Other AP238 Operations: grinding (DiskCutting).

ISO 14649:xx ????

Turning Process Operations

- **Turning Operations**
  - Contouring, facing, grooving, threading and knurling.
  - Roughing and finishing for each
  - Set of strategies

- **Possible Future Operations**
  - Work underway to describe operations for wire and sink EDM, contour cutting of wood and glass, grinding.
  - Efforts in various stages of maturity.
  - Will be added to AP-238 once the information requirements are mature.
Machines

- 5 Degrees:
Machine

- 5 Degrees:

[Diagram of machine with coordinate axes and cutting axis indicated]
Disc

- **Maximum Cutting Depth**
- **Edge Thickness**
- **Diameter**
- **Body Thickness**
- **Edge Thickness**
Cutting Operations

Disc Width
Cutting Operations

**Unidireccional Cut**
(It cuts through the way specified only)

**Bidireccional Cut**
(It cuts through both ways)

Overcut Length

Cutting Depth
Cutting Operations: strategies

1) 2) 3) 4)

First Passes  Middle Passes  Last Passes

(Bidirectional case)
Cut
Cut

Replicate Feature
Cutting

General Profile

Stock
New Model:

- Workplan
  - machining_workingstep
    - disc_cutting_workingstep
      - manufacturing_feature
        - workpiece
        - slot
      - machining_operation
        - disc_cutting_machining_operation
          - depth_cutting
            - cutter_tool
            - cutting_technology
            - cutting_machine_functions
              - unidirectional_cutting
              - bidirectional_cutting
            - disc_cutting_strategy
Model

(ABS)workingstep

its_secplane

47,43, elementary_surface

4,3, (ABS)touch_probing

5,2, rapid_movement

machining_workingstep

its_feature

its_operation

23,173, (ABS)manufacturing_feature

5,120, (ABS)machining_operation

final_features [0:7]
toolpath_orientation

47, 42, axis_2_placement_3d

3,67 (1)

in_process_geometry

as_is

to_be

48,49, shape_representation

removal

48,49, shape_representation

turning_workingstep

its_features [2:7]

its_operation

23,173, (ABS)manufacturing_feature

10,217, (ABS)turning_machining_operation

disc_cutting_workingstep

its_feature

its_operation

23,173, (ABS)manufacturing_feature

5,120, (ABS)machining_operation
Model

[(ABS)operation]

[(ABS)tool_path]

[(ABS)tool_direction]

[its_tool_direction]

[two_axes]

[three_axes]

[(ABS)tool_direction_for_milling]

[three_axes_tilted_tool]

[five_axes_const_tilt_yaw]

[five_axes_vary_tilt_yaw]

[4, 0, (ABS)tool_ch_prob]

[rapid_movement]

[return_home]

[(ABS)machining_operation]

[its_id]

[retract_plane]

[start_point]

[its_tool]

[its_technology]

[its_machine_functions]

[8, 0, (ABS)milling_machining_operation]

[10, 0, (ABS)turning_machining_operation]

[n.n (ABS)disc_cutting_machining_operation]
Model
Model

(ABS) disc cutting tool

Cutter tool
- external diameter: 45, 132, length measure
- cutting width: 45, 132, length measure
- disc body width: 45, 132, length measure
- reach: 45, 132, length measure
- nominal rot speed: 45, 88, rot speed measure
Comercial CNC stone disc cutting machine
AP238 Prototype implementation on a commercial CNC stone disc cutting machine

Stone Cutting Machine

System Control working with Extended AP238

[Diagram showing HMI, PLC, CNC modules, I/O, and石圖識別]
Simulation: The Controller and the control software is the same in the simulation and in a real machine.
CAM Application: Disk parameters
CAM Application: Simple feature selection

MODO TRABAJO

Despiece
CAM Application: Feature selection

MODO TRABAJO

Moldura curva

- Loncheado

- Repasado
CAM Application: Feature selection

MODO TRABAJO

- COPY FIGURES FROM USB
- SELECT PROFILE
- SEQUENTIAL MODE

Moldura recta

- Lonchado
- Repasado
CAM Application: Feature selection