

ISSF 2010 Storage Seminar

Metal cask storage in Switzerland

Walter Heep, Zwilag



1. Plant overview
2. Acceptance hall for casks
3. Cask storage building
4. Cask-Types used in Switzerland
5. Experience with metal cask storage



ZWILAG

Plant overview





Dimension of the Building

Length:	26.30 m
Width:	41.00 m
Height:	17.90 m

Crane capacity (ton)

Main lifting capacity	170 to
1. Auxiliary lifting capacity	15 to
2. Auxiliary lifting capacity	1.5 to



1. Dimension of the Building

Length:	68.40 m
Width:	41.00 m
Height:	ca. 20.00 m including roof hoods
Surface:	2'000 m ²

2. Maximum cask storage capacity

Maximum capacity	200 casks
------------------	-----------

3. Storage cask types

- Castor 20/28 CG-Type (GNS; Germany) for vitrified residues from reprocessing
- TN81CH-Type (TN, France) for vitrified residues from reprocessing
- TN24-Types (TN, France) for spent fuel assemblies

In the future:

- Castor 28M-Type (GNS; Germany) for vitrified residues from reprocessing
- TN-Nova-Type (TN Inc., USA) for spent fuel assemblies
- Hi-Star 180 (Holtec Inc.; USA) for spent fuel assemblies

4. Placement rules of cask

We have a computer based storage program to assure an even heat release of the casks with maximum flexibility of placing different cask types back to back. Based on the actual program of the delivery the storage hall will be filled to 50% in the year 2027.

5. Monitoring of the sealed cask

We monitor the helium filled interspace between primary and secondary lid (6.5 bar overpressure), alarm is set at 4.0 bar overpressure

- For Castor-Type casks we use a pressure switch (on/off-signal)
- For TN81CH-Type casks we use a pressure transmitter (analogue-signal)
- For TN24-Types casks we use a pressure transmitter (analogue-signal)
- For Hi-Star 180-Type we use a pressure transmitter (analogue-signal)
- For TN-Nova-Type maybe we don't use a monitoring system, the lids are welded (at the moment under discussion)

6. Cooling method and ambient temperature (Celsius)

Natural convection cooling

Total heat removal capacity 5.8 MW

Average temperature in summertime: 24-27°C

Average temperature in wintertime: 3-4°C

7. Crane capacity (ton)

Main lifting capacity 140 to

Auxiliary lifting capacity 1.5 to

Inventory:

34 Casks (*incl. Castor Ic*)
6 Lucens-container (*no official Storage places*)

Filling level:

16,5 %

SF:

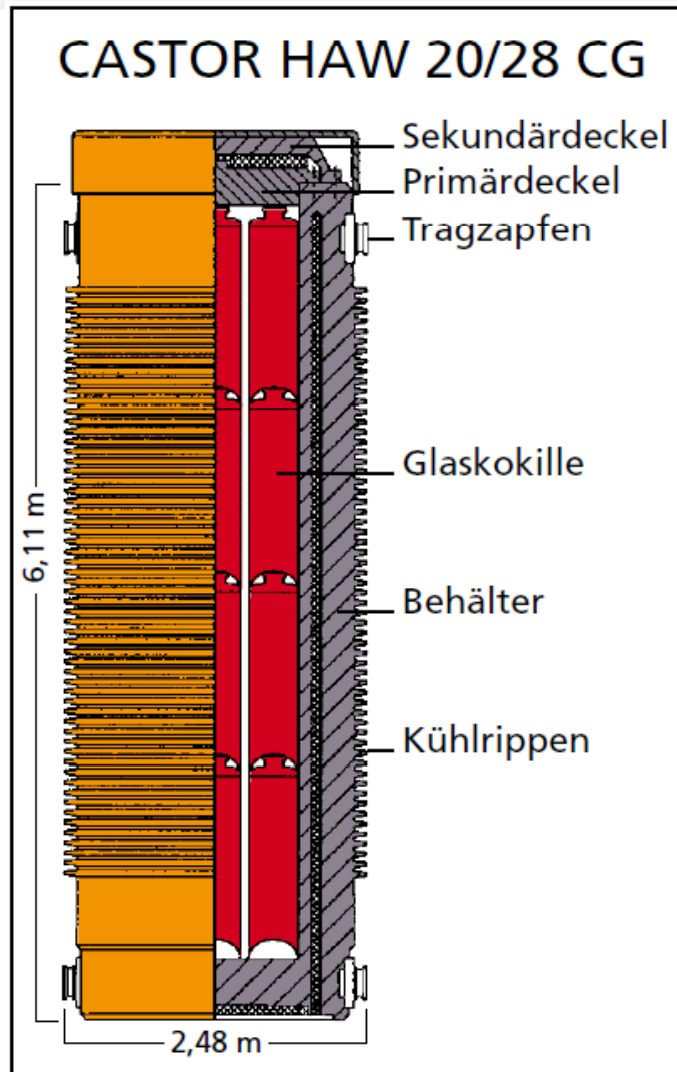
4 KKG (4 x TN24G)
15 KKL (6 x TN24BH + 9 x TN97L + 1 x TN52L)
5 KKM (5 x TN24BH)
1 PSI

