

OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT, ISLAMABAD
FOREIGN SECTION B

(To be completed, filled in, signed and stamped by the principal)

ANNEXURE 'A'

Material PROCUREMENT OF PDC & TRICON BITS
Tender Enquiry No PROC-FB/LCB/D-4778-A/2021
Due Date
Evaluation Criteria ITEM WISE

SCHEDULE OF REQUIREMENT

Sr No	Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY SEA	Total Price C & F BY SEA	Deviated From Tender Spec. If Any
1	BIT,PDC,26",7-5/8" API REG PIN CONN,06 BLADES,CUTTER 16 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	4					
2	BIT,PDC,17-1/2",7-5/8" API REG PIN CONN,06 BLADES,CUTTER 19 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
3	BIT,PDC,17-1/2",7-5/8" API REG PIN CONN,05 BLADES,CUTTER 19 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
4	BIT,PDC,17-1/2",7-5/8" API REG PIN CONN,06 BLADES,CUTTER 16 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	2					
5	BIT, PDC, SIZE 12-1/4", 5 BLADES, 19MM CUTTER SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
6	BIT,PDC,12-1/4", 6-5/8" API REG PIN,06 BLADES,CUTTER 19 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
7	BIT,PDC,12-1/4", 6-5/8" API REG PIN,06 BLADES,CUTTER 16 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	20					
8	BIT,PDC,12-1/4", 6-5/8" API REG PIN,07 BLADES,CUTTER 16 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
9	BIT,PDC,8-1/2", 4-1/2" API REG PIN,06 BLADES,CUTTER 16 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
10	BIT,PDC,8-1/2", 4-1/2" API REG PIN,06 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
11	BIT,PDC,8-1/2", 4-1/2" API REG PIN,08 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
12	BIT, PDC, SIZE 8-1/2", CONNECTION 4-1/2" API REG PIN, 7 BLADES, 13 MM CUTTER SIZE,DETAIL DESCRIPTION ATTACHED.	Number	20					
13	BIT,PDC,6", 3-1/2" API REG PIN,06 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
14	BIT,PDC,6", 3-1/2" API REG PIN,07 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
15	BIT,PDC,5-7/8", 3-1/2" API REG PIN,06 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
16	BIT,PDC,5-7/8", 3-1/2" API REG PIN,07 BLADES,CUTTER 13 MM SIZE,DETAIL DESCRIPTION ATTACHED.	Number	10					
17	BIT, PDC, 5-7/8", 3-1/2" CONNECTION, 7 / 8 BLADES, 11 MM CUTTER, DETAIL DESCRIPTION ATTACHED.	Number	10					
18	BIT, PDC, 4-1/8", 2-3/8" CONNECTION, 5 / 6 BLADES, 9 / 11 MM CUTTER, DETAIL DESCRIPTION ATTACHED.	Number	5					
19	BIT, SIZE 26", CONNECTION 7-5/8" API REG PIN, IADC CODE 115M,DETAIL DESCRIPTION ATTACHED.	Number	10					
20	BIT, SIZE 26", CONNECTION 7-5/8" API REG PIN, IADC 135M,DETAIL DESCRIPTION ATTACHED.	Number	5					
21	BIT, ROCK, 17-1/2", IADC CODE 435M,DETAIL DESCRIPTION ATTACHED.	Number	5					
22	BIT, SIZE 17-1/2" , CONNECTION 7-5/8" API REG. PIN, IADC CODE 515M, DETAIL DESCRIPTION ATTACHED.	Number	5					
23	BIT, SIZE 12-1/4", THREAD 6-5/8" REG. PIN IADC 137M, DETAIL DESCRIPTION ATTACHED.	Number	20					
24	BIT, SIZE 12-1/4" , THREAD 6-5/8" REG. PIN IADC 517M,DETAIL DESCRIPTION ATTACHED.	Number	10					

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Evaluation Criteria ITEM WISE

