DESIGN OF SYSTEMS LAB [ELP305]

Cloth Cleaning Machine Requirements Document

(Draft Version 1.0)

Submission by Tribe - E

January 11, 2024

Contents

1 Tribe Members Information

Name	Entry Number	Additional Role	IF
Samarth Singla	2021MT60942	Tribe Coordinator	1
Tarun Gupta	2021EE30482	Associate Tribe Coordinator	1
Akshat Chaudhary	2021MT60814	Activity Coordinator	1
Ronak Kalvani	2021MT60952	Member	1
Shailesh Saini	2021MT10925	Member	1
Abhirashi Singh	2021EE10646	Member	1
Himanshi Barsker	2021MT10929	Member	1
Aditya Raj	2021MT10262	Member	1
Surya Pratap Singh	2021MT10248	Member	1
Riju Bindua	2021MT10903	Member	1
Komal Gumma	2021EE10677	Member	1
Rashmi	2021MT10934	Member	1
Madhav Manish Gulati	2021EE10139	Activity Coordinator (Electrical)	1
Nihar Patel	2021MT10890	Member	1
Jamith Kaur	2021MT60951	Member	1
Saket Kandoi	2021MT60265	Member	1
Yash Sajjansingh Chavan	2021MT60966	Member	1
Aniruddha Chatterjee	2021MT10896	Member	1
Ananmay Gupta	2021MT10894	Member	1
Abhishek Kumar	2021MT60957	Member	1
M Bhavya	2021EE10648	Member	1
Satwik Kumar	2021MT10740	Member	1
Ankit Mukherjee	2021EE30209	Member	1
Shashank Mahawar	2021EE11108	Member	1
Hardik Varshney	2021EE10383	Activity Coordinator	1

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Name	Entry Number	Additional Role	IF
Saumya Srivastava	2021EE10644	Member	1
Siddharth Gupta	2021EE10627	Member	1
Shreyash Bhilwade	2021EE30178	Member	1
Sumit Sharma	2021MT10264	Member	1
Shreyansh Jain	2021EE10661	Member	1
Deependra Patel	2021EE30278	Member	1
Abhinav Kumar	2021MT10251	Member	1
Kumar Arjun	2021MT10232	Member	1
Jishnu Singh	2021EE10624	Member	1
Shresth Ojha	2021EE30969	Member	1
Shivam Jhanwar	2021EE10625	Member	1
Adnaan Mansoor	2021EE10666	Member	1
Bhaira Ram Gat	2021EE30726	Member	1
Nandini Choudhary	2021EE30716	Activity Coordinator	1
Shouryan Singh	2021MT60943	Member	1
Kartik Kumar Bansiwal	2021EE30743	Member	1
Gouri Nanda T R	2021MT60960	Member	1
Siddhant Raj	2021MT10932	Member	1
Shreysh Verma	2021EE30742	Member	1
Kashish Kumawat	2021EE30739	Member	1
Anjali Pande	2021EE30737	Member	1
Aaradhya Singh	2021EE30736	Member	1
Ishav Singla	2021MT10889	Member	1
Gajendra Meena	2021EE30750	Member	1
Yogendra Kumar	2021EE10170	Member	1
Vishal Gupta	2021MT60955	Member	1
Srijan Singh	2021EE10675	Member	1
Nandini Singh	2021EE30747	Member	1

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Name	Entry Number	Additional Role	IF
Himanshu Bilkhiwal	2021EE30728	Member	1
Harshit Gupta	2021EE30722	Member	1
Amitesh Gupta	2021EE30724	Member	1
Nishant Yadav	2021MT10911	Member	1
Aman Yadav	2021EE30734	Member	1
Tarush Rajawat	2021EE30708	Member	1

Table 1: Team Members Information

2 Requirements

2.1 Problem Statement

"To design a cloth cleaning machine to wash dry uncolored cotton cloth post-manufacturing"-This needs to be bulky

2.2 Input Requirements

2.2.1 Cloth Details

- The cloth being cleaned is just-manufactured, uncolored cotton cloth, for general usage. The thickness is 1-ply, with a thread count of 400, and of denier 60 opaqueness.
- The dimensions of the cloth to be cleaned is of maximum 10m length and 2m width.
- The cloth has mostly oil-based stains to begin with, naturally imbued during the manufacturing process.

2.2.2 Other inputs

- The machine works with pressured water available at an ambient temperature from an overhead tank of capacity 50l on-site.
- The machine works with water of $80mg/l$ $CaCO_3$ equivalent hardness.
- Expendable materials like Detergents, soaps,etc are to be treated as a running cost, and paid for by the client after installation.

2.2.3 Mode of Input

- The machine cleans in batches of 11 Kg dry weight per batch
- Only a single program for general washing is required

2.3 Output Requirements

- The machine is required to both wash and dry the cloth.
- The machine is required to have the capability to sequentially process multiple batches prepared beforehand by the client.

2.4 Power Requirements

- The machine must be compatible with 220V AC 1-Φ (desirable) and 44V AC 3-Φ Power drawing a maximum current of 15A.
- The machine must be able to be connected to plug points upto 20m away.

2.5 Logistical Requirements

2.6 Environmental Requirements

- The machine must use as low an amount of resources(water, electricity) as possible, and comply with CPCB Regulations.

2.7 Site-Demanded Requirements

- The machine is designed to be used at Semi-industrial sites.
- The machine must produce a maximum noise intensity of 70dB.
- It is desirable but not essential that The machine be dis-assembleable and re-installable on request.

2.8 Structural Requirements

- The machine must be of maximum dimensions 25mx40mx60m, designed to be installed in an industrial-size shed.

2.9 Time Requirements

2.9.1 Design Time Requirements

- The maximum time to wash a batch must be under 45 minutes.

2.9.2 Time to Market Requirements

2.9.3 Life Time Requirements

2.9.4 End of Life Requirements

2.10 Miscellaneous Requirements