HLW:

4 KKB (4 x Castor HAW 20/28 CG)
4 KKG (1 x Castor HAW 20/28 CG + 3 x TN81CH)

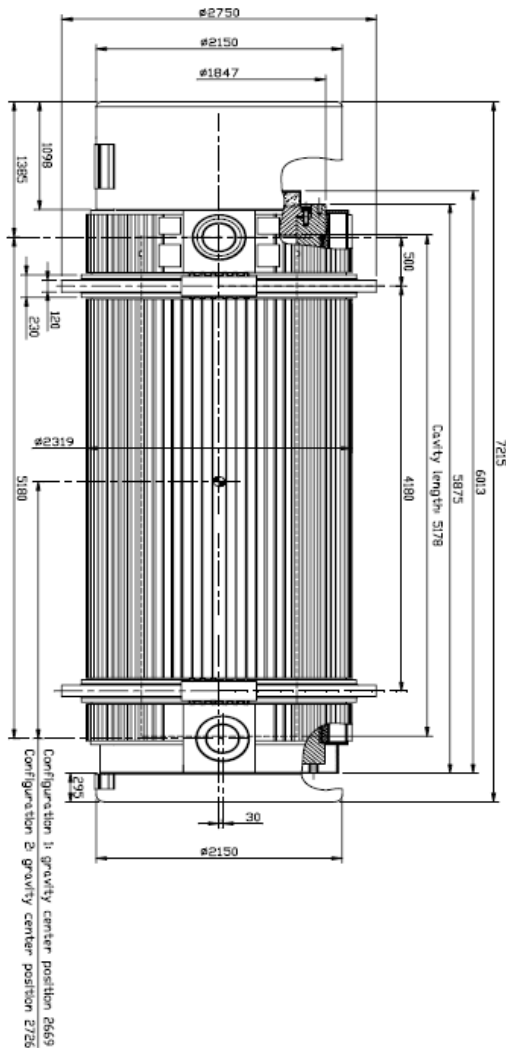
Empty:

1 KKM (1 x TN24BH)
2 KKM (2 x TN9/4)
1 PSI (1 x TC1, Megapie) (only temp. storage)



The CASTOR cask has a capacity for 28 vitrified container and a total weight of 115 to when fully loaded with a heat capacity of 45 kw. The cask is produced from special steel casting. The leaktightness is guaranteed by a double lid system.





