YOUR DRILLING EXPERT

HALCO Rock Tools

DTH DRILL TOOLS USER GUIDE

wwww.halcorocktools.com

Halco Rock Tools Ltd is a world class manufacturer of down-the-hole (DTH) drilling equipment.

Contents

Hammer Range	3
Operating DTH Hammers	4
Thrust (Pulldown) Holdback / Torque	5
Commissioning DTH Hammers & Drill Bits	6
Lubricating Oil	8
Choosing the Right Drill Bit	9
User Certificate	10
Quality Policy	11
Our Commitment to You	11

Halco pioneered the development and distribution of DTH hammers in the 1950's, and now our precision engineered range of performance hammers and drill bits are used globally.

Predominantly used for mining, DTH is preferred in other applications such as construction, quarrying, formation sampling, and the drilling of water wells. Halco Rock Tools is located in Brighouse, UK.

HAMMER RANGE

1" RANGE

PART NUMBER	HAMMER	SHANK
600422	DOMINATOR 10	HALCO 1

2" RANGE

PART NUMBER	HAMMER	SHANK
600169	MACH 20	HALCO 2
600423	DOMINATOR 20	HALCO 2

3" RANGE

PART NUMBER	HAMMER	SHANK
600424	DOMINATOR 30	DHD 3.5
600393	DOMINATOR 375	MD 3.5

4" RANGE

PART NUMBER	HAMMER	SHANK
600070	MACH 44	HALCO 4
600382	SUPER DOMINATOR 450	HALCO 4.5
600425	GP 400	DHD 340A

5" RANGE

PART NUMBER	HAMMER	SHANK
600046	MACH 50	HALCO 5
600267	SUPER DOMINATOR 500	DHD 350R
600294	SUPER DOMINATOR 550	QL 50
600426	GP 500	DHD 350R

6" RANGE

PART NUMBER	HAMMER	SHANK
600035	MACH 60	HALCO 6
600272	SUPER DOMINATOR 600	DHD 360
600316	SUPER DOMINATOR 650	QL 60
600427	GP 600	QL 60
600431	SUPERIOR 650	QL 60

7" RANGE

PART NUMBER	HAMMER	SHANK
600243	DOMINATOR 750	SD8

8" RANGE

PART NUMBER	HAMMER	SHANK
600309	DOMINATOR 800	DHD 380
600396	DOMINATOR 800 LE	QL 80
600245	DOMINATOR 850	QL 80
600261	DOMINATOR 880 DW	DHD 380
600432	SUPERIOR 800	DHD 380
600433	SUPERIOR 850 DW	DHD 380

10" RANGE

PART NUMBER	HAMMER	SHANK
600248	DOMINATOR 1000	SD10
600434	SUPERIOR 1000	SD10

12" RANGE

PART NUMBER	HAMMER	SHANK
600110	MACH 122	SD12
600142	MACH 132	DHD 112
600143	MACH 142	DHD 112S
600435	SUPERIOR 1200	DHD 112
600436	SUPERIOR 1250	DHD 112S

15" RANGE

PART NUMBER	HAMMER	SHANK
600437	SUPERIOR 1500	SD 15

18" RANGE

PART NUMBER	HAMMER	SHANK
600438	SUPERIOR 1800	SD 18

RC RANGE

PART NUMBER	HAMMER	SHANK
600405	RC400	HALCO RC 400
600407	RC400	HALCO RC 400
600415	RC400	HALCO RC 400
600409	RC500	HALCO RC 500
600410	RC500	HALCO RC 500

Rotation speeds

Where drill bit life and cost is a major consideration on a drill site, rotation speeds should be carefully monitored.

