

Assignment 1

by Iwan CostelloDowns

Submission date: 09-Jan-2023 11:30PM (UTC+0000)

Submission ID: 194266459

File name: 12714_Iwan_CostelloDowns_Assignment_1_180854_1269351270.docx (3.7M)

Word count: 13919

Character count: 77144

Course: BSc (Hons) Electrical and Electronic Engineering

Module: SGEL6000 Independent Project

Assignment: Project Definition, Research and Quality Planning

Name: Iwan Costello-Downs

University number: 1809800

Date submitted: 09/01/2023

Word count: 3600

Has this page been left intentionally blank?

Table of Contents

1. Executive Summary.....	4
2. Introduction	5
3. Project Background, Problem Definition & Project Constraints	6
3.1. Background:	6
3.2. Problem Definition:.....	6
3.3. Constraints:.....	7
3.3.1 Ethical Engineering.....	7
3.3.2. Sustainability	8
3.3.3. Legal/Commercial	10
4. Function Design Specification and Test Plan	<i>needs updating</i> Error! Bookmark not defined.
5. Literature Review and Choice of Solution.....	1
6. Project Planning, Work Breakdown Structure and Management Techniques	2
7. Conclusion and Recommendations	3
8. Appendix	6

1. Executive Summary

This report outlines why an industrial project is required for a specific solution, within this report the problem, defined as an upgrade to an existing dust extraction system that requires augmentations to improve energy performance and an ease of use modification for more intuitive operator control. This problem is firstly explained in terms of necessity in regards to the proposal, then in greater detail how the project will effect the system in regards to sustainability and commercial availability. As well as ll? the health and safety and environmental concerns to consider.

The projects test parameters were outlined in the test plan via the function design specification, creating a metric by which we can judge the solution to in relation to the specification. The projects deliverable goals were also outlined in a structured format to elucidate how the project will be managed in regard to time constraints and to ensure the solution is delivered on time and is feasible within that time frame. Finally, alternatives to the design were reviewed and evaluated, and a final cost breakdown could be achieved. Having completed these constituent parts, the document fully outlines the steps required to begin implementing the project.

A basic summary covering some aspects of the project

2. Introduction

The objective of this report is to outline why the project to be undertaken is necessary as well as to outline all the planning and procedures that must be put in place. This report will outline the full scope of the project which will be used in reflection after the completion of the second report and the testing phase to ascertain the success of the project in relation to the outlined specification.

3. Project Background, Problem Definition & Project Constraints

3.1. Background: *A photo or layout diagram of the machine would have been useful here.*

The project to be carried out will be implemented in a tissue paper manufacturing company and involves an upgrade to an existing dust extraction system. The antiquated star-delta starters for the vacuum units are to be replaced with an inverter-controlled panel. Furthermore, the existing control method is to be updated to be automated, rather than manually controlled via operator panels, to improve plant efficiency. The project is being undertaken as the existing control system is inefficient and not user friendly. The proposed new method should be more conducive to energy saving which is something that the company is proactive about.

The finished product comes from a specific converting line, also known as a converting plant. Here, the paper is printed, glued, embossed, punched, and wound onto cardboard cores in order to obtain a log, which is then cut to the required length. These converting lines have native dust extraction units that remove dust particulate from the product, having both running and ambient modes, “running” *redundant word* applies to the product in production and ambient for when the machine is on stop to remove dust and allow the operator to clean out the machine. These two modes decide which vacuum chambers are to be open, as some need to be shut when the machine is running to prevent a paper break.

3.2. Problem Definition: *A clearly defined problem definition*

Operators will often leave the dust extraction on after a shift when the machine is not running, or after it has been activated to clean the line during downtime. The premise of the project is such that the new system will automatically switch to running mode when the line is running and switch to ambient mode when the line stops for a set time. A cleaning function is needed to turn on the ambient system for a set duration to allow operators to clean the machine without having to manually set the system on and off. As the new system is run by an inverter drive, this project will serve as a prototype and, if proved successful, will be implemented across all the industrial converting lines. This project is specifically being undertaken as part of the group policy of continuous energy improvements in keeping with the ISO Standard 50001 (ISO, 2022) and ISO Standard 14001:2015 (ISO, 2022) to fulfil

governmental legislation and regulatory standards in regard to environmental energy consumption and management covered later in this report.

3.3. Constraints:

3.3.1 Ethical Engineering

Following the tenets of ethical engineering the proposed solution must be implemented to the highest standard possible in terms of technical performance and conforms with all workplace regulatory demands to be fit for purpose. All aspects of the project will be fully accounted for in terms of, responsibility of tasks, allocation of finances and adherence to regulation regarding working standards and principles as well as environmental regulations and concerns.

To conform with inclusive engineering standards to ensure the solution is accessible to as many demographics of possible, it is vital to focus on a human centred design before jumping to the solution. By adopting an inclusive mindset, a solution can be devised such that it is accessible to all sectors of society, regardless of sex, age, race or ability.

The (UK) Equality Act 2010 protects people in 9 distinct 'protected' categories from discrimination: age; gender reassignment; being married or in a civil partnership; being pregnant or on maternity leave; disability; race including colour, nationality, ethnic or national origin; religion or belief; sex; sexual orientation. (Legislation.Gov.Uk, 2010)

Beyond this, the Public Sector Equality Duty (PSED), requires those working in the public sector or on services or solutions which are used by the public, to ensure that their work serves to eliminate discrimination, advance equality of opportunity, and fosters good relations between different people when carrying out their activities. (Gov.UK, 2022)

Through this legislation the law is very clear in stating the need for engineers and technologists to produce products, services and solutions that do not discriminate against people with protected characteristics, but in reality there are many other personal characteristics that need to be considered when designing solutions – such as body size, neurodiversity, socio-economic status, even right or left handedness, and it is essential to take these into account to ensure that accessible, risk reduced and appropriate designs are provided for all. The use of Equality Impact Assessments will ensure that the perspectives of different groups of people are considered and tested against the possible solution. (Dawn Bonfield, 2020)

Brief asks for fully justified text

3.3.2. Sustainability

The proposed solution must consider the wider societal, user, business and customer needs as appropriate as well as a consideration of the environmental, societal, and economic codes of practice. To this end the project solution to be implemented covers the grounds of environmental concerns as it will be executed to achieve certain standards and regulations and to fulfil the companies duty to show continuous energy saving improvements. As per The Energy Savings Opportunity Scheme Regulations 2014 as amended 2015, these collective regulations enforce Article 8(4), (5) and (6) of EC Directive 2012/27/EU on energy efficiency and are effective legislature as of July 2014. These regulations outline that organisations of a sizeable revenue or employee headcount (with specific exceptions) must participate in energy consumption audits in certain compliance periods. The regulations state that companies are categorised as “Large Undertakings” if they employ at least 250 people or employ less than 250 people with a potential turnover of excess of 50 million euros with an accompanying balance sheet in excess of 43 million Euros. These statistics apply to accounts for the financial year ending either on the qualifications date of 31 December 2014 or in the 12 months immediately preceding the qualification date of 31 December 2014. The company falls under a large undertaking category and therefore must take part in the Phase 3 implementation of December 2023. (Gov.UK, 2022)

As a participant of the scheme, the company must audit its energy consumption within certain compliance periods, the first ending on 5th December 2015 with the subsequent 4-year compliance period ending on 5th December 2019 etc. As a participant, the company must monitor its energy efficiency and recommend feasible and practical ways to enact energy saving efforts. The audits are carried out by personnel who meet the competency requirements enforced by a professional administrative body with the requirements outlined in a publicly available specification. The company must also notify the Environment Agency of their continuing compliance with scheme by providing documented evidence of such efforts. To enable such efforts, the company has adopted to become ISO 50001 certified to demonstrate compliance with the regulation, this certification provides a management system and model for continual improvement via outlining a policy for efficient energy use, fixing targets and objects for companies to meet, and using the measured results to review the policy. (ISO, 2022)

Furthermore, the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018 enforce the Streamlined Energy and Carbon Reporting (SECR) that came into effect on the 1st of April 2019 after the passing of this regulation. Businesses that fall under the scope of this regulation must, starting on the financial year 1st of April, to disclose their energy and carbon emissions. SECR extends the reporting requirements for quoted companies and mandates new annual disclosures for large unquoted and limited liability partnerships (LLPs), on top of existing requirements such as mandatory greenhouse gas (GHG) reporting for quoted companies. This provided framework is intended to incentivise energy saving efforts and improving general plant productivity via reducing emissions. (Gov.UK, 2022)

SECR applies to the company, already holding relevant permits under GHG, the aforementioned ISO certification 50001 has been adopted by the company as well as ISO 14001:2015 certification which is intended for use by an organization seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability to this end it allows an organization achieve the intended outcomes of its environmental management system, which provide value for the environment, the organization itself and interested parties. Consistent with the organization's environmental policy, the intended outcomes of an environmental management system include enhancement of environmental performance, fulfilment of compliance obligations with the aim to achieve said environmental objectives. (ISO, 2022)

The solution itself will be designed to be as sustainable as possible, as it is an upgrade to a now antiquated system, the parts used will be to current operating and efficiency standards to optimise for power efficiency and reduce hardware failure, reducing longevity costs and reducing waste. The old system will be removed, and the waste ethically disposed of, as the new system is an industrial prototype, the future proofing of this design will be tested over an extended period of time to monitor the efficiency of the system before being implemented on other lines (this will be analysed in respect to the function design specification in the 2nd report), this minimises potential financial loss of investment and wasted equipment if the system is not proved viable. The new system will still produce the same dust particle waste present in the factory, this is reused within the paper making process making the entire process waste free.

3.3.3. Legal/Commercial

Being an industry-based project, the solution must conform to industry and commercial standards both in regard to the health and safety involved in the implementation and commercial concerns in regards to intellectual property and copyright infringement. An appropriate risk assessment has been drafted by the contractor company Toscana Impianti and reviewed ready for the implementation phase; this can be seen in Appendix 1. A site-based risk assessment and induction will be carried out after contractors are on site by the Health and Safety department. All relevant regulations under the Health and Safety Act of 1974 must be adhered to, this includes The Electricity at Work Act. (Legislation.Gov, 2022)

Ensuring that the legal requirements are covered there are also other commercial *constraints* to cover. Such as the ability of the of the contracted company to supply and build the panel without encountering a supply issue with components. There are also wider societal impacts that could interfere with the implementation, such as the impact of Covid-19 and global geopolitical and socio-economic concerns to consider. The newly designed panel is to be created in Tuscany, Italy therefore must conform to European CE marking to demonstrate that the supplied product conforms with the EU health and safety and environmental requirements. (Your Europe, 2022) To ameliorate and mitigate any issues the project may face, a risk register has been drafted and can be seen below. This register facilitates a system in which any issues that could interfere can be identified and remedied with appropriate action.

Risk Description	Likelihood of the risk occurring <i>Rated from 1- 5.</i>	Impact if the risk occurs <i>Rated from 1- 5.</i>	Severity <i>Rating based on impact & likelihood.</i>	Owner <i>Person who will manage the risk.</i>	Mitigating action <i>Actions to mitigate the risk e.g. reduce the likelihood.</i>	Contingent action <i>Action to be taken if the risk happens.</i>	Progress on actions
Project purpose and need is not well-defined.	1	2	Low Severity	Project Manager	Project is clearly defined in the proposal.	Consult proposal and FDS to refocus project scope.	None required thus far
Project schedule is not clearly defined or understood	1	2	Low Severity	Project Manager	Gantt chart has been made to monitor progress.	Consult Gantt Chart and WBS.	None required thus far
No control over staff priorities	2	3	Medium Severity	Project Manager	WBS and Gantt Chart allocate the work in sections.	Hold a meeting with the automation engineer and contractors.	None required thus far
Contractor delays	2	4	High Severity	Toscana Impianti	The panel will arrive before the contractors, it can be installed by company technicians if necessary.	The panel can be shipped separately and installed by myself and other technicians.	None required thus far
Estimating and/or scheduling errors of acquiring components	2	5	High Severity	Project Manager/Toscana Impianti	Software already acquired and the panel is built ready to be shipped.	No feasible contingent action can be taken if the panel does not arrive.	None required thus far

Lack of communication, causing lack of clarity and confusion.	2	4	High Severity	Project Manager/Toscana Impianti	The project has been discussed internally and externally to the contractors.	Hold a meeting with the automation engineer and contractors.	None required thus far
Pressure to arbitrarily reduce task durations and or run tasks in parallel which would increase risk of errors.	3	2	Medium Severity	Project Manager/Toscana Impianti	Task scheduling has been outlined in the Gantt chart.	Hold a meeting with the automation engineer and contractors.	None required thus far

Risk Register for Dust Extraction Line Upgrade - Project Manager: Iwan Costello-Downs

4. Function Design Specification and Test Plan

To measure the performance of the solution after the implementation phase a test criteria table can be drafted, using this table and a factory acceptance test (FAT) can be used to review the solutions performance in relation to the specification.

Reference	Criteria
1.1	The new solution must use a VFD drive to replace the star-delta starter.
1.2	The new solution must be monitored for energy saving feedback to review its performance.
1.3	The original control panel for start/stopping the extraction motor must be removed. <i>no need to include this</i>
1.4	The start/stopping of the motor must be controlled via an I/O module under the line operator panel.
1.5	The dust extraction running mode should still engage at 200mt/m when the machine is running <i>good because this can be measured</i> therefore the remaining wiring and code should still allow this after the modification.
1.6	The HMI must display when the motor is running.
1.7	The cleaning function must be engaged by keeping the extraction running 1 minute after the machine stops.
1.8	The cleaning function must be displayed on the HMI and last for 15 minutes after activation.

