# FIELD QUALITY PLAN

## **FOR**

Civil and allied work for Construction of UHV LAB at BHEL Jhansi.



FACTORY CIVIL DEPARTMENT

BHARAT HEAVY ELECTRICALS LIMITED

JHANSI

## FIELD QUALITY PLAN

## **FOR**

# Civil and allied work for Construction of UHV LAB at BHEL Jhansi.

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|------------------------|--------------------|------------|--|--|
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| REVIEWED BY            | Manager (FCX)      |            |  |  |

### NOTE:

- 1 Contractors will be responsible for getting the work inspected by inspecting authority after carrying out inspection by themself as per Field Quality Plan.
- 2 Abbreviations used in the column "Type of Check" are

R: Record Verification

M: Measurement

V: Visual T: Test

3 Abbreviations used in the column "Format of Record" are

SR: Site Register TR: Test Report



FQP/FCX/UHV/CIVIL **Document Number** 

| 1.0 CAST-II 1.1 COARS 1.1.1 Moistu 1.1.2 Specific Water 1.1.3 Particle determ 1.1.4 Crushir 1.2 FINE Ac 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 1.4.3 Curing 1.4.3 Curing 1.4.1 Crushir cubes 1.4.1 Crushir cubes 1.4.2 Laying 1.4.3 Curing 1.4.3 Curing 1.4.3 Curing 1.4.4 Concrect 1.4.1 Water 1.4.1 Brand 1.4.1 Brand 1.4.1 Brand 1.4.1 Brand 1.4.1 Brand  | ACTERISTICS / ITEM  IN-SITU CONCRETE ISE AGGREGATE (40 n ture Content fic Gravity, Bulk Densi r absorption ele Size & shape-(Sieve mination of material f ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes analysis, particle size | TYPE OF CHECK           | QUANTUM/ FREQUENCY OF<br>CHECK            | REFERENCE  | Issu                    | e Date                    | 03.09.2024   |  |
|---|--|-------------------------|---|--|-------------------------|---------------------------|--|--|
| 1.0 CAST-II 1.1 COARS 1.1.1 Moistu 1.1.2 Specific Water 1.1.3 Particle determ 1.1.4 Crushir 1.2 FINE Ac 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 1.4.1 Crushir cubes 1.4.1 Crushir cubes 1.4.2 Laying 1.4.3 Curing 1.4.1 Crushir cubes 1.4.1 Crushir cubes 1.4.2 Laying 1.4.3 Curing 1.4.3 Curing 1.4.4 Concrete the component of the cubes 1.4.5 Component of the cubes 1.4.6 Concrete the cubes 1.4.7 Concrete the cubes 1.4.8 Concrete the cubes 1.4.9 Component of the cubes 1.4.1 Brand | IN-SITU CONCRETE ISE AGGREGATE (40 nture Content fic Gravity, Bulk Densir absorption le Size & shape-(Sieve mination of material fing Value  AGGREGATE (20mm) ge & Moisture Content lay content, soundness   | CHECK                   |   | REFERENCE  |                         |                           |  |  |
| 1.1         COARS           1.1.1         Moistu           1.1.2         Specific Water           1.1.3         Particle determ           1.1.4         Crushir           1.2         FINE At           1.2.1         Bulkage           1.2.2         Silt, Cla           1.2.3         Sieve a           1.2.4         Specific bulk de           1.3         SAND           1.3.1         Finenes           1.3.2         Silt Cor           1.3.3         Bulkage           1.4         CONCR           1.4.1         Crushir cubes)           1.4.2         Laying           1.4.3         Curing           2.0         BRICKS           2.1         Water           2.2         Compress           3.0         Plaster           3.1         Correct           4.0         Putty           4.1         Brand           6.0         Synthe  | tire Content fic Gravity, Bulk Densi r absorption le Size & shape-{Sieve mination of material f ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes   |                         |   | ACCEPTANC  | DOCUMENT/<br>E STANDARD | FORMAT<br>OF RECORD       | REMARKS  |  |
| 1.1         COARS           1.1.1         Moistu           1.1.2         Specific Water           1.1.3         Particle determ           1.1.4         Crushir           1.2         FINE At           1.2.1         Bulkage           1.2.2         Silt, Cla           1.2.3         Sieve a           1.2.4         Specific bulk de           1.3         SAND           1.3.1         Finenes           1.3.2         Silt Cor           1.3.3         Bulkage           1.4         CONCR           1.4.1         Crushir cubes)           1.4.2         Laying           1.4.3         Curing           2.0         BRICKS           2.1         Water           2.2         Compress           3.0         Plaster           3.1         Correct           4.0         Putty           4.1         Brand           6.0         Synthe  | tire Content fic Gravity, Bulk Densi r absorption le Size & shape-{Sieve mination of material f ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes   |                         |   |  |                         |                           |  |  |
