INTEGRITY-PRO

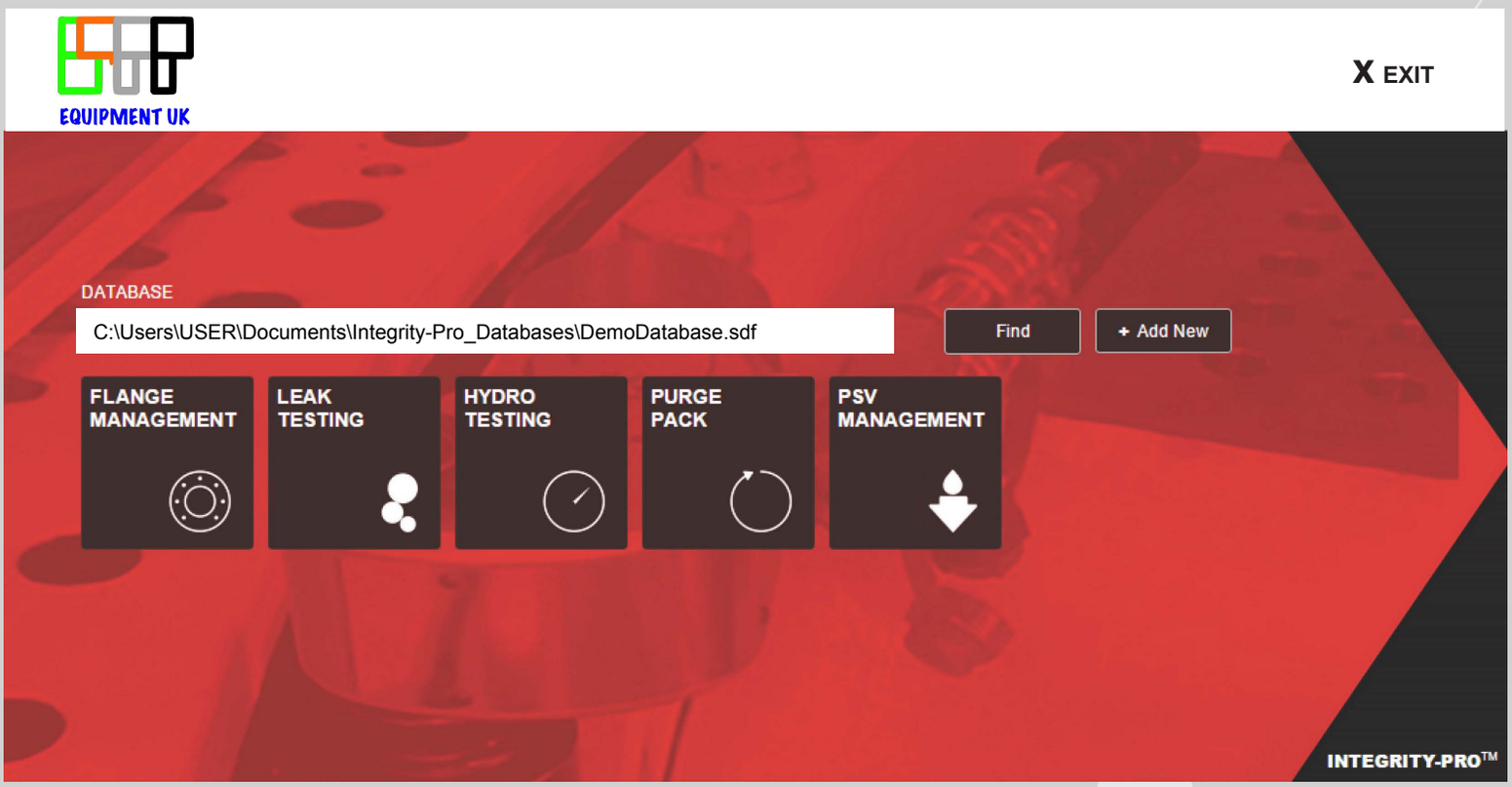
Flange Management Joint Integrity Software

INTEGRITY-PRO Joint Monitoring software is a bespoke database system specifically developed to plan, monitor, control and provide traceability of flanged joints and connections. The database calculation engine uses the Baseline Standard ASME Section VIII Division 1 to define the initial bolt load/stress (using gasket factors) to seat the gasket. This Baseline Standard is compliant with PD5500 (formerly BS5500) that uses ASME code to define gasket factors, and is compared with tabled values in the SHELL ES090 Specification. INTEGRITY-PRO runs on the standard Windows operating system and can be used as stand alone or networked. It has been adopted by major plant operators as an essential management system due to it's simplicity and comprehensive covering of the plant and related maintenance.

