

# DO-331 Coverage Guide

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## Overview

Model coverage analysis per DO-331 Table MB-A.5.

## Coverage Types

Type	Description	Required For
State_Coverage	Each state visited	DAL A, B, C
Transition_Coverage	Each transition executed	DAL A, B, C
Decision_Coverage	Each decision true/false	DAL A, B
Condition_Coverage	Each condition true/false	DAL A
MCDC_Coverage	MC/DC analysis	DAL A only
Entry_Coverage	Function entry points	All DALs
Exit_Coverage	Function exit points	All DALs

## DAL Requirements (DO-331 Table MB-A.5)

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### DAL A

- Modified Condition/Decision Coverage (MC/DC)
- Decision Coverage
- Statement Coverage
- State Coverage
- Transition Coverage

### DAL B

- Decision Coverage
- Statement Coverage
- State Coverage
- Transition Coverage

### DAL C

- Statement Coverage
- State Coverage
- Transition Coverage

## DAL D/E

- Minimal requirements

## Coverage Point Format

```
action def ProcessInput {
    // D0-331 Coverage Point: CP_ENTRY_1 (entry)
    first start;

    then if input > threshold [
        // D0-331 Coverage Point: CP_DEC_1_T (decision_true)
        then assign result := true;
    ] else [
        // D0-331 Coverage Point: CP_DEC_1_F (decision_false)
        then assign result := false;
    ]

    // D0-331 Coverage Point: CP_EXIT_1 (exit)
    then done;
}
```

## Coverage Report

```
{
  "schema": "stunir.coverage.do331.v1",
  "statistics": {
    "total_points": 42,
    "instrumented": 42,
    "covered": 0
  },
  "dal_coverage": {
    "DAL_A": {
      "required": 42,
      "achieved": 0,
      "percent": 0,
      "meets_objective": false
    }
  }
}
```