DNV·GL

Certificate No:
TAE0000130

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
EXANE-VFD-BN, Exane 125 Type P, OBS, Armor & Sheath (A&S)

Issued to
RSCC Wire & Cable LLC
East Granby CT, United States

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Power cable for variable frequency drives.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.
Voltage class (kV) **1 & 2 & 2kVHD**
Temp. class (°C) **95**

Issued at **Høvik** on **2017-05-30**
This Certificate is valid until **2021-06-30**.
DNV GL local station: **New York**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Andreas Kristoffersen
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-007169-4**
Certificate No: **TAE0000130**

Product description

Construction:	Exane-VFD-BN, Exane 125 Type P, Overall Braid Shield, Armor & Sheath
Conductor:	Tinned stranded copper
Insulation:	XLPO (type P)
Grounds:	Single or 3 x segmented grounds
Shields:	Individual shield (I/S) and /or overall shield (OS) aluminium mylar with drain wire or overall tinned copper braid (OBS).
Filler:	Flame retardant (as required)
Inner sheath:	SE1 (Type N)
Metal Covering:	C = Tinned Copper Braid; B = Bronze Braid; S = Stainless Steel Braid
Outer sheath:	SE-1 (Type N)

Number of cores x conductor cross-section		Type designation
mm²	AWG	
3 x 1.94	14	Exane-VFD-BN-3C14+3x#18 Grds-1KV
3 x 3.08	12	Exane-VFD-BN-3C12+3x#16 Grds-1KV
3 x 5.53	10	Exane-VFD-BN-3C10+3x#14 Grds-1KV
3 x 7.6	8	Exane-VFD-BN-3C8+3x#14 Grds-1KV
3 x 7.6	8	Exane-VFD-BN-3C8+3x#10 Grds-1KV
3 x 12.5	6	Exane-VFD-BN-3C6+3x#12 Grds-1KV
3 x 18.6	5	Exane-VFD-BN-3C5+3x#12 Grds-1KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#12 Grds-1KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#8 Grds-1KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#6 Grds-1KV
3 x 25.6	3	Exane-VFD-BN-3C3+3x#10 Grds-1KV
3 x 30.7	2	Exane-VFD-BN-3C2+3x#10 Grds-1KV
3 x 46.1	1	Exane-VFD-BN-3C1+3x#10 Grds-1KV
3 x 56.3	1/0	Exane-VFD-BN-3C1/0+3x#10 Grds-1KV
3 x 56.3	1/0	Exane-VFD-BN-3C1/0+3x#6 Grds-1KV
3 x 66.5	2/0	Exane-VFD-BN-3C2/0+3x#10 Grds-1KV
3 x 66.5	2/0	Exane-VFD-BN-3C2/0+3x#6 Grds-1KV
3 x 92.1	3/0	Exane-VFD-BN-3C3/0+3x#8 Grds-1KV
3 x 92.1	3/0	Exane-VFD-BN-3C3/0+3x#5 Grds-1KV
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#8 Grds-1KV
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#4 Grds-1KV
3 x 133	262	Exane-VFD-BN-3C262+3x#6 Grds-1KV
3 x 159	313	Exane-VFD-BN-3C313+3x#6 Grds-1KV
3 x 159	313	Exane-VFD-BN-3C313+3x#2 Grds-1KV
3 x 189	373	Exane-VFD-BN-3C373+3x#6 Grds-1KV
3 x 225	444	Exane-VFD-BN-3C444+3x#6 Grds-1KV
3 x 225	444	Exane-VFD-BN-3C444+3x#1 Grds-1KV
3 x 225	444	Exane-VFD-BN-3C444+3x#1/0 Grds-1KV
3 x 225	444	Exane-VFD-BN-3C444+3x#3/0 Grds-1KV
3 x 225	444	Exane-VFD-BN-3C444+1x#4/0 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+3x#6 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+3x#4 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+3x#2 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+3x#1 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+3x#1/0 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+1x#2 Grds-1KV
3 x 271	535	Exane-VFD-BN-3C535+1x#2/0 Grds-1KV

Number of cores x conductor cross-section		Type designation
mm²	AWG	
3 x 271	535	Exane-VFD-BN-3C535+1x#4/0 Grds-1KV
3 x 303	600	Exane-VFD-BN-3C600+3x#6 Grds-1KV
3 x 328	646	Exane-VFD-BN-3C646+3x#5 Grds-1KV
3 x 328	646	Exane-VFD-BN-3C646+3x#5 Grds-1KV
3 x 328	646	Exane-VFD-BN-3C646+3x#4 Grds-1KV
3 x 328	646	Exane-VFD-BN-3C646+3x#2/0 Grds-1KV
3 x 328	646	Exane-VFD-BN-3C646+1x#444 Grds-1KV
3 x 394	777	Exane-VFD-BN-3C777+3x#5 Grds-1KV
3 x 394	777	Exane-VFD-BN-3C777+3x#4 Grds-1KV
3 x 394	777	Exane-VFD-BN-3C777+3x#2/0 Grds-1KV
3 x 394	777	Exane-VFD-BN-3C777+1x#444 Grds-1KV
3 x 12.5	6	Exane-VFD-BN-3C6+3x#12 Grds-2KV
3 x 18.6	5	Exane-VFD-BN-3C5+3x#12 Grds-2KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#12 Grds-2KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#8 Grds-2KV
3 x 21.5	4	Exane-VFD-BN-3C4+3x#6 Grds-2KV
3 x 25.6	3	Exane-VFD-BN-3C3+3x#10 Grds-2KV
3 x 30.7	2	Exane-VFD-BN-3C2+3x#10 Grds-2KV
3 x 46.1	1	Exane-VFD-BN-3C1+3x#10 Grds-2KV
3 x 56.3	1/0	Exane-VFD-BN-3C1/0+3x#10 Grds-2KV
3 x 56.3	1/0	Exane-VFD-BN-3C1/0+3x#6 Grds-2KV
3 x 66.5	2/0	Exane-VFD-BN-3C2/0+3x#10 Grds-2KV
3 x 66.5	2/0	Exane-VFD-BN-3C2/0+3x#6 Grds-2KV
3 x 92.1	3/0	Exane-VFD-BN-3C3/0+3x#8 Grds-2KV
3 x 92.1	3/0	Exane-VFD-BN-3C3/0+3x#5 Grds-2KV
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#8 Grds-2KV
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#4 Grds-2KV
3 x 133	262	Exane-VFD-BN-3C262+3x#6 Grds-2KV
3 x 159	313	Exane-VFD-BN-3C313+3x#6 Grds-2KV
3 x 159	313	Exane-VFD-BN-3C313+3x#2 Grds-2KV
3 x 189	373	Exane-VFD-BN-3C373+3x#6 Grds-2KV
3 x 225	444	Exane-VFD-BN-3C444+3x#6 Grds-2KV
3 x 225	444	Exane-VFD-BN-3C444+3x#1 Grds-2KV
3 x 225	444	Exane-VFD-BN-3C444+3x#1/0 Grds-2KV
3 x 225	444	Exane-VFD-BN-3C444+3x#3/0 Grds-

