ADVANTAGES / DISADVANTAGES OF THERMAL LININGS AVAILABLE TODAY

SYSTEM REQUIREMENT	OUR COMPETITION			H.T.L.'s *System 203*
	Insulating Boards	Spray-on Refractories	Steel Liners	
Must thermally protect structure	Boards are good to about 1200° F. "K" values are relatively low, offering good protection unless cracked (see below)	"K" values are high, offering nominal thermal protection. 1600° F on the face will result in excess of 1000° F behind liner	Practically no thermal protection	Excellent protection. 2000° F on face reduced to 205° F at interface within structure. *Note encapsulated insulation backup system*
Must withstand extreme thermal shock	Limited to 1200° F. Degrades under repeated high pressure water streams	Has difficulty with water and thermal shock due to compostion and inflexible nature of product. (No allowance for expansion and contraction.) System is subject to installation problems, deficiencies	Warps with extreme temperatures and thermal shock	Excellent. No effects from thermal shock with temperatures up to 2000° F
Must resist mechanical abuse	Has little resistance. Often cracks and falls apart with impact enabling heat and steam penetration	Good resistance	Excellent	Excellent resistance. Stands up to tools and apparatus
Must withstand "low" as well as "high" temperatures	Has difficulty with temperatures in excess of 1000° F. If water is absorbed, the panels crack	Good resistance to low temperatures. Still has problems with thermal shock (i.e. cracking and delaminating)	Excellent, but warps when heated to above 1200° F	Excellent. Has lasted for years in British Columbia under extremely harsh conditions. Little maintenance
Must accommodate temperature monitoring systems	Good. Thermo-couples may be installed behind the system with easy access	Thermo-couples should be embedded. Should install conduit for future replacement / access. Note difficulty in removing liner for substrate inspection	Good	Good. Thermo-couples may be installed directly behind the system or run in conduit. The system may be removed for easy substrate inspection
Must require minimal maintenance	Requires frequent replacement. Frequency directly related to intensity, duration, and number of burns	Frequency of replacement is in direct relation to intensity, duration, and number of burns. Begins to breakdown at about 1400° F	Requires frequent replacement when burning at temperatures exceeding 1000 to 1200° F	Has been in operation since 1989 without replacement. Recommended maintenance schedule is nominal

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