

- **SCOPE**

This standard covers the requirement of Electrical arc flash protective kit for use in LT supply

- **COMPLIANCE WITH STANDARDS**

It shall comply with the standards

1. Authenticated photo copies of the latest test certificates (from OEMs, National Accredited Test Laboratories) to be submitted along with the offer.
2. Vendor/ bidder to furnish authorization letter from Principal / OEM against the enquiry quoted.
3. Vendor/bidder to submit along with the offer, authenticated copy of latest certificate of product conformity to relevant NFPA standards.
4. The Vendor/Bidder shall confirm their acceptance to the BHEL specifications by Signing and Stamping on it.

- **TECHNICAL REQUIREMENT**

1. The arc flash protective clothing material must be a mixture of cotton and nylon and shall have flame resistance property
2. All arc flash PPE's shall be designed to give protection against thermal hazards of an electric arc
3. The garment must have at least Class-1 protection when tested according to IEC 61482-1-2 or as per NFPA 70E/ASTM standards
4. All layers of arc flash suit shall have flame resistant property.
5. Garments must be sewn with inherently flame retardant threads.
6. Garment shall have equal rating of arc protection on front, back, torso, sleeves and legs
7. Garments must have no exposed external or internal metal or melting parts
8. Garment shall be tested and meet ASTM 1506-10a Arc Thermal Protection Value(ATPV) 8.0 cal/cm2(minimum) and NFPA HRC-2
9. The garment label has to show the lowest ATPV or class if different panels on the garment are used; more detailed information about areas of the garment with higher protection may be given as well on the label or in the manufacturer's instruction of use.
10. The protection clothing material must have substantial tensile strength, tear/burst resistance and minimum dimensional stability to cleaning.
11. Arc flash garment should be of flame retardant, antistatic, rip stop fabric.
12. The suit should be suitably ventilation/breathability to allow carbon dioxide and heat to escape from body.
13. Arc flash suit should be compatible to wear with its hood, gloves, etc.
14. Arc flash suit should confirm to IEC 61482-2 when tested according to IEC 61428-1/IEC 61482-1-1 and IEC 61482-1-2 or as per NFPA 70E
15. Garment should have heat attenuation factor of 80% and more.
16. Expected wear life of flame retardant suit is 100 washes or 24 months worn daily and industrial laundered once per week as per Indian condition.
17. Test reports/certificates of arc flash protective kit and its materials to be submitted along with bid
18. Arc flash resistance PPE's include:
 - Arc flash coat: Torso and sleeve protection
 - Arc Flash Pant: Leg protection
 - Arc Flash Hood: Face protection
 - Face shield with chin cup: face protection

Member1

Member2

Member 3

Member 4

Member 5

- Arc Flash Insulating hand glove: Hand protection
 - Carrying bag: for kit
19. Arc flash coat:
- ATPV value shall be $\geq 8 \text{ cal/cm}^2$
 - Zipper/velcro must be of high temperature plastic/non-metal and zipper tape must be of inherently fire retardant material. Metallic zipper should not be used.
 - Should bear BHEL Logo
20. Arc flash pant:
- ATPV value shall be $\geq 8 \text{ cal/cm}^2$
 - Should have elastic at waist level and protect the worker from waist to toe
21. Electrical helmet with Face shield hood:
- ATPV value shall be $\geq 8 \text{ cal/cm}^2$
 - Helmet shall be Class E Type as per ANSI/ISEA Z89.1-2014.
 - Protection rating should be 360 degree
 - It should have facility for sufficient air flow for breathing.
 - It should have a window for visibility only
 - The visor should be true color recognition with high visibility
 - Suitable balaclava to be provided meeting above requirements.
22. Hand gloves:
- ATPV value shall be $\geq 8 \text{ cal/cm}^2$
 - Should have large protective cuff.
 - Insulating hand gloves should confirm to IEC60903 standard.
 - They are subjected to dielectric, mechanical resistance and ageing tests as per standard
 - Working potential is 1000V as per IEC 60903
 - Gloves are to made of composite material with arc flash protection
 - They are individually tested and delivered in plastic bag
23. Principle parameter
- ATPV value shall be $\geq 8 \text{ cal/cm}^2$
 - All claimed parameter should be marked on the suit through a label or printed
 - All components (coat, pant, hood, gloves etc) shall be compliant with NFPA/OSHA/CE and same shall be marked on the label.
 - All products should be manufactured by a single manufacturer
24. Operating condition
- Ambient temperature(Max): 55° Celsius
 - Humidity: 95%

• **SAMPLE**

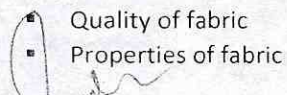
1. Sample cloth (100 cm²), Catalogue with material specification and drawing shall be submitted along with offer for approval. (Test certificate of sample to be submitted for approval)
2. Sample suit along with kit to be submitted (on returnable basis) for committee approval and trial.