Offering data gathered from years of industry experience, Integrity-Pro can provide bolt tightening data including bolting patterns, torque and tensioning figures, procedures, techniques and recommended controlled bolting equipment. Based on the information entered, the Integrity-Pro software will analyze all of the data and produce a complete calculation sheet along with the required torque or tension figures to ensure an accurate and correctly bolted joint is achieved.

Integrity-Pro can also create a specific tightening procedure for each bolted joint, which can include specific information such as any special remarks all of which can be easily entered into the software by the user. It also includes basic information for standard flanges, wafer check valves, spade and spacers, and swivel flange assemblies.

Integrity-Pro joint integrity database management system is used to support bolted joint inspection and maintenance and/or leak testing activities raising safety levels across the industry in which it applies.



INTEGRITY-PRO

Flange Management Joint Integrity Software

FUNCTIONALITY
Full traceability and control of all activities associated with the joint/connection including:

- Joint disassembly/breakout
- Machining/re-facing
- Joint assembly
- Bolt tightening
- Testing
  (Hydrostatic, Pneumatic, Nitrogen or Helium)
- Leak history and incidents

Interacts seamlessly with "Tool-Pro Controlled Bolting" software to provide bolting calculations and data for :

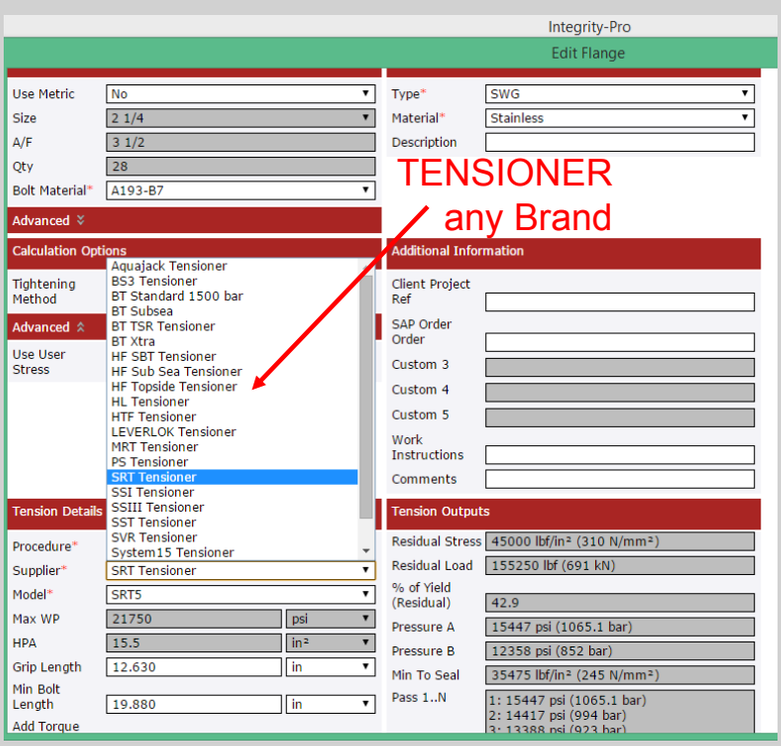
- BS1560/ANSI B16.5 standard flanges
- MSS SP44 standard flanges
- API 6A and 17D standard flanges
- Clamp type connectors(Techlok, Grayloc, Galperti and Destec)
- Non-standard joints, i.e. pressure vessels, heat exchangers, compact flanges, etc..

