HYPER 181

MAINTENANCE, OPERATING AND SERVICE MANUAL

N180/SD18

ROCBIT GROUP

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LIST OF CONTENTS

The **Bulroc Hyper 181** is a strong and robust tool of a simple and straight forward design to provide maximum performance within a minimum of maintenance.

The Hyper 181 is designed to operate efficiently at air pressures between 100psi (7bar) and 225psi (15bar).

The Hyper 181 accepts Hyper 181 button bits (N180) as standard. In addition to this the Hyper 181 can be modified to accept button bits with a Mission Sd18 shank design by simply replacing the chuck, piston and bit retainers.

The Hyper 181 hammer is supplied as standard with a check valve arrangement. This is designed to maintain pressure inside the hammer when the air is switched off and so help prevent contaminated water from entering the hammer.

The Hyper 181 hammer standard backhead is 8⅝" API reg pin.

The Hyper 181 hammer is designed to give optimum performance with the minimum consumption of compressed air. If however, for particular deep hole applications extra flushing air is required, the hammer can be fitted with a choke system, that can easily be applied to suit your operational requirements.

ALWAYS THINK SAFETY FIRST!

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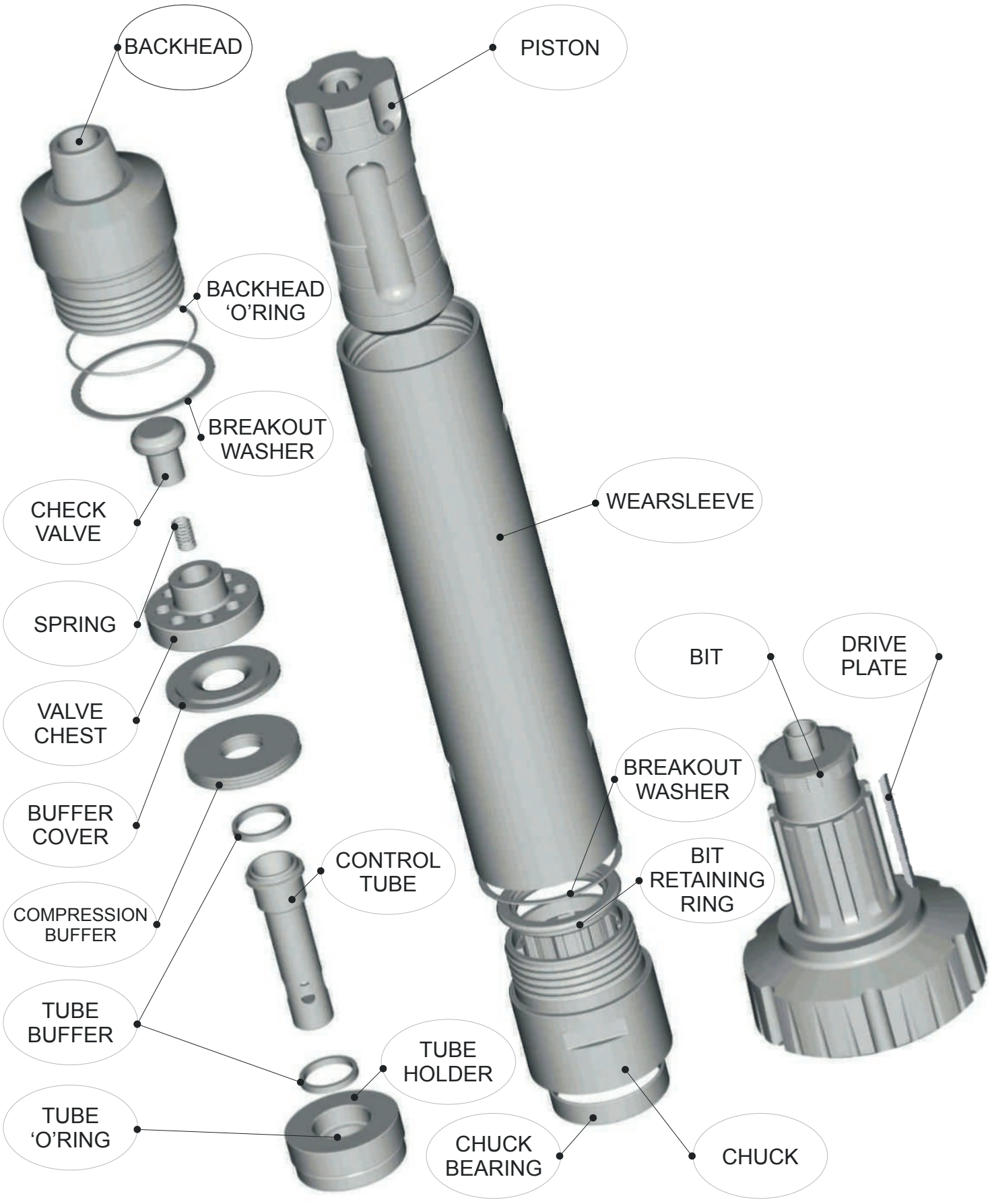
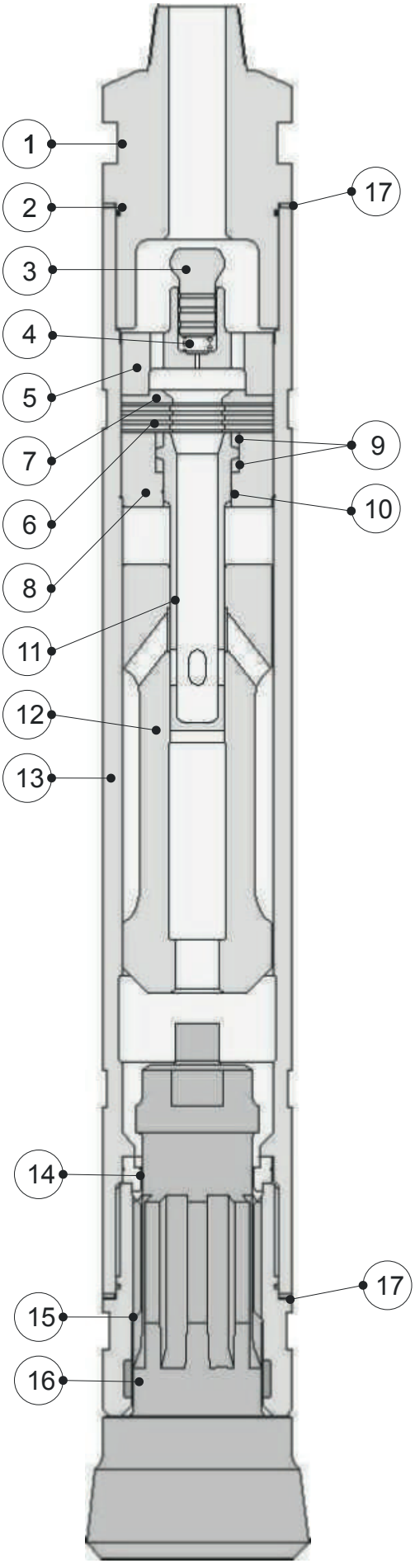
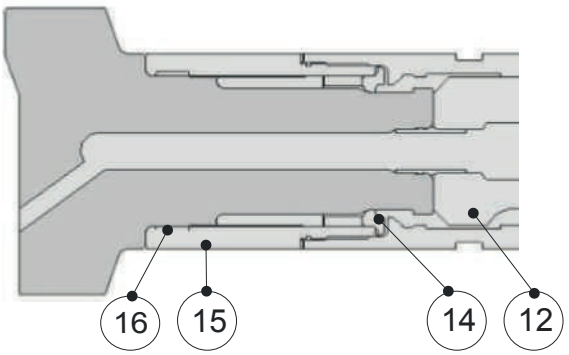
HYPER 181



3 HAMMER PARTS

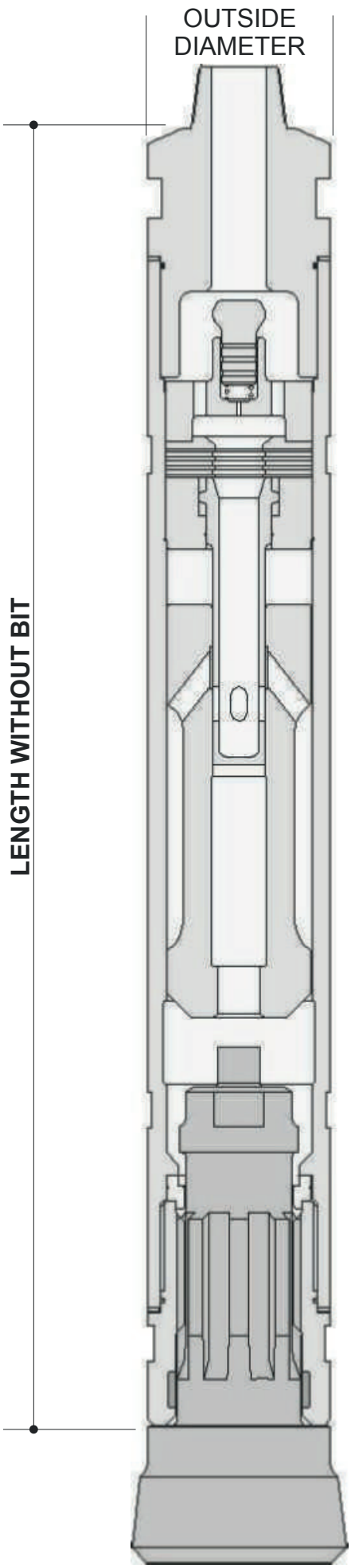


Ref	Description (N180)	Part Number
1	Backhead $8^{5}/_{8}$" Reg. Pin	HSH1813882M
2	Backhead 'O' Ring	HSH18114
3	Check Valve	HSH18108
4	Check Valve Spring	HSH18110
5	Diverter	HSH18107
6	Compression Buffer	HSH18128
7	Buffer Cover	HSH18173
8	Tube Holder	HSH18131
9	Tube Buffers (2)	HSH18129
10	Tube'O'Ring	HSH18130A
11	Control Tube	HSH18130
12	Piston	HSH18103ST
13	Wearsleeve	HSH18100
14	Bit Retaining Ring	HSH18137ST
15	Chuck	HSH18135ST
16	Chuck Bearing	HSH18135CBST
17	Breakout Washers	HSH18126
	Complete Hammer	BR181H01



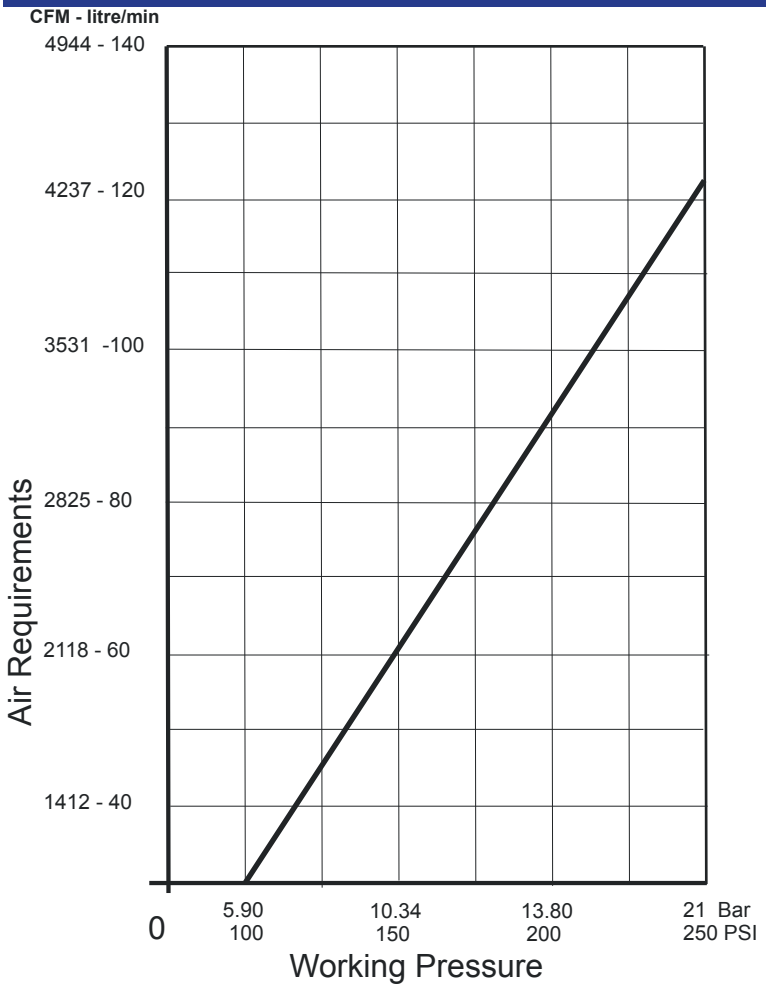
Ref	Description (Sd18 Conv)	Part Number
1	Backhead $8^{5}/_{8}$" Reg. Pin	HSH1813882M
2	Backhead 'O' Ring	HSH18114
3	Check Valve	HSH18108
4	Check Valve Spring	HSH18110
5	Diverter	HSH18107
6	Compression Buffer	HSH18128
7	Buffer Cover	HSH18173
8	Tube Holder	HSH18131
9	Tube Buffers (2)	HSH18129
10	Tube'O'Ring	HSH18130A
11	Control Tube	HSH18130
12	Piston	HSH18103181
13	Wearsleeve	HSH18100
14	Bit Retaining Ring	HSH18137181
15	Chuck	HSH18135181
16	Chuck Bearing	HSH18135CB181
17	Breakout Washers	HSH18126
	Complete Hammer	BR181H01

HAMMER SPECIFICATIONS 4



	Specification	
STANDARD BACKHEAD CONNECTION	8⅝"API reg pin	
CHUCK CONNECTION CONFIGURATION	HYPER 181 (N180) STD OR Sd18	
LENGTH LESS BIT	N180 86" 2185mm	SD18 88.60" 2250mm
OUTSIDE DIAMETER OF HAMMER	16" 406mm	
OUTSIDE DIAMETER OF CHUCK	16" 406mm	
BORE DIAMETER	12.25" 311mm	
PISTON STROKE	5.75" 146mm	
PISTON WEIGHT	726lbs 329kgs	
WEARSLEEVE ACROSS FLATS SIZE	15.5" 394mm	
WEIGHT OF HAMMER LESS BIT	3545lbs 1608kgs	

5 AIR CONSUMPTION



Drill through this face should extra flushing be required see below

Additional Flushing

The Hyper 181 has a control tube with a softened face which can be easily drilled through to allow foe extra flushing air should this be required.
In certain drilling conditions extra flushing air may be required to overcome increasing back pressure and maintain the necessary up hole velocity to ensure efficient hole cleaning. In such conditions, a small hole can be drilled into the face of the control tube which will allow extra live air to be delivered directly to the bit face. The size of the hole will determine the extra volume of air delivered to the bit face depending on the operating pressure.

