

**OPERATOR'S MANUAL  
FOR TOWNSEND  
7-1/16" X 3M – 7-1/16" X 5M  
9" X 3M – 9" X 5M  
11" X 3M - 11" X 5M  
13-3/8" X 3M - 13-5/8" 5M  
TYPE 84  
ANNULAR BOP**



TOWNSEND INTERNATIONAL BOP'S, INC.  
PO BOX 14170 · 5381 W. 42ND STREET  
ODESSA, TX 79768  
OFFICE 432/381-8750 · FAX 432/381-6324



5381 W. 42ND STREET □ P.O. BOX 14170  
ODESSA, TX 79768  
OFFICE 432/381-8750 □ FAX 432/381-6324

## OFFICE LOCATIONS

### TOWNSEND GENERAL OFFICE

**Physical Location:**

Townsend International BOP's, Inc.  
5381 West 42nd Street  
Odessa, Texas 79764

**Mailing Address:**

Townsend International BOP's  
P.O. Box 14170  
Odessa, Texas U.S.A. 79768-4170

**Telephone/Fax/Web Site/E-Mail Address:**

Phone: 432-381-8750

Fax: 432-381-6324

Web Site: [www.townsendbops.com](http://www.townsendbops.com)

E-Mail Address: [townsend@townsendbops.com](mailto:townsend@townsendbops.com)



# TOWNSEND INTERNATIONAL BOP'S INC.

## GENERAL TERMS AND CONDITIONS OF SALE

ACCEPTANCE: ALL PRODUCTS AND SERVICES ARE SOLD OR OTHERWISE FURNISHED IN ACCORDANCE WITH THESE GENERAL TERMS AND CONDITIONS OF SALE. THESE TERMS AND CONDITIONS SUPERCEDE ALL PRIOR TERMS AND CONDITIONS AND SHALL BE THE SOLE TERMS AND CONDITIONS WHICH APPLY TO ANY SALE OR LABOR FURNISHED BY TOWNSEND. ACCEPTANCE BY BUYER OF THE PRODUCT SHALL BE DEEMED A FULL ACCEPTANCE BY BUYER FOR ALL THE TERMS AND CONDITIONS SET FORTH HEREIN.

TERMS OF PAYMENT: ALL ACCOUNTS PAYABLE ARE NET 30 DAYS, PAYABLE TO P.O. BOX 14170, ODESSA, TEXAS 79768-4170. A LATE PAYMENT CHARGE OF 1-1/2% WILL BE ADDED TO ANY OUTSTANDING BALANCE PAST DUE. PRICES SPECIFIED ARE IN U.S. CURRENCY, PAYABLE IN ODESSA, TEXAS, USA, EXCHANGE FREE OF ALL EXPENSE TO TOWNSEND FOR COLLECTION CHARGES OR EXCHANGE RATES. EXPORT TERMS REQUIRE A CONFIRMED IRREVOCABLE LETTER OF CREDIT THROUGH A PRIME U.S. BANK, UNLESS OTHERWISE SPECIFIED. NEW CUSTOMERS OR FINANCIAL CONDITIONS OF PURCHASER MAY REQUIRE CASH PAYMENT OR SATISFACTORY SECURITY BEFORE SHIPMENT.

WARRANTY: SUBJECT TO THE LIMITATIONS HEREAFTER SET FORTH, TOWNSEND WARRANTS PRODUCTS AND SERVICES SOLD BY IT TO BE FREE FROM DEFECTS IN WORKMANSHIP OR MATERIAL FOR A PERIOD OF ONE (1) YEAR FROM PURCHASE DATE ON INVOICE. THIS WARRANTY ONLY APPLIES TO NEW PREVENTERS, ACCUMULATORS, OR COMPONENT PARTS THAT HAVE BEEN SUPPLIED OR REPLACED BY TOWNSEND IN THE PROCESS OF REWORKING OR BUILDING NEW PREVENTERS OR ACCUMULATORS. TOWNSEND'S OBLIGATION UNDER THIS WARRANTY FOR ANY PRODUCT OR SERVICES FOUND BY TOWNSEND TO BE DEFECTIVE IN WORKMANSHIP OR MATERIAL IS LIMITED TO, AT TOWNSEND'S OPTION, REPAIRING OR REPLACING BY TOWNSEND, FREE OF CHARGE, F.O.B. ODESSA, TEXAS, USA, PROVIDED FURTHER THAT WRITTEN NOTICE OF SUCH DEFECT OR FAILURE IS GIVEN TO TOWNSEND WITHIN THIRTY (30) DAYS FROM THE OCCURRENCE AND SUCH PART OR PRODUCT IS RETURNED TO TOWNSEND IN ODESSA, TEXAS, USA, CARRYING CHARGES PREPAID, WITH THE SAID ONE (1) YEAR WARRANTY. IN NO EVENT SHALL TOWNSEND BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR OTHER DAMAGES OF ANY NATURE. IT IS EXPRESSLY AGREED THAT THIS WARRANTY SHALL BE VOID IF REPLACEMENT OF PARTS OR SERVICES ARE PERFORMED BY ANYONE OTHER THAN AN AUTHORIZED AGENT OF TOWNSEND, AND TOWNSEND WILL NOT BE LIABLE FOR SERVICES OR REPLACEMENT OF PARTS OR SERVICES PERFORMED OR AUTHORIZED IN WRITING BY ANY PARTY OTHER THAN TOWNSEND.

IN ADDITION, THIS WARRANTY SHALL NOT APPLY IF THE PRODUCT OR SERVICE HAS BEEN SUBJECT TO MISUSE, NEGLIGENCE, ACCIDENT OR HAS NOT BEEN OPERATED OR INSTALLED IN ACCORDANCE WITH TOWNSEND'S INSTRUCTIONS OR ORIGINAL MANUFACTURER'S INSTRUCTIONS, OR HAS BEEN OPERATED UNDER CONDITIONS MORE SEVERE THAN, OR OTHERWISE EXCEEDING THOSE SET FORTH IN THE SPECIFICATIONS FOR THE PRODUCTS OR SERVICE.

PRODUCTS FURNISHED BY TOWNSEND, BUT NOT MANUFACTURED BY TOWNSEND, WILL CARRY ONLY THE WARRANTY OF THE ORIGINAL MANUFACTURER OF SUCH PRODUCTS, IF ANY. TOWNSEND DOES NOT WARRANT ANY PRODUCT NOT REPLACED BY TOWNSEND, OR IT'S AUTHORIZED AGENT, IN REWORKING OF A PREVENTER, ACCUMULATOR, OR VALVE. TOWNSEND DOES NOT WARRANT ANY PRODUCT REWORKED, SUCH AS COMPLETE BLOWOUT PREVENTER, ACCUMULATOR, VALVE OR MANIFOLDS, MANUFACTURED BY OTHER ORIGINAL EQUIPMENT MANUFACTURERS, (O.E.M.), OTHER THAN SERVICES RENDERED TO THAT PIECE OF EQUIPMENT OR PARTS REPLACED IN OR TO THAT EQUIPMENT BY TOWNSEND. TOWNSEND DOES NOT IMPLY A GUARANTEE TO THE EQUIPMENT BEYOND THE REPLACEMENT OF PARTS OR SERVICES RENDERED AND ONLY GUARANTEES THAT THE PRODUCT HAS BEEN TESTED AS SET FORTH IN THE O.E.M.'S SPECIFICATIONS OR API TEST PROCEDURES.

THE LIABILITY OF TOWNSEND FOR ANY LOSS OR DAMAGE IN ANYWAY RESULTING TO BUYER OR ANY OTHER PERSON FROM ANY FAILURE OF A PRODUCT OR SERVICE TO CONFORM TO ORDER OR SPECIFICATIONS, OR ANY ACCOUNT BREACH OF WARRANTY, OR NEGLIGENCE OR FAILURE TO CONFORM TO ANY STANDARD OR CARE IN ANYTHING DONE OR OMITTED BY TOWNSEND, ANY EMPLOYEE OR AGENT, SHALL NOT, IN ANY EVENT, EXCEED THE AMOUNT WHICH TOWNSEND RECEIVED FROM BUYER FOR THE SPECIFIC PRODUCTS OR SERVICES FOUND TO BE DEFECTIVE.

TOWNSEND DISCLAIMS, TO THE FULLEST EXTENT PERMITTED BY LAW, ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE TO ANY PERSON OTHER THAN BUYER. WHERE WARRANTIES TO A PERSON, OTHER THAN BUYER AS SET FORTH HEREIN, SUBJECT TO ALL DISCLAIMERS, EXCLUSIONS AND LIMITATIONS OF WARRANTIES, ALL LIMITATIONS OF LIABILITY, AND ALL OTHER PROVISIONS SET FORTH IN THE TERMS AND CONDITIONS SET FORTH HEREIN TO ANY AND ALL PERSONS TO WHOM BUYER SELLS, LEASES OR OTHERWISE FURNISHES THE PRODUCTS AND OR SERVICES PROVIDED BY TOWNSEND AND BUYER AGREES TO INDEMNIFY TOWNSEND FOR ANY LIABILITY, LOSSES, COST AND ATTORNEY'S FEES TOWNSEND BY INCUR BY WHICH REASON, IN WHOLE OR IN PART, OF FAILURE OF BUYER TO TRANSMIT THE TERMS AND CONDITIONS AS PROVIDED HEREIN.

TOWNSEND DOES NOT WARRANT THAT IT'S PRODUCTS OR SERVICES MEET THE SPECIFIC REQUIREMENTS OF ANY SAFETY CODE OF AND STATE, MUNICIPALITY OR OTHER JURISDICTION OR THAT PRODUCTS WILL PERFORM AS ANTICIPATED OR DESIRED BY BUYER. LESSEE OR USER AND BUYER, LESSEE AND/OR ASSUMES ALL RISK AND LIABILITY WHATSOEVER RESULTING FROM THE USE, THEREOF, WHETHER USED SINGLY OR IN COMBINATION WITH OTHER MACHINES, APPARATUS, OR EQUIPMENT.

LIMITATION OF LIABILITY: TOWNSEND SHALL NOT BE LIABLE TO ANY EVENT FOR INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, SPECIFICALLY INCLUDING BUT NOT LIMITED TO DAMAGES OR WASTE TO UNDERGROUND MINERAL POOLS, RESERVOIRS OR DEPOSITS, OR ENVIRONMENTAL DAMAGES. TOWNSEND SPECIFICALLY DISCLAIMS ALL LIABILITY TO ANY PARTY OTHER THAN PURCHASER.

TAXES: THE PURCHASER SHALL PAY TO TOWNSEND IN ADDITION TO THE PURCHASE PRICE, THE AMOUNT OF ALL SALES, USE, PRIVILEGE, OCCUPATION, EXCISE OR OTHER TAXES, FEDERAL, STATE, LOCAL OR FOREIGN, WHICH TOWNSEND MAY BE REQUIRED TO PAY IN CONNECTION WITH FURNISHING GOODS OR SERVICES TO PURCHASER.

TOWNSEND SHALL MAINTAIN A PURCHASE MONEY SECURITY INTEREST IN THE PRODUCTS SOLD FOR ANY PORTION OF THE PURCHASE PRICE NOT PAID AT THE TIME OF DELIVERY, AND SHALL RETAIN THIS INTEREST UNTIL BUYER HAS PAID FULL PURCHASE PRICE.

TOWNSEND DOES NOT WARRANT ANY USED EQUIPMENT SOLD TO BUYER, BEYOND REQUIRED TEST TOWNSEND MAKES ON PRODUCT PURCHASED AND INSTALLED IN THE EQUIPMENT BEFORE SALE. TOWNSEND TESTS ALL USED BLOWOUT PREVENTERS PRIOR TO SALE PER STANDARD TEST PROCEDURES OF ORIGINAL EQUIPMENT MANUFACTURER. BLOWOUT PREVENTERS, ACCUMULATORS, VALVES AND MANIFOLDS SOLD BY TOWNSEND THAT ARE USED WILL BE SOLD AS USED EQUIPMENT, UNLESS OTHERWISE SPECIFIED AT POINT OF SALE. TOWNSEND DOES NOT GUARANTEE OTHER ORIGINAL EQUIPMENT MANUFACTURERS EQUIPMENT, ONLY THAT THE EQUIPMENT WILL TEST PER MANUFACTURERS SPECIFICATIONS AT TIME OF SALE. TOWNSEND MAKES ON CLAIMS IMPLIED OR OTHERWISE ON USED EQUIPMENT OTHER THAN WARRANTING PARTS AND SERVICES FURNISHED BY TOWNSEND WHEN EQUIPMENT WAS REWORKED.

