



1

CONTENTS

- Introduction Stage V roots
 - Cases
 - Emissions limits
 - Elements of type approval

- Euro VI equivalency to Stage V – IWP/IWA
 - Main requirements
 - Status demonstration test
 - Process status

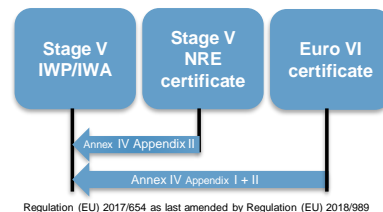
STAGE V

2

INTRODUCTION STAGE V ROOTS

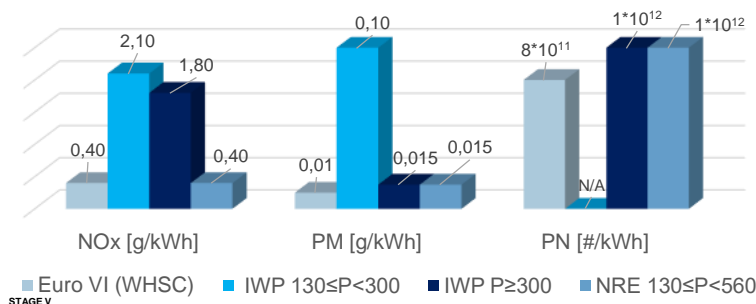
Cases

- New Stage V – IWP/IWA OEM certification
- On basis of equivalency:
 - Stage V - NRE (Non Road Equipment) certificate
 - Euro VI certificate



Regulation (EU) 2017/654 as last amended by Regulation (EU) 2018/989

Emissions limits



3

INTRODUCTION STAGE V ROOTS

Elements of type approval


Element	Stage V - 2016/1628 New IWP Vessel		Stage V - 2016/1628 NRE	Euro VI - EC 595/2009
Laboratory test: Test cycle(s) Off-cycle	E2 / D2 1 point	E3 2 points	C1, NRTC 3 points	WHSC, WHTC 15 points (in 3 grids)
Emissions Durability (EDP)	10.000 hours		8.000 hours	700.000 km
Diagnose	NCD - PCD		NCD - PCD	OBD
Inducement	No inducement (replaced by incident storage)		Power reduction 2 steps	Power reduction 2 steps
Ambient conditions	+2 to +30°C Pressure > 95,5 kPa		-7 to +38°C (PEMS) Pressure > 82,5 kPa	-7 to +38°C (PEMS) Pressure > 82,5 kPa

STAGE V

4

EURO VI EQUIVALENCY TO STAGE V – IWP/IWA

‡ Main requirements

- ‡ Operator warning in case of a NOx Control Diagnostics (NCD) system failure
 - ‡ Example: Warning light, warning signal on operator dashboard 
- ‡ For safety reasons no inducement shall be activated in case of a failure.
 - ‡ Example: diluted AdBlue, blocked AdBlue line, an empty AdBlue tank etc.
- ‡ Incident storage in non-erasable memory
 - ‡ In stead of the severe inducement the incident shall be stored with a corresponding occurrence counter and duration timer

STAGE V

5

EURO VI EQUIVALENCY TO STAGE V – IWP/IWA

‡ Main requirements

- ‡ Documentation package describing the:
 - ‡ Inducement prevention
 - ‡ Operator warning and incident storage system
- ‡ Demonstration report of the operator warning and incident storage system

STAGE V

6

EURO VI EQUIVALENCY TO STAGE V – IWP/IWA

‡ Status demonstration test

- ‡ Performing demonstration tests of:
 - ‡ Low AdBlue tank level – level based
 - ‡ Low AdBlue quality – timer based –incident storage 20 engine hours after failure detection
- ‡ Measurements by data acquisition system including
 - ‡ GPS location
 - ‡ Engine speed and load (OBD port)
- ‡ Tests performed on a vessel in real world operation
- ‡ Total test duration excl. preparation: ~4 days
- ‡ Test preparation: ~1 day

STAGE V

7

EURO VI EQUIVALENCY TO STAGE V – IWP/IWA

‡ Process status

- ‡ Finalizing phase with the RDW about:
 - ‡ Reporting format
 - ‡ Interpretation of regulation
- ‡ After approval the demonstration tests will be scheduled
- ‡ Test report will be submitted to the RDW

STAGE V

8

