

Bullrooc



Maintenance Operating and Service Manual for Hyper 181 model

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.

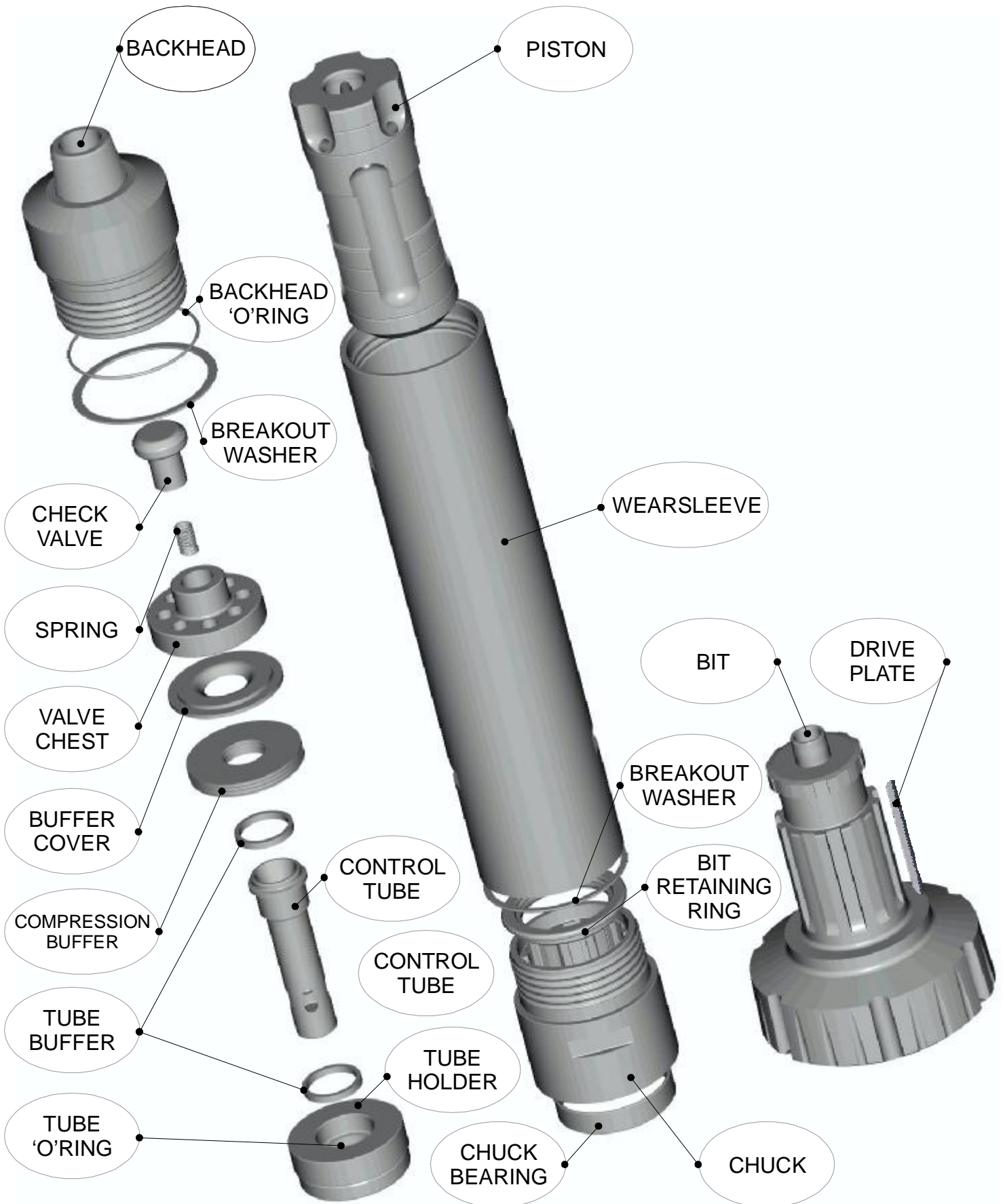
The Hyper 181 hammer is supplied as standard with a check valve arrangement. This is designed to maintain pressure inside the hammer when the air is switched off and so help prevent contaminated water from entering the hammer.

