



**Maintenance Operating and Service
Manual for Hyper 51 QL50 Model**

1 Introduction

The Bulroc range of Hyper Down The Hole Hammers are strong and robust tools of a single and straight forward design to provide maximum performance with minimum maintenance.

Please Note :

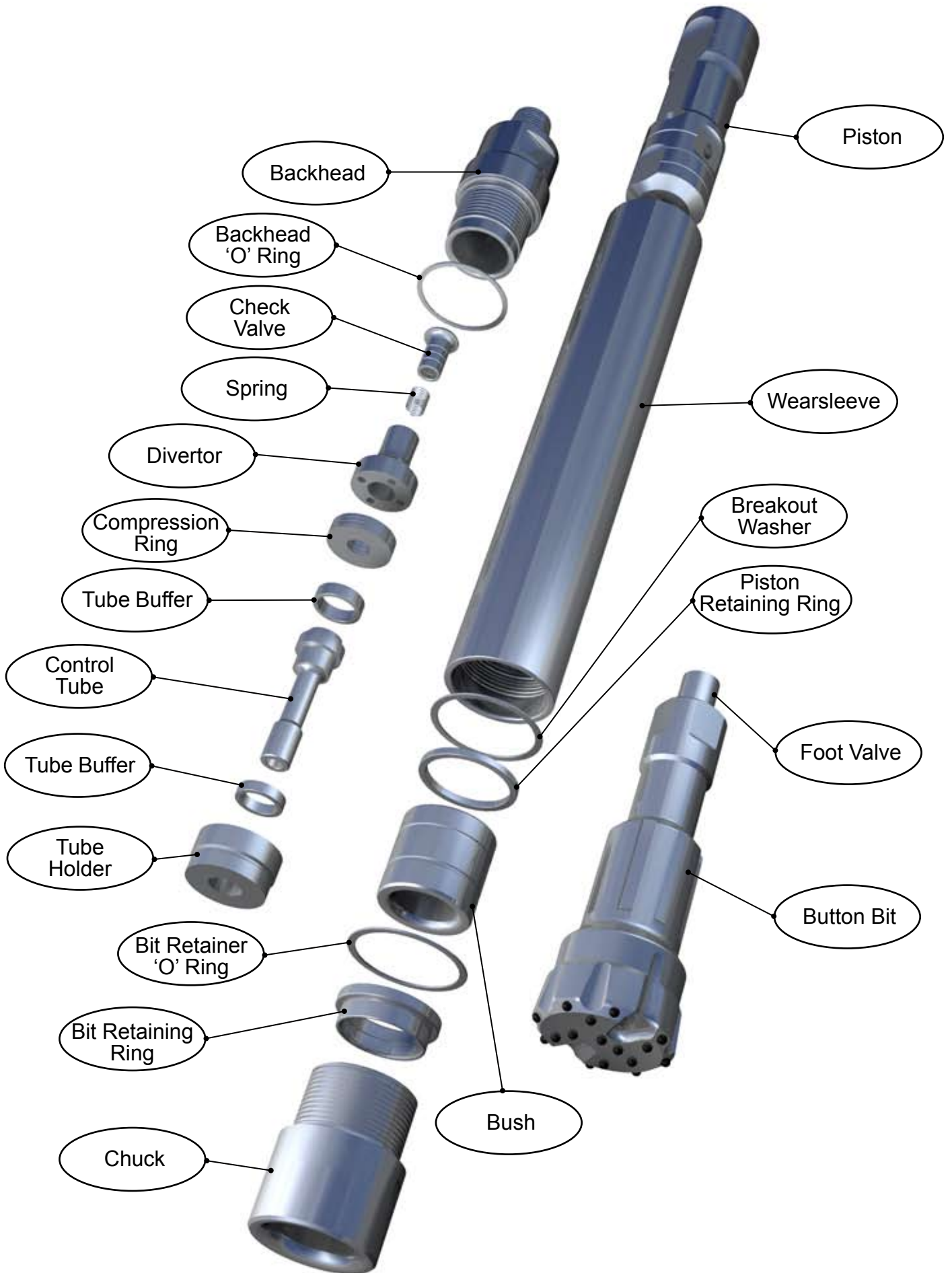
Contrary to other Bulroc hammer models, the Hyper series **do use** bits with Footvalves.

