



**Corrigendum to Tender**

**for**

**Supply of CNC Tooling**

**(Tender Ref.: NSIC/Tool Room/2016-17/94(76))**

**The National Small Industries Corporation  
Limited**

(A Government of India Enterprise)  
Okhla Industrial Estate, Phase III  
New Delhi-110020

Tel No. 011-26826801, 26826847, 26382007  
Fax: - 011-26826783

Email: [ntscok@nsic.co.in](mailto:ntscok@nsic.co.in)  
Website: [www.nsic.co.in](http://www.nsic.co.in)

## Corrigendum

Subject: Corrigendum to tender for supply of CNC Tooling.

Reference is made to Tender No. NSIC/Tool Room/2016-17/94(76) w.r.t for supply of CNC Tooling. In this regard it is informed that there are following amendments in the tender documents. Bidder may accordingly bid the same.

1. Clause:-

**Annexure A (page No. 14 to 26)**

**Details of requirements and technical specifications of tooling**

Name of the Item: CNC Tooling (1 Set)

Sr No	Description	Specification	Qty (Nos.)
<b>Item1</b>	<b>Face Milling Cutter Dia 80 mm with inserts and holder</b>		
1.1	Face Milling Cutter Dia 80 mm	Tool cutting edge angle -45 degree	6
		Cutting diameter -80 mm	
		No of inserts - 6	
		Depth of cut maximum - 6 mm	
		Hand - Right	
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 27	
		Cutting pitch differential , Body material code - Steel	
1.2	Inserts	Inscribed Circle Diameter - 13 mm	500
		Insert shape code - S	
		Cutting edge effective length - 8.8 mm	
		Wiper edge length - 2 mm	
		Corner radius - 0.8 mm	
		Major cutting edge angle - 45 deg	
		Hand - Right	
		Coating - CVD Ti (C, N) + Al2O3 + TiN	
		Insert thickness - 5.6 mm	
1.3	Suitable Basic Holder BT 40 to face mill arbor dia 27 mm	Adaptive interface Work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) -metric: 27	6
		Connection retention knob thread size M16	
		Connection diameter - 27 mm	
		Functional length - 100 mm	
		Body material code - Steel	

<b>Item 2</b>		<b>Shoulder milling cutter Dia 50 mm with inserts and holder</b>	
2.1	Shoulder milling cutter dia 50 mm	Cutting diameter - 50 mm	5
		No of inserts - 5	
		Depth of cut maximum - 10 mm	
		Maximum ramping angle - 1.4 deg	
		Cutting pitch differential	
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 22	
		Hand - Right	
		Connection diameter - 22 mm	
		Functional length - 40 mm	
		Body material code - Steel	
		2.2	
Cutting edge effective length - 10 mm			
Wiper edge length - 1.2 mm			
Corner radius - 0.8 mm			
Major cutting edge angle - 90 deg			
Hand - Right			
Coating - CVD Ti (C, N) + Al2O3 + TiN			
Insert thickness - 3.59 mm ; insert code : AP			
2.3	Suitable Basic Holder BT 40 to face mill arbor dia 22 mm	Adaptive interface work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) -metric: 27	5
		Connection retention knob thread size - M16	
		Connection diameter - 22 mm	
		Functional length - 100 mm	
		Body material code - Steel	
<b>Item 3</b>		<b>Shoulder milling cutter dia 32 mm, long 192 mm with inserts and holder</b>	
3.1	Shoulder milling cutter dia 32 mm long 192 mm	Cutting diameter - 32 mm	5
		No of inserts - 2	
		Depth of cut maximum - 10 mm	
		Maximum ramping angle - 5.5 deg	
		Usable length - 192 mm	
		Cutting pitch differential -true	
		Hand - Right	
		Damping property - True	
		Connection diameter - 50 mm	
		Functional length - 217 mm	
		Body material code - Steel	

3.2	Inserts	Insert width - 6.8 mm	500
		Insert shape code - AP	
		Cutting edge effective length - 10 mm	
		Wiper edge length - 1.2 mm	
		Corner radius - 0.8 mm	
		Major cutting edge angle - 90 deg	
		Hand - Right	
		Coating - PVD (Ti,Al)N2	
		Insert thickness - 3.59 mm	
3.3	Basic Holder BT-40 side lock adaptor	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5
		Connection retention knob thread size M16	
		Connection diameter - 50 mm	
		Functional length - 90 mm	
		Body material code – Steel	
<b>Item 4</b>	<b>High Feed Milling Cutter Dia. 25 mm with inserts and holder</b>		
4.1	High Feed Milling Cutter Dia 25 mm	Tool cutting edge angle - 10 deg	5
		Cutting diameter - 10.9 mm	
		Maximum cutting diameter - 25 mm	
		No of inserts - 2	
		Maximum ramping angle - 14.5 deg	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 20.0	
		Hand - Right	
		Connection diameter - 20 mm	
		Functional length - 180 mm	
		Body material code - Steel	
		4.2	
Insert shape code - S			
Cutting edge effective length - 5.77 mm			
Wiper edge length - 0.66 mm			
Corner radius - 1.4 mm			
Major cutting edge angle - 10 deg			
Hand - Neutral			
Coating - CVD Ti(C,N)+Al2O3+TiN			
Insert thickness - 4.5 mm			

4.3	Basic Holder BT-40 to Side Lock Dia 20 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 20	
		Connection retention knob thread size M16	
		Connection diameter 20 mm	
		Functional length - 75 mm	
		Body material code – Steel	
<b>Item 5</b>	<b>Round Milling Cutter Dia 20 mm with inserts and holder</b>		
5.1	Round Milling Cutter Dia 20 mm	Cutting diameter - 20 mm	5
		Maximum cutting diameter - 32 mm	
		No of inserts - 2	
		Depth of cut maximum - 9 mm	
		Maximum ramping angle - 12 deg	
		Cutting pitch differential - true	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0	
		Hand - Right	
		Connection diameter - 25 mm	
		Connection diameter tolerance - h7	
		Functional length - 190 mm	
		Body material code - Steel	
5.2	Inserts	Inscribed circle diameter - 12 mm	500
		Insert shape code - R	
		Corner radius - 6 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Insert thickness - 3.969 mm	
5.3	Basic Holder BT-40 to Side Lock Dia 25 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 25	
		Connection retention knob thread size M16	
		Connection diameter 25 mm	
		Functional length - 80 mm	
		Body material code – Steel	

<b>Item 6</b>		<b>Round Milling Cutter Dia 50 mm with inserts</b>	
6.1	Round Milling Cutter Dia 50 mm	Cutting diameter - 50 mm	3
		Maximum cutting diameter - 40 mm	
		No of inserts - 4	
		Depth of cut maximum - 9 mm	
		Maximum ramping angle - 12 deg	
		Cutting pitch differential - true	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0	
		Hand - Right	
		Connection diameter - 50 mm	
		Connection diameter tolerance - h7	
		Body material code - Steel	
6.2	Inserts	Inscribed circle diameter - 12 mm	500
		Insert shape code - R	
		Corner radius - 6 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Insert thickness - 3.969 mm	
<b>Item 7</b>		<b>Solid Carbide End mill</b>	
7.1	Solid Carbide Endmill Dia 16 mm	Cutting diameter -16 mm	20
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 16 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.2	Solid Carbide Endmill Dia 12 mm	Cutting diameter -12 mm	20
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 12 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	

7.3	Solid Carbide Endmill Dia 10 mm	Cutting diameter -10 mm	20
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD (Ti,Al)N2	
		Connection diameter - 10 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.4	Solid Carbide Endmill Dia 8 mm	Cutting diameter -8 mm	20
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 8 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.4	Solid Carbide Endmill Dia 20 mm	Cutting diameter -20 mm	20
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 20 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
<b>Item 8</b>	<b>Solid Carbide Ball Nose</b>		
8.1	Solid Carbide Ball Nose Dia 3 mm	Cutting diameter - 3 mm	20
		Corner radius - 1.5 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 3	
		Coating -PVD AlCrN	
		Functional length - 38 mm	
		Connection diameter - 3 mm	

8.2	Solid Carbide Ball Nose Dia 4 mm	Cutting diameter - 4 mm	20
		Corner radius - 2 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 4	
		Coating -PVD AlCrN	
		Functional length - 57 mm	
		Connection diameter - 6 mm	
		8.3	
Corner radius - 3 mm			
Maximum ramping angle -15 deg			
Flute helix angle - 30 deg			
Cutting material hardness $\leq$ 48 HRC			
Peripheral effective cutting edge count - 2			
Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 6			
Coating -PVD AlCrN			
Functional length - 57 mm			
Connection diameter - 6 mm			
8.4	Solid Carbide Ball Nose Dia 8 mm		Cutting diameter -8 mm
		Corner radius - 4 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 8 ,	
		Coating -PVD AlCrN	
		Functional length - 63 mm	
		Connection diameter - 8 mm	
		<b>Item 9</b>	<b>Solid Carbide Drill with M/c Tap</b>
9.1	Solid Carbide Drill Dia4.2mm for M5 & 5mm for M6	Cutting diameter – 4.2 & 5 mm	20 each
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter – 5 & 6 mm	
		Point angle - 140 deg	
		Overall length - 60 & 66 mm	



9.2	Tap M5 & M6	Thread diameter size – M5 & M6	20 each
		Thread pitch – 0.8 & 1 mm	
		Thread tolerance class - 6H	
		Substrate - HSS-E	
		Coating - PVD TiAlN+WC/C	
		Functional length – 70 & 80 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
		Standard - DIN371	
9.3	Solid Carbide Drill Dia 6.8 mm for M8	Cutting diameter - 6.8 mm	20
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 8 mm	
		Point angle - 140 deg	
		Overall length - 91 mm	
9.4	Tap M8	Thread diameter size - M8	20
		Thread pitch - 1.25 mm	
		Thread tolerance class - 6H	
		Substrate - HSS-E	
		Coating - PVD TiAlN+WC/C	
		Functional length - 90 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
Standard - DIN371			
9.5	Solid Carbide Drill Dia 8.5mm for M10	Cutting diameter - 8.5 mm	20
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 10 mm	
		Point angle - 140 deg	
		Overall length - 89 mm	
9.6	Tap M10	Thread diameter size - M 10	20
		Thread pitch - 1.5 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 100 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
		Standard - DIN371	

