This is what we call – Sustainable Productivity.

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