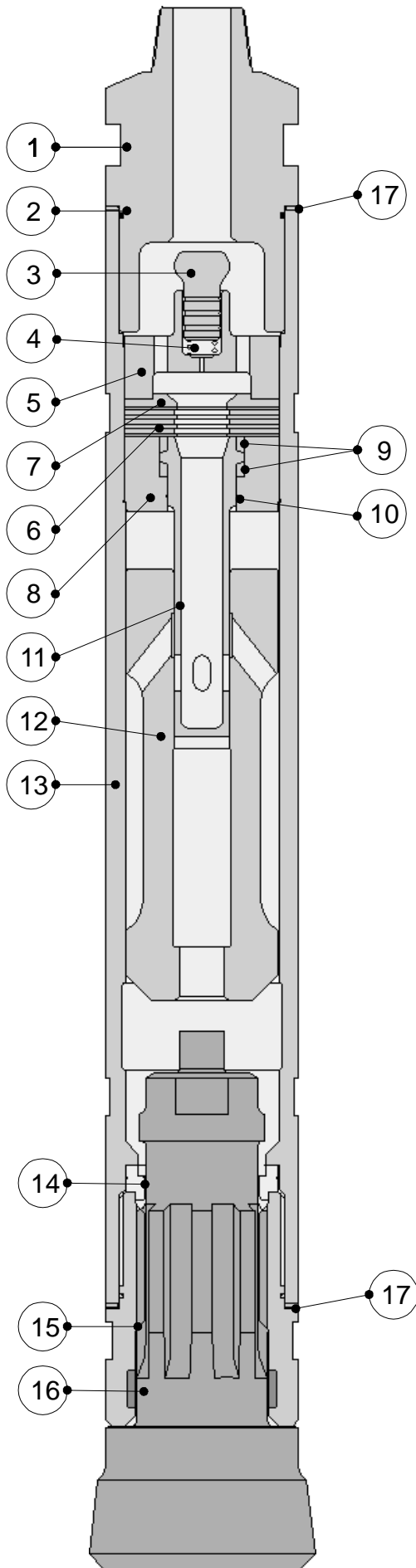
The Hyper 181 hammer standard backhead is 8⁵/₈" API reg pin.

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.

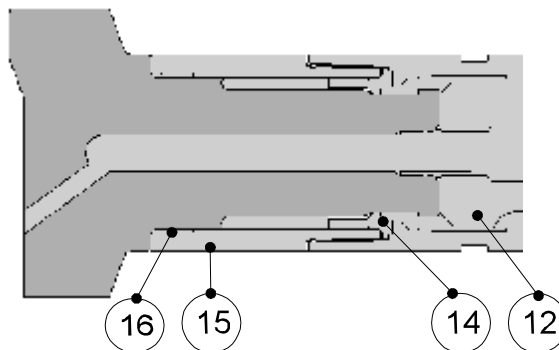
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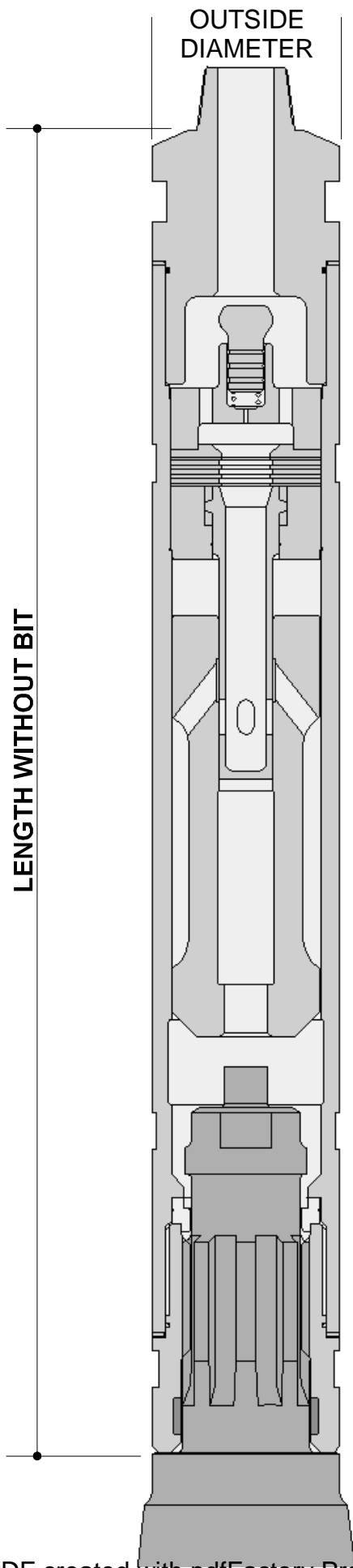


Ref	Description (N180)	Part Number
1	Backhead 8 ⁵ / ₈ " Reg. Pin	HSH1813882M
2	Backhead 'O' Ring	HSH18114
3	Check Valve	HSH18108
4	Check Valve Spring	HSH18110
5	Diverter	HSH18107
6	Compression Buffer	HSH18128
7	Buffer Cover	HSH18173
8	Tube Holder	HSH18131
9	Tube Buffers (2)	HSH18129
10	Tube'O'Ring	HSH18130A
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



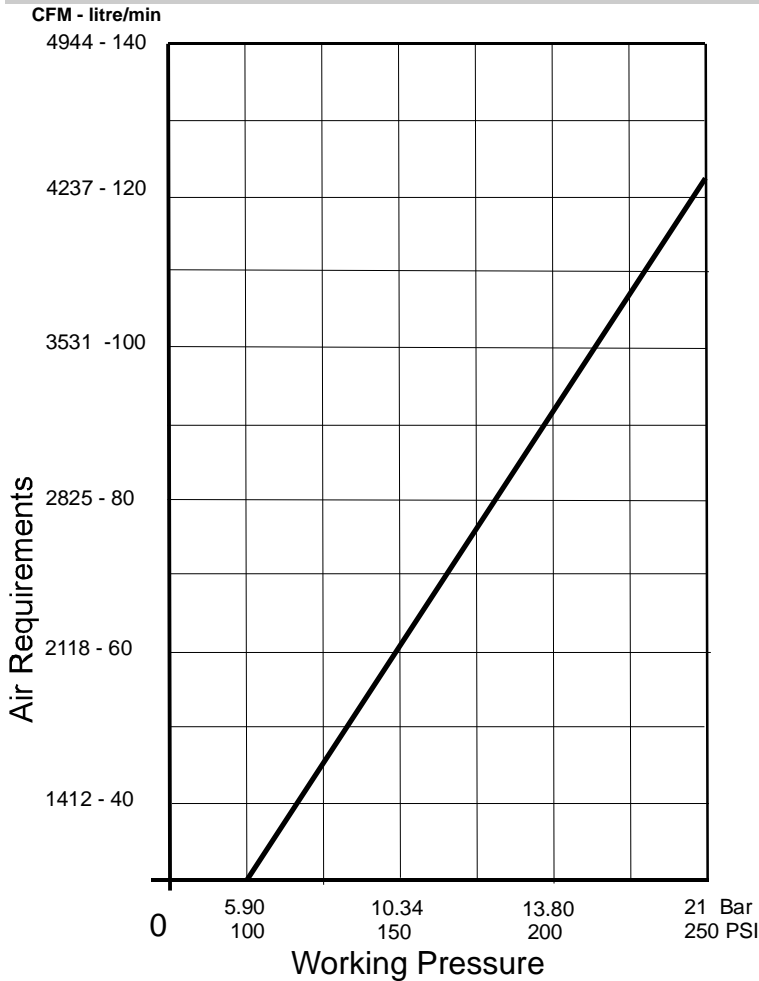
Ref	Description (Sd18 Conv)	Part Number
1	Backhead 8 ⁵ / ₈ " Reg. Pin	HSH1813882M
2	Backhead 'O' Ring	HSH18114
3	Check Valve	HSH18108
4	Check Valve Spring	HSH18110
5	Diverter	HSH18107
6	Compression Buffer	HSH18128
7	Buffer Cover	HSH18173
8	Tube Holder	HSH18131
9	Tube Buffers (2)	HSH18129
10	Tube'O'Ring	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

