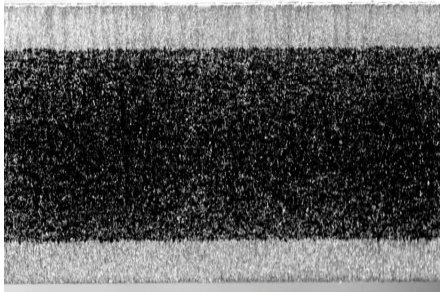




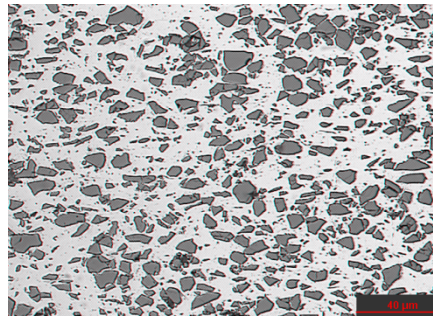
Neutron Absorber Materials for Fresh and Spent Fuel Applications

Ceradyne Canada Materials presentation

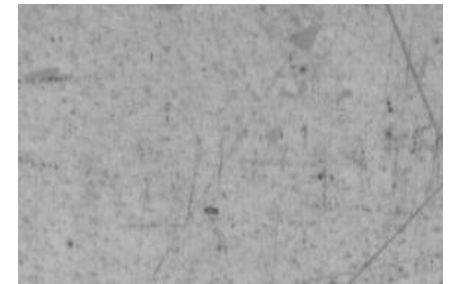
BORAL®



BORTEC®



BorAluminum™



A great selection of neutron absorber materials manufactured under a qualified NQA-1
and

ISO 9001:2008 quality system.

1. Entry into the Nuclear Business



Ceradyne Acquisition	Date Acquired	Nuclear Products
ESK Ceramics	August 26, 2004	Boron Carbide
Ceradyne Canada facility startup	July 01, 2006	Neutron absorbers
AAR Nuclear Division	July 13, 2006	BORAL [®]
EaglePicher Boron	September 4, 2007	BorAluminum [™]
DWAT License	October 1, 2007	BORTEC [®] MMC

2. Quality Assurance Program

- Ceradyne Canada has completed its ISO 9001 (2008) and NQA-1 Quality Program for the BORAL[®] and new BORTEC[®] production line. Under our ISO 9001 (2008) / NQA-1 Program we provide best-in-class service to our customers covering all steps of neutron absorber manufacturing.
- Qualified by many customers from the Nuclear Industry.
- More than 30 customer audits
- ISO certificate issued in 2007. Surveillance audits every year. Successfully passed and re-certified in 2010 passed successfully without any findings.

3. Current use of material

- Sales:

Material	Use	Quantity
BORAL®	Spent fuel pool racks	More than 11,000 sheets
	Dry storage casks	More than 200 casks
	Fresh fuel transportation casks	More than 300 casks
BORTEC®	Dry storage casks	More than 90 casks
BorAluminum®	Dry storage casks Transportation casks	More than 20 casks

- Customers: Transnuclear (an Areva compagny), Areva NP, Hitachi-Zosen, NAC International, Doosan, Westinghouse, CTCIM