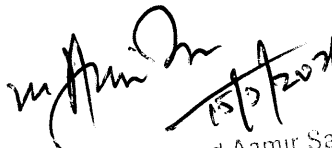
25	BIT, SIZE 12-1/4", CONNECTION 6-5/8" API REG. PIN, IADC CODE 537M,DETAIL DESCRIPTION ATTACHED.	Number	10
26	BIT, SIZE 8-1/2" , THREAD 4-1/2" REG. PIN IADC 137M,DETAIL DESCRIPTION ATTACHED.	Number	20
27	BIT, SIZE 8-1/2" ,THREAD 4-1/2" REG. PIN IADC 437M,DETAIL DESCRIPTION ATTACHED.	Number	10
28	BIT, SIZE 8-1/2" ,CONNECTION 4-1/2" API REG. PIN, IADC CODE 517M, DETAIL DESCRIPTION ATTACHED.	Number	10
29	BIT, SIZE 8-1/2" ,THREAD 4-1/2" REG. PIN IADC 537M,DETAIL DESCRIPTION ATTACHED.	Number	10
30	BIT ROCK, SIZE 6", CONNECTION 3-1/2" API REG PIN, IADC CODE 137M, DETAIL DESCRIPTION ATTACHED.	Number	10
31	BIT, SIZE 5-7/8", CONNECTION 3-1/2" API REG. PIN, IADC CODE 137M,DETAIL DESCRIPTION ATTACHED.	Number	10
32	BIT, SIZE 5-7/8", CONNECTION 3-1/2" API REG. PIN, IADC CODE 517M, DETAIL DESCRIPTION ATTACHED.	Number	10
33	BIT, SIZE 5-7/8", CONNECTION 3-1/2" API REG. PIN, IADC CODE 537M, DETAIL DESCRIPTION ATTACHED.	Number	10
34	BIT, ROCK, SIZE 4-1/8", CONNECTION 2-3/8" API REG. PIN, IADC CODE 137M, DETAIL DESCRIPTION ATTACHED.	Number	5


Note:

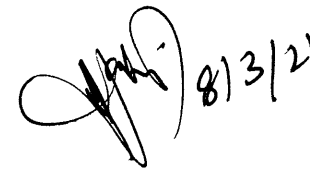
- i. BID BOND OF US \$ 80,000/- EQUIVALENT PAK RUPEES MUST BE SUBMITTED WITH THE TECHNICAL BID WITH VALIDITY OF 150 DAYS BEYOND OPENING DATE.
- ii. BID VALIDITY IS 120 DAYS BEYOND OPENING DATE.
- iii. BIDDING PROCEDURE IS "SINGLE STAGE SINGLE ENVELOPE" MASTER SET OF TENDER DOCUMENT IS AVAILIABLE ON OGDCL'S WEBSITE.
- iv. EVALUATION CRITERIA IS EACH ITEM WISE C&F BY SEA KARACHI.

