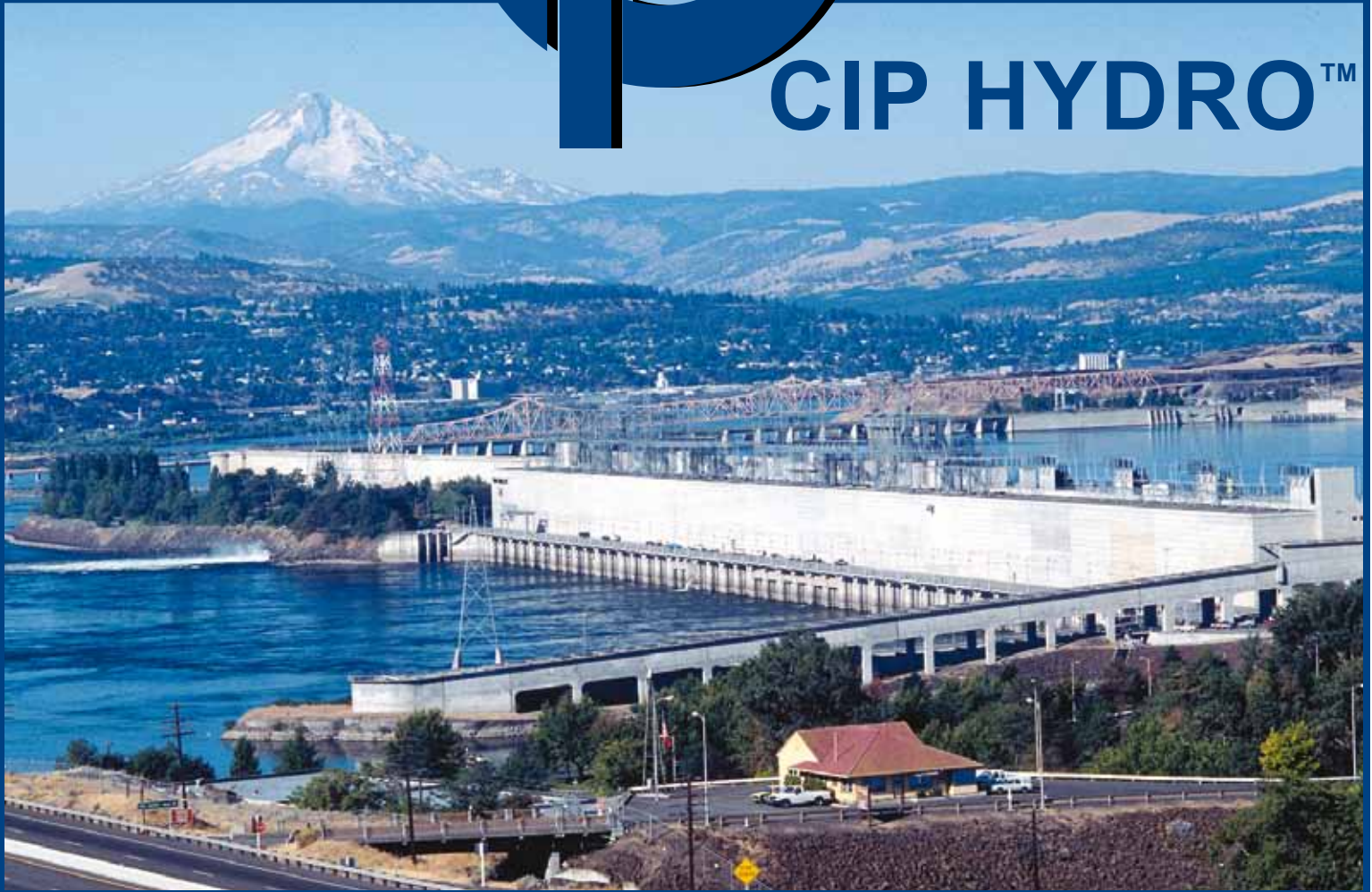




**CIP HYDRO™**



# LAMINATE COMPOSITE MATERIAL FOR HYDRO PROJECT APPLICATIONS

**CIP Composites™**  
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# CIP HYDRO

## CIP HYDRO COMPOSITES™



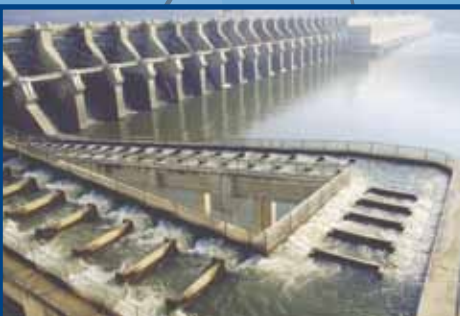
GATE SERVO OPERATING RING  
CONNECTION WITH CIP COMPOSITE



RADIAL SPILLWAY GATE TRUNNION BUSHINGS



LOCK GATE - JOHN DAY DAM



FISH LADDER BUSHINGS



FISH SCREENS BEARINGS

**CIP HYDRO** Composite material is a laminated plastic material made by impregnating fabric with thermosetting resin. The physical and mechanical properties of CIP HYDRO composite make it an excellent bearing material. CIP HYDRO composite offers the design engineer an attractive, low cost alternative to more traditional materials used earlier in the hydro industry for bearings, wear pads, gates, slides and many other applications. CIP HYDRO composites are easily machined, have good dimensional stability and contain no harmful or toxic material.

## CIP HYDRO PROJECT APPLICATIONS

- ▶ Butterfly valve seals
- ▶ Bridge pivot wear pads
- ▶ Control gate bearings
- ▶ Counter weight guide blocks
- ▶ Fish screen bearings
- ▶ Lock gate bearings
- ▶ Operating ring wear pads
- ▶ Running blade adjuster bearings
- ▶ Screen bearings & wear pads
- ▶ Trash rake bearing & wear pads
- ▶ Trunnion bearings
- ▶ Vertical pump shaft bearings
- ▶ Wicket gate linkage bearings
- ▶ Wicket gate bearings
- ▶ Wicket gate thrust washers
- ▶ Floating mooring bitt roller bearings
- ▶ Chain guide/slides
- ▶ Servo wear rings



RADIAL SPILLWAY GATE TRUNNION BUSHINGS



# PHYSICAL PROPERTIES

## CIP HYDRO

Compressive Strength: (ASTM D695)  
 Ultimate: 50,000 PSI  
 Yield: 15,000 PSI  
 Parallel: 13,500 PSI

Tensile Strength: (ASTM D638)  
 11,000 PSI

Tensile Modulus of Elasticity: (ASTM D638)  
 470,000 PSI

Poisson's Ratio: (ASTM D3039-08)  
 0.231

Shear Strength: (ASTM D2344)  
 12,000 PSI

Flexural Modulus of Elasticity: (ASTM D790)  
 260,000 PSI

Hardness Rockwell : (ASTM D785)  
