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Dimensional Inspection Management Application
Brief Overview

1. Purpose of the Application

Software for recording and managing dimensional inspection operations. The application supports defining specified values, entering measurements by order and serial number, automatically checking measurements against tolerances wherever possible, issuing reports and managing a multiuser workflow.

It implements additional functionality for reporting before and after welding and for entering serial numbers as ranges.

2. General Application Description

The application will be used for dimensional inspection (CD) and will support inspectors and supervisors through a controlled workflow for entering, validating, searching, locking and reporting measurements. Relevant production data, such as the part number and product description, can be retrieved from the customer's ERP wherever possible.

The application will use specified values defined for the combination of part number, drawing number and drawing revision. Measured values will be recorded for each inspected serial number, and the system will automatically check, wherever possible, compliance with the limits established by the nominal value and minimum/maximum tolerances.

3. Included Functionality

Functional Area	Description	Details / Main Rules
Specified Value Management	Defining specified values for the part number, drawing number and drawing revision.	Measurement type, unit of measurement, minimum tolerance, maximum tolerance and nominal value; copying values between revisions; changes permitted only if no inspection report exists.
Recording CD Measurements	Adding measurements for the order, part number, drawing number and drawing revision.	If no specified values are defined, the window for entering them opens; measured values are entered for each serial number.

Functional Area	Description	Details / Main Rules
Measurement Validation	Automatic checking against the specified values and tolerances.	Out-of-limit measurements cannot be saved without entering the NCR number.
Search and Consultation	Quick identification of recorded measurements.	Search by order, part number, drawing number and product description.
Locking and Edit Control	Closing measurement records and locking them against editing.	Unlocking will be restricted to the supervisor or a user with special access.
Serial Number Uniqueness Validation	Preventing duplicate entries for the same serial number.	A serial number may have only one measurement, subject to the rules applicable to the report type.
Dimensional Inspection Report	Generating the dimensional inspection printout.	The report includes the signature of the inspector logged in at the time of printing.
Pre Cladding / Final Reports	Distinguishing between reports before and after welding.	Dedicated field with Pre Cladding and Final values; Final as the default; separate uniqueness rules; Pre Cladding identifier on the printout; warning on a Final report if a Pre Cladding report exists for the order.
Serial Number Ranges	Entering serial numbers as a range using the special character ":".	Example: 310:450 is displayed in two columns, FROM 310 and TO 450; the printout retains the same structure; existing functionality remains valid.
Security and Audit	Access control and traceability.	Authorised access at form level; audit of creation and last save.
Multiuser Operation	Simultaneous work by multiple users.	Locking a record while it is being edited to prevent concurrent changes.
Customer ERP Integration	Retrieving data from the customer's ERP wherever possible.	Part number and product description from the production order.

4. Proposed Operational Workflow

1. The user selects or enters the production order and associated information: part number, drawing number and drawing revision.
2. The system checks whether specified values exist for the selected combination. If they do not, the user is directed to define them.
3. The inspector enters serial numbers and measured values. Serial numbers can be entered individually, using existing ranges or using the new FROM/TO range with the character ":".

4. The application automatically validates values against tolerances and requests an NCR number for nonconforming situations.
5. When the inspection is complete, the report can be closed and locked against editing. Unlocking requires special rights.
6. The dimensional inspection report identifies the report type where applicable and includes the signature of the logged-in inspector.

5. Details of Pre Cladding and Final Reports

To manage measurements before and after welding, the report includes a field with two possible values: Pre Cladding and Final. Final will be the default.

- Pre Cladding and Final reports are handled separately, without automatically importing dimensions from the previous report, to avoid duplicate or partially completed lines when specified values differ.
- If a part already appears on a Final report, it cannot be added to another Final report; the same rule applies to Pre Cladding.
- If at least one Pre Cladding report exists for the order when a Final report is added, the system will display a warning.
- The Pre Cladding report printout will include a specific identifying element.

6. Details of Entering Serial Numbers as Ranges

The serial number range extension allows range endpoints to be entered using the special character ":", distinct from the characters already used for automatically expanding individual serial numbers.

- When a range such as 310:450 is detected, the data entry area will create two columns: FROM 310 and TO 450.
- The printout will display the columns in the same way as the data entry area.
- Existing functionality for individually entered serial numbers and previously implemented ranges is retained.

