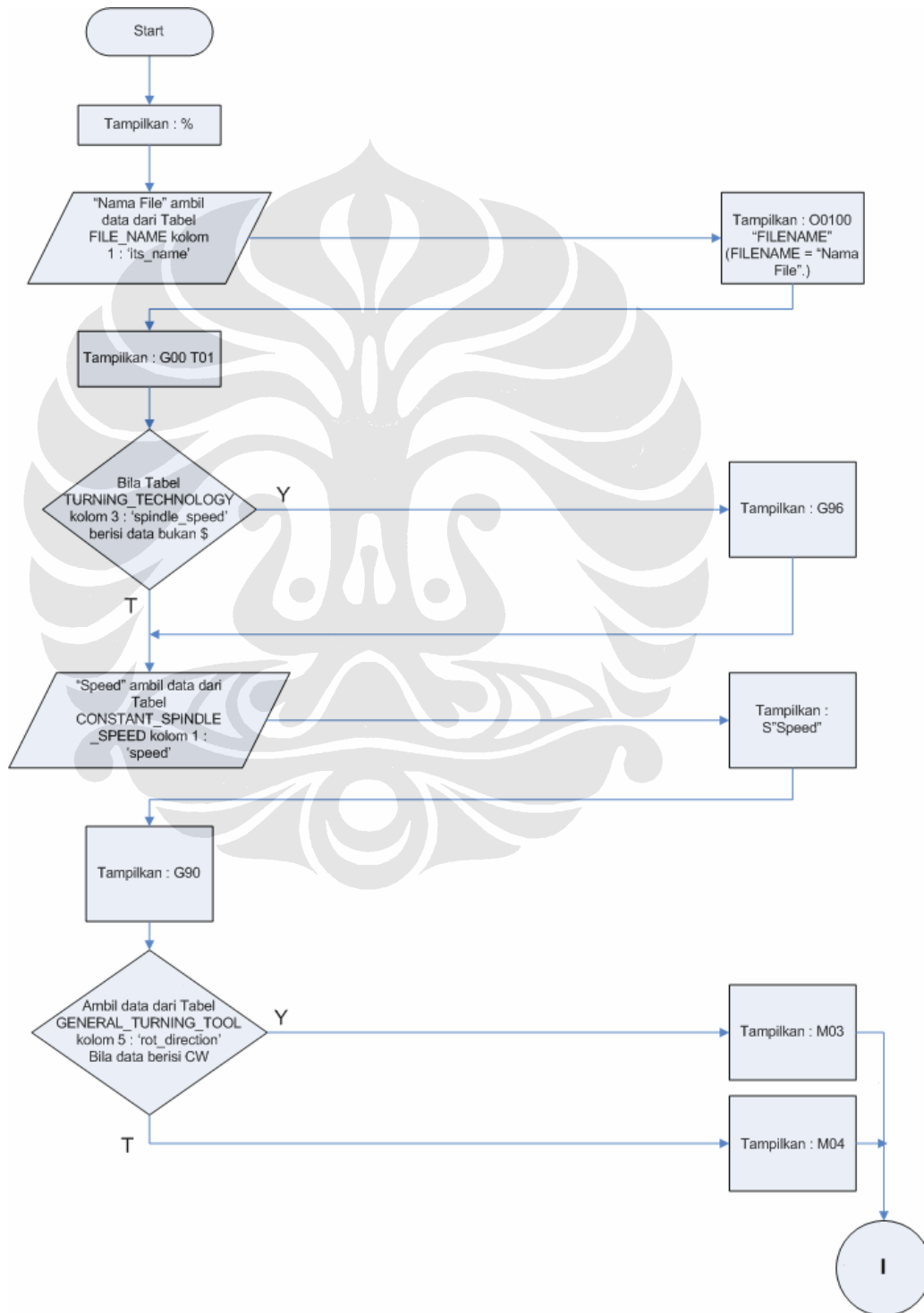
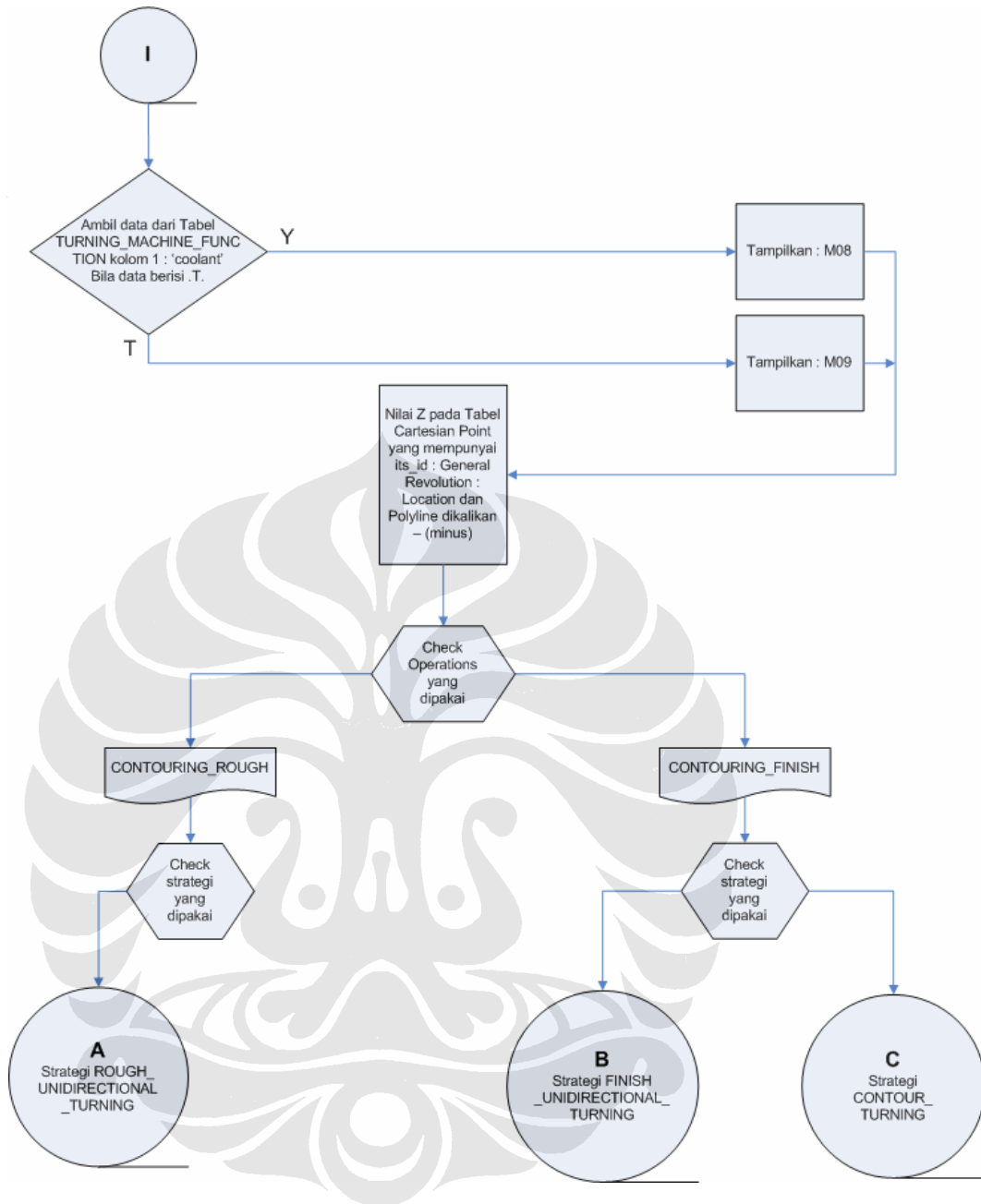