4. Hammer Specifications



	Specification	
STANDARD BACKHEAD CONNECTION	8 ⁵ / ₈ " 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	

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 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 show 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 Bar
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

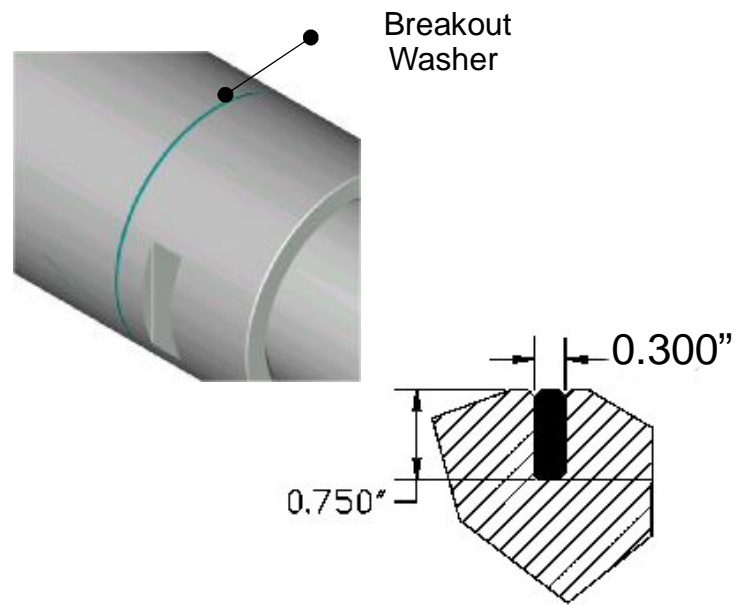
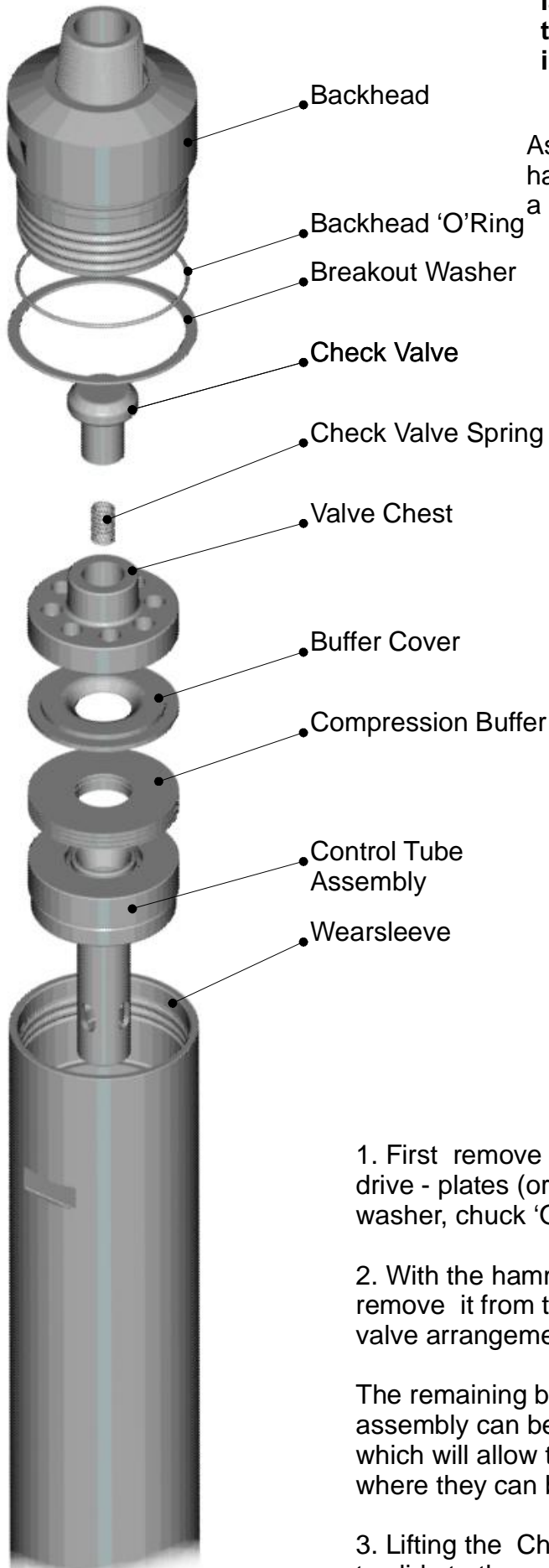
Hole Size	100 psi	150 psi	200 psi	250 psi
blank	31	57	88	123
6mm	33	60	92	127
10mm	35	63	96	133
13mm	39	68	102	141
16mm	43	74	110	151
19mm	48	81	120	163