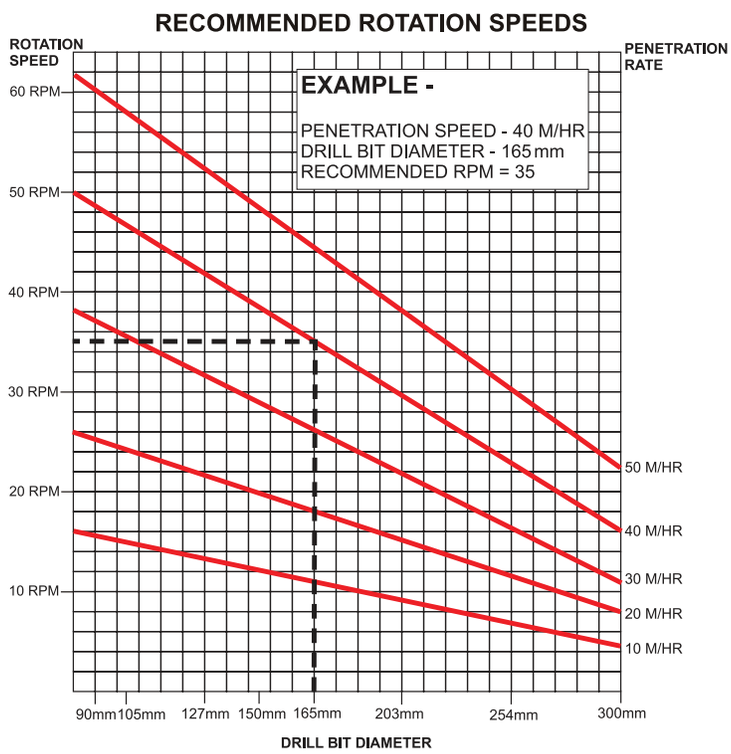
DTH drill bits are rotary - PERCUSSIVE tools with the emphasis on PERCUSSIVE. Their function is to fracture the material being drilled which should then be immediately carried away by the exhaust air. Button bits have no cutting or tearing action as such and the effect of rapid rotation can be detrimental to the life of the bit, especially in abrasive rock which wears away fast moving peripheral inserts or in solid dense material which causes the peripheral inserts to overheat and spall due to friction.

If the string is rotated too slowly, the buttons impact previously chipped areas of the hole with a resultant drop in penetration speed.

As a general guide - the harder the rock or the larger the bit diameter - the slower the rotation speed required.

It may be necessary to increase the rotation speed where the rock is badly fissured in order to prevent stalling.

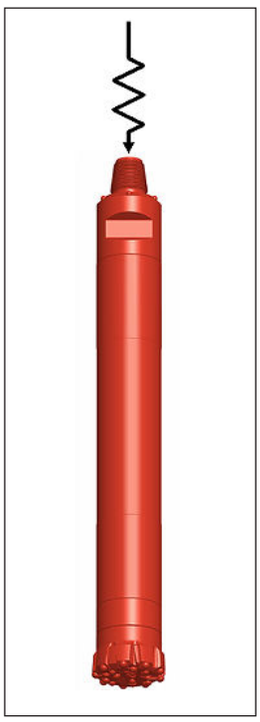
A bit stalling in the bore hole could be the result of an overly worn bit. Increasing the rotation speed in these circumstances will only accelerate the problem.



Thrust should be kept as low as possible at all times to avoid excessive vibration in the drill string.

Hold back should be increased more and more as additional rods are added and as drilling progresses. DTH drilling is primarily percussive drilling using the energy imparted by the hammer piston to the rock through the bit. Any attempts to apply too much weight could damage the bit, hammer and drill string and impair the drilling rate.

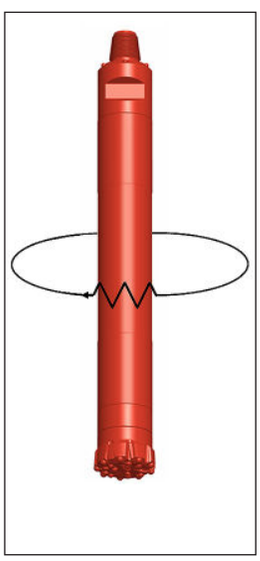
Although the base of the hammer should maintain contact with the drill bit, there should not be excess thrust or vibration due to the reaction between the hammer and drill bit. Insufficient thrust will cause the hammer to bounce resulting in a low blow energy to the rock causing vibration and also potential damage.



Recommended Thrust Capacities

Hammer Size	Min. Thrust	Max. Thrust
3” 76 mm	150 KG (330 Lbs)	300 KG (660 Lbs)
4” 101 mm	250 KG (550 Lbs)	500 KG (1100 Lbs)
5” 127 mm	400 KG (880 Lbs)	900 KG (1980 Lbs)
6” 152 mm	500 KG (1100 Lbs)	1500 KG (3300 Lbs)
8” 203 mm	800 KG (1760 Lbs)	2000 KG (4400 Lbs)
12” 304 mm	1600 KG (3520 Lbs)	3500 KG (7700 Lbs)

When the total weight of the drill string including the weight of the rotary head exceeds the optimum thrust level, the drill string should be put in tension by gradually applying holdback as more tubes are added.



