

## INTISARI

Dirancangnya alat ini diharapkan membantu proses pengisian dan pemindahan larutan yang memerlukan ketelitian dan mengurangi resiko akibat tumpahnya larutan. Dalam kegiatan di laboratorium proses pengisian larutan masih banyak dilakukan secara manual. Pengisian secara manual biasanya kurang akurat, bila tumpah bisa jadi membahayakan. Diperlukan alat pengisian larutan secara otomatis agar teliti dan aman.

Spesifikasi konveyor dengan jenis beban satuan (*unit load*) dan arah pemindahan beban pengangkutannya secara horizontal. Material pada kerangka menggunakan besi siku dengan tebal 3 mm, untuk kerangka proses pengisian menggunakan akrilik (*PMMA Plastic*) dengan ketebalan 5 mm. Tahapan perancangan terdiri : studi literatur, menentukan kapasitas konveyor, menghitung daya konsumsi, menentukan tegangan efektif belt, menentukan sisi kancang dan sisi kendur drive, menentukan umur nominal bantalan, menghitung daya motor, membuat desain, dan Analisis kekuatan struktur atau *stressanalysis* menggunakan *Autodesk Inventor 2016*, dan membuat program untuk menjalankan konveyor menggunakan arduino.

Hasil dari perancangan konveyor pengisi bejana untuk penelitian di laboratorium memiliki dimensi dengan panjang 100 cm, lebar 30 cm, tinggi 40 cm. kapasitas konveyor 31,67 liter/jam. Daya konsumsi yang dibutuhkan sebesar 1,39 Watt. reduksi motor listrik menggunakan *gear box* NRV 050. Hasil *stressanalysis* menggunakan *Autodesk Inventor 2016* didapatkan hasil tegangan maksimum 0,0288 ksi, Displacemen maksimum 90,35 in dan faktor keamanan minimum 15 ul disimpulkan konstruksi layak dan aman bebanaan maksimal diasumsikan 5 kg.

Kata kunci : *unit load*, *PMMA Plastic*, konveyor, *Autodesk Inventor 2016*.

## **Abstract**

*The design of this tool is expected to help the process of filling and transferring solutions that require accuracy and reduce the risk of solution spills. In activities in the laboratory process of filling the solution is still mostly done manually. Manual filling is usually less accurate, if it spills over it can be dangerous. Automatic solution is needed to fill the solution to be thorough and safe. Conveyor specifications with the type of unit load and the direction of moving the load transporting horizontally. Material on the framework uses 3 mm thick iron, for the filling process using acrylic (PMMA Plastic) with a thickness of 5 mm. The design stages consist of: studying the literature, determining conveyor capacity, calculating power consumption, determining the effective stress of the belt, determining the tight side and the slack side of the drive, determining the nominal life of the bearing, calculating motor power, making the design, and analyzing the structural strength or stress analysis using Autodesk Inventor 2016, and create a program to run conveyors using Arduino. The results of the design of vessel filler conveyors for laboratory studies have dimensions of 100 cm long, 30 cm wide, 40 cm high. conveyor capacity of 31.67 liters / hour. The power consumption needed is 1.39 Watt. reduction of electric motors using the gear box NRV 050. The results of stress analysis using Autodesk Inventor 2016 results in a maximum voltage of 0.0288 ksi, a maximum displacement of 90.35 in and a minimum safety factor of 15 ul concluded that construction is feasible and safe maximum load is assumed to be 5 kg.*

*Keywords: unit load, PMMA Plastic, conveyors, Autodesk Inventor 2016.*