LAMPIRAN

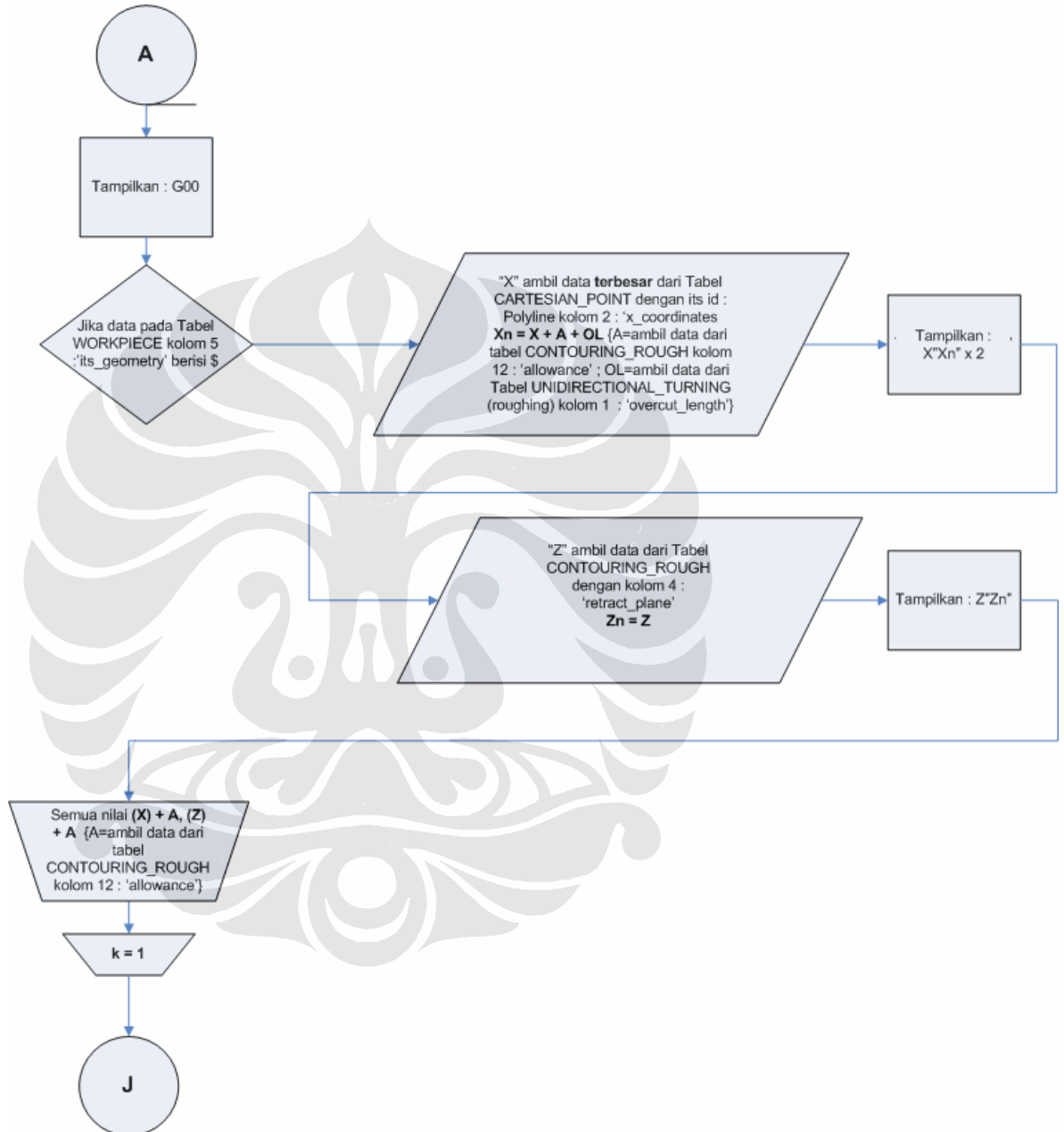
1. Algoritma *Rule Block Start*

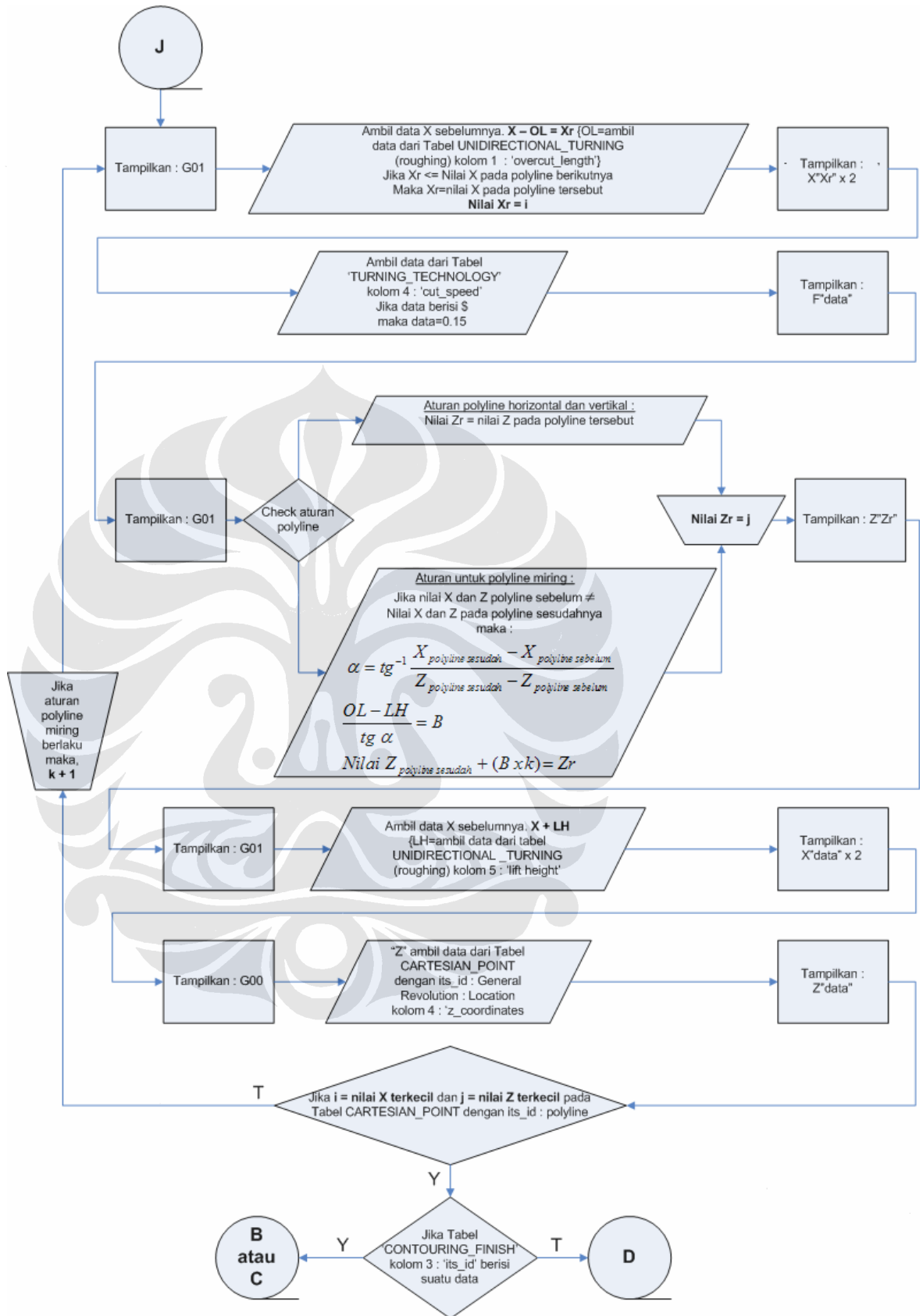




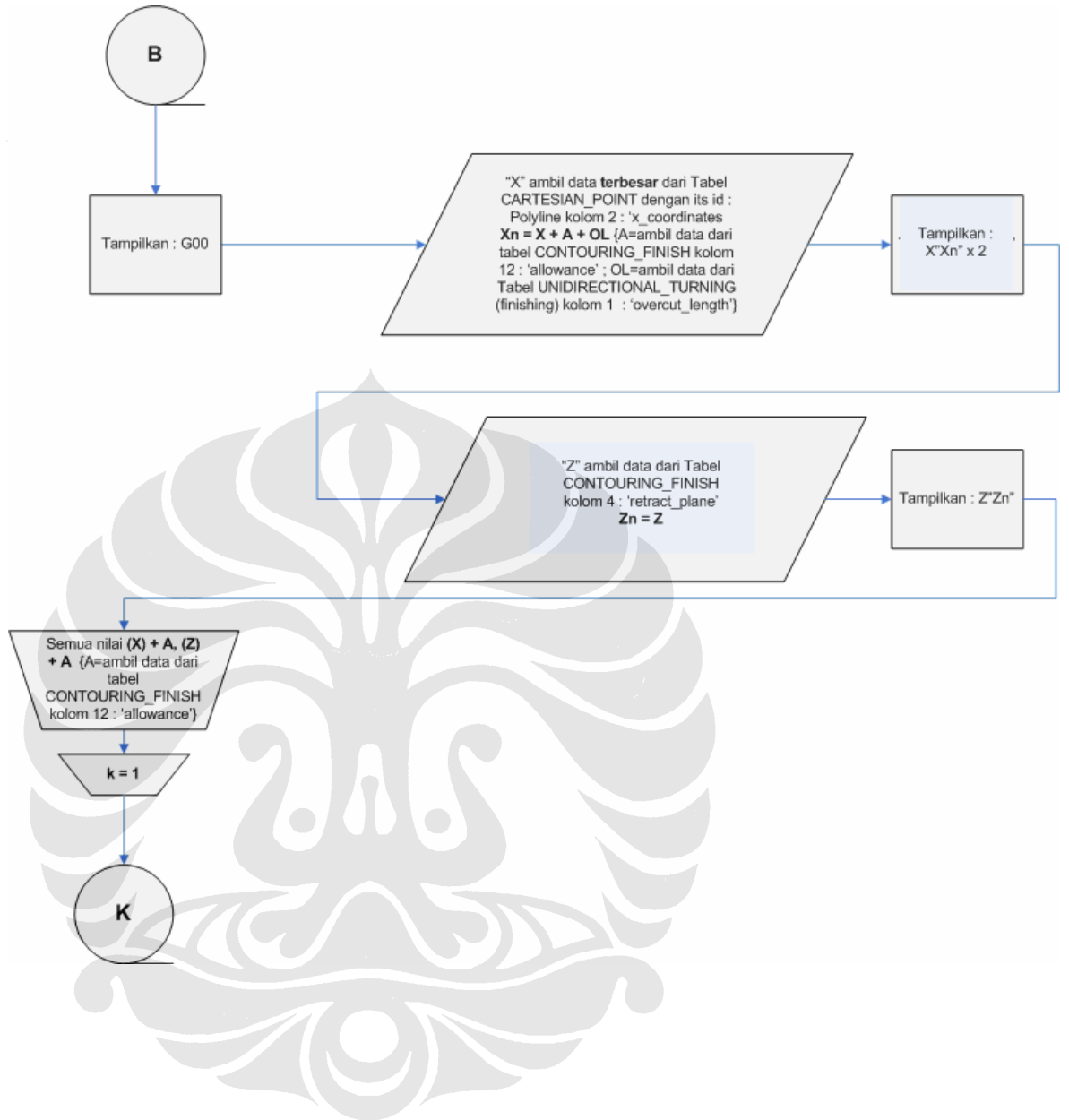
2. Algoritma *Rule Command*

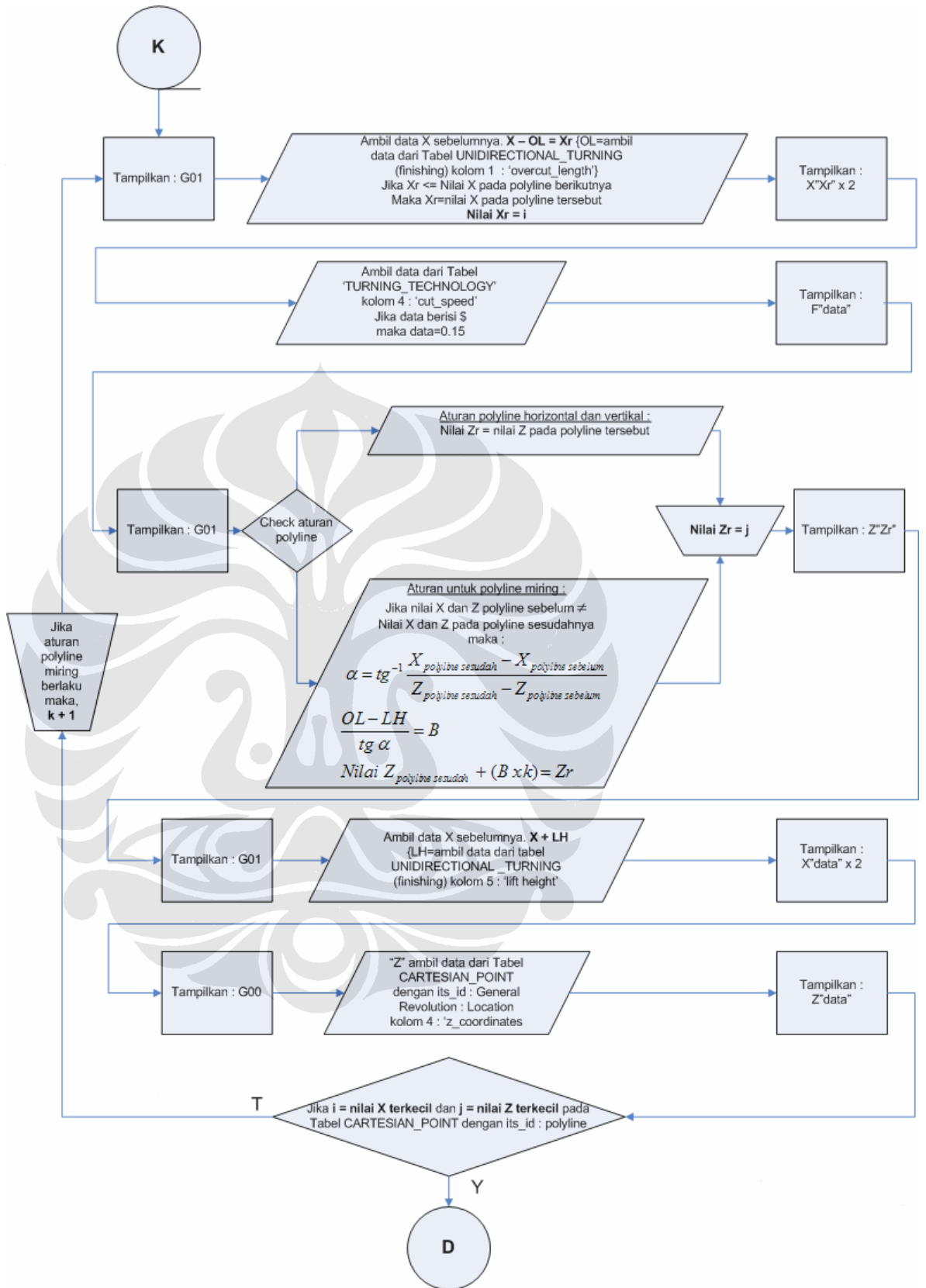
2.1 Algoritma *Rule Rough Unidirectional Turning*



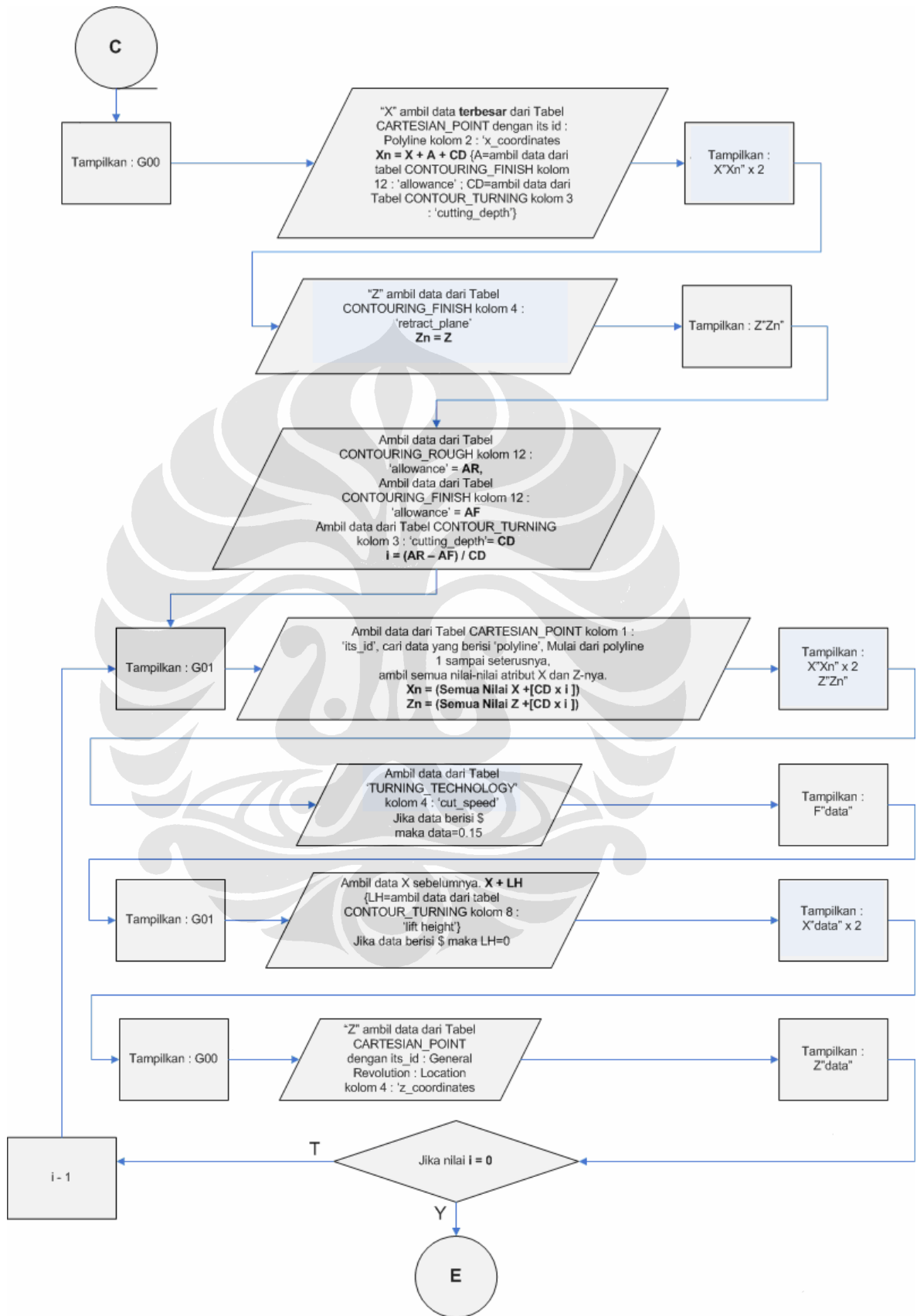


2.2 Algoritma Rule *Finish Unidirectional Turning*