1.7 and 1.8 are very similar functions but have very different values

Using the above criteria table, a testing performance table can be seen below as an example of how the solution will be tested.

these last 2 columns cannot be filled in until the project is complete

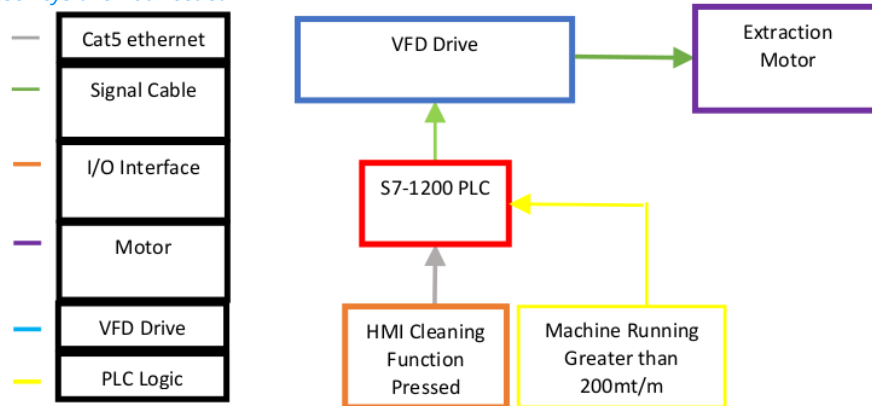
Reference	Description of test	Expected result	Actual result	Pass/fail
1.2	Energy readings taken pre and post installation.	Energy consumption will be less.	Energy consumption is less than previous solution.	Pass
1.5	Run the machine at over 200mt/m.	Extraction motor should start.	Extraction motor starts.	Pass

Using this list of features and the additional table the solution can be analysed in the second report in relation to the proposal.

You should have used a method of justifying your choice of solution

5. Literature Review and Choice of Solution

most of these keys are not needed



These 2 lower blocks are like a flow chart, they should represent hardware

Figure number?

Figure ?

The above block diagram outlines the basic operation of the proposed solution. The company designing the panel have consulted us on the motor specifications to ascertain the most suitable drive. The remaining design will be done by Toscana Impianti and the accompanying drawings can be viewed in Appendix 2. This section details a breakdown of three of the several units that were investigated and suggested by Toscana Impianti as the most optimal device for this application. The specifications of the motor are 3 phase supply at 55kw with a line voltage of 240V, using this criterion a drive can be selected.

The HD1-200A-23 inverter by IMO is a feasible choice. Being rated at 55kw with a 3-phase supply rating of 200V-240V, the data sheet for this drive can be found in Appendix 3. The unit itself is IP20 rated which is okay for the environment it is being installed, furthermore it includes a three-phase filter internally. (LED Controls, 2022) The current market price for this unit is £3391.96.

Another unit suitable would be the ATV650D55N4 from Schneider. This drive has the required kilowatt rating at 55kw as well as a suitable supply voltage range with a IP21 rating. (Marshall E. Campbell, 2022) The retail value of this unit is £3609.83. The relevant datasheet can be viewed in Appendix 4.

The final suitable unit is the Vacon 100 Flow Drive by Danfos. Retailing at £5838.85 the unit meets the specification parameters and allows for open loop vector control which is redundant for this type of application as the motor used is not accurate enough to take advantage of this. The datasheet can be inspected in Appendix 5. (InterAutomatika, 2022)

During a consultation with the contractors it was decided that the IMO HD1 – 200A – 23 was the optimal choice as it had the smallest lead time and was readily available for the implementation phase. It is also cheaper and easily sourced than the other alternatives, as it is manufactured in the same country as the contractor design company.

datasheets should not be included in the report, cite the source instead

The brief asks for 1.5 lines spacing with fully justified text

page numbers have disappeared

6. Project Planning, Work Breakdown Structure and Management Techniques

The technical details of the solution have been outlined; therefore, a full pricing of the project can now take place, this costing spreadsheet can be found in Appendix 6.

To achieve a successful execution of the implementation phase a structured management and monitoring system must be drafted. To this end, several of the projects major milestones can be divided up into a Gantt Chart to track progress and a general work breakdown structure can be used to give a general overview of the entire phases major goals and successive task ordering. The Gantt Chart can be seen in Appendix 6 and the Work Breakdown Structure can be seen in Appendix 7. These two graphics will schedule and keep the project on focus.

7. Conclusion and Recommendations

To conclude, the purpose of this report is to outline the specification needed to solve an issue and expound upon it in detail regarding how, when and why the solution is to be implemented. Considering this it is fair to say this report achieves this. The problem was clearly defined and explained, in terms of why it needed to be done in regards to a production and energy saving issue. The solution was framed in context to the environment it is to be placed as well as how it will be achieved in great detail in procedures such as the Gantt Chart and WBS. Most importantly the test parameters of the solution were defined, giving a clear metric in which, the solution can be judged. Overall, the reports achieves in framing the project in relevance as well as giving actual achievable metrics and goals to progress at a healthy pace.

8. Works Cited

Dawn Bonfield, 2020. *Inclusive Engineering Framework*. [Online]

Available at: <http://www.inceng.org/inclusive-engineering-framework.html>

[Accessed 11 12 2022].

Gov.UK, 2022. *Energy Savings Opportunity Scheme (ESOS)*. [Online]

Available at: <https://www.gov.uk/guidance/energy-savings-opportunity-scheme-esos>

[Accessed 12 12 2022].

Gov.UK, 2022. *Public Sector Equality Duty*. [Online]

Available at: <https://www.gov.uk/government/publications/public-sector-equality-duty>

[Accessed 11 12 2022].

Gov.UK, 2022. *Streamlined Energy and Carbon Reporting (SECR) for academy trusts*. [Online]

Available at: <https://www.gov.uk/government/publications/academy-trust-financial-management-good-practice-guides/streamlined-energy-and-carbon-reporting>

[Accessed 15 12 2022].

InterAutomatika, 2022. *VACON 100 FLOW DRIVE*. [Online]

Available at: <https://www.interautomatika.eu/ee/catalog/product/view/id/4152/s/vacon-100-flow-drive-55kw-205a-208-240v-ip21/category/1894/>

[Accessed 26 12 2022].

ISO, 2022. *ISO 14001:2015*. [Online]

Available at: <https://www.iso.org/standard/60857.html>

[Accessed 02 12 2022].

ISO, 2022. *ISO 50001*. [Online]

Available at: <https://www.iso.org/iso-50001-energy-management.html>

[Accessed 02 12 2022].

LED Controls, 2022. *IMO HD1-200A-23 HD1 INVERTER 55KW, 3PHASE, 200V, 200A IP20 INC FILTER*. [Online]

Available at: <https://www.ledcontrols.co.uk/imo-hd1-200a-23-hd1-inverter-55kw-3phase-200v-200a-ip20-inc-filter.html>

[Accessed 20 12 2022].

Legislation.Gov.Uk, 2010. *Equality Act 2010*. [Online]

Available at: <https://www.legislation.gov.uk/ukpga/2010/15/contents>

[Accessed 10 12 2022].

Legislation.Gov, 2022. *Health and Safety at Work etc. Act 1974*. [Online]

Available at: <https://www.legislation.gov.uk/ukpga/1974/37/contents>

[Accessed 17 12 2022].

Marshall E. Campbell, 2022. *Variable speed drive ATV630*. [Online]

Available at: <https://www.mecampbell.com/square-d-by-schneider-atv630d55m3-variable-speed-drive-atv630-55kw-75hp-200-240v-ip00.html>

[Accessed 22 12 2022].

Parmley Graham, 2022. *£2,589.00*. [Online]

Available at: <https://www.parmley-graham.co.uk/6es7810-5ce13-0yb5>

[Accessed 22 12 2022].

Your Europe, 2022. *CE marking*. [Online]

Available at: https://europa.eu/youreurope/business/product-requirements/labels-markings/ce-marking/index_en.htm

[Accessed 20 12 2022].

9. Appendix

9.1 Appendix 1 – Risk Assessment

Subject:

***OPERATIONAL SAFETY PLAN
FOR TEMPORARY OR MOBILE SITES
(Title IV Legislative Decree 81/08)***

Site Location:

SOFIDEL U. K Ltd

***Brunel Way – BAGLAN ENERGY PARK
NEATH SA11 2HZ U. K.***

Contractor:

SOFIDEL U. K.

NEATH

Works:

***MAINTENANCE OF DUST REMOVAL SYSTEM
AND MODIFY***

Table of contents

1	Introduction	Errore. Il segnalibro non è definito.
1.1	Use and consultation	3
1.2	Plan review.....	Errore. Il segnalibro non è definito.
1.3	Frequent definitions	4
2	Description of the works	6
3	Contracting company identification data	Errore. Il segnalibro non è definito.
3.1	Professional profiles and responsible	7
3.2	Workers	Errore. Il segnalibro non è definito.
4	Site identification	9
4.1	Workers of the contracting company working on the site	9
4.1.1	Documentation regarding information and training of the workers working on the site	10
4.2	Self-employed workers working on the site, operating for the company carrying out the work....	10
4.3	Indicazione delle lavorazioni in subappalto (see O. S. P. of reference)	10
5	Indication of the safety specific tasks, carried out on the site by the person appointed for this purpose by the contracting company.....	10
6	List of the IPDs supplied	10
7	Documentation regarding information and training of the workers working on the site	11
8	Prevention and protection measures coordination.....	11
9	Site configuration	13
9.1	General protection measures (Article 95 Legislative Decree 81/08)	13
9.2	Organisational modalities.....	Errore. Il segnalibro non è definito.
10	Sostanze e hazardous preparations e schede di sicurezza	14
10.1	Safety information sheets.....	15
11	Noise assessment (Article 103 Legislative Decree 81/08)	16
11.1	Noise exposure limits and measures to be adopted (Article 189 and following, Legislative Decree 81/08). 16	
12	Vibrations assessment (Article 199 and following, D. Lgs. 81/08).....	17
12.1	Vibrations exposure limits and measures to be adopted (Article 201 and following, Legislative Decree 81/08)	17
13	First aid measures (Article 45 Paragraph 2 Legislative Decree 81/08)	19
13.1	Telephone numbers and useful addresses	19
13.1.1	Fire brigade calling modality	20
13.1.2	Health emergency calling modality.....	20
13.2	Healthcare facilities.....	Errore. Il segnalibro non è definito.
13.3	Minimum content of the first aid box (Ministerial Decree 388 15/07/03)	20
13.4	Health surveillance	Errore. Il segnalibro non è definito.
14	Detailed procedures of the working phases.....	23
15	Supplementary and detailed procedures required in the Safety and Coordination Plan.....	36

1 Introduction

This Operational Safety Plan (OSP) was developed and drawn up in compliance with the provisions of Title IV of Legislative Decree 81/08, in accordance with the minimum contents as set forth in point 3.1 of Annex XV of Legislative Decree 81/08, relatively to the specific activities of the site identified in point 2 of this document. Moreover, this document was extracted from the Risk Assessment Document as set forth in article 17 of Legislative Decree 81/08, relatively to the activities executed out of the company's premises.

The content is detailed in order to allow immediate reading and understanding to all the site operators. According to the information reported in the OSP, it is possible, for every work phase, to reduce all the risks, through the relative assessments, prevention measures, and relative individual, and/or collective protection devices to be used.

The Plan includes risk identification, analysis, assessment, and relative procedures, preparations, and equipment able to guarantee, for the entire duration of the works, the observance of regulations, prevention of accidents, and workers health protection.

The plan includes a technical report and the requirements connected to the complexity of the work to be realised and any critical phases of the construction process.

Relatively to the specific Site, the employer assessed, in choosing the work equipment and substances or chemical preparations used, as well as the preparation of workplaces, and risks for safety and health of the workers, including those regarding groups of workers exposed to specific risks.

The document is kept at the Site.

1.1 *Use and consultation*

The document shall be used as guidelines by all the subjects belonging to the safety organisation system in order to apply at the best all the measures to be adopted during the various works and relative to the present risk factors.

Everyone shall observe and apply the safety measures reported in this document.

The measures, individual protection devices, and safety precautions are:

- compulsory
- to be correctly and continuously used
- to be observed personally.

The employer of the contracting company, together with any other responsible, shall supervise the observance of the provided prevention and protection measures, for the entire duration of the works.

1.2 Plan review

The updates, regarding the same site, shall be carried out in case circumstances that change the content of the plan substantially, should occur, for any introduction of new and different works after alterations during construction, or for specific operational and organisation needs of the company awarded the contract following the outcomes of the tender.

The realisation coordinator may ask the contracting companies to update the relative OSP, even in case of updating or review of the CSP. On occasion of the Coordination and Safety Plan review, the coordinator for realisation shall take all the necessary initiatives to inform all the responsible of the contracting companies, about the content of the changes carried out.

1.3 Frequent definitions

In this document, the following definitions are adopted:

- **Hazard:** intrinsic characteristic or quality of a specific entity (for example, materials or work equipment, methods and work practices) having the potential of causing damages.
- **Damage:** physical injury and/or damage to health or goods.
- **Risk:** probability that the damage potential limit is reached in use conditions that is, exposure of a specific factor.
- **Residual risk:** risk that remains after having adopted the specific measures to reduce it.
- **Prevention:** the complex of dispositions or measures adopted or arranged in all the phases of the work activity in order to prevent or reduce professional risks for health protection.
- **Agent:** chemical, physical, or biological agent present during work and potentially hazardous for health.
- **Workers' Health and Safety Representative (HSR):** person or people appointed or designated to represent the workers regarding the aspects of health and safety during work activity.
- **Risks assessment:** risk assessment procedure for safety and health protection of the workers, the possible entity of the damage, as a consequence of the risk for the safety and health of the workers while carrying out their tasks, deriving from any hazard at workplace.
- **Planning:** ideation and planning of the activity.
- **Process:** work activity connected and successive to planning, having the purpose of applying what ideated and planned during planning phase. A process may be identified in either a chemical reaction or series of them, in the manipulation of biological agents, machines operation, etc.
- **Contractor:** subject on whose behalf the entire Work is realised, independently from any distribution for its realisation. In case of Public Work, the contractor is the subject who has the decision-making and expense authority relative to the Contract management.
- **Works Responsible:** subject designated by the contractor to control the work planning or realisation; this subject corresponds to the designer for the planning phase of the work, and to the works manager for the carrying out of the work. In the field of application of Legislative Decree 12 April 2006, No. 163, and following amendments, the works responsible is the sole responsible of the proceeding.
- **Self-employed worker:** individual whose professional activity contributes to the realisation of the work without any subordination restriction.
- **Safety and health Coordinator during the planning of the works hereinafter referred to as planning coordinator:** subject designated to carry out the tasks by the contractor or by the works responsible, as set forth in article 91.