• **TEST CERTIFICATE**

1. The supplier shall submit the test certificate along with the bulk supply for



Member1



Member2

Member 3

Member 4


20/8/19

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2. The test certificate shall indicate along with the bulk supply for Batch No. & Date

- **PACKING**

The kit shall be packed in individual bags to prevent dust and damage

- **MARKING**

The suit shall be marked with the following information

1. Relevant NFPA standards
2. BHEL Logo
3. Supplier Identity
4. Month & Year of Manufacturing

- **INSPECTION**

Inspection will be carried out at suppliers works with reference to the pilot sample accepted for the offer.

- **GUARANTEE CERTIFICATE**

Guarantee Certificate to be given for any manufacturing defects along with its consignment for free replacement within six months from the date of receipt at stores.

- **ENQUIRY SPECIFICATION**

The PI and Enquiry shall carry the specification as "ELECTRICAL ARC FLASH PROTECTIVE KIT size Medium / Large / Extra Large" as per BHEL standard _____.

- **DETAILS TO BE FILLED BY BIDDER**

Sl. No.	Particulars	
1	Manufacturer's name	
2	Model No. / Type	
3	Arc Flash protection PPE includes	
	AFP Coat (Yes/No)	
	AFP Pant (Yes/No)	
	AFP face shield hood with helmet (Yes/No)	
	AFP Hand Gloves (Yes/No)	
	Carrying Bag (Yes/ No)	
	Overall weight	
	Others (if any)	
4	AFP Fabric details(% Cotton, % Nylon)	
	Fiber	
	Fabric trademark	
	Weight of fabric	
	Heat attenuation factor	
	Tensile strength	
	Tear strength	
	Dimensional stability	
	Color available	
	Size available	
	Confirm to NFPA 70E or IEC 61482-2 or other standard (specify)	
	Other information (if any)	
5	AFV protection hood	
	Fabric Hood	

Member1

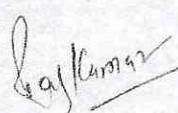
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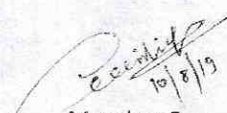
	ATPV	
	Heat attenuation factor	
	Confirms to standard	
6	AFP protective face shield with chin cup and hard hat	
	Material used	
	ATPV	
	Weight	
	VLT	
	Confirm standard	
7	Hand gloves	
	Rated working voltage	
	Confirm to IEC 60903	
	Material used	
	Size	
8	Expected arc flash suit life	


Member1
(Raj Kumar Meena)
Dy. Manager (HSE)


Member2
(Siddharth Kumar)
Dy. Manager (HSE)


Member 3
(S.K. Shrivastava)
Dy. Manager (HSE)


Member 4
(Ankur)
Dy. Manager (HSE)


Member 5
(Chetan Jain)
Dy. Manager (HSE)

- **SCOPE**

This standard covers the requirement of Electrical arc flash protective kit for use in HT supply