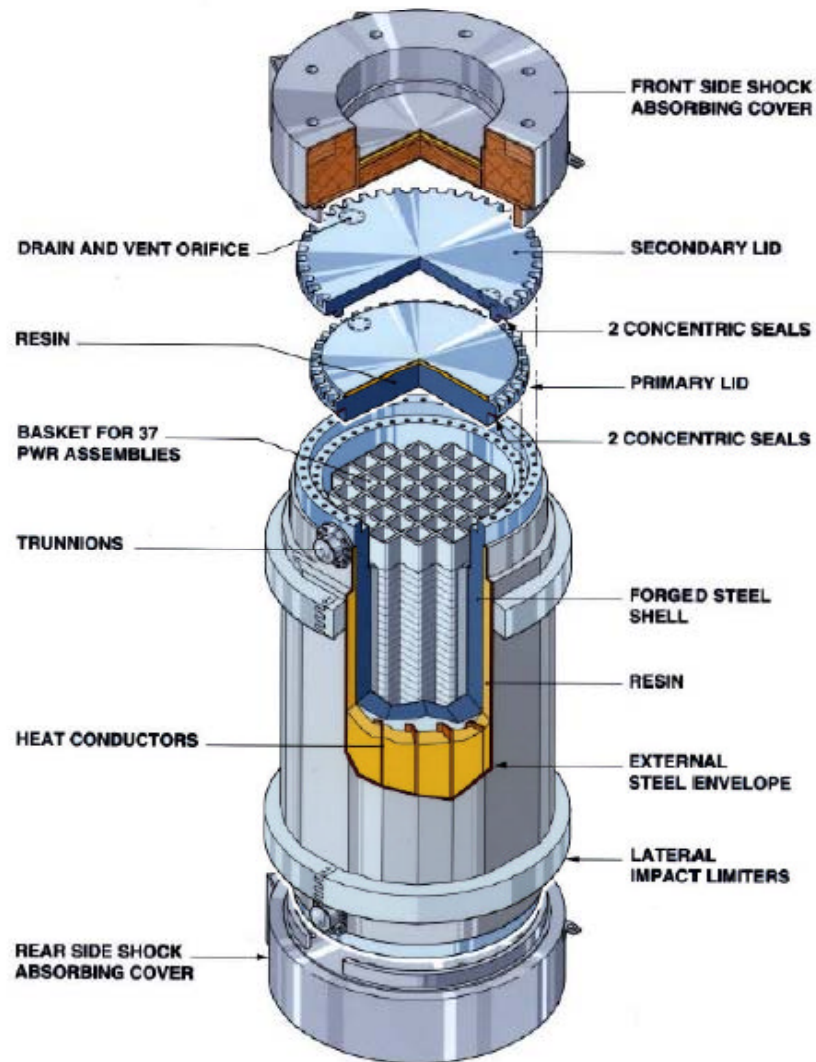
The TN81 CH has a maximum heat capacity of 56 kw. The french containers are made of forged steel. It also houses 28 vitrified glass containers. With it total weight of 115 to it guarantees safe enclosure by means of a double lid system.



Maximum heat release capacity is 56 kw.

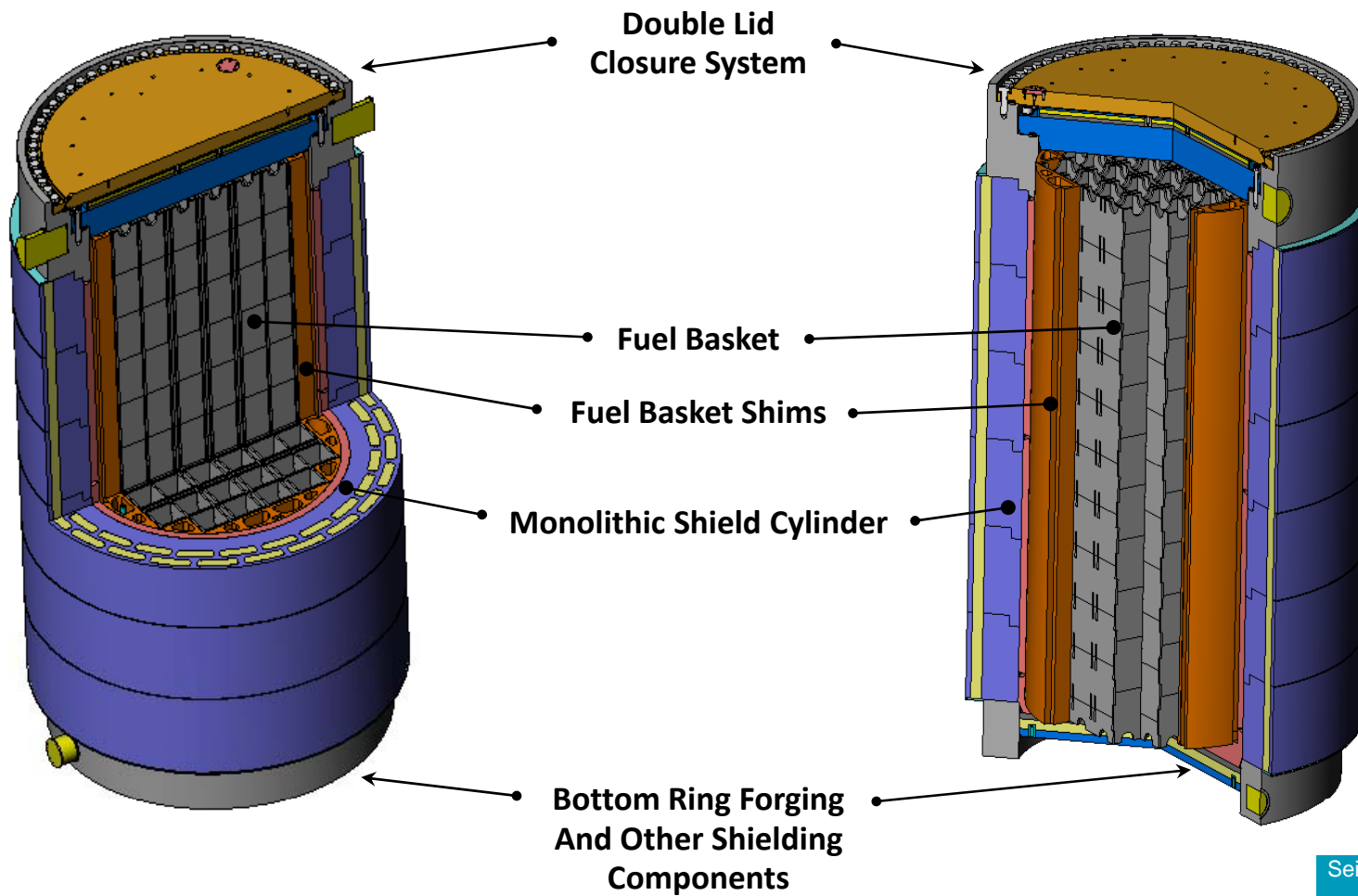
The cask takes a maximum of 28 glass containers with a total weight of 115 to. As the other CASTOR Types, it is made from special steel casting equipped with a double lid system.