9.7	Solid Carbide Drill Dia 10.2mm for M12	Cutting diameter - 10.2 mm	20
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 12 mm	
		Point angle - 140 deg	
		Overall length - 102 mm	
9.8	Tap M 12	Thread diameter size - M 12	20
		Thread pitch - 1.75 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 110 mm	
		Flute count - 4	
		Flute helix angle - 48 deg	
		Standard - DIN371	
9.9	Solid Carbide Drill Dia 14 mm for M16	Cutting diameter - 14 mm	20
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 16 mm	
		Point angle - 140 deg	
		Overall length - 109 mm	
9.10	Tap M 16	Thread diameter size - M 12	20
		Thread pitch – 2.0 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 120 mm	
		Flute count - 4	
		Flute helix angle - 48 deg	
		Standard - DIN371	

Item 10	Fine Boring Head $\Phi$ 6 to 108 mm with all accessories (kit) with suitable adaptor		
10.1	Fine Boring Head $\Phi$ 6 to 108 mm (with all accessories)	Minimum cutting $\Phi$ - 3 mm	3
		Maximum cutting diameter - 108 mm	
		Adaptive interface work piece direction Cylindrical clamping w/ flats (sleeve) -metric: 20	
		Insert type : W , T , C (200 each)	
		Body material code - Steel	
		Least count adjustment - 0.002 mm	
		Min. Working length	
		(1) $\Phi$ 6 -21 mm (2) $\Phi$ 8 – 28mm (3) $\Phi$ 10-35mm (4) $\Phi$ 12 – 42mm (5) $\Phi$ 14 – 50 mm (6) $\Phi$ 16 – 60mm (7) $\Phi$ 18 – 63mm (8) $\Phi$ 22 – 68mm (9) $\Phi$ 28 – 63 & 105mm (10) $\Phi$ 36 - 63 & 105mm (11) $\Phi$ 54 – 79mm (12) 80-93mm	
Item 11	OD Turning Holder for Rough with Inserts		
11.1	OD Turning Holder For Rough	Tool cutting edge angle - 95 deg	3
		Tool lead angle - (-)5 deg	
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20	
		Hand - Left	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 150 mm	
		Functional width - 32 mm	
		Functional height - 25 mm	
		Body material code - Steel	
		Master insert identification - CNMG 12 04 08	
11.2	OD Turning Inserts	Insert size and shape - CN1204	400
		Inscribed circle diameter - 12.7 mm	
		Insert shape code - C	
		Cutting edge effective length - 12.096 mm	
		Corner radius - 0.794 mm	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN	
		Insert thickness - 4.763 mm	

Item 12	OD Turning Holder for Finish with Inserts		
12.1	OD Turning Holder For Finish	Tool cutting edge angle - 93 deg Tool lead angle - (-)3 deg Adaptive interface machine direction Rectangular shank -metric: 20 x 20 Hand - Left Shank width - 20 mm Shank height - 20 mm Functional length - 125 mm Functional height - 20 mm Body material code - Steel Master insert identification - DNMG 11 04 08	3
12.2	OD Turning Inserts	Operation type - Finish Insert size and shape - DN1104 Inscribed circle diameter - 9.525 mm Insert shape code - D Cutting edge effective length - 10.828 mm Corner radius - 0.794 mm Hand - Neutral Coating - CVD Ti(C,N)+Al2O3+TiN Insert thickness - 4.763 mm	400
Item 13	ID Turning Boring Bar with Inserts		
13.1	ID Turning Boring Bar $\Phi$ 6 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 6 Minimum overhang - 9 mm Hand - Left Functional length - 80 mm Functional width - 4.5 mm Body diameter - 6 mm Master insert identification - TCMT 06 T1 02 Cutting approach angle - 91 deg	10
13.2	ID Turning Boring Bar $\Phi$ 8mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 8 Minimum overhang - 12 mm Hand - Left Functional length - 100 mm Functional width - 5 mm Body diameter - 8 mm Master insert identification - CCMT 06 02 04 Cutting approach angle - 91 deg	10

13.3	ID Turning Boring Bar $\Phi$ 10 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 10	10
		Minimum overhang - 15 mm	
		Hand - Left	
		Functional length - 125 mm	
		Functional width -6 mm	
		Body diameter - 10 mm	
		Master insert identification -CCMT 06 02 04	
		Cutting approach angle - 91 deg	
13.4	ID Turning Boring Bar $\Phi$ 12 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 12	10
		Minimum overhang - 18 mm	
		Hand - Left	
		Functional length - 150 mm	
		Functional width -9 mm	
		Body diameter - 12 mm	
		Master insert identification -CCMT 06 02 04	
		Cutting approach angle - 91 deg	
13.5	ID Turning Boring Bar $\Phi$ 16 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16	10
		Minimum overhang - 24 mm	
		Hand - Left	
		Functional length - 200 mm	
		Functional width -11 mm	
		Body diameter - 16 mm	
		Master insert identification -CCMT 09 T3 08	
		Cutting approach angle - 91 deg	
13.6	ID Turning Boring Bar $\Phi$ 20mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 20	10
		Minimum overhang - 30 mm	
		Hand - Left	
		Functional length - 250 mm	
		Functional width -13 mm	
		Body diameter - 20 mm	
		Master insert identification -CCMT 09 T3 08	
		Cutting approach angle - 91 deg	

13.7	Insert	Insert size and shape - CC0602	400
		Inscribed circle diameter - 6.35 mm	
		Insert shape code - C	
		Cutting edge effective length - 6.048 mm	
		Corner radius - 0.397 mm	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN	
		Insert thickness - 2.381 mm	
		Clearance angle major - 7 deg	
		13.8	
Inscribed circle diameter - 9.525 mm			
Insert shape code - C			
Cutting edge effective length - 8.872 mm			
Corner radius - 0.794 mm			
Hand - Neutral			
Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN			
Insert thickness - 3.969 mm			
Clearance angle major - 7 deg			
<b>Item 14</b>	<b>Parting Holder for 2 mm &amp; 3 mm Inserts</b>		
14.1	Parting Holder	Cutting depth maximum - 15 mm	5
		Adaptive interface machine direction	
		Rectangular shank -metric: 20 x 20	
		Work piece side body angle - 0 deg	
		Maximum overhang - 33.5 mm	
		Hand - Left	
		Shank width - 20 mm	
		Shank height - 20 mm	
Functional length - 125 mm			
14.2	2 mm Parting Carbide Insert	Cutting width - 2 mm	200
		Corner radius left - 0.2 mm	
		Corner radius right - 0.2 mm	
		Cutting depth maximum - 19 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N+TiN	
		Clearance angle major - 7 deg	
		Total length - 19 mm	

14.3	3 mm Parting Carbide Insert	Cutting width - 3 mm	200
		Corner radius left - 0.2 mm	
		Corner radius right - 0.2 mm	
		Cutting depth maximum - 18.9 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Clearance angle major - 7 deg	
		Total length - 18.9 mm	
<b>Item 15</b>	<b>OD Threading holder with Inserts</b>		
15.1	OD Threading holder	Adaptive interface machine direction - Rectangular shank - metric: 20 x 20	5
		Hand - Right	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 125 mm	
		Functional width - 25 mm	
		Functional height - 20 mm	
		Shim protection to insert	
		Clearance angle major - (-) 10 deg	
15.2	OD Threading Inserts	Thread form type - WH55	100
		Standard number - ISO 228-1982	
		Thread type - Ext	
		Thread per inch - 8	
		Thread profile type - F	
		Tooth count - 1	
		Thread tolerance class - A	
		Theoretical thread height - 2.52 mm	
		Inscribed circle diameter - 9.525 mm	
		Hand - Right	
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N	
		Insert thickness - 3.969 mm	
<b>Item 16</b>	<b>ID Threading holder with Inserts</b>		
16.1	ID Threading Boring Bar $\Phi$ 16mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16	5
		Minimum bore diameter - 20 mm	
		Minimum overhang - 27 mm	
		Maximum overhang - 48 mm	
		Usable length - 48 mm	
		Hand - Right	
		Shank height - 15 mm	
		Functional length - 200 mm	
		Functional width - 12 mm	
		Body diameter - 16 mm	
16.2	ID Threading Inserts	Thread form type - M60	200
		Standard number - ISO 965-1998	
		Thread type - INT	

		Thread pitch - 1.5 mm	
		Thread profile type - F	
		Tooth count - 2	
		Thread tolerance class - 6	
		Theoretical thread height - 0.96 mm	
		Inscribed circle diameter - 9.525 mm	
		Hand - Right	
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N	
		Insert thickness - 3.969 mm	
<b>Item 17</b>	<b>Index able type End mill cutter with all accessories</b>		
17.1	Dia 16	Working length = ~ 8.8mm	5 each
		Total Length = 90 & 170	
		Insert Count = 2 Min	
		Body : steel	
		Shank Dia. = 16mm	
		Working Dia. = 16 mm	
17.2	Dia 20	Working length = ~ 8.8mm	5 each
		Total Length = 110 & 170	
		Insert Count = 3 Min	
		Body : steel	
		Shank Dia. =20mm	
		Working Dia. = 20 mm	
17.1	Dia 25	Working length = ~ 8.8mm	5 each
		Total Length = 110 & 210	
		Insert Count = 4 Min	
		Body : steel	
		Shank Dia. = 25mm	
		Working Dia. = 25 mm	
17.2	Inserts	Shape code : AP	800
		Coating PVD	

**Note:**

1. The cutter body, accessories and Inserts should be in same make.
2. All items should be available in OEM website along with part no.
3. Product Catalogue has to be submitted along with technical bid.
4. 20 Nos. screws (same Make) has to be supplied extra per cutter body.
5. All accessories which is necessary to run the Tool has to be supplied along with.