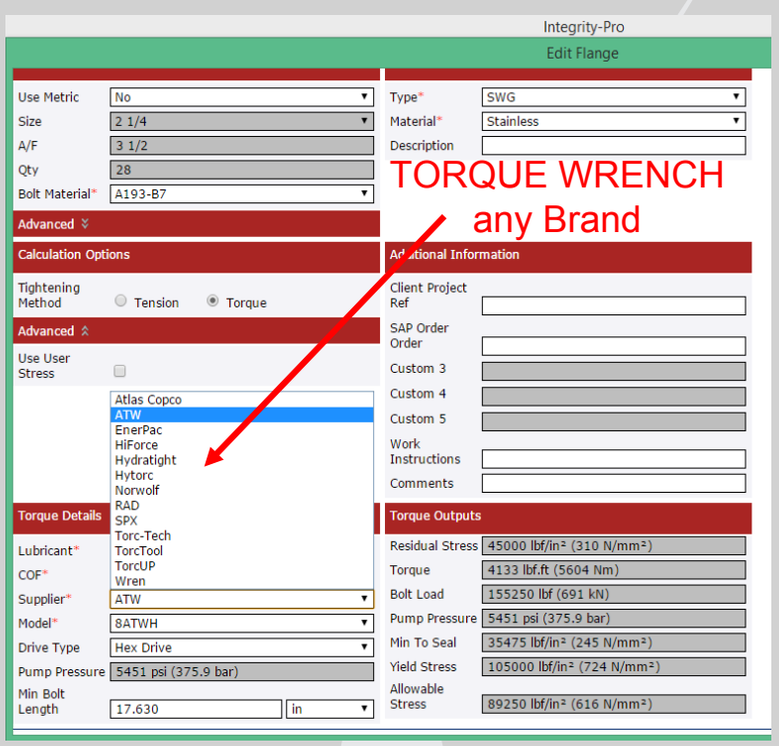
- Project control and review by visual status display of each joint.
- Performs as a central source for documentation and records associated with each activity or task.
- Provides joint tightening proceduresand methods.
- Generates tooling lists.
- Provides and maintains historical data for each joint.

- Search engine to find and display specific flanges/records.

