

# Deluge Resilience Programme



A safety solution to the worldwide issues affecting offshore assets and their firefighting systems

The power behind **your mission**

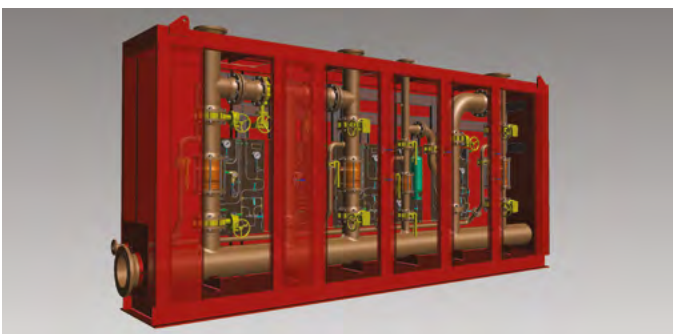


# NEW innovative 5 and 7 year Deluge Resilience Programmes. Unique to Johnson Controls and now available globally to the Oil & Gas Industry.

Our Deluge Resilience Programme combines exclusive and patented technology together with a specifically designed innovative service regime, to bring a cost effective solution for offshore deluge systems. This allows duty holders to eradicate the effects of regular wet testing whilst increasing system integrity and ability to operate every time on demand.

When introduced, duty holders can be assured that their deluge systems will:

- Increase operational efficiency 24/7/365
- Operate in full compliance
- Reduce costly damage repairs caused by Deluge System failure
- Maintain to the required level of safety



## Why choose Johnson Controls?

- Industry leader
- Over 40 years Oil and Gas experience
- Extensively proven market place capabilities
- Full turnkey solutions
- Front end engineering design support
- Project engineering design
- 3D Modelling capability
- System hydraulic calculation and analysis
- Project management
- Procurement / Materials handling
- Onshore workshop
- Onshore / Offshore skid build
- Onshore F.A.T facilities
- Distribution pipe work change out
- Prefabrication
- Alternative pipe work materials
- Offshore installation
- Offshore commissioning & testing
- Through life service & support
- Unique ITM resilience program
- Decommissioning
- Resources and structure to deliver:
  - Operability, functionality, reliability & efficiency

## Our history

With experience that can be traced back to 1852 and one of the world's largest portfolios of fire, safety and asset integrity solutions, Johnson Controls is a leader in meeting safety and security challenges for the Oil & Gas market. We are passionately committed to helping customers improve safety and asset integrity. We help protect 90% of the world's top 50 Marine and Oil & Gas companies for all types of assets and facilities, from fixed platforms, FPSO's, semi-submersible platforms, semi-sub drillers, drill ships, cargo vessels, oil tankers, platform supply vessels to terminals and refineries. With major Marine and Oil & Gas Centres of Excellence in the UK, we have 35 years' experience in providing safety and asset integrity solutions to the global Marine and Oil & Gas markets.



# Deluge Systems

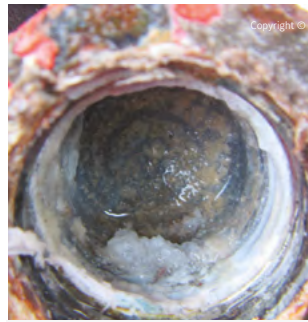
Safety critical & primary source of offshore active fire protection



Corrosion



Debris



Salt Crystallisation

## What is affecting your systems today?

- Corrosion
- Salt water crystallisation
- Marine Life
- Microbiologically Induced Corrosion (MIC)
- Debris

## FACT: Blocked nozzles have been found in systems using all types pipework materials

	Uniform Attack	Pitting Corrosion	Crevice Corrosion	Under Deposit Corrosion	Galvanic Corrosion	Erosion or Erosion Corrosion	Mechanical Damage (4) (5)	Poor Installation (6)	Marine Fouling	Microbial Attack
Uncoated Carbon Steel	•	•	•	•	•	•			•	•
Coated Carbon Steel		•	•	•	•	•	•	•	•	•
Cast / Ductile Iron	•	•	•	•	•	•			•	•
Austenitic Stainless Steel		•	•	•					•	•
Duplex Stainless Steel		•1	•1	•					•	•
Super Duplex Stainless Steel		•2	•2	•					•	•
6% Moly Stainless Steel		•1	•1	•	•3				•	•
Cupronickel				•		•	•	•		•
Titanium					•3				•	•
Glass Reinforced Plastic							•	•	•	•

Table: HSE Offshore Technology Report – OTO:2000:035 – A Review of Degradation of Firewater Piping & Nozzle Performance due to Blockage

**Notes:** 1. Dependent on temperature; 2. Not completely immune; 3. Can cause galvanic corrosion in adjacent materials; 4. Coated carbon steel can suffer from spalling of the internal coating due to impact or heat damage during welding; 5. Cupronickel and grp can suffer mechanical damage during installation due to low strength when compared to steel; 6. All systems can suffer due to poor installation practice, those identified need additional care.