DELIVERY: TOWNSEND RESPONSIBILITY CEASES UPON DELIVERY TO A COMMON CARRIER AT OUR SHIPPING DOCK IN ODESSA, TEXAS, USA. TOWNSEND ENDEAVORS TO SHIP ALL MATERIALS WITHIN THE TIME PROMISED, BUT DOES NOT GUARANTEE TO DO SO. NO CLAIMS FOR DAMAGES OR DELAYS ON ACCOUNT OF TOWNSEND'S FAILURE TO DELIVER OR SHIP WILL BE ALLOWED UNLESS PRE-AGREED BY TOWNSEND AND THE PROMISED DATE OF DELIVERY OR SHIPMENT IS SPECIFICALLY AGREED UPON AND CONFIRMED BY TOWNSEND IN WRITING. PROVIDED, HOWEVER, ALL AGREEMENTS ARE SUBJECT TO DELAYS CAUSED BY STRIKES, LOCKOUTS, ACCIDENTS, FIRE, OR OTHER CASUALTY, ACTS OF GOD, WAR, INSURRECTION, THE ELEMENTS, SHORTAGE OF MATERIALS OR LABOR IN THE OPEN MARKET, GOVERNMENTAL ORDER OR RESTRICTIONS AND CIRCUMSTANCES BEYOND TOWNSEND'S CONTROL. ALL MATERIALS ARE PACKAGED TO THE BEST OF TOWNSEND'S ABILITY TO THAT THEY WILL NOT BREAK, RUST, OR DETERIORATE IN TRANSIT, BUT TOWNSEND DOES NOT GUARANTEE AGAINST SUCH DAMAGE.

RISK OF LOSS, SECURITY: THE PURCHASER SHALL BEAR ALL RISK OF LOSS OF OR DAMAGE TO THE EQUIPMENT AFTER DELIVERY TO TRANSPORTATION FACILITY AT SHIPPING POINT. PURCHASER AGREES TO PERFORM ALL ACTS NECESSARY TO PERFECT AND ASSURE SUCH SECURITY INTEREST ARE THE REQUEST OF TOWNSEND.

QUOTATIONS: REQUEST FOR QUOTATIONS ON PRODUCTS FOR SHIPMENT SHOULD BE SENT TO TOWNSEND INTERNATIONAL BOP'S, INC., P.O. BOX 14170, ODESSA, TEXAS 79768. BY FAX TO (432) 381-6324, BY E-MAIL [townsend@townsendbops.com](mailto:townsend@townsendbops.com). ALL QUOTATIONS AND SALES ARE F.O.B. POINT OF SHIPMENT UNLESS OTHERWISE EXPRESSLY STIPULATED. QUOTATIONS ARE FOR IMMEDIATE ACCEPTANCE, UNLESS A DEFINITE PERIOD OF TIME IS STATED WITHIN WHICH ACCEPTANCE MAY BE MADE. UNLESS OTHERWISE AGREED IN WRITING, LITHARGE, WHARFAGE OR LANDING CHARGES, DUES, DUTIES, OR ANY OTHER CHARGES AT DESTINATION ARE NOT INCLUDED IN QUOTATIONS OR INDICATED BY ANY PRICE LIST. ALL PRICES AND DISCOUNTS, NOW IN EFFECT, OR HEREAFTER ISSUED, ARE SUBJECT TO CHANGE WITHOUT NOTICE. QUOTATIONS ARE GOOD FOR THIRTY (30) DAYS. ANY QUOTATION OVER THIRTY (30) DAYS OLD SHOULD BE RE-QUOTED.

PURCHASE ORDERS: ANY PURCHASE ORDER RECEIVED BY TOWNSEND SHALL BE CONSTRUED AS ACCEPTANCE OF OUR OFFER TO SELL AND SHALL BE FILLED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SALE SET FORTH HEREIN. PURCHASE ORDERS, ONCE PLACED AND ACCEPTED BY TOWNSEND, CAN BE CANCELLED ONLY WITH TOWNSEND'S WRITTEN CONSENT AND UPON TERMS WHICH SHALL SAVE TOWNSEND FROM LOSS. UPON ACCEPTING CANCELLATION OF A PURCHASE ORDER, THE PURCHASER WILL BE LIABLE FOR ANY LABOR CHARGES, FULL VALUE OF MATERIALS PURCHASED AND USED BY TOWNSEND IN PREPARING FOR ORDER. PURCHASER WILL ALSO BE LIABLE FOR ANY AND ALL MATERIALS OR PRODUCTS PURCHASED BY TOWNSEND THAT CANNOT BE RETURNED TO OTHER VENDORS. PURCHASER WILL ALSO BE LIABLE FOR ALL ELECTRICAL AND MACHINE SHOP LABOR PERFORMED ON EQUIPMENT AND ANY MOTOR FREIGHT AND HOT SHOT CHARGES IN PURCHASING OR RETURNING COMPONENTS. TOWNSEND RESERVES THE RIGHT TO REFUSE CANCELLATION OF PURCHASE ORDERS AND PURCHASER AGREES TO PAY FOR ANY AND ALL FINISHED MATERIALS READY FOR SHIPMENT WHEN SHIPMENT IS HELD UP PURSUANT TO CUSTOMER'S WRITTEN INSTRUCTIONS FOR OTHER REASONS BEYOND TOWNSEND'S CONTROL.

INSURANCE: TOWNSEND WILL PLACE INSURANCE AS NEARLY AS POSSIBLE IN ACCORDANCE WITH THE WRITTEN INSTRUCTIONS OF CUSTOMER, AT CUSTOMER'S EXPENSE, BUT TOWNSEND WILL ASSUME NO LIABILITY FOR THE PLACING OF SUCH INSURANCE OR AS TO THE ULTIMATE RECOVERY IN CASE OF BREAKAGE, DAMAGE, OR LOSS.

CONSULAR INVOICES: NO CONSULAR FEES FOR LEGALIZING INVOICES, STAMPING BILLS OF LADING, OR OTHER DOCUMENTS REQUIRED BY THE LAWS OF ANY COUNTRY OR DESTINATION ARE INCLUDED IN QUOTATIONS OR SELLING PRICES. IF INSTRUCTED IN WRITING, TOWNSEND WILL TAKE OUT CONSULAR DOCUMENTS AND MAKE DECLARATIONS AS AGENT OF THE PURCHASER, BUT ASSUME NO RESPONSIBILITY FOR ANY FINES OR OTHER CHARGES IMPOSED DUE TO ERRORS OR INCORRECT DECLARATIONS.

CHANGE OF DESIGN: TOWNSEND EXPRESSLY RESERVES THE RIGHT TO CHANGE OR MODIFY THE DESIGN AND CONSTRUCTION OF ANY PRODUCT, IN DUE COURSE OF OUR MANUFACTURING PROCEDURES, WITHOUT INCURRING ANY OBLIGATION OR LIABILITY OR INSTALL SUCH CHARGES. MODIFICATIONS OR IMPROVEMENTS ON PRODUCTS PREVIOUSLY OR SUBSEQUENTLY SOLD.

GENERAL TERMS: THESE GENERAL TERMS AND CONDITIONS AND SPECIAL CONDITIONS WHICH MAY APPLY SHALL BE CONSTRUED UNDER AND GOVERNED BY THE LAWS OF



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*"The B.O.P. People"*

## TYPE 84 ANNULAR TYPE BOP

### DIMENSIONS & SPECIFICATION DATA



16A - 0051

For inquiries and a complete listing of Blowout Preventers and Accumulators, visit our website at <http://www.townsendbops.com>

DIMENSIONS								
SIZE		7-1/16 X 3M	7-1/16 X 5M	9 X 3M	9 X 5M	11 X 3M	11 X 5M	13-5/8 X 3M
OVERALL HEIGHT LESS STUDS (STUDDED TOP)	STUDDED BOTTOM	27-3/4"	30-3/4"	32-3/4"	33"	34-1/4"	39-5/8"	39-3/8"
	FLANGED BOTTOM	32"	33-1/2"	37-3/4"	38"	39-1/4"	47-3/4"	45-1/4"
OVERALL WIDTH	BODY ONLY	26"	26"	28"	28"	33-3/4"	37-1/2"	40-1/2"
	WITH LIFT EYES	32"	32"	34-1/2"	34-1/2"	40-3/8"	44-1/4"	47-1/2"
OPENING THROUGH PREVENTER		7-1/16"	7-1/16"	9"	9"	11"	11"	13-5/8"
WORKING PRESSURE (LBS.)		3,000	5,000	3,000	5,000	3,000	5,000	3,000
TEST PRESSURE (LBS.)		6,000	10,000	6,000	10,000	6,000	10,000	6,000

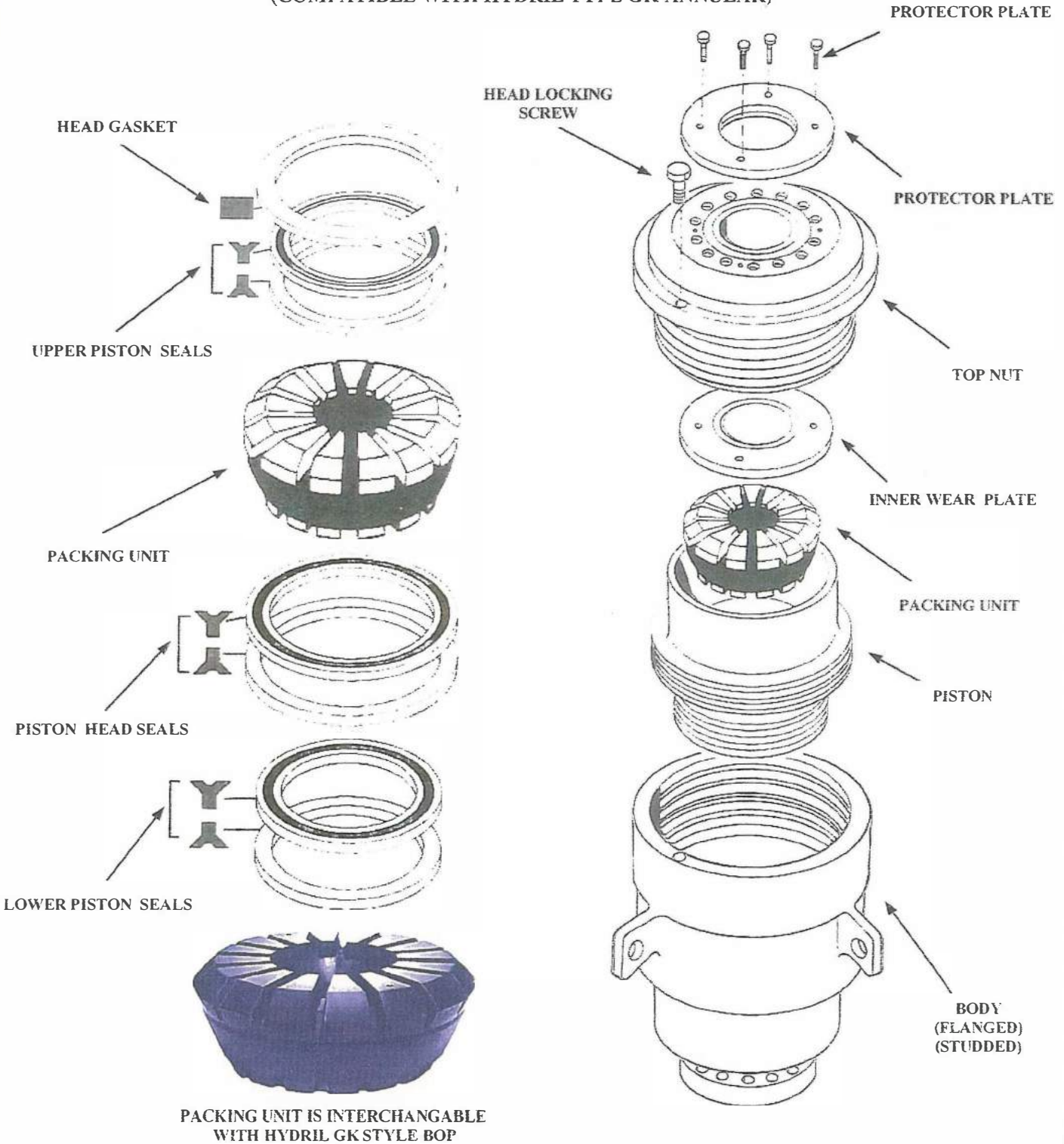
BOP CAPACITIES							
SIZE	7-1/16 X 3M	7-1/16 X 5M	9 X 3M	9 X 5M	11 X 3M	11 X 5M	13-5/8 X 3M
MAXIMUM OPERATING PRESSURE (TO OPEN & CLOSE) (PSI)	1,500	1,500	1,500	1,500	1,500	1,500	1,500
RECOMMENDED OPERATING PSI (TO OPEN & CLOSE) (PSI)	1,500	1,500	1,500	1,500	1,500	1,500	1,500
VOLUME OF FLUID TO OPEN (U.S. GALLONS)	2.24	2.24	3.41	3.41	5.54	7.98	8.94
VOLUME OF FLUID TO CLOSE	2.85	3.85	4.33	6.84	7.43	9.81	11.36
PISTON STROKE (INCHES)	4-1/18"	4-1/2"	5-3/4"	5-3/4"	6-1/8"	7-1/8"	7-1/8"