Recommended Torque Ratings

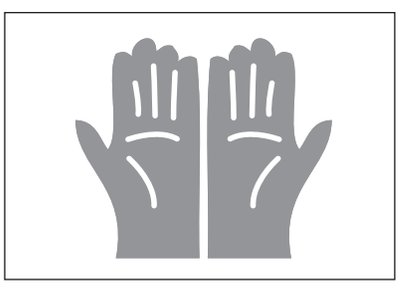
Drill Bit Dia.	Torque (Recommended)
105 mm (4.1/8”)	50 kgm (360 ft/lbs)
127 mm (5”)	120 kgm (865 ft/lbs)
165 mm (6.1/2”)	250 kgm (1800 ft/lbs)
200 mm (7.7/8”)	300 kgm (2170 ft/lbs)
300 mm (11.7/8”)	350 kgm (2530 ft/lbs)
445 mm (17.1/2”)	425 kgm (3075 ft/lbs)

Down the Hole drill bits unlike rotary tricones require very little rotation torque.

COMMISSIONING DTH HAMMERS

Safety

Always wear the correct safety equipment. (Please check with local safety regulations)

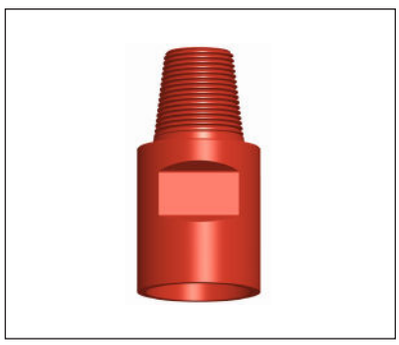


Manual Handling

Components might be heavy. Please carry out a manual handling assessment prior to use.

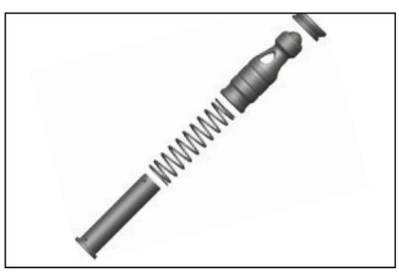
Identification Numbers

Keep a note of equipment serial numbers for future reference. Retain the test certificate and spare parts list supplied with the hammer.



Sub Adaptor

A sub adaptor will be required if the hammer top thread differs to the drill tube thread.



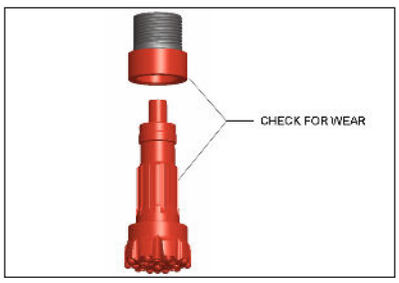
Non Return Valve

You may remove the non-return valve in dry drilling conditions to give a slight increase in performance.

Bit Retaining Rings

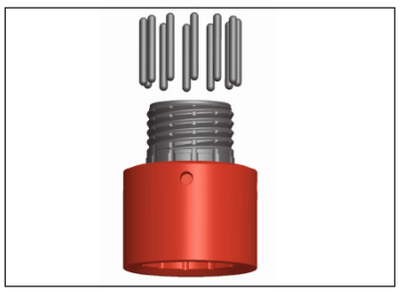
Never mix pairs of retaining rings which generally are manufactured as matched pairs. Always re-fit them in the same orientation as when dismantled from the hammer.

COMMISSIONING DRILL BITS



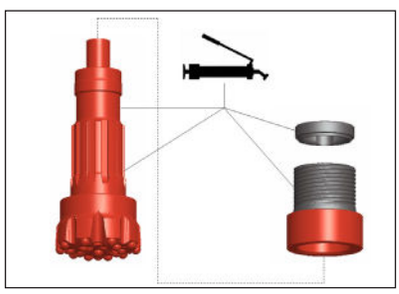
New Hammer or Chuck with used Drill Bit

Check the drill bit splines for wear. If splines are worn damage to the new chuck could occur.