Terms of Reference

1. Technical Literature in Original for all offered Bits specifying comprehensive details as per Manufacturer standard should be submitted with the offer.
2. In case of any deviation from SOR technical Specification, then it is mandatory to put all deviations in a separate column against each bit. Failing to mention the deviation in specifications if any against each bit will lead to disqualification against that Group.
3. Bidder should provide Three (03) Nos. of Best performance records against offered bits from internationally reputable E&P Companies like Exxon, Chevron, Shell, ARAMCO, QP, ADNOC, OMV, PPL, MOL etc.
4. All bits should be new/unused and confirmation to this effect must be provided in the offer. PDC bits with reclaimed cutters will not be acceptable and will lead to disqualification of the supplier.
5. Bidder MUST offer latest technology and CUTTERS. Cutters brand name MUST be provided in the Bid. Bidder is required to provide on original cutter manufacturer letter head regarding CUTTER type/Brand name, deep leached, size, cutter content, Serial number etc. Failure to provide this letter in original before shipping will lead to rejection of material by OGDCL and disqualification of the supplier.
6. Warranty/Guarantee on the manufacturer official letterhead must be furnished with the offer indicating that quoted bits will drill at least average meterage based on average meterage of best provided runs against each bit. In case of bit failure/less meterage than the average meterage of best runs, free of cost replacement of bit along with nozzles will be made immediately by the bidder otherwise action will be taken as per OGDCL Rules.
7. The manufacturer MUST have their qualified Bit application Engineer based in Pakistan having minimum of 5 years' experience and must be available as and when required. Confirmation to this effect MUST be provided in the offer.
8. The successful bidder shall ensure to provide Bit Engineer support Free of Cost and is bound to station 01 qualified Bit Engineer in Pakistan.
9. Bidder to confirm that type, size, serial number and country of origin/manufacturing MUST be engraved on each bit.
10. The successful bidder will be required to furnish mill test certificates of offered bits along with shipping documents. Confirmation to this effect shall be provided in the technical offer.
11. Third Party inspection by internationally reputed inspection company is required for each consignment against issued Purchase order. TPI will be arranged by OGDCL from any of the following parties (i) M/s SGS Pakistan (Pvt) Limited, Pakistan (ii) M/S Bureau VERITAS Pakistan (Pvt) Limited, Pakistan (iii) M/S TUV Austria Bureau of Inspection & certification (Pvt) Limited, Pakistan (iv) M/S TUV Rheinland Arabia LLC, Pakistan (v) M/S Velosi Pakistan. Bidder will assist and make necessary arrangements for TPI. Bidder to confirm that Third Party Inspection report verified by OGDCL will be provided with the shipping documents for LC encashment.
12. Successful bidder will supply against each bit the required nozzles (full range covering all the requested sizes and other reasonable sizes) nozzle installation tools (wrenches, pliers as required) bit breakers for quoted bits, ring gauges and other necessary items if any free of cost.


15/3/2021
Muhammad Aamir Salim
E.D/Petroserve
Ext: 3503


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Ext: 3711


8/3/21

13. Evaluation Criteria will be each item wise.

14. Successful supplier will fill out FULL/COMPLETE information in the below table on official letterhead of Bit manufacturer with sign/stamped and provide it to TPI inspector before shipment in Original (same is required to be shared with Shipping documents for LC encashment);

(Applicable ONLY for PDC bits not for Roller Cone bits)

Index #/Sr # of PO	Size	Bit Type	Serial Number	Installed Cutter Name	Installed cutters are Deep leached or Not	Installed Cutter Manufacturer Name

15. Delivery Period: Within 02 months through C&F by Sea after the establishment of LC.

Scope of Work for TPI

Full Process inspection will be carried out by nominated TPI Company at the manufacturing facility from the start of production (1st Day). In addition to full process inspection of the bits as per API 7-1, TPI Company will also perform the following tasks

- A. Verification of full ultrasonic inspection where applicable
- B. Verification of carats of each PDC Bit cutter (This information will also be provided on official letterhead as per clause 16 of TOR)
- C. Visual Inspection for any defects
- D. API Drift where applicable
- E. Verification that Cutters installed on PDC Bits being supplied to OGDCL are of USA origin.
- F. Verification of mill test certificates
- G. Verification that all equipment is brand new and unused
- H. Verification that all material (quantities & specifications) and documents are in accordance with Purchase order and API 7-1 Specifications
- I. Verification of all Raw Materials (required/used for manufacturing of bits) certificates for country of origin.
- J. Verification of documents for Carrat content against each size of cutters being supplied to OGDCL.


Muhammad Amir Salim
 15/3/2021
 Muhammad Amir Salim
 E.D.(Petroserv)
 Ext: 3503

Ghulam Yasir
 5/3/21
 GHULAM YASIR
 AGM (DO)
 Ext: 3711


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PDC Bits Technical Specifications