The top two tables show the extra flushing air which can be expected with the chokes drilled.

The lower two tables shows the total air required for optimum hammer performance with the chokes drilled.

Extra flushing air for a choke in cubic feet per min

Hole Size	6.9 Bar	10.3 Bar	13.8 Bar	17.2 Bar
0.250”	68	98	128	157
0.375”	152	220	287	352
0.500”	270	390	510	627
0.625”	422	593	796	980
0.750”	607	855	1147	1410

Extra flushing air for a choke in cubic metre per min

Hole Size	100 psi	150 psi	200 psi	250 psi
6mm	1.92	2.77	3.62	4.44
10mm	4.30	6.22	8.12	9.96
13mm	7.64	11.04	14.44	17.75
16mm	11.94	16.79	22.54	27.75
19mm	17.18	24.21	32.47	39.92

Total air requirements for chokes in cubic feet per min

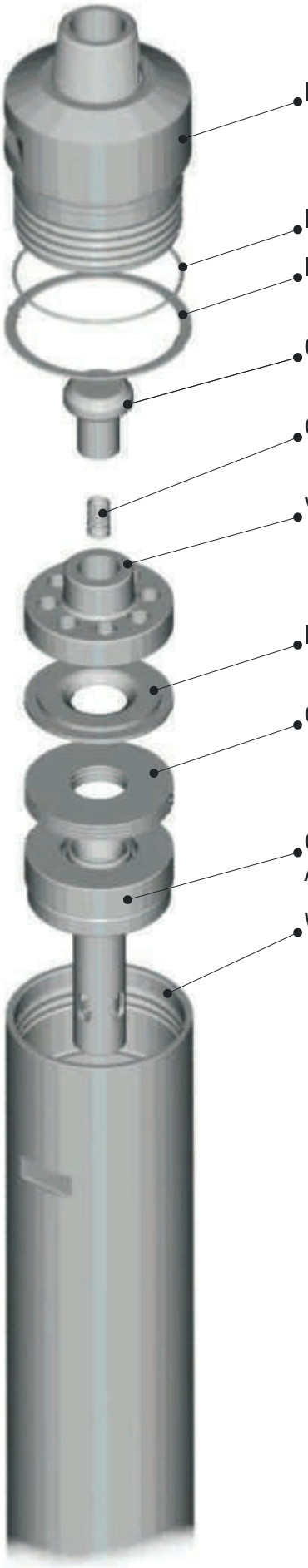
Hole Size	6.9 Bar	10.3 Bar	13.8 Bar	17.2 Bari
blank	1097	2016	3105	4339
0.250”	1165	2114	3233	4496
0.375”	1249	2236	3392	4691
0.500”	1367	2406	3615	4966
0.625”	1519	2609	3901	5319
0.750”	1704	2871	4252	5749

Total air requirements for chokes in cubic metre per min

Hole Size	100 psi	150 psi	200 psi	250 psi
blank	31	57	88	123
6mm	33	60	92	127
10mm	35	63	96	133
13mm	39	68	102	141
16mm	43	74	110	151
19mm	48	81	120	163

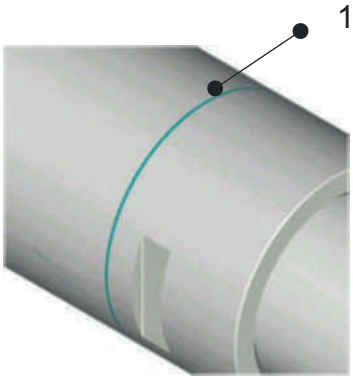
STRIPPING THE HAMMER 6

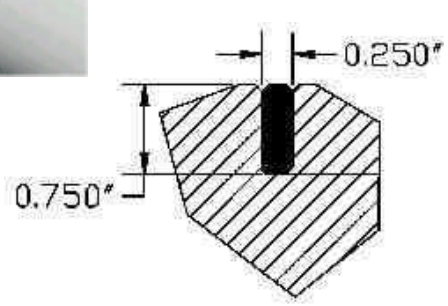
NOTE:- All components must be washed clean and laid out on a dirt free surface to enable inspection to take place. The stripping procedure is explained in the following section,



Assuming both the chuck and the backhead threads have been loosened either on the drilling rig or by using a hydraulic splitter, the stripping procedure is as follows

Note:- On no account should the wearsleeve be impacted by a hand hammer or splitting be assisted by use of localised heat: ie. welding/blow torch, this will invalidate the warranty
Should splitting prove difficult, the breakout washers can be ground out, taking care not to deface other pieces of the drill, to relieve pressure and help splitting,





1. First remove the chuck assembly. This comprises the button bit, drive - plates (or drive pins with the SD 18 conversion), chuck release washer, chuck 'O' ring, and bit retainers.

2. With the hammer laid horizontal, unscrew the backhead and remove it from the wearsleeve. The valve chest along with the check valve arrangement can now be pulled from the backhead end.

The remaining buffer cover, compression buffer and control tube assembly can 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.

3. Lifting the Chuck end of the Wearsleeve again will allow the Piston to slide to the end face from where it can be removed.

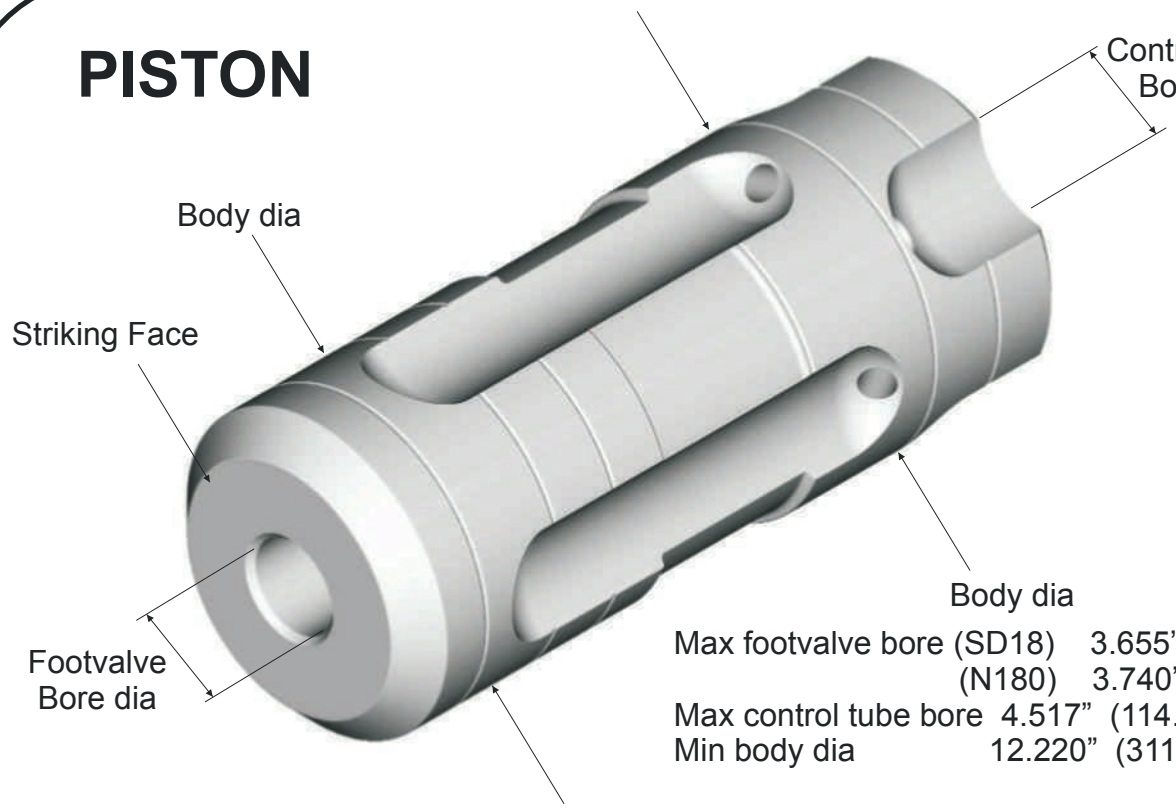
7 CHECKING FOR WEAR AND DAMAGE

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

1. Insufficient or incorrect lubrication.
2. The ingress of debris in 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.

PISTON



Max footvalve bore (SD18)	3.655” (92.6mm)
(N180)	3.740” (95.0mm)
Max control tube bore	4.517” (114.6mm)
Min body dia	12.220” (311.4mm)

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

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 proving there are no signs of cracking. Burrs and dents can be removed with an emery stone.

Maintaining the piston face

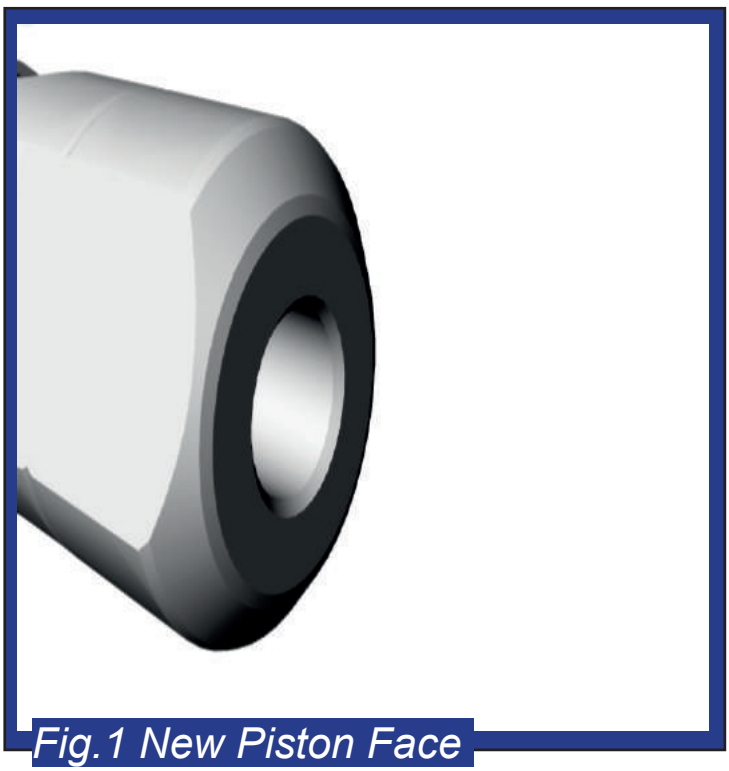


Fig.1 New Piston Face

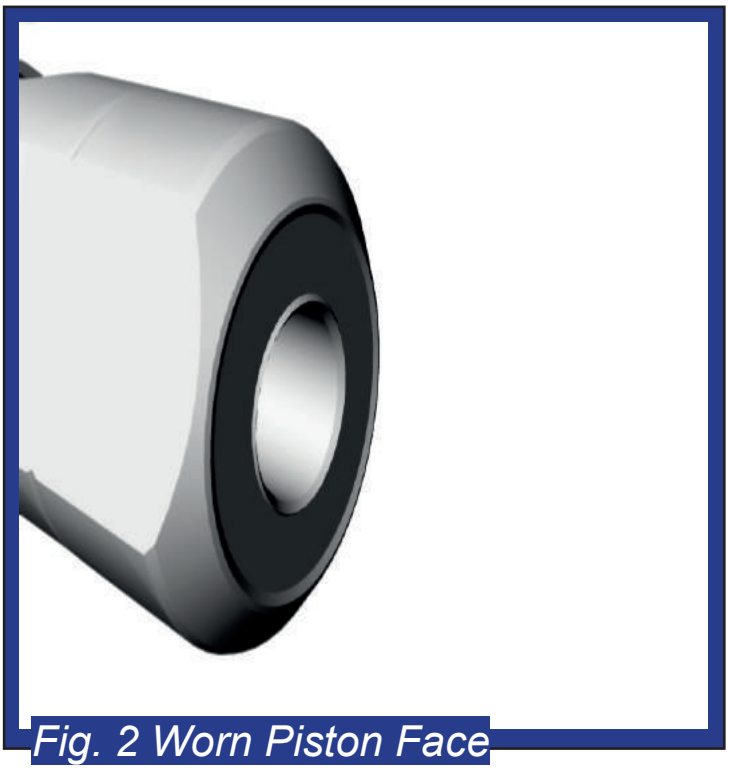


Fig. 2 Worn Piston Face

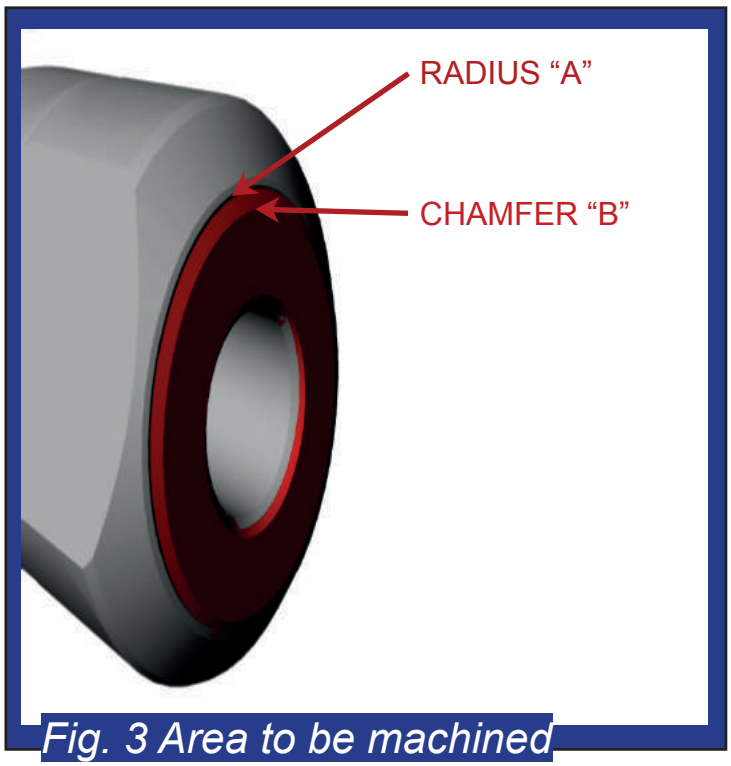


Fig. 3 Area to be machined

During the working life of the hammer the Striking Face on the Piston may become dented or deformed *(see fig.2)*. To prevent this face from cracking, or chipping, the Piston should be returned to a lathe where the strking face can be re-machined flat and then have the outer radius and inner chamfer reformed *(see fig.3)*..