Bulroc Hyper Hammers are supplied as standard with a Check Valve arrangement which is designed to maintain the pressure inside the hammer when air is switched off and so help prevent contaminated water from entering the hammer.

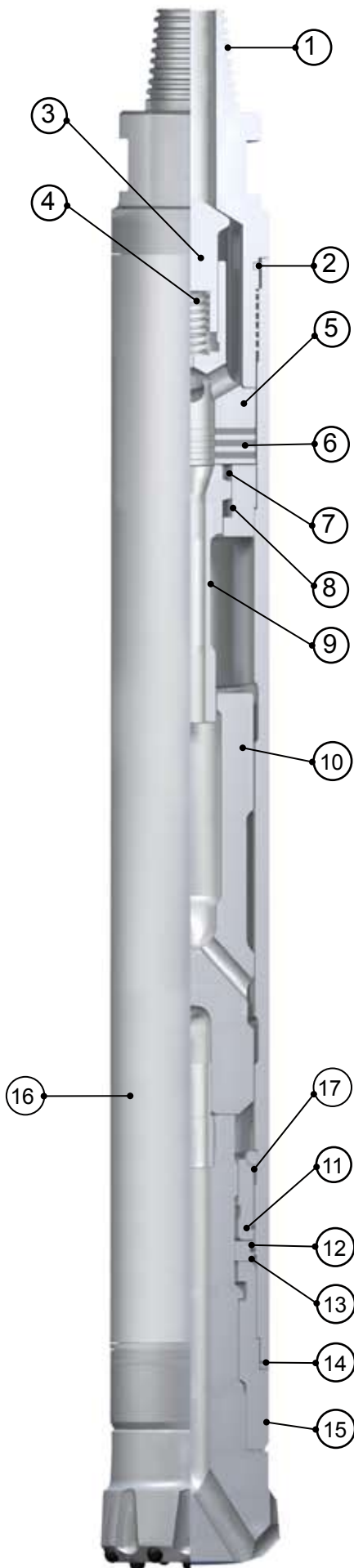
Bulroc Hyper Hammers are designed to give optimum performance with the minimum consumption of compressed air. If however, particular deep-hole application require extra air flushing, this can be achieved by drilling through the soft alloy plug in the piston.