- Embedded equipment database providing access to service records, tool calibration, etc..

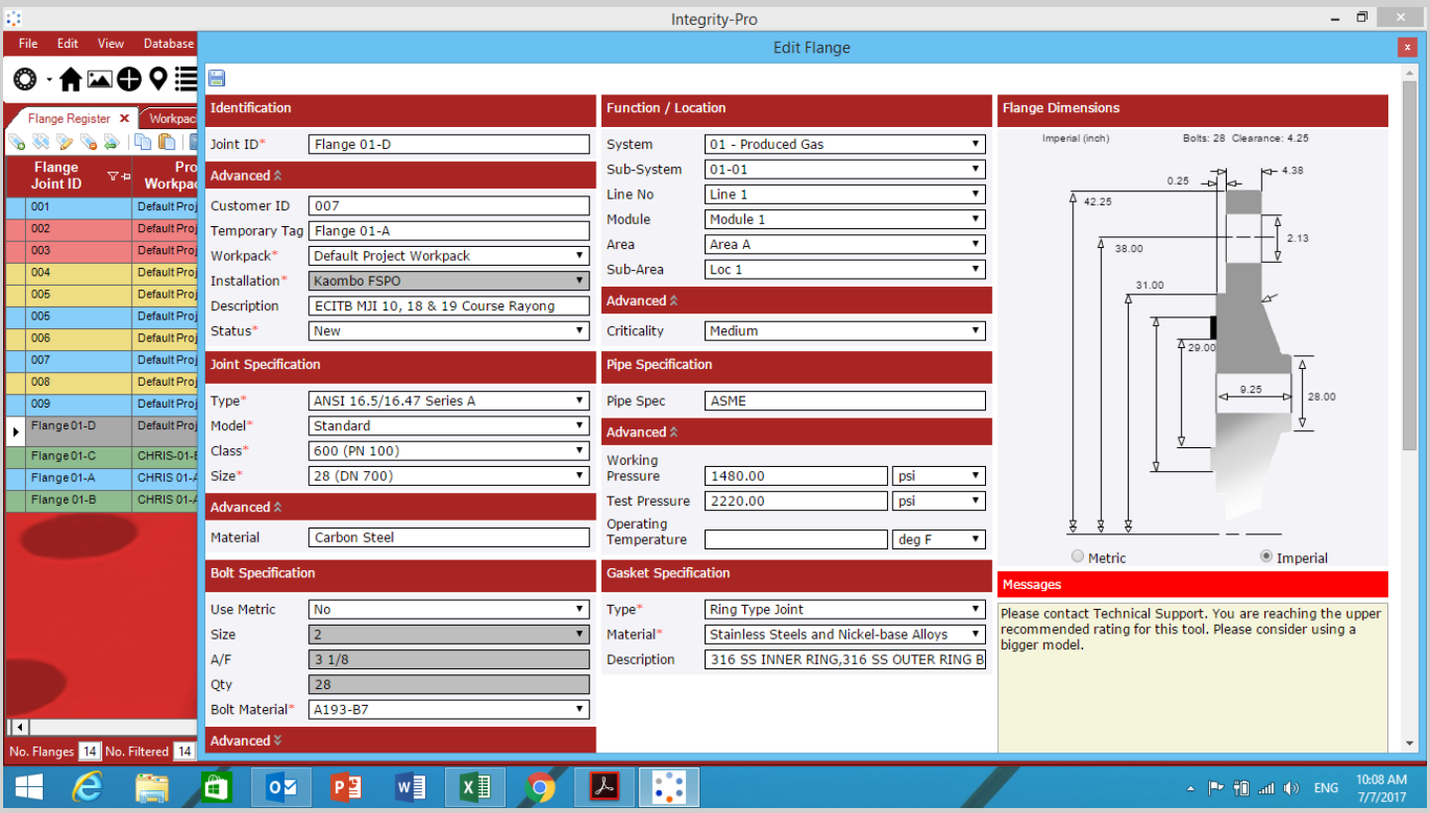
- Embedded personnel database providing access to individual training, competence, qualifications, etc..
- Completed joint databases can be viewed and interrogated by a freeware viewer which can be freely distributed throughout the organization.