Care should be taken to remove the minimum amout of material during this re-machining process and at no point should more than 2mm be removed from the face. **Pistons with wear patterns, or indentations deeper than 2mm should be replaced.**

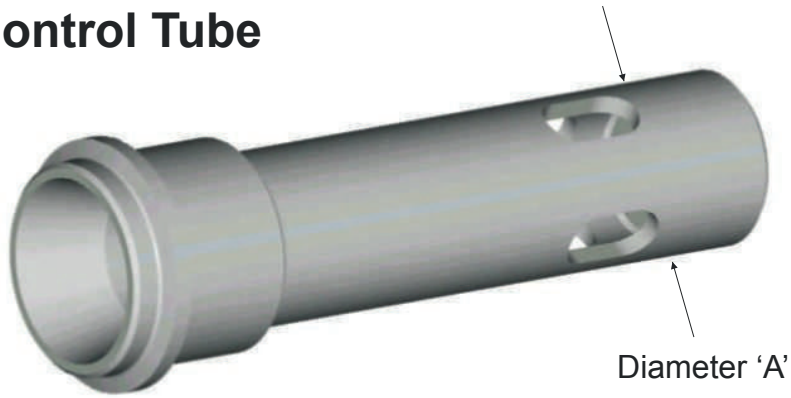
The table below contains useful machine information for reforming the piston face.

MACHINE DETAIL		
HAMMER	**RADIUS “A”**	**CHAMFER “B”**
HYPER 181	0.125”	0.250” @45

8 CHECKING FOR WEAR AND DAMAGE

Control Tube

Control Tube
Minimum Dia
4.492” (76mm)



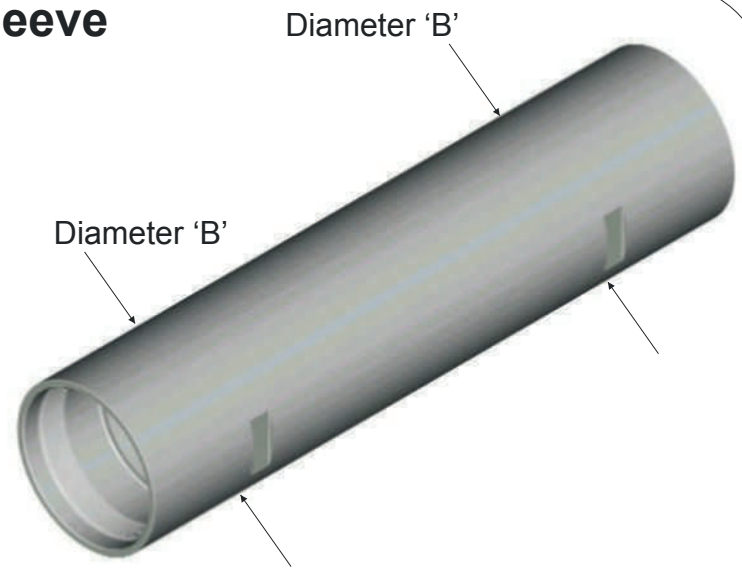
Examine the control tube diameter ‘A’, using a micrometer, check the diameter has not worn under the specified minimum.
If there are signs of pick-up they should be removed by using emery cloth.

Wearsleeve

Using either a micrometer or vernier, measure the outer diameter ‘B’ 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 areas reaches the wear sleeve.

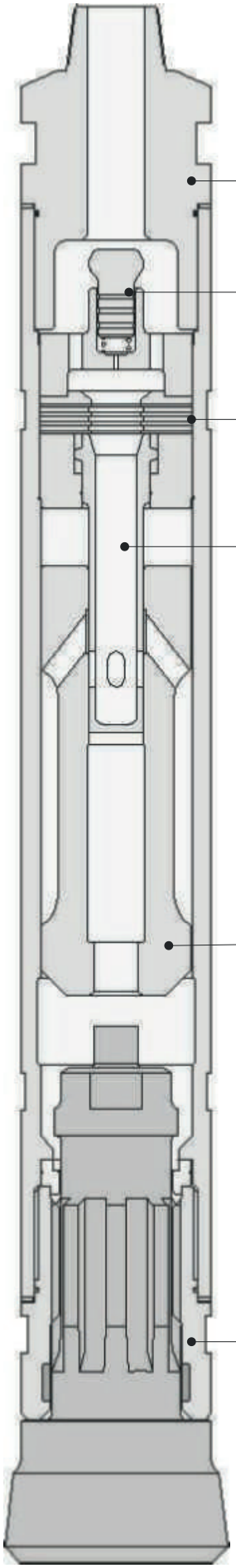
If there are signs of pick-up they should be removed by using emery cloth.

Wearsleeve
Minimum Dia
15.7” (399mm)



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



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

2. Lay the wearsleeve on two wooden blocks, support the chuck end so as to raise the sleeve 50mm - 70mm off the ground this will make it easier to screw in the chuck assembly.

3. Assemble the chuck, chuck release washer and bit retainers around the bit ensuring the chuck and bit retainers (SD18 only) are fitted with new ‘O’ rings. check the condition of the drive plates (or pins) and the chuck bearing and replace if necessary. Cover the threads with a copper based grease. Then 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).

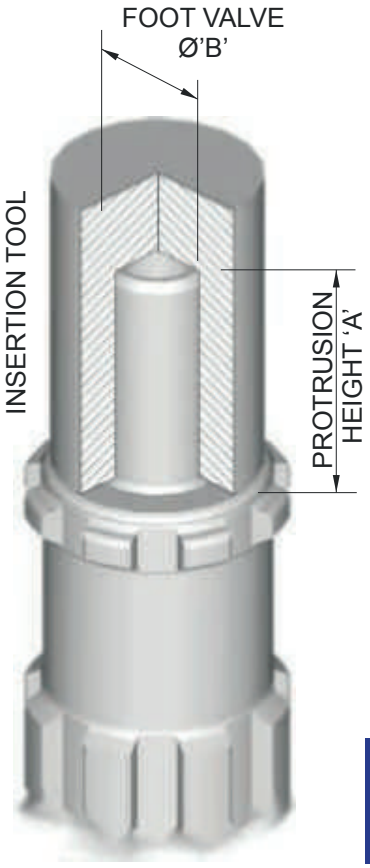
5. Assemble the two control tube buffers and the ‘O’ ring around the control tube, then push the assembly into the tube holder. Coat the outside of the assembly with rock drill oil and insert it into the backhead end of the wearsleeve

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. Fit the buffer cover to 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. Fit the backhead breakout washer. 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 2mm, - if the gap is smaller the ring should be removed and replaced with a new compression ring. When the gap exceeds 2mm the backhead should be fully tightened using the appropriate backhead spanner.

10 BUTTON BIT FOOTVALVES



The Bulroc Hyper 181 hammer is designed to be used with Foot Valves that are to the following specifications:

SHANK TYPE	PROTUSION HEIGHT 'A'	FOOTVALVE DIAMETER 'B'
SD18	2.75" 69.85mm	3.61" 91.7mm
Numa 180	3" 76.2mm	3.68" 93.5mm

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.

11 LUBRICATION

The Hyper 181 piston oscillates at 650 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 181 operating at 150psi = 2016cfm = 6.7 pints per hour
10.3bar = 57cmm = 4 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	T220	T320
BP	ENERGOL RD-E 100	ENERGOL RD-E 300
CHEVRON	ARIES 100	ARIES 320
SHELL	TORCULA 100	TORCULA 320
ESSO/EXXON	AROX EP100	AROX EP320

HAMMER STORAGE PROCEDURES 12

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 T220 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.

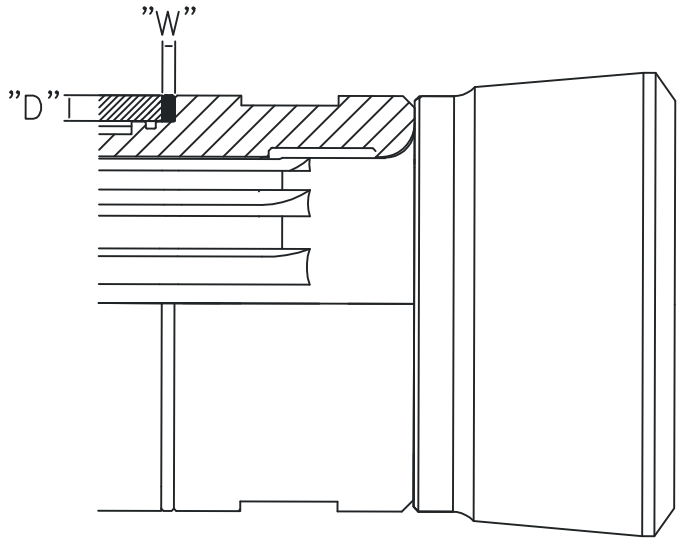
Model	Qty in UK Pints	Qty in litre's
Hyper 181	2	1.25

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 13

PROBLEM	PROBABLE CAUSE	REMEDY
INOPERATIVE DRILL	Drill bit blowholes 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 value
	Excessive lubrication	Adjust lube needle value
	Hanging Piston	Pistion stuck. Polish out the score marks
	Insufficient air pressure	Check compressor discharge and increase to operational value
SLOW PENETRATION	Insufficient air pressure	Increase discharge pressure
	Dull drill bit	Re-grind or change bit
	Worn drill parts	Replace worn parts
	Too much or too little lubrication	Check oil level and if necessary adjust lube needle value
	Dirt in drill	Strip and clean
LOW RETURN AIR VELOCITY	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

A. CHUCK RELEASE WASHERS



CHUCK RELEASE WASHERS		
HAMMER MODEL	"W"	"D"
HYPER 181	0.300" - 7.62mm	0.740" - 18.80mm

Chuck Release Washers are fitted to the Bulroc Range of Hyper Hammers to assist the removal of the Chuck from the Wearsleeve after drilling.

The Chuck Release Washer is manufactured from a composite material that reduces the friction between the lock up faces on the Chuck and Wearsleeve making it easier to overcome the tensional loading applied to these parts during the drilling process.

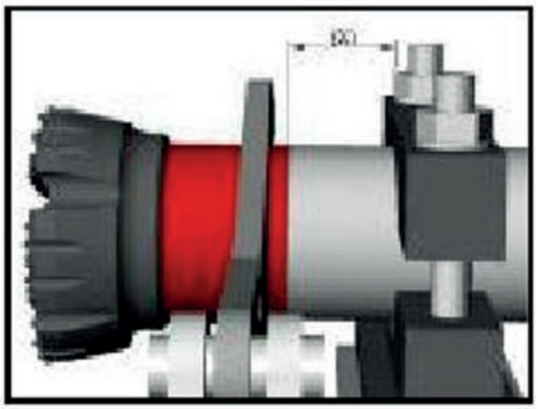
Due to the forces applied to the Chuck Release Washer you may find that its thickness ("W") is reduced during the drilling cycle and it is therefore recommended that a new Washer be fitted each time the Chuck is removed.

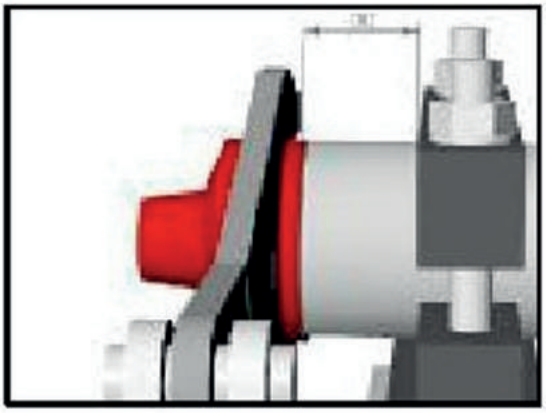
It is possible that on some of the larger Hammers in the Bulroc range, when drilling with large diameter Button Bits or Overburden Systems, certain conditions can generate higher torques than normally expected, resulting in difficulties when trying to remove the Chuck from the Wearsleeve. Should this occur then the removal of the Chuck can be achieved by cutting away the Chuck Release Washer. We do however stress at this point that cutting away the Chuck Release Washer is a final option and should not be done until all other options have proved unsuccessful.

If the cutting away of the Chuck Release Washer is necessary for the removal of the Chuck then it must be done with extreme care to avoid damage to either the Chuck or the Wearsleeve. The composition of the Chuck Release Washer allows for it to be cut with either a hacksaw or a small hand grinder equipped with a slitting wheel. The hacksaw method is much safer and less likely to damage the Chuck or Wearsleeve, but obviously much slower than the hand grinder with a slitting wheel. To remove the Chuck Release Washer a cut must be made in the centre of the washer all the way around it's circumference, and completely through the Washer, thus transforming the single washer into two thinner washers that will then spin freely. Great care must be taken, especially if the Washer is cut with a slitting wheel, to ensure that the cut only penetrates the Washer and does not pass through into the body of the Chuck.

The size shown as 'D" in the above table should be your MAXIMUM depth of cut, and it is recommended that either the saw blade or the slitting wheel are marked in some way so as to indicate when they have achieved this depth.

B. CLAMPING POSITIONS





CLAMP POSITIONS	
HAMMER MODEL	"X" DISTANCE FROM WEARSLEEVE END FACE
HYPER 181	8.250" / 210mm

There are many different "Splitting" Machines available for unscrewing the threaded connections on a Bulroc Hyper Hammer, some are attachments to the Drill Rig, others are independent hydraulic units, or purpose made Bench arrangements. Regardless of which machine is chosen they all require some method of securing the Wearsleeve whilst applying a torque to either the Chuck or Backhead.

The most common machines use either Clamps or Chains around the O/D of the Wearsleeve and the positioning of these is very important, if they are placed too close to the joint being "Split" they will in effect increase the frictional forces on the threaded connection making it impossible to unscrew the component from the Wearsleeve.

The above table shows the correct position for the clamping mechanism to ensure no additional load will be applied to the threaded connection, thus making the joint easier to split.

Due to the high torque loads applied to a Hammer during its drilling cycle, equally high loads are required to "Split" the Chuck and Backhead away from the Wearsleeve and because of this the clamping arrangement around the Wearsleeve must generate enough friction to prevent it from spinning during the process.However great care must be taken to make sure the clamps or chains are not over-tightened as this can cause deformation to the Wearsleeve that can result in both Wearsleeve failure and Piston seizure once the Hammer is returned to service.

To help increase the Wearsleeve's resistance to deformation it is recommended that the Hammer Piston is first slid to the end of the Hammer being "split", before clamps of chains are attached. By doing this the Piston O/D will limit the amount of deformation in the Wearsleeve bore if too much clamping pressure is applied.

NOTE:

The use of Chain type Hydraulic Breakers can leave deep intrusions in the O/D of the Wearsleeve which may result in stress concentrations that could lead to premature failure of the Wearsleeve.

HYPER 125/300

MAINTENANCE, OPERATING AND SERVICE MANUAL

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1. Introduction

The Bulroc Hyper **125/300** is a strong, robust tool of a simple and straight forward design to provide maximum performance with a minimum of maintenance.

The Hyper **125/300** Hammer is designed to operate efficiently at air pressures between 100 PSI (7 Bar) and 250 PSI (24 Bar).

The Hyper **125/300** hammer is designed as standard with a check valve arrangement which is designed to maintain the pressure inside the hammer when the air is switched off and so help prevent contaminated water from entering the hammer.