WEIGHTS								
SIZE		7-1/16 X 3M	7-1/16 X 5M	9 X 3M	9 X 5M	11 X 3M	11 X 5M	13-5/8 X 3M
	STUDDED	2,500	3,540	3,420	3,500	5,300	7,800	8,526
	FLANGED	2,675	3,940	3,560	3,650	5,450	8,250	8,775



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**TOWNSEND TYPE 84 ANNULAR BOP**  
(COMPATIBLE WITH HYDRIL TYPE GK ANNULAR)



**PACKING UNIT IS INTERCHANGABLE  
WITH HYDRIL GK STYLE BOP**

HYDRIL GK is a registered trademark of its respective company. TOWNSEND INTERNATIONAL BOP is not affiliated with this company.



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## INTRODUCTION

THE PURPOSE OF THIS MANUAL IS TO GIVE THE OPERATOR A BETTER UNDERSTANDING OF THE "**TYPE 84**" ANNULAR BLOWOUT PREVENTER AND TO FAMILIARIZE THE OPERATOR WITH THE COMPONENT PARTS AND OPERATION OF THE PREVENTER. PROPER MAINTENANCE WILL HELP DETECT PERFORMANCE DEVIATIONS BEFORE PROBLEMS OCCUR DURING A WELL CONTROL SITUATION.

THE AMERICAN PETROLEUM INSTITUTE RECOMMENDS PRACTICES RP-53 ON BLOWOUT PREVENTION. A COPY OF THIS PROCEDURE CAN BE OBTAINED FROM THE AMERICAN PETROLEUM INSTITUTE. TOWNSEND'S "**TYPE 84**" ANNULAR BLOWOUT PREVENTERS ARE MANUFACTURED UNDER THE AMERICAN PETROLEUM INSTITUTE SPECIFICATION 16-A.

ADDITIONAL INFORMATION IS AVAILABLE IN THE FOLLOWING PUBLICATIONS:

1. THE TOWNSEND GENERAL CATALOG
2. AMERICAN PETROLEUM INSTITUTE (PRACTICES RP-53) ON BLOWOUT PREVENTION
3. AMERICAN PETROLEUM INSTITUTE SPECIFICATION 16-A
4. NATIONAL ASSOCIATION OF CORRECTION ENGINEERS (STANDARD MR-01-75)

THE MOST ECONOMICAL SEQUENCE FOR TEST AND INSPECTION PROCEDURES SHOULD BE CONSISTENT WITH SAFE RIG OPERATIONS.

THE MAINTENANCE OF TOWNSEND'S "**TYPE 84**" ANNULAR BLOWOUT PREVENTER IS DESIGNED TO COINCIDE WITH A NORMAL RIG MOVE OR WHEN THE RIG IS BEING OVERHAULED.

THE TOWNSEND "**TYPE 84**" ANNULAR BLOWOUT PREVENTER IS DESIGNED TO SEAL IN AN OPEN HOLE SITUATION OR CLOSE AROUND ANY SIZE DRILL PIPE BY COMPRESSING RUBBER AGAINST THE PIPE UNTIL IT SEALS OFF.

TOWNSEND INTERNATIONAL BOPS MANUFACTURES THE "**TYPE 84**" ANNULAR PREVENTER IN FLANGE OR STUDDED VERSIONS . THE "**TYPE 84**" ANNULAR BLOWOUT PREVENTERS ARE AVAILABLE IN 7-1/16" 3M & 5M , 9" X 3M & 5M , 11" X 3M, 11" X 5M, 13-3/8" X 3M AND 13-5/8" X 5M PRESSURE RATINGS.

**THE BEST PREVENTATIVE IS A GOOD MAINTENANCE PROGRAM.**



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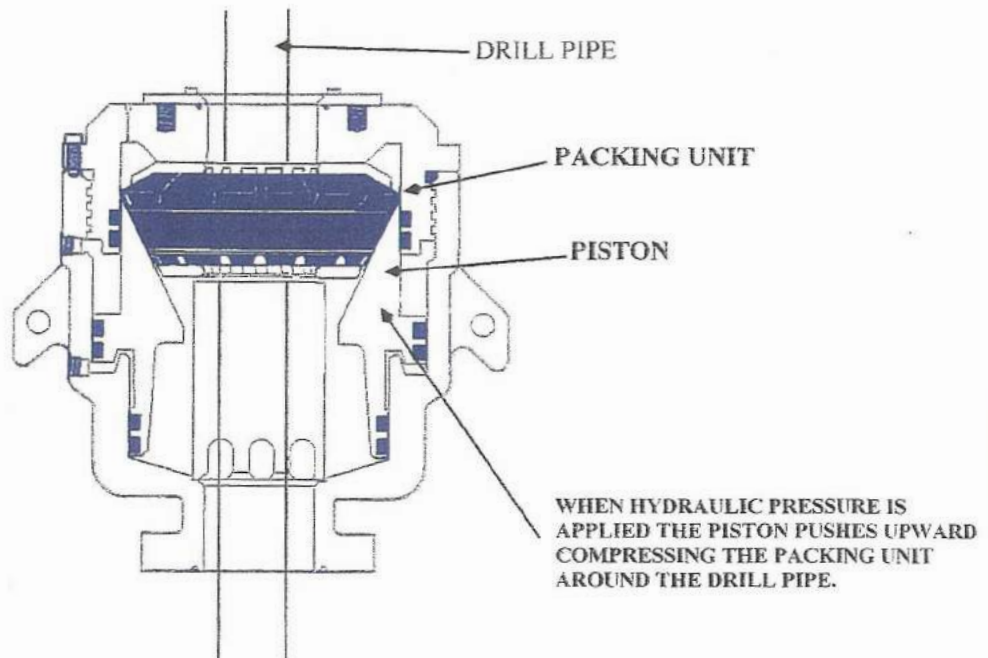
## BASIC OPERATION

WHEN THE TOWNSEND "TYPE 84" ANNULAR PREVENTER IS IN THE OPEN POSITION, THE PACKING UNIT WILL HAVE FULL BORE CLEARANCE TO ALLOW FOR LARGE TOOLS TO PASS THROUGH. EACH TIME THE PREVENTER IS CLOSED AND RELEASED, THE PACKING UNIT WILL RETURN TO THE FULL OPEN BORE POSITION.

WHEN THE HYDRAULIC PRESSURE IS APPLIED TO THE PISTON CHAMBER, IT PUSHES THE PISTON UPWARD CAUSING THE PACKING UNIT TO COMPRESS BECAUSE OF THE TAPERED INTERIOR OF THE PISTON. THE COMPRESSED RUBBER HAS NO WHERE TO GO BUT UPWARD THROUGH THE TOP OPEN BORE OF THE UNIT AND TOWARDS THE DRILL PIPE. ONCE THE WELL BORE PRESSURE COMES INTO CONTACT WITH THE COMPRESSED PACKING UNIT, IT WILL INCREASE THE CLOSING FORCE, REINFORCING THE SEAL OF THE UNIT COMPRESSING AGAINST THE DRILL PIPE.

MOST CLOSING UNITS IN THE FIELD HAVE A SEPARATE "MANUAL REGULATOR VALVE" (MR VALVE) TO REGULATE ACCUMULATOR VOLUME TO OPERATE THE TOWNSEND "TYPE 84" ANNULAR PREVENTER.

THE CLOSING TIME OF THE "TYPE 84" ANNULAR CAN BE REGULATED BY THE RATE OF FLOW OF THE HYDRAULIC FLUID FROM THE ACCUMULATOR TO THE PREVENTER. THE SHORTER THE DISTANCE AND LARGER THE LINES FROM THE ACCUMULATOR ALONG WITH THE VOLUME OF FLUID AVAILABLE FROM THE UNIT HAS A BEARING ON THE TIME IT TAKES THE UNIT TO CLOSE.





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## PACKING UNIT SELECTION

TOWNSEND'S "TYPE 84" PACKING UNITS AND SEALS ARE MANUFACTURED UNDER TOWNSEND'S STRICT QUALITY PROGRAM. TOWNSEND'S PACKING UNIT AND SEAL COMPOUND IS SPECIALLY FORMULATED TO PERFORM UNDER FIELD OPERATIONS.

TOWNSEND IS ONE OF ONLY TWO MANUFACTURERS THAT MAKES EACH SET OF SEALS OVERSIZE AND THEN GROUND BACK TO PROPER SIZE TO CONFIRM THAT UNIFORMITY IS IN EACH SEAL THAT IS PLACED INTO OPERATION. THE PACKING UNIT COMPOUND THAT IS USED BY TOWNSEND HAS BEEN FORMULATED OVER THE PAST 30 YEARS TO CONFORM TO THE DIFFERENT APPLICATIONS OF THE "TYPE 84" ANNULAR BOP. THESE SPECIALLY FORMULATED COMPOUNDS CREATE THE BACKBONE BEHIND THE SUCCESS OF THE TOWNSEND PACKING UNIT AND ADDS TO THE STRENGTH AND DURABILITY OF THE "TYPE 84" ANNULAR ITSELF.

EACH PACKING UNIT HAS FLANGED STEEL SEGMENTS TO ANCHOR THE PACKING UNIT AND CONTROL THE FLOW OF RUBBER AS THE HYDRAULIC PRESSURE IS ADDED TO THE PISTON AND FORCES THE RUBBER TO MOVE UPWARD THROUGH THE BORE CAVITY AND INWARD TOWARDS THE DRILL PIPE TO SEAL.

ALL PACKING UNITS ARE SUBJECT TO WEAR EACH TIME THEY ARE CLOSED, WEAKENING THE RUBBER EACH TIME IT IS PRESSURED UP ON. TOWNSEND'S DESIGN AND UNIQUE COMPOUND SELECTION DETERS THIS WEAR AS LONG AS POSSIBLE. MOST CLOSURE WEAR IS ON THE INSIDE OF THE PACKING UNIT AND STRIPPING WEAR OCCURS IN THE INSIDE BORE OF THE UNIT.

ALL TOWNSEND PACKING UNITS ARE TESTED AT THE FACTORY BEFORE THEY ARE PACKAGED FOR SALE AND ARE TESTED AGAIN WHEN INSTALLED INTO A NEW "TYPE 84" ANNULAR BOP TO CONFIRM TOWNSEND'S COMMITMENT TO QUALITY. EACH UNIT IS SERIAL NUMBERED FOR TRACTABILITY TO CONFIRM BATCH OF RUBBER EACH UNIT WAS MADE FROM AND DATE OF MANUFACTURE.

TOWNSEND'S PACKING UNITS ARE AVAILABLE IN NATURAL RUBBER, NITRILE RUBBER AND NEOPRENE RUBBER.

**NATURAL RUBBER** IS COMPOUNDED FOR DRILLING WITH WATER-BASE DRILLING FLUIDS. THE UNIT CAN BE OPERATED IN TEMPERATURES -30° TO 255° F (35° C TO 107° C). THE NATURAL RUBBER PACKING UNIT IS IDENTIFIED WITH "NR" IN THE SERIAL NUMBER ON TOP OF ONE OF THE METAL INSERTS.



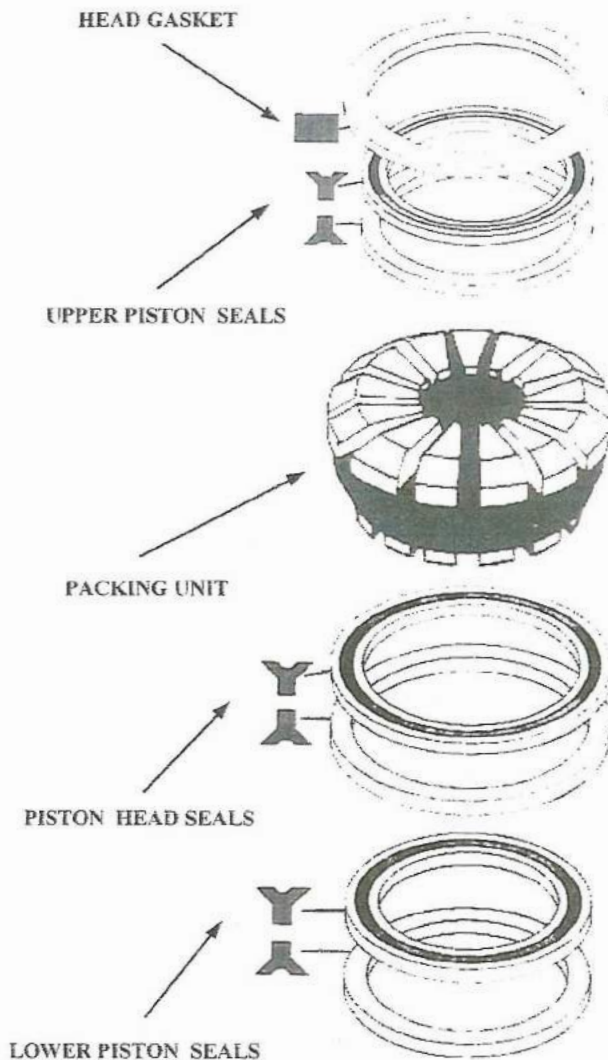


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## PACKING UNIT SELECTION (CONTINUED)

**NITRILE RUBBER** IS COMPOUNDED FOR DRILLING WITH OIL-BASE DRILLING FLUIDS. THE UNIT CAN BE OPERATED IN TEMPERATURES BETWEEN 20° F TO 190° F (-7° C TO 88° C). THE NITRILE PACKING UNIT IS IDENTIFIED WITH "NBR" IN THE SERIAL NUMBER ON TOP OF ONE OF THE METAL INSERTS.

**NEOPRENE RUBBER** IS FOR LOW-TEMPERATURE OPERATION SERVICE IN OIL-BASE DRILLING FLUIDS. THE COMPOUND IS FORMULATED TO OPERATE IN TEMPERATURES BETWEEN -30° F TO +170° F (-35° C TO 77° C). NEOPRENE RUBBER IS ALSO DETRIMENTALLY AFFECTED BY EXTENDED HIGH PRESSURE APPLICATIONS. THE NEOPRENE UNIT IS IDENTIFIED WITH "CR" IN THE SERIAL NUMBER ON TOP OF ONE OF THE METAL INSERTS.





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## INSTALLATION OF PACKING UNIT

TO REPLACE THE PACKING UNIT IN A "TYPE 84" ANNULAR FOLLOW THE FOLLOWING PROCEDURE:

1. REMOVE THE HEAD LOCKING SCREW. (MARKING THE LOCATION TO THE HEAD LOCKING SCREW HOLE ON THE SIDE OF THE OUTER BODY WILL HELP REALIGN WHEN REPLACING THE CAP.)
2. UNSCREW THE TOP CAP BY TURNING IT COUNTER CLOCKWISE. A CHEATER BAR WILL BE REQUIRED TO PLACE BETWEEN TWO EYE BOLTS PLACED IN STUD HOLES 180° APART FROM EACH OTHER. THE CHEATER BAR WILL TORQUE UP AGAINST THE SIDE OF THE EYE BOLTS.

**THE TOP CAP MAY BE DIFFICULT TO REMOVE BECAUSE IT WAS NOT GREASED PROPERLY BEFORE IT'S LAST ASSEMBLY OR MAY BE FROZEN IN PLACE BECAUSE OF TRASH OR RUST. A CATLINE OR WENCH MAY BE REQUIRED TO ADD ADDITIONAL TORQUE TO BREAK THE CAP LOOSE. (SAFETY SHOULD ALWAYS BE A CONCERN WHEN ADDING THIS ADDITIONAL TORQUE TO BREAK THE CAP LOOSE.)  
 DO NOT HEAT THE HEAD WITH A TORCH.**

3. ONCE TOP CAP IS LOOSE FROM THE THREADS IN THE PREVENTER BODY, REMOVE IT FROM THE BOTTOM BOWL USING THE TWO INSERTED EYE BOLTS. BE SURE THAT EYE BOLTS ARE SECURELY SCREWED INTO TOP CAP BEFORE LIFTING.
4. REMOVE THE DAMAGED OR WORN PACKING UNIT FROM THE BOTTOM BOWL USING TWO LIFTING EYES THAT MATCH UP WITH THREADS ON TOP OF THE UNIT.
5. INSPECT THE PISTON BOWL AND LUBRICATE WITH GREASE BEFORE PLACING NEW UNIT BACK INTO THE BOWL AREA.
6. CLEAN THE TOP OF THE CAP, INCLUDING THE THREADS AROUND THE CAP AND THE INTERNAL THREADS ON THE TOP OF THE BODY . ALSO GREASE THE THREADS IN THE BODY AND ON THE CAP WITH A ZINC BASE API TOOL JOINT LUBRICANT.
7. THE PACKING UNIT SHOULD BE SITTING EVENLY IN THE PISTON BOWL AND NOT COCKED TO ONE SIDE OR THE OTHER BEFORE REPLACING THE TOP CAP. BEFORE REPLACING THE TOP CAP, INSPECT THE HEAD LOCKING SCREW HOLE TO CONFIRM THAT THREADS ARE IN GOOD CONDITION AND HAVE BEEN GREASED AND FREE FROM TRASH.
8. REPLACE THE TOP CAP AND TIGHTEN CLOCKWISE UNTIL THE LOCKING SCREW BOLT HOLE ON THE CAP LINES UP WITH THE BOLT HOLE ON TOP OF THE BODY, AND INSTALL THE HEAD LOCKING SCREW AND CONFIRM IT IS TIGHT.



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## PREVENTER PRE-INSTALLATION INSPECTION

1. PRIOR TO INSTALLATION, CLEAN AND TEST THE ANNULAR PREVENTER BEFORE BEING PLACED INTO OPERATION OR MOVED TO ANOTHER JOB. PROLONG INTERVALS OF NON-OPERATION WILL CAUSE SEALS TO FREEZE UP AND POSSIBLY LOCK UP THE PREVENTER. (ALWAYS STORE THE ANNULAR PREVENTER IN AN UPRIGHT POSITION TO PREVENT UNDO STRESS ON INTERNAL SEALS FROM THE WEIGHT OF THE PISTON.
2. VISUALLY INSPECT THE BORE OF THE ANNULAR PREVENTER TO CONFIRM THAT THERE IS NO DAMAGE TO THE PACKING UNIT AND THAT THE RUBBER DOES NOT HAVE LARGE CHUNKS OF RUBBER MISSING FROM THE BORE OR IS CRACKED FROM THE WEATHER.
3. INSPECT FOR DAMAGE TO THE TOP AND BOTTOM RING GROOVE ON THE PREVENTER. CLEAN RING GROOVES PRIOR TO PLACING RING GASKET IN GROOVE WITH EMERY CLOTH AND LIGHTLY OIL. ALWAYS REPLACE RING GASKETS WHEN PREVENTER IS REMOVED OR PLACED ON WELLHEAD OR A JOINTING FLANGE.
4. INSPECT THE TOP BOLT HOLES IN THE TOP NUT TO CONFIRM THAT ALL STUD HOLES ARE FREE FROM TRASH AND ALL THREADS ARE IN GOOD CONDITION. REPLACE ANY STUDS AND NUTS THAT ARE MISSING. ALSO INSPECT THE BOTTOM STUD BOLTS IF THE ANNULAR HAS A STUDDED BOTTOM.
5. INSPECT THE THE STUDS AND NUTS ON TOP AND BOTTOM OF THE PREVENTER TO CONFIRM THREADS ARE NOT DAMAGED. CONFIRM THAT ALL STUDS ARE TIGHT WHEN BOP IS PLACED OVER THE HOLE AND ATTACHED TO CONNECTING FLANGE..
6. INSPECT THE OPEN AND CLOSE PORT HOLES TO CONFIRM THAT THEY ARE CLEAN AND HAVE BEEN PLUGGED WHILE BEING STORED TO PREVENT TRASH FROM COMPROMISING THE INTEGRITY OF THE PREVENTER. DO NOT STICK RAGS IN THE OPEN AND CLOSE PORTS WHEN PLACING IN STORAGE. CONFIRM THAT THREADS ON CONNECTIONS ARE IN GOOD CONDITION.



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## INSTALLATION OF THE PREVENTER

1. BEFORE PLACING THE "TYPE 84 ANNULAR PREVENTER OVER THE HOLE, INSPECT THE INTERIOR BORE OF THE PACKING UNIT TO CONFIRM THAT IT IS IN FULL OPEN HOLE POSITION AND IS NOT COMPRESSED OUT INTO THE WELL BORE.
2. TOWNSEND HAS PROVIDED LIFTING EARS ON THE SIDE OF THE PREVENTER TO HELP LIFT THE PREVENTER OVER THE WELL BORE. JUST BEFORE PLACING THE ANNULAR PREVENTER OVER THE WELL BORE, PLACE A NEW RING GASKET IN THE FLANGE BETWEEN PREVENTER BODY AND THE FLANGE IT IS TO BE ATTACHED TO. INSPECT RING GASKET GROOVES IN BOTH FLANGES TO CONFIRM THEY ARE NOT DAMAGED AND FREE FROM TRASH AND RUST. CLEAN THE RING GROOVES WITH EMERY CLOTH IF NECESSARY.
3. TIGHTEN ALL BOLTS AND NUTS ACCORDINGLY. ONCE ALL NUTS ARE PLACED ON BOLTS AND HAND TIGHTENED, BEGIN TIGHTENING NUTS WITH A WRENCH OR IMPACT. TIGHTEN ONE NUT FIRMLY AND THEN CROSS OVER 180 DEGREES TO THE OTHER SIDE OF THE FLANGE TO TIGHTEN THE OPPOSITE NUT. ONCE THIS NUT IS TIGHTENED, CROSS OVER 90 DEGREES AND BEGIN TIGHTENING THE NEXT NUT, THEN CROSS OVER 180 DEGREES FROM THAT NUT TO THE OPPOSITE SIDE TO TIGHTEN THAT NUT. (GOOD EXAMPLE IS NORTH, SOUTH AND EAST WEST.) ONCE THE FOUR CORNER NUTS HAVE BEEN TIGHTENED, TIGHTEN ALL REMAINING NUTS GOING CLOCKWISE. RE-CHECK EACH NUT AS YOU GO CLOCKWISE AROUND THE FLANGE.

EACH NUT SHOULD HAVE THE FOLLOWING TORQUE POUNDS OF FOOT PRESSURE.