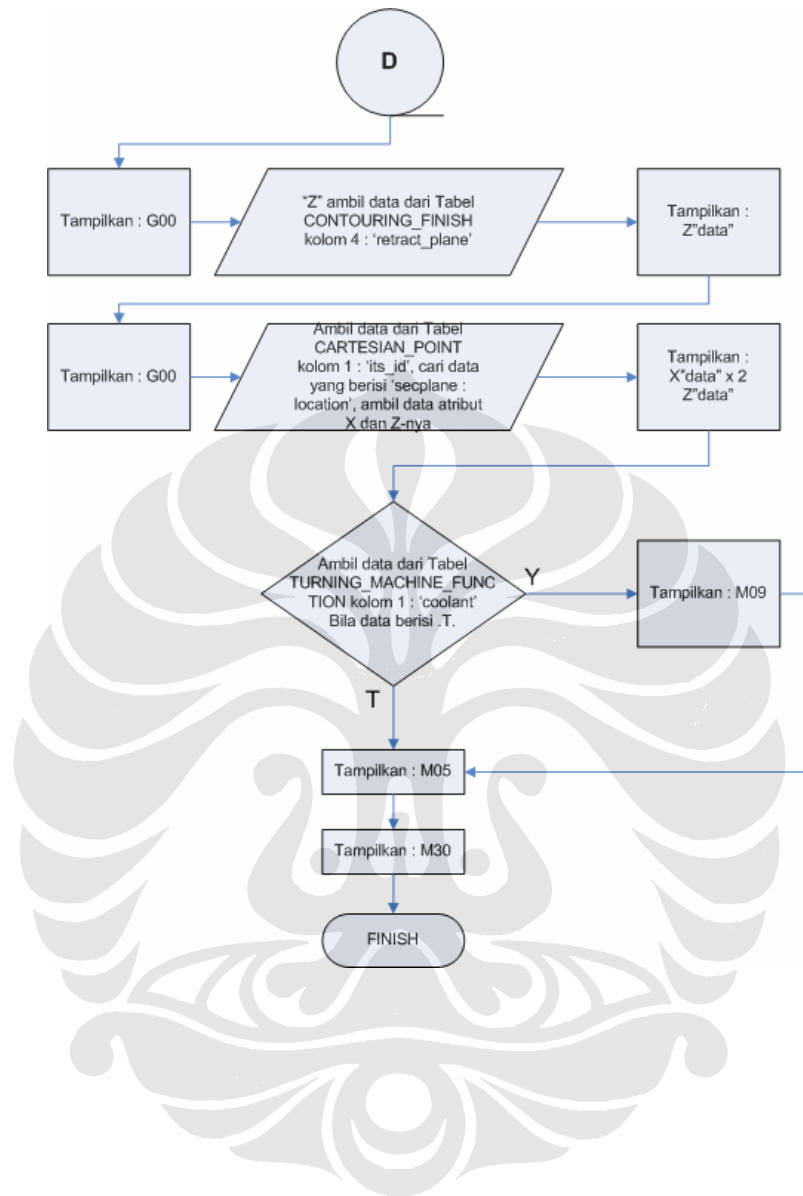




2.3 Algoritma Rule *Finish Contour Turning*



3. Algoritma Rule Block End



4. EXAMPLE 1.STP

```
HEADER;
FILE_DESCRIPTION(('EXAMPLE OF NC PROGRAMME FOR TURNING: COMPLEX
DESIGN.'),'1');
FILE_NAME('EXAMPLE2.STP',$( 'ISO14649'),(''),'SUH','POSTECH','KOREA');
FILE_SCHEMA(('MACHINING_SCHEMA','TURNING_SCHEMA'));
ENDSEC;
```

