



Case Study

Arc Flash Risk Management



Introduction

If you have electrical equipment on your premises the law requires that you assess and understand all of the risks posed by the use of that equipment and to ensure that suitable control measures are in place to minimise their effects.



What is Arc Flash

Arc flash, specifically, is a non-contact short circuit between an energised conductor and another conductor or an earthed part. It can lead to extreme and violent consequences which pose a significant risk to people and plant.

On the surface it may seem like efforts to tackle arc flash are as futile as trying to tame lightning, but there are numerous, well established, positive actions which can (and should) be taken to manage the associated risks.



Our Approach

Inspec Systems were recently engaged by a major UK pharmaceutical company to review their on site electrical systems and carry out an arc flash assessment on their behalf.

Based on the IET's '4P' approach to risk assessment, we embarked on a program which included:

- Analysis of the client's existing systems and documentation.
- Detailed site survey of the fixed electrical system.
- Calculation of arc flash boundary and incident energy values.
- Recommendations for the use of personal protective equipment.
- Labelling of equipment to warn of localised arc flash hazards.
- Information, instruction and training for electrical personnel.





We Design

Challenges of Data Gathering

Critical to the arc flash evaluation was the collation of specific information key to the calculation and risk assessment processes.

Information gathered included:

- Transformer and other supply characteristics.
- Cabling arrangements and lengths.
- Fuse and breaker ratings, adjustable device settings and trip characteristics.
- Modes of operation for the system.
- Prospective short circuit (or 'Bolted Fault') currents.
- Physical sizes of equipment, conductor gaps and terminal arrangements.
- Motor contributions.

Arc Flash Schedule														
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Id No.	Voltage (V)	Fault Current (kA)	Equipment Type	Line of Measure (m)	Enclosure Dimensions (mm)	Working Clearance (mm)	Conductor Gap (mm)	Arcing Current (kA)	Incident Energy (cal/cm²)	Arc Flash Boundary (m)	NFPA PPE Category	NFPA PPE Category		
ES1-10-3	400	7.176	Distribution Board	mm	25.41 100 1	304.8	6.35	6.532	0.161	87	N/A	N/A		
ES2-4-3-3	400	8.572	Distribution Board	mm	25.41 100 1	304.8	6.35	7.288	0.216	105	N/A	N/A		
ES2-7	400	10.866	Secondary Switchgear	mm	25.41 100 1	304.8	6.35	9.359	0.757	229	N/A	N/A		
ES1-10-2	400	3.075	Distribution Board	mm	25.41 100 1	304.8	6.35	2.432	0.072	53	N/A	N/A		
ES2-4-2	400	9.201	Distribution Board	mm	25.41 100 1	304.8	6.35	7.857	0.234	110	N/A	N/A		
ES2-4-6-7-3	230	1.381	Distribution Board	mm	25.41 100 1	304.8	6.35	0.758	0.011	17	N/A	N/A		
ES	400	11.217	Primary Switchgear	mm	25.41 100 1	304.8	6.35	9.675	31.835	2372	3	3		
ES1-10-4-5	400	2.835	Distribution Board	mm	25.41 100 1	304.8	6.35	2.314	0.07	52	N/A	N/A		
ES1-10-4-6	400	2.835	Distribution Board	mm	25.41 100 1	304.8	6.35	2.314	0.07	52	N/A	N/A		
ES1-10-10	400	3.178	Distribution Board	mm	25.41 100 1	304.8	6.35	2.52	0.068	51	N/A	N/A		
ES1-2	400	10.074	Secondary Switchgear	mm	25.41 100 1	304.8	6.35	8.645	0.247	114	N/A	N/A		



We Specialise



We Integrate



We Install



We Bot



We Manage

Site Survey

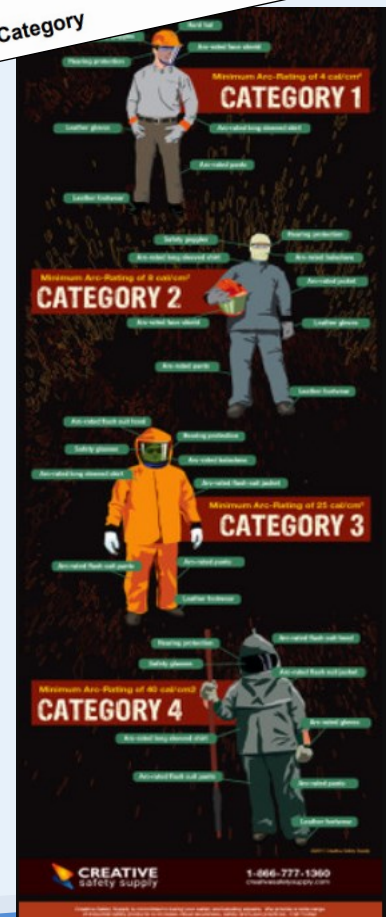
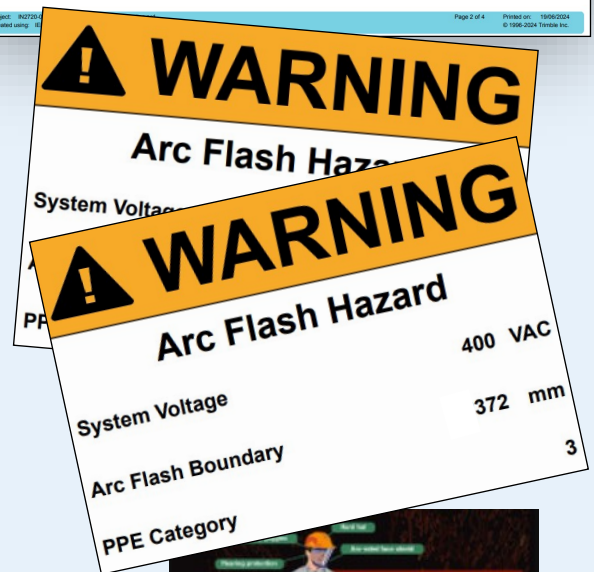
We found that, as with most organisations, some, but not all, of the above information was to hand. Despite assurances that it would be provided, it became clear that we needed to carry out our own site survey to ensure that we collected the correct data in a timely manner allowing the client to progress their day job.

Outcomes

Using our knowledge of distribution systems design and having undertaken specialist arc flash evaluation training we used the data gathered, along with our arc flash assessment software, to calculate arcing currents and durations, incident energies and arc flash boundaries for the system.

The results of these calculations then identified opportunities to reduce protection settings leading to lower incident energy levels and hence the downgrading of necessary PPE. This approach makes the system safer with PPE as the last resort.

A final action is to generate appropriate labelling and display the relevant information physically on the equipment and to make sure that everyone knows and understands the applicable procedures and limitations of access.





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Summary

As is often the case, the process of achieving compliance proved to be a challenge. However the effort and commitment to see the process through ultimately paid off.



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Conclusion

The consequences of an arc flash incident can be catastrophic but arc flash assessments help duty holders to perform their statutory duties by assessing and managing risks.

It is incumbent on duty holders to make sure that arc flash hazards are identified, understood and adequately managed.

As a result of Inspec's assistance, our client is now confident that they are moving towards a more compliant system which provides a safer working environment for their personnel.



We Integrate

What Next?

Arc flash risk assessment is rarely straightforward and the path to compliance can be a tricky journey, but Inspec Systems highly skilled personnel are ready to help deliver the excellence your people and plant deserve.

Why not give us a call and speak to our team to see how we can help?



We Install



We Bot



We Manage



Contact Us

From concept to completion or at any stage we have the skills, capability, judgement and drive to support your projects.

Call us now to find out what we've been up to and how you can take benefit from our lessons learned over the past 20 years.



Contact Us

Tel: 01482 898 080

Email: info@inspecsystems.co.uk

Web: www.inspecsystems.co.uk

Inspec Systems Limited
1st Floor Sidings House
Sidings Business Park
Freightliner Road
Hull