7-1/16 X 3M FLANGE CONNECTION	-	1-1/8" BOLT	-	704 POUNDS OF TORQUE
7-1/16 X 5M FLANGE CONNECTION	-	1-3/8" BOLT	-	1,321 POUNDS OF TORQUE
9" X 3M FLANGE CONNECTION	-	1-3/8" BOLT	-	1,321 POUNDS OF TORQUE
9" X 5M FLANGE CONNECTION	-	1-5/8" BOLT	-	2,582 POUNDS OF TORQUE
11" X 3M FLANGE CONNECTION	-	1-3/8" BOLT	-	1,321 POUNDS OF TORQUE
11" X 5M FLANGE CONNECTION	-	1-7/8" BOLT	-	4,002 POUNDS OF TORQUE
13-3/8" X 3M FLANGE CONNECTION	-	1-3/8" BOLT	-	1,321 POUNDS OF TORQUE
13-5/8" X 5M FLANGE CONNECTION	-	1-5/8" BOLT	-	2,582 POUNDS OF TORQUE

**PERFORM A WELL BORE PRESSURE TEST BEFORE PLACING THE ANNULAR PREVENTER INTO SERVICE**



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## OPERATION OF PREVENTER

1. MOVE THE SELECTOR SWITCH ON THE CLOSING UNIT TO THE CLOSE POSITION. THE HYDRAULIC PRESSURE WILL PUSH THE INTERNAL PISTON UPWARD COMPRESSING THE PACKING UNIT AROUND THE DRILL PIPE.
2. TO RETURN THE PACKING UNIT TO OPEN HOLE POSITION, MOVE THE SELECTOR SWITCH ON THE CLOSING UNIT TO THE OPEN POSITION.
3. MOST ACCUMULATORS ARE EQUIPPED WITH MANUAL REGULATOR VALVE (MR VALVE) WHICH IS USED TO REDUCE THE ACCUMULATOR FLUID PRESSURE TO A MAXIMUM OF 1500 PSI FOR THE OPERATION OF THE ANNULAR PREVENTER. PRESSURE SETTINGS ON THE ANNULAR ARE VERY IMPORTANT TO PROLONG THE LIFE OF THE ELEMENT IN THE PREVENTER. IT IS NECESSARY TO FOLLOW THE MANUFACTURERS RECOMMENDATION AS TO THE MAXIMUM OPERATING PRESSURE WHEN CONTROLLING THE WELL AND DURING STRIPPING OPERATIONS. IF THE ANNULAR REGULATOR VALVE IS MANUALLY OPERATED ALWAYS CHECK THE ANNULAR PRESSURE GAUGE ON THE ANNULAR REGULATOR.

### CAUTION

**IF THE PACKING UNIT DOES NOT FULLY RETRACT FROM THE WELL BORE, THE UNIT CAN BE DAMAGED WHILE DRILLING OR PREVENT LARGE TOOLS FROM BEING INSERTED INTO BORE CAVITY.**



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## MAINTENANCE

**THE TOWNSEND "TYPE 84" ANNULAR BLOWOUT PREVENTER REQUIRES A MINIMUM AMOUNT OF MAINTENANCE. HOWEVER; IT IS IMPORTANT TO PERFORM MAINTENANCE ON ALL BLOWOUT PREVENTERS TO PREVENT UNFORESEEN DEVIATIONS IN A WELL CONTROL SITUATION.**

### TYPE 84 ANNULAR BOP PRE-SERVICE DISASSEMBLY & ASSEMBLY

TOWNSEND SUGGEST THAT THE OPERATOR SHOULD CLEAN AND LUBRICATE ALL PARTS AND SEALS WHEN ASSEMBLING OR REPLACING SEALS OR A PACKING UNIT. IT IS MORE ECONOMICAL TO CHANGE ALL SEALS WHEN REPAIRING THE PREVENTER. (IF A PARTICULAR SEAL IS WEAK, THE OTHERS MOST LIKELY NEED TO BE REPLACED ALSO.)

NEVER PERFORM WELDING ON THE ANNULAR PREVENTER IN THE FIELD SINCE THE TYPE 84 ANNULAR IS A PRESSURE VESSEL. IT WILL PUT UNDO STRESS ON THE PREVENTER BODY. ANY WELDING PERFORMED ON THE PREVENTER SHOULD BE IN A SHOP ENVIRONMENT AND SHOULD BE PROPERLY STRESS RELIEVED.

ONCE THE "TYPE 84" ANNULAR PREVENTER HAS BEEN REPAIRED AND REASSEMBLED, IT SHOULD BE SHOP TESTED TO CONFIRM ALL COMPONENT PARTS ARE OPERATING PROPERLY.

### DISASSEMBLY & ASSEMBLY (REFER TO EXPLODED OF THE "TYPE 84" BLOWOUT PREVENTER)

1. REMOVE THE HEAD LOCKING SCREW FROM THE PREVENTER. MARKING THE LOCATION OF THE HEAD LOCKING SCREW HOLE ON THE OUTSIDE OF THE OUTER BODY WILL HELP REALIGN SCREW HOLES WHEN REASSEMBLING. (ITEM 3)

THE TOP CAP MAY BE DIFFICULT TO REMOVE BECAUSE OF IMPROPER GREASING BEFORE ITS LAST ASSEMBLY OR MAY BE FROZEN IN PLACE BECAUSE OF TRASH OR RUST. A CATLINE OR WENCH MAY BE REQUIRED TO ADD ADDITIONAL TORQUE TO BREAK THE CAP LOOSE. (SAFETY SHOULD ALWAYS BE A CONCERN WHEN ADDING THIS ADDITIONAL TORQUE TO BREAK THE CAP.) DO NOT HEAT THE HEAD WITH A TORCH.



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## MAINTENANCE DISASSEMBLY & ASSEMBLY CONTINUED

2. UNSCREW THE TOP CAP BY TURNING IT COUNTER CLOCKWISE. A CHEATER BAR WILL BE REQUIRED TO PLACE BETWEEN TWO EYE BOLTS TO UNSCREW THE CAP. PLACE EYE BOLTS 180° APART FROM EACH OTHER. THE CHEATER BAR WILL TORQUE UP AGAINST EACH SIDE OF THE EYE BOLTS. (ITEM 4)
3. ONCE THE TOP CAP IS LOOSE FROM THE THREADS IN THE PREVENTER BODY, REMOVE IT FROM THE BOTTOM BOWL USING THE TWO INSERTED EYE BOLTS. BE SURE THAT EYE BOLTS ARE SECURELY SCREWED INTO TOP CAP BEFORE LIFTING. (ITEM 4 - 12)
4. VISUALLY INSPECT THE INTERIOR OF THE TOP CAP FOR DAMAGE TO THE INSIDE WEAR PLATE. IF IT IS DAMAGED REPLACE IT. (ITEM 4 - 5)

WEAR PLATE IS SUBJECTED TO STRESS AND AGING PRODUCED BY THE MOVEMENT OF THE PACKING UNITS AGAINST THE PLATE WHEN HYDRAULIC PRESSURE IS APPLIED.

5. REMOVE THE PACKING UNIT FROM BOTTOM BOWL USING TWO LIFTING EYE BOLTS THAT MATCH UP WITH THREADS ON TOP OF THE PACKING UNIT. (ITEM 8)
6. LIFT THE PISTON FROM THE BODY BY PLACING EYE BOLTS IN THE PRE-DESIGNATED SCREW HOLES ON TOP OF THE PISTON. (ITEM 11 - 12)
7. INSPECT THE INTERNAL BODY FOR WEAR AND DAMAGE. PAY CLOSE ATTENTION TO SEAL AREAS AND WHERE SEALS SEAL AGAINST INTERIOR WALLS AND THREAD AREAS OF THE UPPER NUT AND THE BOP BODY. IF SEALS AREAS ARE WORN, SCARED, SCRATCHED, SCORED, PITTED OR DAMAGED IN ANYWAY, THE UNIT SHOULD BE SENT TO A MACHINE SHOP FOR REPAIR. SOME MINOR SCRATCHES AND PITS CAN BE REMOVED BY USING EMERY CLOTH.

**REMEMBER TO SEND PREVENTER BACK TO TOWNSEND INTERNATIONAL OR AN AUTHORIZED TOWNSEND REPAIR CENTER FOR MACHINING. ALL PARTS THAT ARE WELDED ON SHOULD BE STRESS RELIEVED.**

IF THERE IS DAMAGE TO THE PISTON STUMP THAT THE PISTON SITS ON, THAT IS ATTACHED TO THE INTERIOR BOTTOM OF THE BODY. CONTACT TOWNSEND INTERNATIONAL FOR DETAILS ABOUT A REPLACEMENT.



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## MAINTENANCE DISASSEMBLY & ASSEMBLY CONTINUED

8. INSPECT THE UNIT FOR WEAR, CRACKS AND CHUNKS OF RUBBER MISSING FROM THE INTERIOR. TIME, WEATHER AND EXPOSURE TO OZONE GASES WILL CAUSE UNIT TO CRACK OVER TIME OR BECOME HARD. HARDNESS OF THE UNIT CAN BE CHECKED BY TAKING A BALL POINT PEN AND PRESSING ON THE RUBBER IN DIFFERENT AREAS TO SEE IF THE RUBBER GIVES UNDER PRESSURE AND RETURNS TO PLACE. IF THE RUBBER IS HARD IT WILL FEEL LIKE PRESSING ON A ROCK AND WILL HAVE NO GIVE. IF THE RUBBER IS HARD, CRACKED OR DAMAGED, REPLACE THE UNIT. (ITEM 8)

**REMEMBER TO GREASE INTERIOR OF PISTON BODY BEFORE PLACING PACKING UNIT BACK INTO BOWL AREA AND CONFIRM THAT PACKING UNIT IS NOT COCKED AND IS SITTING LEVEL.**

9. REMOVE AND INSPECT ALL SEALS FOR NICKS, CUTS AND DAMAGE TO THE LIP SEALING AREA. WORN OR DAMAGED SEALS SHOULD BE REPLACED. SEALS ALSO CAN BECOME HARD OVER TIME, THE PEN TEST CAN ALSO BE APPLIED TO THE SEALS TO CONFIRM THEIR ELASTICITY. IF SEALS ARE HARD OR DAMAGED, REPLACE THEM. ALSO INSPECT SEAL AREA AND REMOVE ANY TRASH OR RUST THAT MAY HAVE ACCUMULATED BEHIND SEAL DURING SERVICE. SEAL AREAS CAN BE CLEANED WITH EMERY CLOTH.

WHEN REPLACING SEALS BE SURE IN THE AREAS THAT REQUIRE TWO SEALS, ALWAYS PLACE THE UPPER SEAL WITH LIP FACING UPWARD AND THE BOTTOM SEAL WITH LIP FACING DOWNWARD. THE TOP SEAL IS FOR PUSHING THE PISTON DOWN WHEN OPENING THE UNIT BACK UP TO OPEN HOLE CONFIGURATION AND THE BOTTOM SEAL IS USED FOR LIFTING THE PISTON UP FOR CLOSURE. IN MOST CASES THERE IS MORE STRESS ON THE BOTTOM SEAL THAN THE UPPER SEAL BECAUSE THE WEIGHT OF THE PISTON ASSIST IN ALLOWING THE PISTON TO PRESS DOWNWARD.

IN A FIELD SITUATION, IF THE LOWER PISTON SEAL IS LEAKING, THE UPPER SEAL CAN BE REMOVED AND PLACED IN THE LOWER SEAL AREA AND UNIT WILL PERFORM PROPERLY UNTIL THE PREVENTER CAN BE SENT TO A SHOP FOR REPAIR.

10. THE PREVENTER CAN BE REASSEMBLED BY USING THE SAME STEPS AS DISASSEMBLY IN REVERSE OR FOLLOWING THE INSTRUCTIONS FOR "INSTALLATION OF PACKING UNIT" IN THIS MANUAL. REMEMBER TO LIGHTLY





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## MAINTENANCE DISASSEMBLY & ASSEMBLY CONTINUED

OIL OR GREASE THE INNER COMPONENTS BEFORE ASSEMBLY AND GREASE THE THREADS ON THE CAP AND BODY TO KEEP THEM FROM FREEZING UP WHEN BEING SCREWED TOGETHER.

