



AOGV *///*

Mechanical Isolation Tool

Simple, Safe, Smart

INNOVATIVE KNOW-HOW





AOGV
**BRILLIANT
ENGINEERING**

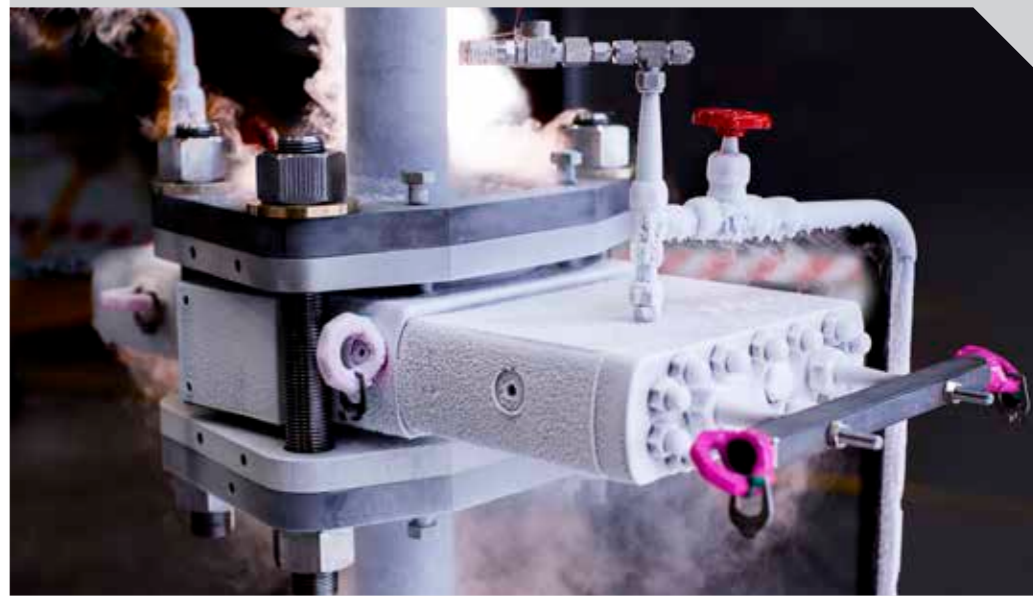
AOGV // MECHANICAL ISOLATION TOOL

DEVELOPED BY IK-GROUP, THE AOGV MECHANICAL ISOLATION TOOL CAN INSERT AND REMOVE AN ISOLATION SPADE ON ANY LIVE FLANGE PAIR TO CREATE A ZERO-ENERGY ZONE WHERE INSPECTION, MODIFICATION AND MAINTENANCE WORK CAN BE PERFORMED SAFELY AND EFFICIENTLY WHILST PRODUCTION IS MAINTAINED.

APPLICATIONS INCLUDE:

- On-site repair of valves and valve replacement
- Repair and modifications of parts of process facilities
- Retrospective installation of equipment
- Emergency plant and piping repairs

The AOGV tool has been approved and deployed by oil and gas supermajors and multinational NOCs across upstream, downstream, and integrated gas assets.



HOW DOES THE AOGV WORK? //



The AOGV tool is assembled in sections over any live flange pair, upstream or downstream of the pipework or equipment requiring intervention.

Sealing on the flange circumference and the flange bolt holes, the pipe pressure and inventory is contained within the AOGV housing. The flanges are separated, the gasket removed, and a spade is inserted for isolation purposes.

The AOGV tool is then disassembled and moved to the next location leaving the flange pair and pipework in the same condition as it was post intervention.

POSITIVE ISOLATION //



Positive Isolation is regarded as the most secure method for energy isolation and the use of the AOGV facilitates:

1. Spool removal: removal of a piped section or spool piece and blanking the live end - also called 'air gapping'.
2. Blind isolation: insertion of a blind between flanges (spade)

MINIMISE YOUR ISOLATION IMPACT //



Passing valves and leaking flanges challenge any process plant. Built-in isolation points can require partial facility shutdowns and the ejection and flushing of large inventory volumes. Typically, this type of work must wait for – or trigger – a full or partial facility shutdown, leading to significant production loss and increased exposure to risk for personnel.

By bringing the isolation point closer to the point of interest, the AOGV reduces the area impacted by the work and negating the likelihood of shutdown and a large ejection of inventory.

