

A SELF REFERRING PROCEDURE FOR THE FULL CALBRATION OF A DYNAMIC GAS DIVIDER

A new approach in the
calibration of gas blenders?

May be.

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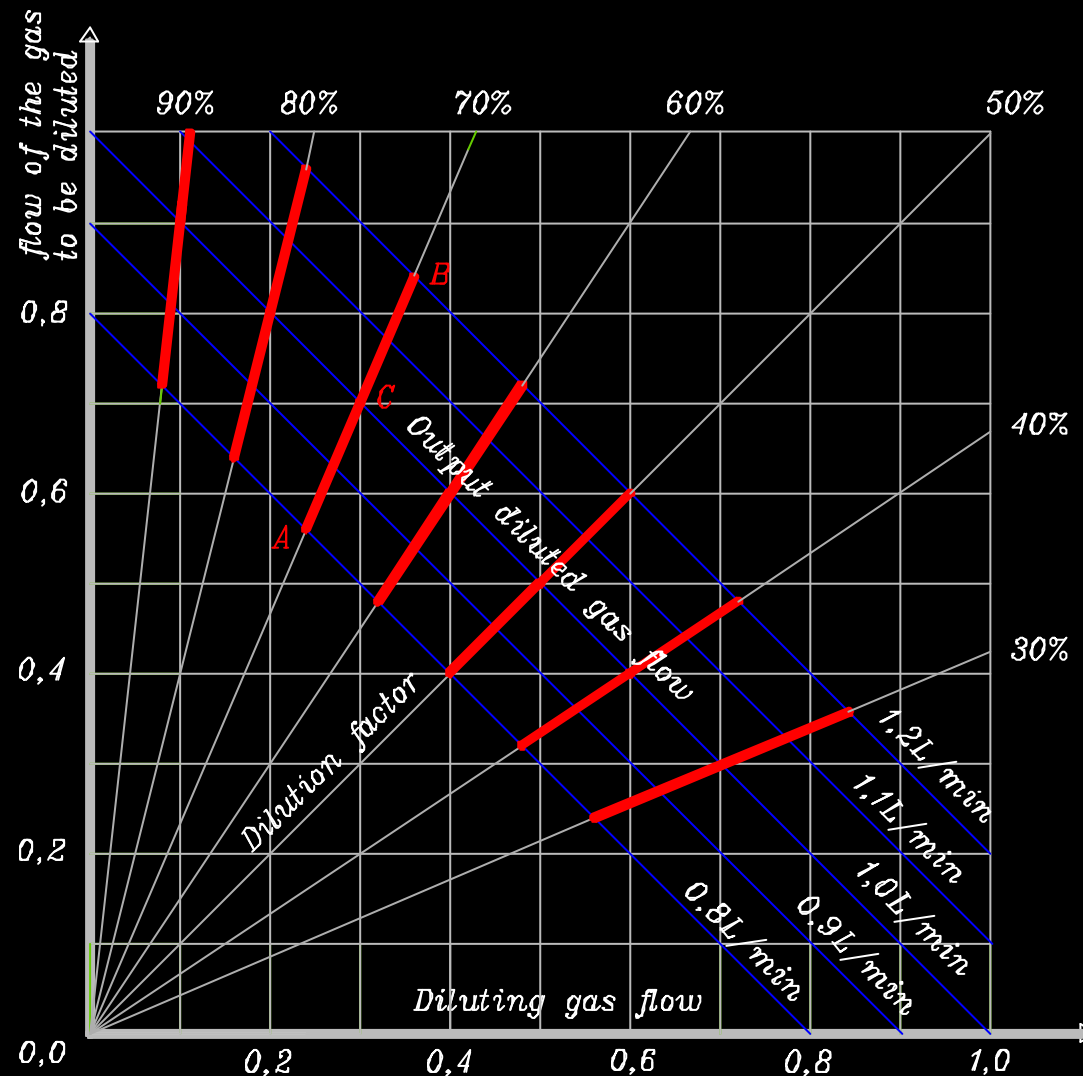
- The uncertainty of a reference mixture got from blending two reference gases is calculated from the concentration uncertainty of one or both the original gases **and dilution process uncertainty**.

Dilution process is a key point for CRMs, but have some particular rule, due to the fact that **his main result is a pure number : the dilution factor**.

