



# FIXED CUTTER BITS



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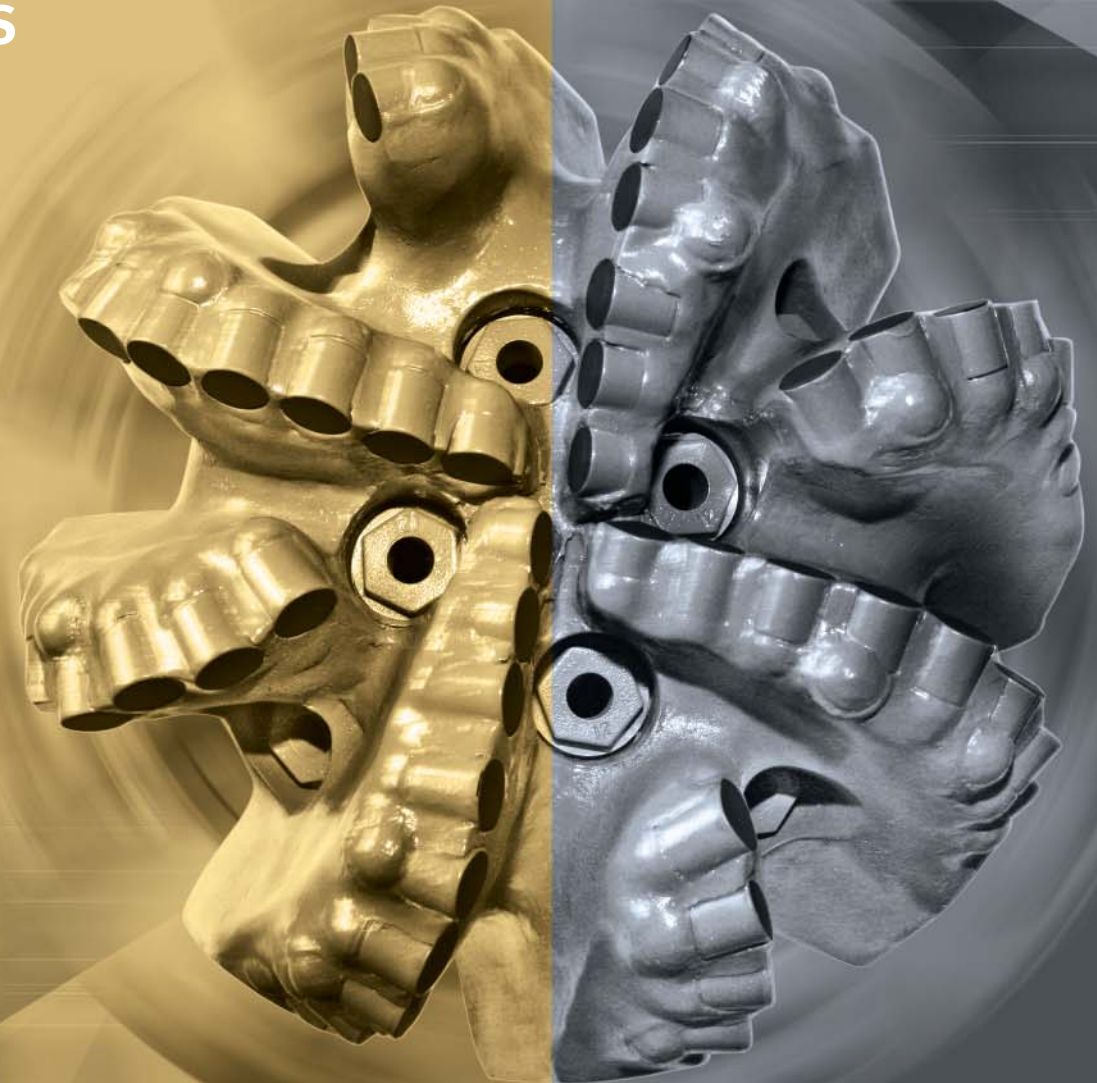
**UNIDRILL**



PDC BITS

IMPREGNATED BITS

NATURAL  
DIAMOND  
BITS



BI-CENTER BITS

CORE BITS

SIDETRACK BITS

## COMPANY PROFILE



UNIVERSAL DRILLING JSC, DOING BUSINESS AS, **UniDrill™** IS A RUSSIAN COMPANY THAT PRODUCES DRILL BITS WITH FIXED CUTTING STRUCTURES DESIGNED FOR VERTICAL, DIRECTIONAL AND HORIZONTAL DRILLING:

- PDC BITS WITH STEEL OR MATRIX BODIES
- IMPREGNATED BITS
- NATURAL DIAMOND BITS
- BI-CENTER BITS WITH STEEL OR MATRIX BODIES
- CORE BITS WITH STEEL OR MATRIX BODIES
- SIDETRACK BITS WITH STEEL OR MATRIX BODIES

CORPORATE HEADQUARTERS AND THE MANUFACTURING FACILITIES ARE LOCATED IN IZHEVSK, RUSSIA. THE MANAGEMENT OFFICE IS LOCATED IN THE CITY OF SAMARA.

THE MANUFACTURING PROCESSES UTILIZE THE LATEST TECHNOLOGY WITH EQUIPMENT PROCURED FROM LEADING DOMESTIC AND FOREIGN MACHINE TOOL MANUFACTURERS.

WE USE SPECIAL 3D SIMULATION AND OPTIMIZATION PROGRAMS (IMPETRO DDS) THAT HAVE BEEN DEVELOPED TO OPTIMIZE THE BIT DESIGN WHICH REDUCES THE DRILLING COST FOR THE CUSTOMER.

OUR COMPANY IS CUSTOMER FOCUSED. THE CUSTOMERS' SATISFACTION AS WELL AS THE ONGOING RELATIONSHIP IS THE MAIN PRIORITY OF OUR COMPANY.

OUR MARKETING AREA IS NOT JUST RUSSIA AND THE CIS COUNTRIES, BUT IS WORLDWIDE. THIS INCLUDES THE DRILLING ACTIVITY IN AREAS SUCH AS CENTRAL ASIA, SOUTHEAST ASIA, MIDDLE EAST, AFRICA, ETC.

OUR PERSONNEL, WHO HAVE EXTENSIVE EXPERIENCE IN THEIR RESPECTIVE AREA OF EXPERTISE, INSURE THE PROFESSIONALISM OF OUR WORK. THIS INCLUDES THE DESIGN, PRODUCTION, AND THE SERVICE OF OUR BITS.

THE GROWTH IN OUR MARKET SHARE WILL BE THE RESULT OF THE SALES ORGANIZATION PROMPT RESPONSE TO CHANGING MARKET DEMANDS. THIS RESPONSE WILL CONSIST OF THE NECESSARY RESOURCES REQUIRED IN THE TECHNOLOGICAL, FINANCIAL, AND CUSTOMER SUPPORT AREAS TO ACHIEVE OUR GOALS AND OBJECTIVES.

ONE OF THE TOP PRIORITIES WITHIN OUR COMPANY IS TO PROVIDE A QUALITY PRODUCT. THE QUALITY MANAGEMENT SYSTEM HAS BEEN ORGANIZED TO COMPLY WITH THE REQUIREMENTS OF ISO 9001, ISO 29001, AND API SPEC Q1. THE QUALITY OF OUR BITS IS CHECKED AT ALL STAGES OF PRODUCTION

TO INSURE THAT THEY MEET THE REQUIREMENTS OF API SPEC 7-1 AND SPEC 7-2.

**UniDrill™** IS AN ASSOCIATE MEMBER OF INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC).

WE UNDERSTAND THAT A SUCCESSFUL BUSINESS IS NOT POSSIBLE WITHOUT OUR EMPLOYEES AND THAT AS A COMPANY WE ADAPT ENVIRONMENTALLY FRIENDLY POLICIES. OUR COMPANY HAS ADAPTED HEALTH, SAFETY, AND ENVIRONMENTAL POLICIES THAT COMPLY WITH ISO 14001 AND BSI-OHSAS 18001. ALL OF OUR DRILL BITS ARE SHIPPED IN ENVIRONMENTALLY FRIENDLY, REUSABLE BIT BOXES THAT PROTECT THE BIT FROM DAMAGE IN TRANSIT.

OUR PRODUCTS ARE SOLD WITH A WARRANTY FROM **UniDrill™** WHICH PROTECTS THE CUSTOMER'S INVESTMENT AND DRILLING COSTS.



