

## Reliability data for Granville-Phillips Mini-Convectron® Modules

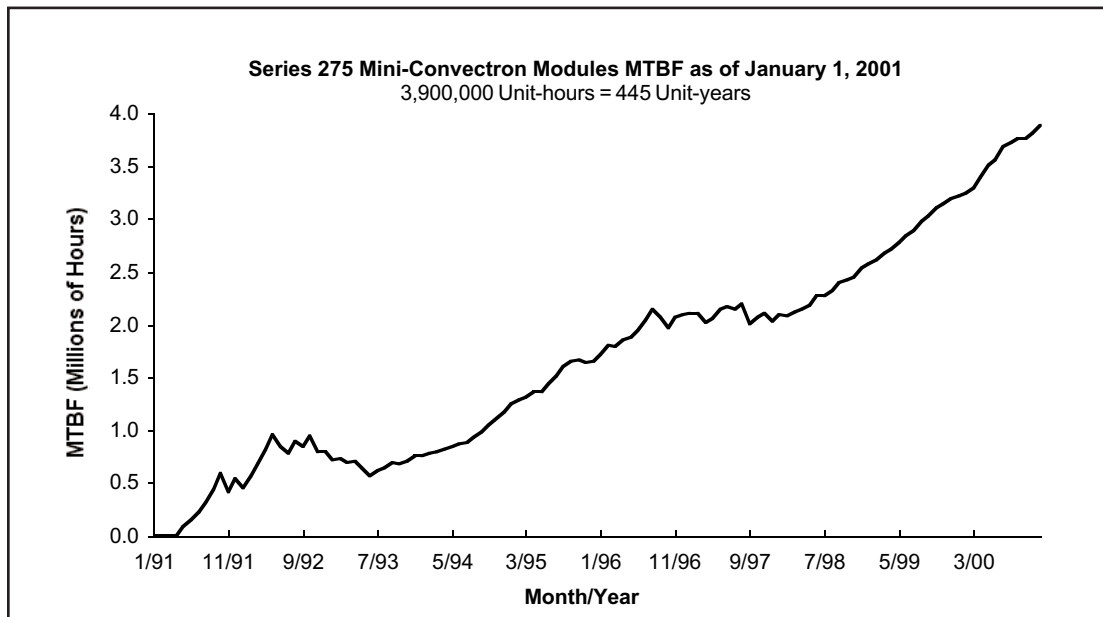
**Introduction:** This report documents the reliability of the Series 275 Mini-Convectron Module as measured by the relationship between the total number of failed units and the total length of time controllers have been in service. These figures should interest anyone concerned about decreasing the costs associated with vacuum system downtime.

### How Mean Time Between Failure is calculated:

The historical mean time between failure (MTBF) is determined by dividing the total number of controller service hours to date by the total number of defective controllers to date. Data is compiled since February 1991. All failures resulting from defects in design, workmanship or materials are counted. Defects that are repaired by the customer in the field are included in the count whenever such repairs are made known to Granville-Phillips. Not included in the failure count are clear cases of product abuse.

### How To Interpret MTBF Data:

The MTBF figure is a statistical calculation based on a large number of units in service. It is not intended to predict the date of the failure of a single unit. The figure is useful in predicting the probable number of units which are likely to fail in a specific length of time, for example, one year. Since there are 8,760 hours per year, dividing the MTBF (hours) by 8,760 will give the number of units one must own to expect a failure rate of one per year. For example, with an MTBF of 3,900,000 unit-hours, expect one failure in 445 units over a period of one year.



The Granville-Phillips Series 275 Mini-Convectron Module can nearly eliminate downtime costs caused by vacuum gauge malfunction. They have operated an average of 3,900,000 unit-hours between failure; one failure in 445 units per year.

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