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3 Parts List

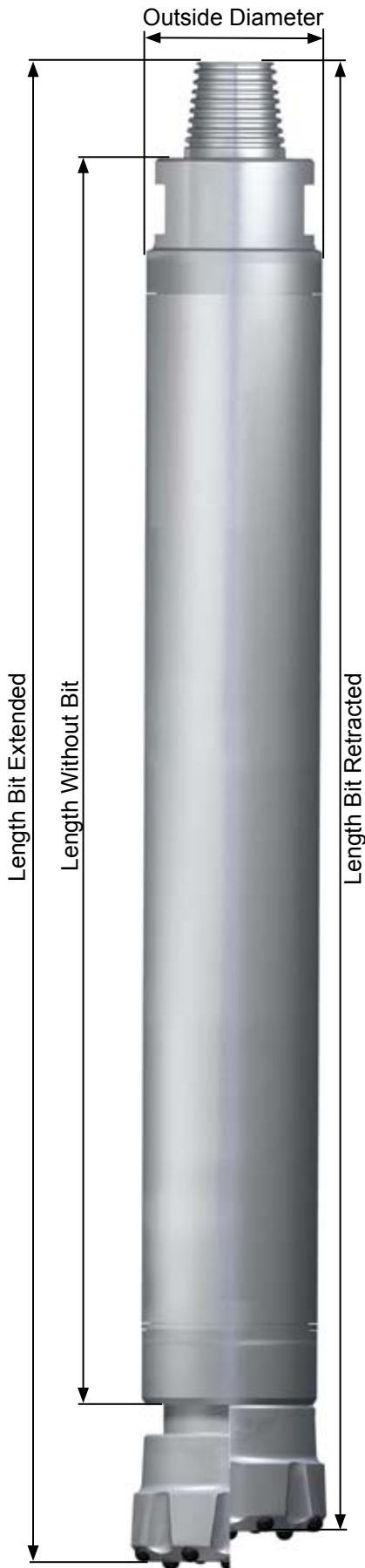


Ref	Description	Part Number
1	Backhead	HSH513803M
2	Backhead 'O' Ring	HSH5114
3	Check Valve	IPRCV03
4	Check Valve Spring	IPRCVS03
5	Diverter	HSH5120
6	Compression Ring	HSH5128
7	Tube Holder	HSH5131
8	Tube Buffers	HSH5129
9	Control Tube	HSH5130
10	Piston	HSH5103098
11	Piston Retaining Ring	HSH5132098
12	Bit Retaining Ring	HSH5137098
13	Bit Retaining 'O' Ring	HSH5137A
14	Chuck Release Washer	HSH5126
15	Chuck	HSH5135098
16	Wearsleeve	HSH5100
17	Bush	HSH5186098
	Complete Hammer	BR51H25

