



Hall Longmore

Corrosion Protection

With Hall Longmore's commitment to delivering highest quality product, corrosion protection is a critical element contributing to the lifespan of steel pipelines.

Carbon steel piping is invariably exposed to some type of corrosive environment. This may require simple external paint coating or sophisticated internal and external coatings supplemented by a cathodic protection system.

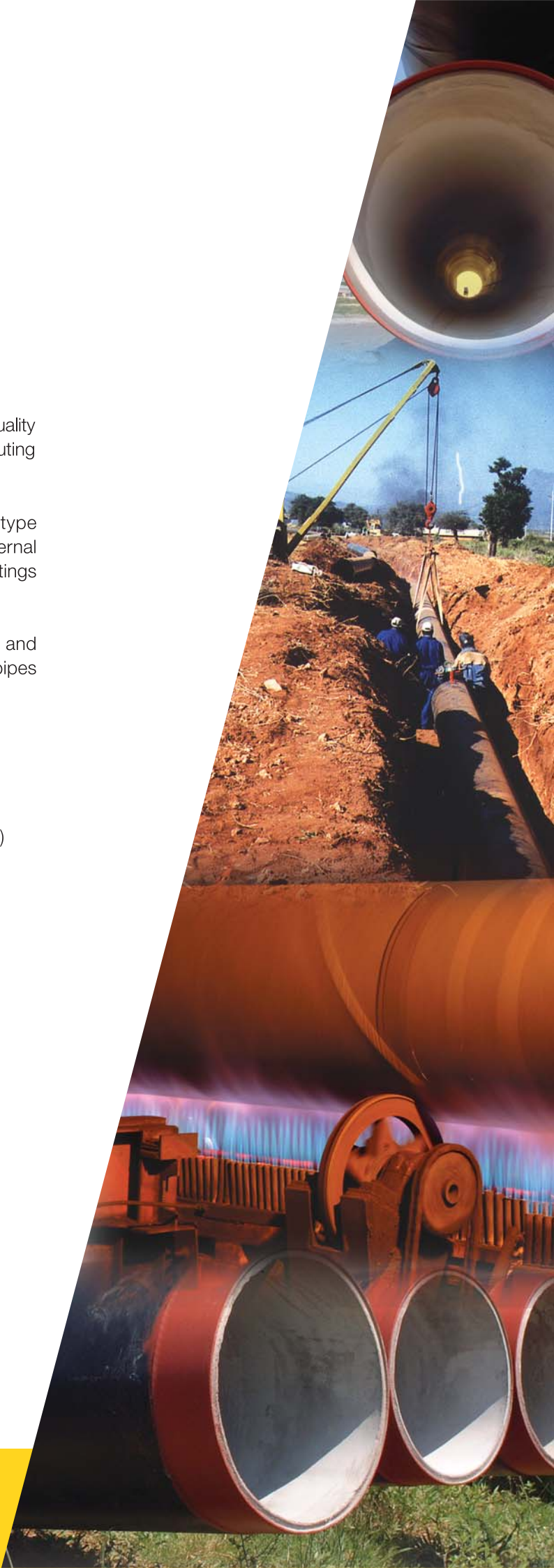
Hall Longmore is an industry leader in the technology and application of protective coatings and linings to steel pipes offering the following systems:

External protection

- Fusion Bonded Epoxy Coatings
- **Sintakote II**[®] Fusion Bonded Medium-Density Polyethylene Coatings
- 3- Layer High Density Coatings (3-LPE & 3-LPP)
- Liquid Epoxy Coatings and Linings

Internal protection

- Liquid Epoxy Linings
- Cement Mortar / Concrete Linings



Corrosion protection

External protection

- **Fusion bonded epoxy (FBE)** is used extensively worldwide under conditions of severe corrosive attack, providing excellent adhesion to the steel substrate through a combination of mechanical and chemical bonding. FBE materials are the preferred coatings for protecting underground pipelines. Tailored gel time and curing characteristics provides for economic application of FBE coatings to all sizes of pipe.
- **Sintakote II® (Fusion bonded medium-density polyethylene)** is applied directly to pipe using a fusion bonding process. It provides cost effective protection to pipes against mechanical damage, chemical and corrosion attack.
Product features include:
 - * High impact and soil stress resistance
 - * Ability to accept pipe bending without damage to coating
 - * High dielectric strength and electrical resistance.
- **3-Layer Coatings (3-LPE & 3-LPP)** are becoming increasingly popular where corrosion and mechanical protection of pipelines is required. This is achieved by applying an initial FBE coating for corrosion protection, followed by a protective adhesive and a High Density Polyethylene (3-LPE) or Polypropylene (3-LPP) layers which provide for protection against mechanical damage. 3-LPE functions well in operating temperatures ranging from 40°C to 80°C while 3-LPP is suitable for temperatures above 120°C.

