

Introduction

Among the many important parameters that figure into the design and operation of water wells, perhaps none engenders more misunderstanding than does the concept of maximum entrance velocity through water well screen. A commonly accepted design concept, proffered some 60 years ago as a general guideline for well design, is that water wells should be constructed with sufficient open area within the well screen so that during pumping the calculated entrance velocity will not exceed 0.1 feet per second (ft/second). Over the years, this concept has been the subject of model simulations and desktop studies which have shown it to be an ultra-conservative design parameter. While it is readily acknowledged that entrance velocity is an integral component of well design, model studies clearly indicate that the range of acceptable entrance is actually considerably higher than 0.1 ft/second, as will be described in this memorandum. For the well designer, this has important relevance when selecting the type and amount of well screen for a new well.

This memorandum is intended as a primer on entrance velocity for water wells. As such, important considerations are introduced and briefly explained. Well designers, particularly those new to water well design, are encouraged to investigate the various references presented herein for more detailed explanations of this subject. Other related and pertinent technical memoranda on well design have been prepared by Roscoe Moss Company and are available upon request.

Well Screen Open Area

Several types of well screens are available for construction of high-capacity water wells. Among these, the three most commonly installed in production wells for municipal, industrial, and agricultural use are: 1) louvered screens; 2) wire-wrapped screens; and 3) mill-slotted screens. Each of these options offers a range of open area per linear foot, as determined by the number of openings (i.e., slots) per linear foot and their dimensions (i.e., length and width). General information on open area for these screens is presented below.

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