4. BORTEC® MMC Qualification for spent fuel racks

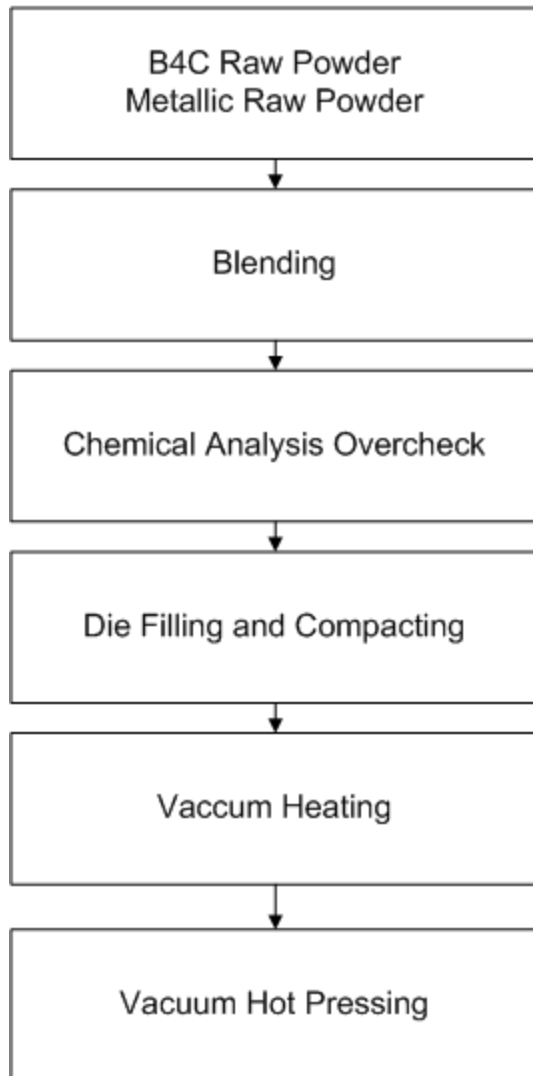


- Ceradyne Canada is presently performing Qualification testing in order to satisfy customer's requirements for usage of BORTEC® MMC in spent fuel pools racks
- This qualification program includes:
 1. Accelerated corrosion (4000 hours)
 2. Mechanical properties
 3. Density and Interconnected Porosity
 4. Boron Uniformity