DATA;

```
(* ***** *)
(* ***** Workpiece definition ***** *)
#1=WORKPIECE('SIMPLE WORKPIECE','#2,0.01,$,$,$,());
#2=MATERIAL('ST-50','STEEL',(#3));
#3=PROPERTY_PARAMETER('E=200000N/M2');

(* ***** *)
(* ***** Manufacturing features ***** *)

(* ***** *)
(* ***** Turning operations ***** *)
#20=CONTOURING_ROUGH($,$,'ROUGH GENERAL
REVOLUTION1',30.000,$,#280,#61,#60,#130,#130,#131,0.5);
#21=CONTOURING_FINISH($,$,'FINISH GENERAL REVOLUTION
1',30.000,$,#280,#61,#60,#130,#130,#132,0.0);

(* ***** *)
(* ***** Project ***** *)
#35=WORKPLAN('MAIN WORKPLAN',(#36,#37),$,#52,$);
#36=WORKPLAN('WORK PLAN FOR SETUP1',(#38,#39,#40,#41,#42,#43,#44,#45),$,$,$);
#37=WORKPLAN('WORK PLAN FOR SETUP2',(#47,#48,#49,#50,#51),$,#54,$);
#40=MACHINING_WORKINGSTEP('WS ROUGH GENERAL_REVOLUTION
1',#56,#12,#20);
#41=MACHINING_WORKINGSTEP('WS FINISH GENERAL_REVOLUTION
1',#56,#12,#21);
#52=SETUP('SETUP 1',#103,#56,(#53));
#53=WORKPIECE_SETUP(#1,#107,$,$,$);
#56=PLANE('SECURITY PLANE',#119);

(* ***** *)
(* ***** Functions / Technology ***** *)
#60=TURNING_MACHINE_FUNCTIONS(.T.,$,$,(),.F.,$,$,(),$,$,$);
#61=TURNING_TECHNOLOGY($,.TCP.,#62,0.300,.F.,.F.,.F.,$);
#62=CONST_SPINDLE_SPEED(500);

(* ***** *)
(* ***** Strategies ***** *)
#130=PLUNGE_RAMP($,45.000);
#131=UNIDIRECTIONAL_TURNING($,$,(3.000),$,$,$,$,2.000,$,$);
#132=UNIDIRECTIONAL_TURNING($,$,(0.500),$,$,$,$,2.000,$,$);

(* ***** *)
(* ***** Placements / Lengths ***** *)
#103=AXIS2_PLACEMENT_3D('SETUP 1',#104,#105,#106);
#104=CARTESIAN_POINT('SETUP1: LOCATION ',(0.000,0.000,0.000));
#105=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#106=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
```

```

#107=AXIS2_PLACEMENT_3D('WORKPIECE',#108,#109,#110);
#108=CARTESIAN_POINT('WORKPIECE1: LOCATION ',(0.000,0.000,0.000));
#109=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#110=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#119=AXIS2_PLACEMENT_3D('SECURITY PLANE',#120,#121,#122);
#120=CARTESIAN_POINT('SECPLANE: LOCATION ',(0.000,0.000,50.000));
#121=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#122=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#194=AXIS2_PLACEMENT_3D('PLACEMENT GENERAL_REVOLUTION
1',#195,#196,#197);
#195=CARTESIAN_POINT(' GENERAL_REVOLUTION : LOCATION ',(0.000,0.000,-2.500));
#196=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#197=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#198=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#200=GENERAL_PROFILE($,#201);
#201=POLYLINE(",(#202,#203,#204,#205,#206));
#202=CARTESIAN_POINT(",(21.000,0.000, 0.000));
#203=CARTESIAN_POINT(",(23.000,0.000, 5.000));
#204=CARTESIAN_POINT(",(23.000,0.000, 55.000));
#205=CARTESIAN_POINT(",(35.000,0.000, 55.000));
#206=CARTESIAN_POINT(",(35.000,0.000, 95.000));

(* ***** *)
(* ***** Tools ***** *)
#280=TURNING_MACHINE_TOOL(",#281,(#283),120,40,$)
#281=GENERAL_TURNING_TOOL(#282,.LEFT,.40,60,.CW.);
#282=TOOL_DIMENSION($,$,$,25,5,7,3,5,0.5,$);
#283=CUTTING_COMPONENT(0.000000,$,$,$);

ENDSEC;

```

5. EXAMPLE 2.STP

ISO-10303-21;

HEADER;

FILE_DESCRIPTION(('EXAMPLE OF NC PROGRAMME FOR TURNING: COMPLEX DESIGN.'),'1');

FILE_NAME('EXAMPLE1.STP',\$,('ISO14649'),('','SUH','POSTECH','KOREA');

FILE_SCHEMA(('MACHINING_SCHEMA','TURNING_SCHEMA');

ENDSEC;

DATA;

(* ***** Workpiece definition ***** *)

#1=WORKPIECE('SIMPLE WORKPIECE','#2,0.01,\$,\$,\$,());

#2=MATERIAL('ST-50','STEEL',(#3));

#3=PROPERTY_PARAMETER('E=200000N/M2');

#4=RIGHT_CIRCULAR_CYLINDER('WORKPIECE PIECE', #5,175.0, 35.0);

#5=AXIS1_PLACEMENT('WORKPIECE PIECE PLACEMENT'#6,#7);

#6=CARTESIAN_POINT('WORKPIECE PIECE: LOCATION ',(0.000,0.000,0.000));

#7=DIRECTION(' AXIS ',(0.000,0.000,1.000));

(* ***** Manufacturing features ***** *)

#10=REVOLVED_FLAT('REVOLVED FLAT 1'#1,(#22,#23),#172,#176,21.0,#178);

#11=REVOLVED_FLAT('REVOLVED FLAT 2'#1,(#31,#32),#183#187,12.0,#189);

#12=GENERAL_REVOLUTION('GENERAL REVOLUTION_1'#1,(#20,#21),#194,#198,21.0,#200);

#13=ROUND_HOLE('HOLE1 FLAT BOTTOM'#1,(#26,#27,#28),#207,#215,#216,\$,#217);

#14=OUTER_DIAMETER('OUTER DIAMETER 1'#1,(#29,#30), #218,#222,#223,#224);

#15=GROOVE('GROOVE 1'#1,(#24,#25), #226,#230,35.0,#232);

#16=GROOVE('CUT_IN'#1,(#33),#236,#240,18.4,#242);

(* ***** Turning operations ***** *)

#20=CONTOURING_ROUGH(\$,\$,'ROUGH GENERAL REVOLUTION1', 30.000, \$, #280, #61, #60, #130,#130,#131,0.5);

#21=CONTOURING_FINISH(\$,\$,'FINISH GENERAL REVOLUTION 1', 30.000, \$, #280, #61, #60,#130,#130,#132,0.0);

#22=FACING_ROUGH(\$,\$,'ROUGH CIRCULAR FACE 2', 50.000, \$, #280, #63, #60, #133, #134,#135,0.500);

#23=FACING_FINISH(\$,\$,'FINISH CIRCULAR FACE 2', 50.000, \$, #280, #63, #60, #133, #134,#136,0.0);

#24=GROOVING_ROUGH(\$,\$,'ROUGH GROOVE 1', 30.000, \$, #285, #65, #60, #137, #137, #138,\$,0.500);

#25=GROOVING_FINISH(\$,\$,'FINISH GROOVE 1', 30.000, \$, #285, #65, #60, #137, #137, #139,\$,0.0);

#26= DRILLING(\$,\$,'DRILL HOLE1',30.000,\$,#289,#66,#67,\$,\$,\$,\$,#140);

#27= REAMING(\$,\$,'REAM HOLE1',30.000,\$,#293,#69,#67,\$,\$,\$,\$,\$,#141.,T.,\$,\$);

#29=CONTOURING_ROUGH(\$,\$,'ROUGH OUTER DIAMETER 1', 30.000, \$, #280, #61, #60, #130,#130,#131,0.5);

#30=CONTOURING_FINISH(\$,\$,'FINISH OUTER DIAMETER 1', 30.000, \$, #280, #61, #60, #130,#130,#132,0.0);

#31=FACING_ROUGH(\$,\$,'ROUGH CIRCULAR FACE 1', 50.000, \$, #280, #63, #60, #133, #134,#135,0.500);

#32=FACING_FINISH(\$,\$,'FINISH CIRCULAR FACE 1', 50.000, \$, #280, #63, #60, #133, #134,#136,0.0);

#33=CUTTING_IN(\$,\$,'CUTTING IN 1',50.000,\$,#297,#70,#60,#142,#142,#143,\$,0.0);

(* ***** Project ***** *)

#34=PROJECT('TURNING EXAMPLE 1',#35.(#1),\$,\$,\$);

```

#35=WORKPLAN('MAIN WORKPLAN',(#36,#37),$,#52,$);
#36=WORKPLAN('WORK PLAN FOR SETUP1',(#38,#39,#40,#41,#42,#43,#44,#45),$,,$);
#37=WORKPLAN('WORK PLAN FOR SETUP2',(#47,#48,#49,#50,#51),$,#54,$);
#38=MACHINING_WORKINGSTEP('WS ROUGH CIRCULAR_FACE 2',#56,#11,#22);
#39=MACHINING_WORKINGSTEP('WS FINISH CIRCULAR_FACE 2',#56,#11,#23);
#40=MACHINING_WORKINGSTEP('WS ROUGH GENERAL_REVOLUTION 1', #56, #12,
#20);
#41=MACHINING_WORKINGSTEP('WS FINISH GENERAL_REVOLUTION 1', #56 #12,
#21);
#42=MACHINING_WORKINGSTEP('WS ROUGH GROOVE 1',#56,#15,#24);
#43=MACHINING_WORKINGSTEP('WS FINISH GROOVE 1',#56,#15,#25);
#44=MACHINING_WORKINGSTEP('WS DRILLING',#56,#13,#26);
#45=MACHINING_WORKINGSTEP('WS REAMING',#56,#13,#27);
#47=MACHINING_WORKINGSTEP('WS ROUGH CIRCULAR_FACE 1',#56,#10,#30);
#48=MACHINING_WORKINGSTEP('WS FINISH CIRCULAR_FACE 1',#56,#10,#31);
#49=MACHINING_WORKINGSTEP('WS ROUGH OUTER_DIAMETER 2',#56,#14,#28);
#50=MACHINING_WORKINGSTEP('WS FINISH OUTER_DIAMETER 2',#56,#14,#29);
#51=MACHINING_WORKINGSTEP('WS FINISH CUT_IN 1',#56,#16,#32);
#52=SETUP('SETUP 1',#103,#56,(#53));
#53=WORKPIECE_SETUP(#1,#107,$,$);
#54=SETUP('SETUP 2',#111,#56,(#55));
#55=WORKPIECE_SETUP(#1,#115,$,$);
#56=PLANE('SECURITY PLANE',#119);

