

(PREVIEW)

*Indian Standard***GUIDE TO THE USE OF  
PIEZOELECTRIC FILTERS****PART I QUARTZ CRYSTAL FILTERS****0. FOREWORD**

**0.1** This Indian Standard ( Part I ) was adopted by the Indian Standards Institution on 26 July 1974, after the draft finalized by the Piezoelectric Crystals for Frequency Control and Selection Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** Electrical filters are widely used in communication, telemetry, navigation and measurement applications. In many cases, the amplification and the filtering are combined as in the case of interstage transformers between active devices, such as tubes or solidstate devices. Recent demands for sharper selectivity, flatter passband characteristics; higher stop band attenuation, higher stability and lower ageing have resulted in increasing use of filters as independent units separated from amplifiers. The advent of integrated circuits has accelerated this trend.

**0.3** The qualities of a filter are mainly governed by the characteristics of the resonant elements used in the filter. Piezoelectric resonators are superior to conventional LC resonant circuits with regard to such characteristics as the quality factor ( $Q$ ), temperature characteristics, ageing rate, size and weight. Hence, a wide variety of piezoelectric filters is now available commercially.

**0.4** There are two main types of piezoelectric filters: one is quartz crystal filter and the other ceramic filter. There are certain similarities as well as dissimilarities between these two types of filters. Two standards have been prepared in response to a generally expressed desire on the part of both the users and the manufacturers for a guide to the use of piezoelectric filters, so that the filter may be used to its best advantage — the first one (this standard) relates to quartz crystal filters and the second relates to ceramic filters [ see IS : 7410 ( Part II ) ]\*.

**0.5** This standard is limited to passive bandpass filters operating over the frequency range from about 10 kHz to 100 MHz which are commercially available as separate and independent units. Filters which are

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\*Guide to the use of piezoelectric filters: Part II Piezoelectric ceramic filters ( *under preparation* ).

## **IS : 7410 (Part I) - 1974**

integrated into a larger system are not covered by this standard. Filters considered in this standard are limited to two-port filters using passive linear elements.

**0.6** It is not the aim of this standard to explain theory, nor to attempt to cover all the eventualities which may arise in practical circumstances. This guide draws attention to some of the more fundamental questions which should be considered by the user before he places an order for a unit for a new application. Such a procedure will be the user's insurance against unsatisfactory performance.

**0.7** While preparing this standard assistance has been derived from the following publications issued by the International Electrotechnical Commission:

IEC Pub 368A 'First supplement to Publication 368 ( 1971 ) Piezo-electric filters'.

IEC Doc: 49( C.O. ) 78 Draft — Check list for crystal filters.

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### **1. SCOPE**

**1.1** *This* standard ( Part I ) deals with the use of piezoelectric quartz crystal filters so that the filters may be used to its best advantage.

**1.2** The scope is limited to passive bandpass filters in the frequency range from about 10 kHz to 100 MHz, which are commercially available as separate and independent units. Filters which are integrated into a larger system are not covered by this standard.

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