- **Safety and health Coordinator during the realisation of the works hereinafter referred to as realisation coordinator:** subject designated to carry out the tasks by the contractor or by the works responsible, as set forth in article 92, who cannot be the contracting company's employer or his dependent or the prevention and protection service responsible (PPSR) designated by him.
- **Man Days:** extent estimated of the site represented by the sum of the employee days performed by the workers, including the self-employed ones, arranged for the realisation of the work.
- **Operational Safety Plan:** the document drawn up by the employer of the contracting company, referring to the single site concerned, pursuant to article 17 paragraph 1, letter a), whose contents are reported in Annex XV – Legislative Decree 81/08 (this document).
- **Contracting company:** company having received the contract directly from the contractor that, in carrying out the works, may use subcontracting companies or self-employed workers.
- **Technical and professional qualification:** organisational skills, as well as availability labour force, machines, and equipment, relative to the realisation of the work.

The professional profiles described have the following tasks:

- **Safety and Health Coordinator during the Planning of the works:**
 - Drawing up of the Safety and Coordination Plan.
 - Prearrangement of a File containing all the useful information for prevention and protection from the risks to which workers are exposed.
- **Safety and Health Coordinator during the Realisation of the works:**
 - ensure, through specific coordination and control actions, the application, by the contracting companies and self-employed workers, of the provisions relative to them included in the safety and coordination plan, as set forth in article 100, and the correct application of the relative work procedures;
 - ensure the suitability of the Operational Safety Plan, to be considered as detailed complementary plan of the safety and coordination one as set forth in article 100, making sure it is coherent with this latter and adapt the safety and coordination plan and the file, as set forth in article 91, paragraph 1, letter b), according to the evolution of the works and any modifications occurred, assessing the proposals of the contracting companies aimed at improving the site safety, as well as ensure that the contracting companies adapt, if necessary, the respective operational safety plans;
 - organise between the employers, including the self-employed workers, the cooperation and coordination of the activities, as well as their reciprocal information;
 - ensure the implementation of the provisions of the agreements between the social parties, in order to realise the coordination between the safety representatives aimed at improving safety on site;
 - communicate to the contractor or to the works responsible, on written notice to the companies, including the self-employed workers, the non observance of the provisions of articles 94, 95, and 96, as well as those of the plan, as set forth in article 100, and propose the suspension of the works and companies, including the self-employed workers on site, or the resolution of the contract. In case the contractor or the person responsible for the works, should not adopt any measure after having received the communication, the realisation coordinator shall inform the Local Health Unit competent for territory and the Provincial Labour department about the default, without any justification being given;
 - suspend, in case of directly verified serious and imminent hazard, the single works until adjustments carried out by the companies involved have been ensured.

2Description of the works

The work to which this Plan is referred, includes the supply and following installation, at the Contractor's company structure, of a new suction and filtering system for air particulate extracted through aspiration vents, from a paper industry products transformation line.

It is therefore prearranged:

- the installation of the ducts system that conveys air from the inlet points of the production line to the suction system (centrifugal fan) and to the filter;
- the installation of the above-mentioned suction system;
- .

Therefore, the activities carried out include:

- Vents, connectors, and ducts assembling;
- Interventions on existing systems (necessary modifications, disassembling and reassembling of components).

3 Contracting company identification data

Company name	Toscana Impianti Tecnologie Ambientali Srl
Registered office and telephone	Via dei Fabbri, 63 – Loc. Forone Uzzano - (PT)
VAT/Tax Code Number.	01118460474
Description of the activities	Production and installation of ventilation systems, air treatment, including modifications on existing lines, installation of aeraulic ducts, stacks, pipes, filters, boxes with relative support works, and connection.
Legal representative	Roberto Dolfi
Weekly working hours	8.00-12.30 14.00-17.30
Economic and Administrative Index (REA)	120155
Register of Companies	01118460474
Industry sector	Mechanics
National Collective Bargaining Agreement applied	Mechanics
INPS (Italian National Social Security Institute) Position	6302380790
INAIL (National Insurance Institute for Accidents at Work) Position	27532949

3.1 Professional profiles and responsible

First aid personnel	Roberto D'Ulivo Roberto Dolfi Roy Paolettoni Alessandro Toni Marco Verdiani
Fire-fighters	Marco Verdiani Alessandro Toni Roy Paolettoni
HSR	Andrea Monfardinii , born in Pistoia (PT) on 12 July 1970 (training course carried out at "VEGA Formazione" from 08/09/2020 to 17/09/2020)
Company physician	Dr. Tacito Burchi (practice in Montecatini Terme, Via Tripoli, 4).
RPPS and Employer	Roberto Dolfi, born in Pistoia on 17 May 1950

3.2 Workers

The current list of dependents (including the personnel working exclusively at the site) employed by Toscana Impianti, is listed following.

Worker	Qualifications
--------	----------------

Attilio Accioli	Partner – Production
Roberto D'Ulivo	Production
Roberto Dolfi	Partner – administration
Andrea Monfardini	Production – external work
Fabrizio Giacomelli	Production – external work
Ennio Sichi	Production – external work
Andrea Venturi	Office
Maurizio Iannotta	Production – external work
Gabriele Romani	Production
Alessandro Toni	Production
Marco Verdiani	Production

4 Site identification

Site location	SOFIDEL U.K. Ltd Brunel Way – Baglan Energy Park NEATH – U.K.
Contractor	SOFIDEL U. K. Ltd
Site Foreman	Roberto Dolfi
Works Responsible (appointed by the Contractor)	Mr.
Planning coordinator (if any)	.....
Realisation coordinator (if any)	...Eng.
Brief description of the site and above-captioned work	Installation of air particulate suction system on paper industry production line.
Organisation of the work	Only daytime working hours 8.30 – 12.30 and 14.00 – 18.00.
Estimated date for the start of the works	14/03/2022
Estimated date for the end of the works	30/04/2022

For the purposes of the application of Title IV of Legislative Decree 81/08, building or civil engineering works are carried out in the above-mentioned site, and coming within the terms of article 89 paragraph 1) letter a) of Legislative Decree 81/08, listed following:

- 1. The works of construction, maintenance, repairing, demolition, preservation, renewal, reconstruction, or equipping, transformation, renovation, or dismantling of fixed, permanent, temporary, masonry, reinforced concrete, metal, wood, or other materials works, including the electrical lines and structural parts of the electric systems, road, railway, hydraulic, maritime, and hydroelectric works, and only if required, building or civil engineering works, cleaning works, forestry works, and excavation.*
- 2. Moreover, building or civil engineering works are the excavations, and assembling and disassembling of prefabricated elements used for the realisation of building or civil engineering works.*

4.1 Workers of the contracting company working on the site

Registration number	Worker	Qualifications
	Roberto Dolfi	Partner
	Andrea Monfardini	Worker
	Ennio Sichi	Worker
	Gianluca Bargellini	Worker
	Maurizio Iannotta	Worker
	Fabrizio Giacomelli	Worker

The above-mentioned workers are those allowed to intervene on the site for the entire duration of the contracted works. However, the estimated number of workers present on the site at the same time is 2-3 units.

4.1.1 Documentation regarding the information and training of the workers working on the site

Certificates and information sheets relative to the safety training of the personnel and the information given to them are annexed to this document (in case they have not already been given to the contractor).

4.2 Self-employed workers working on the site, operating for the company carrying out the work

Registration number	Worker	Qualifications

The presence of self-employed workers operating for the contracting company Toscana Impianti is not arranged

4.3 Indication subcontracted works (see O.S.P. of reference)

Works	Contracting company

Works subcontracted by the contracting company Toscana Impianti are not prearranged

5 Indication of the safety specific tasks, carried out on the site by the person/s appointed for this purpose by the contracting company

Persons appointed	Tasks
Roberto Dolfi	First Aid Officer – Fire Prevention Officer
Roberto D'Ulivo	First Aid Officer – Fire Prevention Officer
Andrea Monfardini	First Aid Officer – Fire Prevention Officer
Ennio Sichi	First Aid Officer – Fire Prevention Officer
Roi Paolettoni	First Aid Officer – Fire Prevention Officer

6 List of the IPDs supplied

All the IPDs with which the workers operating on the site are equipped, are reported following. The IPDs listed below are supplied at the company's headquarters and they are replaced, if necessary, on specific information of the workers.

Parts of the body	IPDs
Hand	Anti-cut gloves
Eyes	Protection goggles
Foot	Safety shoes

<i>Respiratory tract</i>	Anti-dust mask Mask with replaceable filters for solvents
<i>Hearing</i>	Ear plugs Earmuffs
<i>Head</i>	Helmet

<i>Parts of the body</i>	IPDs
<i>Entire body</i>	Safety harnesses and rope Positioning belts

7 Documentation regarding the information and training of the workers working on the site

The documentation inherent the training courses carried out is kept at Toscana Impianti Srl Company headquarters and it is briefly reported following.

- Forklift and lifting platform operator course, held by Lucca Format/Studio SGRO ;
- First Aid course in 3 sessions held by Dr. Luigi Narcetti, for the First Aid officers.
- Fire prevention and fire fighting course held by Eng. Maurizio Giuntori, for the fire prevention officers.
- Workplace safety and health training course, with reference to the risks inherent the specific activity, held in June 2009 by the Employer for all the workers.

8 Prevention and protection measures coordination

In order to implement the coordination of prevention and protection measures, between the Contractor and contracting company, provided for by article 26 of Legislative Decree 81/08, the following is provided:

The Contractor Employer, pursuant to article 26, paragraph 1, letter b) of Legislative Decree 81/08, at the moment of the assignment of the work, within his production unit, shall supply detailed information inherent the specific risks to which the workers of the contracting companies are subject, as well as those regarding prevention and emergency measures adopted relatively to the activity.

Said information SHALL NECESSARILY be acquired by the contracting company Employer BEFORE the starting of the works for the arrangement of the suitable prevention and protection measures and they are annexed to this Operational Safety Plan.

Moreover, the Contractor Employer shall make sure that prevention measures are coordinated in order to prevent risks of interference, by drawing up a Single Document on the Assessment of Risk from Interference (DUVRI), which shall be annexed to the work or service contract.

A list of the machines and equipment, belonging to the Contractor Company, shall be included in the DUVRI. They may be used during the works on site; the list of these machines shall be as limited as possible and the following details shall be specified:

- Brand, model, and registration number;
- Maintenance checks carried out;
- Safety checks outcomes.

The Contracting Company operators shall be trained and tested for the correct use of the machine and a specific coordination report shall be drawn up.

Moreover, the cost relative to occupational safety with specific reference to those of the single contract shall be clearly indicated in the work contract, under penalty of nullity.

With reference to the specific site, the Employer of the contracting company ensures that the coordination has occurred, reporting the details in the following documents, if present.

DOCUMENT	DETAILS
Information sheet about the specific risks present	Safety documentation presented by the company owner of the site subject to the intervention.
Information sheet about the emergency procedures	Safety documentation presented by the company owner of the site subject to the intervention.
Coverage technical specifications	---
Single Document on the Assessment of Risk from Interference <i>(to be annexed to the contract)</i>	Safety documentation presented by the company owner of the site subject to the intervention.
Safety and Coordination Plan (SCP)	---
Safety costs estimate <i>(shown in the contract)</i>	1000,00 €

9 Configuration of the site

9.1 General protection measures (Article 95 Legislative Decree 81/08)

During the carrying out of the works, the employers of the contracting companies observe the general protection measures as set forth in article 15 of Legislative Decree 81/08 and each within the scope of their functions specifically take care of the following:

- a) keeping the site in order and satisfying healthiness conditions;
- b) choice of the workplace locations taking into account the access conditions to such places, and defining moving or circulation ways or areas;
- c) handling conditions of the various materials;
- d) maintenance and control before starting to operate as well as periodical control of the plants and devices in order to eliminate all the defects that could prejudice workers' safety and health;
- e) delimitation and organisation of the various materials stocking and deposit areas, especially when they are hazardous materials and substances;
- f) adjustment, according to the evolution of the site, of the actual duration to be attributed to the various work types or phases;
- g) cooperation between employers and self-employed workers;
- h) interactions with the activities carried out on, inside, or in proximity of the site.

9.2 Organisational modalities

Before starting the activities, the Employer and the Prevention and Protection Service Responsible, together with the contractor responsible, shall inspect the site area, power supply points, and configuration of the power supply panels.

They shall also identify the loading and unloading areas and ensure their compatibility with the ordinary activities carried out by the Company.

On indication of the Contractor Responsible, the site wastes collection containers shall be identified and their accessibility ensured.

Moreover, the risks for the surrounding environment deriving from the site activity (noise, dusts, fibres, exhausts, vapours, gas, odours, other airborne pollutants, and fall of objects towards the external) shall be assessed. For these latter, if possible, infrastructural type prevention and protection measures shall be defined; while if not possible, organisational measures also in collaboration with the Activity Responsible shall be identified.

Specifically, during all the work phases the operational area occupied for the implementation of the mechanical components, as set forth in this contract shall be appropriately marked and delimited with white and red tape, barriers, cones, or similar devices.

In case over ground operations are carried out, the delimited area shall consider the possibility of projection or fall of tools or materials from above, in order to prevent accidents to unauthorised personnel.

For these work phases the workers of Toscana Impianti, shall wear helmets to protect their heads.

10 Hazardous substances and preparations, and safety information sheets

Legislative Decree 81/2008 provides that:

chemical agents, all the elements or chemical compounds, both on their own and in compounds, in their natural state or obtained, used or disposed of, including disposal as wastes, through any work activity, both if they have been intentionally produced or otherwise, and if they have been introduced on the market or not;

hazardous chemical agents:

- **chemical agents classified as hazardous substances** as well as the agents that can be classified as hazardous substances in accordance with the above-mentioned decree. The substances hazardous only for environment, are excluded;
- **chemical agents classified as hazardous preparations** as well as the agents that can be classified as hazardous preparations in accordance with the above-mentioned decree. The preparations hazardous only for environment, are excluded;
- **chemical agents** that, even if cannot be classified as hazardous, according to points 1) and 2), may represent a risk for the safety and health of the workers due to their chemical and physical or toxicological characteristics and the way they are used or present on workplace, including chemical agents to which an occupational exposure limit value has been assigned.