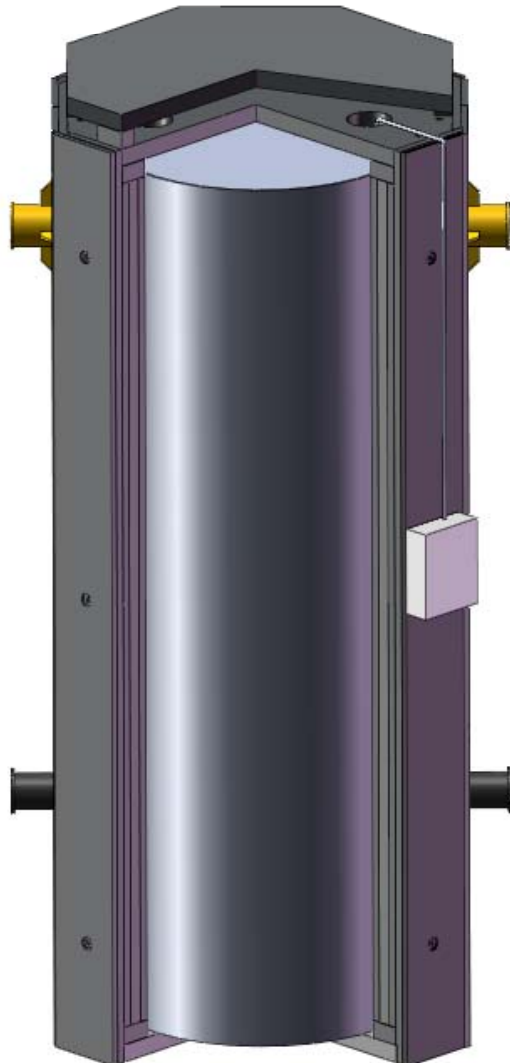




The TN24 production line is designed for a heat capacity of 25 kw. It is also made from forged steel.







TN-NOVA storage overpack:

- Contains the 69BTH canister during storage.
- The 69BTH canister is transferred from the MP197HB transport cask to the TN NOVA storage overpack in a horizontal position.
- Once the transfer is complete, the TN NOVA overpack is uprighted in a vertical position for storage.
- The TN NOVA overpack is equivalent in terms of function and operational sequence of the storage module (NUHOMS HSM) used in the United States.
- The NUHOMS US system operations with the HSM and the TN NOVA system operations are identical except the TN NOVA overpack uprighting step.

positive aspects

never any problems with contamination upon arrival

never any problems to meet the leak rate test requirements

never any corrosion problems during storage

never any problems with surface temperature

never any problems on shielding aspects

minor negative aspects

one single failure on a pressure switch (Castor type): replaced

drift on one pressure transmitter (1 out of 3): no action authorities informed

minor problems with quality of painting

minor problems with fabrication quality (production tolerance)

Zwilag's Final opinion

Metal casks are a reliable solution for transport and intermediate storage of spent fuel and residues from reprocessing



Thank you for your attention

Zwilag Interim Storage Facility
Industriestrasse Beznau 1
CH-5303 Würenlingen
Phone +41 (0)56 297 47 11
Fax +41 (0)56 297 47 22
www.zwilag.ch • info@zwilag.ch