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According to ISO6145, the calibration of a dilution device must be made by separate calibration of the two MFCs through comparison against traceable mass flow references.

That's a sufficient condition : is it necessary too ?

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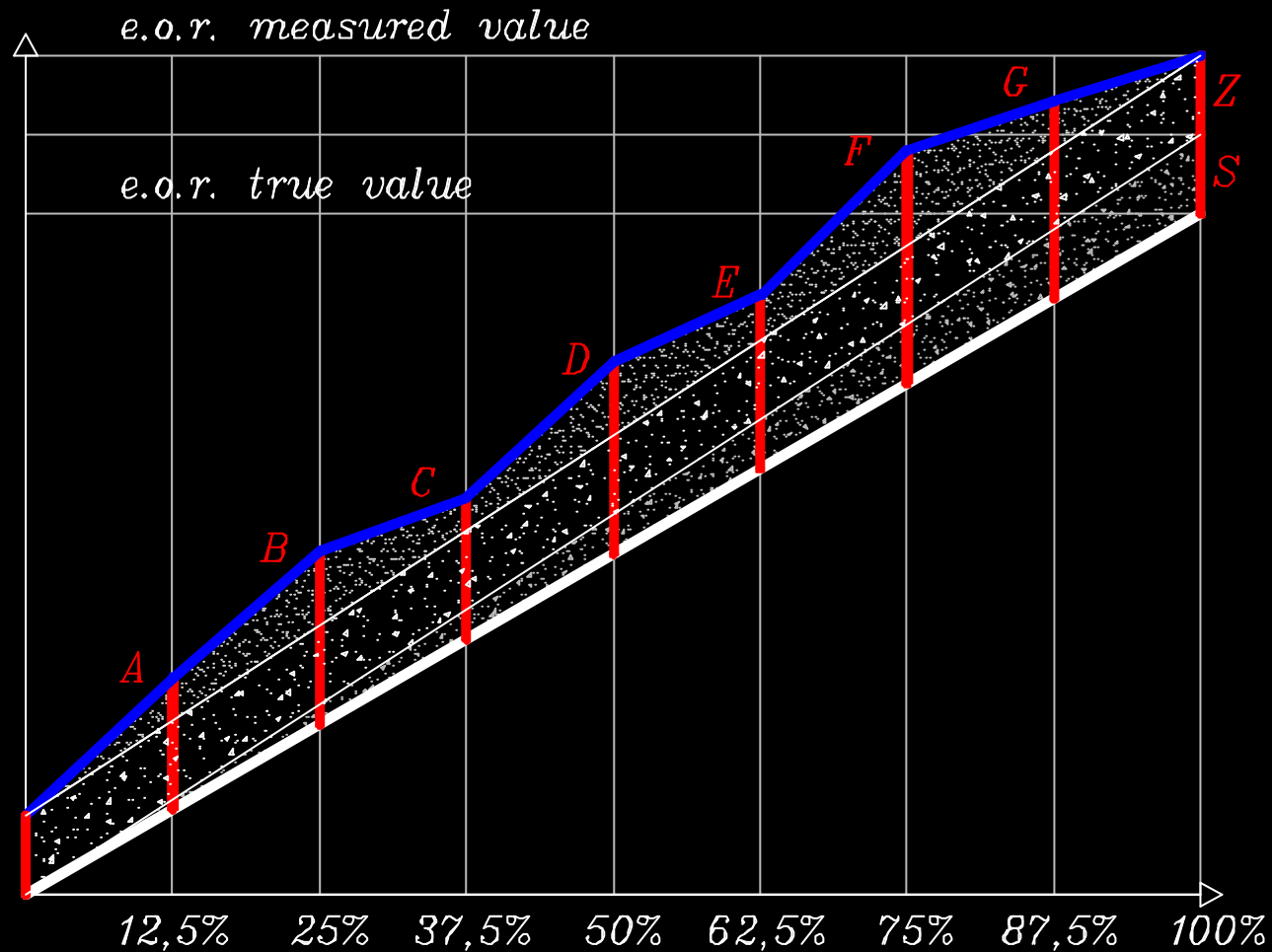
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- We want to present a calibration procedure in which the absolute sensitivity error of the flow controllers is not inspected, but the ratio between the flow controllers sensitivity is accurately controlled. In this way dilution rate is correct. Sensitivities are matched only in the span of each flow controller, but zero and non linearity errors are separately detected and compensated to keep sensitivities matched over all the working range .