# PDC BITS



- **FIXED CUTTER DRILL BITS ARE AVAILABLE IN STEEL OR MATRIX BODIES.**

They have polycrystalline diamond cutters (PDC) cutting elements. Fixed cutter drill bits are used in directional and vertical drilling applications.

- **BI-CENTER BITS ARE AVAILABLE IN STEEL OR MATRIX BODIES.**

They have polycrystalline diamond cutters (PDC) cutting elements. Bi-Center bits are used for reaming.

- **CORE BITS ARE AVAILABLE IN STEEL OR MATRIX BODIES.**

They have polycrystalline diamond cutters (PDC) cutting elements. Core Bits are used to obtain core samples.

- **FIXED CUTTER SIDETRACKING BITS WITH STEEL OR MATRIX BODIES**

They are available with PDC cutters or natural diamonds to meet the customer's specific applications.

- **IMPREGNATED BITS HAVE A MATRIX BODY.**

These bits are impregnated with sharp fine grains of synthetic diamond. The bits are designed for directional and vertical drilling.

- **NATURAL DIAMOND BITS HAVE A MATRIX BODY**

They are designed for directional or vertical drilling.

All of the cutting structure use **PREMIUM PDC CUTTERS**, which are chosen to meet exacting application requirements and drilling parameters.

Our drill bit **BLADE GEOMETRY** is designed to insure balance and steerability requirements for the drilling project.

The **PIN CONNECTIONS** meet all API requirements.

**BIT HYDRAULICS** is optimized using variable nozzle sizes and fixed jets. Location of these nozzles and jets are ascertained by careful review of jet direction and volume. Total count of nozzles and jets are determined in the design of the bit depending on drilling conditions.

To help avoid bit balling, an optional **SPECIAL COATING** can be applied to the drill bit.

Optional **CUTTING FEATURES** can be added to the design to avoid vibration and anti-whirl problems.

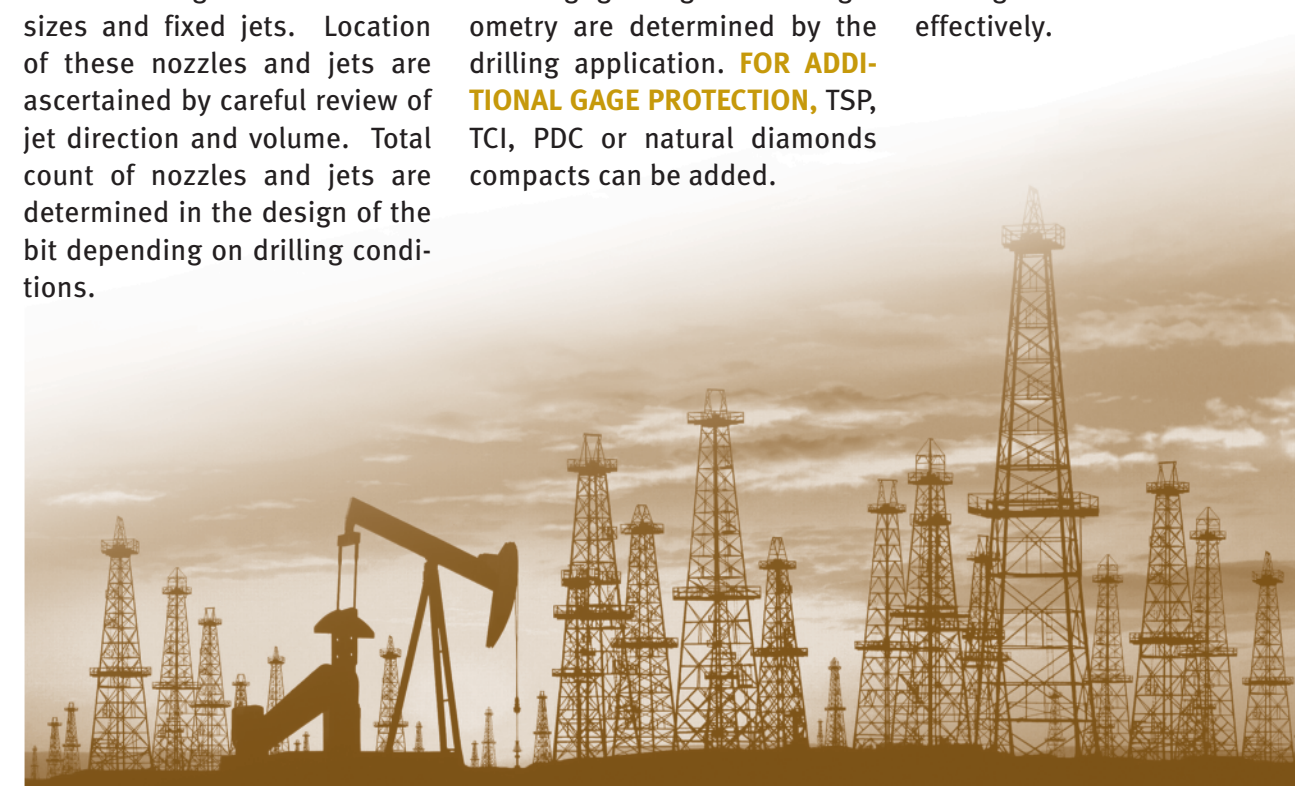
**IMPACT ARRESTERS** restrict the cutting of PDC into the formation. This results in more effective drilling and enhances the stability of the bit.