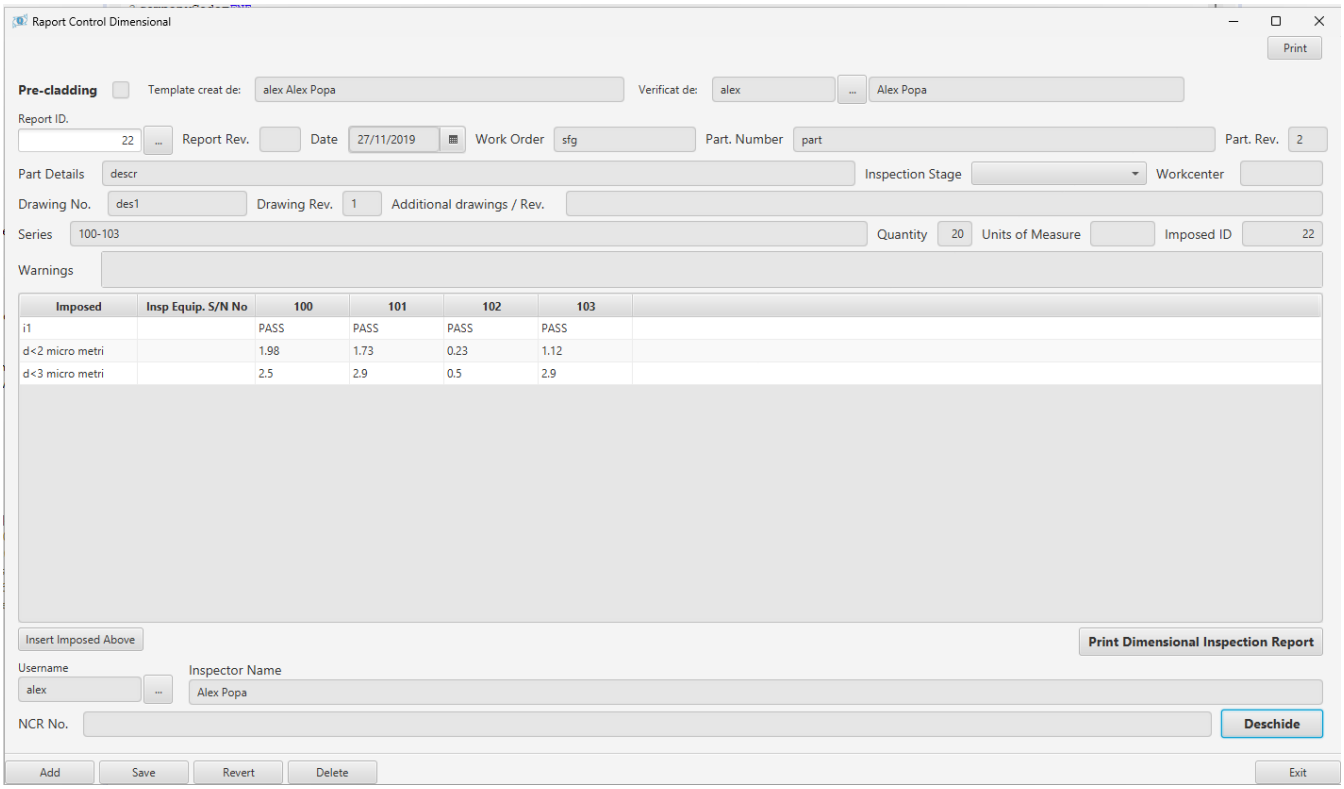
7. Architecture and Technologies Used

User Interface Layer	Windows user interface; the suitability of a web interface can be assessed.
Application Logic Layer	Business logic for validation, uniqueness rules, permissions, audit and report generation.
Database Layer	Data persistence and operation history.
Technologies	JavaEE, Payara 5 Application Server, JavaFX for the GUI and SQL Server as the main database.