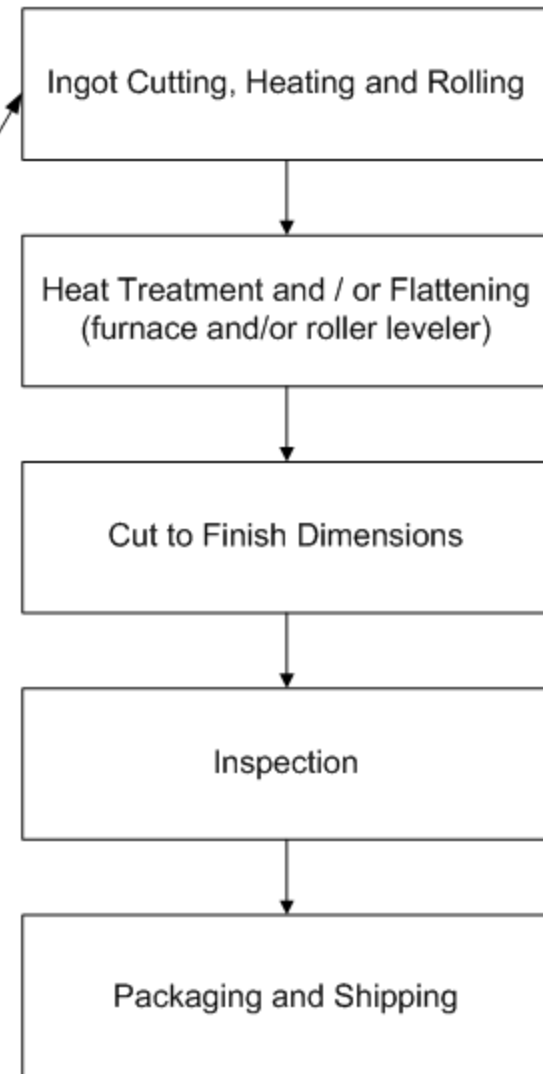
5. Process

BORTEC[®] Process

Billet Manufacturing



Roll to Final Dimension



6. Major Equipment:

material manufacturing



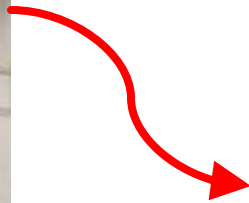
Powder blender



BORTEC Die filling



Vacuum furnace



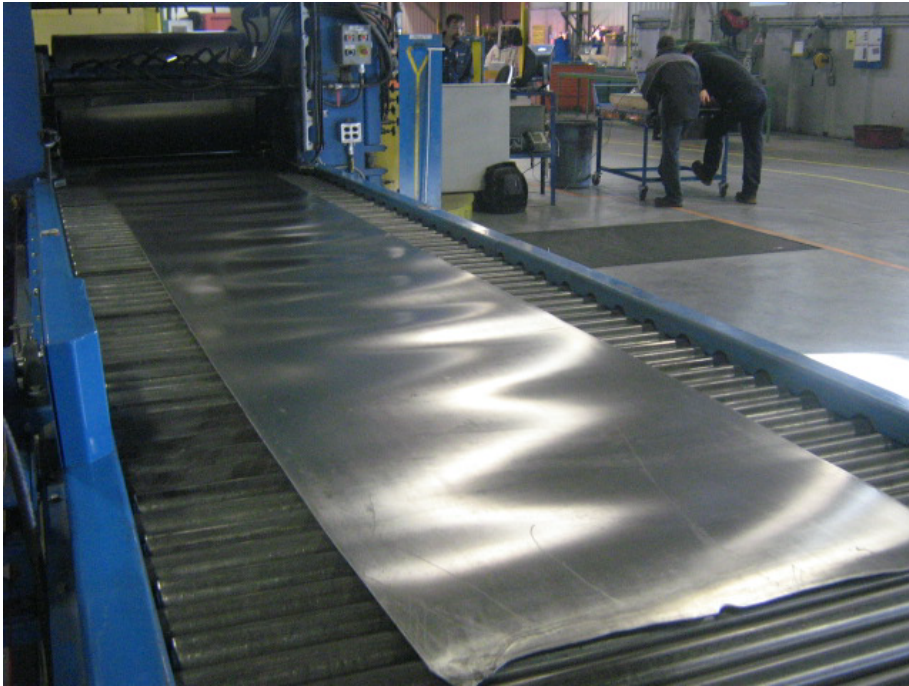
Vacuum Hot Pressing



BORTEC® billet



Rolling mill



BOYTEC®
rolled master sheet



Roller leveler

7. Major Equipment: sheet finishing



