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**Medical Diagnostic X-ray Equipment - Specifications
for High Voltage Cable Plugs and Sockets**

医用诊断 X 射线设备

高压电缆插头、插座技术条件

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Table of Contents

Foreword.....	3
1 Scope.....	4
2 Terms and Definitions	4
3 Compositions	4
4 Requirements.....	5
5 Test Methods.....	15

Medical Diagnostic X-ray Equipment - Specifications for High Voltage Cable Plugs and Sockets

1 Scope

This Standard specifies the terms, compositions, requirements and test methods of high voltage cable plugs and sockets (hereinafter referred to as plugs and sockets) for medical diagnostic X-ray equipment.

This Standard is applicable to plugs and sockets that use three cores and four cores (double focus with grid control) on medical diagnostic X-ray equipment. The rated voltage of the plugs and sockets shall be 75 kV.

2 Terms and Definitions

The following terms and definitions are applicable to this Standard.

2.1 Plug

Plug refers to a plug-in, which is assembled together with high voltage cables for the connection with high voltage generator and X-ray tube assembly.

2.2 Socket

Socket refers to a plug-in, which is installed on high voltage generator or X-ray tube assembly for high voltage connection.

2.3 Rating Voltage

Rating voltage refers to the voltage of plugs and sockets stipulated by the manufacturer; it shall be considered as a basis of dielectric strength test.

3 Compositions

Plugs and sockets shall be constituted of the following main components.

3.1 Plugs

Plugs shall at least be constituted of the following components:

- a) Fastener;

4.2.1 The surface of plugs and sockets shall be smooth and flat; there shall be no traces or corrosion or crack.

4.2.2 Under the condition of no auxiliary renovation in any mode, their interchangeability shall be guaranteed.

4.3 Contact Resistance

Contact resistance of each contact-pair of plug and socket shall be not more than 0.001 Ω (contact resistance of grid control is excluded in the restriction).

4.4 DC Withstand Voltage

4.4.1 BETWEEN the contact-pair of three-core cable plug and socket AND the ground, it shall be able to withstand 94 kV (peak value) of pulsating direct current, maintain for 15 min.

4.4.2 In terms of four-core cable plug and socket, other than satisfying the requirement in 4.4.1, between grid control contact-pair and equipotential short-circuit, it shall also withstand 8 kV (peak value) of pulsating direct current, maintain for 15 min.

4.5 AC Withstand Voltage

4.5.1 BETWEEN the contact-pair of three-core cable plug and socket AND the ground, it shall be able to withstand 70 kV (peak value) and 50 Hz of AC voltage, maintain for 5 min.

4.5.2 In terms of four-core cable plug and socket, other than satisfying the requirement in 4.5.1, between grid control contact-pair and equipotential short-circuit, it shall also withstand 5 kV (peak value) and 50 Hz of AC voltage, maintain for 5 min.

4.6 Sealing Performance

The bonding of socket terminal and insulator shall be firm; there shall be no phenomenon of oil seepage.

4.7 Firmness of Plug-pin

Plug-pin shall be able to withstand not less than 120 N of tensile force, maintain for 1 min. Under the stipulated effect of tensile force, plug-pin shall not have the phenomenon of loosening.

4.8 Firmness of Plugging

After plugging in the socket, the pull-out force shall be not less than 30 N and not more than 100 N. After plugging in the socket, it shall be able to withstand the stipulated pull-out force.

plug in the socket; after 100 times of plug-ins and plug-outs, re-conduct the test. When the DC or AC of test loop is 12 A, use millivolt meter to measure the voltage drop between the plug-pin and the socket terminal within 1 min; calculate the contact resistance, it shall comply with the stipulation in 4.3. The deviation of other test equipment shall be not more than 10%.

5.4 DC Withstand Voltage Test

5.4.1 Use detergent to wipe clean the internal and external surface of plugs and sockets; respectively conduct equipotential short-circuit on the plug-pin and socket terminal of various plugs. Then, on the external surface of plug and socket, and at a distance of 100 mm from the surface where the plug-pin and the socket terminal contact with each other, put on ring metal foil. Respectively place them into room temperature transformer oil, which has reached the requirement through certain processing. Load not more than 40 kV (peak value) of pulsating DC voltage, then, use 10 s of time to gradually rise to 94 kV (peak value), maintain for 15 min; there shall be no phenomenon of breakdown.

5.4.2 In terms of four-core cable plug and socket, other than satisfying the above-mentioned withstand voltage test, under equipotential short-circuit between grid control contact-pair and other contact-pair, load 8 kV (peak value) of pulsating DC voltage, maintain for 15 min; there shall be no phenomenon of breakdown.

5.5 AC Withstand Voltage Test

5.5.1 Use detergent to wipe clean the internal and external surface of plugs and sockets; respectively conduct equipotential short-circuit on the plug-pin and socket terminal of various plugs. Then, on the external surface of plug and socket, and at a distance of 100 mm from the surface where the plug-pin and the socket terminal contact with each other, put on ring metal foil. Respectively place them into room temperature transformer oil, which has been processed to reach the requirement. Load not more than 40 kV (peak value) and 50 Hz of AC voltage, then, use 10 s of time to gradually rise to 70 kV (peak value), maintain for 5 min; there shall be no phenomenon of breakdown.

5.5.2 In terms of four-core cable plug and socket, other than satisfying the above-mentioned withstand voltage test, under equipotential short-circuit between grid control contact-pair and other contact-pair, load 5 kV (peak value), 50 Hz, maintain for 5 min; there shall be no phenomenon of breakdown.

5.6 Sealing Performance Test

5.6.1 In exit-factory inspection: inlet 3,040 hPa of air into the socket; then, immerse it in the water. Within 10 min, no bubbles shall emerge around the socket pin.

5.6.2 In type inspection: gradually lower the temperature of the socket from room