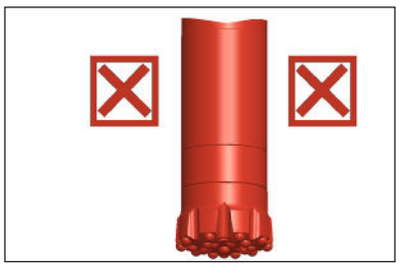
Hammers Equipped with Spline Drive Pins

Always ensure that a full set of serviceable drive pins are fitted to these hammers before operating otherwise damage to splines will occur. In these circumstances, warranty from the manufacturer will not apply.



Grease Components

Grease all threads and splines when assembling drill bit into the hammer.

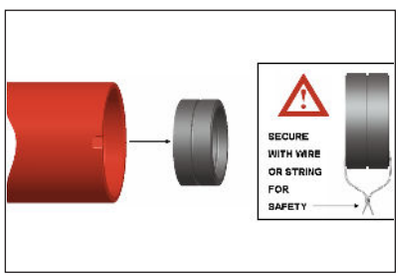


Check Drill Bit Diameter to Hole Diameter

Never try to use a drill bit which is larger in diameter than a partially drilled hole.

Commissioning

Ensure hammer lubricator is working.
Pour 1/2 pint (0.30 litres) of air line oil into the hammer. When attached to drill rig, blow air through to ensure all internal parts are lubricated. Operate at low pressure initially. Progressively increasing, during the first hour, in order to run in the hammer.



Compression Spring

If applicable remove compression spring from cylinder. Ensure that eye protection is worn when removing the compression spring.
Note: Remove with great care as the components may spring apart without warning if dropped. If removed intact secure with wire or string before separating.

LUBRICATING OIL

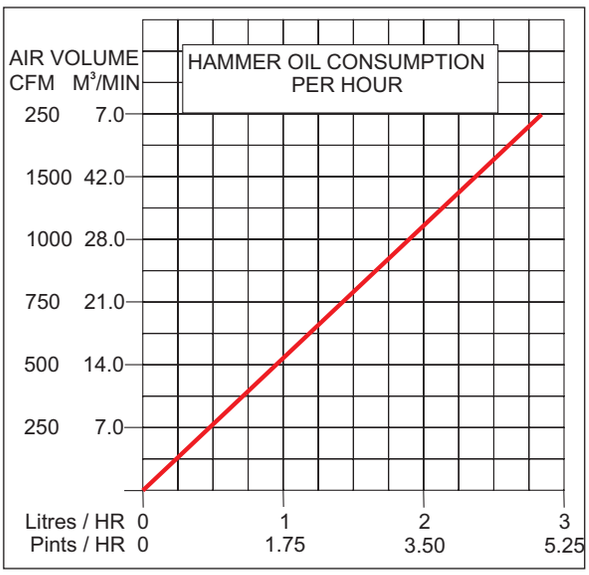
Just like any other piece of precision machinery, the DTH hammer must be lubricated and small quantities of oil should be injected into the air stream at regular intervals while the hammer is working.

Rock drill oils are recommended because these contain the emulsifying and viscosity additives necessary to deal with high pressure and high air flow conditions in which water is usually present, if only from condensation in the air line.

Oil not only provides slip to prevent pick up and premature failure of components but it also acts as a seal on the surface of running parts to use air efficiently without pressure loss.

It is paramount that the correct grade of oil is used at the appropriate consumption rate to suit volume and pressure, in line with the hammer manufacturers recommendation.

Most modern valveless hammers, particularly when operating at high pressures need a heavy oil providing that ambient temperatures allow the oil to run through the airline.



DTH hammers need

- 1/3rd of imp. pint of oil per hour per 100 CFM of air consumed.

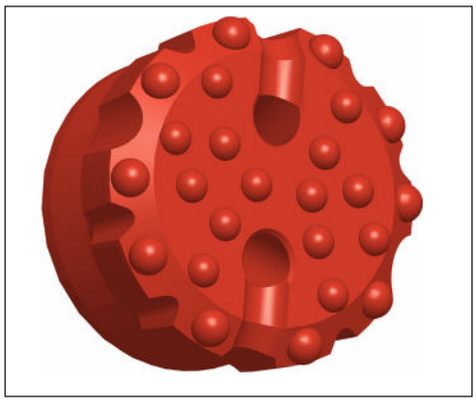
Or

- 0.20L of oil per hour per 3 M³/ Min of air consumed
- Up to double the amount of oil is required when used with water injection
- At temperatures below 5°C oil with an antifreeze additive may be required