Heavy duty wearsleeve, backhead and chuck is available on this model. This is recommended for use in particularly abrasive drilling conditions.

The internal components are identical but the O/D's of the wearsleeve, backhead and chuck have been increased.

However the use of heavy duty parts limit the minimum diameter of hole that can be drilled by the hammer.



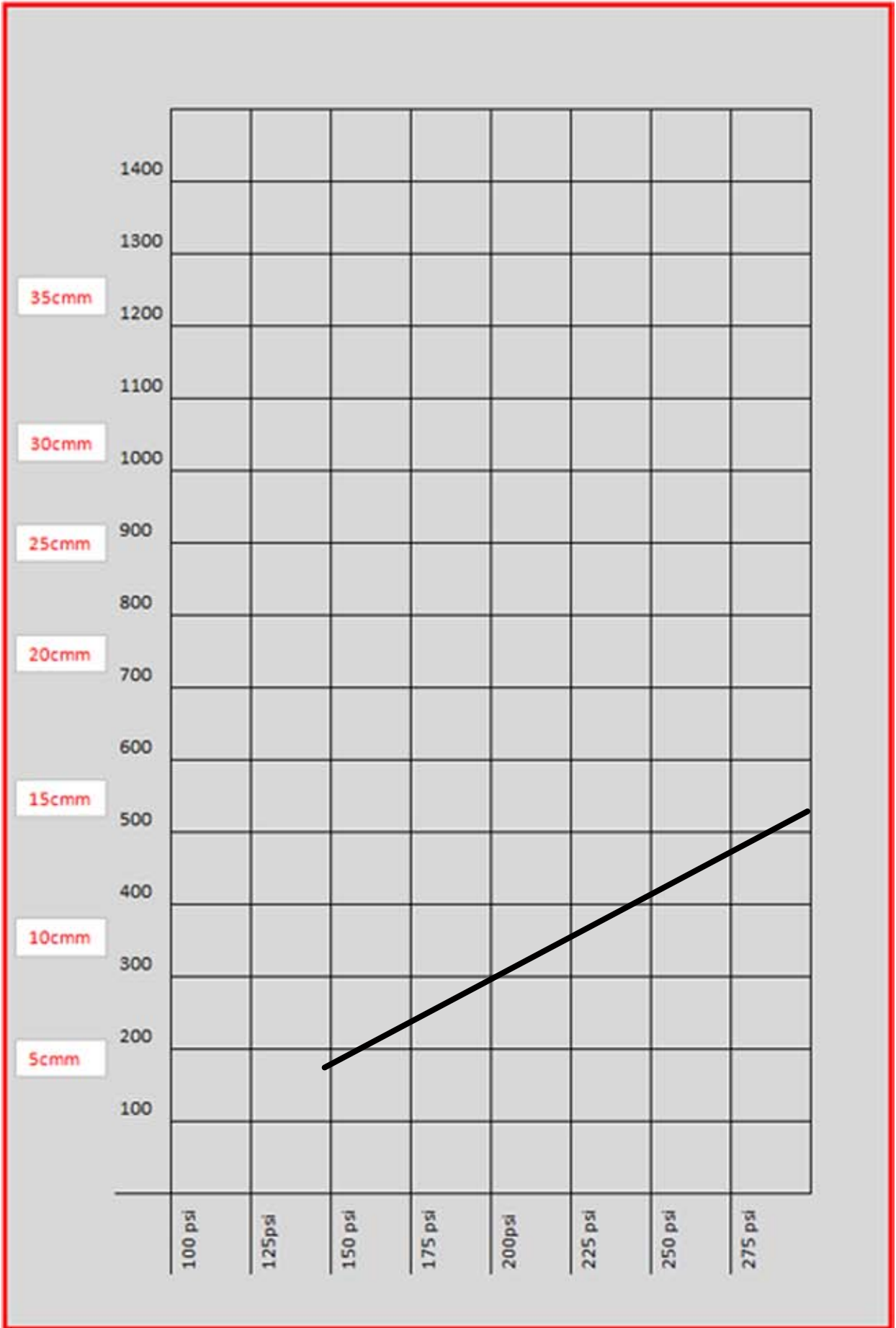
Description	Specification
Standard Backhead Connection	3 1/2" API reg pin
Chuck Connection Configuration	QL50
Length Less Bit	42.92" 1090 mm
Outside Diameter of Hammer	4.50" 114.3 mm
Bore Diameter	3.62" 92.0 mm
Piston Stroke	4.25" 108 mm
Piston Weight	34.3 lbs 15.6 Kgs
Weight of Hammer Less Bit	145.2 lbs 66.0 Kgs