The Hyper **125/300** hammer is designed to give optimum performance with the minimum consumption of compressed air. If however, for particular deep-hole applications, the hammer is designed with a soft faced control tube, that can be drilled through to give extra flushing.

List of contents

ALWAYS THINK

SAFETY FIRST!

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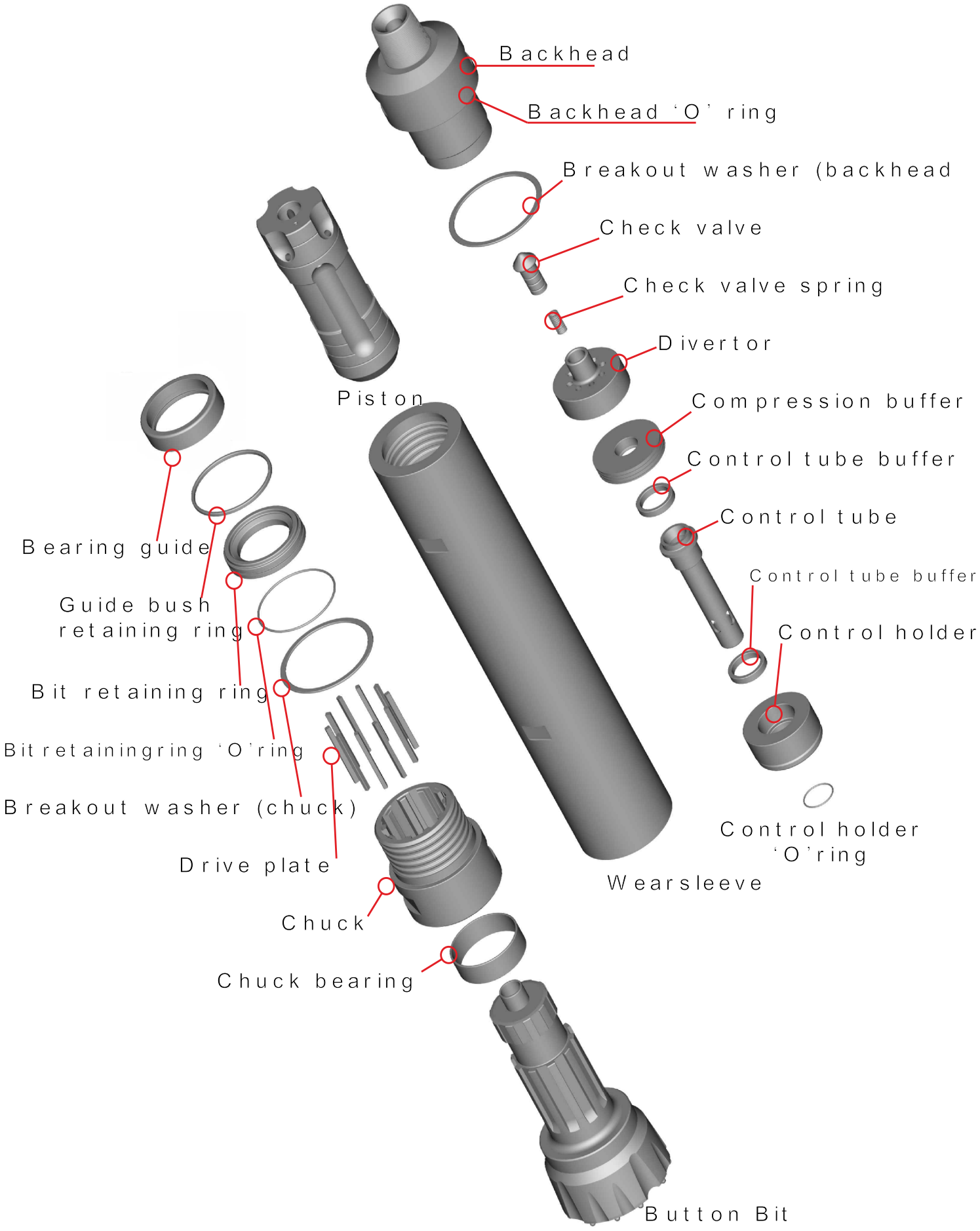
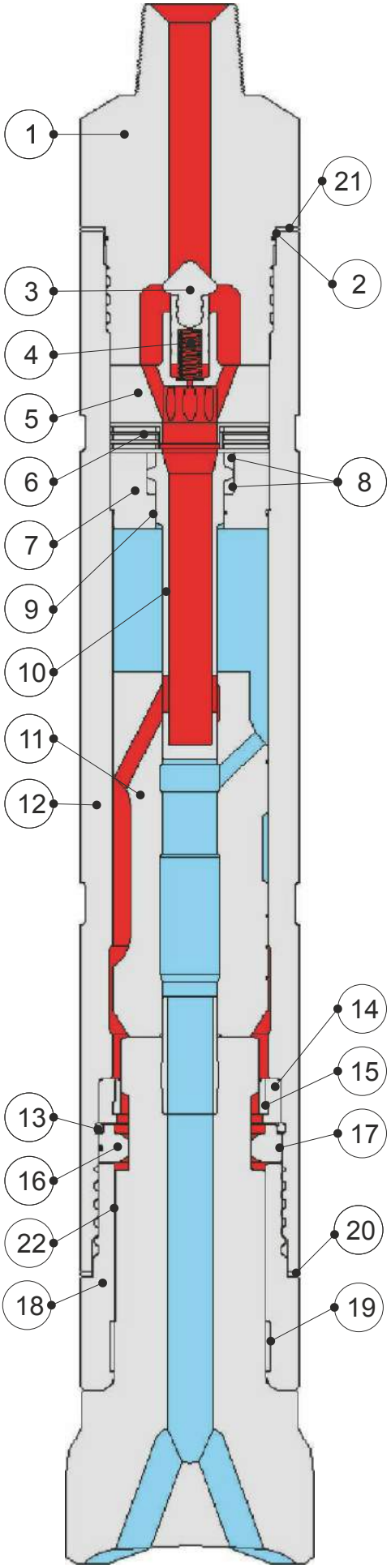
ROCBIT GROUP

2



3. Hammer Parts List



COMPONENT PARTS

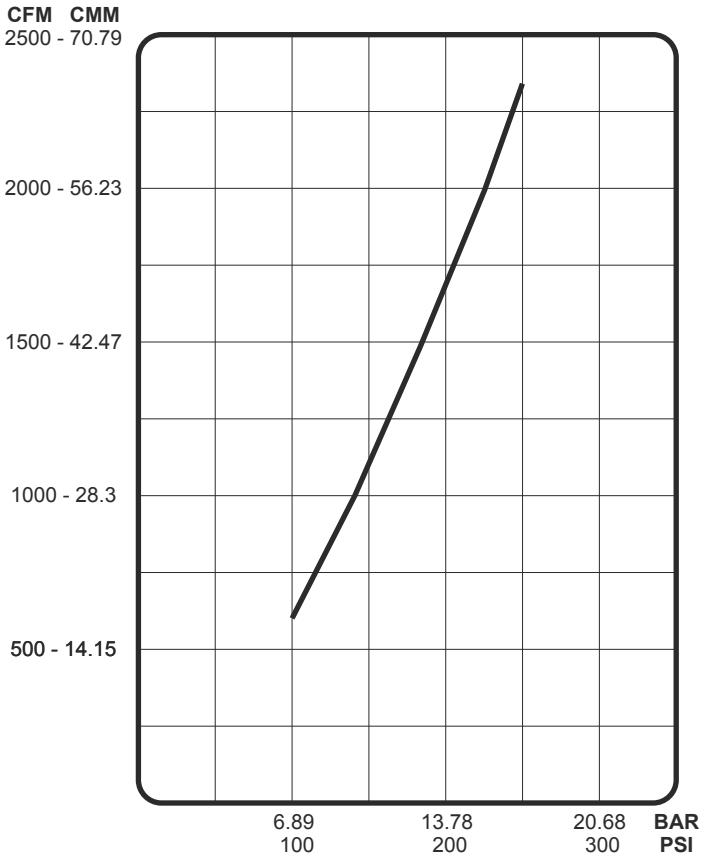
Ref	Description	Part Number
1	Backhead 6 5/8"Reg Pin	HSH1213880M125
2	Backhead 'O' Ring	HSH12114
3	Check Valve	HSH12108
4	Check Valve Spring	HSH12110
5	Diverter	HSH12120
6	Compression Buffer	HSH12128
7	Control Tube Holder	HSH12131
8	Control Tube Buffers (2)	HSH12129
9	Control Tube 'O' Ring	HSH12130A
10	Control Tube	HSH12130
11	Piston	HSH12103125SP
12	Wearsleeve	HSH12100125SP
13	Guide Bush Retaining Ring	HSH12132125
14	Bearing Guide Bush	HSH12186125
15	Bit Bearing	HSH12186BE
16	Bit Retainer (pair)	HSH12137050
17	Bit Retainer 'O' Ring	HSH12137AST
18	Chuck (N125 c/w drive plate slots)	HSH12135125
19	Chuck Bearing	HSH12135125BE
20	Breakout Washer (chuck)	HSH12126125
21	Breakout Washer (backhead)	HSH12125125
22	Drive Plate N125	Dp125
	Complete Hammer	**BR125HO3**
	Alternative Backhead 6 5/8"Reg Box	HSH121388F125

4. Hammer Specifications

Standard Backhead Connection	6 5/8" API REG PIN
Chuck Connection Configuration	N125
Length without Bit	75" 1905mm
Length Bit Extended	83.87" 2210mm
Length Bit Retracted	81.5" 2146mm
Outside Dia Hammer	12" 305mm
Outside Diameter Chuck	12" 305mm
Bore Diameter	8.5" 216mm
Piston Stroke	5" 127mm
Piston Weight	231lbs 105kg
Complete Hammer weight without bit	1584lbs 720kg

NB LENGTHS BASED ON A 445dia BUTTON BIT

5. Air Consumption



Working Pressure

Drill through this face should extra flushing be required see below

Extra flushing air for a choke in cubic feet per min

Hole Size	100 psi	150 psi	200 psi	250 psi
6mm	68	98	128	157
10mm	152	220	287	352
13mm	270	390	510	627
16mm	422	593	796	980
19mm	607	855	1147	1410

Extra flushing air for a choke in cubic metre per min

Hole Size	6.9 bar	10.3 bar	13.8 bar	17.2 bar
6mm	1.92	2.77	3.62	4.44
10mm	4.30	6.22	8.12	9.96
13mm	7.64	11.04	14.44	17.75
16mm	11.94	16.79	22.54	27.75
19mm	17.18	24.21	32.47	39.92

Total air requirements for chokes in cubic feet per min

Hole Size	100 psi	150 psi	200 psi	250 psi
blank	591	1087	1673	2338
6mm	660	1185	1801	2495
10mm	743	1307	1960	2690
13mm	861	1477	2183	2965
16mm	1013	1680	2469	3318
19mm	1198	1942	2820	3748

Total air requirements for chokes in cubic metre per min

Hole Size	6.9 bar	10.3 bar	13.8 bari	17.2 bar
blank	16.75	30.78	47.41	66.22
6mm	18.67	33.55	51.02	70.67
10mm	21.05	37.01	55.52	76.19
13mm	24.39	41.82	61.84	83.98
16mm	28.70	47.57	69.94	93.97
19mm	33.94	54.99	79.88	106.15

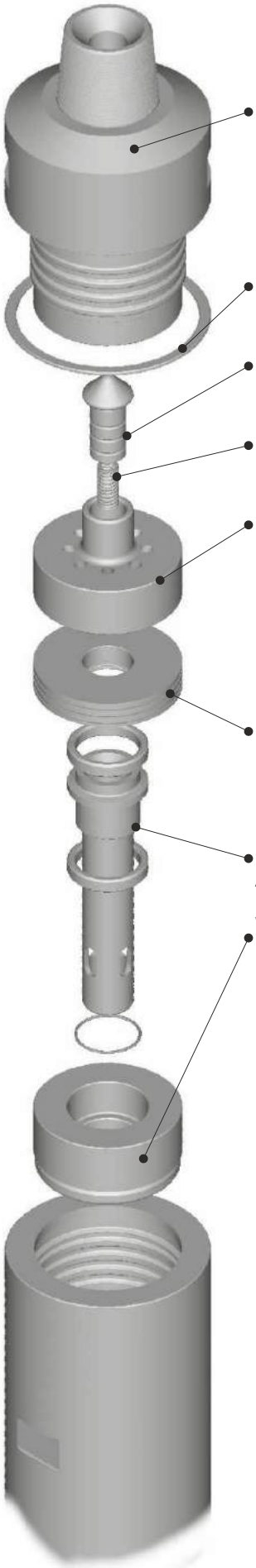
Additional Flushing

The Hyper 125/300 has a control tube with a softened face which can be easily drilled through to allow for extra flushing air should this be required. In certain drilling conditions extra flushing air may be required to overcome increasing back pressure and maintain the necessary up hole velocity to ensure efficient hole cleaning. In such conditions, a small hole can be drilled into the face of the control tube which will allow extra live air to be delivered directly to the bit face. The size of the hole will determine the extra volume of air delivered to the bit face depending on the operating pressure.

The top two tables show the extra flushing air which can be expected with the chokes drilled.

The lower two tables shows the total air required for optimum hammer performance with the chokes drilled.

6. Stripping the Hammer



NOTE:- All components must be washed clean and laid out on a dirt free surface to enable inspection to take place. The stripping procedure is explained in the following section,

Assuming both the Chuck and the Backhead threads have been loosened either on the Drilling Rig or by using a Hydraulic Splitter, the stripping procedure is as follows

Note:- On no account should the wearsleeve be impacted by a hand hammer or splitting be assisted by use of localised heat: ie. Welding/blow torch.
Should splitting prove difficult, The breakout washers can be ground out, taking care not to deface other pieces of the drill, to relieve pressure and help splitting,

1. First remove the chuck assembly. This comprises the button Bit, chuck release washer, chuck 'O' ring, bit retainer, drive plates etc. The guide bush assembly does not need stripping, but the bearing should be removed and replaced if worn.

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.

The remaining, compression buffer and control tube assembly can 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.

3. Lifting the chuck end of the wearsleeve again will allow the piston to slide to the end face from where it can be removed.