Liquid epoxy coatings may be applied where piping is exposed to an aggressive external atmosphere such as within a chemical plant or at coastal installations.

Internal protection

- **Liquid epoxy linings.** These have been utilised successfully for many years in systems conveying water, sewage, chemical and petrochemical products. Various grades are available to suit specific service requirements.
- **Cement Mortar / Concrete Lining** is the preferred lining medium specified by designers for potable water services. The system offers an appropriate balance between performance and economic considerations with respect to corrosion, wear protection, ease of installation and final cost.

Hall Longmore's two purpose-made lining plants cater for diameters from 200 mm to 2100 mm nominal bore. Comprising the drag trowel plant (200 mm to 450 mm Ø) and the belt driven Centrifugal liner (500 mm to 2100 mm Ø), these facilities provide the required consistency of lining and an excellent smooth finish.

A further advantage is that mix designs can be adjusted to include additives or different cement blends to cater for more aggressive applications such as water outside the neutral pH range.



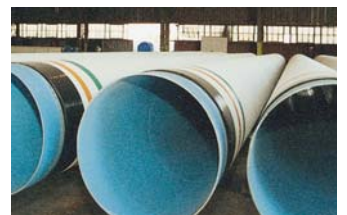
FBE coated/cement mortar lined pipes



Sintakote II®



3-Layer polyethylene coating (3LPE)



Epoxy lined pipes with BFGW coating



Cement mortar lined pipes

Corrosion Protection Process Facilities

Protective coatings and linings ranging from traditional bitumen glass reinforced wrapping and cement mortar lining to specialised paints and electrostatically applied fusion bonded epoxy powders are included in the service offered by Hall Longmore. Hall Longmore's cement mortar lining facilities are considered to be amongst the most up to date in the world.

Fusion Bonded Epoxy Coating

Surface preparation of pipes includes removal of all surface moisture by passing pipes through a heating ring and flame, impinging all surface contaminants.

Surface profile is achieved by shot blasting with a wheelabrater where a steel shot/grit is used to produce the required surface (up to SA 3 standard).

Prepared pipe passes through a process of wire brushing and vacuuming before the application of chromate pre-treatment. This is followed by induction heating which reaches a temperature of between 235°C - 250°C prior to processing through an electrostatic spray booth. Full curing takes place within seconds with inspection commencing once surface temperature has reduced to a hand touch level.

Sintakote II® (Fusion bonded medium-density polyethylene-FBMDPE)

The process of applying Sintakote II® comprises thoroughly cleaning the bare steel by shot blasting and then heating. Heated pipe is dipped into a fluidised bed of Sintakote II® powder which fuses onto the hot surface to a thickness of 1.6 mm-2.3 mm, depending on the pipe size.

3-Layer Coatings

A first layer of Fusion Bonded Epoxy (FBE) is applied. Thereafter a high performance protective adhesive layer is applied to the FBE coating which bonds to the final coat of either High Density Polyethylene or Polypropylene.



FBE coating line



Heating pipe



Pipe coated with Sintakote II®

Liquid Epoxy Lining

A thorough process of surface preparation is conducted. Liquid epoxies, solvent borne and solvent free, are applied to the pipe inner surface through a lance and spray nozzle. For solvent free epoxies the two components are heated to 60°C using heated water jackets along the lance to the mixing nozzle.

For solvent borne products premixed epoxy is pumped through a spray nozzle using airless spray equipment.



Application of liquid epoxy

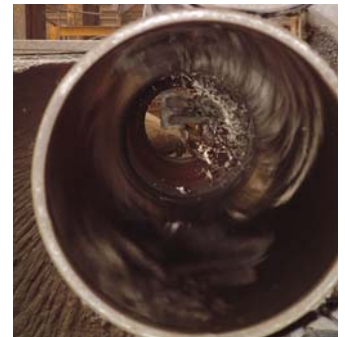
Cement Mortar Lining

Hall Longmore has an in house drag trowel facility for pipe diameters ranging from 200 mm to 450 mm nominal bore. Mortar mix is pumped into the pipe and distributed evenly to the internal circumference by means of a cone shaped vibrating trowel. The trowel is drawn through the pipe with an electric winch during the process.



Drag trowel process

The centrifugal spinning method is used to line pipes from 500 mm to 2100 mm NB. The Hall Longmore process positions pipe on 3 rotating belts which allows pipe to spin unencumbered by fixed wheels or rotators. The mortar mix is pumped into the pipe through a boom which is gradually withdrawn. Lining thickness is governed by the rate of pumping over the speed at which the boom is withdrawn. Mix batching and placement are computer controlled.



Centrifugal spinning of cement mortar lining

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