| 1.1.1 Moistu 1.1.2 Specific Water 1.1.3 Particle determ 1.1.4 Crushir 1.2 FINE At 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 1.4.3 Curing 1.4.1 Crushir cubes 1.4.1 Crushir cubes 1.4.1 Crushir cubes 1.4.2 Laying 1.4.3 Curing 1.4.1 Brand  | ture Content fic Gravity, Bulk Densi r absorption le Size & shape-{Sieve mination of material f ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes   |                         |   |  |                         |                           |  |  |
| Water   | r absorption  le Size & shape-(Sieve mination of material f ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes   | Т                       | Once per source/on every                  | As per IS:2386 Part III                              |                         | Test Report               |  |  |
| 1.1.3 Particle determ 1.1.4 Crushir  1.2 FINE At 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 1.4.3 Curing 1.4.3 Curing 1.4.3 Curing 1.4.1 Correct 1.4.1 Correct 1.4.1 Brand 1.4.1 Synthe  | ele Size & shape-(Sieve<br>mination of material f<br>ing Value  AGGREGATE (20mm) ge & Moisture Conter lay content, soundnes  | ty, Voids, T            | Change of source Once per source/on every | IS:456, IS:383<br>As per IS:2386 Part III            |                         | Test Report               |  |  |
| 1.1.4 Crushir 1.2 FINE At 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compress 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | ing Value  AGGREGATE (20mm)  ge & Moisture Conter  lay content, soundnes   |                         | Once per source/on every change of source | IS:456, IS:383<br>As per IS:2386 Part I IS:456,      |                         | Test Report               |  |  |
| 1.2.1 Bulkage 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finenes 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compri 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | ge & Moisture Conter   | T                       | Once per source/on every change of source | IS:383 As per IS:2386 Part II,IV,VI,IS:383           |                         | Test Report               |  |  |
| 1.2.2 Silt, Cla 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compri 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | lay content, soundnes  |                         | change of source                          | ,,.  | .,                      |                           |  |  |
| 1.2.3 Sieve a 1.2.4 Specific bulk de 1.3 SAND 1.3.1 Finene: 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compress 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | · ·  | nt T                    | Once per source/on every change of source | As per IS:2386 Part III<br>,IS:383                   |                         | Test Report               |  |  |
| 1.2.4 Specific bulk de   1.3 SAND   1.3.1 Finene:   1.3.2 Silt Cor   1.3.3 Bulkage   1.4 CONCR   1.4.1 Crushir cubes)   1.4.2 Laying   1.4.3 Curing   2.0 BRICKS   2.1 Water   2.2 Compress   3.0 Plaster   3.1 Correct   4.0 Putty   4.1 Brand   5.0 Oil Bou   5.1 Brand   6.0 Synthe  | analysis, particle size  |                         | Once per source/on every change of source | As per IS:2386 Part-II, V,<br>VI,VII IS:383          |                         | Test Report               |  |  |
| bulk de   |  | ·                       | Once per source/on every change of source | ,  | 386 IS:383/             | Test Report               |  |  |
| 1.3.1 Finenes 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compri 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | fic Gravity, Water absolensity & voids   | orption, T              | Once per source/on every change of source |  | 386 Part-III,<br>383    | Test Report               |  |  |
| 1.3.2 Silt Cor 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compress 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  |  |                         |   |  |                         |                           |  |  |
| 1.3.3 Bulkage 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compress 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe   | ess Modulus(Sieve an   | alysis) T               | Once per source/on every change of source | As per IS:2  | 386 IS:383/             | Test Report               |  |  |
| 1.4 CONCR 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compris 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | ontent   | Т                       | Once per source/on every change of source | As per IS:2386 IS:383/                               |                         | Test Report               |  |  |
| 1.4.1 Crushir cubes) 1.4.2 Laying 1.4.3 Curing 2.0 BRICKS 2.1 Water 2.2 Compres 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | ge/Moisture Content  | Т                       | Once per source/on every change of source | As per IS:2386 Part III<br>,IS:383                   |                         | Test Report               |  |  |
| 2.0 BRICKS 2.1 Water 2.2 Compres 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe   |  |                         | _   |  |                         |                           | T  |  |