Flattening and/or heat treatment furnace



Mechanical shears



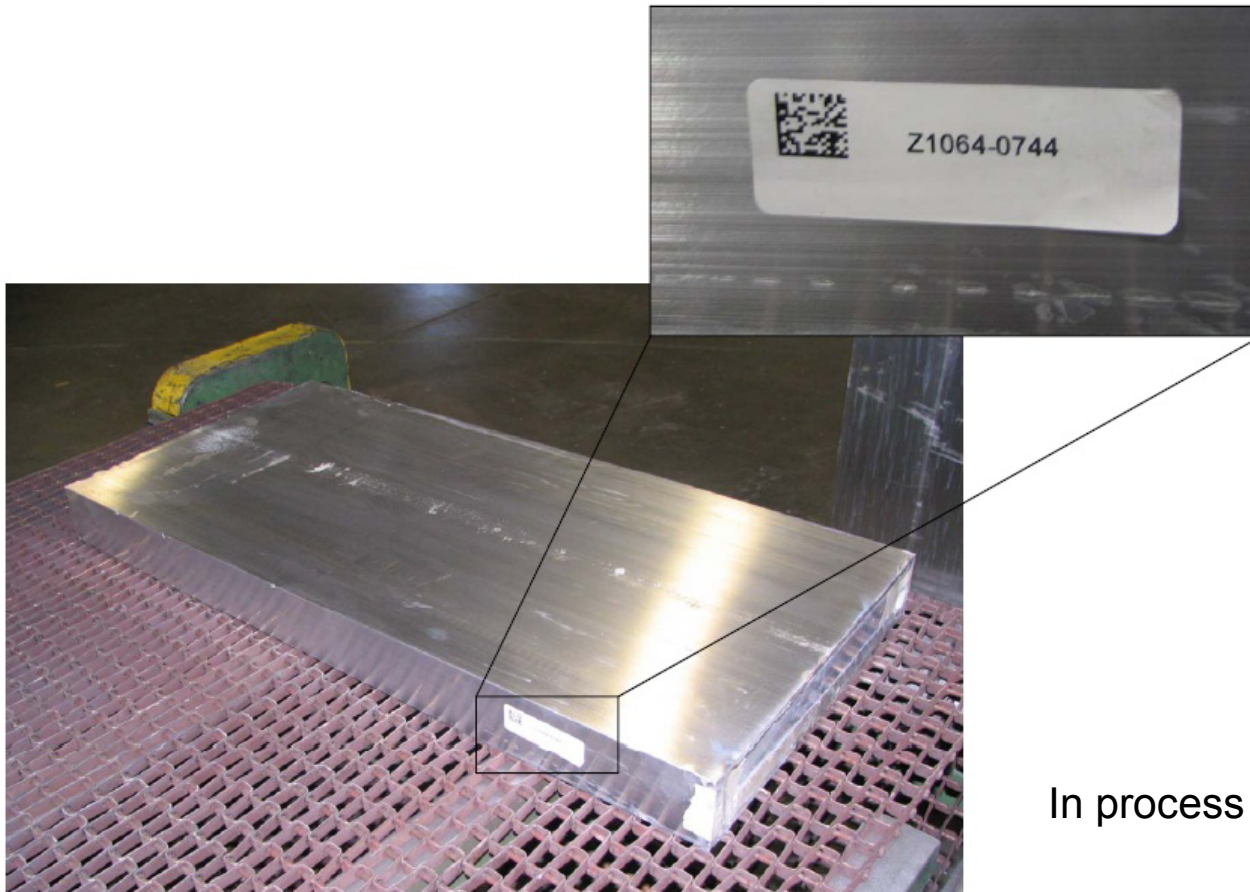
Inspection tables



Shipping preparation

8. Traceability

- Traceability from raw materials to finished sheets assured with traceability software
- Software managed data provides error free numbering, no loss of traceability, no loss of data, no shipping errors, etc.
- Software management also provides better control of process