Make	Below 10°C	From 10°C to 32°C	Above 32°C
Halco	**HS3**	**HS200**	**HS200**
Molybond		**Molyhammer 320**	
BP	Emergol RD-100	Maccurat D220	Maccurat D220
Caltex	Caltex Aries 100	Caltex Aries 320	Caltex 320
Castrol	RD Oil 100	RD Oil 150	Perfora 220
Elf	Perfora 100	Perfora 220	Arox EP150 or Febis K220
Esso	Arox EP 46	Arox EP 150	Gulfstone Heavy
Gulf	Gulfstone	Gulfstone Heavy	Vactra Oil No.4
Mobil	Almo 527	Almo 529	Tonna TX220
Shell	Torcula 100	Tonna TX220	Way Lubricant X220
Texaco	Aires 100	Way Lubricant X220	

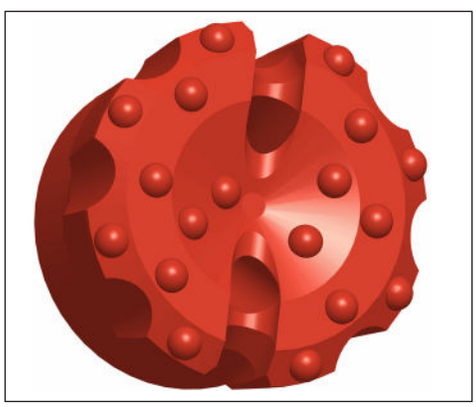
Hammer Grease	
Hammer Grease	Hammer 'O' Ring
Faxene CP Compund	Faxene H76
COG	
Energrease AS11	-
Threadtex	-
-	Red Rubber Grease
Tifora CA	Naturelf GEP 2
-	-
Anti No.2	-
High Pressure Thread	-
-	-

Head Designs



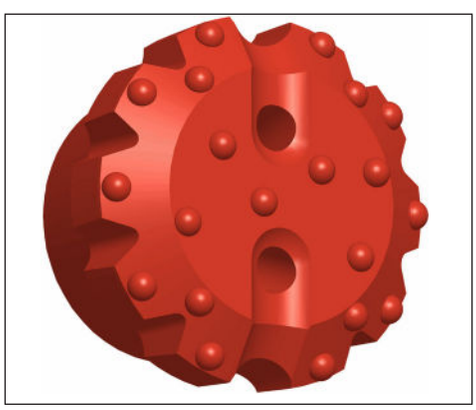
Flat Face

Alternative design for all rock conditions especially fractured and fissured rocks and changing formations.



Concave

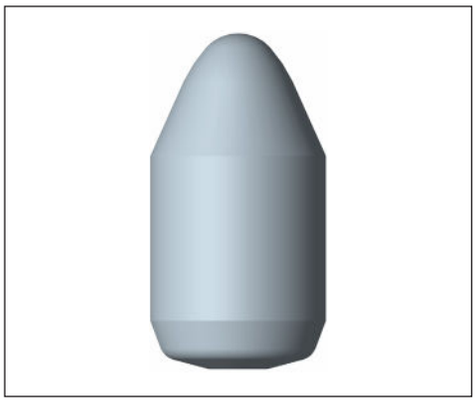
Alternative design for all rock conditions particularly deep hole drilling can improve hole alignment as a result of inverted pilot.



Convex

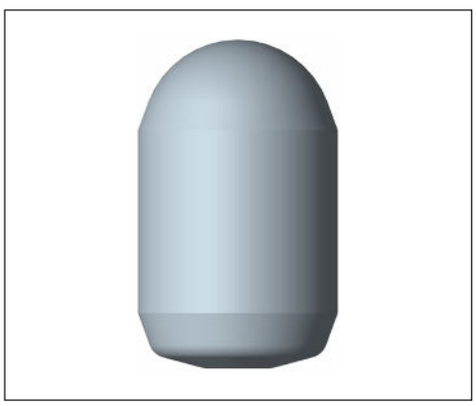
Strong design for all conditions especially hard abrasive rock. Good balance of fast drilling and long service life.