The AOGV is designed to ensure facility downtime is kept to a minimum, asset integrity is maintained, and the risk is mitigated to “as low as reasonably practicable”.

ENVIRONMENTAL IMPACT //



The AOGV reduces the isolated area, meaning that more of the process inventory is left in the plant, reducing the risk of spill and volume of emissions.

- AOGV enables reduced requirement for drainage, venting, purging and flushing
- Reduces volumes to be gas-freed and flared
- Minimises requirements for storing or transport of drained fluids
- Minimises disposal of unwanted fluids
- Minimises release of Volatile Organic Compound to the environment

AOGV TIMELINE //



2016

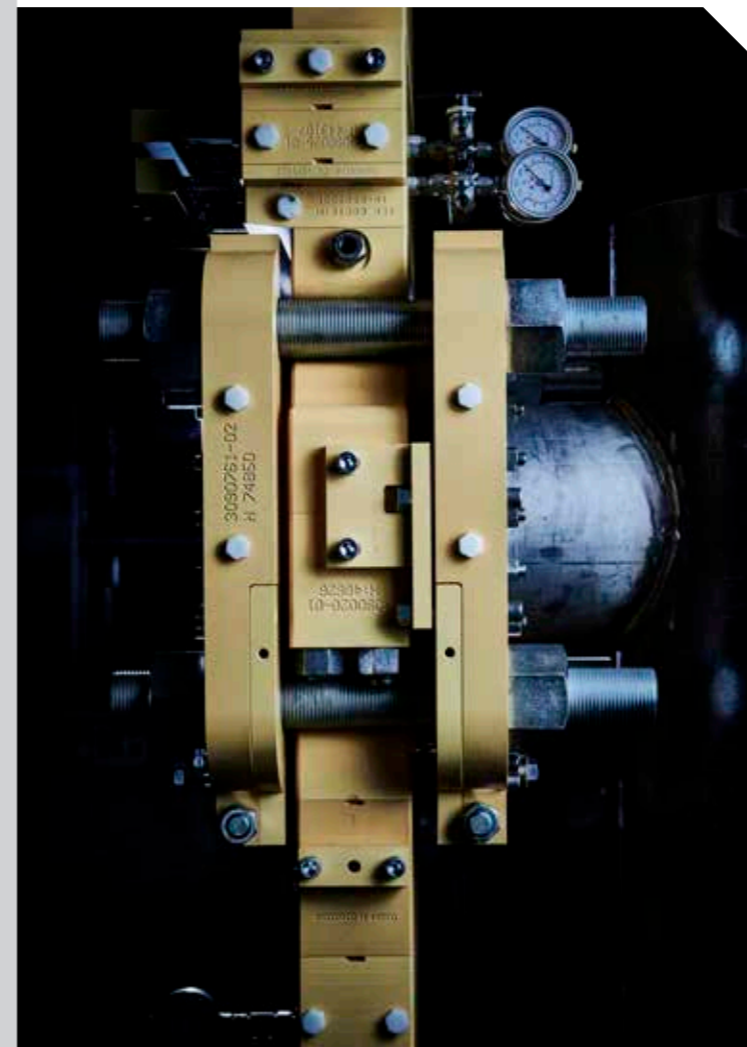
- **2016**
AOGV concept
- **2017 MAR**
First use of a prototype AOGV
- **2018 MAY**
AOGV case jointly presented at OTC Houston by end client and IK
- **2018 AUG**
First High pressure AOGV unit successfully executed (150Bar/2175psi)
- **2019 AUG**
AOGV Patent Awarded

- **2020 AUG**
First operation of a G2.0 High pressure AOGV (155bar / 2250psi)
- **2020 AUG**
Nominated for the Offshore Northern Seas Innovation Award
- **2020 MAY**
First frame agreement for delivery of AOGV technology and services
- **2020 FEB**
First AOGV application for a maintenance contractor
- **2019 SEP**
AOGV case jointly presented at Offshore Europe by end client and IK

- **2021 MAY**
First Global Technology Release by a “Supermajor”
- **2021 AUG**
First cryogenic AOGV application
- **2021 OCT**
2021 - AOGV Patent awarded in USA
- **2021 OCT**
AOGV job # 50 Successfully Executed
- **2022 JAN**
Awarded largest AOGV scope to date - 89 valve replacements

2022
2023

- **2022 APR**
Qualification of the first Compact Flange AOGV
- **2022 MAR**
Order received for the first G1.0 butterfly valve AOGV



INCREASES MAINTENANCE FLEXIBILITY //



The AOGV can insert an isolation spade at any live flange pair, isolating individual pieces of equipment or sections of the process plant where no other means are provided. This makes it possible to execute inspection, modification and maintenance work, as and when needed, without interruption to production.