```

(* ***** Functions / Technology ***** *)

```

#60=TURNING_MACHINE_FUNCTIONS(.T.,$,,$(),.F.,$,,$(),$,,$);
#61=TURNING_TECHNOLOGY($,.TCP.,#62,0.300,.F.,.F.,.F.,$);
#62=CONST_SPINDLE_SPEED(500);
#63=TURNING_TECHNOLOGY($,.TCP.,#64,0.300,.F.,.F.,.F.,$);
#64=CONST_SPINDLE_SPEED(500);
#65=TURNING_TECHNOLOGY($,.TCP.,#66,0.300,.F.,.F.,.F.,$);
#66=CONST_SPINDLE_SPEED(200);
#67=MILLING_MACHINE_FUNCTIONS(.T.,$,,$.F.,,$(),.T.,$,,$());
#66=MILLING_TECHNOLOGY(0.030,.TCP.,$,16.000,$.F.,.F.,.F.,$);
#69=MILLING_TECHNOLOGY(0.030,.TCP.,$,18.000,$.F.,.F.,.F.,$);
#70=TURNING_TECHNOLOGY($,.TCP.,#71,0.300,.F.,.F.,.F.,$);
#71=CONST_SPINDLE_SPEED(100);

```

(* ***** Strategies ***** *)

```

#130=PLUNGE_RAMP($,45.000);
#131=UNIDIRECTIONAL_TURNING($,$,(3.000),$,,$,$,2.000,$,$);
#132=UNIDIRECTIONAL_TURNING($,$,(0.500),$,,$,$,,$,$);
#133=PLUNGE_RAMP($,30.000);
#134=PLUNGE_RAMP($,40.000);
#131=UNIDIRECTIONAL_TURNING($,.T.,(3.000),$,,$,$,2.000,$,$);
#132=UNIDIRECTIONAL_TURNING($,.F.,(0.500),$,,$,$,,$,$);
#137=PLUNGE_TOOL_AXIS($);
#138=MULTISTEP_GROOVING_STRATEGY($,.T.,(3.000),$,5.0,3.0);
#139=CONTOUR_TURNING($,.F.,(0.500),$,,$);
#140=DRILLING_TYPE_STRATEGY(75.000,50.000,5.000,50.000,75.000,40.000);
#141=DRILLING_TYPE_STRATEGY($,$,$,$,$);
#142=PLUNGE_TOOL_AXIS($);
#143=GROOVING_STRATEGY($,.T.,(1.0),$,5.000);

```

(* ***** Placements / Lengths ***** *)

```

#103=AXIS2_PLACEMENT_3D('SETUP 1',#104,#105,#106);
#104=CARTESIAN_POINT('SETUP1: LOCATION ',(0.000,0.000,0.000));
#105=DIRECTION(' AXIS ',(1.000,0.000,0.000));

```

```

#106=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#107=AXIS2_PLACEMENT_3D('WORKPIECE'#108,#109,#110);
#108=CARTESIAN_POINT('WORKPIECE1: LOCATION',(0.000,0.000,0.000));
#109=DIRECTION(' AXIS',(1.000,0.000,0.000));
#110=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#111=AXIS2_PLACEMENT_3D('SETUP 2'#111,#112,#113);
#112=CARTESIAN_POINT('SETUP2: LOCATION',(0.000,0.000,0.000));
#113=DIRECTION(' AXIS',(1.000,0.000,0.000));
#114=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#115=AXIS2_PLACEMENT_3D('WORKPIECE1'#116,#117,#118);
#116=CARTESIAN_POINT('WORKPIECE1: LOCATION',(0.000,0.000,0.000));
#117=DIRECTION(' AXIS',(1.000,0.000,0.000));
#118=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#119=AXIS2_PLACEMENT_3D('SECURITY PLANE'#120,#121,#122);
#120=CARTESIAN_POINT('SECPLANE: LOCATION',(0.000,0.000,50.000));
#121=DIRECTION(' AXIS',(1.000,0.000,0.000));
#122=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#172=AXIS2_PLACEMENT_3D('PLACEMENT END FACE 1'#173,#174,#175);
#173=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,-2.500));
#174=DIRECTION(' AXIS',(1.000,0.000,0.000));
#175=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#176=DIRECTION(' MATERIAL_SIDE',(0.000,0.000,-1.000));
#178=LINEAR_PROFILE(' REVOLVED_FLAT_RADIUS'#179,21.000);
#179=AXIS2_PLACEMENT_3D('PLACEMENT END FACE 1'#180,#181,#182);
#180=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,0.000));
#181=DIRECTION(' AXIS',(0.000,0.000,1.000));
#182=DIRECTION(' REF_DIRECTION',(1.000,0.000,0.000));
#183=AXIS2_PLACEMENT_3D('PLACEMENT REVOLVED FLAT 2'#73,#74,#75);
#184=CARTESIAN_POINT(' REVOLVED FLAT2: LOCATION',(0.000,0.000,-2.500));
#185=DIRECTION(' AXIS',(1.000,0.000,0.000));
#186=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#187=DIRECTION(' MATERIAL_SIDE',(0.000,0.000,-1.000));
#189=LINEAR_PROFILE(' REVOLVED_FLAT_RADIUS'#190,12.000);
#190=AXIS2_PLACEMENT_3D('LINEAR_PROFILE'#191,#192,#193);
#191=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,0.000));
#192=DIRECTION(' AXIS',(0.000,0.000,1.000));
#193=DIRECTION(' REF_DIRECTION',(1.000,0.000,0.000));
#194=AXIS2_PLACEMENT_3D('PLACEMENT GENERAL_REVOLUTION 1'#195,#196,
#197);
#195=CARTESIAN_POINT(' GENERAL_REVOLUTION : LOCATION',(0.000,0.000,-2.500));
#196=DIRECTION(' AXIS',(1.000,0.000,0.000));
#197=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#198=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#200=GENERAL_PROFILE($,#201);
#201=POLYLINE(",(#202,#203,#204,#205,#206));
#202=CARTESIAN_POINT(",(21.000,0.000, 0.000));
#203=CARTESIAN_POINT(",(23.000,0.000, 5.000));
#204=CARTESIAN_POINT(",(23.000,0.000, 55.000));
#205=CARTESIAN_POINT(",(35.000,0.000, 55.000));
#206=CARTESIAN_POINT(",(35.000,0.000, 95.000));
#207= AXIS2_PLACEMENT_3D('HOLE3'#208,#209,#210);
#208= DIRECTION(",(0.,0.,1.));
#209= DIRECTION(",(1.,0.,0.));
#210= CARTESIAN_POINT(",(0.,0.,0.));
#211=AXIS2_PLACEMENT_3D(",#212,#213,#214);
#212=CARTESIAN_POINT(",(0.000,0.000,-40.000));
#213=DIRECTION(",(0.000000,0.000000,1.000000));
#214=DIRECTION(",(1.000000,0.000000,0.000000));

```

```

#215=PLANE("#211);
#216= TOLERANCED_LENGTH_MEASURE(15.0,#251);
#217= FLAT_HOLE_BOTTOM();
#218=AXIS2_PLACEMENT_3D('PLACEMENT OUTER_DIAMETER 1',#219,#220,#221);
#219=CARTESIAN_POINT(' OUTER_DIAMETER 2: LOCATION ',(0.000,0.000,-77.500));
#220=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#221=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#222=TOLERANCED_LENGTH_MEASURE(56.000,#251);
#223=TOLERANCED_LENGTH_MEASURE(75.000,#251);
#224=DIAMETER_TAPER(#225);
#225=TOLERANCED_LENGTH_MEASURE(24.000,#251);
#226=AXIS2_PLACEMENT_3D('PLACEMENT GROOVE 1',#227,#228,#229);
#227=CARTESIAN_POINT(' GROOVE 1: LOCATION ',(0.000,0.000, -67.500));
#228=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#229=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#230=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#232=SQUARE_U_PROFILE(#233,#234,0,#235,0);
#233=TOLERANCED_LENGTH_MEASURE(20.000,#251);
#234=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#235=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#236=AXIS2_PLACEMENT_3D('PLACEMENT CUT_IN 1',#237,#238,#239);
#237=CARTESIAN_POINT(' CUT_IN 1: LOCATION ',(0.000,0.000, -32.500));
#238=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#239=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#240=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#242=SQUARE_U_PROFILE(#243,#244,0.0,#245,0.0);
#243=TOLERANCED_LENGTH_MEASURE(3.000,#251);
#244=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#245=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#251= PLUS_MINUS_VALUE(0.100,0.100,3);