1. Key Feature – Rapid Flange Entry

- Import data from Excel (Data Migration) or Copy existing Flanges.
- Allows for Pre-Engineering project work to commence, saved as a .sdf file.



2. Key Feature – Completion & Work Instruction Certificate

- Once all drawings are in the system and all specifications are added, Work Instructions can be generated to support the field work.
- Also can create completion certificates as part of any documentation handover.

Joint Completion Certificate

PROFAB

Client	Workpack Number		Tag No
PRO FAB	WP-012345		TG_007
Project Number	**Project Name**	**Location**	**Client Tag No**
JN 1176	Ichthys	Batam, Indonesia	TG_007_ab

Workpack Details

Line No	L-80-790_FW347-JF-002	C2SA Propane Tank	C2SA-790_FW347-1GA3-K-N

Joint Details

Joint Type	ANSI Standard	Gasket Type	SWG
Joint Size	20	Gasket Material	Stainless
Joint Class/Rating	300	Bolt Qty	24
Flange Material	ANSI B16.5	Nut A/F	2
Bolt Material	A320-L7	Grip Length	5.13 in
Bolt Size/Length	1 1/4" / 8.46 in	Bolt Coating	Black Oxide
Lubricant Name	MOLYKOTE 1000	Co-efficient Of Friction (μ)	0.11
Residual Bolt Stress	40000 lbf/in^2	Bolt Load	37760 lbf

Recommended Equipment

Tension		Torque			
Tool Recommended		Tool Recommended	3ATWS		
Tool Cover	100% / 50% / 25%	Torque (Stages/Pass)	30%	60%	100%
1st Pass Pressure		Torque Value	177 lbf.ft	353 lbf.ft	589 lbf.ft
2nd Pass Pressure		Pump Pressure	547 psi	1094 psi	1824 psi
Check Pass					

Customer Specified Values?

Equipment Information

				Note:
Tool Used	3ATWS	Serial No	W6005	Record serial numbers for equipment used on final/check pass only
Pump Type	RWP55-BS	Serial No	G234577	

Flange Checks				Comments
Flange Face	Clean	X	Aligned	X	Passed 3,000psi integrity testing
Bolts	Correct Length	X	Correct Material	X	
Gasket	Correct Size	X	Correct Material	X	

Assembled By	Johnny Prastoyoe	Company	PT Advent Prakarsa	Date	06/02/2016
Tightened By	John Smith	Company	PT Advent Prakarsa	Date	07/02/2016

	PT ADVENT	PROFAB	KHI
Print Name	JOHN SMITH – ECITB TECHNICIAN CERT NO. 1988325	Firman Wahyu Jatmiko	Mr Yama Kitahara
Signature	J. Smith	F. Jatmiko	Y. Kitahara
Date	9th FEBRUAURY 2016	10th FEBRUAURY 2016	12th FEBRUAURY 2016

LAPP EQUIPMENT UK
Office Suite 1, Concorde House,
23 Belsay Grove, Bedlington, NE22 5YU England UK
E: info@lappuk.co.uk
W: www.lappuk.co.uk