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Error composition chart

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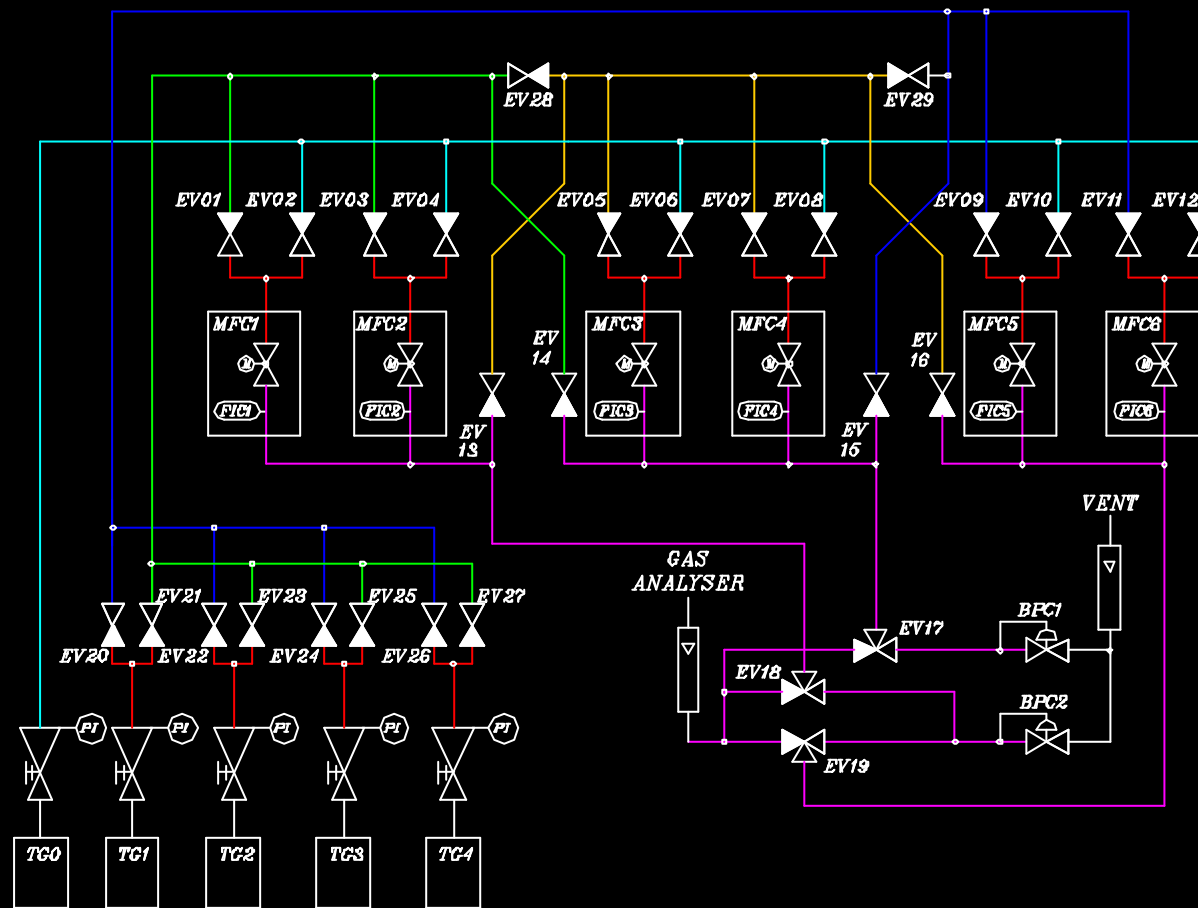
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- Non linearity errors identification requires a special blender construction with **at least three MFCs with the same range**. Three more MFCs with lower range has been added to improve the blender performances with **dilution rates from 1:1 up to 1:512.000**. This is also kept possible thanks to the solenoid valves network allowing whichever MFCs inter-connection.

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The pneumatic circuit

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- The main advantages of this procedure together with this circuit are :
- such a calibration may be repeated in a short time when and where desired with whatever gas and the calibration result is not traceable to...
is it some primary result ?
- The circuit allows for output concentration as low as few ppm diluting pure gases (or few ppb diluting 1000 ppm reference gases)