11. PLACE THE PISTON BACK INTO THE BODY OF THE PREVENTER BY USING TWO EYE BOLTS SCREWED INTO THE PISTON TOP. BE SURE TO LIGHTLY GREASE OR OIL THE PISTON, SEALS AND INTERIOR OF THE PREVENTER BEFORE ASSEMBLY. (ITEM 11 - 12)

**BE SURE THE BOTTOM SEALS ARE LIPPED DOWNWARD AND UPPER SEALS ARE LIPPED UPWARD WHEN PLACING THE PISTON INTO THE BODY. LOWER THE PISTON SLOWLY INTO BODY AND WATCH SEAL LIP AREA TO CONFIRM THAT THEY DO NOT GET CUT OR NICKED WHILE BEING INSTALLED INTO BODY.**

12. ONCE THE PISTON IS IN PLACE AND SITTING ON TOP OF THE PISTON STUMP, BE SURE THAT PISTON IS NOT COCKED ONE WAY OR THE OTHER AND IS SITTING FLUSH ON THE INTERIOR STUMP.
13. REPLACE THE PACKING UNIT BY USING TWO LIFTING EYE BOLTS SCREWED INTO TOP OF UNIT. BE SURE TO LUBRICATE PISTON AND UNIT GENEROUSLY BEFORE PLACING UNIT INTO PISTON BOWL. BE SURE THAT PACKING UNIT IS SITTING EVENLY IN THE PISTON BOWL. (ITEM 8 - 11)
14. PLACE THE TOP CAP BACK ONTO THE BODY BY USING TWO EYE BOLTS. TIGHTEN THE CAP CLOCKWISE UNTIL IT BECOMES SNUG AND THE LOCKING SCREW BOLT HOLES IN THE TOP OF THE CAP LINES UP WITH THE BOLT HOLE IN THE BODY. (ITEM 3, 4 & 12)

**PERFORM A WELL BORE PRESSURE TEST BEFORE PLACING PREVENTER INTO SERVICE.**



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## MAINTENANCE YEARLY INSPECTION

1. REMOVE THE TOP CAP. REMOVE THE PACKING UNIT AND PISTON AND INSPECT THE PACKING UNIT AND SEALS FOR DAMAGE OR WEAR. INSPECT THE INTERIOR SEALING SURFACES OF THE PREVENTER FOR WEAR OR DAMAGE. IF DAMAGED, SEND THE PREVENTER TO A SHOP FOR REPAIR.
2. INSPECT THE BOLTS AND NUTS ON TOP AND BOTTOM OF THE PREVENTER ( IF IT IS STUDDED). REPLACE ANY STUD BOLT OR NUT THAT HAS DAMAGED THREADS OR IS MISSING.

CONFIRM THAT STUDS ARE SECURELY ATTACHED TO THE PREVENTERS BODY.  
REPLACE ANY STUD THAT IS NOT THE RECOMMENDED LENGTH.

3. REPLACE ANY RUBBER GOODS THAT ARE DAMAGED OR CRACKED.
4. REASSEMBLE THE PREVENTER. GREASE OR OIL ALL COMPONENT PARTS BEFORE REASSEMBLING PREVENTER.
5. ALL THREADS SHOULD BE LUBRICATED WITH API-5A2 THREAD LUBRICANT PRIOR TO ASSEMBLY.
6. PREFERABLY SAND BLAST AND PAINT PREVENTER BEFORE ASSEMBLY TO KEEP FREE FROM RUST AND TRASH.
7. PERFORM A "**FIELD WELL BORE PRESSURE TEST**". REFER TO "FIELD WELL BORE PRESSURE TEST PROCEDURES" NEAR THE END OF THIS MANUAL.



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## MAINTENANCE THREE YEAR INSPECTION

TOWNSEND SUGGEST THAT EVERY THREE YEARS THE BLOWOUT PREVENTER SHOULD BE RETURNED TO TOWNSEND INTERNATIONAL BOPS, OR AN AUTHORIZED TOWNSEND REPAIR CENTER TO BE COMPLETELY DISASSEMBLED AND INSPECTED FOR WEAR. ALL WEAR DIMENSIONS SHOULD BE DOCUMENTED. TOWNSEND OR AN AUTHORIZED REPAIR CENTER SHOULD PERFORM ALL NECESSARY REPAIRS TO BRING THE BLOWOUT PREVENTER BACK TO API 6A STANDARDS. **ALL RUBBER GOODS, RAM RUBBERS AND METAL GOODS SHOULD BE REPLACED.** IF THE BODY NEEDS REPAIR, THE BODY SHOULD BE WELDED UP USING TOWNSEND APPROVED WELDING PROCEDURES AND RE-MACHINED BACK TO MANUFACTURERS SPECIFICATIONS.

CONTACT TOWNSEND INTERNATIONAL BOPS FOR ADDITIONAL INFORMATION ON SCHEDULING THREE YEAR INSPECTION OR FOR AUTHORIZED REPRESENTATIVE IN YOUR AREA.

### TOWNSEND GENERAL OFFICE

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## MAINTENANCE BETWEEN WELLS INSPECTION

1. THOROUGHLY CLEAN AND INSPECT "TYPE 84" ANNULAR BLOWOUT PREVENTER FOR DAMAGE TO RING GROOVES, STUDS, STUD HOLES, INTERIOR CAVITY OF CAP AND BORE OF PACKING UNIT FOR OBVIOUS DAMAGE.
2. GREASE ALL BOLTS AND NUTS TO KEEP FROM FREEZING UP.
3. PLUG HYDRAULIC OPEN AND CLOSE LINE INLETS TO PREVENT DIRT AND TRASH FROM CONTAMINATING HYDRAULIC SYSTEM.
4. PLACE A RING GASKET PROTECTOR PLATE OVER RING GASKET GROOVES OR GREASE HEAVILY WITH GREASE. DO NOT PLACE BOTTOM OF THE PREVENTER DIRECTLY ON THE GROUND. PLACE BOARDS OR BLOCKS UNDER FLANGED BOTTOM TO PREVENT RUST TO BOTTOM RING GASKET GROOVE.
5. STORE THE BLOWOUT PREVENTER IN AN UPRIGHT POSITION. WHEN THE BLOWOUT PREVENTER IS PLACED ON IT'S SIDE, UNDO STRESS IS PLACED ON SEALS DAMAGING THEM. STRESS WILL ALSO FLATTEN OUT SEAL LIPS.



INCORRECT WAY TO STORE



CORRECT WAY TO STORE



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## WELL BORE PRESSURE TEST PACKING UNIT

WHEN PERFORMING A "WELL BORE PRESSURE TEST", IT SHOULD CONFORM TO API SPEC 6A, APPENDIX F REQUIREMENTS. TOWNSEND'S SPECIFICATIONS CONFORM TO THAT TEST. FOR ADDITIONAL INFORMATION ON API 6A, APPENDIX F SPECIFICATIONS, CONTACT API FOR THEIR CURRENT PUBLICATION OR CONTACT API THROUGH THEIR WEB PAGE.

THE FIELD WELL BORE PRESSURE TEST CAN BE PERFORMED WHILE THE BOP IS IN A STACK, WELLHEAD, OR ON A TEST STUMP OR BLIND FLANGE.

MAXIMUM PACKING UNIT LIFE IS MAINTAINED WHEN MINIMUM STRESS IS PLACED ON THE UNIT WHEN APPLYING HYDRAULIC PRESSURE TO THE CLOSING CHAMBER OF THE BLOWOUT PREVENTER TO ACCOMPLISH AND MAINTAIN A SEAL OFF ON THE RECOMMENDED TEST PLUG.

1. TEST PRESSURE SHOULD BE THE LOWEST RATED WORKING PRESSURE OF ANY COMPONENT OR CONNECTION WHICH WILL BE PRESSURIZED DURING THE TEST.
2. THE WELL BORE PRESSURE TEST FLUID SHOULD BE COLD WATER OR DRILLING FLUIDS.
3. APPLY HYDRAULIC PRESSURE TO THE CLOSING CHAMBER UNTIL THE PACKING UNIT SEALS OFF AGAINST THE TEST PLUG OR PIPE.
4. ONCE THE PACKING UNIT IS SEAL OFF AGAINST PIPE, WELL BORE PRESSURE CAN BE APPLIED. AS WELL BORE PRESSURE IS INCREASED, THE CLOSING FORCE WILL INCREASE ON THE PACKING UNIT CREATING A TIGHTER SEAL. ONCE THE WELL BORE PRESSURE IS INCREASED TO THE MAXIMUM PRESSURE ALLOWED, CLOSING PRESSURE SHOULD BE PROPORTIONALLY REDUCED AS THE WELL BORE PRESSURE INCREASES. **(REFER TO CONTROL PRESSURE CHART FIGURE 1-1 LOCATED IN MANUAL AFTER THIS PROCEDURE.)**

CLOSING PRESSURE REQUIRED TO SEAL OFF UNIT VARIES BETWEEN PACKING UNITS. THE VARIATION IS CREATED BY AGE OF UNIT, COMPOUND OF UNIT AND SOMETIMES WEATHER CONDITIONS. COLD WEATHER AFFECTS MOVEMENT. TEST WITH RECOMMENDED INITIAL CLOSING PRESSURE. **REFER TO RECOMMENDED CLOSING PRESSURE CHART SHOWN ON FIGURE 1-1 AFTER THIS PROCEDURE.**



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## WELL BORE PRESSURE TEST (CONTINUED) PACKING UNIT

5. ONCE THE MAXIMUM WELL BORE PRESSURE HAS BEEN ACHIEVED. MAINTAIN THE PRESSURE FOR (3) MINUTES OR LONGER TO CHECK FOR LEAKS.

A LEAK CAN BE DETECTED BY AN INCREASE IN THE PRESSURE ON THE PRESSURE GAUGE ON THE TEST UNIT OR CLOSING UNIT OR BY OBSERVING THE BORE OF THE PREVENTER VISUALLY INSPECTING FOR WATER OR FLUIDS SPRAYING FROM THE SEAL OF THE UNIT AGAINST THE DRILL PIPE OR TEST PLUG.

6. ONCE THE DESIGNATED TIME HAS BEEN REACHED, REDUCE THE WELL BORE PRESSURE UNTIL IT REACHES ZERO. THEN REDUCE THE REMAINING HYDRAULIC CLOSING PRESSURE UNTIL THE UNIT RECOVERS TO FULL OPEN HOLE POSITION.
7. VISUALLY INSPECT THE WELL BORE OF THE UNIT FOR ANY DAMAGE OR CHUNKS OF RUBBER MISSING THAT MAY OF OCCURRED DURING TEST. EACH TIME WELL BORE PRESSURE IS APPLIED TO THE UNIT, IT WEAKENS THE INTEGRITY OF THE RUBBER AND REDUCES THE LIFE OF THE PACKING UNIT.



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## PRESSURE TEST CHART - FIGURE 1-1

### AVERAGE CLOSING PRESSURE (PSI) REQUIRED TO ACQUIRE UNIT SEAL-OFF

PIPE OD INCHES	7-1/16 X 3M	7-1/16 X 5M	9 X 3M	9 X 5M	11 X 3M	11 X 5M	13-3/8 X 3M	13-5/8 X 5M
5-1/2								
4-1/2							550	650
3-1/2			450	450	550	550		
2-7/8	450	450						
2-3/8								
1.9								
CSO								

THE PRESSURE GRAPH ABOVE IS A GUIDELINE. MAXIMUM PACKING UNIT LIFE IS OBTAINED BY USING THE LOWEST CLOSING PRESSURE THAT WILL MAINTAIN A SEAL AROUND THE PIPE.



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## SEAL PRESSURE TEST

THERE ARE (7) SEALS IN THE TOWNSEND "TYPE 84" ANNULAR BLOWOUT PREVENTER CONSISTING OF A SQUARE SHAPED HEAD GASKET AND 6 LIPPED SEALS. (2) UPPER PISTON SEALS, (2) LOWER PISTON SEALS, (2) PISTON HEAD SEALS.