Index No.	Item No.	Group	Qty	Size	Description	DETAIL DESCRIPTION	Bit Body	Cutter Name	Impact/Abrasion Resistant	Single/Double Row	Deep Leached (Yes/No)	No. of Cutters
16-01-001-F	1	A	4	26"	PDC bit with 6 blades and 16mm cutters and 7-5/8" Regular Pin <u>with back up cutters.</u>	<p>26" PDC bit, Steel body, 16 mm Primary cutters, 06 Bladed with 8-12 Nos of variable nozzles 7-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Steel	to be specified by bidder	Optimum Impact/Abrasion Resistant	Single Row	Yes	min 125
16-14-053-F	2	B	10	17 1/2"	PDC bit with 6 blades and 19mm cutters and 7-5/8" Regular Pin <u>with back up cutters.</u>	<p>17.5" PDC bit, Steel body, 19 mm Primary cutters, 06 Bladed with 7-10 Nos of variable nozzles 7-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Steel	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 80
16-14-054-F	3	B	10	17 1/2"	PDC bit with 5 blades and 19mm cutters and 7-5/8" Regular Pin <u>with back up cutters.</u>	<p>17.5" PDC bit, Steel body, 19 mm Primary cutters, 05 Bladed with 7-10 Nos of variable nozzles 7-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. Strategically placed 3D Shaped Cutters for high ROP. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Steel	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 70


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16-14-055-F	4	B	2	17 1/2"	PDC bit with 6 blades and 16mm cutters and 7-5/8" Regular Pin <u>with back up cutters</u>	<p>17.5" PDC bit, Matrix body, 16 mm Primary cutters, 06 Bladed with 7-10 Nos of variable nozzles 7-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 110
16-14-103-F	5	C	10	12 1/4"	PDC bit with 5 blades and 19mm cutters and 6-5/8" Regular Pin <u>with back up cutters</u>	<p>12.25" PDC bit, Steel body, 19 mm Primary cutters, 05 Bladed with 6-9 Nos of variable nozzles 6-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Steel	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 60
16-14-107-F	6	C	10	12 1/4"	PDC bit with 6 blades and 19mm cutters and 6-5/8" Regular Pin <u>with back up cutters</u>	<p>12.25" PDC bit, Matrix body, 19 mm Primary cutters, 06 Bladed with 6-9 Nos of variable nozzles 6-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted.</p> <p>Features:</p> <ol style="list-style-type: none"> 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. <p>Bidder to provide Bit Specification Sheet & Best Performance Record</p>	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 75


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 AGM (DO)
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16-14-109-F	7	C	20	12 1/4"	PDC bit with 6 blades and 16mm cutters and 6-5/8" Regular Pin <u>with back up cutters.</u>	12.25" PDC bit, Matrix body, 16 mm Primary cutters, 06 Bladed with 6-9 Nos of variable nozzles 6-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise.3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 90
16-14-110-F	8	C	10	12 1/4"	PDC bit with 7 blades and 16mm cutters and 6-5/8" Regular Pin <u>with back up cutters.</u>	12.25" PDC bit, Matrix body, 16 mm Primary cutters, 07 Bladed with 7-9 Nos of variable nozzles 6-5/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 100
16-12-060-F	9	D	10	8 1/2"	PDC bit with 6 blades and 16mm cutters and 4-1/2" Regular Pin <u>with back up cutters.</u>	8.5" PDC bit, Matrix body, 16 mm Primary cutters, 06 Bladed with 6-8 Nos of variable nozzles 4-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 65

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16-12-062-F	10	D	10	8 1/2"	PDC bit with 6 blades and 13mm cutters and 4-1/2" Regular Pin <u>with back up cutters</u>	8.5" PDC bit, Matrix body, 13 mm Primary cutters, 06 Bladed with 6-8 Nos of variable nozzles 4-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 75
16-12-063-F	11	D	10	8 1/2"	PDC bit with 8 blades and 13mm cutters and 4-1/2" Regular Pin <u>with back up cutters</u>	8.5" PDC bit, Matrix body, 13 mm Primary cutters, 08 Bladed with 6-9 Nos of variable nozzles 4-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 90
16-12-061-F	12	D	20	8 1/2"	PDC bit with 7 blades and 13mm cutters and 4-1/2" Regular Pin <u>with back up cutters</u>	8.5" PDC bit, Matrix body, 13 mm Primary cutters, 07 Bladed with 6-8 Nos of variable nozzles 4-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise.3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 75