## Deluge Systems' maintenance is critical for offshore safety and assets

Upon activation of the system, seawater bi-products within the pipework are carried by the firewater to the deluge nozzles where the small discharge orifices become quickly blocked. This has potentially a disastrous effect should an event occur onboard the installation.



Typical offshore state



Salt Crystallisation in nozzle



Marine growth

# Johnson Controls' Deluge Resilience Programme

Tyco's 5 and 7 Year ITM Programmes = Complete Confidence  
Fire water from every nozzle every time

## ITM (Inspection, Test and Maintenance) Programme

Our ITM (Inspection Test & Maintenance) Programme is an innovation to extend the period between wet deluge testing on offshore assets.

Innovation in safety – creating added value whilst maintaining compliance

Compliance and confidence whilst driving down direct and indirect costs

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Create System baseline Data	Pump performance test at Deluge valves	Pump performance test at Deluge valves	Pump performance test at Deluge valves	Pump performance test at Deluge valves
Modify the System pipework	External Visual Inspection of Systems	External Visual Inspection of Systems	External Visual Inspection of Systems	External Visual Inspection of Systems
Carry out full wet performance test and inspection and ring main flush*	25 % Internal Dry inspection via camera review data and report	25 % Internal Dry inspection via camera review data and report	25 % Internal Dry inspection via camera review data and report	25 % Internal Dry inspection via camera review data and report
Repair and rectification	Repair and rectification	Repair and rectification	Repair and rectification	Repair and rectification

**Typical Savings**  
for an average asset  
**£1,000,000**  
**Over 15 Years**  
Contact us to request our cost model

\*Johnson Controls will bench test the fire pumps whilst under Deluge Load. Not discharging over the side. Johnson Controls are market leaders in the pump test and curve creation.

Moving from wet testing to dry testing is an innovative approach and creates less collateral damage for the operator

Johnson Controls' borescope based test procedure is the ONLY dry testing procedure that inspects the internal condition of your pipe work to identify hidden dangers and its ability to operate on demand

### Why our ITM

- Compliance without reducing safety
- Increase period between wet tests up to 7 years
- Increase asset integrity and life
- Reduce testing time
- Removes restricted access requirement
- Eliminate potential for unplanned shutdown
- Demonstrate complete compliance
- In accordance with Offshore Safety Case Directive 2015 reviewed and accepted by the UK HSE

Boreoscope views of hidden dangers



# Global Strength

## Local Expertise. At your service.

### JCI's full spectrum of Life Safety and Asset Integrity Solutions

- Fire & Gas Detection/Alarm
- Detection & Control
- Portable Gas Detection
- Interface Engineering
- Safety Products
- Fire Protection Systems
- Fire Safety Maintenance
- Deluge Verification
- Environmental/HVAC
- Descaling
- Audio Communications
- Fiscal Metering
- Wellhead and Hydraulic Process Control
- Security and Surveillance

### United Kingdom Oil and Gas Locations

#### Aberdeen, Altens

Tel: +44 (0)1224 295191

#### Great Yarmouth

Tel: +44 (0)1493 440 500

#### Manchester

Tel: +44 (0)161 455 4400

#### Norwich

Tel: +44 (0)1603 201 201

#### Nottingham

Tel: +44 (0)1159 040 404

### International Locations

- Europe
  - United Kingdom
  - Norway
- North America
  - Mexico
- Asia
  - Seoul, Korea
  - Busan, Korea
  - Singapore
  - China
  - Malaysia
- Middle East
  - UAE
  - Kuwait
  - Oman
- South America
  - Brazil
  - Argentina
  - Chile
- Africa

Contact us for further information on how we can help with your safety & asset integrity requirements [tfis.delugesystems.uk@tycoint.com](mailto:tfis.delugesystems.uk@tycoint.com)

[www.johnsoncontrols.co.uk](http://www.johnsoncontrols.co.uk)

The power behind **your mission**



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