ONCE A LEAK HAS BEEN DISCOVERED, TOWNSEND RECOMMENDS THAT ALL (7) SEALS BE REPLACED BECAUSE OF THE ADDED EXPENSE OF TEAR DOWN REPLACING ONE SEAL AT A TIME..

TO DETERMINE WHICH SEAL IS LEAKING USE THE FOLLOWING SEAL PRESSURE TEST:

1. TEST THE LOWER AND UPPER SEALS (ITEMS 9, UPPER SEAL & 10, LOWER SEAL).

A. APPLY HYDRAULIC PRESSURE TO THE CLOSE CHAMBER. USE THE PRESSURE TEST CHART ( FIGURE 1-1) ON PRECEDING PAGE TO DETERMINE THE RECOMMENDED CLOSING PRESSURE FOR EACH SIZE ANNULAR AND DRILL PIPE OR TEST PLUG SIZE. IF THERE IS NO UNIT IN THE ANNULAR DO NOT TO EXCEED 1500 PSI.)

B. VENT OPENING CHAMBER TO THE ATMOSPHERE .

\* IF CLOSING FLUID IS SEEN AT THE OPENING CHAMBER, SEAL 9 (LOWER) IS LEAKING.

\* IF CLOSING CHAMBER PRESSURE GAUGE IS DROPPING AND NO FLUID IS SEEN AT OPENING CHAMBER, SEAL 10 (UPPER) IS LEAKING.

2. TEST SEAL 8 (LOWER), AND SEAL 9 (UPPER), AND 6 (HEAD GASKET).

A. PRESSURIZE OPENING CHAMBER TO 1500 PSI.

B. VENT CLOSING CHAMBER TO ATMOSPHERE.

\* IF FLUID IS SEEN COMING FROM AREA BETWEEN BODY AND HEAD, SEAL 6 (HEAD GASKET) IS LEAKING

\* IF FLUID IS SEEN COMING INTO WELL BORE OF PREVENTER, SEAL 8 (LOWER) IS LEAKING

\* IF FLUID IS SEEN AT CLOSING CHAMBER SEAL 9 (UPPER) IS LEAKING.





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## SEAL PRESSURE TEST (CONTINUED)

### 3. TEST SEALS 8 (UPPER) AND SEAL 10 (LOWER)

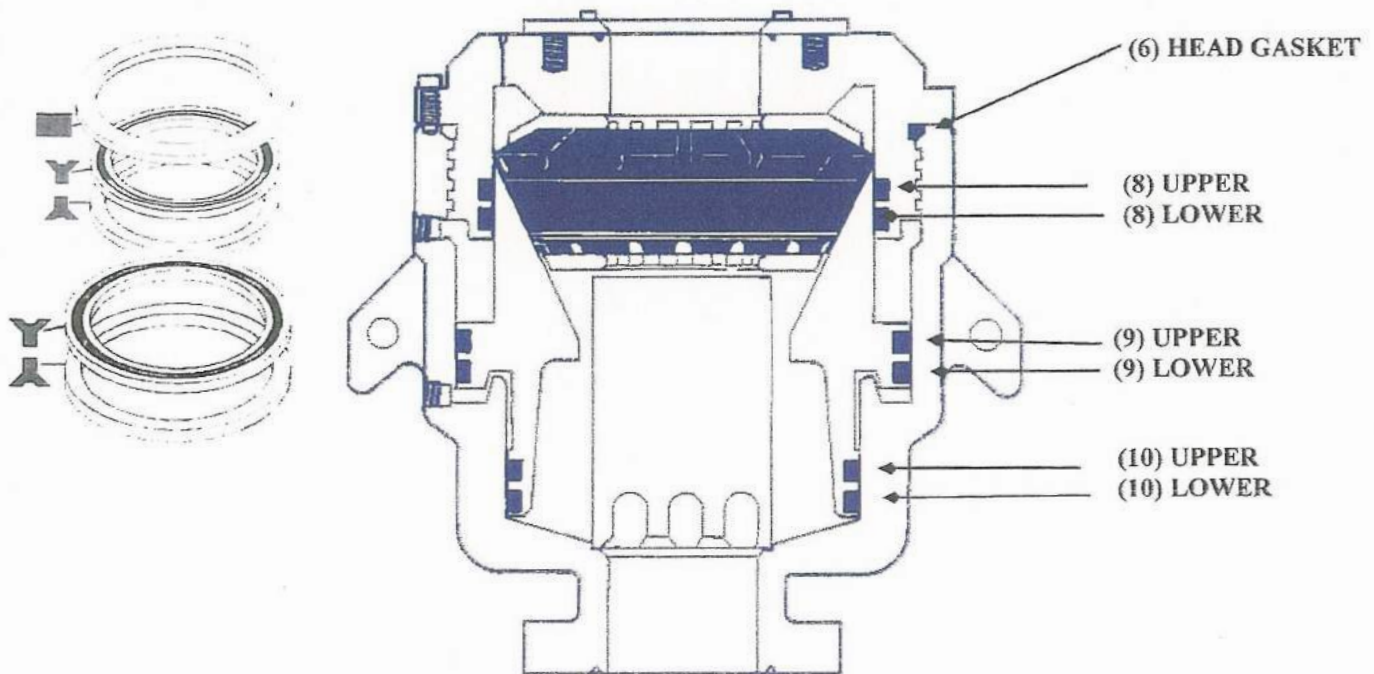
- A. VENT THE CLOSING AND OPENING CHAMBERS TO THE ATMOSPHERE.
- B. PRESSURIZE WELL BORE (**3000 PSI MAXIMUM**)  
REQUIRES A BLIND FLANGE ON TOP OF UNIT SINCE PACKING UNIT IS IN  
OPEN POSITION.

- \* IF FLUID IS SEEN COMING FROM THE OPENING CHAMBER,  
SEAL 8 (UPPER) IS LEAKING.
- \* IF FLUID IS SEEN COMING FROM THE CLOSING CHAMBER,  
SEAL 10 (LOWER) IS LEAKING.



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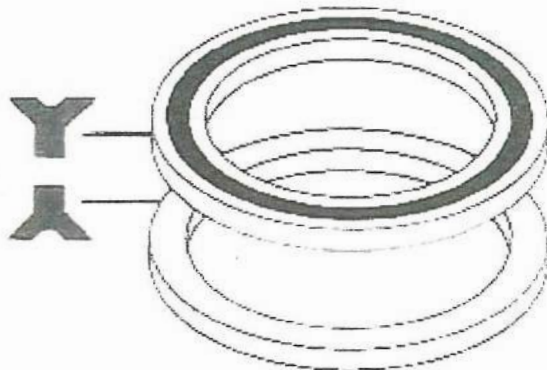
## SEAL PRESSURE TEST (CONTINUED)



NOTE: IN A FIELD ENVIRONMENT AND THE LOWER SEAL IS LEAKING, THE MATCHING SEAL ABOVE IT CAN BE EXCHANGED AND PUT IN THE LOWER SEALS PLACE.. PREVENTER SHOULD BE SHOPPED AS SOON AS POSSIBLE OR HAVE ALL SEALS REPLACED AS QUICKLY AS POSSIBLE.

LIP FACING UPWARD

LIP FACING DOWNWARD





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## TOWNSEND TYPE 84 ANNULAR BOP (COMPATIBLE WITH HYDRIL GK ANNULAR)



7-1/16 X 3M - 7-1/16 X 5M  
 9 X 3M - 9 X 5M  
 11 X 3M - 11 X 5M  
 13-5/8 X 3M - 13-5/8 X 5M

NO.	DESCRIPTION	NO.	7-1/16 X 3M	7-1/16 X 5M	9 X 3M	9 X 5M	11 X 3M	11 X 5M	13-5/8 X 3M	13-5/8 X
1	PROTECTOR PLATE SCREW	4	105-3046	105-3046	105-3046	105-3046	105-3046	105-3046	105-3046	105-3046
2	PROTECTOR PLATE	1	65-30693	65-30693	95-32882	95-32882	105-31406	105-31406	123-30741	135-38188
3	HEAD LOCKING SCREW	1	63-31607	65-30695	103-31607	103-31607	103-31607	105-31407	123-30695-L	135-31407
4	TOP CAP	1	63-31601	65-30664	93-32879	95-33503	103-31813	105-31398	123-30730	135-42944
5	INNER WEAR PLATE	1	---	---	---	---	---	---	---	---
6	HEAD GASKET	1	63-31602	65-30690	93-32868	95-33508	103-31809	105-31402	123-30738	135-38150
7	UPPER PISTON SEAL	2	63-31603	65-31689	93-32807	105-32599	103-31808	105-31403	123-30736	135-38151
8	PACKING UNIT (SYNTHETIC)	1	63-31078-S	65-30667-S	93-32603 -S	95-33506 -S	103-31818 -S	105-31401 -S	123-30732 -S	135-38148 -S
8	PACKING UNIT (NATURAL)	1	63-31078-N	65-30667-N	93-32603 -N	95-33506 -N	103-31818 -N	105-31401 -N	123-30732 -N	135-38148 -N
9	PISTON HEAD SEAL	2	103-31604	65-30688	93-32871	123-30735	103-31807	123-30736	123-30737	135-38152
10	LOWER PISTON SEAL	2	63-15614	65-30705	93-32869	95-30689	103-31604	105-32599	123-30735	135-38165
11	PISTON	1	63-31599	65-30665	93-32880	95-33504	103-31814	105-31389	123-30731	135-38146
12	BODY FLANGED	1	---	---	---	---	---	---	---	---
12	BODY STUDDED	1	---	---	---	---	---	---	---	---
**	COMPLETE SEAL KIT	1	63-50683	65-50684	93-50685	95-50686	103-50687	105-50688	123-60689	135-50690



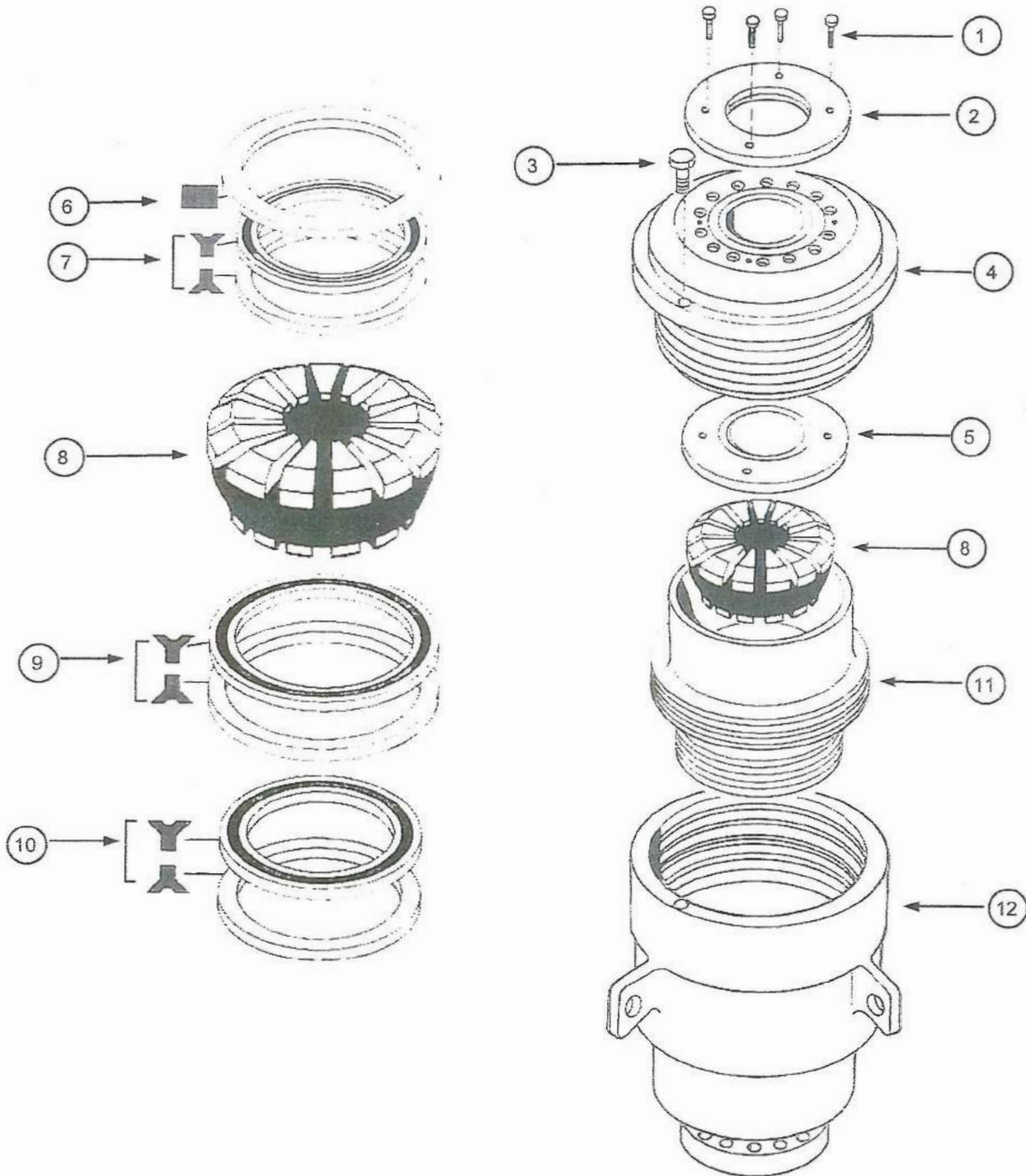
# TOWNSEND

INTERNATIONAL BOP'S, INC.