- **COMPLIANCE WITH STANDARDS**

It shall comply with the standards

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2. All arc flash PPE's shall be designed to give protection against thermal hazards of an electric arc
3. The garment must have at least Class-1 protection when tested according to IEC 61482-1-2 or as per NFPA 70E/ASTM standards
4. All layers of arc flash suit shall have flame resistance property.
5. Garments must be sewn with inherently flame retardant threads.
6. Garment shall have equal rating of arc protection on front, back, torso, sleeves and legs
7. Garments must have no exposed external or internal metal or melting parts
8. Garment shall be tested and meet ASTM 1506-10a Arc Thermal Protection Value(ATPV) 40.0 cal/cm²(minimum) and NFPA HRC-3
9. The garment label has to show the lowest ATPV or class if different panels on the garment are used; more detailed information about areas of the garment with higher protection may be given as well on the label or in the manufacturer's instruction of use.
10. The protection clothing material must have substantial tensile strength, tear/burst resistance and minimum dimensional stability to cleaning.
11. Arc flash garment should be of flame retardant, antistatic, rip stop fabric.
12. The suit should be suitably ventilation/breathability to allow carbon dioxide and heat to escape from body.
13. Arc flash suit should be compatible to wear with its hood, goggles, gloves, etc.
14. Arc flash suit should confirm to IEC 61482-2 when tested according to IEC 61428-1/IEC 61482-1-1 and IEC 61482-1-2 or as per NFPA 70E
15. Garment should have heat attenuation factor of 80% and more.
16. Expected wear life of flame retardant suit is 100 washes or 24 months worn daily and industrial laundered once per week as per Indian condition.
17. Test reports/certificates of arc flash protective kit and its materials to be submitted along with bid
18. Arc flash resistance PPE's include:
 - Arc flash coat: Torso and sleeve protection
 - Arc Flash Pant: Leg protection
 - Arc Flash Hood: Face protection
 - Face shield with hood & class E Helmet: face protection

Member1

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- Arc Flash Insulating hand glove: Hand protection
 - Carrying bag: for kit
19. Arc flash coat:
- ATPV value shall be $\geq 40 \text{ cal/cm}^2$
 - Zipper/velcro must be of high temperature plastic/non-metal and zipper tape must be of inherently fire retardant material. Metallic zipper should not be used.
 - Should bear BHEL Logo
20. Arc flash pant:
- ATPV value shall be $\geq 40 \text{ cal/cm}^2$
 - Should have elastic at waist level and protect the worker from waist to toe
21. Face shield with hood and class E helmet:
- ATPV value shall be $\geq 40 \text{ cal/cm}^2$
 - Protection rating should be 360 degree
 - It should have facility for sufficient air flow for breathing.
 - Visible light transmission(VLT) is 70% or more
 - It should be anti-fog lens.
 - It should be replacement lens and brackets
 - The visor should be true color recognition with high visibility
22. Hand gloves:
- ATPV value shall be $\geq 40 \text{ cal/cm}^2$
 - Should have large protective cuff.
 - Insulating hand gloves should confirm to IEC60903 standard.
 - They are subjected to dielectric, mechanical resistance and ageing tests as per standard
 - Working potential is 36000V as per IEC 60903
 - Gloves are to made of composite material with arc flash protection
 - They are individually tested and delivered in plastic bag
23. Principle parameter
- ATPV value shall be $\geq 40 \text{ cal/cm}^2$
 - All claimed parameter should be marked on the suit through a label or printed
 - All components (coat, pant, hood, gloves etc) shall be compliant with NFPA/OSHA/CE and same shall be marked on the label.
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- Ambient temperature(Max): 55° Celsius
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• **TEST CERTIFICATE**

1. The supplier shall submit the test certificate along with the bulk supply for

- Quality of fabric
- Properties of fabric

[Signature]
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[Signature]
Member2

[Signature]
Member 3

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Member 4

[Signature]
10/8/19
Member 5

2. The test certificate shall indicate along with the bulk supply for Batch No. & Date

- **PACKING**

The kit shall be packed in individual bags to prevent dust and damage

- **MARKING**

The suit shall be marked with the following information

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	AFP Hand Gloves (Yes/No)	
	Carrying Bag (Yes/ No)	
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	Fabric trademark	
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	Heat attenuation factor	
	Tensile strength	
	Tear strength	
	Dimensional stability	
	Color available	
	Size available	
	Confirm to NFPA 70E or IEC 61482-2 or other standard (specify)	
	Other information (if any)	
5	AFV protection hood	

Member 1

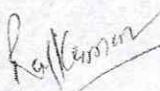
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Member 3

Member 4

Member 5

	Fabric Hood	
	ATPV	
	Heat attenuation factor	
	Confirms to standard	
6	AFP protective face shield with chin cup and hard hat	
	Material used	
	ATPV	
	Weight	
	VLT	
	Confirm standard	
7	Hand gloves	
	Rated working voltage	
	Confirm to IEC 60903	
	Material used	
	Size	
8	Expected arc flash suit life	



Member1

(RAJKUMAR MEENA)
Dy. Mgr (HSE)

Member2

Siddhartha Mishra
Dy. Mgr (HSE)

Member3

S.K. S. Mishra
Dy Mgr (FPX)

Member 4

Dy Mgr (HSE)



Member5

Chintu Jain
Dy. Mgr (EL)