Stripping the Hammer

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.

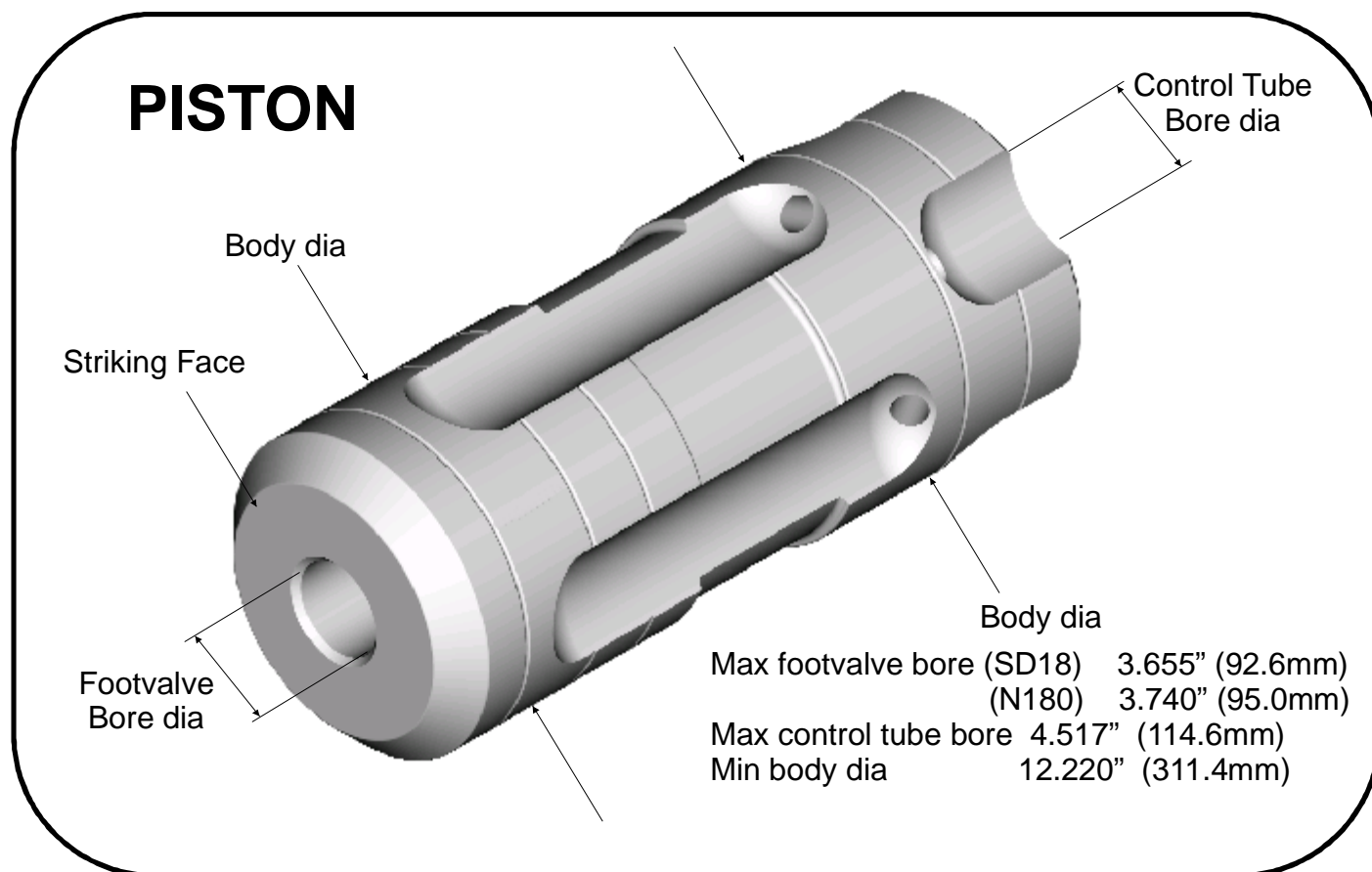
3. Lifting the Chuck end of the Wearsleeve again will allow the Piston to slide to the end face from where it can be removed.