Number of cores x conductor cross-section		Type designation
mm²	AWG	
		2KV
3 x 225	444	Exane-VFD-3C444+1x#4/0 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+3x#6 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+3x#4 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+3x#2 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+3x#1 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+3x#1/0 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+1x#2 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+1x#2/0 Grds-2KV
3 x 271	535	Exane-VFD-BN-3C535+1x#4/0 Grds-2KV
3 x 303	600	Exane-VFD-BN-3C600+3x#6 Grds-2KV
3 x 328	646	Exane-VFD-BN-3C646+3x#6 Grds-2KV
3 x 328	646	Exane-VFD-BN-3C646+3x#5 Grds-2KV
3 x 328	646	Exane-VFD-BN-3C646+3x#4 Grds-2KV
3 x 328	646	Exane-VFD-BN-3C646+3x#2/0 Grds-2KV
3 x 328	646	Exane-VFD-BN-3C646+1x#444 Grds-2KV
3 x 394	777	Exane-VFD-BN-3C777+3x#5 Grds-2KV
3 x 394	777	Exane-VFD-BN-3C777+3x#4 Grds-2KV
3 x 394	777	Exane-VFD-BN-3C777+3x#2/0 Grds-2KV
3 x 394	777	Exane-VFD-BN-3C777+1x#444 Grds-2KV
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#8 Grds-2KV(HD)
3 x 113	4/0	Exane-VFD-BN-3C4/0+3x#4 Grds-2KV(HD)
3 x 133	262	Exane-VFD-BN-3C262+3x#6 Grds-2KV(HD)
3 x 159	313	Exane-VFD-BN-3C313+3x#6 Grds-2KV(HD)
3 x 159	313	Exane-VFD-BN-3C313+3x#2 Grds-2KV(HD)
3 x 189	373	Exane-VFD-BN-3C373+3x#6 Grds-2KV(HD)
3 x 225	444	Exane-VFD-BN-3C444+3x#6 Grds-2KV(HD)

Number of cores x conductor cross-section		Type designation
mm²	AWG	
3 x 225	444	Exane-VFD-BN-3C444+3x#1 Grds-2KV(HD)
3 x 225	444	Exane-VFD-BN-3C444+3x#1/0 Grds-2KV(HD)
3 x 225	444	Exane-VFD-BN-3C444+3x#3/0 Grds-2KV(HD)
3 x 225	444	Exane-VFD-BN-3C444+1x#4/0 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+3x#6 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+3x#4 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+3x#2 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+3x#1 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+3x#1/0 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+1x#2 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+1x#2/0 Grds-2KV(HD)
3 x 271	535	Exane-VFD-BN-3C535+1x#4/0 Grds-2KV(HD)
3 x 303	600	Exane-VFD-BN-3C600+3x#6 Grds-2KV(HD)
3 x 328	646	Exane-VFD-BN-3C646+3x#6 Grds-2KV(HD)
3 x 328	646	Exane-VFD-BN-3C646+3x#5 Grds-2KV(HD)
3 x 328	646	Exane-VFD-BN-3C646+3x#4 Grds-2KV(HD)
3 x 328	646	Exane-VFD-BN-3C646+3x#2/0 Grds-2KV(HD)
3 x 328	646	Exane-VFD-BN-3C646+1x#444 Grds-2KV(HD)
3 x 394	777	Exane-VFD-BN-3C777+3x#5 Grds-2KV(HD)
3 x 394	777	Exane-VFD-BN-3C777+3x#4 Grds-2KV(HD)
3 x 394	777	Exane-VFD-BN-3C777+3x#2/0 Grds-2KV(HD)
3 x 394	777	Exane-VFD-BN-3C777+1x#444 Grds-2KV(HD)

Application/Limitation

The cable may be installed and sized according to IEC 60092-352 provided Cable ends with flexible rope stranded conductors are to be terminated using approved compression terminals intended and designed for these conductors.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Issued	General description	Limitation

Standard	Issued	General description	Limitation
IEEE1580	2010	IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities	
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Bunch test Category A

Marking of product

EXANE-VFD-BN Type P (Armor & Sheath) - IEEE1580 - Type designation - number and size of conductors – Voltage- IEC 60332-3-22 – Year

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE