



# ROLLER DRILL BITS





## JET NOZZLES STANDARD NOZZLES

Nozzle	Bit Diameter, inch	Outlet Diameter ( $\frac{1}{32}$ " )															
		7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28
R3510	4 $\frac{3}{4}$ - 4 $\frac{7}{8}$	●	●	●	●	●	●	●	●	●	●						
R3401	5 $\frac{1}{2}$ - 6	●	●	●	●	●	●	●	●	●	●	●	●				
R1804	6 $\frac{1}{8}$ - 6 $\frac{3}{4}$			●	●	●	●	●	●	●	●	●	●				
R0030	7 $\frac{1}{2}$ - 9 $\frac{5}{8}$		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
R0101	9 $\frac{7}{8}$ - 17 $\frac{1}{2}$		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### EXTENDED NOZZLES

Bit type	Nozzle	Bit Diameter, inch	Outlet Diameter ( $\frac{1}{32}$ " )		
			19	23	25
ST	NUG - 15/47 NUG - 18/47 NUG - 20/47	7 $\frac{1}{2}$ - 8 $\frac{1}{2}$	●	●	●
TCI	NUG - 15/52.5 NUG - 18/52.5 NUG - 20/52.5	8 $\frac{1}{2}$	●	●	●

### ROLLER BIT SIZE TOLERANCE

Bit Size, inch	Tolerance, inch mm	
1.75 to 13 $\frac{3}{4}$ , inclusive	+1/32-0	+0.8-0
14 to 17 $\frac{1}{2}$ , inclusive	+1/16-0	+1.59-0
17 $\frac{5}{8}$ and larger	+3/32-0	+2.38-0

## HYDRAULIC SYSTEM



**TYPE 1**  
Central Jet



**TYPE 2**  
Three Side Jets



**TYPE 3**  
Three side jets with  
extended nozzles



**PREFIX "B"**  
Mud blade  
on leg

**TYPE 4**  
Two side jets with extended noz-  
zles and additional widened area  
instead of the third side jet

**TYPE 5**  
Combination  
of three side jets  
and one central jet

**TYPE 6**  
Combination of three side  
jets with extended nozzles  
and one central jet

## TUNGSTEN CARBIDE INSERTS





## STEEL TOOTH HARDFACING



**TYPE 1**  
Hardfacing is only on the entering edge



**TYPE 2**  
Hardfacing is on the entering edge and on the origin of the trailing edge



**TYPE 3**  
Hardfacing is on all four edges and on the root face

## GAUGE PROTECTION FOR STEEL TOOTH BITS



**TYPE 1** Surface hardfacing



**TYPE 2** Hardfacing of prepared grooves



**TYPE 3** Combined hardfacing of prepared grooves enhanced by tungsten carbide inserts



**TYPE 4** Combined hardfacing of prepared grooves enhanced by two rows of tungsten carbide inserts



## GAUGE PROTECTION FOR TUNGSTEN CARBIDE INSERT BITS



**TYPE 1**  
Gauge protection with inserts having a crest surface on a heel row and with one row of flat inserts



**TYPE 2**  
Gauge protection with two rows of flat inserts



**TYPE 3**  
Gauge protection with rows of semi spherical and flat inserts

## LEG PROTECTION

**TYPE 1**  
Hard grain alloy is applied along the shirttail



**TYPE 2**  
Hard grain alloy is applied along the shirttail and leg leading edge



**TYPE 3**  
Hard grain alloy is applied along the shirttail and leg leading edge; ball plug area is protected with tungsten carbide inserts



**TYPE 4**  
Hard grain alloy is applied along the shirttail and leg leading edge. For additional protection tungsten carbide or diamond compacts are inserted on the leg of the bit.

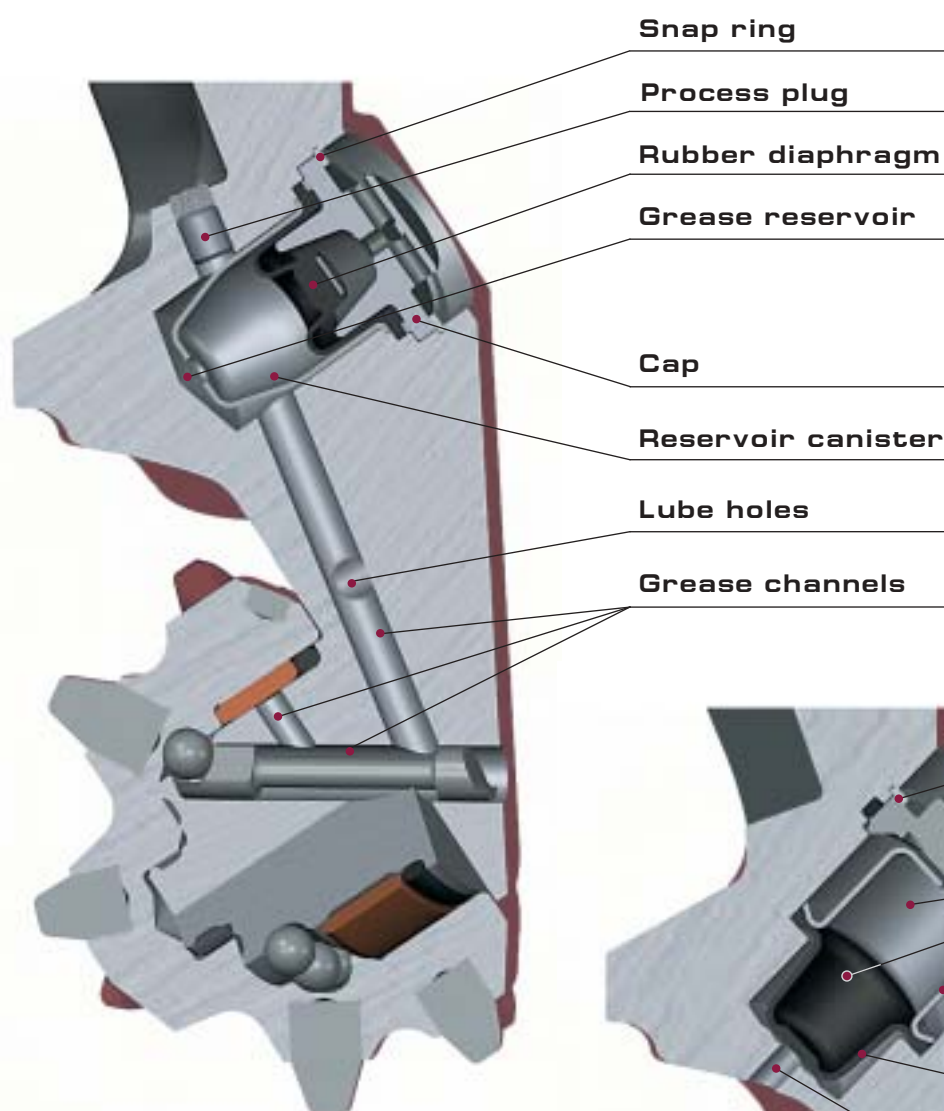


**TYPE 5**  
Hard grain alloy is applied along the shirttail and leg leading edge. For additional protection tungsten carbide or diamond compacts are inserted on the leg of the bit. Stabilization pads containing carbide or diamond inserts are added to the bit leg to minimize wear and stabilize the bit in directional and horizontal applications.