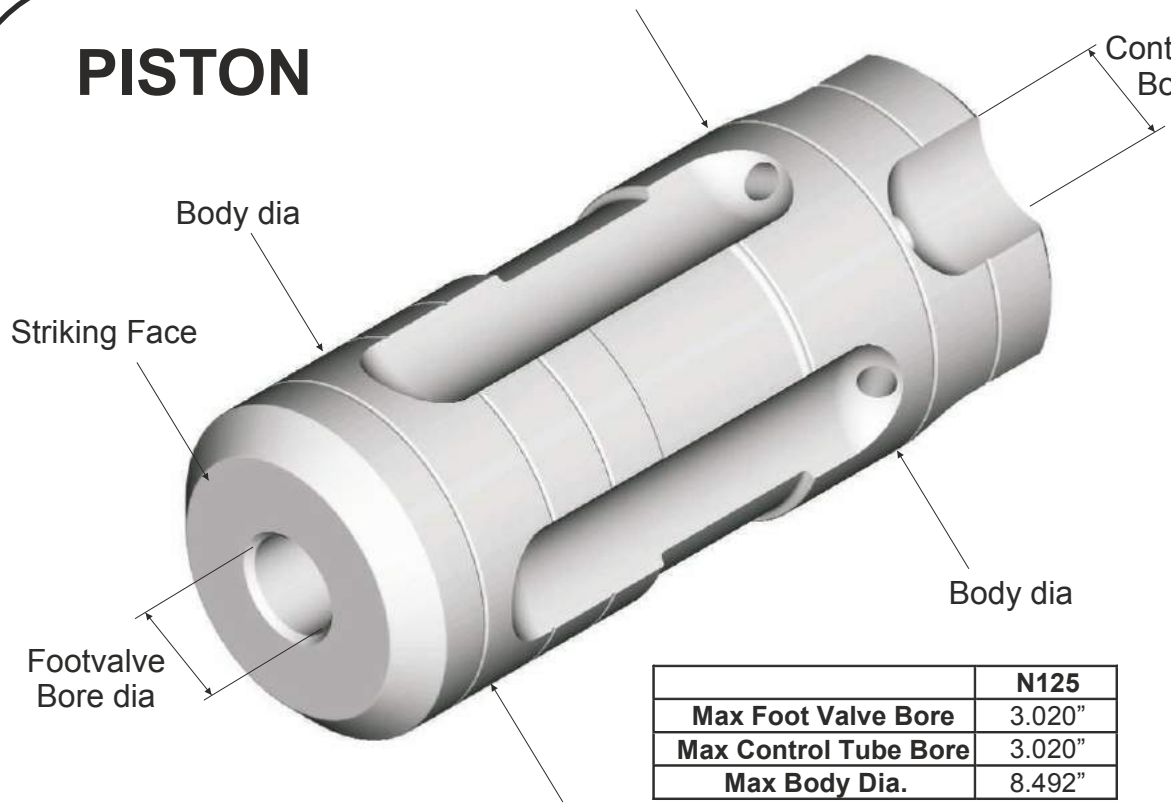
7. Checking for Wear and Damage

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

1. Insufficient or incorrect lubrication.
2. The ingress of debris in 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.

PISTON



	N125
Max Foot Valve Bore	3.020”
Max Control Tube Bore	3.020”
Max Body Dia.	8.492”

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

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.

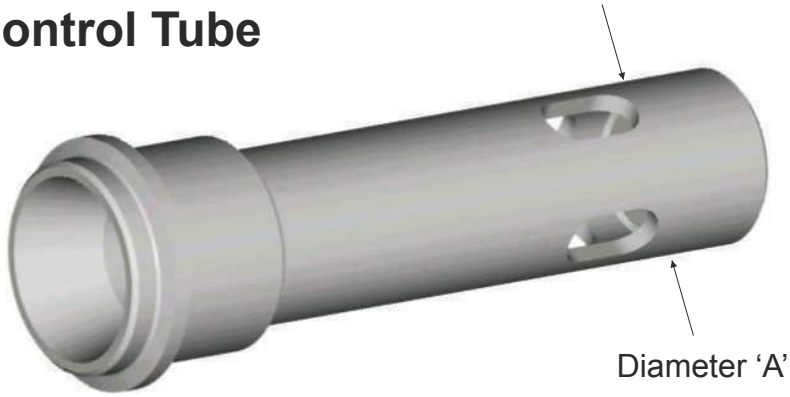
2. Secondly, using a micrometer, measure the diameter of the bore at both ends of the piston and refer to the maximum quoted sizes.

3. Examine the striking face. Distortion is acceptable proving there are no signs of cracking. Burrs and dents can be removed with an emery stone.

8. Checking for Wear and Damage

Control Tube

Control Tube
Minimum Dia
2.992” (76mm)



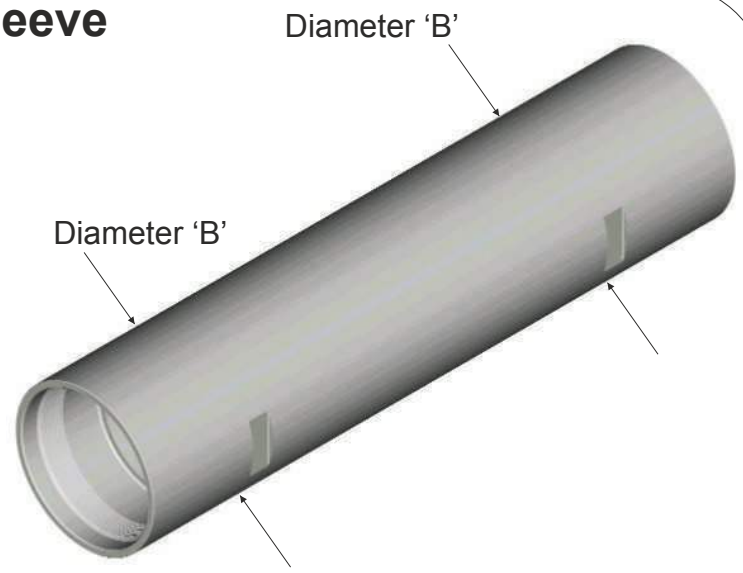
Examine the control tube diameter ‘A’, using a micrometer, check the diameter has not worn under the specified minimum.
If there are signs of pick-up they should be removed by using emery cloth.

Wearsleeve

Using either a micrometer or vernier, measure the outer diameter ‘B’ 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 areas reaches the wear sleeve.

If there are signs of pick-up they should be removed by using emery cloth.

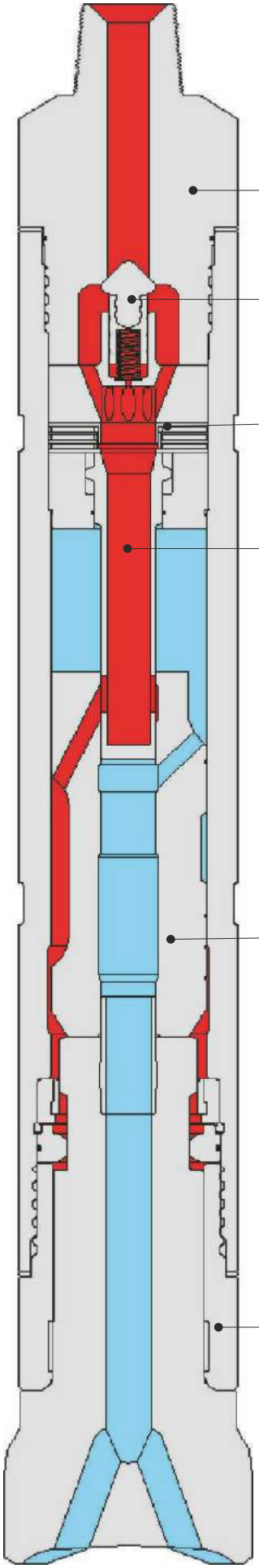
Wearsleeve
Minimum Dia
11.8” (300mm)



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



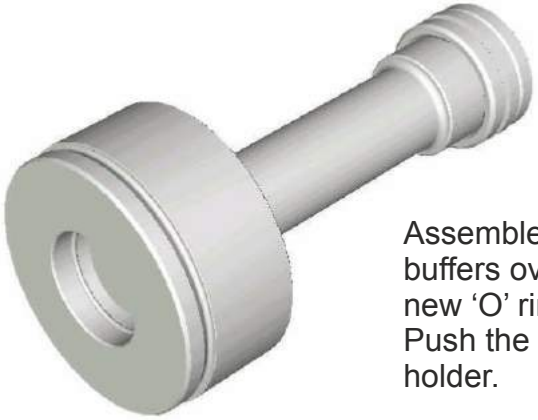
Before rebuilding the hammer, check the guide bush, and bearing for any wear or damage, replace if necessary.

The Chuck should be placed over the bit and drive plates

Fit the Chuck release washer and bit retaining ring, noting the orientation of the ring

Cover the threads with a copper based grease. Then Screw the Chuck fully in until there is no gap between the wearsleeve and chuck release washer.

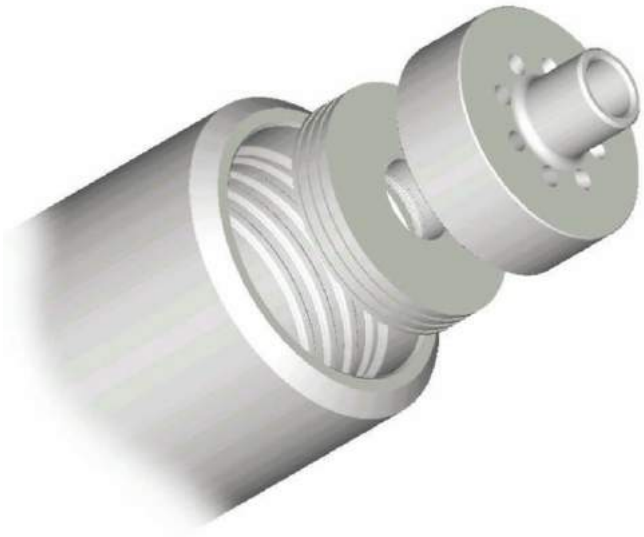
Coat the piston with rock oil and slide it into the backend end of the wearsleeve.(Ensure the striking face enters first)



Assemble the two compression buffers over the control tube. Fit a new ‘O’ ring in the holder.
Push the control tube in the holder.

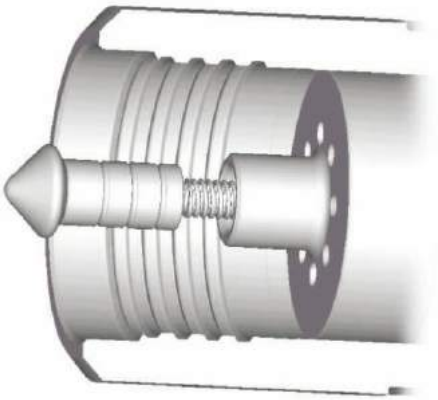
10. Rebuilding the Hammer

Coat the entire assembly with rock oil and slide the assembly into the backhead end of the wearsleeve until it seats.

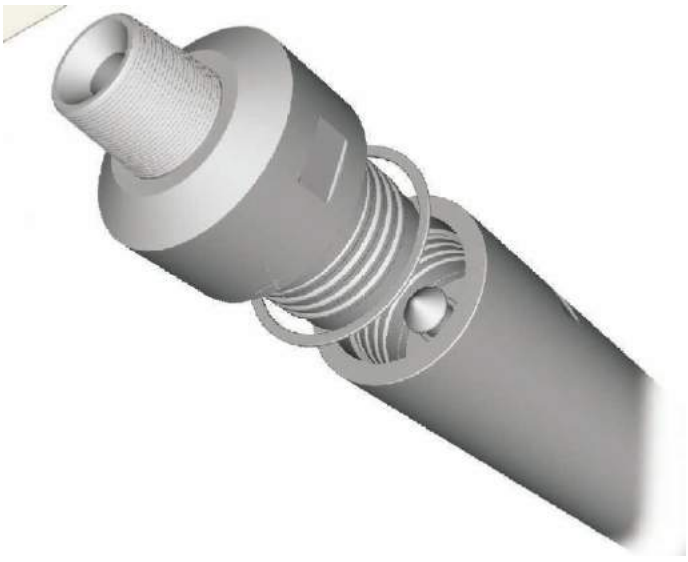


Followed by the compression ring, and the divertor..

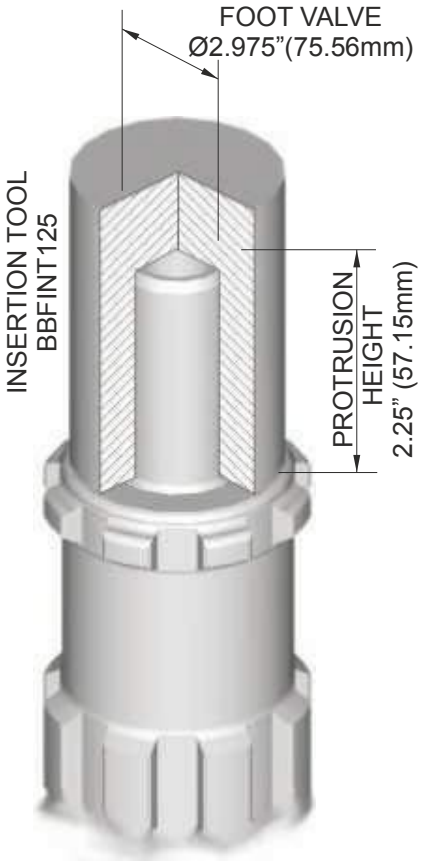
Insert the spring into the check valve, and then slide the assembly into the hole in the divertor.



Fit a new ‘O’ ring to the backhead and coat the threads in a copper based grease. Fit the backheadbreakout washer. 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 2mm, if the gap is smaller the ring should be removed and replaced with a new compression ring. When the gap exceeds 2mm the backhead should be fully tightened using the appropriate backhead spanner.



11. Button Bit Details



Bulroc Hyper 125/300/ hammers are designed to be used with the N125 Foot Valve.

This foot valve must be fitted or it will seriously affect the hammers performance.

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

Using foot valves which are longer in diameter than the specified shown will result in premature failure of the foot valve. Foot valves which are much smaller than the sizes shown will reduce the performance of the hammer.

12. Lubrication

The Hyper 125 piston oscillates at 850 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 off 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.
It 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 hour, per 100cfm of air through the hammer (0.07 litre per metre cubed)

Eg Hyper 125 operating at 150psi = 1087cfm = 3.62 pints per hour
10.3bar = 2.77cmm = 2.1 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	MEDIUM SAE 30 ISO VG 100	HEAVY SAE 50 ISO VG 220
BULROC	T220	T320
BP	ENGERGOL RD-E 100	ENERGOL RD-E 300
CHEVRON	ARIES 100	ARIES 320
SHELL	TORCULA 100	TORCULA 320
ESSO/EXXON	AROX EP100	AROX EP320

13. Storage

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 T220 or similar rock drill oil should be poured into the 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 litres
Hyper 125	1¾	1

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.

Notes

14. Troubleshooting

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 valve needle
	Hanging piston	Piston stuck, polish out bores
	Insufficient air pressure	Check Compressor discharge and increase to operational pressure
SLOW PENETRATION	Insufficient air pressure	Check Compressor discharge and increase to operational pressure
	Blunt drill bit	Re-grind or change bit
	Worn drill bits	Replace worn parts
	Too much or to 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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HYPER 141

MAINTENANCE, OPERATING AND SERVICE MANUAL

CONTENTS

1. INTRODUCTION

The Bulroc Hyper 141 is a strong and robust tool of a simple and straight forward design to provide maximum performance within a minimum of maintenance. Thie Hyper 141 is designed to operate efficiently at air pressures between 100psi (7bar) and 250psi (15bar) and accepts Hyper 141 button bits (N125) as standard.