Hammer Conversions

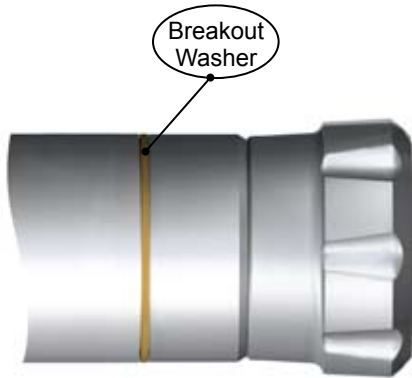
Conversion	Chuck	Bit Retainer	Piston	Complete Hammer
Mission SD5	HSH5135043	HSH5137043	HSH4103043	BR51H043
Ingersoll DHD 350R	HSH5135092	HSH5137092	HSH5103092	BR51401

5 Air Consumption

Air Consumption in Ft³ / min



Line Pressure



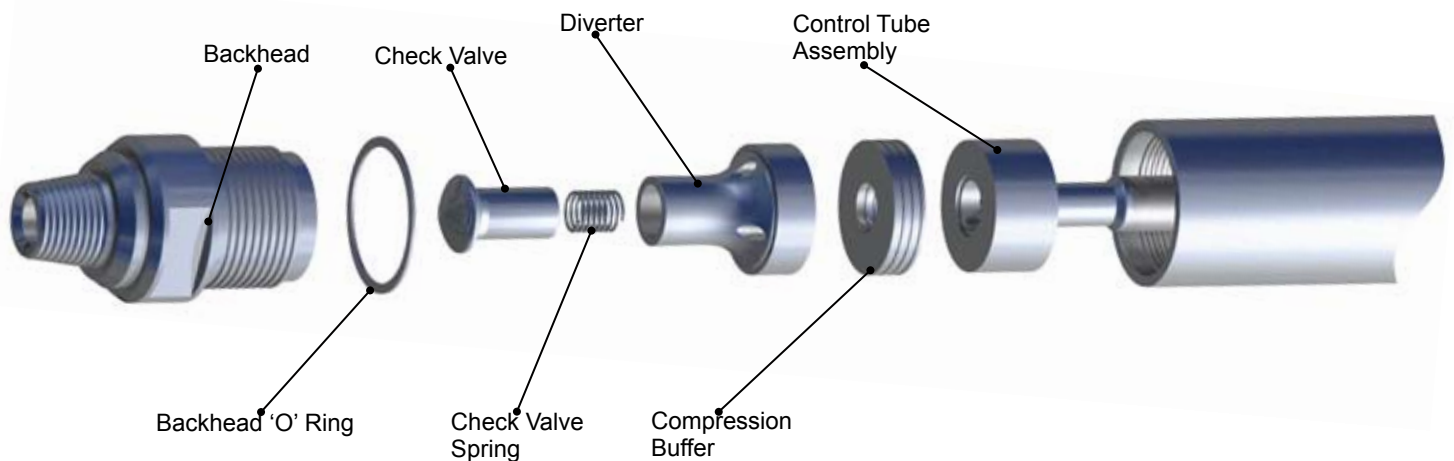
After extensive drilling the Chuck might become too tight to loosen on a Bulroc Bench Splitter or on the drill rig.

If this problem occurs, the breakout washer can be ground or drilled out. This will relieve the pressure and enable the chuck to be removed.



NB : On no occasion the wearsleeve be impacted by a hand hammer. Splitting should not be assisted by the use of localised heat i.e. Blow torch.

Assuming both the Chuck and Backhead threads have been loosened either on the drilling rig or on a hammer splitter, the stripping procedure is as follows.



1. First remove the chuck assembly. This comprises the Button Bit, Chuck, Chuck Release Washer and the Bit Retainers.
2. With the hammer laid horizontal, unscrew the backhead and remove it from the wearsleeve. The Diverter along with the Check Valve arrangement can now be pulled from the Backhead end.
3. The remaining Compression Buffer and Control Tube assembly can best be removed by lifting the Chuck end of the Wearsleeve which will allow the Piston to push the parts up to the end face from where they can be removed by hand.
4. Lifting the Chuck end of the Wearsleeve again will allow the Piston to slide to the end face from where it can be removed.
5. Unless there is damage to the Piston Retaining Ring it should not be necessary to remove it from the Wearsleeve. However if the retainer is damaged it can be removed by dropping the inverted Piston onto the ring from the Backhead end of the Wearsleeve.



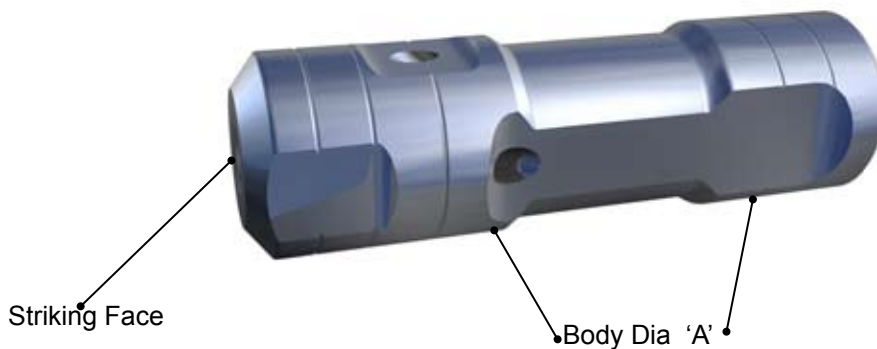
7 Checking for Wear & Damage

Piston

Premature wear to internal parts is a result of either:-

1. **Insufficient or incorrect lubrication.**
2. **The ingress of debris into the hammer.**
3. **Incorrect service and storage.**

The maximum wear allowance shown in this section are a guide as to when to replace parts. In certain conditions parts may need to be replaced before they reach the sizes shown.



Note - Min body diameter 3.618" (91.90mm)

There are two main areas to examine on a used piston:-

1. Check the body diameter for signs of pick-up and burning (both are signs of poor lubrication). Using a micrometer, measure the diameter and refer to the quoted minimum size above.