The ways through which chemical agents can be introduced into the body are the following:

Inhalation: the seriousness of the consequences depends on the dimension of the inhaled particles and can be limited to infections of the upper respiratory tract (particles bigger than 10 micron) or reach the lungs (particles smaller than 10 micron). The particles smaller than 0.5-micron do not stay in the respiratory system.

Penetration through skin or mucosae: phenomena such as irritation, dermatitis, chemical burns, and contaminations could occur. Contact involves the part of the body exposed to the chemical agent, but in case of easily absorbable substances, they can spread through the body and originate intoxication phenomena.

Ingestion: ingestion could occur through the exposure to particulate or fumes polluted air, or by hands, face, food, and beverages contamination. In this case, the intoxication could cause even serious damages.

The chemical agents are divided into the following classes according to their potentiality:

Explosives (E): they can explode in presence of flames, crash, or rubbing

Combustibles (C): they can cause burning of combustible materials or, if mixed with these latter, they can even explode

Highly inflammable (F+): they have a very low flash point and low boiling point

Easily inflammable (F): they can catch fire in contact with air and room temperature, or after short contact with an inflammable source and continue to burn even after having been moved away from it: they have a very low flash point

Highly toxic (T+): the ingestion, inhalation, or contact with skin of very small quantities, can cause death or acute or chronic damages

Toxic (T): the ingestion, inhalation, or contact with skin of very small quantities, can cause death or acute or chronic damages

Noxious (Xn): all those substances with DL50 higher than the one set to classify them as very toxic or toxic

Corrosive (C): they can exercise a destructive action if in contact with living tissues

Irritants (Xi): their contact with skin or mucosae can cause an inflammatory reaction

Carcinogenic: the ingestion, inhalation, or contact with skin can cause cancer

Teratogenic: they can cause malformations in the developing embryo

Mutagenic: they can modify the cells genetic map.

In case of use, manipulation and/or stocking of chemical agents, remember that:

Every container, containing a hazardous product, shall be labelled by the person who has filled it up. The supplier shall prearrange an information sheet with the safety data and give it to the user.

One of the absolute priorities is represented by the inventory of the hazardous products, especially the carcinogenic ones, in order to limit their use and try to replace them with less hazardous products.

Inform about the hazardous products or preparations composition (clear labelling, verbal or written information, if necessary).

Systematically inform every worker in advance about the health and safety risks, before using them, about the operational modalities, and the use conditions and precautions.

Limit the number of workers exposed to the action of hazardous products, control and observe the statutory exposure levels, taking into account the recommended values (exposure limit values and average values have been defined for a large number of substances).

Develop the means of collective protection (upstream collection, aeration, purification of the premises, detection means, etc.) or if this is not possible, use individual protection devices.

Prearrange an information sheet with the relative warnings for every workplace where workers are exposed to hazardous products, in order to inform them about the risks and precautions to be taken.

The substances and chemical products used for the works on the site are reported in the following table:

Substance	Use
SOUDAL MULTI PORPOSE Silicone	Duct joints sealing

10.1 Safety information sheets

The safety information sheets relative to any hazardous substances and preparations used are annexed to this document.

11 Noise assessment (Article 103 Legislative Decree 81/08)

Article 103 of Legislative Decree 81/08 provides the possibility to calculate, in preliminary phase, the daily personal exposure of a worker “with reference to the exposure times and noise standard levels identified through studies and measurements whose validity is recognised by the accident prevention committee”.

However, it is necessary to carry out phonometric measurements on the sites in the following cases:

- in case of machinery replacement or purchase;
- if machinery wear has modified the noisiness;
- if the typology of work is different from those reported in the officially recognised information sources as specified following by the local Supervisory Body (U.O.M.I.A.L. – Health Services Provincial Unit).

Noise assessment shall be executed at the opening of the site and repeated, if necessary, during the carrying out of the works. The assessment can be based on literature values, unless the employer uses machinery with a noisiness significantly different from what provided for in literature or the environmental conditions require it. In these cases, it is necessary to integrate the assessment with specific phonometric measurements.

The controls through phonometric measurements shall be carried out on occasion of machinery replacement or purchase, in case wear has modified the sound power emitted or if works cannot be compared to any of the situations described in literature.

11.1 Noise exposure limits and measures to be adopted (Article 189 and following, Legislative Decree 81/08)

The obligatory fulfilments of the noise exposure level, as well as risk assessment and reduction obligatory ones through technical, organisational, and procedural interventions, are reported following.

Level 0	LEX,8h < 80 dB(A) or 135 dB(C) ✓ No specific action
Level 1	80 dB(A) or 135 dB(C) < LEX,8h < 85 dB(A) or 137 dB(C) ✓ Information of the workers (Article 195 Legislative Decree 81/08) ✓ Distribution of IPDs (Article 193 Paragraph 1 Letter a, Legislative Decree 81/08) ✓ Reduction interventions implementation ✓ Health control on request (Article 196 Paragraph 2, Legislative Decree 81/08)
Level 2	85 dB(A) or 137 dB(C) < LEX,8h < 87 dB(A) or 140 dB(C) ✓ Information of the workers (Article 195 Legislative Decree 81/08) ✓ IPDs use obligation (Article 193 Paragraph 1 Letter b, Legislative Decree 81/08) ✓ Reduction interventions implementation ✓ Health control (Article 196 Paragraph 1 Legislative Decree 81/08)
Level 3	LEX,8h > 87 dB(A) or 140 dB(C) ✓ Information of the workers (Article 195 Legislative Decree 81/08) ✓ IPDs use obligation (Article 193 Paragraph 1 Letter b, Legislative Decree 81/08) ✓ Reduction interventions implementation (Article 194 Legislative Decree 81/08) ✓ Increased health control ✓ Communication to Local Health Unit ✓ Delimitation and signs

The personnel working at the external present the following daily exposure level:

Measure	No.	Machine/ Equipment	LAeq (dBA)	Ea (Laeq) (dBA)	LCeq (dBC)	SNR	L'Aeq (dBA)	Ppeak (dBC)	Duration exp. Ti (minutes)	E(Ti) minutes
10	---	DEWALT D28401 Flexible	99.9	0.4	98.6	23	75.6	115.6	5	2.5
11	---	DEWALT D28111 Flexible	91.3	0.1	89.6	23	66.6	106.5	5	2.5
12	---	MAKITA TW0350 Electric screwdriver	81.4	1.2	81.0	23	58.0	109.9	5	2.5
13	---	MAKITA Drill	84.2	1.2	82.8	23	59.8	104.4	5	2.5
14	---	MAKITA Electric screwdriver	92.6	1.0	91.5	23	68.5	115.9	5	2.5
15	---	DEWALT DW817 Flexible	97.8	0.9	96.1	23	73.1	113.6	5	2.5
16	---	SUPERSTAR Flexible	98.8	0.6	97.8	23	74.8	114.9	5	2.5
17	---	25C072 Drill	80.7	0.5	80.6	23	57.6	105.7	5	2.5
18	---	BOSCH GSC160 Cutter	82.5	0.2	84.4	23	61.4	104.2	5	2.5
19	A1	Profiling Machine Area	73.1	0.4	74.4	---	--	99.5	50	2.5
20	A3	Welding Area	81.5	2.0	82.8	23	59.8	113.4	50	2.5
9	---	MITSUBISHI FD30 Forklift	82.1	0.0	95.2	23	72.2	110.7	20	2.5
---	---	Manual works	<75.0	--	--	---	---	<<135.0	315	12.6

Personal daily exposure Lex,8h dB(A)	85.2
Uncertainty personal daily exposure level E(Lep,d)(dBA)(°)	2.3
IPDs SUPPLY OBLIGATION	YES
IPDs USE OBLIGATION	YES
Recommended IPDs	Earmuffs 3M 1435
SNR	23
EFFICIENCY ASSESSMENT OUTCOME	POSITIVE
<i>The efficiency assessment gives a positive outcome, for the works with a higher risk, using the SNR values supplied by the IPD reported above and referred to the correct use of the IPD, no one of the tasks exposes the worker to L'Aeq levels higher than low values of action.</i>	

The high exposure level is given especially by the use of angle grinder (flexible) and electric screwdrivers/drills.

12 Vibrations Assessment (Article 199 and following, Legislative Decree 81/08)

12.1 Vibrations exposure limits and measures to be adopted (Article 201 and following, Legislative Decree 81/08)

The obligatory fulfilments of the noise exposure level, as well as risk assessment and reduction obligatory ones through technical, organisational, and procedural interventions, are reported following.

➤ Hand-arm system

- Daily exposure limit value (8h): $5 \frac{m}{s^2}$
- Immediate exposure limit value: $20 \frac{m}{s^2}$

* The $E(L_{ep,d})$ uncertainty takes into account the environmental one $E_a(L_{Aeq})$, the exposure times one $E(T_i)$, and the instrumental one $E_s=0.7$ dBA.

- Daily action value (8h): $2,5 \frac{m}{s^2}$

➤ Entire body

- Daily exposure limit value (8h): $1,0 \frac{m}{s^2}$
- Immediate exposure limit value: $1,5 \frac{m}{s^2}$
- Daily action value (8h): $0,5 \frac{m}{s^2}$

The workers in charge of the external works present the following daily exposure level relative to the Hand-Arm system:

MEASURE	NAME	A _{hw} (m/s ²)	T _i exposure time (minutes)
6	DEWALT D28401 Flexible	8.73	5
7	DEWALT D28111 Flexible	10.90	5
8	MAKITA TW0350 Electric screw driver	6.62	5
9	MAKITA Drill	12.60	5
10	MAKITA Electric screw driver	15.28	5
11	DEWALT DW817 Flexible	9.13	5
12	SUPERSTAR Flexible	6.98	5
13	25C072 Drill	13.44	5
14	BOSCH GSC160 Cutter	15.95	5
---	Other activities not subject to HAV	---	435

Daily exposure to vibrations transmitted to the hand arm system A(8)	3.53
Risk Class	1

Therefore, the workers fall into Class 1, that is, for them the action level is exceeded, but not the exposure limit one.

13 First aid measures (Article 45 Paragraph 2 Legislative Decree 81/08)

If there is the necessity to perform first aid to an injured person, remember to:

- act with caution, not impulsively nor irresponsibly
- immediately evaluate if the situation requires extra help apart from yours
- if around the injured person there are hazardous situations (electrical, chemical risks, etc.), before intervening adopt all the necessary prevention and protection measures. If possible, eliminate the factor that caused the injury.
- move the injured person from the place of the accident only if necessary or if there are immediate or continuous hazard situations and avoid being exposed to the same risks that caused the accident
- verify the injury suffered by the injured person: type of injury (serious, superficial, etc.), body part involved, probable immediate consequences (fainting, cardio-respiratory insufficiency, etc.)
- verify the causes: single or multiple causes (fall, electrocution and fall, etc.); physical or chemical agent (scrap, intoxication, etc.)
- position the injured person in the most appropriate position (survival one) and give first aid
- calm the injured person and explain what is happening trying to establish reciprocal trust
- maintain emotional stability to overcome the unpleasant aspects of the emergency situation and control the despair and/or discomfort sensations that may arise from it
- do not subject the injured person to unnecessary movements
- absolutely do not move persons with head or spinal cord traumas and those with suspected fractures
- do not press and/or massage when the injury may have caused profound lesions
- do not administer beverages or other substances
- undo garments that could hinder respiration
- artificial respiration may be given to the injured person if he is not breathing
- take action for the intervention of persons and/or means for emergency assistance and transport of the injured person to the closest emergency department.

13.1 Telephone numbers and useful addresses

EVENT	WHO TO CALL	Telephone No.
Fire Emergency	Fire brigade	115
Health Emergency	Emergency Unit	118
Police Forces	Carabinieri	112
	State Police	113
	Local Police of .....	.....
System failures	.....	.....
Failures notification (water and gas)	.....	.....
Failures notification (electric power)	.....	.....
Other numbers	Roberto Dolfi	337/689364
		
		
Useful addresses	.....	.....
		
		

13.1.1 Fire Brigade Calling Modality

If the intervention of the Fire Brigade is required, the Emergency Responsible shall communicate the following data to the 115 emergency number:

- Name of the company
- Exact address of the site
- Indications of the way and reference points for fast localisation of the building
- Company telephone number
- Type of fire (small, medium, large)
- Material that is burning
- Presence of people in danger
- Name of the person calling.

13.1.2 Health Emergency Calling Modality

If intervention is required, the Emergency Responsible shall communicate the following data to the 118 emergency number:

- Name of the company
- Exact address of the site
- Indications of the way and reference points for fast localisation of the site
- Company telephone number
- Pathology the injured person presents (burns, bleeding, fracture, respiratory arrest, cardiac arrest, shock, etc.)
- Condition of the injured person (conscious, unconscious)
- Name of the person calling.

13.2 Healthcare Facilities

There shall be healthcare facilities, indispensable to administer first aid to injured workers or to those subject to sudden indisposition, in the site.

The healthcare facility present in the site shall be correlated to the maximum number of people that may be present at the site, to the risk level of the site and its geographical location. In relation to the specific entrepreneurial organisation, the company is obliged to choose the facility belonging to it; in the operative plan, the company shall indicate the type of facility that will be present in the site.

13.3 Minimum content of the first aid box (Ministerial Decree 388 15/07/03)

- Disposable sterile gloves (5 pairs)
- Splash guard visors
- Bottle of iodopovidone cutaneous solution, iodine 10%, 1 litre (1)
- Bottles of physiological saline (sodium chloride – 0. 9%), 500 ml (3)
- Sterile gauze pads 10 x 10 in single pouches (10)
- Sterile gauze pads 18 x 40 in single pouches (2)
- Disposable sterile sheets (2)
- Disposable sterile medication tweezers (2)
- Package of medium size elastic mesh (1)
- Package of cotton wool (1)
- Packages of ready to use plasters of various sizes (2)
- Plaster rolls 2.5 cm high (2)

- A pair of scissors
- Tourniquets (3)

- Cold packs (two packages)
- Disposable bags for the collection of health-care wastes (2)
- Thermometer
- Device for arterial pressure measurement

13.4 Health Surveillance

The contractor, within ten days from the assignment of the works, shall send to the realisation coordinator the name of the company physician and attach to this plan the complete details of said doctor, whose name and telephone number shall always be kept at the workers' disposal.