Work Instruction

BAKER HUGHES

Client	Workpack Number	Tag No
BP	WP-012345	TG_007
Project Number	**Location**	**Client Tag No**
JN 1176	Ulsan, South Korea	TG_007_ab

Workpack Details

System	C2SA-790_FW347-1GA3-K-N	Sub-System	N/A
Line No	L-80-790_FW347-JF-002		

Instruction

(xvii) Flange make up method shall be followed as per below for hydrocarbon / hydraulic oil / water injection systems:

For all lines classes below 1500# flange joints, manual wrench shall be used for bolt up to 1" dia. For over 1" to 1 ¼" bolt dia., manual torque wrench shall be used. For bolt over 1 ¼" to 2" bolt dia., hydraulic bolt torque shall be used. For over 2" bolt dia.,bolt tensioning should be applied.

For all line classes 1500# & above, manual torque wrench shall be used for bolts up to 1" bolt dia. For over 1" to 2" bolt dia., hydraulic bolt torque shall be applied. For over 2" bolt dia., bolt tensioning should be applied.

Joint Details

Joint Type	ANSI Standard	Gasket Type	SWG
Joint Size	20	Gasket Material	Stainless
Joint Class/Rating	300	Bolt Qty	24
Flange Material	ANSI B16.5	Nut A/F	2
Bolt Material	A320-L7	Grip Length	5.13 in
Bolt Size/Length	1 1/4" / 8.46 in	Bolt Coating	Black Oxide
Lubricant Name	MOLYKOTE 1000	Co-efficient Of Friction (μ)	0.11
Residual Bolt Stress	40000 lbf/in^2	Bolt Load	37760 lbf

Recommended Equipment

Tension		Torque			
Tool Recommended		Tool Recommended	HTL-DS3		
Tool Cover	100% / 50% / 25%	Torque (Stages/Pass)	30%	60%	100%
1st Pass Pressure		Torque Value	177 lbf.ft	353 lbf.ft	589 lbf.ft
2nd Pass Pressure		Pump Pressure	547 psi	1094 psi	1824 psi
Check Pass					

Equipment Information

				Note:
Tool Used	3ATW	Serial No	W6005	Record serial numbers for equipment used on final/check pass only
Pump Type	LAPP5	Serial No	123456	

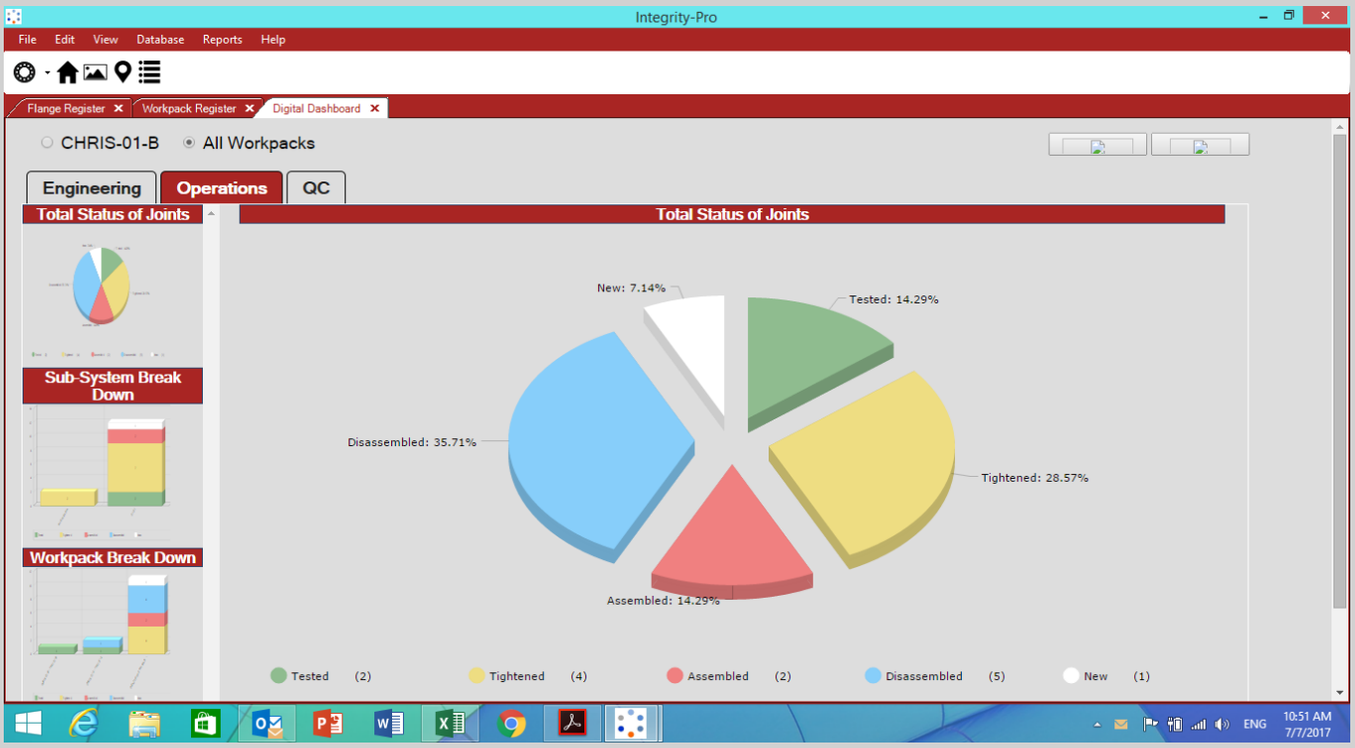
Flange Checks				Comments
Flange Face	Clean	X	Aligned	X	All good in good condition!
Bolts	Correct Length	X	Correct Material	X	
Gasket	Correct Size	X	Correct Material	X	