The gage length and bit geometry are determined by the drilling application. **FOR ADDITIONAL GAGE PROTECTION**, TSP, TCI, PDC or natural diamonds compacts can be added.

In extreme drilling conditions **A SECOND ROW OF CUTTERS** can be added to the bit design for maximum performance.

**BACKREAMING CUTTERS** can be added to the design to prevent sticking when tripping out of the hole.

Our Core Bits have **ADDITIONAL PORTS** to improve cutting removal as well as cooling the PDC cutters more effectively.



# STANDARD US AND STANDARD UM LINES

**BITS OF STANDARD US AND STANDARD UM LINES ARE DESIGNED FOR HORIZONTAL, DIRECTIONAL AND VERTICAL DRILLING.**

- **STANDARD US** line bit body is made of steel and the blades are typically hardfaced. This offers increased wear and erosion resistance in soft, medium-hard, and hard non-abrasive formations as well as low abrasive formations.

- **STANDARD UM** line bit body is made of tungsten carbide. This offers increased wear and erosion resistance in abrasive formations when heavy drilling fluids are required.

### BIT DESIGNATION SAMPLE

**8 1/2 US613**

Cutters size, mm

Blades count:  
3 to 9; 0 – 10 blades; 1 – 11 blades; 2 – 12 blades

Product lines  
(S – steel body; M – matrix body)

Bit size, mm or inch



### PRODUCT RANGE OF STANDARD US AND STANDARD UM LINES

BIT SIZE		BLADES COUNT									
In	mm	3	4	5	6	7	8	9	10	11	12
3 1/4	83.0										
3 3/4	95.4										
3 7/8	98.4										
4 1/8	104.8										
4 1/2	114.3										
4 3/4	120.6										
4 7/8	123.8										
5 1/2	139.7										
5 5/8	142.9										
5 7/8	149.2										
5 3/4	146.0										
6	152.4										
6 1/8	155.6										
6 1/4	158.8										
6 1/2	165.1										
6 3/4	171.4										
7 5/8	193.7										
7 7/8	200.0										
8 3/8	212.7										
8 1/2	215.9										
8 11/16	220.7										
8 3/4	222.2										
9 1/2	241.3										
9 7/8	250.8										
10 5/8	269.9										
11	279.4										
11 5/8	295.3										
12	304.8										
12 1/4	311.1										
13 1/2	342.9										
13 3/4	349.2										
14 1/2	368.3										
14 3/4	374.6										
15 1/2	393.7										
16	406.4										
17 1/2	444.5										
20	508.0										
22	558.8										
23	584.2										
24	609.4										
26	660.4										

**Note:**

- We can manufacture custom drill bits from 3 3/4 to 26 inches in diameter. Drill bits larger than 24 inches in diameter are available in steel body only.
- For specific drilling conditions or according to our customer's requirements, custom bits can be designed.
- Our bits are normally designed with a pin connection, but a bit with a box connection can be designed as well.