**Amendment:-****ANNEXURE-A****Details of requirements and technical specifications of tooling**

Name of the Item: CNC Tooling (1 Set)

Sr No	Description	Specification	Qty. (Nos.)
<b>Item1</b>	<b>Face Milling Cutter Dia 80 mm with inserts and holder</b>		
1.1	Face Milling Cutter Dia 80 mm	Tool cutting edge angle -45 degree	4
		Cutting diameter -80 mm	
		No of inserts - 6	
		Depth of cut maximum - 6 mm	
		Hand - Right	
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 27	
		Cutting pitch differential , Body material code - Steel	
1.2	Inserts	Inscribed Circle Diameter - 13 mm	200
		Insert shape code - S	
		Cutting edge effective length - 8.8 mm	
		Wiper edge length - 2 mm	
		Corner radius - 0.8 mm	
		Major cutting edge angle - 45 deg	
		Hand - Right	
		Coating - CVD Ti (C, N) + Al2O3 + TiN	
		Insert thickness - 5.6 mm	
1.3	Suitable Basic Holder BT 40 to face mill arbor dia 27 mm	Adaptive interface Work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) -metric: 27	4
		Connection retention knob thread size M16	
		Connection diameter - 27 mm	
		Functional length - 100 mm	
		Body material code - Steel	

<b>Item 2</b>		<b>Shoulder milling cutter Dia 50 mm with inserts and holder</b>	
2.1	Shoulder milling cutter dia 50 mm	Cutting diameter - 50 mm	4
		No of inserts - 5	
		Depth of cut maximum - 10 mm	
		Maximum ramping angle - 1.4 deg	
		Cutting pitch differential	
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 22	
		Hand - Right	
		Connection diameter - 22 mm	
		Functional length - 40 mm	
		Body material code - Steel	
		2.2	
Cutting edge effective length - 10 mm			
Wiper edge length - 1.2 mm			
Corner radius - 0.8 mm			
Major cutting edge angle - 90 deg			
Hand - Right			
Coating - CVD Ti (C, N) + Al2O3 + TiN			
Insert thickness - 3.59 mm ; insert code : AP			
2.3	Suitable Basic Holder BT 40 to face mill arbor dia 22 mm	Adaptive interface work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) -metric: 27	4
		Connection retention knob thread size - M16	
		Connection diameter - 22 mm	
		Functional length - 100 mm	
		Body material code - Steel	
<b>Item 3</b>		<b>Shoulder milling cutter dia 32 mm, long 192 mm with inserts and holder</b>	
3.1	Shoulder milling cutter dia 32 mm long 192 mm	Cutting diameter - 32 mm	4
		No of inserts - 2	
		Depth of cut maximum - 10 mm	
		Maximum ramping angle - 5.5 deg	
		Usable length - 192 mm	
		Cutting pitch differential -true	
		Hand - Right	
		Damping property - True	
		Connection diameter - 50 mm	
		Functional length - 217 mm	
		Body material code - Steel	

3.2	Inserts	Insert width - 6.8 mm	200
		Insert shape code - AP	
		Cutting edge effective length - 10 mm	
		Wiper edge length - 1.2 mm	
		Corner radius - 0.8 mm	
		Major cutting edge angle - 90 deg	
		Hand - Right	
		Coating - PVD (Ti,Al)N2	
		Insert thickness - 3.59 mm	
3.3	Basic Holder BT-40 side lock adaptor	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	4
		Connection retention knob thread size M16	
		Connection diameter - 50 mm	
		Functional length - 90 mm	
		Body material code – Steel	
<b>Item 4</b>	<b>High Feed Milling Cutter Dia. 25 mm with inserts and holder</b>		
4.1	High Feed Milling Cutter Dia 25 mm	Tool cutting edge angle - 10 deg	4
		Cutting diameter - 10.9 mm	
		Maximum cutting diameter - 25 mm	
		No of inserts - 2	
		Maximum ramping angle - 14.5 deg	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 20.0	
		Hand - Right	
		Connection diameter - 20 mm	
		Functional length - 180 mm	
		Body material code - Steel	
4.2	Inserts	Inscribed circle diameter - 9.5 mm	200
		Insert shape code - S	
		Cutting edge effective length - 5.77 mm	
		Wiper edge length - 0.66 mm	
		Corner radius - 1.4 mm	
		Major cutting edge angle - 10 deg	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al2O3+TiN	
		Insert thickness - 4.5 mm	

4.3	Basic Holder BT-40 to Side Lock Dia 20 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	4
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 20	
		Connection retention knob thread size M16	
		Connection diameter 20 mm	
		Functional length - 75 mm	
		Body material code – Steel	
<b>Item 5</b>	<b>Round Milling Cutter Dia 20 mm with inserts and holder</b>		
5.1	Round Milling Cutter Dia 20 mm	Cutting diameter - 20 mm	4
		Maximum cutting diameter - 32 mm	
		No of inserts - 2	
		Depth of cut maximum - 9 mm	
		Maximum ramping angle - 12 deg	
		Cutting pitch differential - true	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0	
		Hand - Right	
		Connection diameter - 25 mm	
		Connection diameter tolerance - h7	
		Functional length - 190 mm	
		Body material code - Steel	
5.2	Inserts	Inscribed circle diameter - 12 mm	200
		Insert shape code - R	
		Corner radius - 6 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Insert thickness - 3.969 mm	
5.3	Basic Holder BT-40 to Side Lock Dia 25 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	4
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 25	
		Connection retention knob thread size M16	
		Connection diameter 25 mm	
		Functional length - 80 mm	
		Body material code – Steel	

<b>Item 6</b>		<b>Round Milling Cutter Dia 50 mm with inserts</b>	
6.1	Round Milling Cutter Dia 50 mm	Cutting diameter - 50 mm	2
		Maximum cutting diameter - 40 mm	
		No of inserts - 4	
		Depth of cut maximum - 9 mm	
		Maximum ramping angle - 12 deg	
		Cutting pitch differential - true	
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0	
		Hand - Right	
		Connection diameter - 50 mm	
		Connection diameter tolerance - h7	
		Body material code - Steel	
6.2	Inserts	Inscribed circle diameter - 12 mm	200
		Insert shape code - R	
		Corner radius - 6 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Insert thickness - 3.969 mm	
<b>Item 7</b>		<b>Solid Carbide End mill</b>	
7.1	Solid Carbide Endmill Dia 16 mm	Cutting diameter -16 mm	6
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 16 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.2	Solid Carbide Endmill Dia 12 mm	Cutting diameter -12 mm	6
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 12 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	

7.3	Solid Carbide Endmill Dia 10 mm	Cutting diameter -10 mm	6
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD (Ti,Al)N2	
		Connection diameter - 10 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.4	Solid Carbide Endmill Dia 8 mm	Cutting diameter -8 mm	6
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 8 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
7.5	Solid Carbide Endmill Dia 20 mm	Cutting diameter -20 mm	6
		Peripheral effective cutting edge count -4	
		Connection diameter tolerance - h6	
		Coating - PVD TiAlN	
		Connection diameter - 20 mm	
		Max ramping angle - 5 deg	
		Flute helix angle - 50 deg	
		Cutting material hardness $\leq$ 48 HRC	
<b>Item 8</b>	<b>Solid Carbide Ball Nose</b>		
8.1	Solid Carbide Ball Nose Dia 3 mm	Cutting diameter - 3 mm	6
		Corner radius - 1.5 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 3	
		Coating -PVD AlCrN	
		Functional length - 38 mm	
		Connection diameter - 3 mm	
8.2	Solid Carbide Ball Nose Dia 4 mm	Cutting diameter - 4 mm	6
		Corner radius - 2 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 4	
		Coating -PVD AlCrN	
		Functional length - 57 mm	

		Connection diameter - 6 mm	
8.3	Solid Carbide Ball Nose Dia 6 mm	Cutting diameter - 6 mm	6
		Corner radius - 3 mm	
		Maximum ramping angle -15 deg	
		Flute helix angle - 30 deg	
		Cutting material hardness $\leq$ 48 HRC	
		Peripheral effective cutting edge count - 2	
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 6	
		Coating -PVD AlCrN	
		Functional length - 57 mm	
		Connection diameter - 6 mm	
		8.4	
Corner radius - 4 mm			
Maximum ramping angle -15 deg			
Flute helix angle - 30 deg			
Cutting material hardness $\leq$ 48 HRC			
Peripheral effective cutting edge count - 2			
Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 8 ,			
Coating -PVD AlCrN			
Functional length - 63 mm			
Connection diameter - 8 mm			
<b>Item 9</b>	<b>Solid Carbide Drill with M/c Tap</b>		
9.1	Solid Carbide Drill Dia4.2mm for M5 & 5mm for M6	Cutting diameter – 4.2 & 5 mm	6 each
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter – 5 & 6 mm	
		Point angle - 140 deg	
		Overall length - 60 & 66 mm	
9.2	Tap M5 & M6	Thread diameter size – M5 & M6	4 each
		Thread pitch – 0.8 & 1 mm	
		Thread tolerance class - 6H	
		Substrate - HSS-E	
		Coating - PVD TiAlN+WC/C	
		Functional length – 70 & 80 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
Standard - DIN371			
9.3	Solid Carbide Drill Dia 6.8 mm for M8	Cutting diameter - 6.8 mm	6
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 8 mm	
		Point angle - 140 deg	
		Overall length - 91 mm	
9.4	Tap M8	Thread diameter size - M8	4

		Thread pitch - 1.25 mm	
		Thread tolerance class - 6H	
		Substrate - HSS-E	
		Coating - PVD TiAlN+WC/C	
		Functional length - 90 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
		Standard - DIN371	
9.5	Solid Carbide Drill Dia 8.5mm for M10	Cutting diameter - 8.5 mm	6
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 10 mm	
		Point angle - 140 deg	
		Overall length - 89 mm	
9.6	Tap M10	Thread diameter size - M 10	4
		Thread pitch - 1.5 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 100 mm	
		Flute count - 3	
		Flute helix angle - 48 deg	
		Standard - DIN371	
9.7	Solid Carbide Drill Dia 10.2mm for M12	Cutting diameter - 10.2 mm	6
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 12 mm	
		Point angle - 140 deg	
		Overall length - 102 mm	
9.8	Tap M 12	Thread diameter size - M 12	4
		Thread pitch - 1.75 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 110 mm	
		Flute count - 4	
		Flute helix angle - 48 deg	
		Standard - DIN371	



9.9	Solid Carbide Drill Dia 14 mm for M16	Cutting diameter - 14 mm	6
		Achievable hole tolerance - H9	
		Coating - PVD (Ti,Al)N	
		Connection diameter - 16 mm	
		Point angle - 140 deg	
		Overall length - 109 mm	
9.10	Tap M 16	Thread diameter size - M 12	4
		Thread pitch – 2.0 mm	
		Thread tolerance class - 6HX	
		Substrate - HSS-E-PM	
		Coating - PVD (Ti,Al)N	
		Functional length - 120 mm	
		Flute count - 4	
		Flute helix angle - 48 deg	
		Standard - DIN371	
<b>Item 10</b>	<b>Fine Boring Head <math>\Phi</math> 6 to 108 mm with all accessories (kit) with suitable adaptor</b>		
10.1	Fine Boring Head $\Phi$ 6 to 108 mm (with all accessories)	Minimum cutting $\Phi$ - 6 mm	2
		Maximum cutting diameter - 108 mm	
		Adaptive interface work piece direction Cylindrical clamping w/ flats (sleeve) -metric: 20	
		Insert type : W , T , C (30 Nos each)	
		Body material code - Steel	
		Least count adjustment - 0.002 mm	
		Min. Working length	
		(2) $\Phi$ 6 -21 mm (2) $\Phi$ 8 – 28mm (3) $\Phi$ 10-35mm (4) $\Phi$ 12 – 42mm (5) $\Phi$ 14 – 50 mm (6) $\Phi$ 16 – 60mm (7) $\Phi$ 18 – 63mm (8) $\Phi$ 22 – 68mm (9) $\Phi$ 28 – 63 & 105mm (10) $\Phi$ 36 - 63 & 105mm (11) $\Phi$ 54 – 79mm (12) 80-93mm	
<b>Item 11</b>	<b>OD Turning Holder for Rough with Inserts</b>		
11.1	OD Turning Holder For Rough	Tool cutting edge angle - 95 deg	2
		Tool lead angle - (-)5 deg	
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20	
		Hand - Left	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 150 mm	
		Functional width - 32 mm	
		Functional height - 25 mm	
		Body material code - Steel	
		Master insert identification - CNMG 12 04 08	
11.2	OD Turning Inserts	Insert size and shape - CN1204	100
		Inscribed circle diameter - 12.7 mm	
		Insert shape code - C	
		Cutting edge effective length - 12.096 mm	

		Corner radius - 0.794 mm	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al2O3+TiN	
		Insert thickness - 4.763 mm	
<b>Item 12</b>	<b>OD Turning Holder for Finish with Inserts</b>		
12.1	OD Turning Holder For Finish	Tool cutting edge angle - 93 deg	2
		Tool lead angle - (-)3 deg	
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20	
		Hand - Left	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 125 mm	
		Functional height - 20 mm	
		Body material code - Steel	
		Master insert identification - DNMG 11 04 08	
12.2	OD Turning Inserts	Operation type - Finish	100
		Insert size and shape - DN1104	
		Inscribed circle diameter - 9.525 mm	
		Insert shape code - D	
		Cutting edge effective length - 10.828 mm	
		Corner radius - 0.794 mm	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al2O3+TiN	
		Insert thickness - 4.763 mm	
<b>Item 13</b>	<b>ID Turning Boring Bar with Inserts</b>		
13.1	ID Turning Boring Bar $\Phi$ 6 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 6	2
		Minimum overhang - 9 mm	
		Hand - Left	
		Functional length - 80 mm	
		Functional width - 4.5 mm	
		Body diameter - 6 mm	
		Master insert identification - TCMT 06 T1 02	
		Cutting approach angle - 91 deg	
13.2	ID Turning Boring Bar $\Phi$ 8mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 8	2
		Minimum overhang - 12 mm	
		Hand - Left	
		Functional length - 100 mm	
		Functional width - 5 mm	
		Body diameter - 8 mm	
		Master insert identification - CCMT 06 02 04	
Cutting approach angle - 91 deg			
13.3		Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 10	2

	ID Turning Boring Bar $\Phi$ 10 mm	Minimum overhang - 15 mm Hand - Left Functional length - 125 mm Functional width -6 mm Body diameter - 10 mm Master insert identification -CCMT 06 02 04 Cutting approach angle - 91 deg	
13.4	ID Turning Boring Bar $\Phi$ 12 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 12 Minimum overhang - 18 mm Hand - Left Functional length - 150 mm Functional width -9 mm Body diameter - 12 mm Master insert identification -CCMT 06 02 04 Cutting approach angle - 91 deg	2
13.5	ID Turning Boring Bar $\Phi$ 16 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16 Minimum overhang - 24 mm Hand - Left Functional length - 200 mm Functional width -11 mm Body diameter - 16 mm Master insert identification -CCMT 09 T3 08 Cutting approach angle - 91 deg	2
13.6	ID Turning Boring Bar $\Phi$ 20mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 20 Minimum overhang - 30 mm Hand - Left Functional length - 250 mm Functional width -13 mm Body diameter - 20 mm Master insert identification -CCMT 09 T3 08 Cutting approach angle - 91 deg	2
13.7	Insert	Insert size and shape - CC0602 Inscribed circle diameter - 6.35 mm Insert shape code - C Cutting edge effective length - 6.048 mm Corner radius - 0.397 mm Hand - Neutral Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN Insert thickness - 2.381 mm Clearance angle major - 7 deg	100
13.8	Insert	Insert size and shape - CC09T3 Inscribed circle diameter - 9.525 mm Insert shape code - C	100

		Cutting edge effective length - 8.872 mm	
		Corner radius - 0.794 mm	
		Hand - Neutral	
		Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN	
		Insert thickness - 3.969 mm	
		Clearance angle major - 7 deg	
<b>Item 14</b>	<b>Parting Holder for 2 mm &amp; 3 mm Inserts</b>		
14.1	Parting Holder	Cutting depth maximum - 15 mm	2
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20	
		Work piece side body angle - 0 deg	
		Maximum overhang - 33.5 mm	
		Hand - Left	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 125 mm	
14.2	2 mm Parting Carbide Insert	Cutting width - 2 mm	100
		Corner radius left - 0.2 mm	
		Corner radius right - 0.2 mm	
		Cutting depth maximum - 19 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N+TiN	
		Clearance angle major - 7 deg	
		Total length - 19 mm	
14.3	3 mm Parting Carbide Insert	Cutting width - 3 mm	100
		Corner radius left - 0.2 mm	
		Corner radius right - 0.2 mm	
		Cutting depth maximum - 18.9 mm	
		Hand - Neutral	
		Coating - PVD (Ti,Al)N	
		Clearance angle major - 7 deg	
		Total length - 18.9 mm	

<b>Item 15</b>		<b>OD Threading holder with Inserts</b>	
15.1	OD Threading holder	Adaptive interface machine direction - Rectangular shank -metric: 20 x 20	2
		Hand - Right	
		Shank width - 20 mm	
		Shank height - 20 mm	
		Functional length - 125 mm	
		Functional width - 25 mm	
		Functional height - 20 mm	
		Shim protection to insert	
		Clearance angle major - (-) 10 deg	
15.2	OD Threading Inserts	Thread form type - WH55	100
		Standard number - ISO 228-1982	
		Thread type - Ext	
		Thread per inch - 8	
		Thread profile type - F	
		Tooth count - 1	
		Thread tolerance class - A	
		Theoretical thread height - 2.52 mm	
		Inscribed circle diameter - 9.525 mm	
		Hand - Right	
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N	
		Insert thickness - 3.969 mm	
<b>Item 16</b>		<b>ID Threading holder with Inserts</b>	
16.1	ID Threading Boring Bar $\Phi$ 16mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16	2
		Minimum bore diameter - 20 mm	
		Minimum overhang - 27 mm	
		Maximum overhang - 48 mm	
		Usable length - 48 mm	
		Hand - Right	
		Shank height - 15 mm	
		Functional length - 200 mm	
		Functional width - 12 mm	
		Body diameter - 16 mm	
16.2	ID Threading Inserts	Thread form type - M60	100
		Standard number - ISO 965-1998	
		Thread type - INT	
		Thread pitch - 1.5 mm	
		Thread profile type - F	
		Tooth count - 2	
		Thread tolerance class - 6	
		Theoretical thread height - 0.96 mm	
		Inscribed circle diameter - 9.525 mm	
		Hand - Right	
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N	

		Insert thickness - 3.969 mm	
<b>Item 17</b>	<b>Index able type</b>	<b>End mill cutter with all accessories</b>	
17.1	Dia 16	Working length = ~ 8.8mm	2 each
		Total Length = 90 & 170	
		Insert Count = 2 Min	
		Body : steel	
		Shank Dia. = 16mm	
		Working Dia. = 16 mm	
17.2	Dia 20	Working length = ~ 8.8mm	2 each
		Total Length = 110 & 170	
		Insert Count = 3 Min	
		Body : steel	
		Shank Dia. =20mm	
		Working Dia. = 20 mm	
17.3	Dia 25	Working length = ~ 8.8mm	2 each
		Total Length = 110 & 210	
		Insert Count = 4 Min	
		Body : steel	
		Shank Dia. = 25mm	
		Working Dia. = 25 mm	
17.4	Inserts	Shape code : AP	300
		Coating PVD	

Note:

6. The cutter body, accessories and Inserts should be in same make.
7. All items should be available in OEM website along with part no.
8. Product Catalogue has to be submitted along with technical bid.
9. 20 Nos. insert screws (same Make) has to be supplied extra per cutter body.
10. All accessories which is necessary to run the Tool has to be supplied along with.

**2. Annexure C, Clause No 5 (Page No : 28 to 47)**

**Confirmation of acceptance of Technical Specifications for the supply of Tooling:**

Sr No	Description	Specification	Qty	Acceptance to the Specification as placed at Annexure-A and agreed to supply with required Quantity (write YES/ NO only along with part no)	If marked "NO" in the column before, specify the deviation in specification of the Tooling offered for the supply.
Item1	Face Milling Cutter Dia 80 mm with inserts and holder				
1.1	Face Milling Cutter Dia 80 mm	Tool cutting edge angle -45 degree	6		
		Cutting diameter -80 mm			
		No of inserts - 6			
		Depth of cut maximum - 6 mm			
		Hand - Right			
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 27			
		Cutting pitch differential			

1.2	Inserts	Inscribed Circle Diameter - 13 mm	500		
		Insert shape code - S			
		Cutting edge effective length - 8.8 mm			
		Wiper edge length - 2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 45 deg			
		Hand - Right			
		Coating - CVD Ti (C, N) + Al2O3 + TiN			
		Insert thickness - 5.6 mm			
1.3	Suitable Basic Holder BT 40 to face mill arbor dia 27 mm	Adaptive interface Work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) - metric: 27	6		
		Connection retention knob thread size M16			
		Connection diameter - 27 mm			
		Functional length - 100 mm			
		Body material code - Steel			
<b>Item 2</b>	<b>Shoulder milling cutter Dia 50 mm with inserts and holder</b>				
2.1	Shoulder milling cutter dia 50 mm	Cutting diameter - 50 mm	5		
		No of inserts - 5			
		Depth of cut maximum - 10 mm			
		Maximum ramping angle - 1.4 deg			
		Cutting pitch differential			
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) -metric: 22			
		Hand - Right			
		Connection diameter - 22 mm			
		Functional length - 40 mm			
		Body material code - Steel			



2.2	Inserts	Insert width - 6.8 mm	500		
		Cutting edge effective length - 10 mm			
		Wiper edge length - 1.2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 90 deg			
		Hand - Right			
		Coating - CVD Ti (C, N) + Al2O3 + TiN			
		Insert thickness - 3.59 mm ; insert code : AP			
2.3	Suitable Basic Holder BT 40 to face mill arbor dia 22 mm	Adaptive interface work piece direction	5		
		Arbor -ISO 6462 -A/B (center bolt/washer) -metric: 27			
		Connection retention knob thread size - M16			
		Connection diameter - 22 mm			
		Functional length - 100 mm			
	Body material code - Steel				
<b>Item 3</b>	<b>Shoulder milling cutter dia 32 mm, long 192 mm with inserts and holder</b>				
3.1	Shoulder milling cutter dia 32 mm long 192 mm	Cutting diameter - 32 mm	5		
		No of inserts - 2			
		Depth of cut maximum - 10 mm			
		Maximum ramping angle - 5.5 deg			
		Usable length - 192 mm			
		Cutting pitch differential -true			
		Hand - Right			
		Damping property - True			
		Connection diameter - 50 mm			
		Functional length - 217 mm			
		Body material code - Steel			
3.2	Inserts	Insert width - 6.8 mm	500		
		Insert shape code - AP			
		Cutting edge effective length - 10 mm			
		Wiper edge length - 1.2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 90 deg			
		Hand - Right			
		Coating - PVD (Ti,Al)N2			