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.



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.

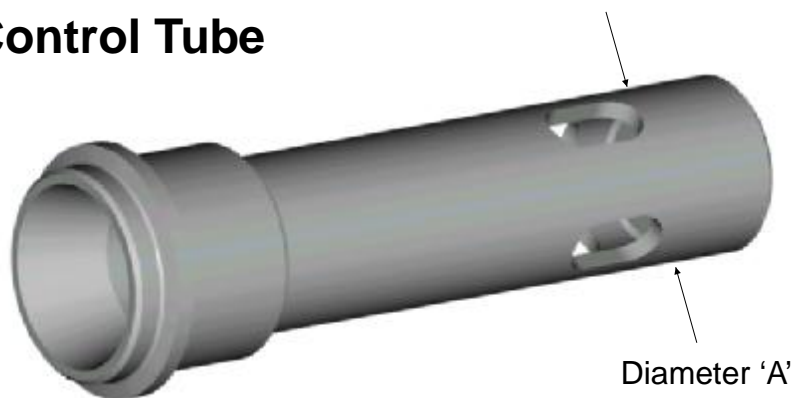
Any light 'Pick up' marks can be removed using emery cloth, however if there are signs of overheating and cracking, the piston should be replaced and the lubrication system examined.

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

Control Tube

Control Tube
Minimum Dia
4.492" (76mm)



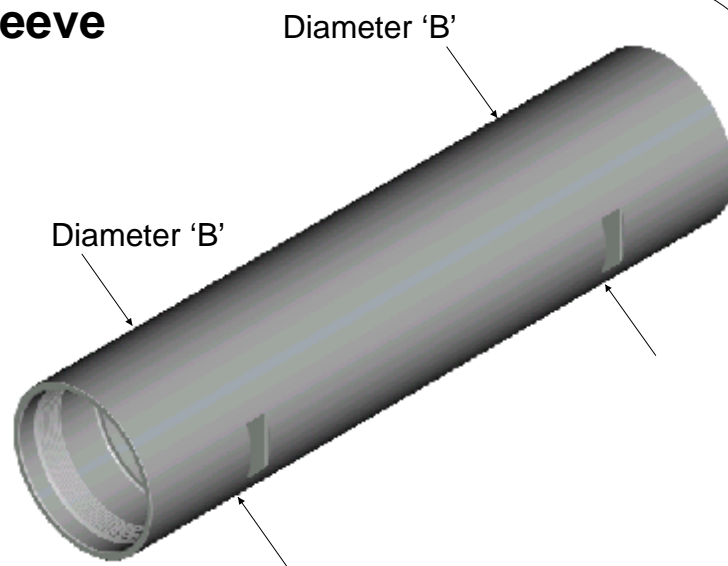
Examine the control tube diameter 'A', using a micrometer, check the diameter has not worn under the specified minimum.
If there are signs of pick-up they should be removed by using emery cloth.