```

(* ***** Tools ***** *)

```

#280=TURNING_MACHINE_TOOL("#281,(#283),120,40,$)
#281=GENERAL_TURNING_TOOL(#282,.LEFT.,40,60,.CW.);
#282=TOOL_DIMENSION($,$,$,25,5,7,3,5,0.5,$);
#283=CUTTING_COMPONENT(0.000000,$,$,$);
#285=TURNING_MACHINE_TOOL("#286,(#288),120,40,$)
#286=GROOVING_TURNING_TOOL(#287,.LEFT.,40,60,.CW.,10.0, $ );
#287= TOOL_DIMENSION($,$,$,$,$,$,$,0.5,$);
#288=CUTTING_COMPONENT(40.000,$,$,$);
#289= MILLING_CUTTING_TOOL('SPIRAL_DRILL_15MM',#290,(#292),90.000,$,$);
#290= TWIST_DRILL(#290,2,.RIGHT.,F.,0.840);
#291= MILLING_TOOL_DIMENSION(15.000,31.000,0.100,45.000,2.000,5.000,8.000);
#292= CUTTING_COMPONENT(90.000,$,$,$);
#293= MILLING_CUTTING_TOOL('REAMER_22MM',#294,(#296),100.000,$,$);
#294= REAMER(#295,6,$,F.,$,$);
#295= MILLING_TOOL_DIMENSION(15.000,$,$,$,$,$);
#296= CUTTING_COMPONENT(100.000,$,$,$);
#297=TURNING_MACHINE_TOOL("#298,(#300),$,$,$)
#298= USER_DEFINED_TURNING_TOOL(#299,.LEFT.,40,60,.CW.,10.0, $ );
#299= TOOL_DIMENSION($,$,$,$,$,$,$,$,$);
#300=CUTTING_COMPONENT(40.000,$,$,$);

```

```

ENDSEC;
END-ISO-10303-21;

```

6. G-CODE hasil konversi EXAMPLE 2.NC

```
% *****HEADER*****
O0100 (EXAMPLE1.STP)
N01 M32 G00 T100
N02 G96 S500
N03 G90 M03 M08 T01
N04 G00 X77.0 Z30.0 *****UNIDIRECTIONAL_ROUGHING*****
N05 G01 X71.0 F0.30 *****GARIS HORIZONTAL*****
N06 G01 Z-94.5
N07 G01 X75.0
N08 G00 Z2.5
N09 G01 X69.0 F0.30 *****GARIS VERTIKAL*****
N10 G01 Z-54.5
N11 G01 X73.0
N12 G00 Z2.5
N13 G01 X67.0 F0.30
N14 G01 Z-54.5
N15 G01 X71.0
N16 G00 Z2.5
N17 G01 X65.0 F0.30
N18 G01 Z-54.5
N19 G01 X69.0
N20 G00 Z2.5
N21 G01 X63.0 F0.30
N22 G01 Z-54.5
N23 G01 X67.0
N24 G00 Z2.5
N25 G01 X61.0 F0.30
N26 G01 Z-54.5
N27 G01 X65.0
N28 G00 Z2.5
N29 G01 X59.0 F0.30
N30 G01 Z-54.5
N31 G01 X63.0
N32 G00 Z2.5
N33 G01 X57.0 F0.30
N34 G01 Z-54.5
N35 G01 X61.0
N36 G00 Z2.5
N37 G01 X55.0 F0.30
N38 G01 Z-54.5
N39 G01 X59.0
N40 G00 Z2.5
N41 G01 X53.0 F0.30
N42 G01 Z-54.5
N43 G01 X57.0
N44 G00 Z2.5
N45 G01 X51.0 F0.30
N46 G01 Z-54.5
N47 G01 X55.0
N48 G00 Z2.5
N49 G01 X49.0 F0.30
N50 G01 Z-54.5
N51 G01 X53.0
N52 G00 Z2.5
N53 G01 X47.0 F0.30
N54 G01 Z-54.5
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N55 G01 X51.0
N56 G00 Z2.5
N57 G01 X45.0 F0.30
N58 G01 Z-2.0
N59 G01 X49.0
N60 G00 Z2.5
N61 G01 X43.0 F0.30
N62 G01 Z0.5
N63 G01 X47.0
N64 G00 Z2.5
N65 G00 X71.0 Z30.0
N66 G01 X70.0 F0.30
N67 G01 Z-95.0
N68 G01 X70.0
N69 G00 Z2.5
N70 G01 X69.0 F0.30
N71 G01 Z-55.0
N72 G01 X69.0
N73 G00 Z2.5
N74 G01 X68.0 F0.30
N75 G01 Z-55.0
N76 G01 X68.0
N77 G00 Z2.5
N78 G01 X67.0 F0.30
N79 G01 Z-55.0
N80 G01 X67.0
N81 G00 Z2.5
N82 G01 X66.0 F0.30
N83 G01 Z-55.0
N84 G01 X66.0
N85 G00 Z2.5
N86 G01 X65.0 F0.30
N87 G01 Z-55.0
N88 G01 X65.0
N89 G00 Z2.5
N90 G01 X64.0 F0.30
N91 G01 Z-55.0
N92 G01 X64.0
N93 G00 Z2.5
N94 G01 X63.0 F0.30
N95 G01 Z-55.0
N96 G01 X63.0
N97 G00 Z2.5
N98 G01 X62.0 F0.30
N99 G01 Z-55.0
N100 G01 X62.0
N101 G00 Z2.5
N102 G01 X61.0 F0.30
N103 G01 Z-55.0
N104 G01 X61.0
N105 G00 Z2.5
N106 G01 X60.0 F0.30
N107 G01 Z-55.0
N108 G01 X60.0
N109 G00 Z2.5
N110 G01 X59.0 F0.30
N111 G01 Z-55.0
N112 G01 X59.0

*****GARIS MIRING*****

*****UNIDIRECTIONAL FINISHING*****
*****GARIS HORIZONTAL*****

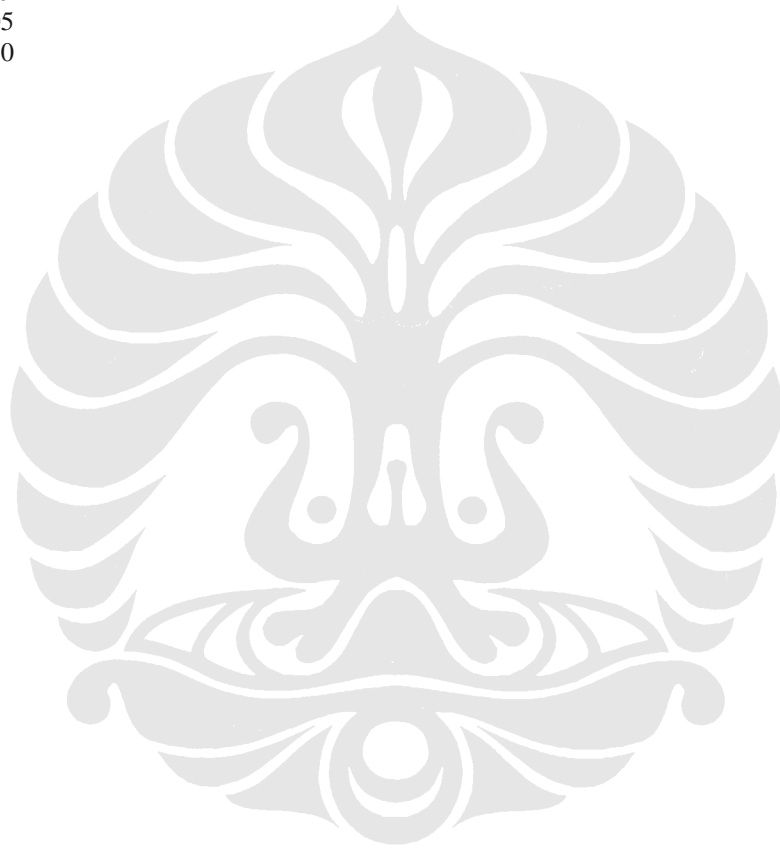
*****GARIS VERTIKAL*****

N113 G00 Z2.5
N114 G01 X58.0 F0.30
N115 G01 Z-55.0
N116 G01 X58.0
N117 G00 Z2.5
N118 G01 X57.0 F0.30
N119 G01 Z-55.0
N120 G01 X57.0
N121 G00 Z2.5
N122 G01 X56.0 F0.30
N123 G01 Z-55.0
N124 G01 X56.0
N125 G00 Z2.5
N126 G01 X55.0 F0.30
N127 G01 Z-55.0
N128 G01 X55.0
N129 G00 Z2.5
N130 G01 X54.0 F0.30
N131 G01 Z-55.0
N132 G01 X54.0
N133 G00 Z2.5
N134 G01 X53.0 F0.30
N135 G01 Z-55.0
N136 G01 X53.0
N137 G00 Z2.5
N138 G01 X52.0 F0.30
N139 G01 Z-55.0
N140 G01 X52.0
N141 G00 Z2.5
N142 G01 X51.0 F0.30
N143 G01 Z-55.0
N144 G01 X51.0
N145 G00 Z2.5
N146 G01 X50.0 F0.30
N147 G01 Z-55.0
N148 G01 X50.0
N149 G00 Z2.5
N150 G01 X49.0 F0.30
N151 G01 Z-55.0
N152 G01 X49.0
N153 G00 Z2.5
N154 G01 X48.0 F0.30
N155 G01 Z-55.0
N156 G01 X48.0
N157 G00 Z2.5
N158 G01 X47.0 F0.30
N159 G01 Z-55.0
N160 G01 X47.0
N161 G00 Z2.5
N162 G01 X46.0 F0.30
N163 G01 Z-55.0
N164 G01 X46.0
N165 G00 Z2.5
N166 G01 X45.0 F0.30
N167 G01 Z-3.75
N168 G01 X45.0
N169 G00 Z2.5
N170 G01 X44.0 F0.30

*****GARIS MIRING*****

N171 G01 Z-2.5
N172 G01 X44.0
N173 G00 Z2.5
N174 G01 X43.0 F0.30
N175 G01 Z-1.25
N176 G01 X43.0
N177 G00 Z2.5
N178 G01 X42.0 F0.30
N179 G01 Z0.0
N180 G01 X42.0
N181 G00 Z2.5
N182 G00 Z30.0
N183 G00 X0.0 Z50.0
N184 G28 U0.0 W0.0 T00
N185 M09
N186 M05
N187 M30
%

*****FOOTER*****



7. EXAMPLE 3.STP

ISO-10303-21;

HEADER;

FILE_DESCRIPTION(('EXAMPLE OF NC PROGRAMME FOR TURNING: COMPLEX DESIGN.'),'1');

FILE_NAME('EXAMPLE1.STP',\$,('ISO14649'),(''),'SUH','POSTECH','KOREA');

FILE_SCHEMA(('MACHINING_SCHEMA','TURNING_SCHEMA'));

ENDSEC;

DATA;

(* ***** Workpiece definition ***** *)

#1=WORKPIECE('SIMPLE WORKPIECE','#2,0.01,\$,\$,\$,());

#2=MATERIAL('ST-50','STEEL',(#3));

#3=PROPERTY_PARAMETER('E=200000N/M2');

#4=RIGHT_CIRCULAR_CYLINDER('WORKPIECE PIECE', #5,175.0, 35.0);

#5=AXIS1_PLACEMENT('WORKPIECE PIECE PLACEMENT'#6,#7);

#6=CARTESIAN_POINT('WORKPIECE PIECE: LOCATION ',(0.000,0.000,0.000));

#7=DIRECTION(' AXIS ',(0.000,0.000,1.000));

(* ***** Manufacturing features ***** *)

#10=REVOLVED_FLAT('REVOLVED FLAT 1'#1,(#22,#23),#172,#176,21.0,#178);

#11=REVOLVED_FLAT('REVOLVED FLAT 2'#1,(#31,#32),#183#187,12.0,#189);

#12=GENERAL_REVOLUTION('GENERAL_REVOLUTION_1'#1,(#20,#21),#194,#198,21.0,#200);

#13=ROUND_HOLE('HOLE1 FLAT BOTTOM'#1,(#26,#27,#28),#207,#215,#216,\$,#217);

#14=OUTER_DIAMETER('OUTER_DIAMETER 1'#1,(#29,#30), #218,#222,#223,#224);

#15=GROOVE('GROOVE 1'#1,(#24,#25), #226,#230,35.0,#232);

#16=GROOVE('CUT_IN'#1,(#33),#236,#240,18.4,#242);

(* ***** Turning operations ***** *)

#20=CONTOURING_ROUGH(\$,\$,'ROUGH GENERAL REVOLUTION1', 30.000, \$, #280, #61, #60, #130,#130,#131,0.5);

#21=CONTOURING_FINISH(\$,\$,'FINISH GENERAL REVOLUTION 1', 30.000, \$, #280, #61, #60,#130,#130,#132,0.0);

#22=FACING_ROUGH(\$,\$,'ROUGH CIRCULAR FACE 2', 50.000, \$, #280, #63, #60, #133, #134,#135,0.500);

#23=FACING_FINISH(\$,\$,'FINISH CIRCULAR FACE 2', 50.000, \$, #280, #63, #60, #133, #134,#136,0.0);

#24=GROOVING_ROUGH(\$,\$,'ROUGH GROOVE 1', 30.000, \$, #285, #65, #60, #137, #137, #138,\$,0.500);

#25=GROOVING_FINISH(\$,\$,'FINISH GROOVE 1', 30.000, \$, #285, #65, #60, #137, #137, #139,\$,0.0);

#26= DRILLING(\$,\$,'DRILL HOLE1',30.000,\$,#289,#66,#67,\$,\$,\$,\$,#140);

#27= REAMING(\$,\$,'REAM HOLE1',30.000,\$,#293,#69,#67,\$,\$,\$,\$,\$,#141.,T.,\$,\$);

#29=CONTOURING_ROUGH(\$,\$,'ROUGH OUTER DIAMETER 1', 30.000, \$, #280, #61, #60, #130,#130,#131,0.5);

#30=CONTOURING_FINISH(\$,\$,'FINISH OUTER_DIAMETER 1', 30.000, \$, #280, #61, #60, #130,#130,#132,0.0);

#31=FACING_ROUGH(\$,\$,'ROUGH CIRCULAR FACE 1', 50.000, \$, #280, #63, #60, #133, #134,#135,0.500);

#32=FACING_FINISH(\$,\$,'FINISH CIRCULAR FACE 1', 50.000, \$, #280, #63, #60, #133, #134,#136,0.0);

#33=CUTTING_IN(\$,\$,'CUTTING IN 1',50.000,\$,#297,#70,#60,#142,#142,#143,\$,0.0);

(* ***** Project ***** *)

#34=PROJECT('TURNING EXAMPLE 1',#35.(#1),\$,\$,\$);

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#35=WORKPLAN('MAIN WORKPLAN',(#36,#37),$,#52,$);
#36=WORKPLAN('WORK PLAN FOR SETUP1',(#38,#39,#40,#41,#42,#43,#44,#45),$,,$);
#37=WORKPLAN('WORK PLAN FOR SETUP2',(#47,#48,#49,#50,#51),$,#54,$);
#38=MACHINING_WORKINGSTEP('WS ROUGH CIRCULAR_FACE 2',#56,#11,#22);
#39=MACHINING_WORKINGSTEP('WS FINISH CIRCULAR_FACE 2',#56,#11,#23);
#40=MACHINING_WORKINGSTEP('WS ROUGH GENERAL_REVOLUTION 1', #56, #12,
#20);
#41=MACHINING_WORKINGSTEP('WS FINISH GENERAL_REVOLUTION 1', #56 #12,
#21);
#42=MACHINING_WORKINGSTEP('WS ROUGH GROOVE 1',#56,#15,#24);
#43=MACHINING_WORKINGSTEP('WS FINISH GROOVE 1',#56,#15,#25);
#44=MACHINING_WORKINGSTEP('WS DRILLING',#56,#13,#26);
#45=MACHINING_WORKINGSTEP('WS REAMING',#56,#13,#27);
#47=MACHINING_WORKINGSTEP('WS ROUGH CIRCULAR_FACE 1',#56,#10,#30);
#48=MACHINING_WORKINGSTEP('WS FINISH CIRCULAR_FACE 1',#56,#10,#31);
#49=MACHINING_WORKINGSTEP('WS ROUGH OUTER_DIAMETER 2',#56,#14,#28);
#50=MACHINING_WORKINGSTEP('WS FINISH OUTER_DIAMETER 2',#56,#14,#29);
#51=MACHINING_WORKINGSTEP('WS FINISH CUT_IN 1',#56,#16,#32);
#52=SETUP('SETUP 1',#103,#56,(#53));
#53=WORKPIECE_SETUP(#1,#107,$,$);
#54=SETUP('SETUP 2',#111,#56,(#55));
#55=WORKPIECE_SETUP(#1,#115,$,$);
#56=PLANE('SECURITY PLANE',#119);

```

(* ***** Functions / Technology ***** *)

```

#60=TURNING_MACHINE_FUNCTIONS(.T.,$,,$(),.F.,$,,$(),$,,$);
#61=TURNING_TECHNOLOGY($,.TCP.,#62,0.300,.F.,.F.,.F.,$);
#62=CONST_SPINDLE_SPEED(500);
#63=TURNING_TECHNOLOGY($,.TCP.,#64,0.300,.F.,.F.,.F.,$);
#64=CONST_SPINDLE_SPEED(500);
#65=TURNING_TECHNOLOGY($,.TCP.,#66,0.300,.F.,.F.,.F.,$);
#66=CONST_SPINDLE_SPEED(200);
#67=MILLING_MACHINE_FUNCTIONS(.T.,$,,$.F.,,$(),.T.,$,,$());
#66=MILLING_TECHNOLOGY(0.030,.TCP.,$,16.000,$.F.,.F.,.F.,$);
#69=MILLING_TECHNOLOGY(0.030,.TCP.,$,18.000,$.F.,.F.,.F.,$);
#70=TURNING_TECHNOLOGY($,.TCP.,#71,0.300,.F.,.F.,.F.,$);
#71=CONST_SPINDLE_SPEED(100);

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(* ***** Strategies ***** *)

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#130=PLUNGE_RAMP($,45.000);
#131=UNIDIRECTIONAL_TURNING($,$,(3.000),$,,$,$,2.000,$,$);
#132=CONTOUR_TURNING($,$,(0.250),$,,$,$,,$,$);
#133=PLUNGE_RAMP($,30.000);
#134=PLUNGE_RAMP($,40.000);
#131=UNIDIRECTIONAL_TURNING($,.T.,(3.000),$,,$,$,2.000,$,$);
#132=UNIDIRECTIONAL_TURNING($,.F.,(0.500),$,,$,$,,$,$);
#137=PLUNGE_TOOL_AXIS($);
#138=MULTISTEP_GROOVING_STRATEGY($,.T.,(3.000),$,5.0,3.0);
#139=CONTOUR_TURNING($,.F.,(0.500),$,,$);
#140=DRILLING_TYPE_STRATEGY(75.000,50.000,5.000,50.000,75.000,40.000);
#141=DRILLING_TYPE_STRATEGY($,$,$,$,$);
#142=PLUNGE_TOOL_AXIS($);
#143=GROOVING_STRATEGY($,.T.,(1.0),$,5.000);

```

(* ***** Placements / Lengths ***** *)

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#103=AXIS2_PLACEMENT_3D('SETUP 1',#104,#105,#106);
#104=CARTESIAN_POINT('SETUP1: LOCATION ',(0.000,0.000,0.000));
#105=DIRECTION(' AXIS ',(1.000,0.000,0.000));