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16-12-082-F	13	E	10	6"	PDC bit with 6 blades and 13mm cutters and 3-1/2" Regular Pin <u>with back up cutters</u>	6" PDC bit, Matrix body, 13 mm Primary cutters, 06 Bladed with 6-8 Nos of variable nozzles 3-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 45
16-12-083-F	14	E	10	6"	PDC bit with 7 blades and 13mm cutters and 3-1/2" Regular Pin <u>with back up cutters</u>	6" PDC bit, Matrix body, 13 mm Primary cutters, 07 Bladed with 6-8 Nos of variable nozzles 3-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise.3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 50
16-12-105-F	15	F	10	5 7/8"	PDC bit with 6 blades and 13mm cutters and 3-1/2" Regular Pin <u>with back up cutters</u>	5-7/8" PDC bit, Matrix body, 13 mm Primary cutters, 06 Bladed with 5-7 Nos of variable nozzles 4-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 40

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AGM (DO)
Ext. 8711



16-12-106-F	16	F	10	5 7/8"	PDC bit with 7 blades and 13mm cutters and 3-1/2" Regular Pin <u>with back up cutters</u>	5-7/8" PDC bit, Matrix body, 13 mm Primary cutters, 07 Bladed with 5-7 Nos of variable nozzles 3-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 45
16-11-704-F	17	F	10	5 7/8"	PDC bit with 7/8 blades and 11mm cutters and 3-1/2" Regular Pin <u>with back up cutters</u>	5-7/8" PDC bit, Matrix body, 11 mm Primary cutters, 7/8 Bladed with 5-7 Nos of variable nozzles 3-1/2" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 60
16-12-151	18	G	5	4 1/8"	PDC bit with 5/6 blades and 11/9 mm cutters and 2-3/8" Regular Pin <u>with or without back up cutters</u>	4-1/8" PDC bit, Matrix body, 11/9 mm Primary cutters, 5/6 Bladed with 2-5 Nos of variable nozzles 2-3/8" Regular Pin. Only bits with Top Notch cutters and proven records will be accepted. Features: 1) Premium Top of line High Abrasion Resistant/ High Impact resistant Cutters. 2) Double Row Cutters with offset from primary cutters to ensure no ROP compromise. 3) Agressive Back Rack Angle for Good ROP. 4) Back reaming features 5) Vibration Control inserts if design permits 6) Having high Junk slot area & NFV Ratio for better cleaning and ROP 7) Anti Bit balling coating to prevent severe bit balling. Efficient Hydraulics / cleaning 8) Extra enhanced Premium TSP gauge protection to ensure maximum gauge-holding ability in the most abrasive directional drilling environments. 9) Suitable for Directional Drilling. Bidder to provide Bit Specification Sheet & Best Performance Record	Matrix	to be specified by bidder	Optimum Impact/Abrasion Resistant	Double Row	Yes	min 25

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No. of 3Dimensional Cutters (Shaped Cutters)	Vibration Control	No. of Nozzles	Gauge Length (inch)	Junk Slot Area (in2)	Back Reaming	Gauge Protection	Rotary/Motor/RSS Compatible	Directional Feature	Nozzles Requirements
to be specified by bidder	Yes	8-12	4-6"	min 120	Yes	TSP Protection	Yes	Yes	04 NOS, BIT BREAKER PLATES AGAINST 04 NUMBER 26" PDC BIT , 04 NOS. NOZZLE KEYS . 08 SETS EACH OF 16/32", 08 SETS OF 18/32", 08 SETS OF 20/32" & 08 SETS OF 22/32" NOZZLES FOR 04 NOS 26" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	7-10	3.5-4.5"	min 80	Yes	TSP Protection	Yes	Yes	10 NOS, BIT BREAKER PLATES AGAINST 10 NUMBER 17-1/2" PDC BIT , 10 NOS. NOZZLE KEYS . 20 SETS EACH OF OF 14/32", 20 SETS OF 16/32", 20 SETS OF 18/32" & 20 SETS OF 20/32" NOZZLES FOR 10 NOS 17-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS)
to be specified by bidder	Yes	7-10	3-4.5"	min 75	Yes	TSP Protection	Yes	Yes	10 NOS, BIT BREAKER PLATES AGAINST 10 NUMBER 17-1/2" PDC BIT , 10 NOS. NOZZLE KEYS . 20 SETS EACH OF OF 14/32", 20 SETS OF 16/32", 20 SETS OF 18/32" & 20 SETS OF 20/32" NOZZLES FOR 10 NOS 17-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS)