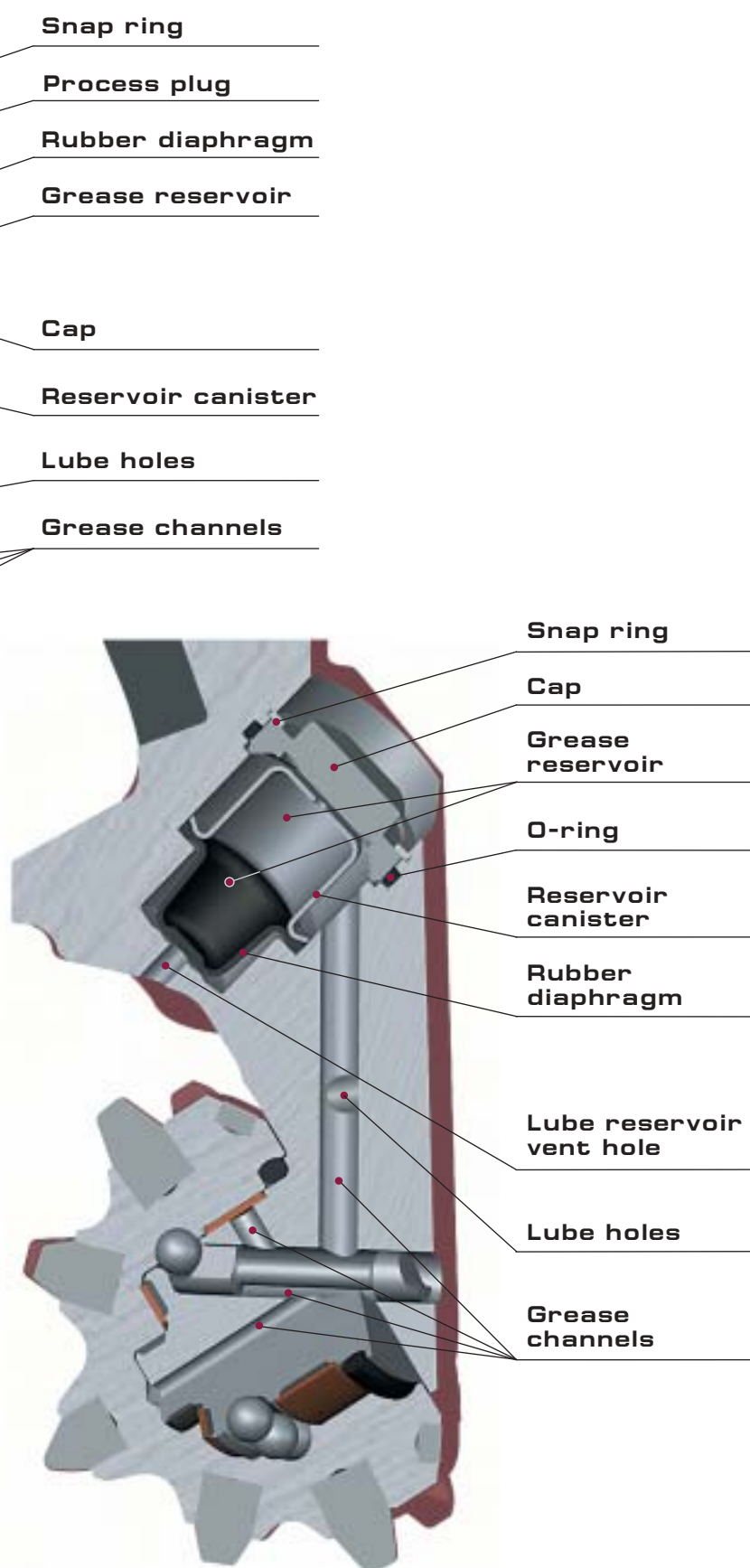




# LUBRICATION SYSTEMS OF SEALED BEARINGS



**TYPE 1**  
Lubrication system  
with a rubber  
diaphragm  
venting on  
the shirttail side



**TYPE 2**  
Lubrication system  
with a rubber diaphragm arranged  
on the side of under cone area



## «AUL» LINE

Low-speed drill bits (up to 180 RPM) are specially designed for drilling of wells with down hole hydraulic motors and rotor.

Bit bearings are sealed by radial heat and oil-resistant rubber O-rings. The bearing type: radial journal bearing-ball-thrust journal bearing-radial journal bearing.

As an option the bearing design incorporates the PowerRing™ Seal that allows higher rotary speed up to 300 RPM.

Outer journal bearing is equipped with a split floating bushing, made of anti-friction wear-resistant material. Thrust journal bearing is equipped with a thrust floating washer, made of the same material as the bushing. Both the bushing and the washer are silver plated along all their surfaces. The inner cavity of the cone on all the surfaces of thrust journal bearing and radial journal bearing has anti-friction silver layer.

### STEEL TOOTH BITS



**9 7/8" AUL-L11TG**

### TCI BITS



**8 1/2" AUL-LS43X**

The surfaces of all friction bearings on the journal are hard faced.

The bearing cavity is filled with the patented grease "Dolotol-AU", which greatly reduces friction coefficient in the bearing, its overheat and wear. A bit lubrication system is designed for grease and pressure compensation. It consists of a grease reservoir with a rigidly mounted cap, a rubber diaphragm and a metal canister, protecting the diaphragm from breakage.

The system channels connect the grease reservoir with friction areas in a leg bearing.

The lubrication system relief valve prevents high pressure in the bit bearing.

Depending on the formation hardness cutting structure of cones can be either tungsten carbide inserts or steel teeth.