The company physician, shall issue a medical fitness certificate to the workers subject to preventive medical check-up before starting to work, said physician shall also take care of the periodical check-ups according to the frequencies required by law. Following are listed the compulsory medical check-ups, relative to the main site works, that the workers are subject to:

- Annual check-up: use of compressed air tools that expose the worker to vibrations (pneumatic hammers, vibrators, etc.).
- Six-month check-up: waterproofing with use of tar and bitumen.
- Three-month/six-month check-up: painting with use of solvents (such as toluene, xylene, acetone, alcohol derivatives), workers exposed to concentrations of lead in the air.
- Six-month check-up: use of disarming oils.
- Annual check-up and, in any case, before starting a new site: use of materials containing asbestos (installation and/or removal).
- Annual check-up and chest X-ray: workers exposed to risk of siliceous particulate (cement, etc.)
- At least biennial check-up for LEX(w) 85-87 dB(A), annual if over LEX(w) 87 dB(A): works that expose the workers to noise.
- Preventive and periodical check-up with periodicity defined by the company physician: workers subject to manual handling of the loads.

The company physician shall visit the work environments at least once a year, without prejudice to the compulsoriness of additional visits when the risk situations are changed. The company physician shall:

- collaborate with the employer and realisation coordinator, based on the specific knowledge of the company organisation and risk situation, arrangement of the measures for the protection of health and psychophysical integrity of the workers;
- carry out health tests;
- express opinions of suitability for specific work tasks;
- inform the contractor and the same worker in writing, if following the tests, the physician expresses an opinion of partial, temporary or total suitability of the worker;
- to make and update, under his own responsibility, a health and risk record for every worker subject to health surveillance to be kept at the employer's facility with protection of professional privilege;
- supply the workers with information regarding the meaning of the health tests they are subject to and, in case of exposure to agents with long-term effects, the need to take health tests also after the ending the activity that involves exposure to said agents. To supply, upon request, analogous information to the workers' representative;
- inform every involved worker about the results of the health tests and, upon request of the same, to give him a copy of the health record documentation;
- communicate, during meetings, to the safety representative the collective anonymous results of the health and instrumental tests carried out and supply indications about the meaning of said results;
- visit the work environments (with the limitations mentioned above) and participate in the programming of the worker's exposure control, whose results shall be promptly supplied to him, by the contractor, for his professional opinion;

- without prejudice to the health check-ups, carry out the medical check-ups requested by the worker if said request is correlated to the professional risks;
- collaborate with the employer for the arrangement of first aid service;
- collaborate in the training and information activities.

14 Detailed procedures of the working phases

WORKING PHASE	EQUIPMENT, FILTERS, AND DUCTS ASSEMBLING
DESCRIPTION OF WORKS	
After having prearranged the equipment, filters, and ducts previously realised, proceed with their installation both on the ground (for what concerns the suction equipment and filters) and over ground (for what concerns the overhead ducts) with the support of staging, movable bridges, liftable platforms, etc.	
WORKING PHASE SAFETY MANAGEMENT MODALITY	
The activities start with the preparation of the operating areas. First it is necessary to check that the installation areas can be easily accessed, the doors can be used, and that the roads where means or automated shuttles transit shall not be crossed before the machinery arrives. If this should occur, notify the responsible so that the courses can be deviated. Then proceed with the limiting of the transit areas of the means for the unloading of the equipment and materials and preparation of an area (if necessary) where sheets, ducts, brackets, and components can be deposited on the ground. The area selected shall be sufficiently wide so that high stacking, which could be unstable, is not necessary. Afterwards the unloading phase is started; the operators, equipped with the appropriate IPDs, proceed with the unloading of the material and, therefore, their transport to the installation position. If it is necessary to transport very heavy components, the internal responsible is informed and their own means SHALL BE used (for example forklifts). Then the assembling phase starts after having previously assessed the conditions of the floors, walls, joisted floors or structures and if it is necessary to realise connections and brackets shall on these. If there are any doubts regarding the resistance of the structures and ALWAYS in case of positioning components on joisted floors and not on the ground, it is necessary to request a declaration regarding the capacity of the joisted floors (or structures) to the Internal Responsible. The assembling activities can take place: -with operators on ground; -with operators on staging; -with operators on liftable platform;	

The operators are always equipped with appropriate IPDs, and in case of over ground operations use suitable fall protection IPDs, about which they have been thoroughly trained.

When assembling ducts, a “free passage” is prepared under the duct having a width of at least 2m per side, which is freed from people and possibly things to prevent that possible falling of equipment or materials could be a hazard for the other workers. After the assembling of a limited quantity of ducts, proceed with the stability check of the same before the Technical Responsible of the site.

Before finishing the assembling activity, it is necessary to check the stability of all the components (for example filters, ducts, stacks), absence of unprotected electric conductors, earthing connection check, check of the absence of hazardous or sharp parts (for example sheets at eye level), together with the Technical Responsible.

Afterwards, proceed with the cleaning of the work area and dismantling of the site; after the issuing of all the necessary documents regarding the conformity of the machines, they are connected to the power supply by an Authorised Electrician.

MACHINERY, EQUIPMENT AND SYSTEMS USED

Code	Machine
M25	mod. D28111 Flexible
M26	mod. D28401 Flexible
M27	mod. TW0350 Electric screw driver
M28	Drill
M29	Flexible
M30	mod. 25C072 Drill
M31	Electric screw driver
M32	mod.DW817 Flexible
M33	mod. GSC160 Cutter
M34	mod. GSC160 Cutter
V01	FIAT DAILY Lorry
V02	FIAT DAILY Lorry
V03	FIAT DAILY Lorry
V04	FIAT DAILY Lorry

RISK ASSESSMENT	
IDENTIFICATION OF HAZARDS	PREVENTION MEASURES AND INSTRUCTIONS FOR WORKERS
Falls from high points	During the preparation and ground assembling phase of the single pieces of the machinery, systems, equipment, and in the assembling phase over ground it is necessary to follow the safety measures foreseen against risk of falling from high points; mobile bridges on wheels, platform ladders, or scaffolds can be used; where not technically possible it is necessary to use fall protection individual protection devices. The use of rung ladders shall be limited to minimum, only for interventions that do not require use of both hands at the same time and only if fixed or held at the bottom by another person; for more complex operations equipment such as platform ladders, scaffold mobile bridges or liftable platforms shall be used. The moving and unhooking of the single preassembled or to be assembled components, specifically if at different levels, shall be executed with adequate equipment, preventing climbing on the same, even only for load hooking-unhooking operations.
Bumps, blows, impacts, squeezing	Use tools, devices, and equipment suitable to the tasks, kept in good condition and in good order. Organise the deposits in order to prevent collapsing and crushing making the handling of the material stocked in it easy. Use shoes with crushproof toecap.
Slipping, falling over	Keep walkways free from equipment, materials, or other things able to hinder the walking of the operators and sufficiently illuminated. Wear suitable footwear. Signal fixed and/or protected obstacles.
Falling of material from above	All the operators shall use safety helmets. The portable tools shall be fixed safely to the operator's body when he moves in the working area. Prevent debris from falling during all operations carried out over ground.
Particulate, fibres	In case of works that present high dustiness, the workers shall use appropriate respiratory tract protection masks and wear suitable clothing; if necessary, the same workers shall be subject to health surveillance.

Electrical	The power supply of the portable electric tools must be through a system, also temporary, that ensures their safe use. Usually, a site electric panel connected through socket-plug, and equipped with suitable magnetothermal and differential protections is used. The use of cable reels is allowed, as long as they are equipped with thermal or magnetothermal protection or with maximum voltage, which protects the cable from overheating damaging, both with cable wounded or unwounded, and is equipped with industrial type sockets. The portable electric tools shall have double electrical isolation and protection level of at least IP 44, or be fed by a safety transformer. Before starting the activities, it is necessary to carry out an inspection of the work places in order to identify the possible existence of overhead electric lines and define the suitable precautions to prevent possible direct or indirect contact with energized elements. Written appropriate and detailed instructions must be drawn up for the persons in charge and workers that shall operate in proximity of electrical lines.
Pricks, cuts, abrasions	Contact between the operator's body and cutting or pointed elements or other ones able to cause injury shall be prevented; however, if it is necessary to handle potentially hazardous materials it is necessary for the workers to use IPDs suitable for the task, (for example: safety shoes, gloves, aprons, etc.). All the working parts of the equipment shall be protected against accidental contacts.
Manual handling of the loads	The manual handling of the loads shall be reduced to minimum and rationalized in order not to require excessive physical effort of the workers. Use auxiliary handling or division of the load. This latter shall be easily graspable and shall not present characteristics that may cause injuries to the operator's body, also in function of the work typology. Concerning the characteristics and entity of the loads, the manual handling activity shall be anticipated and accompanied by suitable information and training action, depending on test, for non-occasional activities, of the worker's health conditions.

Infections from microorganisms	The works that shall be carried out in potentially unhealthy environment, due to the presence of organic wastes, health-care waste, and anything else able to infect persons, shall be previously inspected in order to identify possible foci of microorganisms. If the outcome of the inspection is positive it is necessary to decontaminate the area with equipment, IPDs, and adequate personnel, once heard the company physician's opinion.
IPDs	
Helmet	
Safety shoes	
Respiratory tract protection masks	
Gloves	
Fall protection individual protection devices	
Protective clothing	
High visibility clothing (for external works)	
SIGNS	
Signs with prohibition signals ▪ Access to unauthorised persons is forbidden;	
Signs with warning signals ▪ Temporary signalling of hazard for circulation (yellow-black tape for internal walkways and white-red one for external walkways); ▪ Danger of tripping; ▪ Suspended loads.	
Signs with obligation signals ▪ Helmet is compulsory; ▪ Safety shoes are compulsory; ▪ Face/eyes protection is compulsory; ▪ Fall protection individual protection devices are compulsory; ▪ Vehicles at walking pace are compulsory; ▪ Body protection is compulsory; ▪ Respiratory tract protection is compulsory.	

RISK ASSESSMENT	
IDENTIFICATION OF HAZARDS	PREVENTION MEASURES AND INSTRUCTIONS FOR WORKERS
Bumps, blows, impacts, squeezing	Use tools, devices, and equipment suitable to the tasks, kept in good condition and in good order. Organise the deposits in order to prevent collapsing and crushing making the handling of the material stocked in it easy. Use shoes with crushproof toecap.
Slipping, falling over	Keep walkways free from equipment, materials, or other things able to hinder the walking of the operators and sufficiently illuminated. Wear suitable footwear. Signal fixed and/or protected obstacles.
Falling of material from above	All the operators shall use safety helmets. The portable tools shall be fixed safely to the operator's body when he moves in the working area. Prevent debris from falling during all operations carried out over ground.
Particulate, fibres	In case of works that present high dustiness, the workers shall use appropriate respiratory tract protection masks and wear suitable clothing; if necessary, the same workers shall be subject to health surveillance.

Electrical	The power supply of the portable electric tools must be through a system, also temporary, that ensures their safe use. Usually, a site electric panel connected through socket-plug, and equipped with suitable magnetothermal and differential protections is used. The use of cable reels is allowed, as long as they are equipped with thermal or magnetothermal protection or with maximum voltage, which protects the cable from overheating damaging, both with cable wounded or unwounded, and is equipped with industrial type sockets. The portable electric tools shall have double electrical isolation and protection level of at least IP 44, or be fed by a safety transformer. Before starting the activities, it is necessary to carry out an inspection of the work places in order to identify the possible existence of overhead electric lines and define the suitable precautions to prevent possible direct or indirect contact with energized elements. Written appropriate and detailed instructions must be drawn up for the persons in charge and workers that shall operate in proximity of electrical lines.
Pricks, cuts, abrasions	Contact between the operator's body and cutting or pointed elements or other ones able to cause injury shall be prevented; however, if it is necessary to handle potentially hazardous materials it is necessary for the workers to use IPDs suitable for the task, (for example: safety shoes, gloves, aprons, etc.). All the working parts of the equipment shall be protected against accidental contacts.
Manual handling of the loads	The manual handling of the loads shall be reduced to minimum and rationalized in order not to require excessive physical effort of the workers. Use auxiliary handling or division of the load. This latter shall be easily graspable and shall not present characteristics that may cause injuries to the operator's body, also in function of the work typology. Concerning the characteristics and entity of the loads, the manual handling activity shall be anticipated and accompanied by suitable information and training action, depending on test, for non-occasional activities, of the worker's health conditions.

Infections from microorganisms	The works that shall be carried out in potentially unhealthy environment, due to the presence of organic wastes, health-care waste, and anything else able to infect persons, shall be previously inspected in order to identify possible foci of microorganisms. If the outcome of the inspection is positive it is necessary to decontaminate the area with equipment, IPDs, and adequate personnel, once heard the company physician's opinion.
Intoxication from toxic or cancerogenic substances	The works that shall be carried out in potentially toxic or cancerogenic environment (for example asbestos coverings), due to the presence of substances able to intoxicate shall be previously inspected in order to identify all the possible sources of intoxicant substances. If the outcome of the inspection is positive it is necessary to suspend the works and contact the Technical Responsible of the contracting company.
IPDs	
Helmet	
Safety shoes	
Protection Goggles	
Respiratory tract protection masks	
Ear protections	
Gloves	
Fall protection individual protection devices	
Protective clothing	
SIGNS	
Signs with prohibition signals	
▪ Access to unauthorised persons is forbidden.	
Signs with warning signals	
▪ Falling of material from above; ▪ Danger of tripping; ▪ Harmful or irritant substances; ▪ Suspended loads.	

