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## UK workshop services

A guide to our valve testing facilities and how we can help

# Valve testing by ABB

## Introduction

The key role that control valves play in regulating the flow of liquids and gases in industrial processes means it is crucially important to ensure that they are in good working order throughout their operational life.

As a way of gauging performance and ensuring continued accuracy, capacity testing of control valves can help to highlight any potential deterioration or problems, either with the valve or associated equipment such as actuators or positioners, that could impact on their effectiveness.

## How can we help?

ABB's valve testing service can help you to verify the characteristics of both standalone valves and complete valve systems, depending on your requirements. Using our independent calibration facility at our factory in Stonehouse, Gloucestershire, we can test valves ranging from 25mm to 600mm (please enquire for larger sizes) and weighing up to 10 tonnes. In accordance with the EN ISO 60534-2-3 standard for control valve testing.

## Why test a control valve?

There are several factors driving the need to ensure that valves in flow control lines are correctly capacity tested and verified. Firstly, end customers increasingly expect that the companies they purchase from will have had the capacity of their control valves verified in accordance with the required standards, such as EN ISO 60534-2-3, which provides an effective best practice guideline for valve testing.

Secondly, strict standards regarding the control of leaks and emissions from industrial processes are obliging industrial operators to look at every aspect of their processes. As a major potential source of leaks, control valves therefore need to be regularly inspected and maintained.

In most cases, control valves will only have been tested and set up under a limited set of specific conditions in the manufacturer's own facilities. These ideal conditions rarely reflect the range of actual installed conditions they will face in a real application. For this reason, it is advisable to ensure that your valves are tested for the actual flow and pressure conditions in your application in order to ensure the highest levels of accuracy and repeatability.

A key factor to remember is that the valve is just one part of a flow control system. In addition to the valve itself, there will also be a positioner and actuator, used to control and adjust the valve position, both of which can affect the accuracy of an overall valve installation. It is highly likely that in most cases, these three critical parts will have been supplied by multiple manufacturers, each operating their own procedures and standards regarding accuracy and verification.

## What information can be gained from testing a control valve?

There are a number of performance characteristics which can be measured through testing.



- CV value – the CV value is the valve sizing coefficient that determines the quantity of a media that will flow through the valve during a set period at a set pressure. Testing the CV value includes ascertaining the valve’s flow and pressure drop characteristics.
- Linearity – checking the calibration of your control valve will help to check actual performance against its ideal characteristics
- Hysteresis – factors such as friction and gradual wearing of the valve and/or actuator and positioner linkages, can impact on the amount of force needed to shift the valve stem This can impact on the ability of the valve controller to maintain a precise position, which in turn reduces accuracy and repeatability.

- Closed Valve Seat Testing – Tests can be performed to verify internal leakage past the valve seat to identify if the seat is damaged or prevented from closing due to dirt or rust.
- SAFEM – As valves are a critical control point in process, testing and verification during key shut downs could save you money and keep your plant safe.

### Benefits of ABB calibration services

With over 30 years’ experience in testing valves, we can help you to ensure that your control valves are fully tested to the highest standards.

Our valve testing services can help you to get the best levels of performance from your control valve or control valve system throughout its lifetime, resulting in:

- Improved process optimisation – reduced raw material cost, increased process speed and accurate process control
- Improved precision – ensuring that process flows are being accurately controlled at all times and that the effects of any variations are eliminated
- Improved process availability – reducing unscheduled valve maintenance helps maximise the uptime of your plant or process
- Continued regulatory compliance – our services provide you with independent testing and third party signed certificates for your records
- Enhanced safety – having your control valve or control valve system regularly tested at consistent intervals and authenticated with the relevant certification can help enhance your process safety and minimize your risk of exposure in the event of an accident

ABB CERTIFICATE OF TEST									
Customer Name: Smith & Co					ABB Reference: ABB Initial Testing				
Customer Reference: Test Valve					Certificate No.: Not Allocated				
Tag Number: 65 LCV 205					Test Rig: G35 Rig 1 (180)				
Calibration Date: 07 March 2013					Fluid: Water				
Meter Type: Valve - Air to Open					Density (SG): 1.00				
Valve Model No.: 89480 001 001					Flow Units: m <sup>3</sup> /hr				
Valve Serial No.: P04MUC120013 R2					Valve Inlet ID Size: 500 mm				
Valve Size (Inches): 1" 1/2 (25mm)					Valve Outlet ID Size: 500 mm				
Tested by: P. Ballinger					Test Pipework Inlet ID Size: 500 mm				
Test Description: Valve CV Testing					Test Pipework Outlet ID Size: 500 mm				
Comments: Valve CV Testing @ Nominal DP of 666mBar									
Reference Data				Test Data					
Test Run Number	Valve Position % Open	Run Time Seconds	Water Temperature Deg C	Flow Rate m <sup>3</sup> /hr	Differential Pressure mBar	Valve Cv @ 100% Open	Valve Cv		
1	10	106.8	23.0	0.48	672.90	0.65			
2	20	100.7	23.0	2.14	699.22	3.04			
3	30	101.0	23.0	3.95	679.34	4.30			
4	40	105.8	23.0	4.48	682.80	6.29			
5	50	100.5	23.0	5.20	698.11	7.43			
6	60	100.4	23.0	6.38	653.50	9.13			
7	70	100.6	23.0	7.19	661.45	10.25			
8	80	100.6	23.0	7.94	656.45	10.86			
9	90	100.4	23.0	8.92	658.01	11.47			
10	100	100.4	23.0	8.91	687.97	10.25			

The above tests were carried out in accordance with British Standard BS EN 60534-2-2:1995 excluding any variances list below.

Valences:  
None

Test Procedure:  
Valve to be fully opened and flow passed through system for a minimum of 5 minutes to ensure all air is removed. Flowrate is then set to give the desired Differential Pressure (DP) and flow is then logged and averaged over a period (approx 60seconds).

Technician Signature: \_\_\_\_\_ Witness Name (Optional): \_\_\_\_\_ Witness Signature (Optional): \_\_\_\_\_

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Testing will enable the impact of any hysteresis on valve accuracy to be ascertained.

- Repeatability – ideally, a control valve should be able to achieve a set position for a given input. Checking valve performance will enable any variation to be pinpointed and redressed.
- Valve response time – the ability of a valve to move quickly in response to a signal variation can have a major impact on control accuracy and stability, especially in high precision applications. Testing the valve will help to check for factors such as friction, wearing and whether the valve is correctly matched to its actuator and positioner.
- Deadtime – this is the time taken by the valve to respond to a variation in the input signal. Excessive dead time may be indicative of a problem with the valve, actuator or positioner. Testing will allow the deadtime to be tested under fully loaded conditions.

When you deal with ABB for valve testing, you can be sure that all work is conducted by highly trained ABB service technicians.



# Contact us

## **ABB Limited**

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For more information about our valve testing services,  
call **03339 997 996**  
or email [repairs.stonehouse@gb.abb.com](mailto:repairs.stonehouse@gb.abb.com)

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