		Insert thickness - 3.59 mm			
3.3	Basic Holder BT-40 side lock adaptor	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5		
		Connection retention knob thread size M16			
		Connection diameter - 50 mm			
		Functional length - 90 mm			
		Body material code – Steel			
<b>Item 4</b>	<b>High Feed Milling Cutter Dia. 25 mm with inserts and holder</b>				
4.1	High Feed Milling Cutter Dia 25 mm	Tool cutting edge angle - 10 deg	5		
		Cutting diameter - 10.9 mm			
		Maximum cutting diameter - 25 mm			
		No of inserts - 2			
		Maximum ramping angle - 14.5 deg			
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 20.0			
		Hand - Right			
		Connection diameter - 20 mm			
		Functional length - 180 mm			
		Body material code - Steel			
4.2	Inserts	Inscribed circle diameter - 9.5 mm	500		
		Insert shape code - S			
		Cutting edge effective length - 5.77 mm			
		Wiper edge length - 0.66 mm			
		Corner radius - 1.4 mm			
		Major cutting edge angle - 10 deg			
		Hand - Neutral			
		Coating - CVD Ti(C,N)+Al2O3+TiN			
		Insert thickness - 4.5 mm			
4.3	Basic Holder BT-40 to Side Lock Dia 20 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5		
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 20			

		Connection retention knob thread size M16			
		Connection diameter 20 mm			
		Functional length - 75 mm			
		Body material code – Steel			
<b>Item 5</b>	<b>Round Milling Cutter Dia 20 mm with inserts and holder</b>				
5.1	Round Milling Cutter Dia 20 mm	Cutting diameter - 20 mm	5		
		Maximum cutting diameter - 32 mm			
		No of inserts - 2			
		Depth of cut maximum - 9 mm			
		Maximum ramping angle - 12 deg			
		Cutting pitch differential - true			
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0			
		Hand - Right			
		Connection diameter - 25 mm			
		Connection diameter tolerance - h7			
		Functional length - 190 mm			
		Body material code - Steel			
		5.2		Inserts	Inscribed circle diameter - 12 mm
Insert shape code - R					
Corner radius - 6 mm					
Hand - Neutral					
Coating - PVD (Ti,Al)N					
Insert thickness - 3.969 mm					

5.3	Basic Holder BT-40 to Side Lock Dia 25 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	5		
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 25			
		Connection retention knob thread size M16			
		Connection diameter 25 mm			
		Functional length - 80 mm			
		Body material code – Steel			
<b>Item 6</b>	<b>Round Milling Cutter Dia 50 mm with inserts</b>				
6.1	Round Milling Cutter Dia 50 mm	Cutting diameter - 50 mm	3		
		Maximum cutting diameter - 40 mm			
		No of inserts - 4			
		Depth of cut maximum - 9 mm			
		Maximum ramping angle - 12 deg			
		Cutting pitch differential - true			
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0			
		Hand - Right			
		Connection diameter - 50 mm			
		Connection diameter tolerance - h7			
		Body material code - Steel			
6.2	Inserts	Inscribed circle diameter - 12 mm	500		
		Insert shape code - R			
		Corner radius - 6 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N			
		Insert thickness - 3.969 mm			
<b>Item 7</b>	<b>Solid Carbide End mill</b>				
7.1	Solid Carbide Endmill Dia 16 mm	Cutting diameter -16 mm	20		
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD TiAlN			
		Connection diameter - 16 mm			

		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness $\leq$ 48 HRC			
7.2	Solid Carbide Endmill Dia 12 mm	Cutting diameter -12 mm	20		
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD TiAlN			
		Connection diameter - 12 mm			
		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness $\leq$ 48 HRC			
7.3	Solid Carbide Endmill Dia 10 mm	Cutting diameter -10 mm	20		
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD (Ti,Al)N2			
		Connection diameter - 10 mm			
		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness $\leq$ 48 HRC			
7.4	Solid Carbide Endmill Dia 8 mm	Cutting diameter -8 mm	20		
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD TiAlN			
		Connection diameter - 8 mm			
		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness $\leq$ 48 HRC			

7.4	Solid Carbide Endmill Dia 20 mm	Cutting diameter -20 mm	20		
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD TiAlN			
		Connection diameter - 20 mm			
		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness $\leq$ 48 HRC			
<b>Item 8</b>	<b>Solid Carbide Ball Nose</b>				
8.1	Solid Carbide Ball Nose Dia 3 mm	Cutting diameter - 3 mm	20		
		Corner radius - 1.5 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness $\leq$ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 3			
		Coating -PVD AlCrN			
		Functional length - 38 mm			
		Connection diameter - 3 mm			
		8.2		Solid Carbide Ball Nose Dia 4 mm	Cutting diameter - 4 mm
Corner radius - 2 mm					
Maximum ramping angle -15 deg					
Flute helix angle - 30 deg					
Cutting material hardness $\leq$ 48 HRC					
Peripheral effective cutting edge count - 2					
Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 4					
Coating -PVD AlCrN					
Functional length - 57 mm					
Connection diameter - 6 mm					

8.3	Solid Carbide Ball Nose Dia 6 mm	Cutting diameter - 6 mm	20		
		Corner radius - 3 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness ≤ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction			
		Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 6			
		Coating -PVD AlCrN			
		Functional length - 57 mm			
		Connection diameter - 6 mm			
8.4	Solid Carbide Ball Nose Dia 8 mm	Cutting diameter -8 mm	20		
		Corner radius - 4 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness ≤ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction			
		Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 8 ,			
		Coating -PVD AlCrN			
		Functional length - 63 mm			
		Connection diameter - 8 mm			
<b>Item 9</b>	<b>Solid Carbide Drill with M/c Tap</b>				
9.1	Solid Carbide Drill Dia4.2mm for M5 & 5mm for M6	Cutting diameter – 4.2 & 5 mm	20 each		
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter – 5 & 6 mm			
		Point angle - 140 deg			
		Overall length - 60 & 66 mm			
9.2	Tap M5 & M6	Thread diameter size – M5 & M6	20 each		
		Thread pitch – 0.8 & 1 mm			
		Thread tolerance class - 6H			
		Substrate - HSS-E			
		Coating - PVD TiAlN+WC/C			

		Functional length – 70 & 80 mm			
		Flute count - 3			
		Flute helix angle - 48 deg			
		Standard - DIN371			
9.3	Solid Carbide Drill Dia 6.8 mm for M8	Cutting diameter - 6.8 mm	20		
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter - 8 mm			
		Point angle - 140 deg			
		Overall length - 91 mm			
9.4	Tap M8	Thread diameter size - M8	20		
		Thread pitch - 1.25 mm			
		Thread tolerance class - 6H			
		Substrate - HSS-E			
		Coating - PVD TiAlN+WC/C			
		Functional length - 90 mm			
		Flute count - 3			
		Flute helix angle - 48 deg			
		Standard - DIN371			
9.5	Solid Carbide Drill Dia 8.5mm for M10	Cutting diameter - 8.5 mm	20		
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter - 10 mm			
		Point angle - 140 deg			
		Overall length - 89 mm			



9.6	Tap M10	Thread diameter size - M 10	20		
		Thread pitch - 1.5 mm			
		Thread tolerance class - 6HX			
		Substrate - HSS-E-PM			
		Coating - PVD (Ti,Al)N			
		Functional length - 100 mm			
		Flute count - 3			
		Flute helix angle - 48 deg			
		Standard - DIN371			
9.7	Solid Carbide Drill Dia 10.2mm for M12	Cutting diameter - 10.2 mm	20		
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter - 12 mm			
		Point angle - 140 deg			
		Overall length - 102 mm			
9.8	Tap M 12	Thread diameter size - M 12	20		
		Thread pitch - 1.75 mm			
		Thread tolerance class - 6HX			
		Substrate - HSS-E-PM			
		Coating - PVD (Ti,Al)N			
		Functional length - 110 mm			
		Flute count - 4			
		Flute helix angle - 48 deg			
Standard - DIN371					
9.9	Solid Carbide Drill Dia 14 mm for M16	Cutting diameter - 14 mm	20		
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter - 16 mm			
		Point angle - 140 deg			
		Overall length - 109 mm			

9.10	Tap M 16	Thread diameter size - M 12	20		
		Thread pitch – 2.0 mm			
		Thread tolerance class - 6HX			
		Substrate - HSS-E-PM			
		Coating - PVD (Ti,Al)N			
		Functional length - 120 mm			
		Flute count - 4			
		Flute helix angle - 48 deg			
		Standard - DIN371			
<b>Item 10</b>	<b>Fine Boring Head <math>\Phi</math> 6 to 108 mm with all accessories (kit) with suitable adaptor</b>				
10.1	Fine Boring Head $\Phi$ 6 to 108 mm (with all accessories)	Minimum cutting $\Phi$ - 3 mm	3		
		Maximum cutting diameter - 108 mm			
		Adaptive interface work piece direction			
		Cylindrical clamping w/ flats (sleeve) -metric: 20			
		Insert type : W , T , C (200 each)			
		Body material code - Steel			
		Least count adjustment - 0.002 mm			
		Min. Working length			
		(3) $\Phi$ 6 -21 mm (2) $\Phi$ 8 – 28mm (3) $\Phi$ 10-35mm (4) $\Phi$ 12 – 42mm (5) $\Phi$ 14 – 50 mm (6) $\Phi$ 16 – 60mm (7) $\Phi$ 18 – 63mm (8) $\Phi$ 22 – 68mm (9) $\Phi$ 28 – 63 & 105mm (10) $\Phi$ 36 - 63 & 105mm (11) $\Phi$ 54 – 79mm (12) 80-93mm			

Item 11		OD Turning Holder for Rough with Inserts						
11.1	OD Turning Holder For Rough	Tool cutting edge angle - 95 deg	3					
		Tool lead angle - (-)5 deg						
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20						
		Hand - Left						
		Shank width - 20 mm						
		Shank height - 20 mm						
		Functional length - 150 mm						
		Functional width - 32 mm						
		Functional height - 25 mm						
		Body material code - Steel						
		Master insert identification - CNMG 12 04 08						
		11.2		OD Turning Inserts	Insert size and shape - CN1204	400		
					Inscribed circle diameter - 12.7 mm			
Insert shape code - C								
Cutting edge effective length - 12.096 mm								
Corner radius - 0.794 mm								
Hand - Neutral								
Coating - CVD Ti(C,N)+Al2O3+TiN								
Insert thickness - 4.763 mm								