In process identification

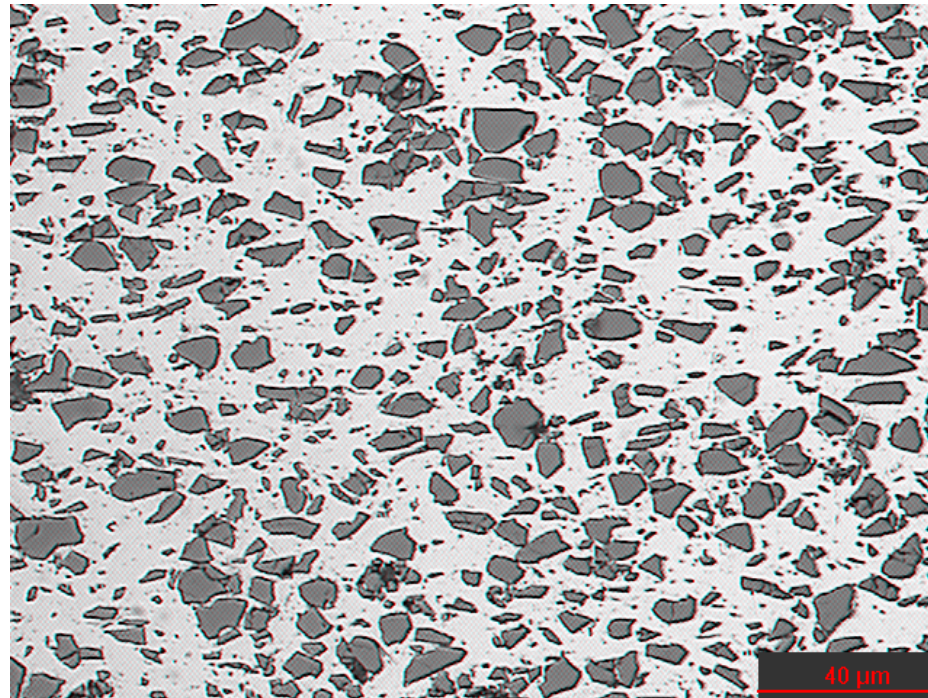


Finished sheet identification



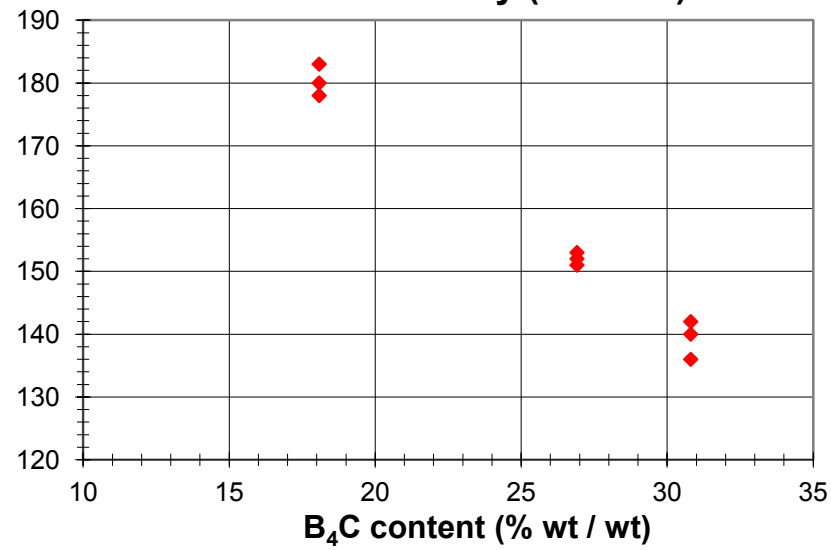
Laser etching equipment

9. BORTEC[®] Properties

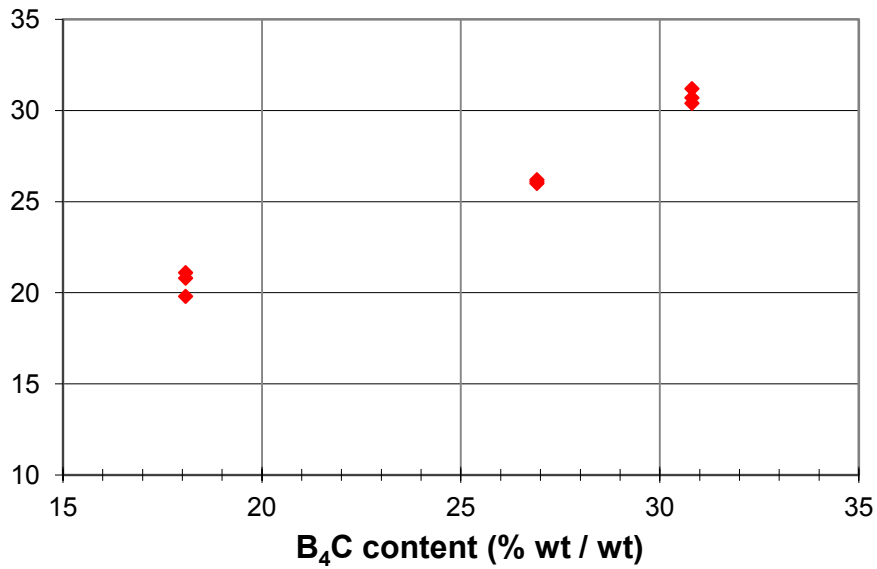


- Very good uniformity because of powder blending process
- Density > 98%
- Interconnected porosity ≤ 0.5 vol%

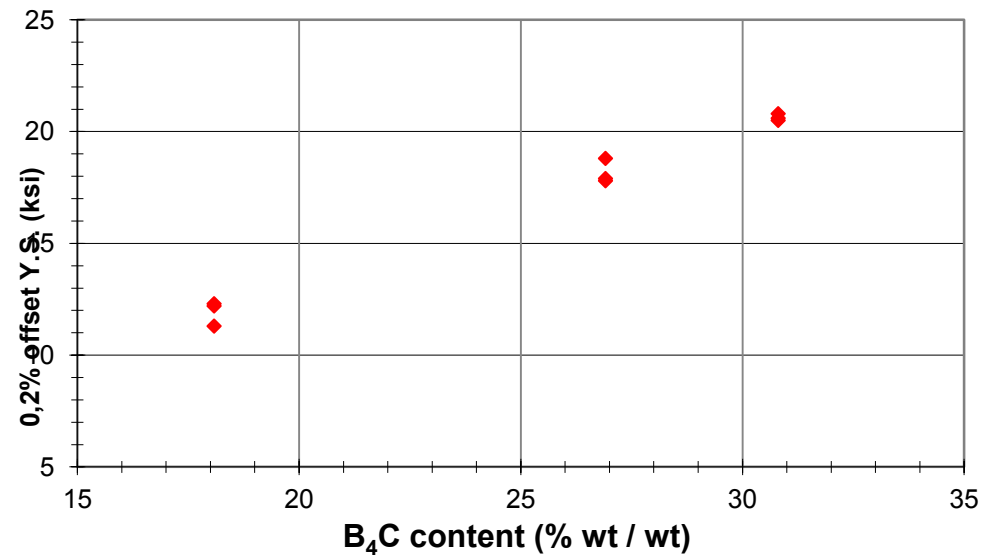
Thermal conductivity (W / m K)



UTS (ksi)



0,2% offset Y.S. (ksi)



10. Summary



- Material manufactured securely under the umbrella of a proven NQA-1/ISO Quality Assurance Program;
- Properties qualifying for industry need
- Problem free traceability

Ceradyne Canada: a single window for high quality neutron absorption materials