| 1.4.3         Curing           2.0         BRICKS           2.1         Water           2.2         Compress           3.0         Plaster           3.1         Correct           4.0         Putty           4.1         Brand           5.0         Oil Bout           5.1         Brand           6.0         Synthe  | ing strength (Works to<br>s)   | ests T                  | Once per 50 cum or part<br>thereof        | IS:516 & IS:   | 456, IS:10262           | Test Report/ Departmental |  |  |
| 1.4.3         Curing           2.0         BRICKS           2.1         Water           2.2         Compress           3.0         Plaster           3.1         Correct           4.0         Putty           4.1         Brand           5.0         Oil Bout           5.1         Brand           6.0         Synthe  | g and Mixing of concre   | ete V                   | Random                                    | As per site requirement                              |                         | Testing<br>SR             |  |  |
| 2.1 Water 2.2 Comprise 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe   |  | V                       | Random                                    | As per site requirement                              |                         | SR                        |  |  |
| 2.1 Water 2.2 Comprise 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe   | (S   |                         | 1   |  |                         |                           |  |  |
| 3.0 Plaster 3.1 Correct 4.0 Putty 4.1 Brand 5.0 Oil Bou 5.1 Brand 6.0 Synthe  | r absorption   | Т                       | For each lot of 50,000 or part thereof    | IS 1077 , IS 3495 & IS 5454                          |                         | Test Report               |  |  |
| <ul> <li>3.1 Correct</li> <li>4.0 Putty</li> <li>4.1 Brand</li> <li>5.0 Oil Bou</li> <li>5.1 Brand</li> <li>6.0 Synthe</li> </ul>   | pressive Strength  | Т                       | For each lot of 50,000 or part<br>thereof | IS 1077 , IS 3495 & IS 5454                          |                         | Test Report               |  |  |
| <ul> <li>4.0 Putty</li> <li>4.1 Brand</li> <li>5.0 Oil Bou</li> <li>5.1 Brand</li> <li>6.0 Synthe</li> </ul>  | er   |                         |   |  |                         |                           |  |  |
| <ul><li>4.1 Brand</li><li>5.0 Oil Bou</li><li>5.1 Brand</li><li>6.0 Synthe</li></ul>  | ctness   | V                       | Random                                    | As per site requirement                              |                         | SR                        |  |  |
| 5.1 Brand 6.0 Synthe  |  | V                       | Random                                    | As per remark  |                         | SR                        | Make of putty shall be Birla Wall Care<br>Cement Putty/JK Wall Putty/Asian<br>Wall Putty/Burger Wall Putty/Nerolad<br>Wall Putty |  |
| 6.0 Synthe  | ound Washable Dister   | mper/Acrylic Emulsion ( | (Interior/Exterior)                       | 1  |                         |                           | 1 VVan Tutty   |  |
|   |  | V                       | Random                                    | As per   | remark                  | SR                        | Make of distemper shall be<br>Asian/Burger/Nerolac   |  |
| 6.1 Brand   | etic Enamel Paint  | -                       |   |  |                         |                           |  |  |
|   |  | V                       | Random                                    | As per   | remark                  | SR                        | Make of distemper shall be<br>Asian/Burger/Nerolac   |  |
|   | Sheet (Plain and Perfo   |                         | T   | I  |                         | 1                         | T  |  |
| 7.1 Total co  |  | ss T                    | Per Lot Per Lot                           | As per item specification  As per item specification |                         | TC/MTC TC/MTC             | 0.63 mm Total coated thickness  Minimum 120 gsm/sqm total of both  |  |
| 7.3 Pitch   | coated metel thickness   | Т                       | Per Lot                                   | As per technical                                     |                         | TC/MTC                    | side<br>Maximum 205 mm C/C   |  |
| 7.4 Crest   |  | T T                     | Per Lot                                   | As per technical                                     |                         | TC/MTC                    | Minimum 28 mm  |  |
|   | Coating  | V                       | Per Lot                                   | As per item s  |                         | SR                        | JSW/Essar/Tata/SAIL/Equivalent   |  |
|   | Coating  | V                       | Per Lot                                   | As per item s  | pecification            | SR                        | Hole size of 1.8 - 2 mm at 20 mm c/c along the entire sheet.   |  |
|   | coating of Sheet ration (If required)  | G, C , 11 G,            |   |  |                         |                           |  |  |

