



Random Hardware Reliability Assessment Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The following BEL Valves Ltd, Slab Gate Valves (along with actuators and their associated Hydraulic Control panel (HCP)) have been assessed:

- **T35479-V (ETAP No: XXV-204000, XXV-204032 & XXV-204039);**
- **T35480-V (ETAP No: XXV-204029);**
- **T35481-V (ETAP No: XXV-204031);**
- **T35487-V (ETAP No: XXV-823019), and;**
- **T35490-V (ETAP No: XXV-204022).**

The assessment was carried out to determine the PFD and IEC 61508 architectural type and Safe Failure Fraction (SFF).

The assessment was based on the assumptions, data provided, and recommendations given in:

- **Engineering Safety Consultants (ESC) Ltd Report: K020_ FM001 rev. 2.**

The products were assessed against the following failure mode:

- Ability to close gate valve and isolate pipework & equipment downstream.

The assessment results are as follows:

HFT = 0				
Description	Proof Test Coverage (PTC)	Assumed Proof Test Interval	PFD Achieved	Type
T35479-V (ETAP Tag No: XXV-204000 & XXV-204032) + HCP	95%	1 year	3.8E-03	A
T35479-V (ETAP Tag No: XXV-204039) + HCP		1 year	3.8E-03	A
T35480-V (ETAP Tag No: XXV-204029) + HCP		1 year	3.8E-03	A
T35481-V (ETAP Tag No: XXV-204031) + HCP		1 year	3.7E-03	A
T35487-V (ETAP Tag No: XXV-823019) + HCP		1 year	3.7E-03	A
T35490-V (ETAP Tag No: XXV-204022) + HCP		1 year	3.7E-03	A
T35479-V (ETAP Tag No: XXV-204000 & XXV-204032) + HCP	100%	1 year	2.5E-03	A
T35479-V (ETAP Tag No: XXV-204039) + HCP		1 year	2.5E-03	A
T35480-V (ETAP Tag No: XXV-204029) + HCP		1 year	2.5E-03	A
T35481-V (ETAP Tag No: XXV-204031) + HCP		1 year	2.5E-03	A
T35487-V (ETAP Tag No: XXV-823019) + HCP		1 year	2.5E-03	A
T35490-V (ETAP Tag No: XXV-204022) + HCP		1 year	2.5E-03	A

HFT = 1				
Description	Proof Test Coverage (PTC)	Assumed Proof Test Interval	PFD Achieved	Type
T35479-V (ETAP Tag No: XXV-204000 & XXV-204032) + HCP	95%	1 year	3.9E-04	A
T35479-V (ETAP Tag No: XXV-204039) + HCP		1 year	3.9E-04	A
T35480-V (ETAP Tag No: XXV-204029) + HCP		1 year	3.9E-04	A
T35481-V (ETAP Tag No: XXV-204031) + HCP		1 year	3.9E-04	A
T35487-V (ETAP Tag No: XXV-823019) + HCP		1 year	3.9E-04	A
T35490-V (ETAP Tag No: XXV-204022) + HCP		1 year	3.9E-04	A
T35479-V (ETAP Tag No: XXV-204000 & XXV-204032) + HCP	100%	1 year	2.6E-04	A
T35479-V (ETAP Tag No: XXV-204039) + HCP		1 year	2.6E-04	A
T35480-V (ETAP Tag No: XXV-204029) + HCP		1 year	2.6E-04	A
T35481-V (ETAP Tag No: XXV-204031) + HCP		1 year	2.6E-04	A
T35487-V (ETAP Tag No: XXV-823019) + HCP		1 year	2.6E-04	A
T35490-V (ETAP Tag No: XXV-204022) + HCP		1 year	2.6E-04	A

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the devices. For response times (along with any relevant assumptions) reference should be made to the Safety Manual of each device and the total SIF response time **MUST** be compared against the process safety time for the specific application.



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