	Print Name	Signature	Date
Supervisor	JOHN SMITH	J. Smith	7th OCTOBER 2015
Client Acceptance	SEAN KIM	보넨사람	7th OCTOBER 2015

Baker Hughes | Process and Pipeline Services
Office Direct: + 603 51234805
Cell: + 6012 667 5424 |
http://www.bakerhughes.com

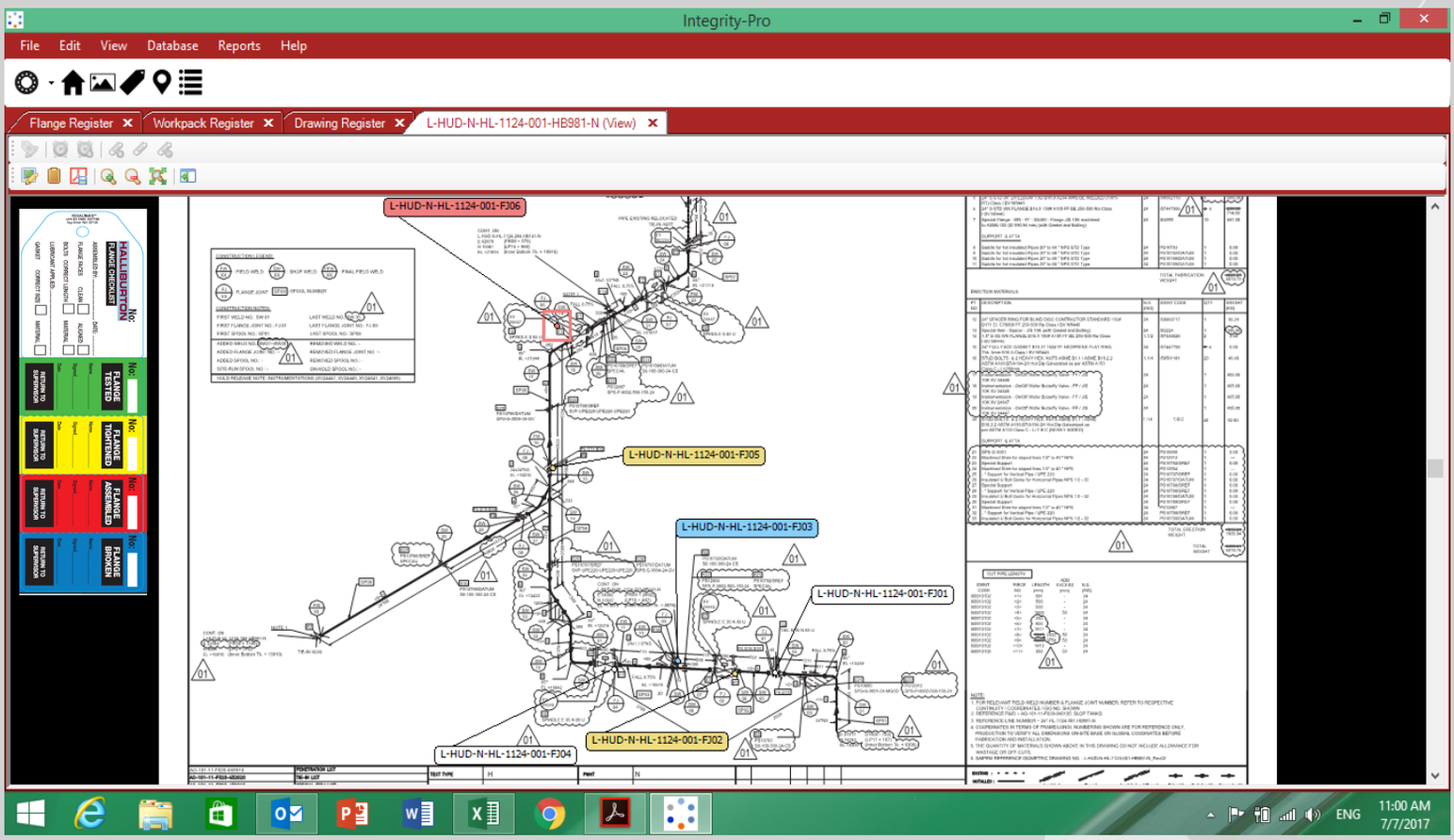
3. Key Feature – Digital Dashboard

- Dashboard for Engineering, QC and Operations.



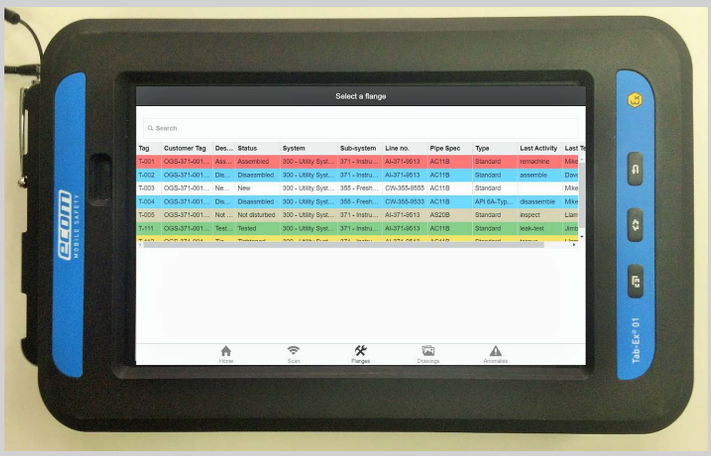
4. Key Feature – Drawing Overlay & Mark-up

- Drawing overlay feature allows Flange Management tags and visual status to be layered on top of leak test mark-up route.
- Mark-up drawings allow detailing information on valves within the test envelope.

