

# NEXT GENERATION 500KV HVDC EXTRUDED CABLE SYSTEM

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(From 1. Oct., Furukawa Electric)



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# Future expectation in the field of HVDC extruded cable system

- Clear trend of increased installation of renewable generation.
- Also the case in Japan, where still limited amount of renewable generation.
- Japanese government now encouraging to expand renewable generation.
- National project has commenced to develop off shore wind farm with 500kV HVDC mass power transportation.

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- Also the case in Japan, where still limited amount of renewable generation.
- Japanese government now encouraging to expand renewable generation.
- National project has commenced to develop off shore wind farm with 500kV HVDC mass power transportation.
- Increased demand for higher voltage HVDC extruded cable expected in the very near future.
- Improved productivity of HVDC extruded cable as well as raw material to be achieved to cope with above future trend.

# Newly developing next generation HVDC extruded cable system

- Development project (up to 500kV level) is on going.
- HVDC performance (space charge, resistivity, etc.) improved by material modification.
- Aim to increase the efficiency of the cable system.



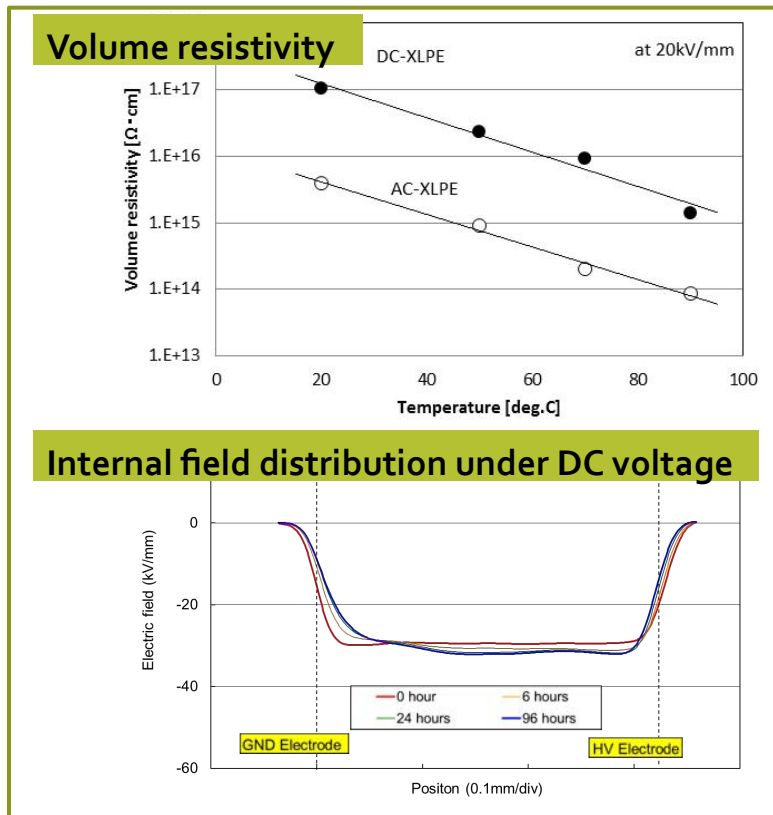
DC 320kV 1x2500mm<sup>2</sup>



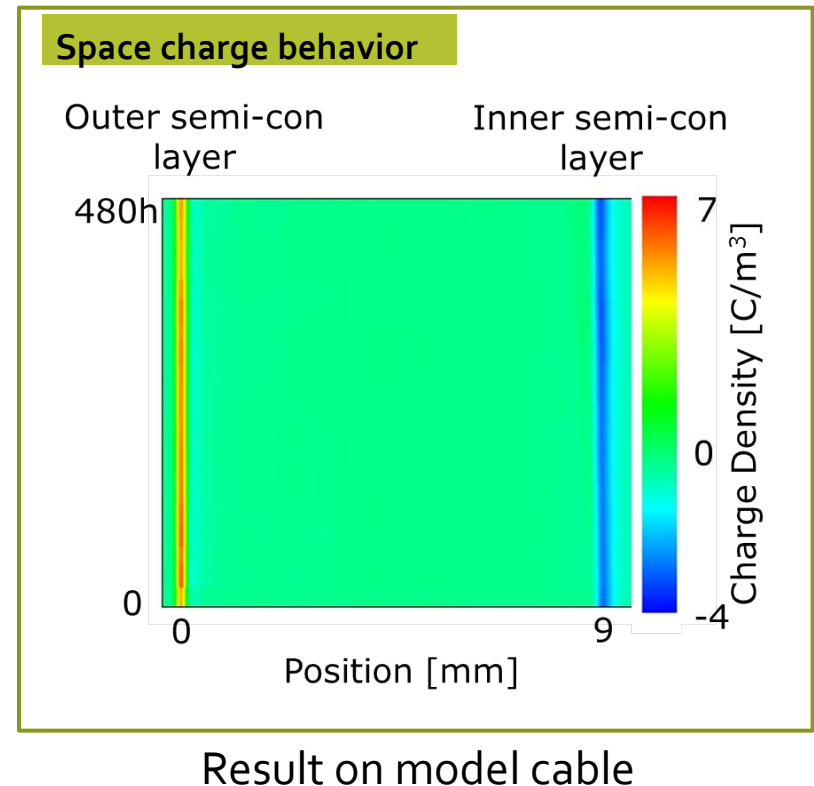
DC 500kV 1x1800mm<sup>2</sup>

# Basic property of the next generation system

- Test results on model (flat sheets / model cables).



Results on flat sheet specimens



# System development (1)

- 320kV underground system PQ test successfully completed.
  - ✓ Accordance with TB496 (LCC)
  - ✓  $2500\text{mm}^2(\text{Cu})$ ,  $U_o=320\text{kV}$ ,  $T_{\text{cond}} = 90 \text{ deg.C}$