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to be specified by bidder	Yes	7-10	3.5-6"	min 80	Yes	TSP Protection	Yes	Yes	02 NOS. BIT BREAKER PLATES AGAINST 02 NUMBER 17-1/2" PDC BIT, 02 NOS. NOZZLE KEYS, 04 SETS EACH OF 14/32", 04 SETS OF 16/32", 04 SETS OF 18/32" & 04 SETS OF 20/32" NOZZLES FOR 02 NOS 17-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-9	3-4"	min 60	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBERS 12-1/4" PDC BITS, 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 14/32", 20 SETS OF 16/32", 20 SETS OF 18/32" & 20 SETS OF 20/32" NOZZLES FOR 10 NOS 12-1/4" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-9	3-4"	min 25	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBERS 12-1/4" PDC BITS, 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 14/32", 20 SETS OF 16/32", 20 SETS OF 18/32" & 20 SETS OF 20/32" NOZZLES FOR 10 NOS 12-1/4" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).



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to be specified by bidder	Yes	6-9	3-4"	min 30	Yes	TSP Protection	Yes	Yes	20 NOS. BIT BREAKER PLATES AGAINST 20 NUMBERS. 12-1/4" PDC BITS , 20 NOS. NOZZLE KEYS. 40 SETS EACH OF 14/32", 40 SETS OF 16/32", 40 SETS OF 18/32" & 40 SETS OF 20/32" NOZZLES FOR 20 NOS 12-1/4" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	7-9	3-4"	min 25	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBERS 12-1/4" PDC BITS , 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 14/32", 20 SETS OF 16/32", 20 SETS OF 18/32" & 20 SETS OF 20/32" NOZZLES FOR 10 NOS 12-1/4" PDC BITS.(02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-8	2.5-3.5"	min 10	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATES AGAINST 10 NUMBERS. 8-1/2" PDC BITS , 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 12/32", 20 SETS OF 14/32", 20 SETS OF 16/32" & 20 SETS OF 18/32" NOZZLES FOR 10 NOS 8-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).

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to be specified by bidder	Yes	6-8	2-3"	min 10	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATES AGAINST 10 NUMBERS. 8-1/2" PDC BITS, 10 NOS. NOZZLE KEYS, 20 SETS EACH OF 12/32", 20 SETS OF 14/32", 20 SETS OF 16/32" & 20 SETS OF 18/32" NOZZLES FOR 10 NOS 8-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-9	2-3"	min 7	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATES AGAINST 10 NUMBERS. 8-1/2" PDC BITS, 10 NOS. NOZZLE KEYS, 20 SETS EACH OF 12/32", 20 SETS OF 14/32", 20 SETS OF 16/32" & 20 SETS OF 18/32" NOZZLES FOR 10 NOS 8-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-8	2-3"	min 7	Yes	TSP Protection	Yes	Yes	20 NOS. BIT BREAKER PLATES AGAINST 20 NUMBERS. 8-1/2" PDC BITS, 20 NOS. NOZZLE KEYS, 40 SETS EACH OF 12/32", 40 SETS OF 14/32", 40 SETS OF 16/32" & 40 SETS OF 18/32" NOZZLES FOR 20 NOS 8-1/2" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).