Any light 'Pick up' marks can be removed using emery cloth, however if there are signs of overheating and cracking, the piston should be replaced and the lubrication system examined.

2. Secondly, using a micrometer, measure the diameter of the bore at both ends of the piston and refer to the maximum quoted sizes.
3. Examine the striking face. Distortion is acceptable providing there are no signs of cracking. Burrs and dents can be removed with an emery stone.

Control Tube

Note - Control Tube minimum diameter 1.564" (39.57mm)

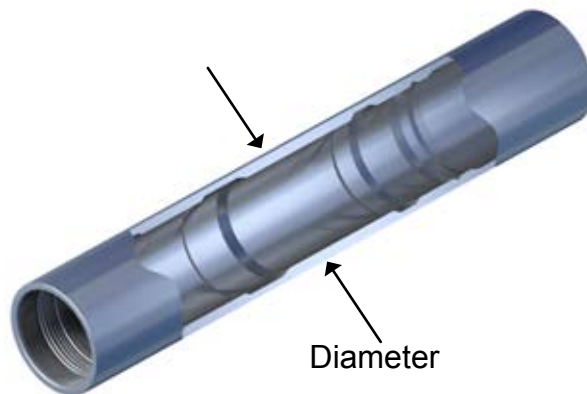


Examine the control tube diameter using a micrometer. Check the diameter has not worn under the specified minimum. If there are signs of pick-up they should be removed by using emery cloth.

Wearsleeve

Using either a micrometer or vernier, measure the outer diameter of the wearsleeve. If it is below the minimum it must be replaced. The wear rate of the wearsleeve can be slowed by replacing the Chuck before the wear area reaches the Wearsleeve.

The bore of the Wearsleeve should be periodically checked for any signs of 'Pick up'. If there are signs of pick-up they should be removed by using emery cloth.