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#106=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#107=AXIS2_PLACEMENT_3D('WORKPIECE'#108,#109,#110);
#108=CARTESIAN_POINT('WORKPIECE1: LOCATION',(0.000,0.000,0.000));
#109=DIRECTION(' AXIS',(1.000,0.000,0.000));
#110=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#111=AXIS2_PLACEMENT_3D('SETUP 2'#111,#112,#113);
#112=CARTESIAN_POINT('SETUP2: LOCATION',(0.000,0.000,0.000));
#113=DIRECTION(' AXIS',(1.000,0.000,0.000));
#114=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#115=AXIS2_PLACEMENT_3D('WORKPIECE1'#116,#117,#118);
#116=CARTESIAN_POINT('WORKPIECE1: LOCATION',(0.000,0.000,0.000));
#117=DIRECTION(' AXIS',(1.000,0.000,0.000));
#118=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#119=AXIS2_PLACEMENT_3D('SECURITY PLANE'#120,#121,#122);
#120=CARTESIAN_POINT('SECPLANE: LOCATION',(0.000,0.000,50.000));
#121=DIRECTION(' AXIS',(1.000,0.000,0.000));
#122=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#172=AXIS2_PLACEMENT_3D('PLACEMENT END FACE 1'#173,#174,#175);
#173=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,-2.500));
#174=DIRECTION(' AXIS',(1.000,0.000,0.000));
#175=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#176=DIRECTION(' MATERIAL_SIDE',(0.000,0.000,-1.000));
#178=LINEAR_PROFILE(' REVOLVED_FLAT_RADIUS'#179,21.000);
#179=AXIS2_PLACEMENT_3D('PLACEMENT END FACE 1'#180,#181,#182);
#180=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,0.000));
#181=DIRECTION(' AXIS',(0.000,0.000,1.000));
#182=DIRECTION(' REF_DIRECTION',(1.000,0.000,0.000));
#183=AXIS2_PLACEMENT_3D('PLACEMENT REVOLVED FLAT 2'#73,#74,#75);
#184=CARTESIAN_POINT(' REVOLVED FLAT2: LOCATION',(0.000,0.000,-2.500));
#185=DIRECTION(' AXIS',(1.000,0.000,0.000));
#186=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#187=DIRECTION(' MATERIAL_SIDE',(0.000,0.000,-1.000));
#189=LINEAR_PROFILE(' REVOLVED_FLAT_RADIUS'#190,12.000);
#190=AXIS2_PLACEMENT_3D('LINEAR_PROFILE'#191,#192,#193);
#191=CARTESIAN_POINT('END FACE 1: LOCATION',(0.000,0.000,0.000));
#192=DIRECTION(' AXIS',(0.000,0.000,1.000));
#193=DIRECTION(' REF_DIRECTION',(1.000,0.000,0.000));
#194=AXIS2_PLACEMENT_3D('PLACEMENT GENERAL_REVOLUTION 1'#195,#196,
#197);
#195=CARTESIAN_POINT(' GENERAL_REVOLUTION : LOCATION',(0.000,0.000,-2.500));
#196=DIRECTION(' AXIS',(1.000,0.000,0.000));
#197=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#198=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#200=GENERAL_PROFILE($,#201);
#201=POLYLINE(",(#202,#203,#204,#205,#206));
#202=CARTESIAN_POINT(",(21.000,0.000, 0.000));
#203=CARTESIAN_POINT(",(23.000,0.000, 5.000));
#204=CARTESIAN_POINT(",(23.000,0.000, 55.000));
#205=CARTESIAN_POINT(",(35.000,0.000, 55.000));
#206=CARTESIAN_POINT(",(35.000,0.000, 95.000));
#207= AXIS2_PLACEMENT_3D('HOLE3'#208,#209,#210);
#208= DIRECTION(",(0.,0.,1.));
#209= DIRECTION(",(1.,0.,0.));
#210= CARTESIAN_POINT(",(0.,0.,0.));
#211=AXIS2_PLACEMENT_3D(",#212,#213,#214);
#212=CARTESIAN_POINT(",(0.000,0.000,-40.000));
#213=DIRECTION(",(0.000000,0.000000,1.000000));
#214=DIRECTION(",(1.000000,0.000000,0.000000));

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#215=PLANE("#211);
#216= TOLERANCED_LENGTH_MEASURE(15.0,#251);
#217= FLAT_HOLE_BOTTOM();
#218=AXIS2_PLACEMENT_3D('PLACEMENT OUTER_DIAMETER 1',#219,#220,#221);
#219=CARTESIAN_POINT(' OUTER_DIAMETER 2: LOCATION ',(0.000,0.000,-77.500));
#220=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#221=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#222=TOLERANCED_LENGTH_MEASURE(56.000,#251);
#223=TOLERANCED_LENGTH_MEASURE(75.000,#251);
#224=DIAMETER_TAPER(#225);
#225=TOLERANCED_LENGTH_MEASURE(24.000,#251);
#226=AXIS2_PLACEMENT_3D('PLACEMENT GROOVE 1',#227,#228,#229);
#227=CARTESIAN_POINT(' GROOVE 1: LOCATION ',(0.000,0.000, -67.500));
#228=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#229=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#230=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#232=SQUARE_U_PROFILE(#233,#234,0,#235,0);
#233=TOLERANCED_LENGTH_MEASURE(20.000,#251);
#234=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#235=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#236=AXIS2_PLACEMENT_3D('PLACEMENT CUT_IN 1',#237,#238,#239);
#237=CARTESIAN_POINT(' CUT_IN 1: LOCATION ',(0.000,0.000, -32.500));
#238=DIRECTION(' AXIS ',(1.000,0.000,0.000));
#239=DIRECTION(' REF_DIRECTION',(0.000,0.000,1.000));
#240=DIRECTION(' MATERIAL_SIDE',(-1.000,0.000,0.000));
#242=SQUARE_U_PROFILE(#243,#244,0.0,#245,0.0);
#243=TOLERANCED_LENGTH_MEASURE(3.000,#251);
#244=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#245=TOLERANCED_LENGTH_MEASURE(0.000,#251);
#251= PLUS_MINUS_VALUE(0.100,0.100,3);

(* ***** Tools ***** *)
#280=TURNING_MACHINE_TOOL("#281,(#283),120,40,$)
#281=GENERAL_TURNING_TOOL(#282,.LEFT.,40,60,.CW.);
#282=TOOL_DIMENSION($,$,$,25,5,7,3,5,0.5,$);
#283=CUTTING_COMPONENT(0.000000,$,$,$);
#285=TURNING_MACHINE_TOOL("#286,(#288),120,40,$)
#286=GROOVING_TURNING_TOOL(#287,.LEFT.,40,60,.CW.,10.0, $ );
#287= TOOL_DIMENSION($,$,$,$,$,$,$,0.5,$);
#288=CUTTING_COMPONENT(40.000,$,$,$);
#289= MILLING_CUTTING_TOOL('SPIRAL_DRILL_15MM',#290,(#292),90.000,$,$);
#290= TWIST_DRILL(#290,2,.RIGHT.,F.,0.840);
#291= MILLING_TOOL_DIMENSION(15.000,31.000,0.100,45.000,2.000,5.000,8.000);
#292= CUTTING_COMPONENT(90.000,$,$,$);
#293= MILLING_CUTTING_TOOL('REAMER_22MM',#294,(#296),100.000,$,$);
#294= REAMER(#295,6,$,F.,$,$);
#295= MILLING_TOOL_DIMENSION(15.000,$,$,$,$,$);
#296= CUTTING_COMPONENT(100.000,$,$,$);
#297=TURNING_MACHINE_TOOL("#298,(#300),$,$,$)
#298= USER_DEFINED_TURNING_TOOL(#299,.LEFT.,40,60,.CW.,10.0, $ );
#299= TOOL_DIMENSION($,$,$,$,$,$,$,$,$);
#300=CUTTING_COMPONENT(40.000,$,$,$);

ENDSEC;
END-ISO-10303-21;

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8. G-CODE hasil konversi EXAMPLE 3.NC

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% *****HEADER*****
O0100 (EXAMPLE2.STP)
N01 M32 G00 T100
N02 G96 S500
N03 G90 M03 M08 T01
N04 G00 X77.0 Z30.0 *****UNIDIRECTIONAL_ROUGHING*****
N05 G01 X71.0 F0.30 *****GARIS HORIZONTAL*****
N06 G01 Z-94.5
N07 G01 X75.0
N08 G00 Z2.5
N09 G01 X69.0 F0.30 *****GARIS VERTIKAL*****
N10 G01 Z-54.5
N11 G01 X73.0
N12 G00 Z2.5
N13 G01 X67.0 F0.30
N14 G01 Z-54.5
N15 G01 X71.0
N16 G00 Z2.5
N17 G01 X65.0 F0.30
N18 G01 Z-54.5
N19 G01 X69.0
N20 G00 Z2.5
N21 G01 X63.0 F0.30
N22 G01 Z-54.5
N23 G01 X67.0
N24 G00 Z2.5
N25 G01 X61.0 F0.30
N26 G01 Z-54.5
N27 G01 X65.0
N28 G00 Z2.5
N29 G01 X59.0 F0.30
N30 G01 Z-54.5
N31 G01 X63.0
N32 G00 Z2.5
N33 G01 X57.0 F0.30
N34 G01 Z-54.5
N35 G01 X61.0
N36 G00 Z2.5
N37 G01 X55.0 F0.30
N38 G01 Z-54.5
N39 G01 X59.0
N40 G00 Z2.5
N41 G01 X53.0 F0.30
N42 G01 Z-54.5
N43 G01 X57.0
N44 G00 Z2.5
N45 G01 X51.0 F0.30
N46 G01 Z-54.5
N47 G01 X55.0
N48 G00 Z2.5
N49 G01 X49.0 F0.30
N50 G01 Z-54.5
N51 G01 X53.0
N52 G00 Z2.5
N53 G01 X47.0 F0.30
N54 G01 Z-54.5
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N55 G01 X51.0
N56 G00 Z2.5
N57 G01 X45.0 F0.30
N58 G01 Z-2.0
N59 G01 X49.0
N60 G00 Z2.5
N61 G01 X43.0 F0.30
N62 G01 Z0.5
N63 G01 X47.0
N64 G00 Z2.5
N65 G00 X70.5 Z30.0
N66 G01 X43.0 Z0.5 F0.30
N67 G01 X47.0 Z-4.5 F0.30
N68 G01 X47.0 Z-54.5 F0.30
N69 G01 X71.0 Z-54.5 F0.30
N70 G01 X71.0 Z-94.5 F0.30
N71 G01 X71.0
N72 G00 Z2.5
N73 G01 X42.5 Z0.25 F0.30
N74 G01 X46.5 Z-4.75 F0.30
N75 G01 X46.5 Z-54.75 F0.30
N76 G01 X70.5 Z-54.75 F0.30
N77 G01 X70.5 Z-94.75 F0.30
N78 G01 X70.5
N79 G00 Z2.5
N80 G01 X42.0 Z0.0 F0.30
N81 G01 X46.0 Z-5.0 F0.30
N82 G01 X46.0 Z-55.0 F0.30
N83 G01 X70.0 Z-55.0 F0.30
N84 G01 X70.0 Z-95.0 F0.30
N85 G01 X70.0
N86 G00 Z2.5
N87 G00 Z30.0
N88 G00 X0.0 Z50.0
N89 G28 U0.0 W0.0 T00
N90 M09
N91 M05
N92 M30
%

*****GARIS MIRING*****

*****CONTOUR_FINISHING*****

*****FOOTER*****