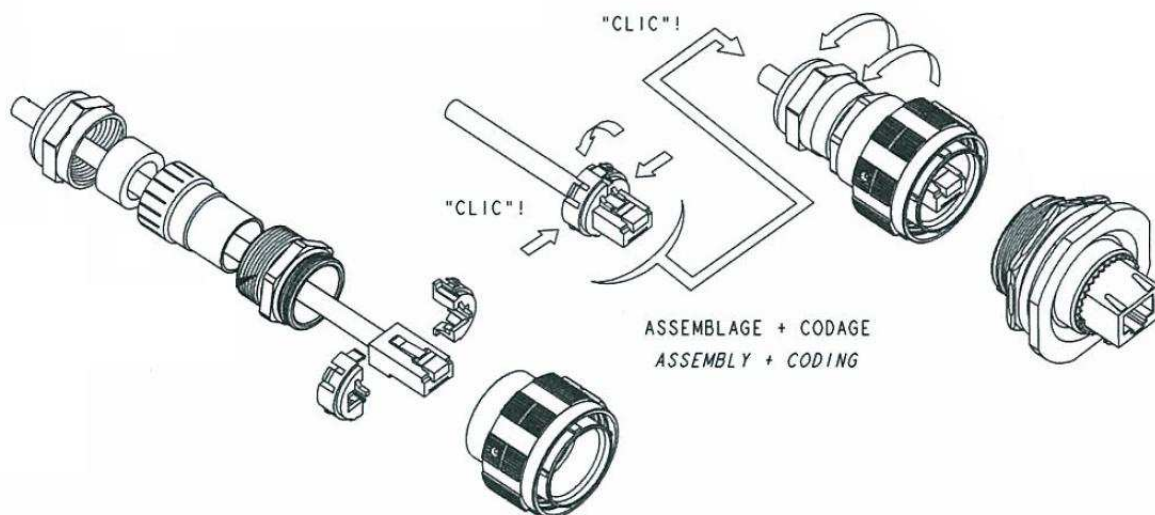


Compliance with EN60079-15: 2006 Electrical apparatus for explosive atmospheres Type of Protection « n » for Zone 2

RJFTVX series: rugged and sealed RJ45 connectors



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Introduction

This report will demonstrate compliance of RJFTVX series with requirements of EN60079-15: 2006 Electrical apparatus for explosive atmospheres – type of protection “n”.

Electrical Characteristics

Voltage: 60V_{eff} max

RJ45 jack contacts of RJFTVX series are rated for at least 1.5A.

As RJFTVX is low power non-sparking electrical connector, voltage and current have to be chosen to handle a max power of 20W.

Data transmission: 10BaseT, 100BaseTX and 1000BaseT networks. Cat5E per TIA/EIA 568B and ClassD per ISO/IEC 11801

Review of Requirements (by section)

1. Scope

EN60079-15: 2006 describes requirements for construction, testing and marking of Group II electrical apparatus with type of protection “n” dedicated to be used in explosive atmospheres of gas.

It's applicable to non-sparking electrical apparatus as well as apparatus with parts or circuits producing arcs or sparks or having hot surfaces which, if not protected in one of the ways specified in this standard, could be capable of igniting a surrounding explosive atmosphere.

RJFTVX series is designed for device group II, category 3G. It may be operated within zone 2 as a low power non sparking connector under specified electrical characteristics.

Following paragraphs will show compliance with a T6 temperature classification and an operating temperature range of – 40°C / + 60°C.

2. Normative references

Please consult EN60079-15: 2006 and EN60079-0: 2006

3. Definitions

Please consult EN60079-15: 2006 and EN60079-0: 2006

4. General : Group of material and surface temperature

RJFTVX series will be classified as Group II (no specific explosive gas atmosphere) with a T6 classification.

5. Temperatures

Ambient temperature:

The operating temperature range of RJFTVX series is – 40°C to + 60°C. As this range is special compared to standard one - 20°C / + 40°C, EN60079-15 rating code II3G ExnAII T6 will be followed by the symbol “X”.

Surface temperature:

RJFTVX series meets the requirement for a T6 classification.

To evaluate this T6 classification for an ambient temperature of -40°C / +60°C, representative samples were tested at an ambient temperature of 20°C. A derating curve gives us then the heating for an ambient of 60°C : at 59.7°C of ambient and with a current of 1.5A per contact the hottest point (inside the plug) is 80° (T6 – 5°C).