The Hyper 141 hammer is supplied as standard with a check valve arrangement. This is designed to maintain pressure inside the hammer when the air is switched off and so help prevent contaminated water from entering the hammer.

The Hyper 141 hammer standard backhead is 6⅝" api Reg. Pin.

The Hyper 141 hammer is designed to give optimum performance with the minimum consumption of compressed air. If however, for particular deep hole applications extra flushing air is required, the hammer can be fitted with a choke system, that can easily be applied to suit your operational requirements.

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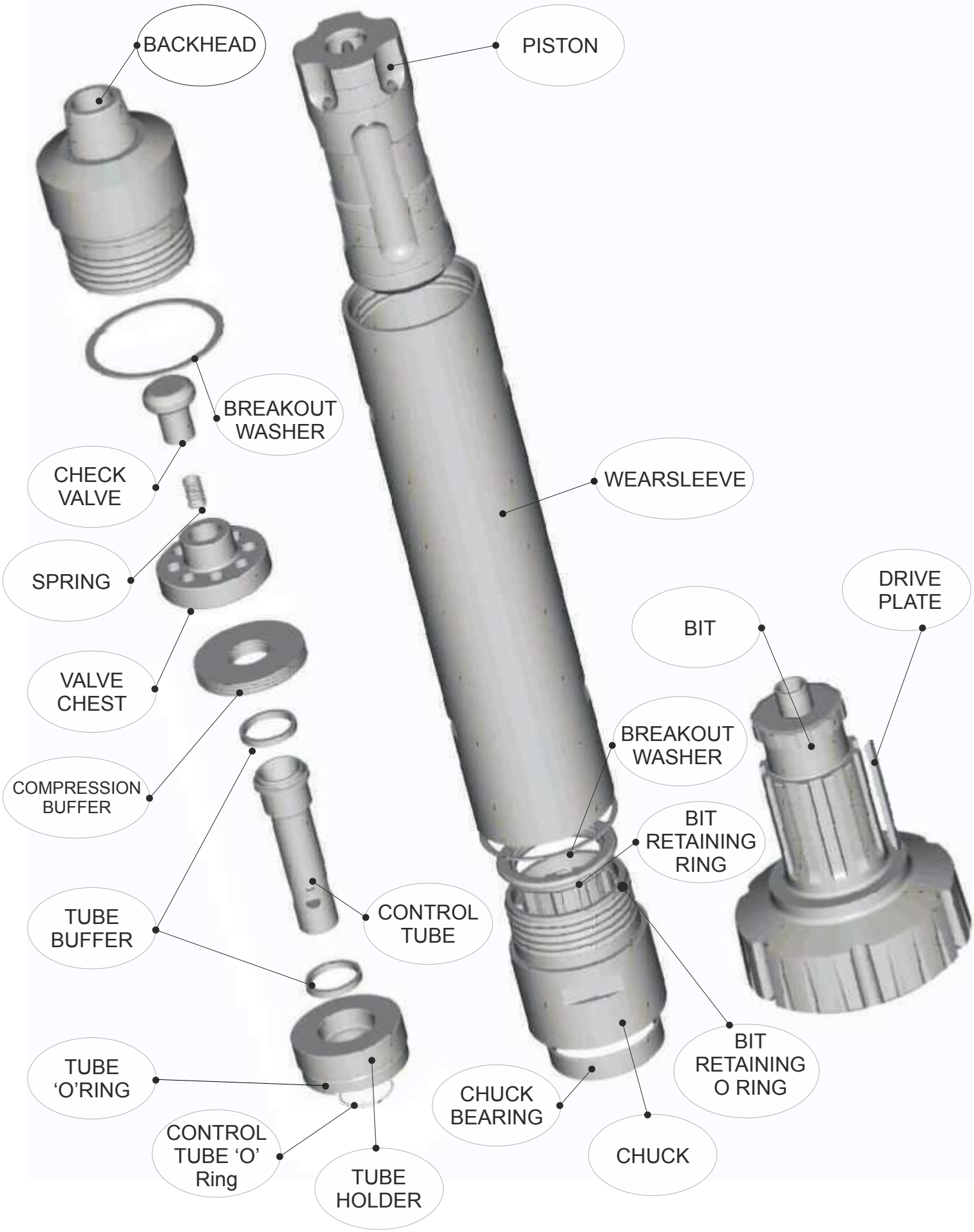
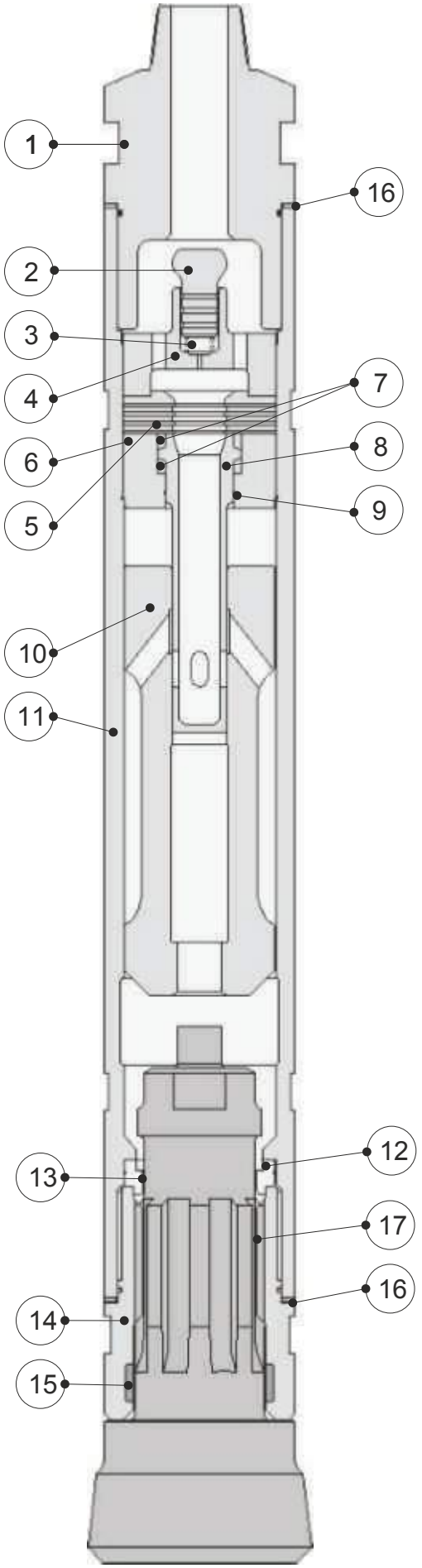
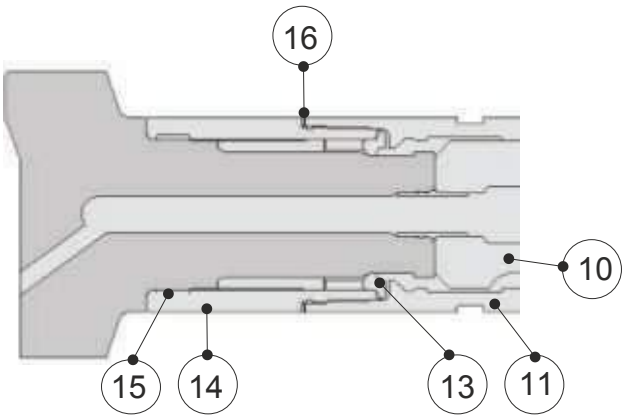
HYPER 141



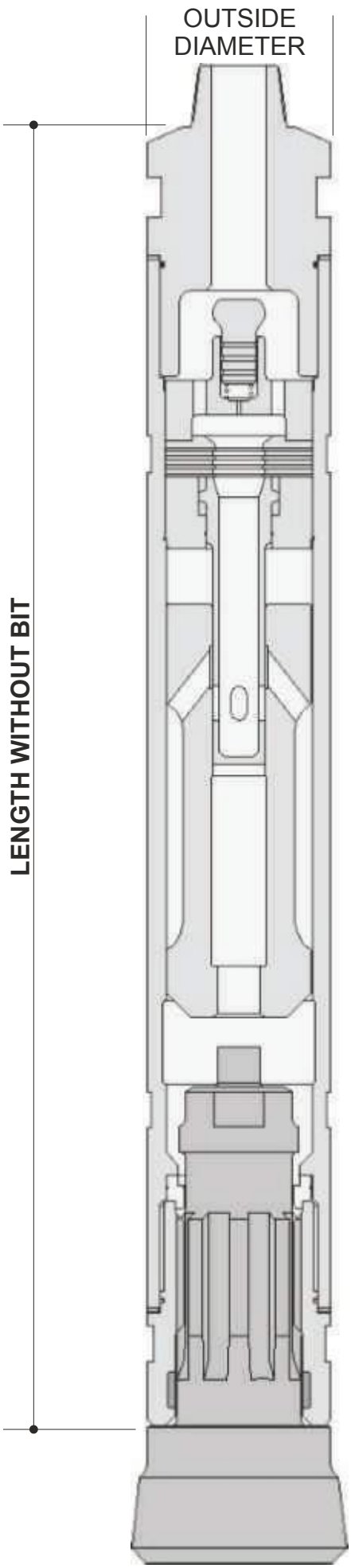
3 HAMMER PARTS



Ref	Description	Part Number
1	Backhead 6 5/8” Reg. Pin	HSH1413880M
2	Check Valve	HSH12108
3	Check Valve Spring	HSH12110
4	Diverter	HSH14120
5	Compression Buffer	HSH14128
6	Control Tube Holder	HSH14131
7	Control Tube Buffers (2)	HSH14129
8	Control Tube	HSH14130
9	Control Tube “O” Ring	HSH14130A
10	Piston	HSH14103125
11	Wearsleeve	HSH14100
12	Bit Retainer (pair)	HSH14137125
13	Bit Retainer “O” Ring	HSH14137AST
14	Chuck (N125 C/W drive plate slot)	HSH14135125
15	Chuck Bearing	HSH14135125BE
16	Breakout Washer (chuck)	HSH14126
16	Breakout Washer (Backhead)	HSH14126
17	Drive Plate N125 (10)	DP125
	Complete Hammer	BR141H01

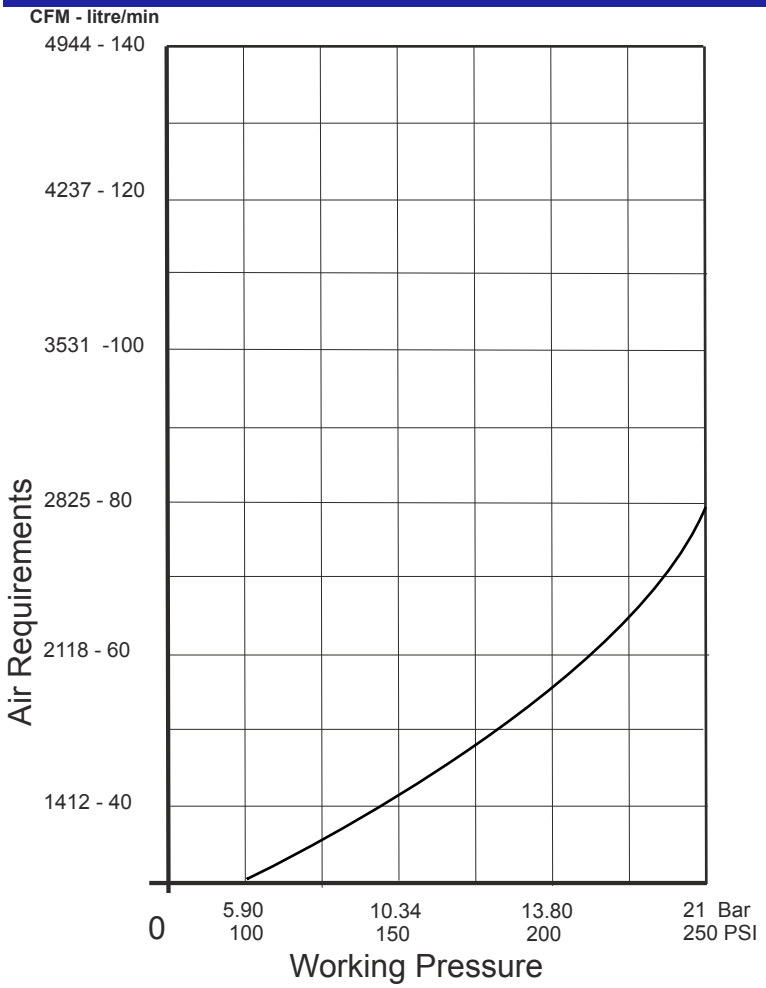


HAMMER SPECIFICATIONS



	Specification
STANDARD BACKHEAD CONNECTION	6⅝”API reg pin
CHUCK CONNECTION CONFIGURATION	N125
LENGTH LESS BIT	76.4” 1941mm
OUTSIDE DIAMETER OF HAMMER	12.6” 320mm
BORE DIAMETER	9.75” 248mm
PISTON STROKE	5” 127mm
PISTON WEIGHT	414lbs 188kgs
WEARSLEEVE ACROSS FLATS SIZE	12.125” 308mm
WEIGHT OF HAMMER LESS BIT	2420lbs 1100kgs

5 AIR CONSUMPTION



Drill through this face should extra flushing be required see below

Additional flushing air through orifice (CFM)

HOLE SIZE	100PSI	150PSI	200PSI	300PSI
6mm	104	150	196	287
10mm	294	338	441	646
13mm	415	600	784	1148
16mm	649	910	1225	1795
19mm	934	1315	1764	2583

Additional flushing air through orifice (cubic meter per minute)

HOLE SIZE	100PSI	150PSI	200PSI	300PSI
6mm	2.95	4.25	5.55	8.13
10mm	8.33	9.57	12.49	18.29
13mm	11.75	16.99	22.2	32.51
16mm	18.38	25.76	34.69	50.83
19mm	26.45	37.24	49.95	73.15

Total air through hammer (CFM)

CHOKE SIZE	100PSI	150PSI	200PSI	300PSI
Blank	714	1311	2018	3708
6mm	818	1461	2214	3995
10mm	1008	1649	2459	4354
13mm	1129	1911	2802	4856
16mm	1363	2221	3243	5503
19mm	1648	2626	3782	6291

Total air through hammer (cubic meter per minute)

CHOKE SIZE	100PSI	150PSI	200PSI	300PSI
Blank	20.2	37.13	57.16	105.01
6mm	23.15	41.38	62.71	113.14
10mm	28.53	46.7	69.65	123.3
13mm	31.95	54.12	79.36	137.52
16mm	38.58	62.89	91.85	155.84
19mm	46.65	74.37	107.11	178.16