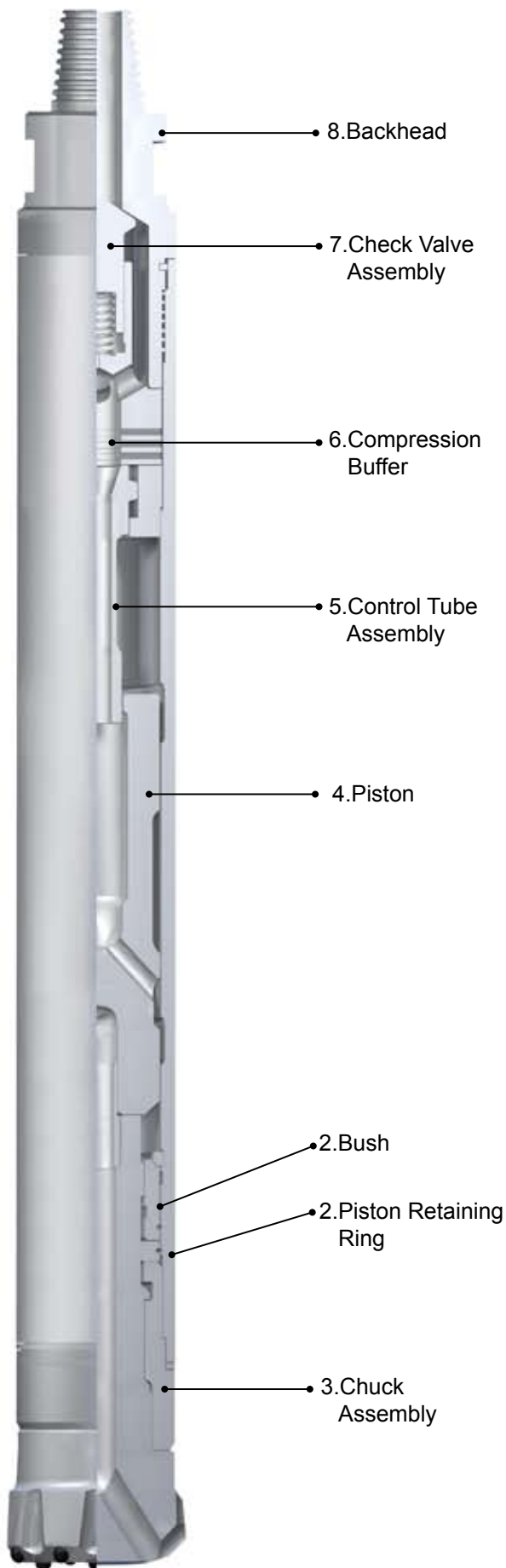


Note - Wearsleeve minimum diameter 4.22" (107.25mm)

If a piston has broken within the wearsleeve it is imperative that the bore is honed to remove any burrs or 'pick-up'

Failure to do so will result in 'pick-up' on the replaced piston and will lead to early failure of this component

9 Rebuilding the Hammer



1. Ensure all the maintenance work outlined in the previous section has been completed.

2. Stand the Wearsleeve on the floor, Chuck end upwards. Insert the Bush & Piston Retaining Ring into the bore, hammer the ring down until it springs into the groove in the Wearsleeve bore. It is important to make sure that the Piston Retaining Ring is positioned in the groove correctly. Failure to do so will seriously affect the hammer performance.

3. Clamp the Wearsleeve horizontally in a vice taking care not to over tighten the jaws. Assemble the Chuck, Chuck Release Washer and Bit Retainers around the Bit ensuring the Retainers are fitted with a new 'O' Ring. Cover the threads with a copper based grease. Then lift the whole assembly into the Wearsleeve. Screw the Chuck fully in until there is no gap between the Wearsleeve and the Chuck Release Washer.

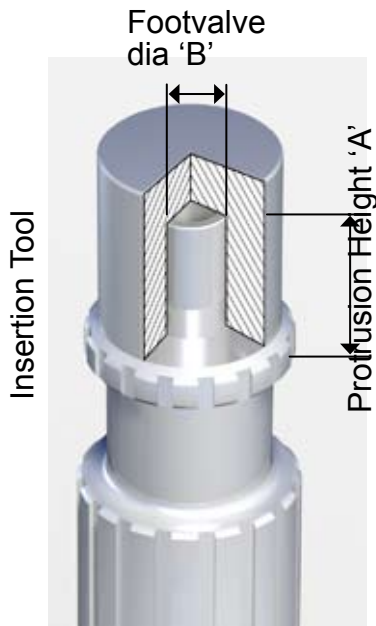
4. Coat the piston with rock drill oil and slide it into the Backhead end of the wearsleeve. (Ensure the piston striking face enters first).

5. Assemble the two Control Tube Buffers around the Control Tube, then push the assembly into the Tube Holder. Coat the outside of the assembly with rock drill oil and insert it into the Backhead end of the Wearsleeve.

6. Slide the Compression Ring on to the Control Tube assembly.

7. Insert the Spring into the Check Valve and then slide the assembly into the Valve Chest. Push the whole assembly down onto the Compression Ring.

8. Fit a new 'O' Ring to the Backhead and coat the threads in copper based grease. Screw the Backhead into the Wearsleeve until it is hand tight, then measure the gap between the Wearsleeve face and the lock-up face on the Backhead. This gap should be a minimum of 1mm. If the gap is smaller the Ring should be removed and replaced with a new Compression Ring. When the gap exceeds 1mm, the Backhead should be fully tightened using the appropriate Backhead spanner.



The Bulroc Hyper 51/QL50 hammer is designed to be used with Foot Valves that are to the following specifications.

Shank Type	Insertion Tool	Protrusion Height 'A'	Footvalve diameter 'B'
QL50	FVIT098	2.080" / 52.80mm	1.513" / 38.4mm

To guarantee the diameter and protrusion height are correct, it is recommended the correct insertion tool is used.

Using Foot Valves which are larger in diameter than the sizes shown will result in premature failure of the Foot Valve.