6. Requirements for electrical material

Mechanical resistance:

Representative samples were tested following articles 26.4.2 mechanical resistance.

A mass of 1kg (diameter of 25mm) falls twice on each mated pair from a height of 0.7m.

No deterioration which could affect the IP protection level has been observed. Moreover no electrical discontinuity has been noticed during the test.

Then plugs of each mated pairs were submitted to drop tests described in article 26.4.3: 4 falls from 1m height on horizontal floor in concrete. As for mechanical resistance tests, no deterioration able to affect the IP protection has been observed. Then mated pairs were submitted successfully to IP67 tests following EN60529.

Furthermore, as RJFTVX shells are based on military specification MIL-DTL-38999 serie III, its mechanical resistance equals many of the parameters established by this standard.

Protection degree :

RJFTVX is IP67 and IP68.

Clearances, creepage distances and separations:

RJFTVX is a low power non-sparking electrical material. The protection degree is IP67 and IP68. The maximum voltage of use is 60Veff and power should not exceed 20W.

So no special creepage and clearance are required.

As RJFTVX is a passive component which doesn't contain any power, this connector is not concerned by any transient.

Dielectric Withstanding Voltage (DWV):

RJFTVX has been successfully tested under a test voltage of 500V during 1 minute, according to 6.8.1.

Moreover, according to 6.8.2 and 34, each panel mount receptacle is controlled during production and has to support test voltage of 500V during 1 minute without any breakdown or flashover.

7. Non metallic shell or part of shell

Not applicable: the shell of RJFTVX is completely metallic.

8. Metallic shell

As RJFTVX is designed for group II zone 2 applications, no constraint is specified.

9. Shell Closing

Not applicable: RJFTVX doesn't contain any closing to satisfy the IP67 and IP68 degree of protection.

10. Coupling system

Requirements of EN60079-0 are not applicable for EN60079-15.

11. Rotation of through bulkhead

Not applicable: there is no necessary rotation to insure the connection of cable on RJFTVX.

12. Material used for transversal sealing



Each panel mount receptacle of RJFTVX is compounded for transversal sealing (IP67 and IP68), even in unmated conditions.

The temperature range of used compounds is $-50^{\circ}\text{C} / +180^{\circ}\text{C}$ so it's in accordance with our temperature range of use $-40^{\circ}\text{C} / +60^{\circ}\text{C}$.

13. Ex components

RJFTVX is an Ex component. He complies with ATEX European Union Directive 94/9/EC relating to Group II Category 3G locations (annex VIII) except of the CE marking: as passive components, connectors are not submitted to CE marking. So RJFTVX will have to be used as an Ex component with systems, materials or enclosures on which the integration has been foreseen, for example by respecting recommended panel drillings.

14. Wiring elements and wiring localisation

RJFTVX contains standard RJ45 components which are suitable for use with Ethernet cables of the market and is a non-sparking electrical connection.

RJFTVX plug is equipped with an increased safety metallic gland (EExeII2G/D) suitable for use in Zone 2. For other information on this gland see hereunder article 16.

15. Wiring elements of ground conductors

Not applicable.

16. Shell entry

RJFTVX plug contains a cable entry: an increased safety metallic gland (EExeII2G/D) suitable for use in Zone 2 and compliant with EN60079-0 and EN60079-7.

The acceptable outside cable diameters are from 6mm to 12mm.

The torques to apply with this gland are:

- torque on body of metallic gland = 13Nm
- torque on nut of metallic gland = 11Nm

17. Supplementary requirements for non-sparking rotating machine

Not applicable. RJFTVX do not have any rotating features.

18. Supplementary requirements for connection apparatus

Not applicable. Description given for connection apparatus doesn't correspond to RJFTVX.

19. Supplementary requirements for non-sparking fuses and fuse assemblies

Not applicable. The products covered by this document do not have any built-in fuses.

20. Supplementary requirements for non-sparking plugs and sockets

In use RJFTVX will be connected on one material. It is mechanically immobilized by a thread coupling with anti decoupling device. This standard coupling system of military specification MIL-DTL-38999 serie III will avoid any involuntary separation.

RJFTVX will have the warning marking: **WARNING – DO NOT SEPARATE WHEN ENERGIZED.**

As RJFTVX receptacles are compounded, they are IP67 and IP68 even in unmated conditions. Moreover sealing caps are available for plugs and receptacles and provide an IP67 and IP68 sealing.