Signs with obligation signals

- Helmet is compulsory;
- Hearing protection is compulsory;
- Safety shoes are compulsory;
- Body protection is compulsory;
- Face protection is compulsory;
- Hands protection is compulsory;
- Respiratory tract protection is compulsory;
- Fall protection individual protection devices are compulsory.

WORKING PHASE	MAINTENANCE, MODIFICATION, DISASSEMBLING AND REASSEMBLING OF EXISTING EQUIPMENT INTERVENTIONS
DESCRIPTION OF WORKS	
We are talking about various types of maintenance activities, disassembling and reassembling, or changing of components of existing systems carried out in the site and/or in various departments of industrial plants. Usually, they involve ground work activities or ones in places accessible through staging, for example for interventions on fans, aspirators, filters, shutters, pipes, ducts, etc.	
WORKING PHASE SAFETY MANAGEMENT MODALITY	
The workers are informed about both mechanical and electric type risks deriving from the equipment subject to maintenance or disassembling interventions. The Employer, before sending the operators on site, checks the materials treated by the plant and checks, in collaboration with the contractor, if conditions for the presence of the following may exist: -Chemical Risk, due, for example, to suction systems (possible presence of particulate matter, solvents, or other hazardous chemical products); - Cancerogenic Risk, deriving for example from systems that aspirate potentially cancerogenic particulate, such as hard wood particulate; - Biological Risk, deriving for example from air conditioning or suction systems of specific type of rooms, such as stables for keeping laboratory animals, or buildings used for medical or biological-experimental purposes; -Explosion Risk, deriving from the presence of potentially explosive gas or particulate in the system. In the event that the presence of one or more of the above-mentioned risks exists, the Employer shall check the presence of appropriate IPDs and, if necessary, integrates the supply. Moreover, he shall inform the workers regarding the specific risks present and requires their comprehension. During working phase, the workers operate on the machines ONLY AFTER HAVING DISCONNECTED the same pneumatically and electrically, and being assure that they cannot restart (for example by keeping the key of the lock located on the disconnecting switch in the pocket). The workers then proceed with the disassembling or maintenance carefully, preventing to make unstable parts such as overhead ducts, fans, filters, or other parts that could fall. Any cleaning with compressed air is preferably carried out at the headquarters, by picking the material up and	

redelivering it; if it is necessary to operate at the site, said operations are carried out in areas indicated by the Internal Responsible and always delimited.

MACHINERY, EQUIPMENT AND SYSTEMS USED

Code	Machine
M25	mod. D28111 Flexible
M26	mod. D28401 Flexible
M27	mod. TW0350 Electric screw driver
M28	Drill
M29	Flexible
M30	mod. 25C072 Drill
M31	Electric screw driver
M32	mod. DW817 Flexible
M33	mod. GSC160 Cutter
M34	mod. GSC160 Cutter
V01	FIAT DAILY Lorry
V02	FIAT DAILY Lorry
V03	FIAT DAILY Lorry
V04	FIAT DAILY Lorry
---	Leased Liftable platform

RISK ASSESSMENT

IDENTIFICATION OF HAZARDS	PREVENTION MEASURES AND INSTRUCTIONS FOR WORKERS
Bumps, blows, impacts, squeezing	Use tools, devices, and equipment suitable to the tasks, kept in good condition and in good order. Organise the deposits in order to prevent collapsing and crushing making the handling of the material stocked in it easy. Use shoes with crushproof toecap.
Falling of material from above	All the operators shall use safety helmets. The portable tools shall be fixed safely to the operator's body when he moves in the working area. Prevent debris from falling during all operations carried out over ground using boards and containment nets.

Particulate, fibres	During the preparation operations of mortar, plaster, and paint mixes, etc. the production of dust must be prevented as much as possible. The workers shall use appropriate respiratory tract protection masks and wear suitable clothing; if necessary, the same workers shall be subject to health surveillance.
Vibrations	If it is not possible to prevent the direct use of tools and equipment able to transmit vibrations to the worker's body, specifically electric or pneumatic hammers, these latter must be equipped with all the most efficient technical solutions for the protection of the works (for example, anti-vibration handles, damping devices, etc.) and be kept in perfect efficiency condition. The possibility of subjecting the workers to health surveillance shall be taken into consideration.
Noise	The equipment shall be correctly maintained and used, in conformity with the indications of the manufacturer, in order to limit their excessive noisiness. Prevent useless noise. The personnel not needed for the works shall stay away from the area involved and the workers shall adopt, if necessary, the individual protection devices conform to the indications of the noise assessment report. The machines working area with high noisiness shall be delimited and indicated with signs.
Pricks, cuts, abrasions	Contact between the operator's body and cutting or pointed elements or other ones able to cause injury shall be prevented; however, if it is necessary to handle potentially hazardous materials it is necessary for the workers to use IPDs suitable for the task, (for example: safety shoes, gloves, aprons, etc.). All the working parts of the equipment shall be protected against accidental contacts.
Mists	During the operations of cold or hot pressure washing (or of other products applied with similar modalities) the workers shall wear suitable protective legging, waterproof protective clothing, and IPDs adequate to the agent, such as face shields, masks, goggles). The pressure of the pump and distance from the wall to be treated shall be proportionate to the characteristics of the material. The personnel not strictly necessary shall be sent away. The work area shall be appropriately marked and delimited with barriers.

Jets, splashing	During water jet washing operations the workers shall wear suitable protective legging and waterproof protective clothing. The personnel not strictly necessary shall be sent away. The washing waters shall be contained inside the delimited and protected area and disposed of according to criteria that keep into account the products removed and contained in suspension.
Gas, vapours	During cold or hot works, carried out by hand or with devices, materials, substances, and products that can develop, by themselves or in combination, gas, vapours, aerosols, and similar, hazardous to health, measures to prevent that the concentration of pollutants in the air exceed the maximum value allowed indicated in the regulations in force, shall be adopted. The reduction of the concentration can also be obtained with general ventilation means or with local suction ones followed by breaking-down. In confined rooms the check of the oxygen level shall be carried out, continuing with the blowing of clean air depending on the needs noticed or using the IPDs suitable for the agent. However, rapid exiting of personnel in emergency cases shall be organised. In the event that the presence or possibility of toxic or asphyxiating gas production is established or that the air of the room is unbreathable and it is impossible to ensure efficient aeration and complete decontamination, the workers shall be with supplied suitable respirators equipped with sufficient autonomy. Moreover, the continuous connection with persons at the external able to intervene promptly in case of emergencies shall always be ensured.
IPDs	
Helmet	
Safety shoes	
Goggles and face masks (for chipping, pressure washing, and welding operations)	
Respiratory tract protection masks (for stripping, chipping, welding, and similar operations)	
Ear protection (ear plugs, ear muffs)	
Protective clothing (for stripping, painting, pressure washing, welding, and similar operations)	
Fall protection individual protection devices	
Full suit complete with respirator for sandblasting works.	

SIGNS
Signs with prohibition signals ▪ Access to unauthorised persons is forbidden; ▪ No smoking or use of free flames; ▪ Works in progress, do not execute manoeuvres; ▪ Do not touch.
Signs with warning signals ▪ Falling of material from above; ▪ Danger of tripping; ▪ Suspended loads;
Signs with obligation signals ▪ Helmet is compulsory; ▪ Safety gloves are compulsory; ▪ Respiratory tract protection is compulsory; ▪ Fall protection individual protection devices are compulsory.

15 Supplementary and detailed procedures required in the Safety and Coordination Plan

No supplementary and detailed procedures linked to the realisation of the work subject of this contract or to the single working phases inherent said realisation, are not specifically required.

Uzzano loc. Forone,

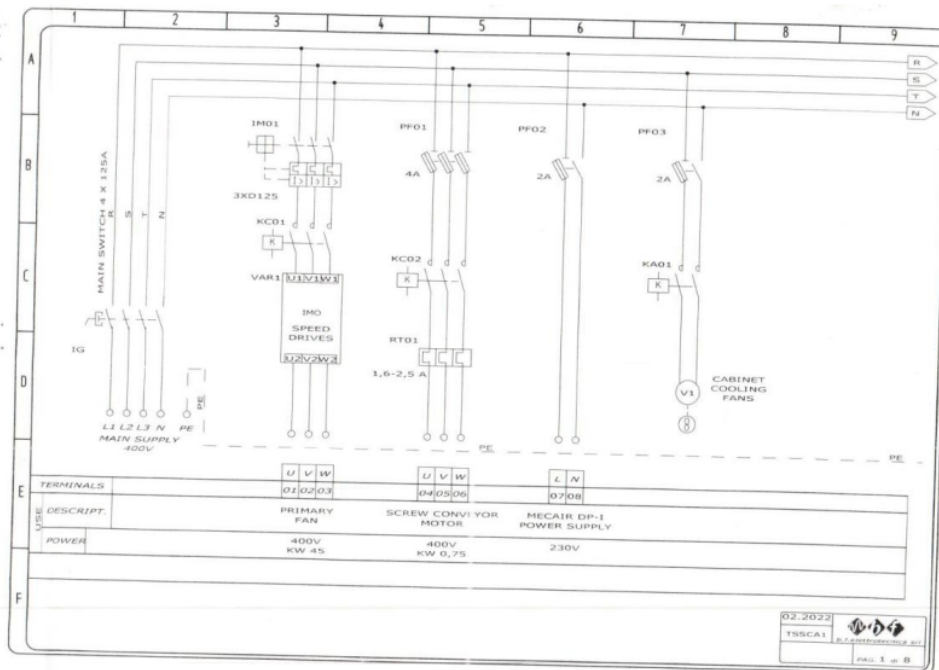
10/03/2022 The

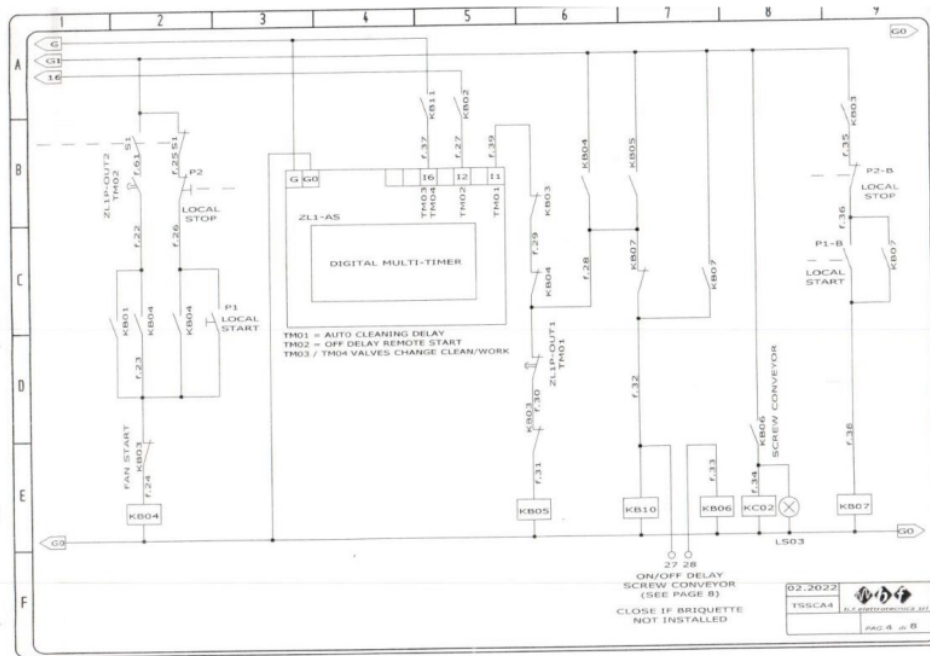
Company

Stamp and Signature

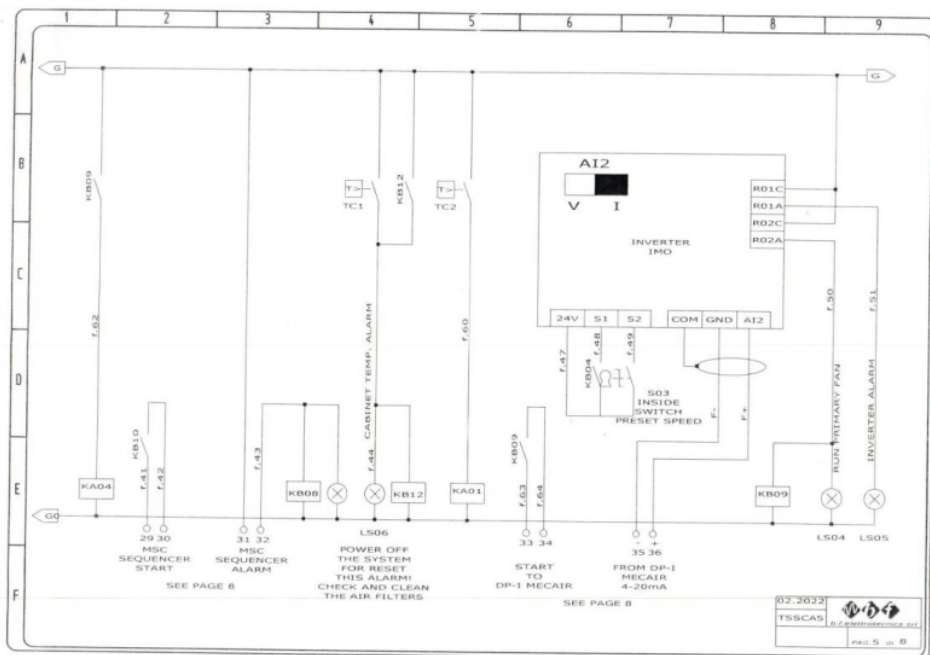
9.2 Appendix 2 – Panel Drawings

 b.f. elettrotecnica s.r.l. Via di Montecarlo 117 Castelfranco di Pistoia PT Tel. 0572 452923 WWW.BFELETTROTECNICA.IT		ORDER 02/2022 REFERENCE QAS DATE 24.02.2022
Contributitori:  TOSCANA IMPIANTI TECNOLOGIE AMBIENTALI S.R.L. Via di Montecarlo 117 Castelfranco di Pistoia PT Tel. 0572 452923		DRAWN INTERTISSUE U.K. F.S. 1 0 RELEASE 1 0
DESCRIPTION 45KW FAN (INVERTER) 0,75KW SCREW CONVEYOR WORK./CLEAN. SOL VALVES ELECTRIC CONTROL BOARD		EN01-439-1 EN01-439-2 EN01-439-3 MATR. TS00422 

