



Arc Flash Hazard Analysis

Introduction

As our name implies, we specialize in providing arc flash studies and power systems analysis to assist in mitigating risk to the work force and optimising the reliability of both new and installed power systems and electrical equipment.

Our team can also provide a variety of other services including preventative maintenance programs, inspection, testing and commissioning services and thermographic studies and have incorporated the best practices from various industries into our processes.

Arc Flash Advisors Ltd. is pleased to submit a proposal for performing your arc flash hazard analysis and assessment as per CSA-Z462 15.

Arc Flash Advisors agrees to furnish an Arc Flash Analysis Report in compliance with CSA-Z462 15. The study will be performed using SKM's Power Tools for Windows.

All reports provided are stamped and signed by a Professional Engineer licensed in the Province of the facility.

Deliverables

- As-built Arc Flash Single Line diagram
- Arc Flash, short circuit and device and settings coordination assessment/analysis as per IEEE-1584
- Electrical equipment labelling as per CSA-Z462 15 and ANSI Z535.4
- Data collected(photos/spreadsheets/SKM files)
- Certificate of Compliance
- (Optional) Thermographic report and anomaly images



Arc Flash Hazard Analysis

Data Collection and Inspection

Arc Flash Advisor personnel will visit the facility to conduct a visual and optional infrared inspection if required and collect the data necessary to prepare an arc flash hazard analysis.

The data collector may require the following to be provided for the facility:

- A simple floor plan of the facility, drawn to scale. This will be used to estimate the length of feeder circuits.
- Identification of all disconnects, circuit breakers, switchboards, motor control centers and transformers.
- Man-lift and/or ladders, as needed to collect data on electrical equipment.
- If the facility has a qualified electrician or engineer available, Arc Flash Advisors requests that one accompany and assist in the data gathering, increasing the overall safety, thoroughness and efficiency of the data collection process.
- Copies of any existing data sheets and/or drawings that provide information on the existing electrical system.





Arc Flash Hazard Analysis

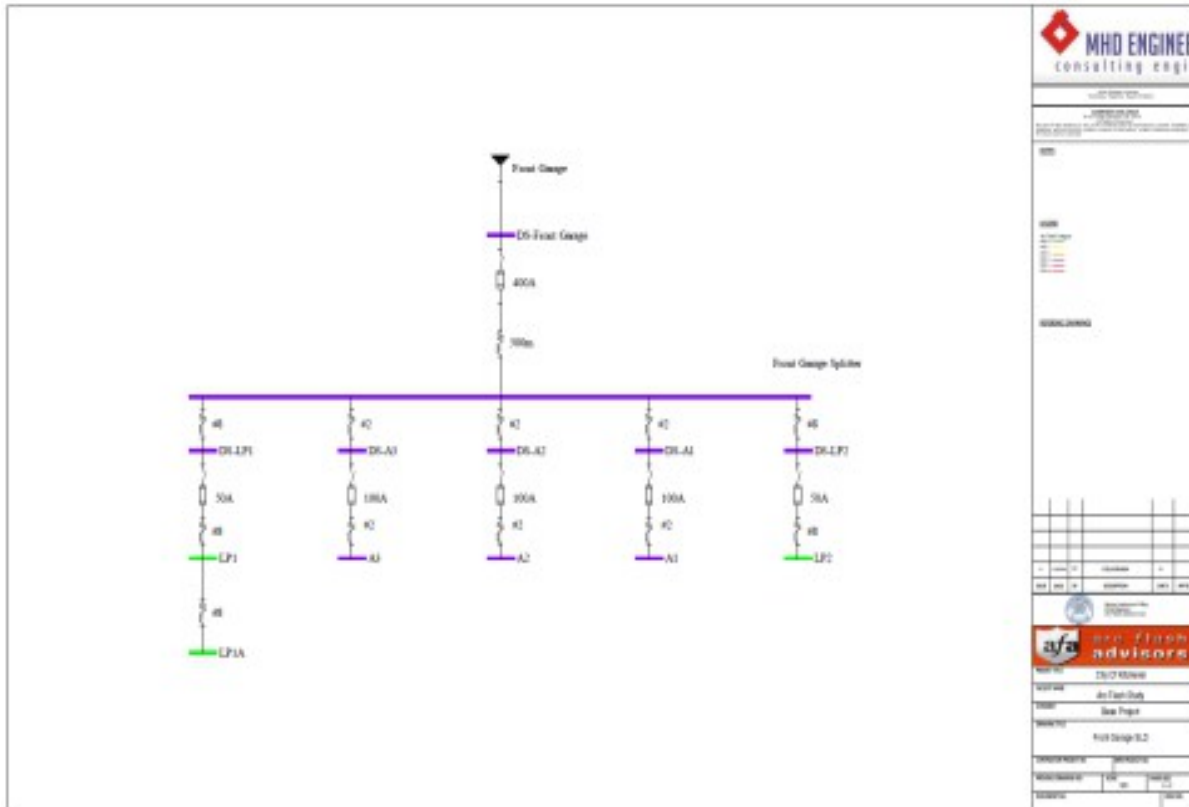
Arc Flash Study and Reports

Short Circuit Study

A short circuit study will be performed for the facility to verify that the interrupting rating is greater than the available fault current for fuses, circuit breakers and relays, following the recommendations of the latest standards of IEEE 399 and IEEE 551. The study will provide a list of recommendations for any device that is underrated.