<b>Item 12 OD Turning Holder for Finish with Inserts</b>					
12.1	OD Turning Holder For Finish	Tool cutting edge angle - 93 deg	3		
		Tool lead angle - (-)3 deg			
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20			
		Hand - Left			
		Shank width - 20 mm			
		Shank height - 20 mm			
		Functional length - 125 mm			
		Functional height - 20 mm			
		Body material code - Steel			
		Master insert identification - DNMG 11 04 08			
		12.2		OD Turning Inserts	Operation type - Finish
Insert size and shape - DN1104					
Inscribed circle diameter - 9.525 mm					
Insert shape code - D					
Cutting edge effective length - 10.828 mm					
Corner radius - 0.794 mm					
Hand - Neutral					
Coating - CVD Ti(C,N)+Al2O3+TiN					
Insert thickness - 4.763 mm					
<b>Item 13 ID Turning Boring Bar with Inserts</b>					
13.1	ID Turning Boring Bar $\Phi$ 6 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 6	10		
		Minimum overhang - 9 mm			
		Hand - Left			
		Functional length - 80 mm			
		Functional width - 4.5 mm			
		Body diameter - 6 mm			
		Master insert identification - TCMT 06 T1 02			
		Cutting approach angle - 91 deg			
13.2	ID Turning Boring Bar $\Phi$ 8mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 8	10		
		Minimum overhang - 12 mm			

		Hand - Left			
		Functional length - 100 mm			
		Functional width - 5 mm			
		Body diameter - 8 mm			
		Master insert identification - CCMT 06 02 04			
		Cutting approach angle - 91 deg			
13.3	ID Turning Boring Bar $\Phi$ 10 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 10	10		
		Minimum overhang - 15 mm			
		Hand - Left			
		Functional length - 125 mm			
		Functional width -6 mm			
		Body diameter - 10 mm			
		Master insert identification -CCMT 06 02 04			
		Cutting approach angle - 91 deg			
13.4	ID Turning Boring Bar $\Phi$ 12 mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 12	10		
		Minimum overhang - 18 mm			
		Hand - Left			
		Functional length - 150 mm			
		Functional width -9 mm			
		Body diameter - 12 mm			
		Master insert identification -CCMT 06 02 04			
		Cutting approach angle - 91 deg			

13.5	ID Turning Boring Bar $\Phi$ 16 mm	Adaptive interface machine direction	10		
		Cylindrical shank w/ 3 flats -metric: 16			
		Minimum overhang - 24 mm			
		Hand - Left			
		Functional length - 200 mm			
		Functional width -11 mm			
		Body diameter - 16 mm			
		Master insert identification -CCMT 09 T3 08			
Cutting approach angle - 91 deg					
13.6	ID Turning Boring Bar $\Phi$ 20mm	Adaptive interface machine direction	10		
		Cylindrical shank w/ 3 flats -metric: 20			
		Minimum overhang - 30 mm			
		Hand - Left			
		Functional length - 250 mm			
		Functional width -13 mm			
		Body diameter - 20 mm			
		Master insert identification -CCMT 09 T3 08			
Cutting approach angle - 91 deg					
13.7	Insert	Insert size and shape - CC0602	400		
		Inscribed circle diameter - 6.35 mm			
		Insert shape code - C			
		Cutting edge effective length - 6.048 mm			
		Corner radius - 0.397 mm			
		Hand - Neutral			
		Coating - CVD Ti(C,N)+Al2O3+TiN			
		Insert thickness - 2.381 mm			
		Clearance angle major - 7 deg			

13.8	Insert	Insert size and shape - CC09T3	400		
		Inscribed circle diameter - 9.525 mm			
		Insert shape code - C			
		Cutting edge effective length - 8.872 mm			
		Corner radius - 0.794 mm			
		Hand - Neutral			
		Coating - CVD Ti(C,N)+Al2O3+TiN			
		Insert thickness - 3.969 mm			
		Clearance angle major - 7 deg			
<b>Item 14</b>	<b>Parting Holder for 2 mm &amp; 3 mm Inserts</b>				
14.1	Parting Holder	Cutting depth maximum - 15 mm	5		
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20			
		Work piece side body angle - 0 deg			
		Maximum overhang - 33.5 mm			
		Hand - Left			
		Shank width - 20 mm			
		Shank height - 20 mm			
		Functional length - 125 mm			
14.2	2 mm Parting Carbide Insert	Cutting width - 2 mm	200		
		Corner radius left - 0.2 mm			
		Corner radius right - 0.2 mm			
		Cutting depth maximum - 19 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N+TiN			
		Clearance angle major - 7 deg			
		Total length - 19 mm			

14.3	3 mm Parting Carbide Insert	Cutting width - 3 mm	200		
		Corner radius left - 0.2 mm			
		Corner radius right - 0.2 mm			
		Cutting depth maximum - 18.9 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N			
		Clearance angle major - 7 deg			
		Total length - 18.9 mm			
<b>Item 15</b>	<b>OD Threading holder with Inserts</b>				
15.1	OD Threading holder	Adaptive interface machine direction - Rectangular shank -metric: 20 x 20	5		
		Hand - Right			
		Shank width - 20 mm			
		Shank height - 20 mm			
		Functional length - 125 mm			
		Functional width - 25 mm			
		Functional height - 20 mm			
		Shim protection to insert			
Clearance angle major - (-) 10 deg					
15.2	OD Threading Inserts	Thread form type - WH55	100		
		Standard number - ISO 228-1982			
		Thread type - Ext			
		Thread per inch - 8			
		Thread profile type - F			
		Tooth count - 1			
		Thread tolerance class - A			
		Theoretical thread height - 2.52 mm			
		Inscribed circle diameter - 9.525 mm			
		Hand - Right			
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N			
		Insert thickness - 3.969 mm			



Item 16	ID Threading holder with Inserts							
16.1	ID Threading Boring Bar $\Phi$ 16mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16	5					
		Minimum bore diameter - 20 mm						
		Minimum overhang - 27 mm						
		Maximum overhang - 48 mm						
		Usable length - 48 mm						
		Hand - Right						
		Shank height - 15 mm						
		Functional length - 200 mm						
		Functional width - 12 mm						
		Body diameter - 16 mm						
		16.2		ID Threading Inserts	Thread form type - M60	200		
					Standard number - ISO 965-1998			
Thread type - INT								
Thread pitch - 1.5 mm								
Thread profile type - F								
Tooth count - 2								
Thread tolerance class - 6								
Theoretical thread height - 0.96 mm								
Inscribed circle diameter - 9.525 mm								
Hand - Right								
Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N								
Insert thickness - 3.969 mm								

Item 17	Index able type End mill cutter with all accessories				
17.1	Dia 16	Working length = ~ 8.8mm	5 each		
		Total Length = 90 & 170			
		Insert Count = 2 Min			
		Body : steel			
		Shank Dia. = 16mm			
		Working Dia. = 16 mm			
17.2	Dia 20	Working length = ~ 8.8mm	5 each		
		Total Length = 110 & 170			
		Insert Count = 3 Min			
		Body : steel			
		Shank Dia. =20mm			
		Working Dia. = 20 mm			
17.1	Dia 25	Working length = ~ 8.8mm	5 each		
		Total Length = 110 & 210			
		Insert Count = 4 Min			
		Body : steel			
		Shank Dia. = 25mm			
		Working Dia. = 25 mm			
17.2	Inserts	Shape code : AP	800		
		Coating PVD			
18	The cutter body, accessories and Inserts should be in same make.				
19	All items should be available in OEM website along with part no.				
20	Product Catalogue has to be submitted along with technical bid.				
21	20 Nos. screws (same Make) has to be supplied extra per cutter body.				
22	All accessories which is necessary to run the Tool has to be supplied				

**Amendment:-**

**Annexure C, Clause 5**

**Confirmation of acceptance of Technical Specifications for the supply of Tooling:**

Sr No	Description	Specification	Part No	Acceptance to the Specification as placed at Annexure-A and agreed to supply with required Quantity (write YES/ NO only)	If marked "NO" in the column before, specify the deviation in specification of the Tooling offered for the supply.
Item1	<b>Face Milling Cutter Dia 80 mm with inserts and holder</b>				
1.1	Face Milling Cutter Dia 80 mm	Tool cutting edge angle -45 degree			
		Cutting diameter -80 mm			
		No of inserts - 6			
		Depth of cut maximum - 6 mm			
		Hand - Right			
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) - metric: 27			
		Cutting pitch differential			
1.2	Inserts	Inscribed Circle Diameter - 13 mm			
		Insert shape code - S			
		Cutting edge effective length - 8.8 mm			
		Wiper edge length - 2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 45 deg			
		Hand - Right			
		Coating - CVD Ti (C, N) + Al2O3 + TiN			
		Insert thickness - 5.6 mm			

1.3	Suitable Basic Holder BT 40 to face mill arbor dia 27 mm	Adaptive interface Work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) - metric: 27			
		Connection retention knob thread size M16			
		Connection diameter - 27 mm			
		Functional length - 100 mm			
		Body material code - Steel			
<b>Item 2</b>	<b>Shoulder milling cutter Dia 50 mm with inserts and holder</b>				
2.1	Shoulder milling cutter dia 50 mm	Cutting diameter - 50 mm			
		No of inserts - 5			
		Depth of cut maximum - 10 mm			
		Maximum ramping angle - 1.4 deg			
		Cutting pitch differential			
		Adaptive interface machine direction Arbor -ISO 6462 -A (hexagon socket head cap screw) -metric: 22			
		Hand - Right			
		Connection diameter - 22 mm			
		Functional length - 40 mm			
		Body material code - Steel			
2.2	Inserts	Insert width - 6.8 mm			
		Cutting edge effective length - 10 mm			
		Wiper edge length - 1.2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 90 deg			
		Hand - Right			
		Coating - CVD Ti (C, N) + Al2O3 + TiN			
		Insert thickness - 3.59 mm ; insert code : AP			
2.3	Suitable Basic Holder BT 40 to face mill arbor dia 22 mm	Adaptive interface work piece direction Arbor -ISO 6462 -A/B (center bolt/washer) - metric: 27			
		Connection retention knob thread size - M16			
		Connection diameter - 22 mm			
		Functional length - 100 mm			