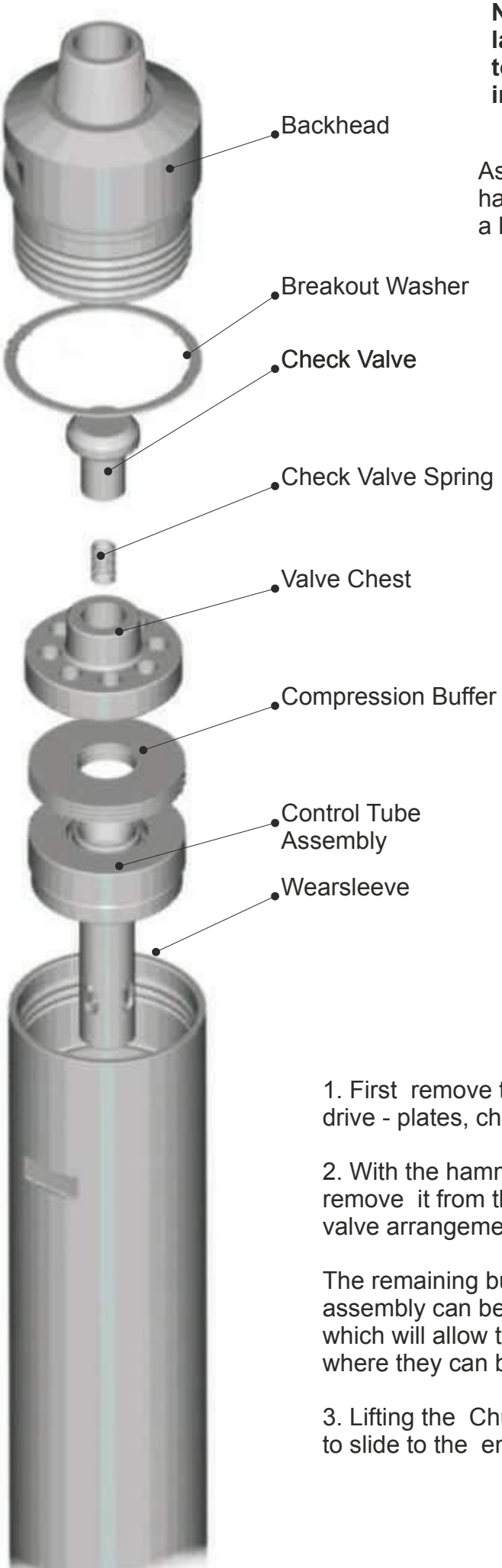
Additional Flushing

The Hyper 141 has a control tube with a softened face which can be easily drilled through to allow foe extra flushing air should this be required.
In certain drilling conditions extra flushing air may be required to overcome increasing back pressure and maintain the necessary up hole velocity to ensure efficient hole cleaning. In such conditions, a small hole can be drilled into the face of the control tube which will allow extra live air to be delivered directly to the bit face. The size of the hole will determine the extra volume of air delivered to the bit face depending on the operating pressure.

The top two tables show the extra flushing air which can be expected with the chokes drilled.

The lower two tables shows the total air required for optimum hammer performance with the chokes drilled.

STRIPPING THE HYPER 141

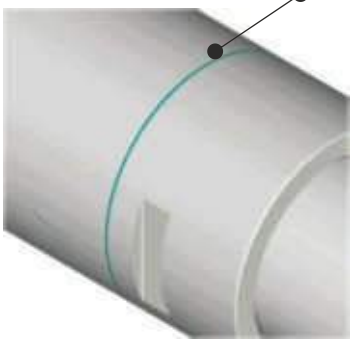


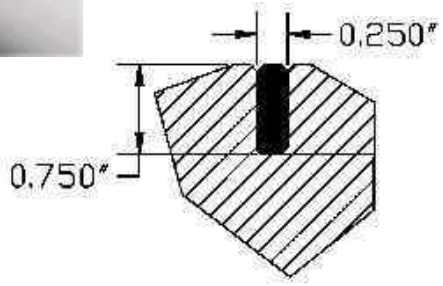
NOTE:- All components must be washed clean and laid out on a dirt free surface to enable inspection to take place. The stripping procedure is explained in the following section,

Assuming both the chuck and the backhead threads have been loosened either on the drilling rig or by using a hydraulic splitter, the stripping procedure is as follows

Note:- On no account should the wearsleeve be impacted by a hand hammer or splitting be assisted by use of localised heat: ie. welding/blow torch, this will invalidate the warranty.

Should splitting prove difficult, the breakout washers can be ground out, taking care not to deface other pieces of the drill, to relieve pressure and help splitting.





1. First remove the chuck assembly. This comprises the button bit, drive - plates, chuck release washer, and bit retainers.

2. With the hammer laid horizontal, unscrew the backhead and remove it from the wearsleeve. The valve chest along with the check valve arrangement can now be pulled from the backhead end.

The remaining buffer cover, compression buffer and control tube assembly can 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.

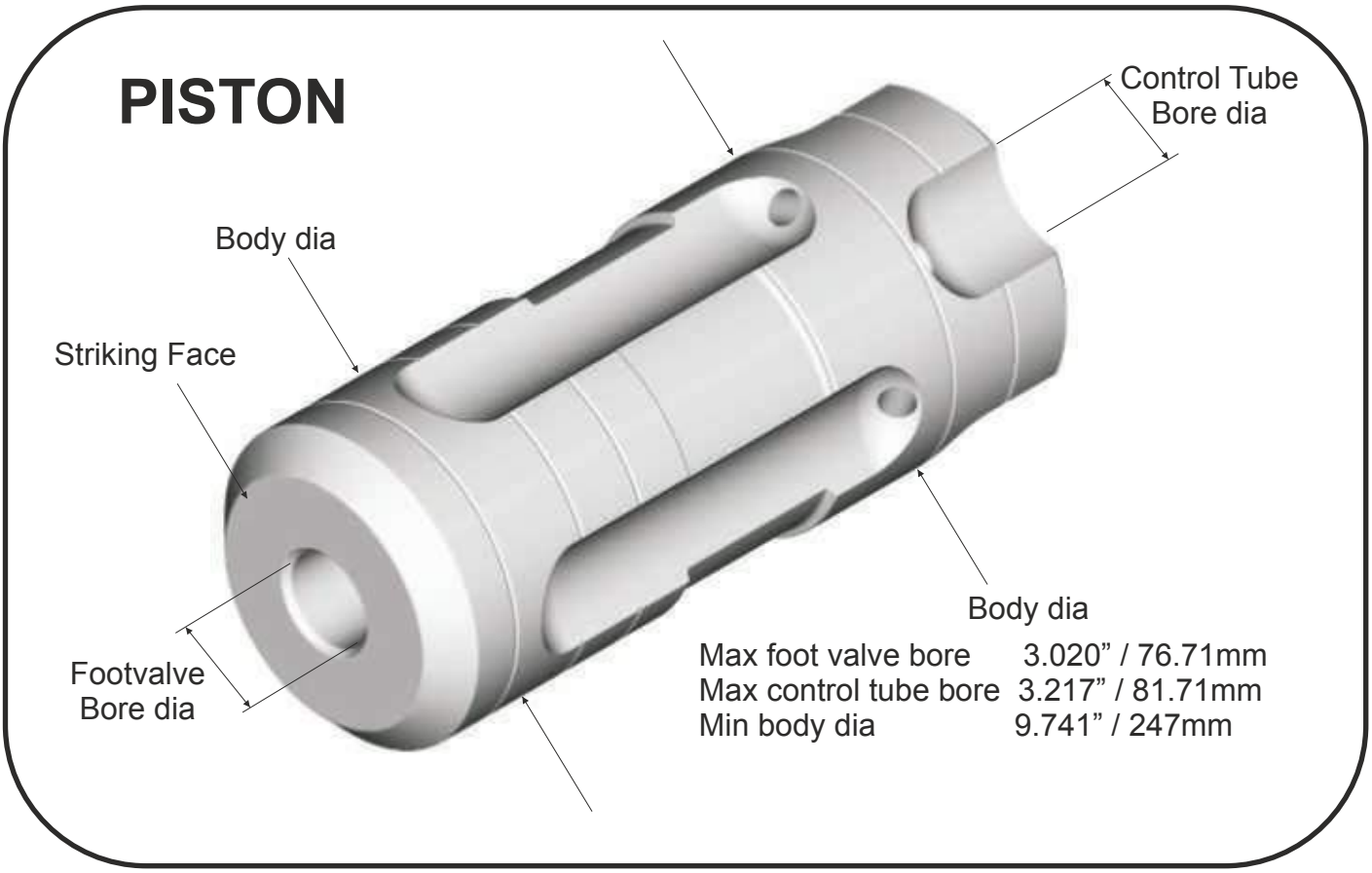
3. Lifting the Chuck end of the Wearsleeve again will allow the Piston to slide to the end face from where it can be removed.

7 CHECKING FOR WEAR AND DAMAGE

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

1. Insufficient or incorrect lubrication.
2. The ingress of debris in 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.



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

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 proving there are no signs of cracking. Burrs and dents can be removed with an emery stone.

7 CHECKING FOR WEAR AND DAMAGE

MAINTAINING THE PISTON

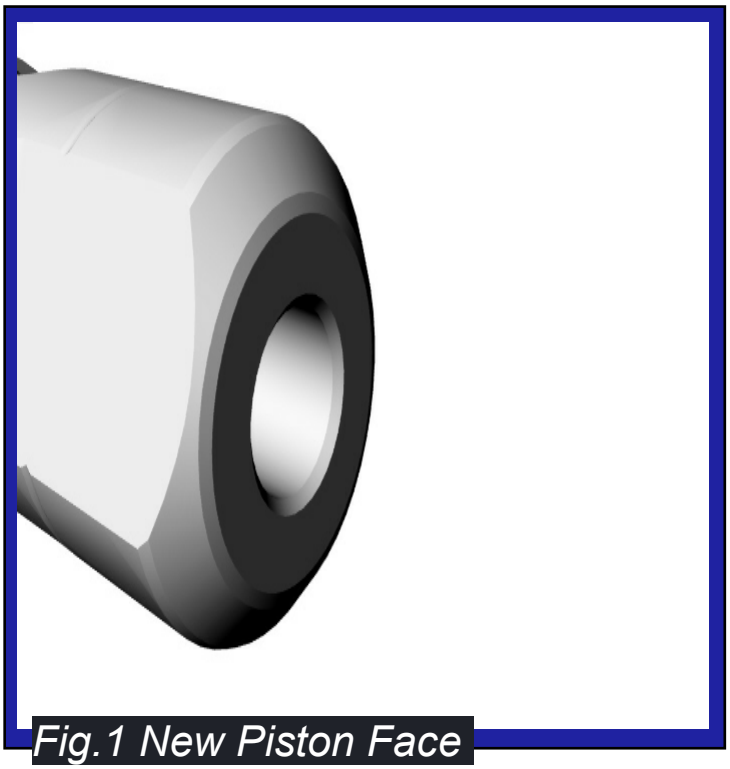


Fig.1 New Piston Face

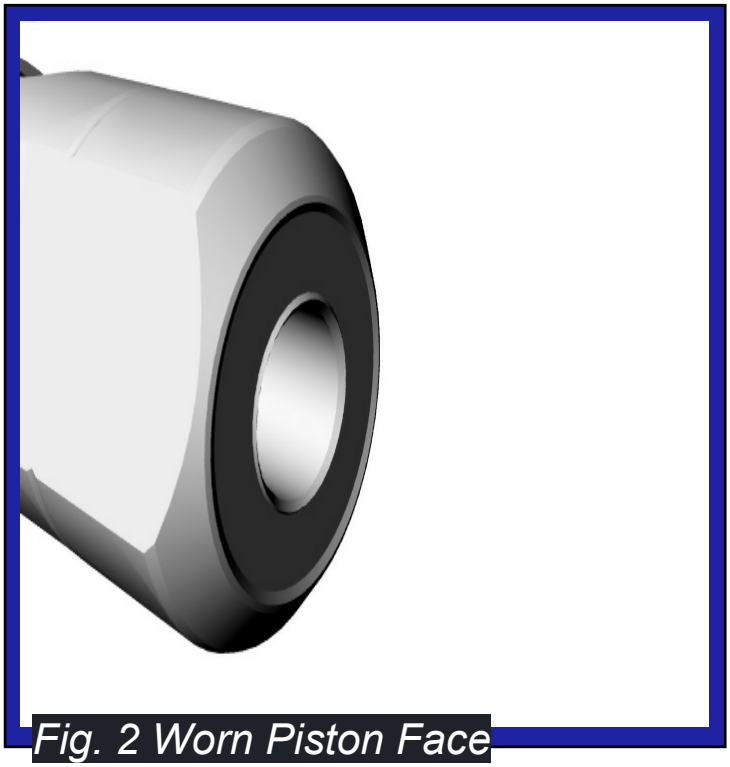


Fig. 2 Worn Piston Face

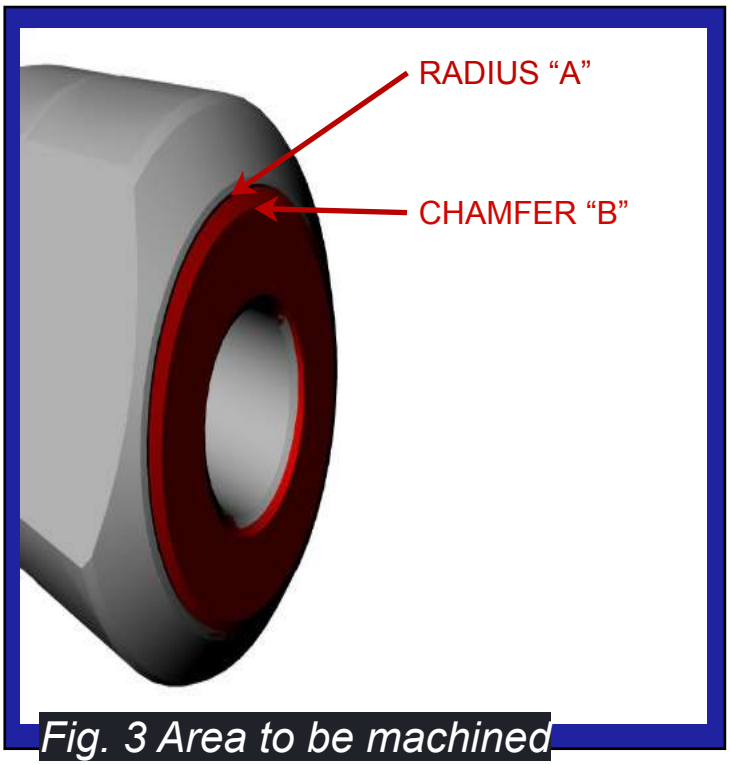


Fig. 3 Area to be machined

During the working life of the hammer the Striking Face on the Piston may become dented or deformed *(see fig.2)*. To prevent this face from cracking, or chipping, the Piston should be returned to a lathe where the striking face can be re-machined flat and then have the outer radius and inner chamfer reformed *(see fig.3)*..

