### Design of Mobile Raw Milk Chilling Unit for Rural Area

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**Keywords:** Dairy Co-operative Societies, Raw Milk, Rural Area, Chilling Unit

**Abstract:**

Freshly collected raw milk at village co-operative societies is transported to chilling unit. The routes for transportation are recognized by the milk federation. In chilling unit, milk collected from many such routes are chilled and then transported to secondary processing unit once in a day. To maintain the quality, the milk has to be chilled at village co-operative society level which does not happen as the quantity of milk collected is low (40 – 200 liter) and hence bulk milk chillers are not suitable. Current transport method is not hygienic and also loading and unloading methods are without ergonomic consideration. This project was envisaged for developing transport refrigeration with layout, storage facility for milk can and handling equipments, which can reduce the effort and time required to load and unload milk cans.

Information regarding the present method of milk collection, primary chilling, transportation method of raw milk and documentation process done at Dairy Co-operative Societies were gathered by surveying the collection centers. Requirements to preserve the quality of the milk, duration of collection and transport data were collected. Data regarding the current trends of transport refrigeration were collected. Heat loads were calculated as per the requirements. Based on collected data, Quality Function Deployment (QFD) and Product Design Specifications (PDS) were generated. The concepts of the vehicle were sketched and 2D layout was designed using AUTOCAD software. The final concept was selected and 3D model was generated using ALIAS and CATIA geometric modeling software. Mock up model was built using final modeled concept.

Heat loads obtained from calculations for route - 1 and route -2 were 11125W and 9974W respectively. Weight calculations, cost estimation for the project and chilling cost were carried out. After chilling total price per liter of milk obtained was 28.70 INR.

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**Images:**

- Final concept of vehicle
- Concept design of exterior and interior of vehicle
- Rendered images of interior design of vehicle
- Mock-Up model of the vehicle