Certificate no.:
TAK00002KE

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Syntactic Foam

with type designation(s)
HZ-34

issued to
CMT Materials LLC
Attleboro, MA, USA

is found to comply with
DNV rules for classification – Underwater technology Pt.2 Sec.5 Materials and welding for UWT systems

Application:

Buoyancy material for subsea applications (unmanned).

Issued at **Hamburg** on **2025-10-07**
This Certificate is valid until **2030-10-06**.
DNV local unit: **Certification & Inspection Services**

Approval Engineer: **Joachim Rehbein**

for **DNV**

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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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Syntactic Foam HZ-34: hollow glass microspheres embedded in an epoxy matrix.

The following manufacturer's specified values are confirmed by type testing:

Properties	Test Method	HZ-34	Unit	value
Density (nominal)	ASTM D792	545	kg/m^3	msv[1]
Density (range)	ASTM D792	513 - 577	kg/m^3	msv
Hydrostatic crush pressure (HCP)[3]	ASTM D2736	1067[4]	bar	msmv[2]
Water absorption[5]	ASTM D2735	≤1.0	%	msv

Notes:
1: msv - manufacturers specified value.
2: msmv - manufacturers specified minimum value.
3: at 20°C.
4: after 10 hydrostatic pressure cycles to 613 bar and 24 hours hold at 613 bar.
5: immersed static 24 hours at 23°C.

Application/Limitation

Application of syntactic foam for buoyancy material in unmanned underwater systems, including remotely operated vehicles (ROVs) and autonomous underwater vehicles (AUVs).

For manned applications additional testing may be required.

Area of application will be evaluated during approval of classified objects.

The foam complies with the applicable requirements of DNV and is compatible to the coating and/or adhesive.

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with Type Approval documentation.

Marking of product

Product shall be marked with *manufacturer's name, type designation*, *density*, *dimension*, *HCP* and *WA*.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV Type Approval Certificate.

Assessed production sites

1. CMT Materials LLC
   107 Frank Mossberg Dr, Attleboro, MA 02703
   USA

2. ESS LLC (Engineered syntactic system LL)
   200 Shuman Avenue, Stoughton, MA 02072
   USA

Periodical assessment

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

Periodical assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

A production site with a valid Approval of Manufacturer (AoM) certificate for material in question is exempted from the obligation concerning periodical and renewal assessments.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com.

END OF CERTIFICATE