## BEARING

Sealed by a special seal. The bearing type: radial journal bearing with beryllium copper split floating bushing-ball bearing-thrust journal bearing with beryllium copper thrust washer-radial journal bearing

## CUTTING STRUCTURE

Shape of inserts depends on the formation being drilled  
X- Chisel insert Y- Conical insert Z- other shape insert

## HYDRAULIC SYSTEM

According to types 2 or 5\*

## GAUGE PROTECTION

According to types 1, 2 or 3\*

## LEG PROTECTION

According to types 2, 3, 4 or 5\*

## LUBRICATION SYSTEM

Overpressure relief valve according to type 2\*

## TCI BITS AVAILABILITY

Bit Diameter		IADC										
mm	inch	417	437	447	517	527	537	547	617	627	637	837
190,5	7 1/2				AUL-LS51X			AUL-LS54X				
200,0	7 7/8				AUL-LS51X	AUL-LS52Y	AUL-LS53X AUL-LS53Y	AUL-LS54Y		AUL-LS62Y	AUL-ALS63Y AUL-LS63Y	
212,7	8 3/8				AUL-LS51X			AUL-LS54X				
215,9	8 1/2		AUL-LS43XP AUL-LS43X AUL-RL43ZPF AUL-LS43ZP AUL-RLS43XP AUL-RLS43X AUL-RKLS43X AUL-RLS43ZP AUL-RLS43XW AUL-RKLS43XWDGD AUL-RLSP43XW	AUL-LS44X	AUL-LS51X AUL-RLS51X		AUL-LS53X AUL-KLS53X AUL-RLS53X	AUL-LS54X AUL-LS54Y AUL-LS54YP AUL-RLS54Y AUL-RLSP54Y	AUL-LS61XP AUL-LS61X AUL-LS61Y AUL-LS61YP AUL-RLS61X AUL-LS61XPE	AUL-LS62X AUL-LS62Y AUL-LS62YP AUL-RLS62Y	AUL-LS63Y AUL-RLSP63Y	
222,3	8 3/4		AUL-LS43X AUL-LS43Y					AUL-LS54X AUL-LS54Y		AUL-LS62X AUL-LS62Y	AUL-ALS63Y	
244,5	9 5/8		AUL-LS43XP									
250,8	9 7/8	AUL-LS41X			AUL-LS51X						AUL-ALS63Y	
269,9	10 5/8				AUL-LS51X							
279,4	11					AUL-LS52Y		AUL-LS54Y				AUL-LS83Y
295,3	11 5/8						AUL-LS53X	AUL-LS54XP		AUL-LS62YP		
311,1	12 1/4	AUL-LS41X AUL-KLS41XP AUL-RKLS41XP	AUL-LS43X AUL-LS43XW AUL-RKLS43X AUL-RKLS43XWDGD	AUL-LS44XW	AUL-LS51XPW AUL-LS51Y	AUL-LS52Y	AUL-LS53X AUL-LS53XGG	AUL-LS54X AUL-LS54YGG	AUL-LS61XGG			AUL-LS83YGG
381,0	15											AUL-LS83Y



## BEARING

Sealed by a special seal. The bearing type: radial journal bearing with beryllium copper split floating bushing-ball bearing-thrust journal bearing with beryllium copper thrust washer-radial journal bearing

## CUTTING STRUCTURE

All "AUL" line bits prismatic teeth are applied with wear-resistant hard alloy with increased thickness of hardfacing according to type 3\*

## HYDRAULIC SYSTEM

According to types 2 or 5\*

## GAUGE PROTECTION

According to types 3 or 4\*

## LEG PROTECTION

According to types 2, 3, 4 or 5\*

## LUBRICATION SYSTEM

Overpressure relief valve according to type 2\*

## ST BITS AVAILABILITY

Bit Diameter mm inch	IADC					
	117	126	136	137	216	217
190,5 7 1/2				AUL-LS13TG		AUL-LS21TG
200 7 7/8	AUL-LS11TG					
212,7 8 3/8					AUL-LS21T	AUL-LS21TG
215,9 8 1/2	AUL-KLS11TG AUL-RKLS11TG	AUL-LS12T	AUL-LS13	AUL-KLS13TG AUL-RKLS13TG	AUL-LS21T	
244,5 9 5/8	AUL-LS11TG					
250,8 9 7/8	AUL-LS11TG					
279,4 11	AUL-LS11TG					
295,3 11 5/8	AUL-KLS11TG			AUL-LS13TGP	AUL-LS21T	
311,1 12 1/4	AUL-LS11TG AUL-KLS11TG AUL-RKLS11TG		AUL-KLS13T	AUL-KLS13TG		AUL-LS21TG

\* Types of hydraulic system, steel teeth, gauge and leg protection, bearing lubrication systems are given on pages 11-13.