Foot Valves which are much smaller in diameter than the sizes shown will reduce the performance of the hammer.

Lubrication

The Hyper 51 piston's oscillates at around 1000 bpm at 150 psi (10bar). It is therefore extremely important that an adequate supply of the correct type of rock drill oil is constantly fed to the hammer whilst it is operating. Failure to do so will quickly lead to excessive component wear and if the oil supply is cut of for any reason, the piston will quickly seize inside the wearsleeve, resulting in irreparable damage to both components.

An air line lubrication system should be installed, preferably on the drill rig. The lubricator reservoir should be of sufficient capacity to supply the required volume of rock drill oil for a full shift. With larger hammers, this may be impractical but the capacity should be sufficient for at least half a shift.

This is equally important that the lubricator system must be adjustable and have a visual check to ensure the lubricator does not run out of oil. As a good general guide, all Bulroc Hyper hammers require a third of a pint of oil per 100cfm of air through the hammer (0.07 litre per metre cubed)

Eg : Hyper 41 operating at 300psi = 427cfm = 1.42 pints per hour
 21bar = 12.1cmm = 0.8 litre per hour

The amount of lubricating oil should be increased by 50% when drilling with water or foam. When new drill pipes are added to the drill string, it is recommended that a half pint (a quarter of a litre) of rock drill oil is poured into the pipe to provide a good internal coating and helps prevent the hammer from running dry at any time. The grade of rock drill oil will be determined by the ambient temperature at the drilling site. If the ambient temperature is between 0 and 25 degree centigrade, then a 30 grade oil should be used. If the ambient temperature is greater than 25 degree centigrade, use a 50 grade oil. Bulroc supply their own recommended rock drill oil and this is detailed below, together with other brands of suitable oils.

Make	Type 30 Grade	Type 50 Grade
Bulroc	Lube T320	Lube T500
BP	Energol RD100	Energol RD300
Texaco	100/1542 EPM	320/1543 EPM
Esso	Arox EP 150	Arox EP 320

11 Storage Procedures

We recommend following the points listed below when removing a 'down hole hammer' from service. This will ensure trouble free operation once the hammer starts work again.

The hammer should be stripped and cleaned and free of all water/moisture as possible. Bulroc 320 or similar rock drill oil should be poured into backhead (see chart below for quantity) allowing all parts to be coated throughout the hammer. Both ends of the hammer should be then covered to prevent the ingress of dirt, etc. It should be then laid horizontally in a dry environment ready for use next time.

Model	Qty in UK Pints	Qty in litre's
Hyper 51	1/2	0.28

If this procedure is followed then apart from protecting the hammer from corrosion it will protect the parts from premature wear and of course reduce 'down time' and eventual repair costs. However we strongly recommend that the hammer, especially if stored for any long periods of time should be stripped, cleaned, inspected and re-oiled prior use to be sure of smooth drilling.

Troubleshooting

Trouble	Probable Cause	Remedy
Inoperative Drill	Drill bit blow holes blocked	Unblock holes
	Dirt inside drill	Strip and clean drill
	Worn or damaged parts	Replace damaged parts
	Insufficient lubrication	Check oil, level adjust lube needle valve
	Excessive lubrication	Adjust lube needle valve
	Hanging piston	Piston stuck, Polish out score marks
	Insufficient air pressure	Check compressor discharge and increase to operational valve
Slow Penetration	Insufficient air pressure	Increase discharge pressure
	Dull drill bit	Reground or change bit
	Worn drill parts	Replace worn parts
	Too much or too little lubrication	Check oil level and if necessary adjust tube needle valve
	Dirt in drill	Strip and clean
Low Return Air Velocity	Low air pressure	Increase air pressure
	Insufficient hole flushing air passing through hammer	Drill or increase hole size through the piston
	Drill bit exhaust holes blocked	Clean out blockage
Spasmodic Operation	Failed or damaged parts	overhaul drill
	Lack of oil	Check lubrication
	Drill bit broken	Replace bit
	Dirt in drill	Strip and clean



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