  - ✓ Outdoor terminations (Porcelain, Composite)
  - ✓ Intermediate joints (Pre fabricated type, Premolded type)



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Certificate No.: 2014/5001/40277

**SGS**  
SGS File No.: 2014-5001-40277  
August 9, 2016

**CERTIFICATE FOR PREQUALIFICATION TEST**  
This is to certify that we, SGS Japan Inc., Yokohama, Japan, at the request of  
**VISCAS CORPORATION, JAPAN**  
attended at Manufacturer's premises for the purpose of witnessing of Prequalification Tests on the following equipment.

APPLICANT / SUPPLIER: VISCAS CORPORATION, JAPAN  
END USER: DOMESTIC & OVERSEAS UTILITIES  
COMMODITY: DC320KV XLPE CABLE SYSTEM  
MANUFACTURER: VISCAS CORPORATION, JAPAN  
TEST LABORATORY: VISCAS CORPORATION, ICHIHARA PLANT R & D CENTER, JAPAN  
VISCAS CORPORATION, ICHIHARA PLANT POWER CABLE MANUFACTORY, JAPAN  
INSPECTION DATE: JUNE 23, 2014 to JUNE 28, 2016  
SGS INSPECTOR: S. MATSUMI

**INSPECTION / TEST PERFORMED:**

No.	Name	Drawing No.	Qty	Test Item
1	DC320kV 1x2500mm <sup>2</sup> XLPE Insulated Power Cable	CED-14054	Approx. 100m	All items from 1) to 6)
3	DC320kV Premolded joint (OPJ)	EVNJ-10101	1 set	Item 3) to 6)
4	DC320kV Prefabricated joint (PJ)	EVJ-10113	1 set	Item 3) to 6)
5	DC320kV Outdoor termination (polymeric insulator)	EVEA-10173	1 set	Item 3) to 6)
6	DC320kV Outdoor termination (porcelain insulator)	EVEA-10172	1 set	Item 3) to 6)
7	DC320kV Gas immersed termination	EVEG-10150	2 sets	Item 3) to 6)

# System development (2)

- 320kV submarine system PQ test just started.
  - ✓ Accordance with TB496 (LCC).
  - ✓  $2500\text{mm}^2(\text{Cu})$ ,  $U_o=320\text{kV}$ ,  $T_{\text{cond}} = 90 \text{ deg.C}$ .
  - ✓ Mechanical tests had been performed on cable and factory joint.
  - ✓ Repair Joint included.



- ✓ 500kV submarine system development under preparation.

Thank you for your attention!