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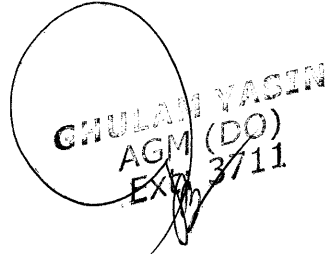


to be specified by bidder	Yes	6-8	2-3"	min 5	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBER 6" PDC BIT, 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 10/32", 20 SET OF 12/32", 20 SETS OF 14/32" & 20 SETS OF 16/32" NOZZLES FOR 10 NOS 6" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	6-8	2-3"	min 5	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBER 6" PDC BIT, 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 10/32", 20 SET OF 12/32", 20 SETS OF 14/32" & 20 SETS OF 16/32" NOZZLES FOR 10 NOS 6" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	4-7	1.5-3"	min 3	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBER 5-7/8" PDC BIT, 10 NOS. NOZZLE KEYS. 20 SETS EACH OF 10/32", 20 SET OF 12/32", 20 SETS OF 14/32" & 20 SETS OF 16/32" NOZZLES FOR 10 NOS 5-7/8" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).

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to be specified by bidder	Yes	5-7	1.5-3"	min 3	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBER 5-7/8" PDC BIT , 10 NOS. NOZZLE KEYS, 20 SETS EACH OF 10/32", 20 SET OF 12/32", 20 SETS OF 14/32" & 20 SETS OF 16/32" NOZZLES FOR 10 NOS 5-7/8" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	5-7	1.5-3"	min 3	Yes	TSP Protection	Yes	Yes	10 NOS. BIT BREAKER PLATE AGAINST 10 NUMBER 5-7/8" PDC BIT , 10 NOS. NOZZLE KEYS, 20 SETS EACH OF 10/32", 20 SET OF 12/32", 20 SETS OF 14/32" & 20 SETS OF 16/32" NOZZLES FOR 10 NOS 5-7/8" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).
to be specified by bidder	Yes	3-6	1-2.5	min 2	Yes	TSP Protection	Yes	Yes	05 NOS. BIT BREAKER PLATE AGAINST 05 NUMBER 4-1/8" PDC BIT , 05 NOS. NOZZLE KEY, 10 SETS EACH OF 10/32" 10 SETS OF 12/32" & 10 SETS OF 14/32" NOZZLES FOR 05 NOS 4-1/8" PDC BITS. (02 SETS OF EACH SIZE NOZZELS).



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Roller Cone Bits Technical Specifications

INDEX #	SR # AS INDENT	GROUP	DETAILED DESCRIPTION OF BITS (TRICONE BITS)	BITS QTY REQUIRED	ACCESSORIES QTY REQUIRED
16-01-012-F	19	H	SIZE 26" , IADC 115M , Teeth/Insert count: 100+ Premimu Dual Cap Hard facing, Gage protected by back row inserts, thick shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Centre.Jet, Superior Sealed Roller Bearing, Good to run on PDM, 7-5/8" API REG PIN. (C.Jet size : 18/32" Preinstalled in each bit).	10	10 NOS. NOZZLE KEYS. 20 SETS EACH OF 18/32", 20/32" & 22/32" NOZZLES FOR 10 NOS 26" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-097-F	20	H	SIZE 26" , IADC 135M , Teeth/Insert count: 160+ Premimu Dual Cap Hard facing, Gage protected by back row inserts, thick shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Centre.Jet, Superior Sealed Roller Bearing, Good to run on PDM, 7-5/8" API REG PIN. (C.Jet size : 18/32" Preinstalled in each bit).	5	05 NOS. NOZZLE KEYS. 10 SETS EACH OF 18/32", 20/32" & 22/32" NOZZLES FOR 5 NOS 26" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-046-F	21	I	Size 17-1/2" IADC 435M , Teeth/Insert count: 150+, Chiesel shaped inserts, gage proteced by back row inserts Min 50% Diamond Enhanced "D" Feature, Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 7-5/8" API REG PIN.	5	05 NOS. NOZZLE KEYS. 10 SETS EACH OF 16/32", 18/32", 20/32" NOZZLES & 22/32" NOZZLES FOR 5 NOS 17-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS).
16-01-071-F	22	I	Size 17-1/2" IADC 515M , Premium Inserts, Chiesel shaped inserts, Insert count 250+, gage proteced by back row inserts Min 50% Diamond Enhanced "D" Feature, Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 7-5/8" API REG PIN.	5	05 NOS. NOZZLE KEYS. 10 SETS EACH OF 16/32", 18/32", 20/32" & 22/32" NOZZLES FOR 5 NOS 17-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS).
16-01-178-F	23	J	Size 12-1/4" IADC 137M , Premium Dual Cap Hardfacing, gage proteced by back row inserts , Insert count 100+Min 50% Diamond Enhanced "D" Feature, Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Centre Jet, Good to Run on PDM. 6-5/8" API REG PIN. (C.Jet size : 16/32" Preinstalled in each bit)	20	20 NOS. NOZZLE KEYS. 40 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 20 NOS 12-1/4" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-176-F	24	J	Size 12-1/4" IADC 517M , Premium Inserts, Chiesel shaped inserts, Insert count 150+, gage proteced by back row inserts Min 50% Diamond Enhanced "D" Feature, Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 6-5/8" API REG PIN.	10	10 NOS. NOZZLE KEYS. 20 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 10 NOS 12-1/4" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS).
16-01-114-F	25	J	Size 12-1/4" IADC 537M , Premium Inserts, Inner row Chiesel shaped inserts, Gage Row conical inserts, Insert count 170+. Gage proteced by double back row inserts Minimum 50% Diamond Enhanced "D" Feature, Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 6-5/8" API REG PIN.	10	10 NOS. NOZZLE KEYS. 20 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 10 NOS 12-1/4" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS).