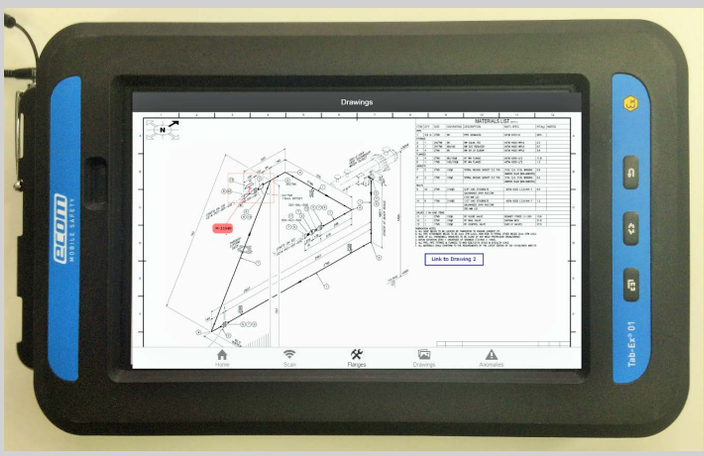


5. Key Feature – ATEX ECOM tablet

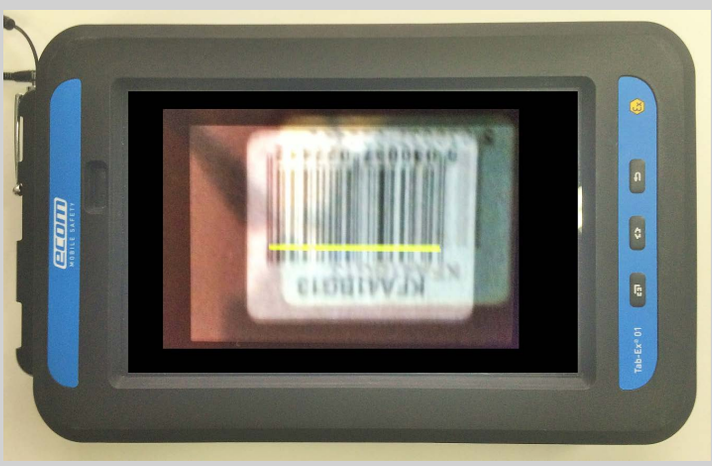
- Intrinsically safe Zone 1/21 & DIV. 1 ATEX ECOM tablet running INTEGRITY-PRO (Flange Management) FM JIT software.
- The ECOM tablet can directly scan the Flange Tag Bar Code, thereby locating the Flange Joint ID immediately in the Flange Register where the Flange status can be updated in real time.



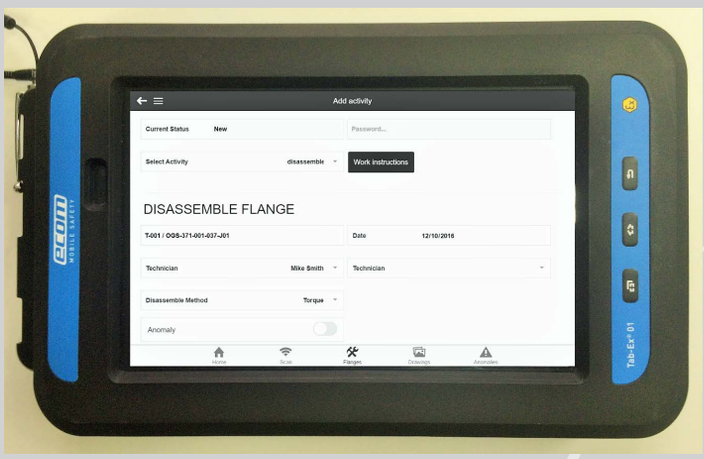
FLANGE REGISTER



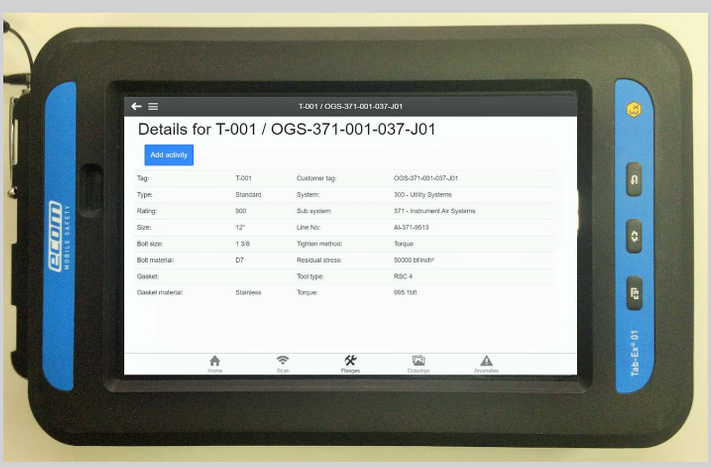
DRAWING OVERLAY MARK-UP



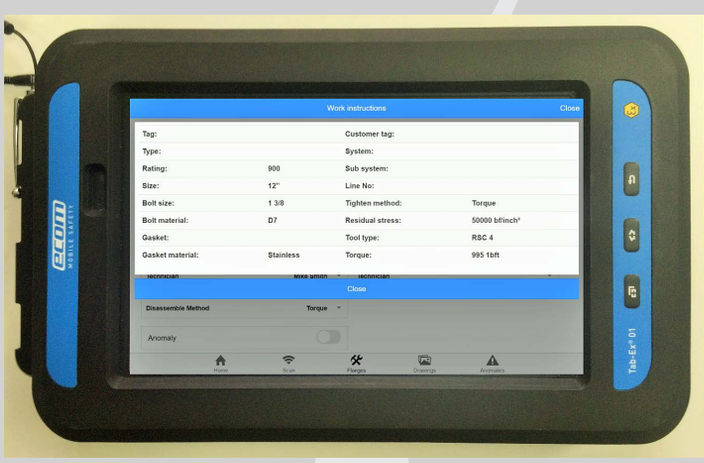
FLANGE TAG BAR CODE SCANNING



ADD FLANGE ACTIVITIES



Data upload to local server/cloud hosted DB



ADD WORK INSTRUCTION