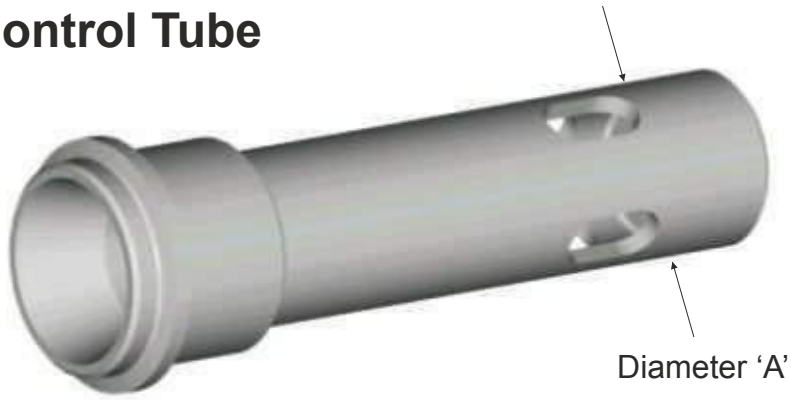
Care should be taken to remove the minimum amount of material during this re-machining process and at no point should more than 2mm be removed from the face. **Pistons with wear patterns, or indentations deeper than 2mm should be replaced.**

The table below contains useful machine information for reforming the piston face.

MACHINE DETAIL		
HAMMER	**RADIUS “A”**	**CHAMFER “B”**
HYPER 141	0.125”	0.250” @45

Control Tube

Control Tube
Minimum Dia
3.190” / 81mm



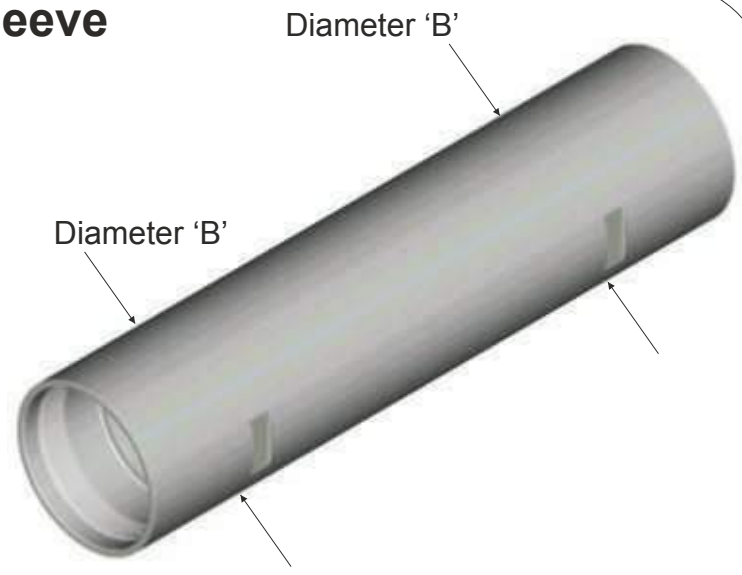
Examine the control tube diameter ‘A’, using a micrometer, check the diameter has not worn under the specified minimum.
If there are signs of pick-up they should be removed by using emery cloth.

Wearsleeve

Using either a micrometer or vernier, measure the outer diameter ‘B’ 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 areas reaches the wear sleeve.

If there are signs of pick-up they should be removed by using emery cloth.

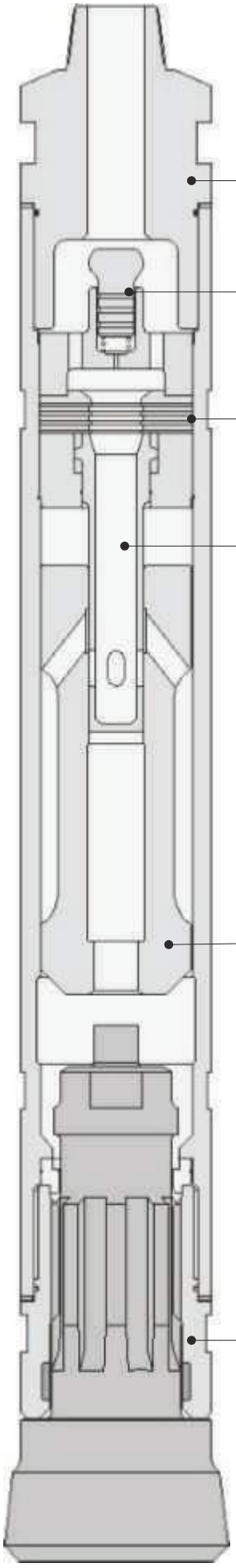
Wearsleeve
Minimum Dia
12.350” / 313.7mm



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 HYPER 141



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

2. Lay the wearsleeve on two wooden blocks, support the chuck end so as to raise the sleeve 50mm - 70mm off the ground this will make it easier to screw in the chuck assembly.

3. Assemble the chuck, chuck release washer and bit retainers around the bit ensuring the bit retainers are fitted with new 'O' rings. check the condition of the drive plates and the chuck bearing and replace if necessary. Cover the threads with a copper based grease. Then 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).

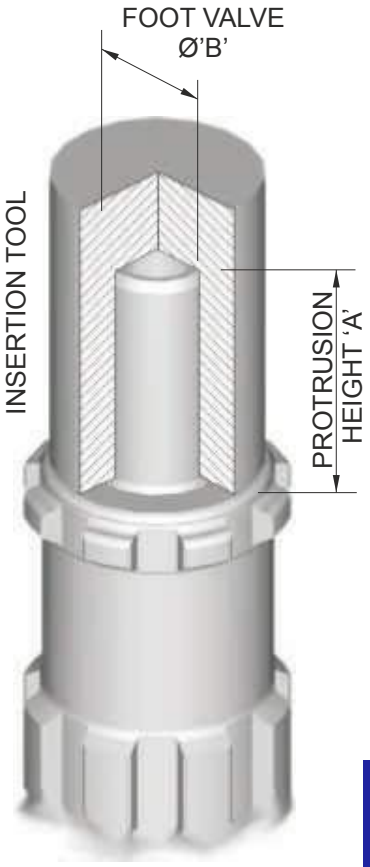
5. Assemble the two control tube buffers and the 'O' ring around the control tube, then push the assembly into the tube holder. Coat the outside of the assembly with rock drill oil and insert it into the backhead end of the wearsleeve.

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. Fit the buffer cover to the valve chest. Push the whole assembly down onto the compression ring.

8. Coat the backhead threads in copper based grease. Fit the backhead breakout washer. 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 2mm, - if the gap is smaller the ring should be removed and replaced with a new compression ring. When the gap exceeds 2mm the backhead should be fully tightened using the appropriate backhead spanner.

BUTTON BIT FOOTVALVES 10



The Bulroc Hyper 141 hammer is designed to be used with Foot Valves that are to the following specifications:

SHANK TYPE	PROTUSION HEIGHT 'A'	FOOTVALVE DIAMETER 'B'
N125	2.973" / 75.5mm	2.250" / 57.2mm

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.

11 LUBRICATION

The Hyper 141 piston oscillates at 650 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 141 operating at 150psi = 1311cfm = 4.3 pints per hour
10.3bar = 37.13cmm = 2.44 litres 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	T220	T320
BP	ENERGOL RD-E 100	ENERGOL RD-E 300
CHEVRON	ARIES 100	ARIES 320
SHELL	TORCULA 100	TORCULA 320
ESSO/EXXON	AROX EP100	AROX EP320

12 HAMMER 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.

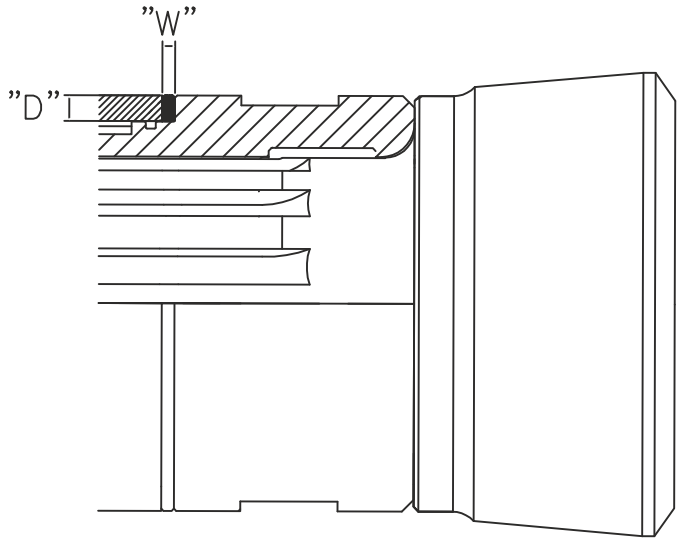
Model	Qty in UK Pints	Qty in litre's
Hyper 141	1¾	1.00

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.

13 TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
INOPERATIVE DRILL	Drill bit blowholes 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 value
	Excessive lubrication	Adjust lube needle value
	Hanging Piston	Pistion stuck. Polish out the score marks
	Insufficient air pressure	Check compressor discharge and increase to operational value
SLOW PENETRATION	Insufficient air pressure	Increase discharge pressure
	Dull drill bit	Re-grind or change bit
	Worn drill parts	Replace worn parts
	Too much or too little lubrication	Check oil level and if necessary adjust lube needle value
	Dirt in drill	Strip and clean
LOW RETURN AIR VELOCITY	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

A. CHUCK RELEASE WASHERS



CHUCK RELEASE WASHERS		
HAMMER MODEL	"W"	"D"
HYPER 141	0.330" - 8.38mm	0.860" -21.97mm

Chuck Release Washers are fitted to the Bulroc Range of Hyper Hammers to assist the removal of the Chuck from the Wearsleeve after drilling.

The Chuck Release Washer is manufactured from a composite material that reduces the friction between the lock up faces on the Chuck and Wearsleeve making it easier to overcome the tensional loading applied to these parts during the drilling process.

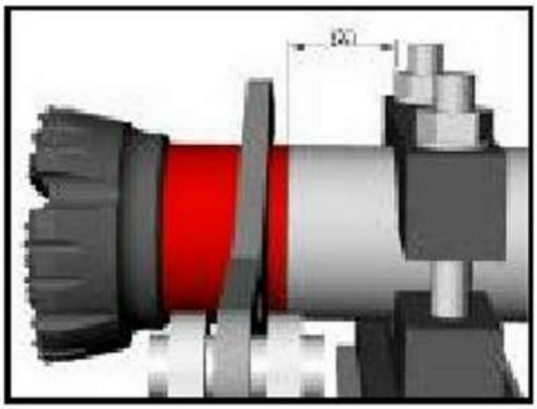
Due to the forces applied to the Chuck Release Washer you may find that its thickness ("W") is reduced during the drilling cycle and it is therefore recommended that a new Washer be fitted each time the Chuck is removed.

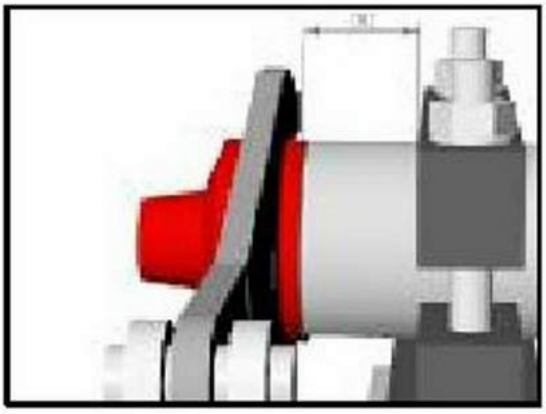
It is possible that on some of the larger Hammers in the Bulroc range, when drilling with large diameter Button Bits or Overburden Systems, certain conditions can generate higher torques than normally expected, resulting in difficulties when trying to remove the Chuck from the Wearsleeve. Should this occur then the removal of the Chuck can be achieved by cutting away the Chuck Release Washer. We do however stress at this point that cutting away the Chuck Release Washer is a final option and should not be done until all other options have proved unsuccessful.

If the cutting away of the Chuck Release Washer is necessary for the removal of the Chuck then it must be done with extreme care to avoid damage to either the Chuck or the Wearsleeve. The composition of the Chuck Release Washer allows for it to be cut with either a hacksaw or a small hand grinder equipped with a slitting wheel. The hacksaw method is much safer and less likely to damage the Chuck or Wearsleeve, but obviously much slower than the hand grinder with a slitting wheel. To remove the Chuck Release Washer a cut must be made in the centre of the washer all the way around it's circumference, and completely through the Washer, thus transforming the single washer into two thinner washers that will then spin freely. Great care must be taken, especially if the Washer is cut with a slitting wheel, to ensure that the cut only penetrates the Washer and does not pass through into the body of the Chuck.

The size shown as 'D" in the above table should be your MAXIMUM depth of cut, and it is recommended that either the saw blade or the slitting wheel are marked in some way so as to indicate when they have achieved this depth.

B. CLAMPING POSITIONS





CLAMP POSITIONS	
HAMMER MODEL	“X” DISTANCE FROM WEARSLEEVE END FACE
Hyper 141	10.000” / 254mm

There are many different “Splitting” Machines available for unscrewing the threaded connections on a Bulroc Hyper Hammer, some are attachments to the Drill Rig, others are independent hydraulic units, or purpose made Bench arrangements. Regardless of which machine is chosen they all require some method of securing the Wearsleeve whilst applying a torque to either the Chuck or Backhead.

The most common machines use either Clamps or Chains around the O/D of the Wearsleeve and the positioning of these is very important, if they are placed too close to the joint being “Split” they will in effect increase the frictional forces on the threaded connection making it impossible to unscrew the component from the Wearsleeve.

The above table shows the correct position for the clamping mechanism to ensure no additional load will be applied to the threaded connection, thus making the joint easier to split.

Due to the high torque loads applied to a Hammer during its drilling cycle, equally high loads are required to “Split” the Chuck and Backhead away from the Wearsleeve and because of this the clamping arrangement around the Wearsleeve must generate enough friction to prevent it from spinning during the process. However great care must be taken to make sure the clamps or chains are not over-tightened as this can cause deformation to the Wearsleeve that can result in both Wearsleeve failure and Piston seizure once the Hammer is returned to service.

To help increase the Wearsleeve’s resistance to deformation it is recommended that the Hammer Piston is first slid to the end of the Hammer being “split”, before clamps of chains are attached. By doing this the Piston O/D will limit the amount of deformation in the Wearsleeve bore if too much clamping pressure is applied.

NOTE:

The use of Chain type Hydraulic Breakers can leave deep intrusions in the O/D of the Wearsleeve which may result in stress concentrations that could lead to premature failure of the Wearsleeve.

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