| बी एप ई एल |  |                  |                                | Document Number                      |   | FQP/FCX/UHV/CIVIL   |  |  |
|------------|--|------------------|--------------------------------|--------------------------------------|---|---------------------|--|--|
|            | JHANSI   |                  | STATEMENT OF CHECKS            |                                      | Revision Number                         |                     | Nil                                      |  |
|            |  |                  |                                |                                      |   |                     | 03.09.2024                               |  |
| S No.      | CHARACTERISTICS / ITEM   | TYPE OF<br>CHECK | QUANTUM/ FREQUENCY OF<br>CHECK |                                      | DOCUMENT/<br>CE STANDARD                | FORMAT<br>OF RECORD | REMARKS                                  |  |
| 8.2        | Zinc Coating   | т                | Per Lot                        | As per item specification            |   | тс/мтс              | Minimum 120 gsm/sqm total of both side   |  |
| 8.3        | Make of Sheet  | V                | Per Lot                        | As per item s                        | pecification                            | SR                  | JSW/Essar/Tata/SAIL/Equivalent.          |  |
| 9.0        | Polycarbonate Sheet  |                  |                                |                                      |   |                     |  |  |
| 9.1        | Thickness  | T                | Per Lot                        | As per item s                        |   | TC/MTC              | Minimum 3 mm                             |  |
| 9.2        | UV Resistance  | T                | Per Lot                        | As per item s                        | pecification                            | TC/MTC              | Should be UV resistant                   |  |
| 10.0       | M S Gutter   |                  |                                |                                      |   |                     |  |  |
| 10.1       | Thickness  | T                | Per Lot                        | As per item s                        | pecification                            | TC/MTC              | Minimum 3 mm                             |  |
| 11.0       | Fabrication Work   |                  | T                              |                                      |   |                     | 1  |  |
| 11.1       | Visual checks/Dye penetration test as per criticality of the joint | V/T              | Random                         | As per item specification SR         |   | SR                  |  |  |
| 12.0       | Paint  |                  |                                |                                      |   |                     |  |  |
| 12.1       | Make of Paint  | V                | Per Lot                        | As per item specification            |   | SR                  | Asian, Berger, Nerolac                   |  |
| 12.2       | Coat of Paint  | V                | Random                         | As per item specification SR         |   | SR                  | Double coat for new work                 |  |
| 13.0       | Primer   |                  |                                |                                      |   |                     |  |  |
| 13.1       | Make of Paint  | V                | Per Lot                        | As per item specification            |   | SR                  | Asian, Berger, Nerolac                   |  |
| 13.2       | Primer Coat  | V                | Random                         | As per item specification SR         |   | SR                  | Single coat before erection for new work |  |
| 14.0       | Glass Fibre Wool   |                  |                                |                                      |   |                     |  |  |
| 14.1       | Density  | T                | Per Lot                        | As per item specification            |   | TC/MTC              | Minimum 24 Kg/m3                         |  |
| 14.2       | Thickness  | Т                | Per Lot                        | As per item specification SR         |   | SR                  | Minimum 100 mm                           |  |
| 15.0       | Geotextile   |                  |                                |                                      |   |                     |  |  |
| 15.1       | Unit Weight  | Т                | Per Lot                        | As per item s                        | pecification                            | TC/MTC              | Minimum 120 GSM                          |  |
| 15.2       | Thickness  | Т                | Random                         | <u> </u>                             |   | SR                  | Thickness 1 - 1.25 mm                    |  |
| 16.0       | EPOXY FLOORING   |                  |                                |                                      |   |                     |  |  |
| 16.1       | SCREED   |                  |                                |                                      |   |                     |  |  |
| 16.1.1     | Compressive Strength   | Т                | Per Lot                        | As per ASTM C-<br>579/EN13892 MTC/TR |   | MTC/TR              | Minimum 50 N/Sqmm at 7 days              |  |
| 16.1.2     | Flexural Strength  | T                | Per Lot                        | BS-6319 Part 3 MTC/TR                |   | MTC/TR              | Minimum 25 N/Sqmm at 7 days              |  |
| 16.2       |  |                  |                                |                                      |   |                     |  |  |
| 16.2.1     | Compressive Strength   | Т                | Per Lot                        | As per ASTM C-<br>579/EN13892 MTC/TR |   | MTC/TR              | Minimum 50 N/Sqmm at 7 days              |  |
| 16.2.2     | Flexural Strength  | Т                | Per Lot                        | BS-631                               | BS-6319 Part 3 MTC/TR Minimum 20 N/Sqmi |                     | Minimum 20 N/Sqmm at 7 days              |  |
| 17.0       | THICKNESS  |                  |                                | •                                    |   |                     |  |  |

#### 18.2 Note:

17.1

**18.0** 18.1

Colour

Thickness Measurement

VISUAL EXAMINATION

Straightness of Line/Markings

As per technical

specification

As per requirement

As per requirement

SR

SR

SR

Minimum thickness 5mm

Every 250 Sqm

100%

100%

М

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<sup>1.</sup> The tests/procedure mentioned above are only indicative and any other test required to maintain/improve/access the quality of work shall also form part of Field Quality Plan.

<sup>2.</sup> Testing over any item/material used in any item shall only be carried out if the executed value for the said item is more than Rs. 50,000.00