INTER PLANT STANDARD - STEEL INDUSTRY		
IPSS	**SWITCH MODE POWER SUPPLY (SMPS)**	**IPSS: 1-10-039-08**
	Corresponding IS does not exist	

0. FOREWORD

0.1 This Inter Plant Standard has been prepared by the Standards Committee on Electrical Components and equipment, IPSS 1:10 with the active participation of the representatives of the Steel Plants, major consultancy Organizations and established manufacturers and was adopted in May 2008.

1. SCOPE

1. This Interplant standard covers the requirements of Switch Mode Power Supply system with PWM technique.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions in IS: 1885 (Part 17): 1979 "Electro technical Vocabulary: Part 17 Switchgear & Controlgear (*First Revision*)" shall apply.

3. SITE CONDITIONS

3.1. The following shall constitute the normal site conditions for the purpose of this standard.

3.2. **Ambient Temperature**: The reference ambient temperature shall be 50^0C.

3.3. **Altitude**: The altitude shall not exceed 1000 m above sea level.

3.4. **Relative Humidity**: The maximum relative humidity shall be 99%. However, maximum temperature & maximum relative humidity may not occur simultaneously.

3.5. **Ambient Air**: The Ambient air may contain fair amount of conductive dust.

3.6. **Noise**- Noise shall conform to IEC 61000.

3.7. **Vibration**- Vibration shall conform to IEC 60068-2-34.

4. ENCLOSURE:

4.1 The operating cubicle shall have IP41 degree of protection for assemblies (with cooling fan for 1 KW or higher wattages).

5.0 POWER SUPPLY SYSTEM:

5.1 The SMPS unit shall be suitable for operation from the following power supply system :

i) **Rated Input Voltage**:

415V AC, 3 Phase 3 wire/4wire system
OR
220 V AC, single Phase
(This shall be specified during the placement of order)

ii) **Voltage variation**: +10% / -15%

iii) **Frequency Variation**: +4%, -6%.

6.0 EQUIPMENT DETAILS:

6.1 Rating and Features

6.1.1 It may be a single/multi output SMPS. The Output Voltage & Current Ratings of SMPS shall be specified during the placement of order.

6.1.2 The SMPS shall always be designed for continuous duty.

6.1.3 Efficiency of SMPS shall be minimum 95%.

6.1.4 The SMPS shall have long life and high reliability. The MTBF (Mean Time Between Failures) should be more than 200,000 hours min. at 25^0C

6.1.5 It shall have minimum isolation of 3 kV AC between input & Output, 1.5 kV AC between input & Case and 250V AC between Output & Case.

6.1.6 It should have screw terminals for connections of Inputs, Outputs & Earth.

6.1.7 It shall conform to EN 61000-3-2 for power factor correction.

6.1.8 The SMPS should have following features:

(i) Miniature size, high power density.
(ii) High operating temperature up to 70°C.
(iii) De-rating shall be less than or equal to 2% per °C above 50° C.
(iv) Power factor correction to EN 61000-3-2.
(v) No minimum load is required to SWITCH ON the Power supply.
(vi) Maximum Ripple & Noise content is 1% (peak to peak) of rated output Voltage.
(vii) It shall have Line regulation [{dVout/dVin} X 100/ Vout] of ±0.5 % max.
(viii) It shall have Load regulation of ±0.5 % max. at rated I/P (0 to 100% load)
(ix) Potentio-meter for fine adjustment of output voltage/voltages.

6.2 DESIGN FEATURE

6.2.1 The SMPS shall have three stage conversion i.e. ac-dc, dc-ac & ac-dc.

6.2.2 The ac-dc conversion shall be carried out by either Diode Bridge (for SMPS of 2KW or less) or any other better power conversion device (Like Thyristor, power transistor etc.) for SMPS above 2KW.

6.2.3 The dc-ac conversion shall be accomplished by Pulse Width Modulation (PWM) using PWM IC & Power Transistor or MOSFET or any other better power conversion device.

6.2.4 The final ac-dc converter shall be carried out by either Diode Bridge or any other better power conversion device.

6.3 PROTECTION

6.3.1 The SMPS shall have following minimum protection:

(i) Instantaneous Over Current.
(ii) Output Short Circuit
(iii) Output Overload
(iv) Output Over voltage
(v) Over Temperature.
(vi) Fan Failure (applicable to 1KW or higher wattage power supplies)
(vii) Any other protection as per purchaser's requirement.

6.4 ALARM AND INDICATION

6.4.1 The SMPS shall have following minimum indication

(i) Main power on/off.
(ii) Power OK LEDs
(iii) Fault LEDs (e.g. Over Temperature, Output overload, Fan failure etc.)

(iv) Any other alarm & indication as per purchaser's requirement.

6.5 TESTING

6.5.1 The tests shall include but not limited to the following at manufacturer's works :

(i) Visual Inspection
(ii) Insulation Test
(iii) Functional test
(iv) Power Loss / Power efficiency test.
(v) Full load & temperature rise test
(vi) Checking of protection system
(vii) Checking of interlocking system
(viii) Checking of alarm system

6.5.2 The test certificates of all tests carried out shall be furnished.

7.0 SAFETY

7.1 The SMPS shall confirm to safety standard of IEC/EN 60950, UL1950

7.2 EMC compliance to EN55011, EN55022-B, FCC-B and VCCI-B for conducted and radiated noise/ emission.

8.0 DOCUMENTATION TO BE FURNISHED

8.1 The following documents shall be furnished along with the equipment:

(i) Test reports / Certificates.
(ii) Card details containing card drawing with component details and PCB Lay out.
(iii) Operation & maintenance instruction.
(iv) Detailed schematic and wiring diagram.
(v) Trouble shooting & fault finding.