The AOGV technology provides quantifiable value by reducing the time spent “in-plant” and the area of the facility impacted. Compared to alternatives, the AOGV allows:

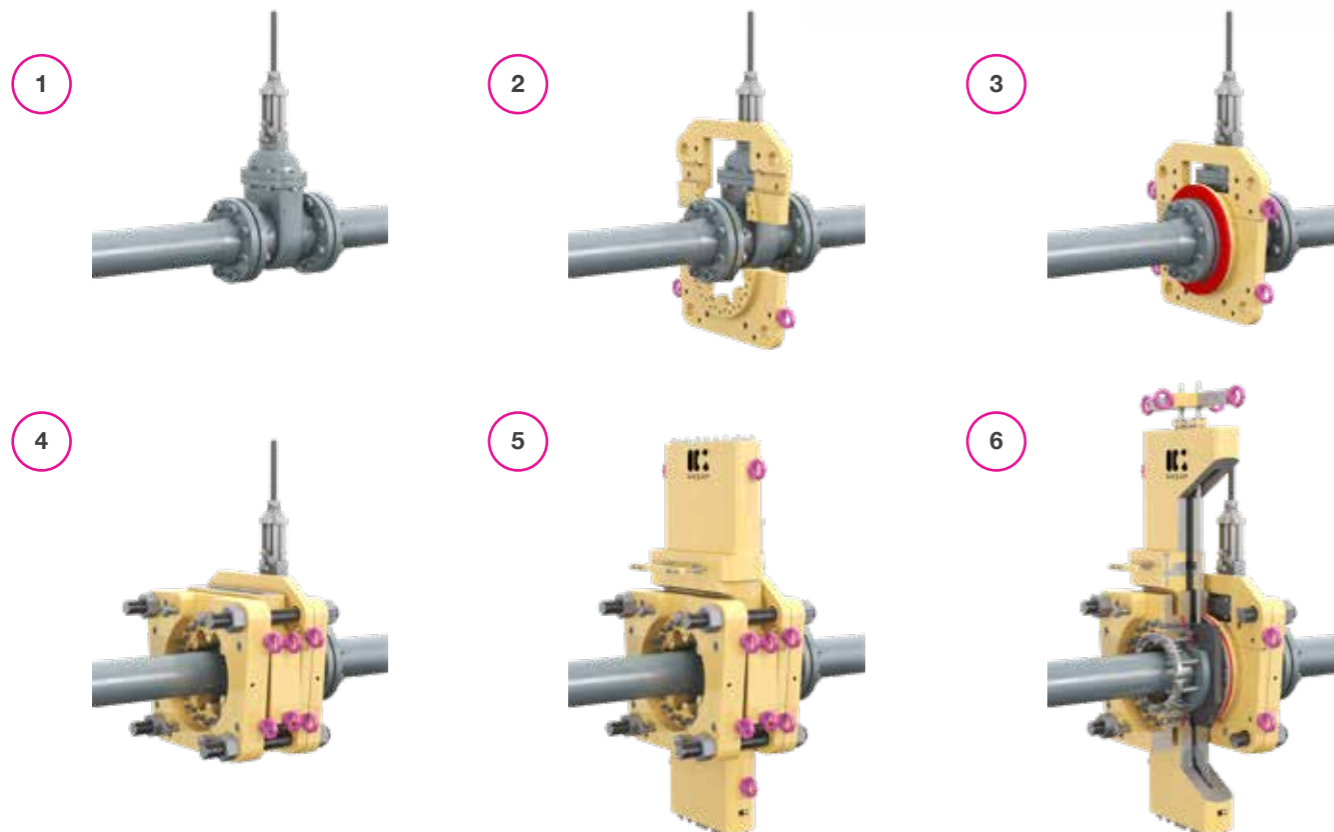
- Isolation of individual parts of equipment where no other means are provided or available
- Execution of work outside of a turnaround (TAR), increasing asset uptime (reliability)
- No requirement for “hot work”
- No permanent alteration to the pipework
- Reduction in maintenance schedule by minimising isolation impact
- Reduction in drainage, venting, purging and flushing time and cost
- Maintained production through simplified isolation

The AOGV is tested to and complies with all relevant regulations and standards – PED2014/68/EU, EN 13445, ASME B31.3, and is CE marked by DNV.

