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Pressure Terminology

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This paper reports the initial effort of the ASME Subcommittee on High Pressure Technology to improve the terminology and hence communication in the field of high pressure. A survey soliciting suggestions for schemes of pressure designation was conducted among personnel working in the field. The results of this survey are summarized and several proposals are made for clarifying titles and abstracts of papers dealing with pressure.

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In his introductory remarks to the 1964 ASME Symposium on High Pressure, Edward Lloyd pointed out how communication in the rapidly expanding field of high pressure is handicapped by the absence of an established terminology. This paper summarizes the initial efforts of the ASME Subcommittee on High Pressure Technology to alleviate this problem.

Communication difficulties in the field of high-pressure technology appear to center around three sources: 1 Units; 2 misuse of existing terms; and 3 lack of accepted nomenclature. As the bar becomes more generally accepted as the basic pressure unit, the confusion associated with units is gradually diminishing. This improvement in communication stems from its proposal several years ago at a high-pressure symposium at Bolton Landing. The prime example of an often misused term with a well-established meaning is the term hydrostatic. Continued misuse of a term eventually limits its usefulness, and unless the misuse is curtailed, redundant terms such as true hydrostatic soon develop. The lack of accepted nomenclature is evidenced by the exotic descriptive adjectives now in use. Terms such as superpressure, ultra-high-pressure, and extreme-pressure have no established definitions and are meaningless unless accompanied by numerical clarification.

The need for a self-consistent set of expressions to designate pressure ranges has been recognized for some time and was the impetus for these initial efforts to improve pressure terminology.

SURVEY AND RESULTS

The initial effort consisted of a survey of personnel in the high-pressure field and an analysis of the replies from the survey. The survey served the dual purposes of reminding the personnel of the communication difficulties, and soliciting their suggestions for improvement. The survey letter contained two examples of proposed schemes to designate various pressure ranges. One was the Deciboyle system proposed by Baldwin and Tonks (ASME paper 64-WA/PT-19). This system is a decilogarithmic scale, analogous to the decibel system used in acoustics and electronics, and is based on the bar. The other scheme was a naming of various regions as suggested by Roger A. Paquin, as follows:

1 bar to 30 bar.....low pressure
30 bar to 1 kbar.....medium pressure
1 kbar to 30 kbar.....high pressure
30 kbar to 1 megabar.....very high pressure
Over 1 megabar.....ultra high pressure

During the course of the survey we distributed over 300 letters and received 78 replies, representing the opinions of over a hundred workers in the field. The replies were interesting and encouraging, often offering the support to any worthwhile scheme to improve the terminology. Many were quite detailed in making positive suggestions and pointing out pitfalls which must be avoided.

The first conclusion drawn from the survey was a definite rejection of the Deciboyle system. Only three replies endorsed this system, each of these three stated reservations and proposed changes in the system. Thirteen replies made statements rejecting the Deciboyle system. The primary objection to the Deciboyle system was that, although it is based on the bar, it introduces another unit to the multiplicity of units and conversion factors. Also, within the high-pressure field, the logarithmic scale is not particularly needed. The pressures themselves, rather than pressure ratios, are of most importance.

In reference to the naming of various pressure regions as suggested by Paquin, there was a general support for this type of scheme but of the 41 replies endorsing the scheme, 19 pointed out how the limits must be changed to fit their various interests. The objections to Paquin's system were based on the choice of region limits as well as the choice of names for the regions. The objections raised because some types of apparatus would overlap two regions probably would not preclude the general acceptance of a similar scheme; but it is doubtful whether anyone would use terms such as low pressure and medium pressure to describe their particular pressure apparatus.

Various other naming schemes were proposed by the replies. The system most frequently proposed, and probably the easiest to commit to memory, was to base the naming system on the bar and use the prefixes adopted by the National Bureau of Standards in 1959 to describe weights and measures. This would yield expressions such as deckabar, hectobar, kilobar, myriabar, and megabar, to represent 10 bar, 10^2 bar, 10^3 bar, 10^4 bar, and 10^6 bar, respectively.

DISCUSSIONS AND SUGGESTIONS

The various naming schemes proposed thus far have two aspects in common which could lead to