## STANDARD UBS AND STANDARD UBM LINES

## STANDARD UCS AND STANDARD UCM LINES

BI-CENTER BITS OF **STANDARD UBS** AND **STANDARD UBM** LINES ARE DESIGNED FOR VERTICAL AND DIRECTIONAL DRILLING AS WELL AS EFFICIENT WELLBORE OPENING.

- **STANDARD UBS** line bit body is made of steel; the blades are hardfaced, which offers increased wear resistance in soft, medium and hard non-abrasive formations as well as erosive wear resistance.

- **STANDARD UBM** line bit body is made of tungsten carbide. This offers increased wear resistance in high abrasive formations and erosive wear resistance when heavy drilling fluids are required.

### BIT DESIGNATION SAMPLE

**12 1/4" x 8 1/2" UBS516**

- Cutters size, mm
- Blades count: 3 to 9; 0 – 10 blades; 1 – 11 blades; 2 – 12 blades
- Product line (B – bicenter; S – steel body; M – matrix body)
- Pass trough diameter, mm or inch
- Drill diameter, mm or inch



- Drill Bits are available in any size up to 17 1/2".
- Our Bit Engineers select special bit design for specific drilling conditions or according to our customers' requirement.

CORE BITS OF **STANDARD UCS** AND **STANDARD UCM** LINES ARE DESIGNED FOR CORING.

- **STANDARD UCS** line Bit body is made of steel; the blades are hardfaced, which offers increased wear resistance in soft, medium and low abrasive formations as well as provide wear resistance to erosion.

- **STANDARD UCM** line Bit body is made of tungsten carbide, which offers increased wear resistance in most abrasive formations and erosive wear resistance when heavy drilling fluids are required.

### HEAD DESIGNATION SAMPLE

**8 1/2" x 4" UCS516**

- Cutters size, mm
- Blades count: 3 to 9; 0 – 10 blades; 1 – 11 blades; 2 – 12 blades
- Product line (C – core head; S – steel body; M – matrix body)
- Core diameter, mm or inch
- Core head OD, mm or inch



- Core Bits are available in any OD size up to 12 1/4".
- Connection thread can be custom made.

## SPECIAL BITS

## REFERENCES

### UI LINE

- **IMPREGNATED BITS** have a matrix body. These bits are impregnated with sharp fine grains of synthetic diamond. The bits are designed for directional and vertical drilling.

- The matrix composition is determined by the formation so that the matrix will wear more quickly than the diamonds.

- Diamond Impregnated bits are designed for exceptional advanced performance when drilling at high

rotary speeds through abrasive formations. Impreg bits are used to improve drill-out ability, and to improve ROP. Cutters are backed up by impregnated matrix material. Deep junk slots improve ROP by optimizing cutting removal.

- We offer specifically placed ports to increase bit cooling and to ensure bit cleaning. TSP is placed on the bit shoulder for increased stability and strength, and greater resistance.

### UD LINE

- **NATURAL DIAMOND BITS** with a matrix body are designed for directional and vertical drilling.

- These bits are designed for rotary or mud motor drilling in hard and extremely abrasive formations.

- UD line of bits are designed to achieve optimal performance in special drilling conditions.

- The natural diamond bit combines a matrix body with polycrystalline diamond, natural or synthetic diamond cutters. The cutting structure consists of polycrystalline diamond cutters brazed into the bit. When

natural or synthetic diamonds are used they are impregnated into the bit.

- Natural diamond bits are used in applications where PDC bits will tend to fail. Some of the more abrasive sandstones will require a natural diamond that dissipates heat better.