INSTALLATION SEQUENCE //



- Fits on any standard ASME flange
- Leave pipe medium in place
- Clamp on the AOGV and suspend its weight
- Transfer the compression force from the flange bolts to the AOGV & unbolt the flange using standard tools
- Plug the flange bolt holes
- Separate the pipe flanges and remove the gasket
- Insert a blind spade and compress the flanges to seal
- Perform the required work
- Release and retract the blind spade
- Insert new gasket and compress flanges to seal
- Install flange bolts and torque up flanges to reinstate the system



FREQUENTLY ASKED QUESTIONS //



1. What temperature and pressure ranges can the AOGV be used?

The temperature range is from -280 degrees to +400 degree Fahrenheit. Pressures of up to 2900psi have been achieved. Higher pressures are also feasible.

2. What sizes of pipe and pressure class combinations can the AOGV be used?

We have been focusing on the ASME class 150 & 300 in sizes 1" to 24" but have tools that can handle sizes up to 36" ASME and up to class 2500. The AOGV can also accommodate other flange standards such as DIN, JIS and Compact Flanges. Please see our tool fleet at AOGV.com for available on the shelf sizes and class combinations.

3. How much clearance does the AOGV need on either side of the flange to be able to be installed?

As a rule of thumb, for pipework from 1" to 4" the AOGV needs 2" of clearance and from 5" and upwards a 1/2 of the pipe diameter is needed. This measured from the bolts and nut side of the flange.

4. How is the AOGV going to seal on the full circumference of the flange and the bolt holes?

The flange seal is pre-energized, acts as a plug, and seals directly from the flange circumference to the inside of the AOGV. The bolt holes are also plugged with mechanical plugs bolted to the AOGV kit. The type of seal used is dependent on the application and process inventory but typically elastomer is used to make sure uneven surfaces will be sealed properly.

5. Can the AOGV be fitted on the flange of a 3-piece valve?

The AOGV can be fitted on most valve types and nozzles including 3-piece valves.

6. Does the pipework have to handle the weight of the AOGV?

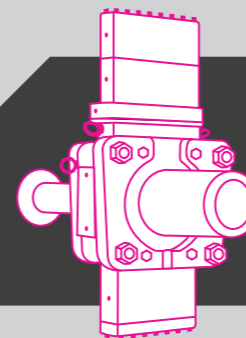
For some of the smaller sized AOGV's, the pipe can easily handle the weight. However, it is normal practice to suspend the weight of the AOGV in chain hoists attached to a super-structure or scaffolding above the AOGV.

7. What about the condition of my flange face?

As part of the AOGV operation, we remove the old seal/gasket at the beginning of the operation and replace it with a new seal/gasket at the end. So far, we have been 100% successful in restoring the flange integrity.

8. How do you perform the splitting of the flanges after the AOGV has been installed?

Either the system pressure is used for splitting the flanges or the pipe is gently moved by use of e.g., chain hoists to pull them apart. The stress tolerances are calculated for the displacements, and we analyze where in the plant you're able to give a little with your pipe to handle the movement. The movement itself is controlled by gradually releasing the compression exerted by the integrity clamps of the AOGV.



For more information, please contact
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AOGV.com



BRILLIANT ENGINEERING IS THE DNA OF THE IK GROUP //

We make your operations run safely and profitably. Onshore and Offshore, Topside and Subsea. With the clever use of proven technology, we have solved some of our industry's most complex challenges.

The innovative AOGV is just one of our brilliant solutions that helps our customers to smooth and predictable operations. The AOGV is approved by and in use by oil and gas supermajors and multinational NOCs in upstream, downstream and integrated gas assets.

INNOVATIVE KNOW-HOW



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EN 13445



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