		Body material code - Steel			
<b>Item 3</b>	<b>Shoulder milling cutter dia 32 mm, long 192 mm with inserts and holder</b>				
3.1	Shoulder milling cutter dia 32 mm long 192 mm	Cutting diameter - 32 mm			
		No of inserts - 2			
		Depth of cut maximum - 10 mm			
		Maximum ramping angle - 5.5 deg			
		Usable length - 192 mm			
		Cutting pitch differential -true			
		Hand - Right			
		Damping property - True			
		Connection diameter - 50 mm			
		Functional length - 217 mm			
		Body material code - Steel			
3.2	Inserts	Insert width - 6.8 mm			
		Insert shape code - AP			
		Cutting edge effective length - 10 mm			
		Wiper edge length - 1.2 mm			
		Corner radius - 0.8 mm			
		Major cutting edge angle - 90 deg			
		Hand - Right			
		Coating - PVD (Ti,Al)N2			
		Insert thickness - 3.59 mm			
		3.3	Basic Holder BT-40 side lock adaptor	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40	
Connection retention knob thread size M16					
Connection diameter - 50 mm					
Functional length - 90 mm					
Body material code – Steel					

Item 4	High Feed Milling Cutter Dia. 25 mm with inserts and holder				
4.1	High Feed Milling Cutter Dia 25 mm	Tool cutting edge angle - 10 deg			
		Cutting diameter - 10.9 mm			
		Maximum cutting diameter - 25 mm			
		No of inserts - 2			
		Maximum ramping angle - 14.5 deg			
		Adaptive interface machine direction Cylindrical shank without clamping features - metric: 20.0			
		Hand - Right			
		Connection diameter - 20 mm			
		Functional length - 180 mm			
		Body material code - Steel			
		4.2		Inserts	Inscribed circle diameter - 9.5 mm
Insert shape code - S					
Cutting edge effective length - 5.77 mm					
Wiper edge length - 0.66 mm					
Corner radius - 1.4 mm					
Major cutting edge angle - 10 deg					
Hand - Neutral					
Coating - CVD Ti(C,N)+Al2O3+TiN					
Insert thickness - 4.5 mm					
4.3	Basic Holder BT-40 to Side Lock Dia 20 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40			
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) - metric: 20			
		Connection retention knob thread size M16			
		Connection diameter 20 mm			
		Functional length - 75 mm			
		Body material code – Steel			

Item 5		Round Milling Cutter Dia 20 mm with inserts and holder			
5.1	Round Milling Cutter Dia 20 mm	Cutting diameter - 20 mm			
		Maximum cutting diameter - 32 mm			
		No of inserts - 2			
		Depth of cut maximum - 9 mm			
		Maximum ramping angle - 12 deg			
		Cutting pitch differential - true			
		Adaptive interface machine direction Cylindrical shank without clamping features - metric: 25.0			
		Hand - Right			
		Connection diameter - 25 mm			
		Connection diameter tolerance - h7			
		Functional length - 190 mm			
		Body material code - Steel			
		5.2	Inserts	Inscribed circle diameter - 12 mm	
Insert shape code - R					
Corner radius - 6 mm					
Hand - Neutral					
Coating - PVD (Ti,Al)N					
Insert thickness - 3.969 mm					
5.3	Basic Holder BT-40 to Side Lock Dia 25 mm	Adaptive interface machine direction MAS-BT403 -AD/B central/flange coolant - BT40			
		Adaptive interface workpiece direction Cylindrical clamping (ISO9766 drill shank) -metric: 25			
		Connection retention knob thread size M16			
		Connection diameter 25 mm			
		Functional length - 80 mm			
		Body material code – Steel			

Item 6		Round Milling Cutter Dia 50 mm with inserts			
6.1	Round Milling Cutter Dia 50 mm	Cutting diameter - 50 mm			
		Maximum cutting diameter - 40 mm			
		No of inserts - 4			
		Depth of cut maximum - 9 mm			
		Maximum ramping angle - 12 deg			
		Cutting pitch differential - true			
		Adaptive interface machine direction Cylindrical shank without clamping features -metric: 25.0			
		Hand - Right			
		Connection diameter - 50 mm			
		Connection diameter tolerance - h7			
		Body material code - Steel			
6.2	Inserts	Inscribed circle diameter - 12 mm			
		Insert shape code - R			
		Corner radius - 6 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N			
		Insert thickness - 3.969 mm			
Item 7		Solid Carbide End mill			
7.1	Solid Carbide Endmill Dia 16 mm	Cutting diameter -16 mm			
		Peripheral effective cutting edge count -4			
		Connection diameter tolerance - h6			
		Coating - PVD TiAlN			
		Connection diameter - 16 mm			
		Max ramping angle - 5 deg			
		Flute helix angle - 50 deg			
		Cutting material hardness ≤ 48 HRC			



7.2	Solid Carbide Endmill Dia 12 mm	Cutting diameter -12 mm		
		Peripheral effective cutting edge count -4		
		Connection diameter tolerance - h6		
		Coating - PVD TiAlN		
		Connection diameter - 12 mm		
		Max ramping angle - 5 deg		
		Flute helix angle - 50 deg		
		Cutting material hardness $\leq$ 48 HRC		
7.3	Solid Carbide Endmill Dia 10 mm	Cutting diameter -10 mm		
		Peripheral effective cutting edge count -4		
		Connection diameter tolerance - h6		
		Coating - PVD (Ti,Al)N <sub>2</sub>		
		Connection diameter - 10 mm		
		Max ramping angle - 5 deg		
		Flute helix angle - 50 deg		
		Cutting material hardness $\leq$ 48 HRC		
7.4	Solid Carbide Endmill Dia 8 mm	Cutting diameter -8 mm		
		Peripheral effective cutting edge count -4		
		Connection diameter tolerance - h6		
		Coating - PVD TiAlN		
		Connection diameter - 8 mm		
		Max ramping angle - 5 deg		
		Flute helix angle - 50 deg		
		Cutting material hardness $\leq$ 48 HRC		
7.4	Solid Carbide Endmill Dia 20 mm	Cutting diameter -20 mm		
		Peripheral effective cutting edge count -4		
		Connection diameter tolerance - h6		
		Coating - PVD TiAlN		
		Connection diameter - 20 mm		
		Max ramping angle - 5 deg		
		Flute helix angle - 50 deg		
		Cutting material hardness $\leq$ 48 HRC		

Item 8		Solid Carbide Ball Nose			
8.1	Solid Carbide Ball Nose Dia 3 mm	Cutting diameter - 3 mm			
		Corner radius - 1.5 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness $\leq$ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 3			
		Coating -PVD AlCrN			
		Functional length - 38 mm			
		Connection diameter - 3 mm			
8.2	Solid Carbide Ball Nose Dia 4 mm	Cutting diameter - 4 mm			
		Corner radius - 2 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness $\leq$ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 4			
		Coating -PVD AlCrN			
		Functional length - 57 mm			
		Connection diameter - 6 mm			
8.3	Solid Carbide Ball Nose Dia 6 mm	Cutting diameter - 6 mm			
		Corner radius - 3 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness $\leq$ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 6			
		Coating -PVD AlCrN			
		Functional length - 57 mm			
		Connection diameter - 6 mm			

8.4	Solid Carbide Ball Nose Dia 8 mm	Cutting diameter -8 mm			
		Corner radius - 4 mm			
		Maximum ramping angle -15 deg			
		Flute helix angle - 30 deg			
		Cutting material hardness ≤ 48 HRC			
		Peripheral effective cutting edge count - 2			
		Adaptive interface machine direction			
		Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 8 ,			
		Coating -PVD AlCrN			
		Functional length - 63 mm			
		Connection diameter - 8 mm			
<b>Item 9</b>	<b>Solid Carbide Drill with M/c Tap</b>				
9.1	Solid Carbide Drill Dia4.2mm for M5 & 5mm for M6	Cutting diameter – 4.2 & 5 mm			
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter – 5 & 6 mm			
		Point angle - 140 deg			
		Overall length - 60 & 66 mm			
9.2	Tap M5 & M6	Thread diameter size – M5 & M6			
		Thread pitch – 0.8 & 1 mm			
		Thread tolerance class - 6H			
		Substrate - HSS-E			
		Coating - PVD TiAlN+WC/C			
		Functional length – 70 & 80 mm			
		Flute count - 3			
		Flute helix angle - 48 deg			
Standard - DIN371					
9.3	Solid Carbide Drill Dia 6.8 mm for M8	Cutting diameter - 6.8 mm			
		Achievable hole tolerance - H9			
		Coating - PVD (Ti,Al)N			
		Connection diameter - 8 mm			
		Point angle - 140 deg			
		Overall length - 91 mm			

9.4	Tap M8	Thread diameter size - M8		
		Thread pitch - 1.25 mm		
		Thread tolerance class - 6H		
		Substrate - HSS-E		
		Coating - PVD TiAlN+WC/C		
		Functional length - 90 mm		
		Flute count - 3		
		Flute helix angle - 48 deg		
		Standard - DIN371		
		9.5	Solid Carbide Drill Dia 8.5mm for M10	Cutting diameter - 8.5 mm
Achievable hole tolerance - H9				
Coating - PVD (Ti,Al)N				
Connection diameter - 10 mm				
Point angle - 140 deg				
Overall length - 89 mm				
9.6	Tap M10	Thread diameter size - M 10		
		Thread pitch - 1.5 mm		
		Thread tolerance class - 6HX		
		Substrate - HSS-E-PM		
		Coating - PVD (Ti,Al)N		
		Functional length - 100 mm		
		Flute count - 3		
		Flute helix angle - 48 deg		
		Standard - DIN371		
9.7	Solid Carbide Drill Dia 10.2mm for M12	Cutting diameter - 10.2 mm		
		Achievable hole tolerance - H9		
		Coating - PVD (Ti,Al)N		
		Connection diameter - 12 mm		
		Point angle - 140 deg		
		Overall length - 102 mm		

9.8	Tap M 12	Thread diameter size - M 12		
		Thread pitch - 1.75 mm		
		Thread tolerance class - 6HX		
		Substrate - HSS-E-PM		
		Coating - PVD (Ti,Al)N		
		Functional length - 110 mm		
		Flute count - 4		
		Flute helix angle - 48 deg		
		Standard - DIN371		
9.9	Solid Carbide Drill Dia 14 mm for M16	Cutting diameter - 14 mm		
		Achievable hole tolerance - H9		
		Coating - PVD (Ti,Al)N		
		Connection diameter - 16 mm		
		Point angle - 140 deg		
		Overall length - 109 mm		
9.10	Tap M 16	Thread diameter size - M 12		
		Thread pitch – 2.0 mm		
		Thread tolerance class - 6HX		
		Substrate - HSS-E-PM		
		Coating - PVD (Ti,Al)N		
		Functional length - 120 mm		
		Flute count - 4		
		Flute helix angle - 48 deg		
		Standard - DIN371		