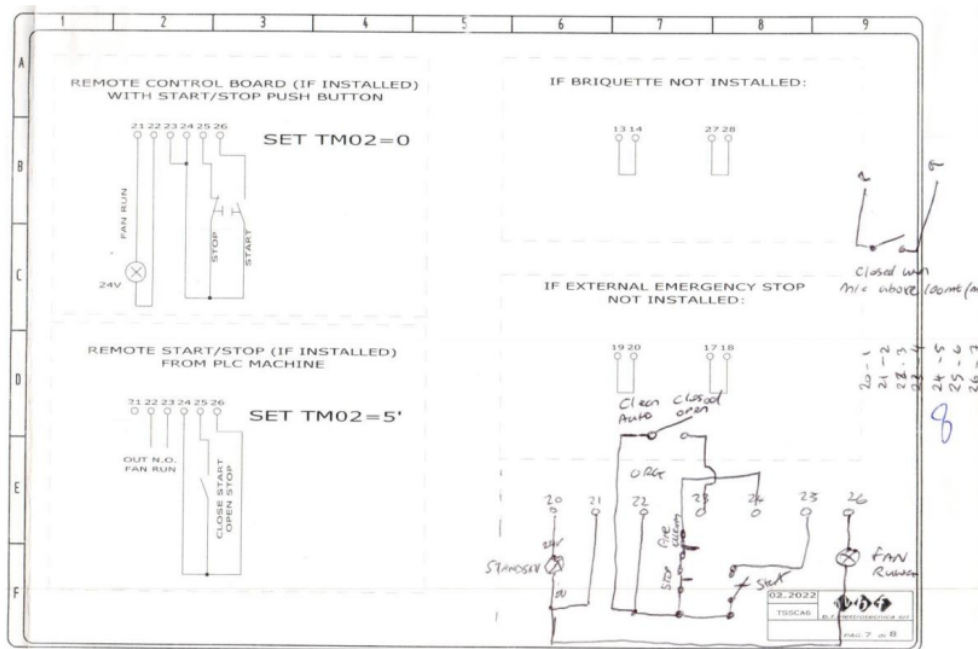
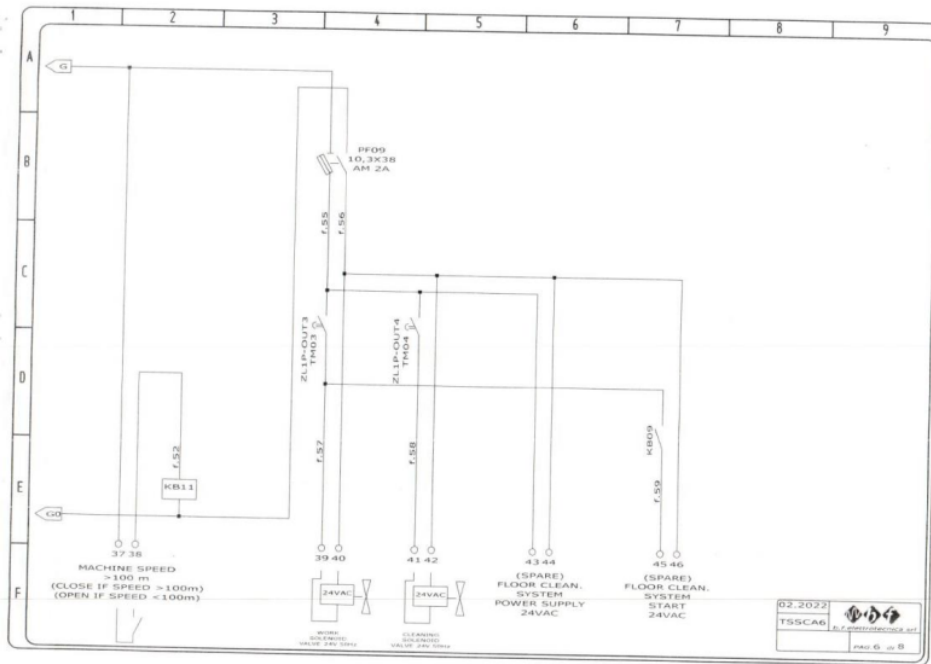


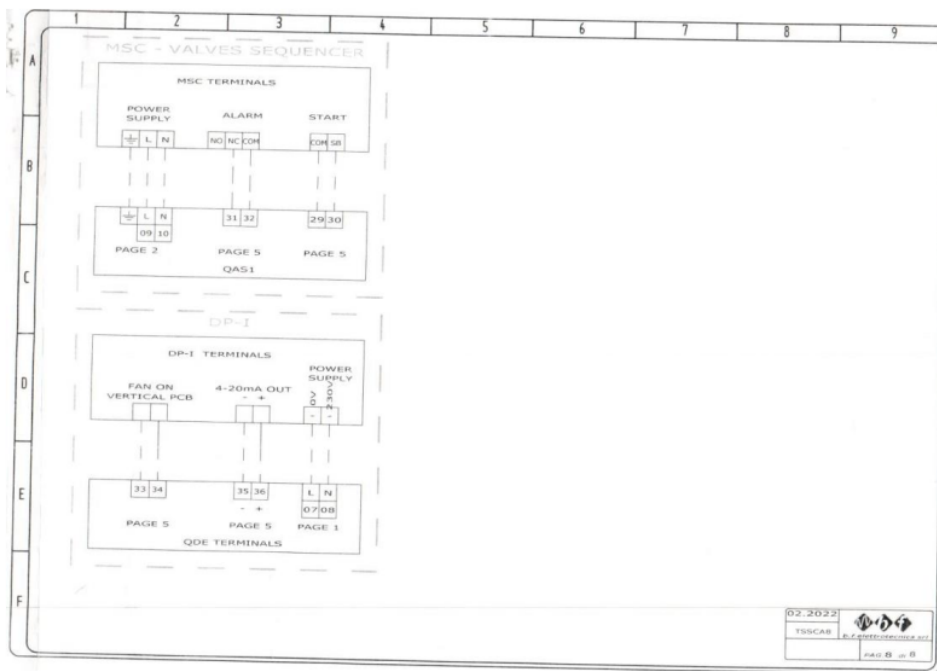


5



6





9.3 Appendix 3 – HD1 - 200A – 23 Datasheet

Options & Ordering Codes

HD1 - 75A - 43		
Series		Input
HD1 Inverter Drive		400V
HD1		Three Phase
Output Power kW (HP)		
1.5kW (2HP)	3.7A	30kW (40HP)
2.2kW (3HP)	5A	37kW (50HP)
4.0kW (5.5HP)	9.5A	45kW (60HP)
5.5kW (7.5HP)	14A	55kW (75HP)
7.5kW (10HP)	18.5A	75kW (100HP)
11kW (15HP)	25A	90kW (125HP)
15kW (20HP)	32A	110kW (150HP)
18.5kW (25HP)	38A	125kW (175HP)
22kW (30HP)	45A	160kW (215HP)
		200A
		23

HD1 - 130A - 23		
Series		Input
HD1 Inverter Drive		200V
HD1		Three Phase
Output Power kW (HP)		
0.75kW (1HP)	4.5A	15kW (20HP)
1.5kW (2HP)	7A	18.5kW (25HP)
2.2kW (3HP)	10A	22kW (30HP)
4kW (5.5HP)	16A	30kW (40HP)
5.5kW (7.5HP)	20A	37kW (50HP)
7.5kW (10HP)	30A	45kW (60HP)
11kW (15HP)	42A	55kW (75HP)
		200A
		23

HD1 - 52A - 63		
Series		Input
HD1 Inverter Drive		600V
HD1		Three Phase
Output Power kW (HP)		
18.5kW (25HP)	27A	55kW (75HP)
22kW (30HP)	35A	75kW (100HP)
30kW (40HP)	45A	90kW (125HP)
37kW (50HP)	52A	110kW (150HP)
45kW (60HP)	62A	
		200A
		63

HD1 Ratings & Specifications

Model	HD Mode (150% Overload - 1 min)				ND Mode (120% Overload - 1 min)			
	Rated Power kW (HP)	Carrier Frequency (kHz)	Rated Input Current (A)	Rated Output Current (A)	Rated Power kW (HP)	Carrier Frequency (kHz)	Rated Input Current (A)	Rated Output Current (A)
HD1-3.7A-43	1.5 (2)	8	5	3.7	-	-	-	-
HD1-5A-43	2.2 (3)	8	5.8	5	-	-	-	-
HD1-8.5A-43	4 (5.5)	8	13.5	9.5	5.5 (7.5)	4	19.5	14
HD1-14A-43	5.5 (7.5)	8	19.5	14	7.5 (10)	4	25	18.5
HD1-18.5A-43	7.5 (10)	8	25	18.5	11 (15)	4	32	25
HD1-25A-43	11 (15)	8	32	25	15 (20)	4	40	32
HD1-32A-43	15 (20)	4	40	32	18.5 (25)	2	47	38
HD1-38A-43	18.5 (25)	4	47	38	22 (30)	2	56	45
HD1-45A-43	22 (30)	4	56	45	30 (40)	2	70	60
HD1-60A-43	30 (40)	4	70	60	37 (50)	2	80	75
HD1-75A-43	37 (50)	4	80	75	45 (60)	2	94	92
HD1-92A-43	45 (60)	4	94	92	55 (75)	2	128	115
HD1-115A-43	55 (75)	4	128	115	75 (100)	2	160	150
HD1-150A-43	75 (100)	2	160	150	90 (125)	2	190	180
HD1-180A-43	90 (125)	2	190	180	110 (150)	2	225	215
HD1-215A-43	110 (150)	2	225	215	132 (175)	2	265	260
HD1-260A-43	132 (175)	2	265	260	160 (215)	2	310	305
HD1-305A-43	160 (215)	2	310	305	185 (250)	2	345	340
HD1-340A-43	185 (250)	2	345	340	200 (270)	2	385	380
HD1-380A-43	200 (270)	2	385	380	220 (300)	2	430	425
HD1-425A-43	220 (300)	2	430	425	250 (335)	2	485	480
HD1-480A-43	250 (335)	2	485	480	280 (375)	2	545	530
HD1-530A-43	280 (375)	2	545	530	315 (420)	2	610	600
HD1-600A-43	315 (420)	2	610	600	350 (470)	2	625	650
HD1-650A-43	350 (470)	2	625	650	400 (535)	2	715	720
HD1-720A-43	400 (535)	2	715	720	500 (670)	2	890	860
HD1-890A-43	500 (670)	2	890	860	-	-	-	-

Model	Output Power kW (HP)	Carrier Frequency (kHz)	Input Current (A)	Rated Output Current (A)
HD1-4.5A-23	0.75 (1)	2	5	4.5
HD1-7A-23	1.5 (2)	2	7.7	7
HD1-10A-23	2.2 (3)	2	11	10
HD1-16A-23	4 (5.5)	2	17	16
HD1-20A-23	5.5 (7.5)	2	21	20
HD1-30A-23	7.5 (10)	2	31	30
HD1-42A-23	11 (15)	2	43	42
HD1-55A-23	15 (20)	2	56	55
HD1-70A-23	18.5 (25)	2	71	70
HD1-80A-23	22 (30)	2	81	80
HD1-110A-23	30 (40)	2	112	110
HD1-130A-23	37 (50)	2	132	130
HD1-160A-23	45 (60)	2	163	160
HD1-200A-23	55 (75)	2	200	200

Model	Output Power kW (HP)	Carrier Frequency (kHz)	Input Current (A)	Rated Output Current (A)
HD1-27A-63	18.5 (25)	4	35	27
HD1-35A-63	22 (30)	4	40	35
HD1-45A-63	30 (40)	4	47	45
HD1-52A-63	37 (50)	4	52	52
HD1-62A-63	45 (60)	4	65	62
HD1-86A-63	55 (75)	4	85	86
HD1-98A-63	75 (100)	2	95	98
HD1-120A-63	90 (125)	2	118	120
HD1-150A-63	110 (150)	2	145	150

HD (Heavy Duty) and ND (Normal Duty) offer 150% and 120% overload respectively and are easily selectable with one configuration parameter.

IMO rating data is based upon default carrier frequency and 40°C ambient temperature. Please contact IMO for further support in selecting and sizing a comparable drive for your application.

9.4 Appendix 4 – ATV630D55N4 Datasheet

Product data sheet Characteristics

ATV630D55N4

variable speed drive ATV630 - 55kW/75HP -
380...480V - IP21/UL type 1



Main

Range of product	Altivar Process ATV600
Product or component type	Variable speed drive
Product specific application	Process and utilities
Device short name	ATV630
Variant	Standard version
Product destination	Asynchronous motors Synchronous motors
Mounting mode	Wall mount
EMC filter	Integrated EN/IEC 61800-3 category C3 150 m
IP degree of protection	IP21 conforming to IEC 61800-5-1 IP21 conforming to IEC 60529
Degree of protection	UL type 1 UL 508C
Type of cooling	Forced convection
Supply frequency	50...60 Hz - 5...5 %
Network number of phases	3 phases
[Us] rated supply voltage	380...480 V - 15...10 %
Motor power kW	55 kW normal duty 45 kW heavy duty
Motor power hp	75 hp normal duty 60 hp heavy duty
Line current	97.2 A 380 V normal duty 84.2 A 480 V normal duty 81.4 A 380 V heavy duty 71.8 A 480 V heavy duty
Prospective line Isc	50 kA
Apparent power	70 kVA 480 V normal duty 59.7 kVA 480 V heavy duty
Continuous output current	106 A 2.5 kHz normal duty 88 A 2.5 kHz heavy duty
Maximum transient current	116.6 A 60 s normal duty 132 A 60 s heavy duty

Warning: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.