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## TOWNSEND TYPE 84 ANNULAR BOP

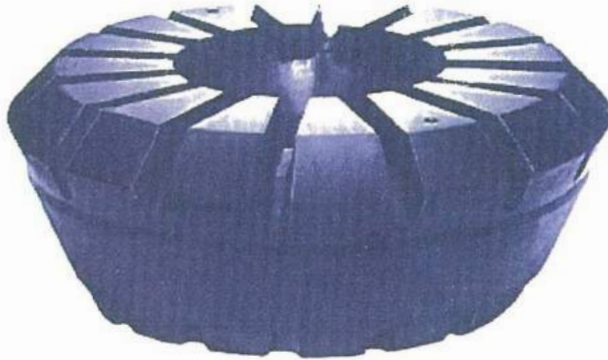
(COMPATIBLE WITH HYDRIL TYPE GK ANNULAR)





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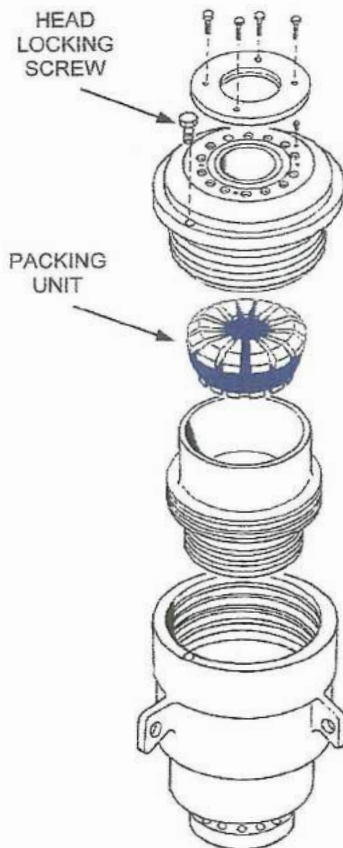
## TOWNSEND TYPE 84 PACKING UNITS (COMPATIBLE WITH HYDRIL GK STYLE UNITS)



*TOWNSEND* manufactures replacement Packing Units to fit all Hydril GK Annular Blowout Preventers. *TOWNSEND's* replacement Packing Units are available in both natural and synthetic compounds. *TOWNSEND's* Packing Unit compounds have been developed specifically for longevity, but are flexible enough for complete closure in open hole situations.

*TOWNSEND's* Packing Units are tested before sale using API test standards in both open hole conditions and on drill pipe. All Packing Units are subject to a drift test after performing Annular test on rubber to confirm that they will open back up to standard size.

*TOWNSEND* is not just a rubber company, we take pride in the fact that we produce Blowout Preventer replacement parts, both metal and rubber. Years of experience and testing has helped *TOWNSEND* become a major player in the industry.



SERIES	RUBBER TYPE		HEAD LOCKING SCREW
	SYNTHETIC	NATURAL	
6" x 3M	63-31078-S	63-31078-N	103-31607
6" x 5M	65-30667-S	65-30667-N	65-30695
8" x 3M	83-32603-S	83-32603-N	103-31607
10" x 3M	103-31818-S	103-31818-N	103-31607
10" x 5M	105-31401-S	105-31401-N	105-31407
12" x 3M	123-30732-S	123-30732-N	65-30695
13-5/8" x 5M	135-38148-S	135-38148-N	105-31407



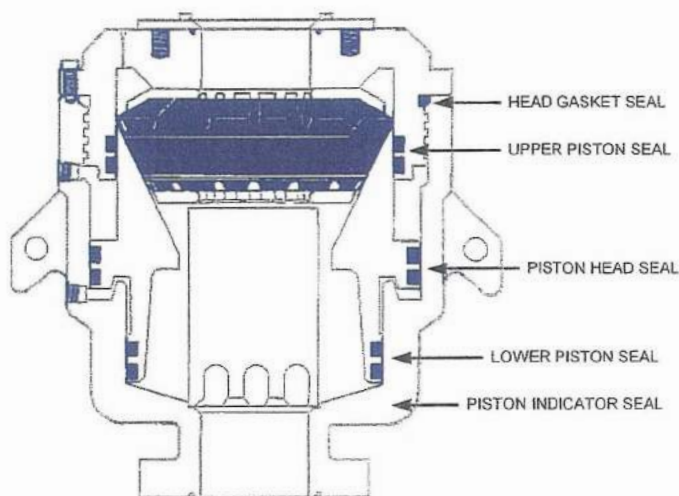
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## TOWNSEND TYPE 84 SEAL KITS (COMPATIBLE WITH HYDRIL GK STYLE UNITS)

*TOWNSEND* manufactures replacement Seal Kits to fit all Hydril GK Annular Blowout Preventers.

*TOWNSEND's* Seal Kits are available both as individual Seals and as Kits. All *TOWNSEND* Seals are molded oversize, then ground back down to size to assure our Quality is the same standard as offered by the OEM.

*TOWNSEND* also manufactures the Piston Indicator Seal, which is used on old style GK Annular Blowout Preventers to check the location of the piston. Newer model GK Annular Blowout Preventers do not require this seal.



SERIES	HEAD GASKET SEAL	UPPER PISTON SEAL	PISTON HEAD SEAL	LOWER PISTON SEAL	COMPLETE SEAL KIT	PISTON INDICATOR SEAL
6" x 3M	63-31602	63-31603	103-31604	63-15614	63-50683	100-29644
6" x 5M	65-30690	65-30689	65-30688	65-30705	65-50684	100-29644
8" x 3M	83-32868	83-32870	83-32871	83-32869	83-50685	100-29644
8" x 5M	85-33508	105-32599	123-30735	65-30689	85-50686	100-29644
10" x 3M	103-31809	103-31808	103-31807	103-31604	103-50687	100-29644
10" x 5M	105-31402	105-31403	123-30736	105-32599	105-50688	100-29644
12" x 3M	123-30738	123-30736	123-30737	123-30735	123-50689	100-29644
13-5/8" x 5M	135-38150	135-38151	135-38152	135-38165	135-50690	100-29644
13-5/8" x 5M Latched Head	123-31738	135-38151	135-38152	135-38165	135-50691 Q	100-29644
QTY REQ'D	1	2	2	2	1	N/A

Q To complete the Seal Kit for a 13-5/8" x 5M Latched Head GK Annular Blowout Preventer, (1) Part #202-37381 Head Seal is also required.

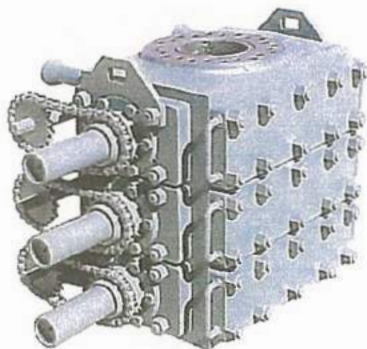
## THE "GROWING" TOWNSEND BOP FAMILY



**TOWNSEND TYPE 84 ANNULAR BOP**  
 7-1/16 X 3M - 7-1/16 X 5M - 9 X 3M - 9 X 5M  
 11 X 3M - 11 X 5M - 13-5/8 X 3M - 13-5/8 X 5M  
 11 X 3M - 11 X 5M - 13-5/8 X 3M - 13-5/8 X 5M



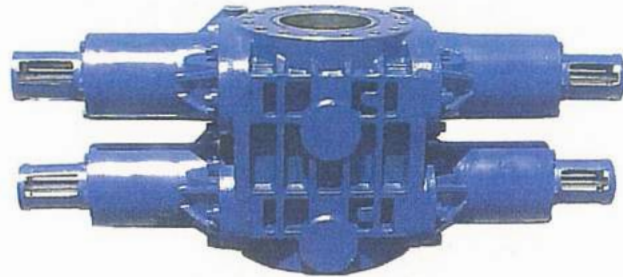
**TOWNSEND TYPE 90 ANNULAR BOP**  
 7-1/16 X 3M - 7-1/16 X 5M - 9 X 3M  
 11 X 5M - 13-5/8 X 5M



**TOWNSEND TYPE 81 MANUAL BOP**  
 7-1/16 X 3M & 9 X 3M  
 SINGLE - DOUBLE - TRIPLE



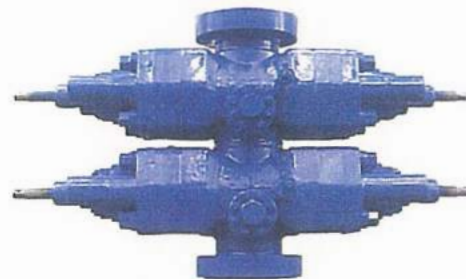
**TOWNSEND TYPE 81 HYDRAULIC BOP**  
 7-1/16 X 3M - 7-1/16 X 5M - 9 X 3M - 9 X 5M  
 SINGLE - DOUBLE - TRIPLE



**TOWNSEND TYPE 82 HYDRAULIC BOP**  
 7-1/16 X 5M - 11 X 3M - 11 X 5M - 13-5/8 X 3M  
 SINGLE - DOUBLE - TRIPLE



**TOWNSEND TYPE 88 HYDRAULIC BOP**  
 9 X 3M  
 SINGLE - DOUBLE - TRIPLE



**TOWNSEND "ST" HYDRAULIC BOP**  
 7-1/16 X 10M



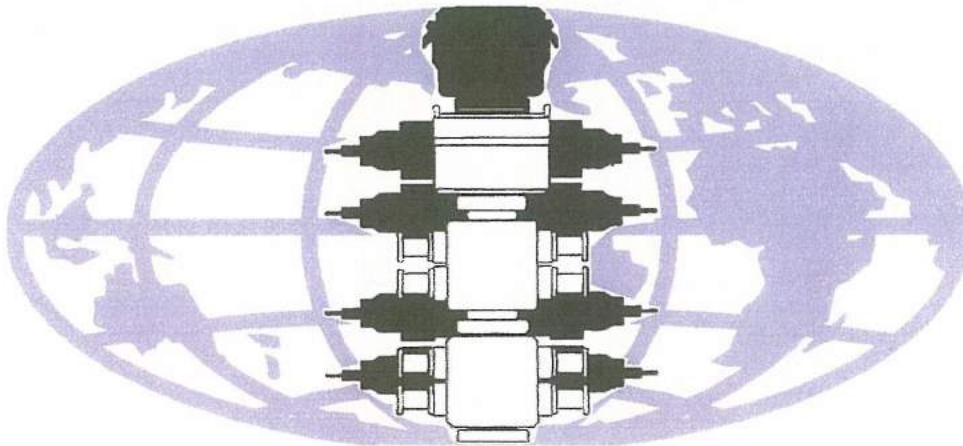
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16A - 0051

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