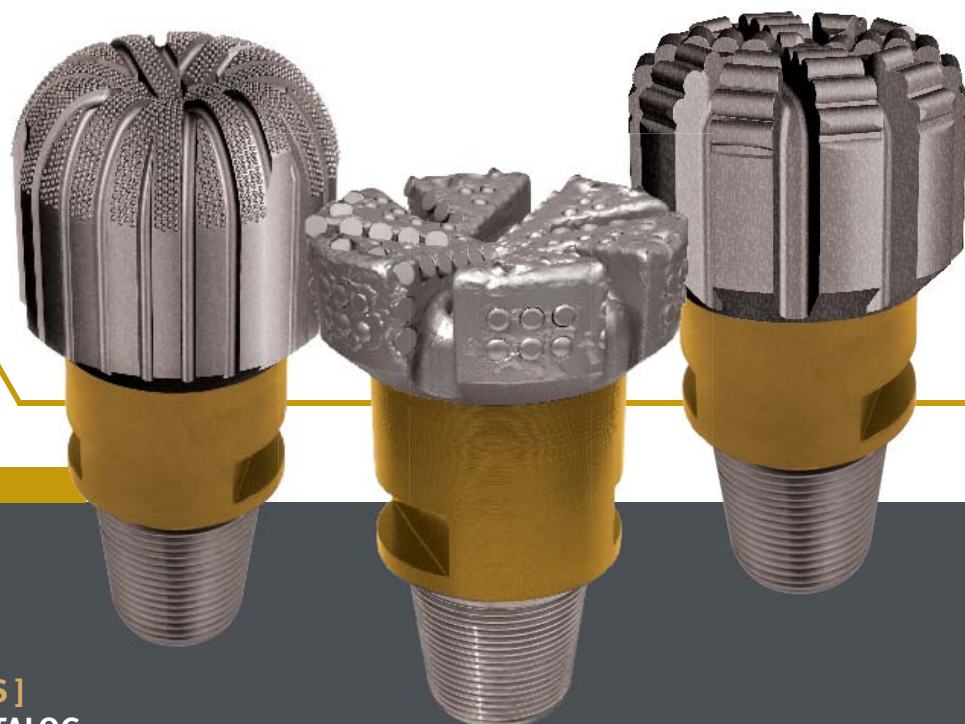
- Hard and abrasive sandstones are too tough for PDC bits to drill economically. These bits offer cost effective drilling in virtually any formation ranging from medium to hard to extremely hard conditions.

### CUTJET LINE (UCJS OR UCJM)

- **FIXED CUTTER SIDETRACKING BITS** with steel or matrix bodies are available with PDC cutters or natural diamonds for the customer's specific applications.

- Sidetracking drill bits feature a short gage and radius on the shoulder to enhance directional changes and provide efficient side-tracking.

For additional information please contact UniDrill.



### FIXED CUTTER BIT TOLERANCES

BIT SIZE OD		OD TOLERANCES	
mm	inch	inch	mm
Less than 171.4	Less than 6 3/4	0 -0.015	0 -0.38
172.2 to 228.6	6 25/32 to 9	0 -0.020	0 -0.51
229.4 to 349.2	9 1/32 to 13 3/4	0 -0.030	0 -0.76
350.0 to 444.5	13 25/32 to 17 1/2	0 -0.045	0 -1.14
445.3 and larger	17 17/32 and larger	0 -0.063	0 -1.60

### FIXED CUTTER BIT CONNECTIONS

BIT SIZE		API REG. CONNECTION SIZE, inch
Inch	mm	
3 1/2 to 4 1/2	88.9 to 114.3	2 3/8
4 17/32 to 5	115.1 to 127.0	2 7/8
5 1/32 to 7 3/8	127.8 to 187.3	3 1/2
7 13/32 to 9 3/8	188.1 to 238.1	4 1/2
9 13/32 to 14 1/2	238.9 to 368.3	6 5/8
14 9/16 to 18 1/2	369.9 to 469.9	6 5/8 or 7 5/8
18 9/16 and larger	471.5 and larger	7 5/8 or 8 5/8

Pin connection can be produced with Box connection.

### STANDARD FIXED CUTTER BIT GAGE

BIT SIZE, inch	GAGE LENGTH, inch
≤ 5.000	2.0
5.001 – 9.000	2.5
9.001 – 13.000	3.0
13.1 – 18.000	3.5

Gage length can be produced according to customer's requirement.