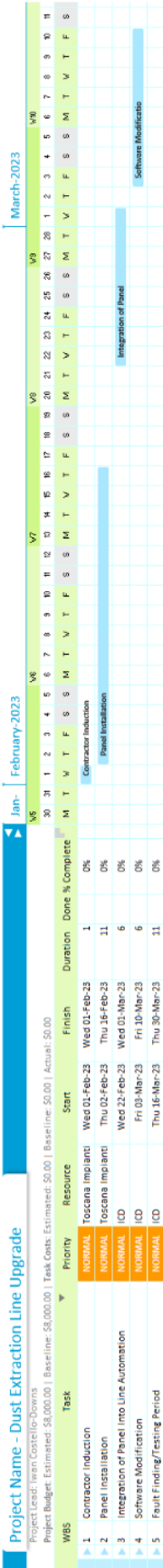
9.5 Appendix 5 – Vacon 100 Flow Drive

Application:	designed for control of pumps, fans, compressors, blowers..
Control Performance:	Open loop vector control (5-150% of base speed) Ramp times (acceleration and deceleration): 0.1-3000 s
Frame:	MR8
Low/High Loadability:	110%
Power:	55kW (110% 1min/10min)
Current:	205A (110% 1min/10min)
Voltage:	208 ± 240VAC
Input:	2 x AI 6 x DI 10V, ref. 24V in
Output:	1 x AO 3 x RO 2 x RO + TI 2 x 24V out Built in modules: Modbus TCP/IP, BACnet IP, PROFINET, EtherNet/IP
Output Frequency:	0 ± 320Hz
Ambient Temperature:	-10 ± 50°C
Braking Chopper:	integrated
DC Choke:	integrated
Emmissions:	EMC class 2
Protection Class:	IP21
Dimensions (W X H X D):	290 x 966 x 343mm
Weight:	66kg
Approvals:	SIL3, DNV -GL, BV, LR, ABS and RINA

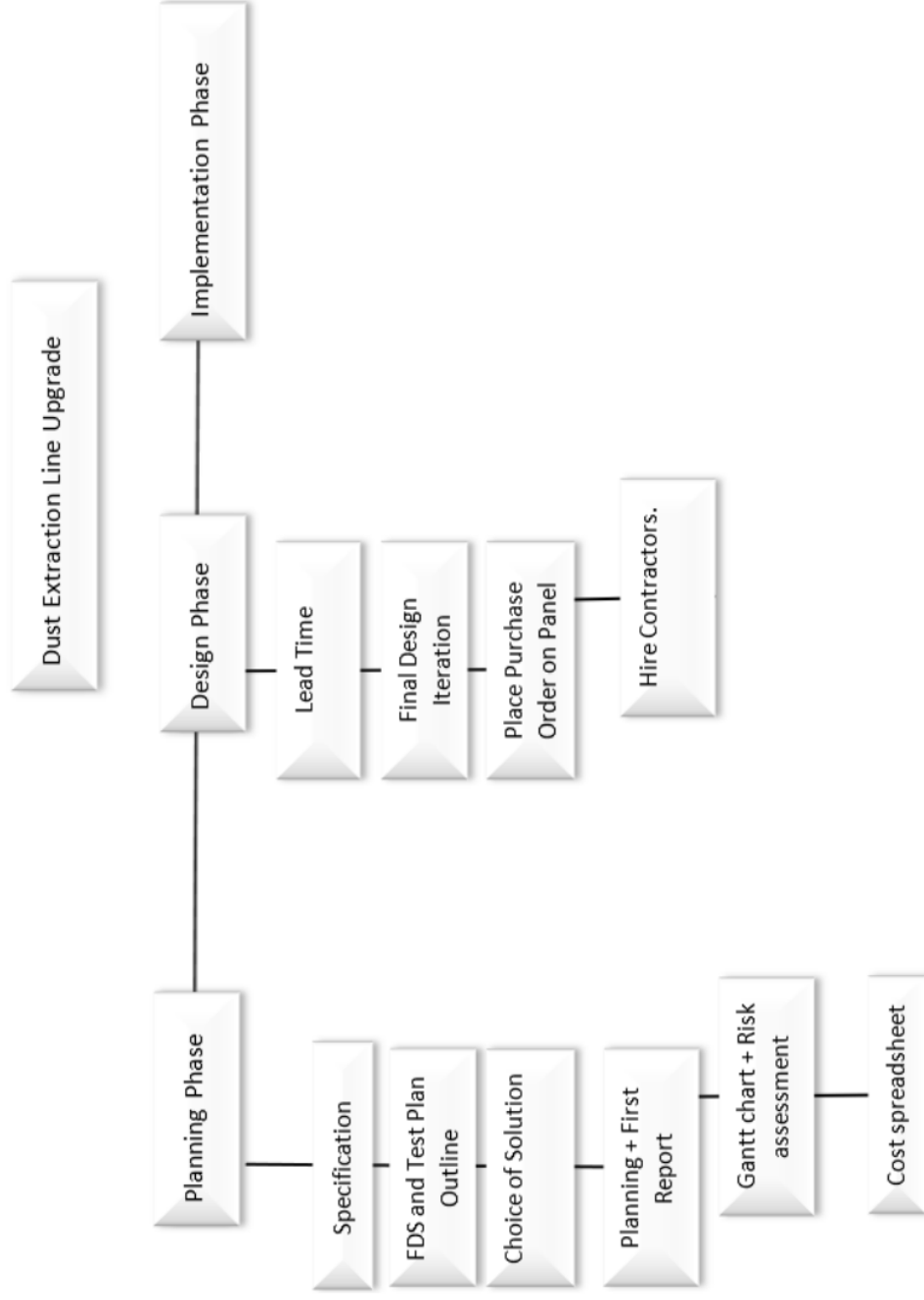
9.6 Appendix 6 – Costing Spreadsheet

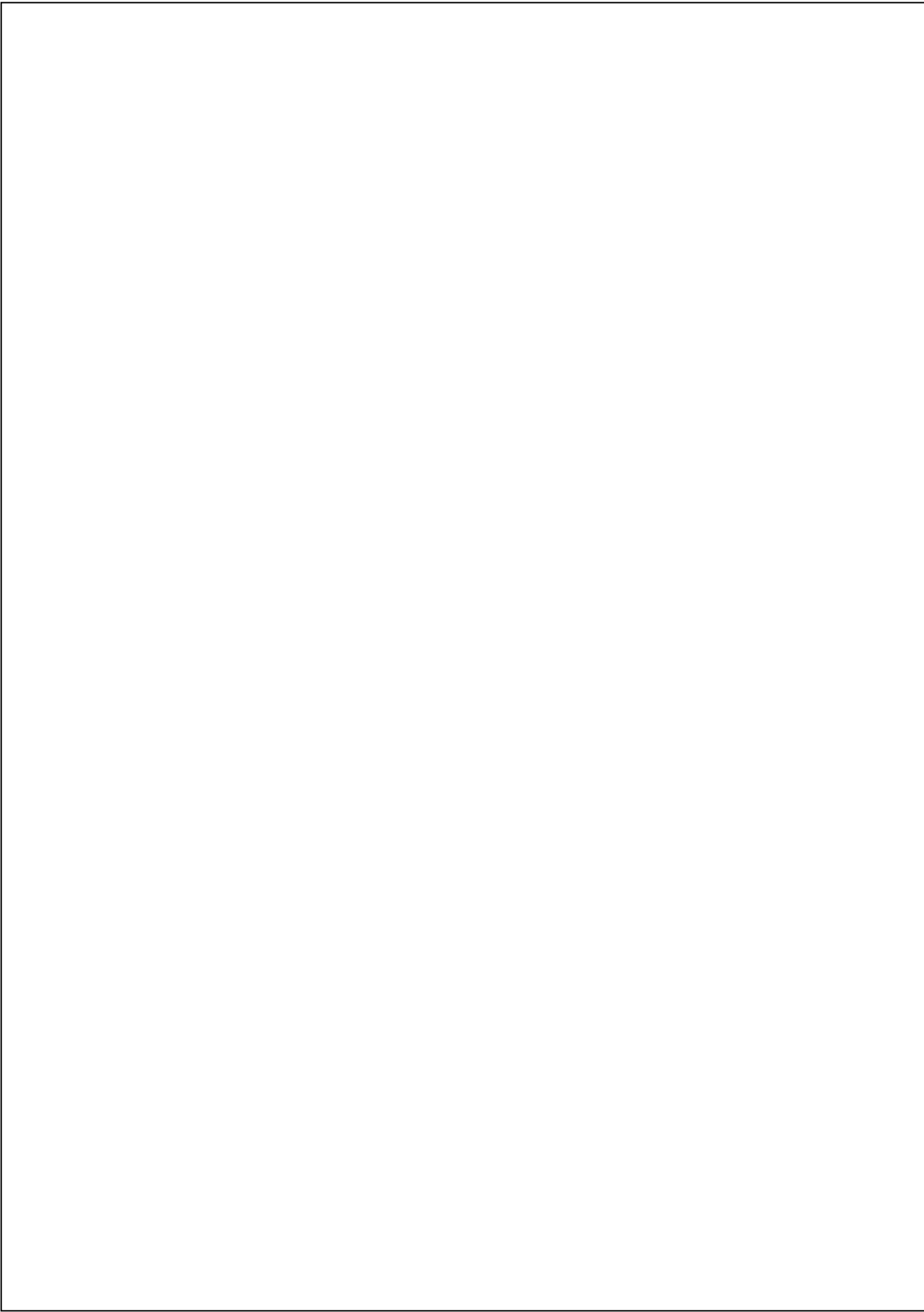
Predicted costing	Actual costing
SIMATIC STEP 7 Prof. Combo V16 - £2,589.00 (Parmley Graham, 2022)	Already Acquired – N/A
Panel Design and Installation Cost - £8000	£8000

9.7 Appendix 7 – Gantt Chart



9.8 Appendix 7 – WBS





Assignment 1

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

40/100

PAGE 1

PAGE 2

Text Comment. Has this page been left intentionally blank?

PAGE 3

Text Comment. needs updating

PAGE 4

Text Comment. ?

QM

Punctuation Error

Punctuation error

QM

Write in the third person

Don't refer to your self as I, me, my or others as you etc. Avoid personal references. If absolutely necessary, refer to self as "the author".

Text Comment. A basic summary covering some aspects of the project

PAGE 5

PAGE 6

Text Comment. A photo or layout diagram of the machine would have been useful here.

Text Comment. redundant word

Text Comment. A clearly defined problem definition

PAGE 7

Text Comment. Brief asks for fully justified text

PAGE 8

PAGE 9

PAGE 10

Text Comment. constraints

PAGE 11

PAGE 12

PAGE 13

Text Comment. no need to include this

Text Comment. good because this can be measured

Text Comment. 1.7 and 1.8 are very similar functions but have very different values

Text Comment. these last 2 columns cannot be filled in until the project is complete

PAGE 14

Text Comment. You should have used a method of justifying your choice of solution

Text Comment. most of these keys are not needed

Text Comment. These 2 lower blocks are like a flow chart, they should represent hardware

Text Comment. Figure number?

Text Comment. Figure ?

Text Comment. datasheets should not be included in the report, cite the source instead

Text Comment. The brief asks for 1.5 lines spacing with fully justified text

Text Comment. page numbers have disappeared

PAGE 15

PAGE 16

PAGE 17

PAGE 18

PAGE 19

PAGE 20

PAGE 21

PAGE 22

PAGE 23

PAGE 24

PAGE 25

PAGE 26

PAGE 27

PAGE 28

PAGE 29

PAGE 30

PAGE 31

PAGE 32

PAGE 33

PAGE 34

PAGE 35

PAGE 36

PAGE 37

PAGE 38

PAGE 39

PAGE 40

PAGE 41

PAGE 42

PAGE 43

PAGE 44

PAGE 45

PAGE 46

PAGE 47

PAGE 48

PAGE 49

PAGE 50

PAGE 51

PAGE 52

PAGE 53

PAGE 54

PAGE 55

PAGE 56

PAGE 57

PAGE 58

PAGE 59

PAGE 60

PAGE 61

PAGE 62

GRADING FORM: NEW CSG-RUBRIC

IWAN COSTELLODOWNS

40

1. ENGAGEMENT WITH LITERATURE



Sections 3 and 5: Engagement in research, judicial use and critical evaluation sources for project constraints and literature review of solutions Some evidence provided. Literature review is very short (4/10) Sections 3, 5 and 8: Extent of reading, use of credible sources, use of Harvard method for listing and citing There is evidence of reading from credible sources but the citation is shorter than expected for this level (3/10) Total = 7/20

7

2. KNOWLEDGE AND UNDERSTANDING



Section 3: Project background and problem definition Briefly explained (2/5) Section 3: Project constraints: Ethical. This section contains some details relevant to the project. (3/5) Section 3: Project constraints: Sustainability This section contains some details relevant to the project (2/5) Section 3: Project constraints: Legal/Commercial A good section (3/5) Total = 10/20

10

3. COGNITIVE AND INTELLECTUAL



Section 4: Functional Design Specification A brief description given (2/5) Section 4: Test planning Test plan contains 2 test and results have already been filled in (1/5) Section 5: Evaluation of solutions and justification of final solution Little evaluation of solutions, no method of selection provided, little justification of final choice (1/5) Section 7: Conclusions and Recommendations A brief section (1/5) Total = 5/20

5

4. PRACTICAL APPLICATION



Section 6: Project Plan A very simple plan offered in the appendix (1/5) Section 6: Working breakdown structure, costing exercise and management techniques A simple diagram offered in the appendix with some explanation in the main report (1/5) Appendix: Risk assessment for implementation phase A very detailed operational safety plan and details of working phase procedures provided in the appendix (4/5)

6

Appendix: Planning phase log-book entries. No log entries included (0/5) Total = 6/20

5. TRANSFERABLE SKILLS



Section 1: Executive summary A basic summary covering some aspects of the project (1/5) All Sections: Presentation quality of the report, diagrams, charts, tables, figure numbering, page, and section numbering etc Generally, well presented but figures are not numbered and page numbers rung out half way through. (2/5) All Sections: Quality of the writing style, use of punctuation and grammar Good writing style etc (4/5) Word count limit not exceeded Not exceeded (5/5) Total = 12/20

12