

# SPAD GUIDELINE

## FAULT FREE RUN (FFR)

Document Type	Guideline
Document Owner	Rail
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## 1.0 INTRODUCTION

This document is to provide guidelines on the process of Fault Free Run (FFR) for rolling stock.

FFR will only be allowed to commence after all sub-systems/components test and the systems integration/interfacing tests have been completed successfully.

## 2.0 FAULT FREE RUN PROCESS

The process and requirements for Fault Free Run is stipulated under APPENDIX A, APPENDIX B AND APPENDIX C.

## 3.0 FORMS & OTHER RELATED DOCUMENTS

This guideline must be read together with the following documents:

- i. **APPENDIX A - Fault Free Run Process Flow**
- ii. **APPENDIX B - Fault Free Run Standard Distance**
- iii. **APPENDIX C - Minimum Sub-Systems for Major Fail Criteria**



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## APPENDIX A – FAULT FREE RUN PROCESS FLOW

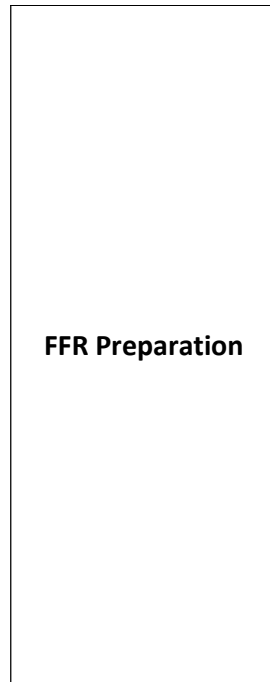
### Project Owner/Operator/ICE Role



#### Project Owner

- inform SPAD to start FFR for new rolling stock 3 months before commencement of FFR.

Note: FFR can only be allowed to commence after all sub-systems/components and systems integration/interfacing tests have been completed successfully.



#### Project Owner

- to submit to SPAD 3 months before commencement of FFR:

- FFR planning and schedule;
- FFR procedure;
- Pass/Fail criteria (major and minor). Refer to **APPENDIX C**;
- FFR start-up checklist.

#### ICE

- to verify all sub-systems/components and systems integration/interfacing tests have been completed successfully before FFR.

- to review, verify and approve FFR procedure.

Note : Operator to provide input and agree on the FFR procedure.

: FFR distance shall refer to **APPENDIX B**.

: FFR route, headway and schedule shall be according to operational condition.

: Pass/Fail criteria shall be approved by Project Owner, Operator and ICE.



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**FFR Witnessing**

Project Owner/ Operator

- to ensure the FFR to be carried out according to the test procedure, safety regulations and general operating requirement.

ICE

- to attend and witness the FFR from start to completion.



**Fault During FFR**

Project Owner/ Operator/ ICE

- to ensure all faults during FFR are being handled according to the agreed FFR procedure.

- to ensure all issues to be recorded

(including NFF), included in the FFR Report and acknowledged by the operator.

- to submit FFR updates weekly.

- to submit FFR fault report within 1 week for major fault.

Note: the fault during FFR shall be managed according to the following:

• **Major Fault**

- The FFR shall be stopped, then return to depot to resolve the root cause. The train shall be tested and verified by Project Owner, Operator, ICE and other relevant party before FFR can restart (from OKM).

• **Minor Fault**

- The FFR shall be stopped. The issues to be resolved, tested and verified by Project Owner, Operator, ICE and other relevant party before FFR can restart (continue from previous KM).



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**Completion of FFR**

Project Owner  
- to submit FFR report approved by Operator and ICE. The FFR Report shall include NFF record.

ICE  
- to approve and accept the FFR with no fault.



**Post FFR**

Project Owner/ Operator/ ICE  
- to present on lesson learnt and measures to be taken for future improvement.



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## APPENDIX B - FAULT FREE RUN STANDARD DISTANCE

### MONORAIL

Rolling Stock	Mileage (FFR)
1 <sup>st</sup> set	2000 km
Subsequent sets	1000 km

### METRO/ URBAN RAIL

Rolling Stock	Mileage (FFR)
1 <sup>st</sup> set	4000 km
Subsequent sets	2000 km

### REGIONAL/INTERCITY RAIL

Rolling Stock	Mileage (FFR)
1 <sup>st</sup> set	8000 km
Subsequent sets	4000 km

### HIGH SPEED RAIL

Rolling Stock	Mileage (FFR)
1 <sup>st</sup> set	TBC*
Subsequent sets	TBC*

\*To be confirmed at later stage.



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### REFURBISHED ROLLING STOCK

Rolling Stock	Mileage (FFR)
Monorail	1000 km
Metro / Urban Rail	2000 km
Regional / Intercity Rail	4000 km
High Speed Rail	TBC*

\*To be confirmed at later stage.

### CATEGORIES OF ROLLING STOCK

Rolling Stock	Definition
Monorail	Guided system using rubber wheel
Metro / Urban Rail	System operating with speed <120km/h and network within 100km radius from city center
Regional / Intercity Rail	System operating with speed of <250km/h and alignment length >100km
High Speed Rail	System operating with speed >250km/h and alignment length >100km





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### **APPENDIX C - MINIMUM SUB-SYSTEMS FOR MAJOR FAIL CRITERIA**

The following sub-systems shall be included as the major fail criteria.

No.	Sub-System
1.	Automatic Train Protection (ATP)
2.	Automatic Train Operation (ATO) / Automatic Train Control (ATC)
3.	Signalling (on-board)
4.	Human Machine Interface (HMI)
5.	Traction
6.	Bogie
7.	Braking
8.	Earthing
9.	Passenger Door
10.	Carbody (leaking)