## REFERENCES

### RECOMMENDED MAKE-UP TORQUES FOR FIXED CUTTER BITS

API REG. CONNECTION SIZE, inch	BIT OD, inch	BIT SUB OD, inch	RECOMMENDED MAKE-UP TORQUE, 1000 Ft/lb	RECOMMENDED MAKE-UP TORQUE, kNm
2 3/8	2 3/4 – 4 1/2	3	1.8 – 2.0	2.4 – 2.7
		3 1/8	2.4 – 2.7	3.3 – 3.6
		3 1/4	3.1 – 3.4	4.2 – 4.6
2 7/8	4 3/4 – 5	3 1/2	3.1 – 3.4	4.2 – 4.6
		3 3/4	4.6 – 5.1	6.3 – 6.9
		3 7/8	4.6 – 5.1	6.3 – 6.9
3 1/2	5 7/8 – 6 3/4	4 1/8	5.2 – 5.7	7.0 – 7.7
		4 1/4	6.3 – 6.9	8.6 – 9.4
		4 1/2	7.6 – 8.4	10.3 – 11.4
4 1/2	7 7/8 – 8 3/4	5 1/2	12.5 – 13.7	16.9 – 18.6
		5 3/4	16.5 – 18.1	22.4 – 24.6
		6	20.3 – 22.4	27.6 – 30.3
		6 1/4	20.3 – 22.4	27.6 – 30.3
6 5/8	9 7/8 – 12 1/4	7 1/2	37.1 – 40.8	50.3 – 55.4
		7 3/4	42.7 – 46.9	57.9 – 63.6
		8	42.7 – 46.9	57.9 – 63.6
		8 1/4	42.7 – 46.9	57.9 – 63.6
7 5/8	14 1/2 and larger	8 1/2	48.3 – 53.2	65.6 – 72.1
		8 3/4	57.7 – 63.5	78.3 – 86.1
		9	67.6 – 74.3	91.6 – 100.8
		9 1/4	70.9 – 78.0	96.1 – 105.7
		9 1/2	70.9 – 78.0	96.1 – 105.7

### BIT BREAKERS

API REG. CONNECTION SIZE, inch	BIT BREAKER DESIGN NUMBER
2 3/8	B66i
2 7/8	B76i
3 1/2	B88i
4 1/2	B117i
6 5/8	B152i
7 5/8	B177i

## REFERENCES

### NOZZLES

NOZZLES SERIES	NOZZLE SIZE, mm or inch															
	5.6	6.4	7.1	7.9	8.7	9.5	10.3	11.1	11.9	12.7	13.5	15.9	17.5	19.1	20.6	22.2
	7/32	8/32	9/32	10/32	11/32	12/32	13/32	14/32	15/32	16/32	17/32	20/32	22/32	24/32	26/32	28/32
NL	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

### TOTAL FLOW AREA (TFA) OF STANDARD NOZZLES CHART (in<sup>2</sup>)

NOZZLE SIZE (in)	NUMBER OF NOZZLES									
	1	2	3	4	5	6	7	8	9	10
7/32	0.038	0.075	0.113	0.150	0.188	0.225	0.263	0.301	0.338	0.376
8/32	0.049	0.098	0.147	0.196	0.245	0.295	0.334	0.393	0.442	0.491
9/32	0.062	0.124	0.186	0.249	0.311	0.373	0.435	0.497	0.559	0.621
10/32	0.077	0.153	0.230	0.307	0.383	0.460	0.537	0.614	0.690	0.767
11/32	0.093	0.186	0.278	0.371	0.464	0.557	0.650	0.742	0.835	0.928
12/32	0.110	0.221	0.331	0.442	0.552	0.663	0.773	0.884	0.994	1.104
13/32	0.130	0.259	0.389	0.518	0.640	0.778	0.907	1.037	1.167	1.296
14/32	0.150	0.301	0.451	0.601	0.752	0.902	1.052	1.203	1.353	1.503
15/32	0.173	0.345	0.518	0.690	0.863	1.035	1.208	1.381	1.553	1.726
16/32	0.196	0.393	0.589	0.785	0.982	1.178	1.374	1.571	1.767	1.963
18/32	0.249	0.497	0.746	0.994	1.243	1.491	1.740	1.988	2.237	2.485
20/32	0.307	0.614	0.920	1.227	1.534	1.841	2.148	2.454	2.761	3.068
22/32	0.371	0.742	1.114	1.485	1.856	2.227	2.599	2.970	3.341	3.712
24/32	0.442	0.883	1.325	1.766	2.208	2.649	3.091	3.533	3.974	4.416
26/32	0.518	1.036	1.555	2.073	2.591	3.109	3.628	4.146	4.664	5.182
28/32	0.601	1.202	1.803	2.404	3.005	3.606	4.207	4.808	5.409	6.010

### WRENCHES

NOZZLES SERIES	WRENCH DESIGN NUMBER
NM, NL	KML



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