 M100

Density: (ASTM D792)  
 0.047 lbs/in<sup>3</sup>

Water Absorption:  
 (ASTM D570)  
 <0.1%



MARSHAL WADDINGTON (USACE) AND STEVE PHILLIPS (CIP) INSPECTING WICKET GATE LINKAGE.

## TEST RESULTS

CIP Hydro Composite has been tested by Power Tech Labs in Surrey, British Columbia, Canada which resulted in these extremely low coefficients of friction numbers. The U.S. Army Corps of Engineers has listed CIP Hydro bearings as approved materials for hydro projects.

Dry static	=	.075
Wet static	=	.056
Dry dynamic	=	.065
Wet dynamic	=	.046



WICKET GATE READY FOR REBUILD



WICKET GATES WITH CIP HYDRO



TURBINE HEAD AND COVER



THRUST BEARING SPIDER HOUSING



GENERATOR ROTOR

## CIP TUBES & SHEETS

### TUBE

Minimum bore 3/8" (9.5mm)  
 Maximum bore 54" (1371mm)  
 Standard Lengths 16" - 24" - 32"  
 (406-609-812mm)

### SHEET

Minimum thickness 1/16" (1.6mm)  
 Maximum thickness 6" (152.4mm)  
 Standard widths 16" - 24" - 32"  
 (406-609-812mm)  
 Standard lengths 24" - 36" - 48" - 60"  
 (609-914-1219-1524mm)



### MACHINING

CIP composite is readily machinable by conventional machining techniques and, as a general guide, may be treated as bronze but should be machined dry without coolant. For turning, tungsten carbide-tipped tools should be used to obtain a fine finish. High-speed steel tools can be used for machining when accuracy below .005" is not required and for small quantity production. For details contact our engineering department.

CIP composites are completely non-toxic. It is advisable to use adequate dust extraction when machining CIP composites.

### BENEFITS

- ▶ Low friction
- ▶ Edge load tolerant
- ▶ Self lubricating
- ▶ Excellent wear life
- ▶ High shock loading
- ▶ Pollution free
- ▶ Very low moisture absorption
- ▶ Custom sizes available
- ▶ Freeze fitting
- ▶ Easy to machine
- ▶ Wet or Dry running
- ▶ Short lead time
- ▶ Can be machined in place
- ▶ Non-conducting
- ▶ Manufactured in the U.S.A.
- ▶ Engineering support

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