21. Supplementary requirements for non-sparking luminaries



Not applicable. The product doesn't contain any luminaries.

22. Supplementary requirements for non-sparking battery elements

Not applicable. The product doesn't contain any battery elements.

23. Supplementary requirements for low power non-sparking material

RJFTVX series is a low power non-sparking rugged RJ45 connector rated for a voltage of 60Veff max with a max power of 20W.

RJFTVX provides an IP67 and IP68 protection degree which is superior to IP54.

As RJFTVX is a passive component which doesn't contain any power, this connector is not concerned by any transient.

24. Supplementary requirements for non-sparking current transformers

Not applicable: RJFTVX doesn't contain any current transformer.

25. Other electrical material

Not concerned.

26. Supplementary general requirements for producing arcs, sparks or hot surfaces material

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces.

27. Supplementary requirements for enclosed-break devices and non-incendive components which produce arcs, sparks or hot surfaces

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces and doesn't utilize these devices or features.

28. Supplementary requirements for hermetically sealed devices which produce arcs, sparks or hot surfaces

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces and doesn't utilize these devices or features.

29. Supplementary requirements for closed or encapsulated devices which produce arcs, sparks or hot surfaces

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces and doesn't utilize these devices or features.

30. Supplementary requirements for energy-limited materials and circuits which produce arcs, sparks or hot surfaces

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces and doesn't utilize these devices or features.

31. Supplementary requirements for materials protected by restricted-breathing enclosures and which produce arcs, sparks or hot surfaces

Not applicable, RJFTVX doesn't produce any arcs, sparks or hot surfaces and doesn't utilize these devices or features.

32. General information on verification and tests



The tests made on RJFTVX series follow endurance, mechanical resistance and IP protection degree.

All Amphenol Socapex interconnection system are designed and manufactured following the corporations ISO9001 approved product design and testing procedures.

33. Type tests

To certify RJFTVX series as a zone 2 reinforced & sealed RJ45 connector, Amphenol Socapex has performed the tests required by standard EN60079-15 in his own laboratory. Test reports can be provided on request.

34. Verifications and individual tests

Generalities :

As explained above in article 33, Amphenol Socapex performs in its own laboratory the tests on RJFTVX required by standard EN60079-15. Please ask us to consult test reports.

Specific individual testings: Dielectric Withstanding Voltage (DWV) test:

Each panel mount receptacle is controlled during production and has to support test voltage of 500V during 1 minute without any breakdown or flashover.

35. Marking

RJFTVX is suitable for use in zone 2 hazardous locations and is marked according to clause

35. Description of marking:

Manufacturer's name : AMPHENOL

Manufacturer's type: [Amphenol Socapex commercial designation (example: RJFTVX2SA1N)]

Certification code: II3G ExnAIIIT6X, see note 1

Operating ambient temperature: - 40°C to + 60°C, see note 2

Certification org. and code: Not applicable

Batch identification code: Date code of production (example : 0822 for week 22 of year 2008)

As RJFTVX will be connected on one material, according to clause 20, the marking will contain the warning: WARNING – DO NOT SEPARATE WHEN ENERGIZED.

Note 1 :

X indicates special conditions. In our case it refers to extended ambient temperature range – 40°C to + 60°C compared to the standard one – 20°C to + 40°C.

Note 2 :

Ambient temperature range won't be listed on RJFTVX plugs and receptacles: they are small products and certification code is already followed by an "X".

RJFTVX complies with ATEX European Union Directive 94/9/EC relating to Group II category 3G locations (annex VIII) except of the CE marking: as passive components, connectors are not submitted to CE marking. So RJFTVX will have to be used as an Ex component with systems, materials or enclosures on which the integration has been foreseen, for example by respecting recommended panel drillings.

36. Documentation & 37. Instructions

RJFTVX is delivered with a notice where information for proper installation, use and performance is precised.



Conclusion

In conclusion, this document shows the compliance of RJFTVX series manufactured by Amphenol Socapex with EN60079-15: 2006.

All the verification tests have been performed by Amphenol Socapex on representative samples of all the products covered by this document.

All products covered by this document are also subject to Manufacturing Department Production Testing in accordance with the ISO9001 approved test procedures.