One Line Diagram

Arc Flash Advisors will create an as-built electrical one line diagram for the facility. This will include all electrical equipment needed to calculate the maximum fault current, the arc flash current and the anticipated maximum energy released in the event of an arc flash for each location as required by CSA Z462 15.





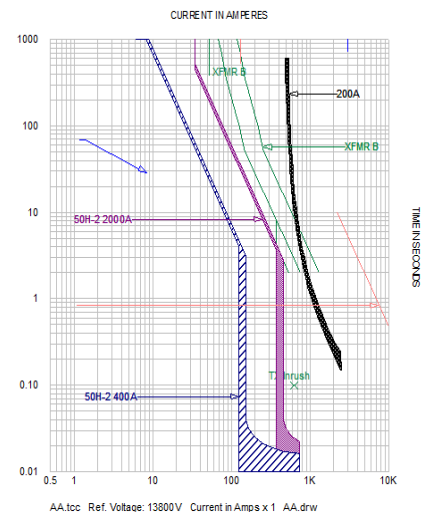
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Protective Device Coordination Study

A protective device coordination study will be performed following the recommendations of the latest standards of IEEE 242 and IEEE 399 for the facility to determine the correct settings and sizes for fuses, circuit breakers and relays, in order to minimize unnecessary service interruptions and nuisance tripping. For any devices determined to be outside acceptable incident energy limits in the study, analysis will be performed to determine if device settings and/or fuse sizes and types can be modified to achieve acceptable PPE requirements.

The analysis will include:

- Plots of transformer protection curves, motor starting curves, fuse sizes, circuit breaker and relay settings.
- Time-Current characteristic curves plotted on log-log paper demonstrating selective coordination of devices (when achievable).
- Time current curves will include device characteristics data, equipment protective limits and 3P bolted fault cut-off values at device location.
- List of overcurrent protective devices displaying device or circuit name, device type, manufacturer, function, interruption rating, ampere frame/sensor/trip/plug, and the recommended protective device settings/frame sizes in order to provide optimal protection and system reliability.
- A list of recommendations in order to achieve selectivity (coordination) between protective devices, such that only the nearest protective device trips during over current conditions, leaving the rest of the system unaffected.
- A list of recommendations in order to prevent false overcurrent protective device tripping due to transformer inrushes, transients, motor starting currents, hot and cold load pick up currents.





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The Arc Flash study will be performed for the facility to determine the Incidental Energy, Flash Boundary, and PPE Requirements for panel boards, switchboards, industrial control panels, and meter socket enclosures indicated on the one line drawing and as-found on site.

The study will be in accordance with the latest Standard IEEE 1584 recommended calculation method and performed on equipment 208/120 Volts and above. The study will use the latest CSA Z462 15 Standards for boundary calculations, hazard categories, and recommended PPE.



Reports

The final reports will be written to present and discuss the study findings and recommendations. The report will include the following:

- Introduction
- Executive Summary and Recommendations.
- Short Circuit Study description, assumptions, and results.
- As-built Arc Flash one line drawing.
- Protective Device Coordination Study description, assumptions, results and recommendations.
- Arc Flash Study description, assumptions, results, and recommendations.
- Recommendations for Arc Flash Mitigation at hazard risk category above HRC 2 (8 cal/cm²).
- Optional Visual and Infrared Inspection Report





Arc Flash Hazard Analysis

Arc Flash Warning Label Installation

Arc Flash Advisors Ltd. personnel will affix the warning labels to the electrical equipment. Warning labels will be affixed to the following electrical equipment, as per CSA-Z462 15:

- Switchgear and switchboards
- Panel boards
- Transformers
- Feeder bus ducts
- Variable Frequency Drives
- Control Cabinets
- Industrial Control Panels
- Meter socket enclosures
- Motor Control Centres
- Junction Boxes
- Miscellaneous equipment likely to be serviced, examined, or maintained while energized

 WARNING	
Arc Flash and Shock Hazard	
Appropriate PPE Required	
31 inches	Arc Flash Boundary
2.9 cal/cm ²	Incident energy using D.4 IEEE1584
18 inches	Working Distance
600 VAC	Shock Hazard when cover is removed
0	Glove Class
42 inches	Limited Approach
12 inches	Restricted Approach
ID: (Fed From) DS-A/C #2 (DP#1)	
	Prepared On: 04/20/2015 By: Steven Ladouceur P.Eng. www.arcflashadvisors.com

Certificate of Compliance

Upon completion of the study, Arc Flash Advisors will provide a certificate of compliance which is valid for a period of 5 years. If at any time during this period changes are made to the electrical system, Arc Flash Advisors will provide a study based on the change documentation and update any required labels free of charge. If the proposed modifications are delivered to Arc Flash Advisors prior to the changes taking place an impact statement will be provided free of charge. If any label is damaged, lost, or misplaced for any reason Arc Flash Advisors will provide a replacement free of charge.

References

- Ontario Occupational Health and Safety Act (OHSA)
- Canadian Labour Code (CLC) for federally incorporated companies
- CSA Z462-15
- Ontario Electrical Safety Code (OESC)