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.

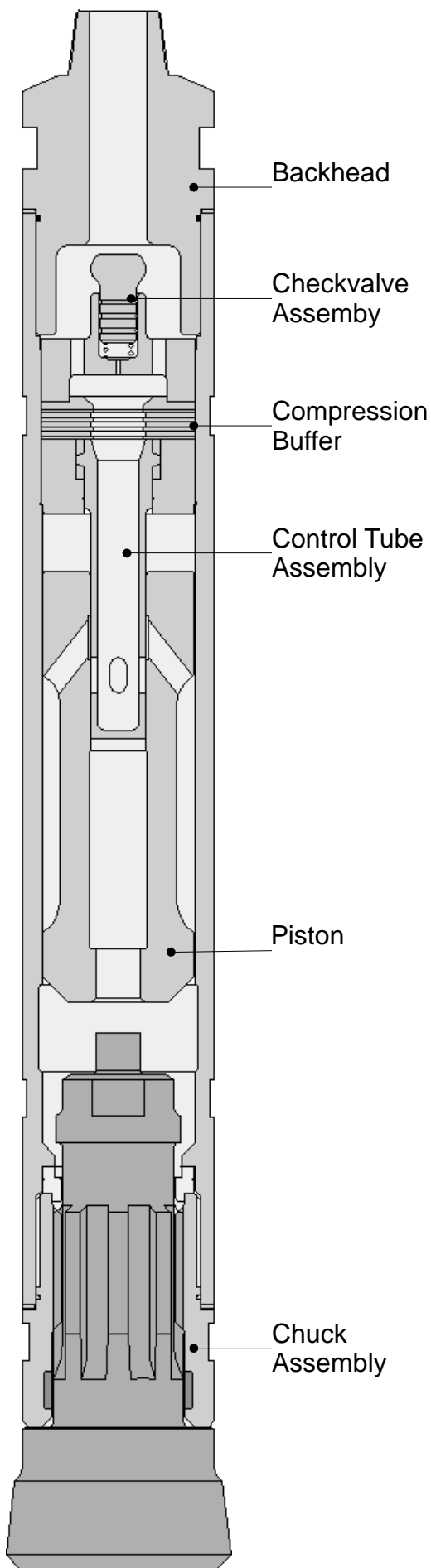
Wearsleeve
Minimum Dia
15.7" (399mm)



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

8. Rebuilding Hyperammers



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.

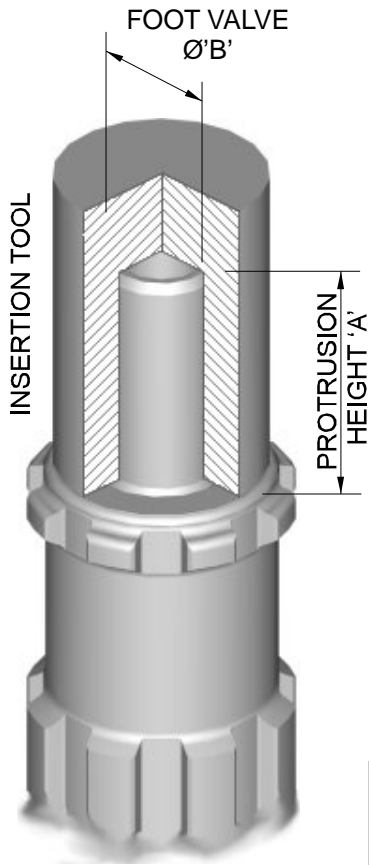
4. Coat the piston with rock drill oil and slide it into the backhead end of the wearsleeve. (Ensure the piston striking face enters first).

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.



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

SHANK TYPE	PROTRUSION 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.

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	LUBE T320	LUBE T500
BP	ENERGOL RD100	ENERGOL RD300
TEXACO	100/1542 EPM	320/1543 EPM
ESSO	AROX EP 150	AROX EP 320

