



## INTISARI

Filtrasi diperlukan untuk memperbaiki kualitas air. Media filter yang digunakan sangat beragam, seperti pasir sungai, zeolit, karbon aktif, arang kayu. Pasir pecah dapat digunakan sebagai salah satu alternatif media filter. Pasir pecah merupakan limbah penggilingan batu. Pasir pecah memiliki ukuran butiran 0 – 5 mm. Penelitian menggunakan pasir pecah sebagai media filter. Tujuan penelitian untuk mengetahui sifat dan kemampuan pasir pecah sebagai media filter. Pasir sungai digunakan sebagai pembanding dengan pasir pecah.

Penelitian menggunakan sistem filter pasir cepat. Alat yang digunakan adalah satu set instalasi filter dengan satu buah kolom filter. Kolom filter terbuat dari pipa PVC berdiameter 4 inchi dan tinggi 80 cm. Media filter yang digunakan diayak dan disusun 5 lapisan. Ukuran media yang digunakan pada setiap lapisan yaitu 0,425 mm – 0,600 mm, 0,600 mm – 0,850 mm, 0,850 mm – 1,00 mm, 1,00 mm – 1,4 mm, dan 1,4 mm – 2,00 mm. Ukuran butiran paling besar berada di lapisan paling bawah. Penelitian dirancang sebanyak 12 percobaan, dengan 3 variasi debit outlet yaitu 20 liter/jam ( laju filtrasi 2466 liter/m<sup>2</sup>/jam), 30 liter/jam (laju filtrasi 3700 liter/m<sup>2</sup>/jam), 40 liter/jam (laju filtrasi 4933 liter/m<sup>2</sup>/jam), 2 variasi kekeruhan inlet yaitu kekeruhan rendah (0 - 50 NTU), kekeruhan tinggi (50 – 100 NTU), serta 2 variasi media filter yaitu pasir pecah dan pasir sungai.

Berdasarkan hasil percobaan, pasir pecah memiliki porositas rerata lebih tinggi (50,484 %) dibandingkan pasir sungai (38,356 %). Pada debit outlet 20 liter/jam, kekeruhan inlet 0 – 50 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (80,36 %) dibandingkan pasir sungai (64,52 %). Pada debit outlet 30 liter/jam, kekeruhan inlet 0 – 50 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (79,50 %) dibandingkan pasir sungai (64,23 %). Pada debit outlet 40 liter/jam, kekeruhan inlet 0 – 50 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (71,49 %) dibandingkan pasir sungai (59,71 %). Pada debit outlet 20 liter/jam, kekeruhan inlet 50 – 100 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (81,98 %) dibandingkan pasir sungai (74,52 %). Pada debit outlet 30 liter/jam, kekeruhan inlet 50 – 100 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (78,65 %) dibandingkan pasir sungai (65,41 %). Pada debit outlet 40 liter/jam, kekeruhan inlet 50 – 100 NTU, pasir pecah memiliki efisiensi filter lebih tinggi (74,57 %) dibandingkan pasir sungai (62,61 %). Pasir sungai lebih efektif sebagai media filter karena lebih lama jenuh, dibandingkan pasir pecah. Pasir pecah mempunyai efisiensi filter yang baik jika digunakan sebagai media filter. Pasir pecah dapat digunakan sebagai salah satu media filter untuk menyaring air.

**Kata kunci** : debit, kekeruhan, efektifitas, efisiensi, pasir sungai.



## ABSTRACT

Filtration is needed to improve the quality of water. Filter medias used are very diverse, such as river sand, zeolite, activated carbon, and charcoal. Split sand can be used as an alternative of filter media. Split sand is a waste of grinding stone. Split sand have a grain size of 0 – 5 mm. This study used split sand as a filter media. This study aims to determine the nature and capability of split sand as a filter media. River sand is used as a comparison with split sand.

This study using rapid sand filter system. Tools that used are a set of filter installation with a single column filter. Column filter made of PVC pipe with 4 inches in diameter and 80 cm in high. Filter medias used sifted and collated 5 layers. The size of the media used in each layer is 0.425 mm - 0.600 mm, 0.600 mm - 0.850 mm, 0.850 mm - 1.00 mm, 1.00 mm - 1.4 mm, and 1.4 mm - 2.00 mm. Most large grain size is in the bottom layer. The study was designed as much as 12 trials, with 3 variations of the discharge outlet is 20 liters / hour (filtration rate of 2466 liters / m<sup>2</sup> / h), 30 liters / hour (filtration rate of 3700 liters / m<sup>2</sup> / h), 40 liters / hour (filtration rate 4933 liters / m<sup>2</sup> / h), 2 variations of inlet turbidity is low turbidity (0 - 50 NTU), high turbidity (50 - 100 NTU), as well as 2 variations of the filter media is split sand and river sand.

Based on the experimental results, split sand has an average porosity higher (50.484%) than the river sand (38.356%). At the discharge outlet 20 liters / hour, turbidity inlet 0-50 NTU, split sand has a higher filter efficiency (80.36%) than the river sand (64.52%). At the discharge outlet 30 liters / hour, turbidity inlet 0-50 NTU, split sand has a higher filter efficiency (79.50%) than the river sand (64.23%). At the discharge outlet 40 liters / hour, turbidity inlet 0-50 NTU, split sand has a higher filter efficiency (71.49%) than the river sand (59.71%). At the discharge outlet 20 liters / hour, turbidity inlet 50-100 NTU, split sand has a higher filter efficiency (81.98%) than the river sand (74.52%). At the discharge outlet 30 liters / hour, turbidity inlet 50-100 NTU, split sand has a higher filter efficiency (78.65%) than the river sand (65.41%). At the discharge outlet 40 liters / hour, turbidity inlet 50-100 NTU, split sand has a higher filter efficiency (74.57%) than the river sand (62.61%). River sand is more effective as a filter media because longer saturated, compared to split sand. Split sand have a good filter efficiency when used as a filter media. Split sand can be used as one of the filter media to filter the water.

**Keywords** : discharge, turbidity, effectiveness, efficiency, river sand.