Inserts Types



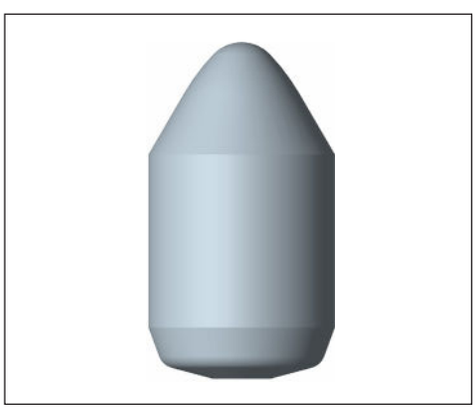
Ballistic Inserts

Suitable for soft and medium compact low abrasive rocks producing large cuttings. Not suitable for badly fractured rocks.



Domed Inserts

Strong rugged shape for high performance and good service life in all conditions particularly suitable for very hard abrasive rocks and deep hole drilling.



Semi-Ballistic Inserts

Suitable for all soft and medium rock conditions including fractured and fissured rocks.

USER CERTIFICATE

Hammer Model:

Hammer Part No:

Hammer Serial No:

We certify that the above DTH hammer has been manufactured in compliance with Halco BS EN ISO 9001:2000 Quality Procedures.

Important: Please refer to enclosed instructions before commisioning the hammer.

Attention: Prière de lire les instructions jointes avant de mettre en marche.

Importante: Sirvanse de consultar las instrucciones adjutadas antes de poner en marcha el martillo.

Wichtig: Vor der Inbetriebnahme eines Hammers beachten Sie bitte die Instruktionen in dieser Broschüre.

QUALITY POLICY

Halco Rock Tools Ltd is recognised as a leader in the design, development, manufacture, servicing and repair of 'Down the Hole' (DTH) Percussive Rock Drilling Tools.

We are committed to the continual improvement of quality by reviewing and measuring processes and products against policies and objectives.

Sales and Marketing personnel implement effective procedures for communicating the market place requirements into the company.

The training and education of personnel within the company ensures smooth product integration in the workplace and develops skills and experience critical in satisfying customer expectations and requirements.

Our Quality Management System has been formulated to comply with the requirements of the appropriate National and International Standards ISO:9001:2000 Quality System. This is a model for quality assurance in design, development, production, installation and product servicing.

We ensure all personnel are fully conversant with the company's quality goals, the expectations and needs of its customers through ongoing feedback and business reviews.

Activities within the Company will at all times reflect the principles of the quality management system to ensure that all orders are processed with regard to the above mentioned criteria. The System is monitored for effectiveness by use of regular audits and reviews.

Our commitment to you

Our aim is to provide excellent service that reflects your needs and exceeds your expectations. Our trained customer support team is dedicated to providing you what you want and when you need it. With over 65 years experience in assisting customers with their drilling applications, our support team has gained the expertise to provide an accurate and timely response.

Warranty

Our warranty on hammers and bits provides you an ease of mind that any problem that might occur will be solved quickly and effectively by our experienced customer support team.

Training Sessions

Training is available at any of our locations. Our distributors are trained and available locally for support as well. Training includes selection, service, maintenance and repair.

Technical support

Technical support is always ready to assist you. Whether you need service or maintenance tips, troubleshooting, or advice on a repair, help is only a phone call away.

Our service engineers are happy to make on-site visits too.

Publications

When you want to learn more about DTH drilling or product maintenance to improve efficiency, we have established 4 books to help you.

- A to Z of DTH Drilling
- DTH maintenance manual
- DTH maintenance RC hammers
- Maintenance Sim-Cas

We are committed to help our customers realise their full potential. Just as we constantly innovate and improve our hammers and bits, we want to continually evolve our company to be in the best position to accelerate new technologies as they emerge and to better serve our customers.

www.halcorocktools.com

United Kingdom

Halco Rock Tools Ltd
Armytage Road
Brighouse
West Yorkshire
HD6 1QF

Tel: +44 (0)1422 399900

Email: salesuk@halcorocktools.com

USA

Halco America LLC
2720 Fallon Drive
Sherman
TX 75090

Tel: +1 903-893-2300

Email: salesusa@halcorocktools.com

Australia

Halco Australia
Dillington Pass
Landsdale WA 6065

Tel: +61 8 9303 9506

Email: salesaus@halcorocktools.com

South Africa

Halco South Africa
21 Harriet Ave
Driehoek
Germiston 1459
Shop No4
Johannesburg

Email: salesafrica@halcorocktools.com

Halco Rock Tools
Quality Management System
is Certified to ISO9001: 2008
Certificate No: LRQ 0850659

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