<b>Item 10</b>	<b>Fine Boring Head <math>\Phi</math> 6 to 108 mm with all accessories (kit) with suitable adaptor</b>			
10.1	Fine Boring Head $\Phi$ 6 to 108 mm (with all accessories)	Minimum cutting $\Phi$ - 6 mm Maximum cutting diameter - 108 mm Adaptive interface work piece direction Cylindrical clamping w/ flats (sleeve) -metric: 20 Insert type : W , T , C (30 each) Body material code - Steel Least count adjustment - 0.002 mm Min. Working length (4) $\Phi$ 6 -21 mm (2) $\Phi$ 8 – 28mm (3) $\Phi$ 10-35mm (4) $\Phi$ 12 – 42mm (5) $\Phi$ 14 – 50 mm (6) $\Phi$ 16 – 60mm (7) $\Phi$ 18 – 63mm (8) $\Phi$ 22 – 68mm (9) $\Phi$ 28 – 63 & 105mm (10) $\Phi$ 36 - 63 & 105mm (11) $\Phi$ 54 – 79mm (12) 80-93mm		
<b>Item 11</b>	<b>OD Turning Holder for Rough with Inserts</b>			
11.1	OD Turning Holder For Rough	Tool cutting edge angle - 95 deg Tool lead angle - (-)5 deg Adaptive interface machine direction Rectangular shank -metric: 20 x 20 Hand - Left Shank width - 20 mm Shank height - 20 mm Functional length - 150 mm Functional width - 32 mm Functional height - 25 mm Body material code - Steel Master insert identification - CNMG 12 04 08		

11.2	OD Turning Inserts	Insert size and shape - CN1204		
		Inscribed circle diameter - 12.7 mm		
		Insert shape code - C		
		Cutting edge effective length - 12.096 mm		
		Corner radius - 0.794 mm		
		Hand - Neutral		
		Coating - CVD Ti(C,N)+Al2O3+TiN		
		Insert thickness - 4.763 mm		
<b>Item 12</b>	<b>OD Turning Holder for Finish with Inserts</b>			
12.1	OD Turning Holder For Finish	Tool cutting edge angle - 93 deg		
		Tool lead angle - (-)3 deg		
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20		
		Hand - Left		
		Shank width - 20 mm		
		Shank height - 20 mm		
		Functional length - 125 mm		
		Functional height - 20 mm		
		Body material code - Steel		
		Master insert identification - DNMG 11 04 08		
12.2	OD Turning Inserts	Operation type - Finish		
		Insert size and shape - DN1104		
		Inscribed circle diameter - 9.525 mm		
		Insert shape code - D		
		Cutting edge effective length - 10.828 mm		
		Corner radius - 0.794 mm		
		Hand - Neutral		
		Coating - CVD Ti(C,N)+Al2O3+TiN		
		Insert thickness - 4.763 mm		

Item 13		ID Turning Boring Bar with Inserts		
13.1	ID Turning Boring Bar $\Phi$ 6 mm	Adaptive interface machine direction		
		Cylindrical shank w/ 3 flats -metric: 6		
		Minimum overhang - 9 mm		
		Hand - Left		
		Functional length - 80 mm		
		Functional width - 4.5 mm		
		Body diameter - 6 mm		
		Master insert identification - TCMT 06 T1 02		
		Cutting approach angle - 91 deg		
13.2	ID Turning Boring Bar $\Phi$ 8mm	Adaptive interface machine direction		
		Cylindrical shank w/ 3 flats -metric: 8		
		Minimum overhang - 12 mm		
		Hand - Left		
		Functional length - 100 mm		
		Functional width - 5 mm		
		Body diameter - 8 mm		
		Master insert identification - CCMT 06 02 04		
		Cutting approach angle - 91 deg		
13.3	ID Turning Boring Bar $\Phi$ 10 mm	Adaptive interface machine direction		
		Cylindrical shank w/ 3 flats -metric: 10		
		Minimum overhang - 15 mm		
		Hand - Left		
		Functional length - 125 mm		
		Functional width -6 mm		
		Body diameter - 10 mm		
		Master insert identification -CCMT 06 02 04		
		Cutting approach angle - 91 deg		
13.4	ID Turning Boring Bar $\Phi$ 12 mm	Adaptive interface machine direction		
		Cylindrical shank w/ 3 flats -metric: 12		
		Minimum overhang - 18 mm		
		Hand - Left		
		Functional length - 150 mm		
		Functional width -9 mm		



		Body diameter - 12 mm			
		Master insert identification -CCMT 06 02 04			
		Cutting approach angle - 91 deg			
13.5	ID Turning Boring Bar $\Phi$ 16 mm	Adaptive interface machine direction			
		Cylindrical shank w/ 3 flats -metric: 16			
		Minimum overhang - 24 mm			
		Hand - Left			
		Functional length - 200 mm			
		Functional width -11 mm			
		Body diameter - 16 mm			
		Master insert identification -CCMT 09 T3 08			
		Cutting approach angle - 91 deg			
13.6	ID Turning Boring Bar $\Phi$ 20mm	Adaptive interface machine direction			
		Cylindrical shank w/ 3 flats -metric: 20			
		Minimum overhang - 30 mm			
		Hand - Left			
		Functional length - 250 mm			
		Functional width -13 mm			
		Body diameter - 20 mm			
		Master insert identification -CCMT 09 T3 08			
		Cutting approach angle - 91 deg			
13.7	Insert	Insert size and shape - CC0602			
		Inscribed circle diameter - 6.35 mm			
		Insert shape code - C			
		Cutting edge effective length - 6.048 mm			
		Corner radius - 0.397 mm			
		Hand - Neutral			
		Coating - CVD Ti(C,N)+Al <sub>2</sub> O <sub>3</sub> +TiN			
		Insert thickness - 2.381 mm			
		Clearance angle major - 7 deg			

13.8	Insert	Insert size and shape - CC09T3			
		Inscribed circle diameter - 9.525 mm			
		Insert shape code - C			
		Cutting edge effective length - 8.872 mm			
		Corner radius - 0.794 mm			
		Hand - Neutral			
		Coating - CVD Ti(C,N)+Al2O3+TiN			
		Insert thickness - 3.969 mm			
		Clearance angle major - 7 deg			
<b>Item 14</b>	<b>Parting Holder for 2 mm &amp; 3 mm Inserts</b>				
14.1	Parting Holder	Cutting depth maximum - 15 mm			
		Adaptive interface machine direction Rectangular shank -metric: 20 x 20			
		Work piece side body angle - 0 deg			
		Maximum overhang - 33.5 mm			
		Hand - Left			
		Shank width - 20 mm			
		Shank height - 20 mm			
		Functional length - 125 mm			
14.2	2 mm Parting Carbide Insert	Cutting width - 2 mm			
		Corner radius left - 0.2 mm			
		Corner radius right - 0.2 mm			
		Cutting depth maximum - 19 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N+TiN			
		Clearance angle major - 7 deg			
		Total length - 19 mm			

14.3	3 mm Parting Carbide Insert	Cutting width - 3 mm			
		Corner radius left - 0.2 mm			
		Corner radius right - 0.2 mm			
		Cutting depth maximum - 18.9 mm			
		Hand - Neutral			
		Coating - PVD (Ti,Al)N			
		Clearance angle major - 7 deg			
		Total length - 18.9 mm			
<b>Item 15</b>	<b>OD Threading holder with Inserts</b>				
15.1	OD Threading holder	Adaptive interface machine direction - Rectangular shank -metric: 20 x 20			
		Hand - Right			
		Shank width - 20 mm			
		Shank height - 20 mm			
		Functional length - 125 mm			
		Functional width - 25 mm			
		Functional height - 20 mm			
		Shim protection to insert			
Clearance angle major - (-) 10 deg					
15.2	OD Threading Inserts	Thread form type - WH55			
		Standard number - ISO 228-1982			
		Thread type - Ext			
		Thread per inch - 8			
		Thread profile type - F			
		Tooth count - 1			
		Thread tolerance class - A			
		Theoretical thread height - 2.52 mm			
		Inscribed circle diameter - 9.525 mm			
		Hand - Right			
		Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N			
		Insert thickness - 3.969 mm			

Item 16	ID Threading holder with Inserts							
16.1	ID Threading Boring Bar $\Phi$ 16mm	Adaptive interface machine direction Cylindrical shank w/ 3 flats -metric: 16						
		Minimum bore diameter - 20 mm						
		Minimum overhang - 27 mm						
		Maximum overhang - 48 mm						
		Usable length - 48 mm						
		Hand - Right						
		Shank height - 15 mm						
		Functional length - 200 mm						
		Functional width - 12 mm						
		Body diameter - 16 mm						
		16.2		ID Threading Inserts	Thread form type - M60			
					Standard number - ISO 965-1998			
Thread type - INT								
Thread pitch - 1.5 mm								
Thread profile type - F								
Tooth count - 2								
Thread tolerance class - 6								
Theoretical thread height - 0.96 mm								
Inscribed circle diameter - 9.525 mm								
Hand - Right								
Coating - PVD (Ti,Cr,Al)N+(Ti,Al)N								
Insert thickness - 3.969 mm								

Item 17	Index able type End mill cutter with all accessories			
17.1	Dia 16	Working length = ~ 8.8mm		
		Total Length = 90 & 170		
		Insert Count = 2 Min		
		Body : steel		
		Shank Dia. = 16mm		
		Working Dia. = 16 mm		
17.2	Dia 20	Working length = ~ 8.8mm		
		Total Length = 110 & 170		
		Insert Count = 3 Min		
		Body : steel		
		Shank Dia. =20mm		
		Working Dia. = 20 mm		
17.1	Dia 25	Working length = ~ 8.8mm		
		Total Length = 110 & 210		
		Insert Count = 4 Min		
		Body : steel		
		Shank Dia. = 25mm		
		Working Dia. = 25 mm		
17.2	Inserts	Shape code : AP		
		Coating PVD		
18	The cutter body, accessories and Inserts should be in same make.			
19	All items should be available in OEM website along with part no.			
20	Product Catalogue has to be submitted along with technical bid.			
21	20 Nos. Insert screws (same Make) has to be supplied extra per cutter body.			
22	All accessories which is necessary to run the Tool has to be supplied			

### 3. Annexure C, Clause 7 (page no 48)

#### Confirmation for supply to the location:

#	Details	Location
		New Delhi
1	Tentative quantity required	As given in sl no 5
2	Consent to supply: (write YES/ NO only)	

#### Amendment

#### Confirmation for supply to the location:

#	Details	Location
		New Delhi
1	Tentative quantity required	As per Annexure A
2	Consent to supply: (write YES/ NO only)	