Two application screenshots are shown below:

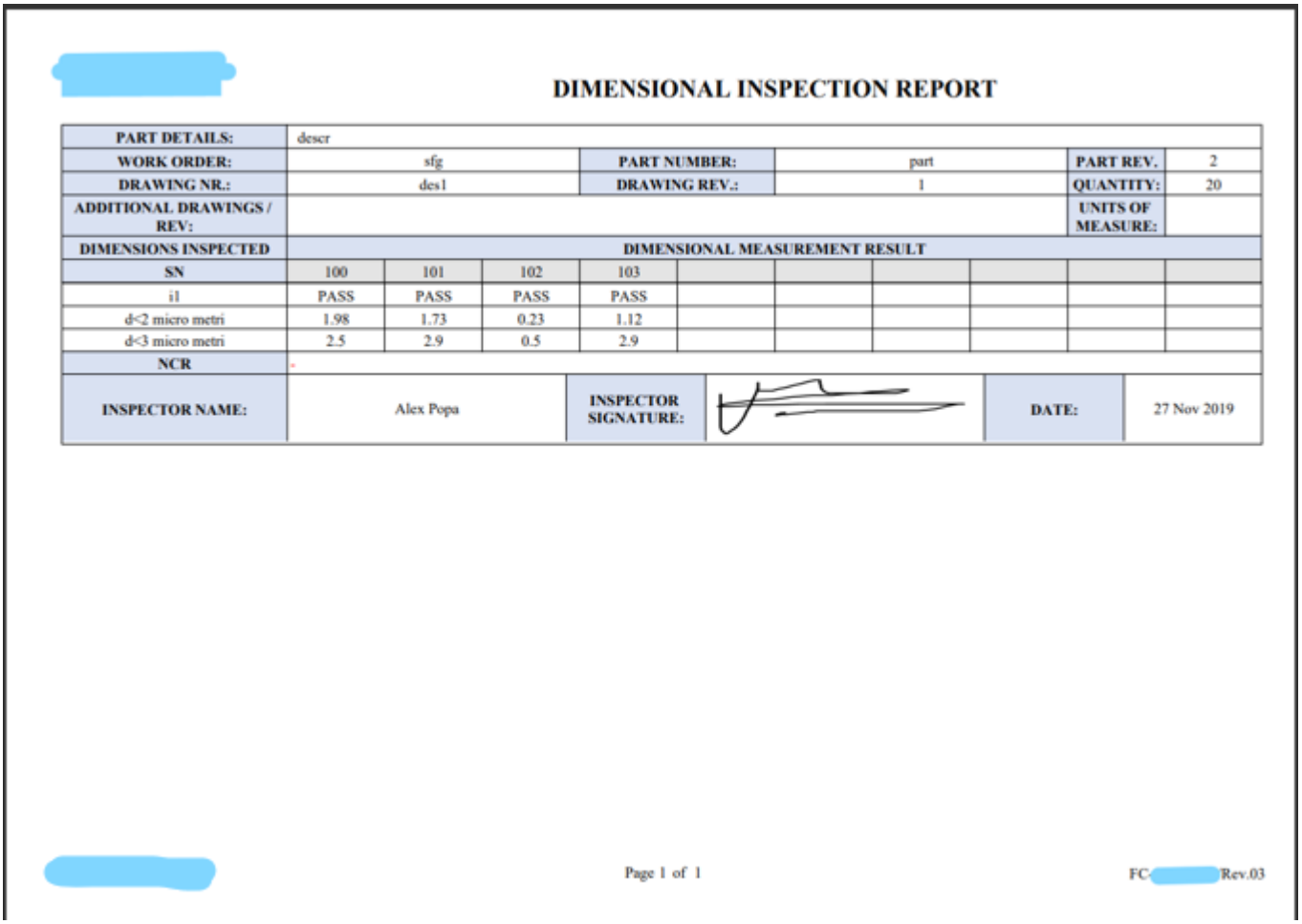
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Data Entry Form:



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Dimensional Report:



[redacted]

DIMENSIONAL INSPECTION REPORT

PART DETAILS:	descr									
WORK ORDER:	sfg			**PART NUMBER:**	part			**PART REV.**	2	
DRAWING NR.:	des1			**DRAWING REV.:**	1			**QUANTITY:**	20	
ADDITIONAL DRAWINGS / REV:								**UNITS OF MEASURE:**		
DIMENSIONS INSPECTED	**DIMENSIONAL MEASUREMENT RESULT**									
SN	100	101	102	103						
i1	PASS	PASS	PASS	PASS						
d<2 micro metri	1.98	1.73	0.23	1.12						
d<3 micro metri	2.5	2.9	0.5	2.9						
NCR	-									
INSPECTOR NAME:	Alex Popa			**INSPECTOR SIGNATURE:**				**DATE:**	27 Nov 2019	

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