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16-01-314-F	26	K	Size 8-1/2" IADC 137M , Premium Dual Cap Hardfacing, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 80+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 4-1/2" API REG PIN.	20	20 NOS . NOZZLE KEYS. 40 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 20 NOS 8-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS).
16-01-318-F	27	K	Size 8-1/2" IADC 437M , Premium Inserts, Chiesel shaped, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 90+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 4-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 10 NOS 8-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-266-F	28	K	Size 8-1/2" IADC 517M , Premium Inserts, Chiesel shaped, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 150+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 4-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 10 NOS 8-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-313-F	29	K	Size 8-1/2" IADC 537M , Premium Inserts, Chiesel shaped, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 150+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 4-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 14/32", 16/32", 18/32" & 20/32" NOZZLES FOR 10 NOS 8-1/2" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-409-F	30	L	Size 6" IADC 137M , Premium Dual Cap Hardfacing, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 90+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 3-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 10/32", 12/32", 14/32" & 16/32" NOZZLES FOR 10 NOS 6" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-468-F	31	M	Size 5-7/8" IADC 137M , Premium Dual Cap Hardfacing, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 80+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 3-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 10/32", 12/32", 14/32" & 16/32" NOZZLES FOR 10 NOS 5-7/8" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-467-F	32	M	Size 5-7/8" IADC 517M , Premium Inserts, Chiesel shaped, gage protected by back row inserts Minimum 50% Diamond Enhanced "D" Feature, Insert count 115+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 3-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 10/32", 12/32", 14/32" & 16/32" NOZZLES FOR 10 NOS 5-7/8" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-466-F	33	M	Size 5-7/8" IADC 537M , Premium Inserts, Chiesel shaped, gage protected by back row inserts 50% Diamond Enhanced "D" Feature, Insert count 130+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail, Superior Sealed Journal Bearing. Good to Run on PDM. 3-1/2" API REG PIN.	10	10 NOS . NOZZLE KEYS. 20 SETS EACH OF 10/32", 12/32", 14/32" & 16/32" NOZZLES FOR 10 NOS 5-7/8" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)
16-01-492-F	34	N	Size 4-1/8" IADC 137/236M , Premium Dual Cap Hardfacing, gage protected by back row inserts. Insert count 80+. Thick Shirrtail hardfacing, Shirrtail protection by TC inserts on entire length of shirrtail. Superior Sealed Journal Bearing. 2-3/8" API REG PIN.	5	05 NOS . NOZZLE KEYS. 10 SETS EACH OF 12/32", 14/32" & 16/32" NOZZLES FOR 05 NOS 4-1/8" ROCK BITS. (02 SETS OF EACH SIZE NOZZELS)

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