

Description of PIH Fused Field Joint Coating System

Introduction

The PROBLEM:

Field Joint Coating is often a compromise between performance and practicality in the field.

The main area of compromise is often adhesion to steel and more significantly the parent coating.

This is particularly difficult when trying to bond to Polyolefin factory applied coatings.

Introduction

The SOLUTION:

An 'end to end', fully fused, 3-Layer field joint coating for
3-Layer Polyolefin Coated Linepipe

This removes virtually all of the compromise AND uses
established materials and proven automated application
methods and equipment

WHO IS PIH?

A FIELD JOINT COATING CONTRACTING COMPANY

ESTABLISHED IN 1982 (OVER 25 YRS EXPERIENCE)

INDEPENDENT APPLICATOR - NOT A MATERIAL MANUFACTURER

Who Do We Work For?

Some of the companies we have worked for:

Clients

BP

Total

Shell

Petrobras

National Grid

ExxonMobil

Statoil

Norsk Hydro

Main Contractors

Allseas

CCIC

HHI

Acergy

McDermott

Saipem

Bechtel

Subsea7

PIH Awards

PIH received the IPLOCA “Field service Contractor” Safety award for 1999, 2002



PIH Awards

... and again for 2004



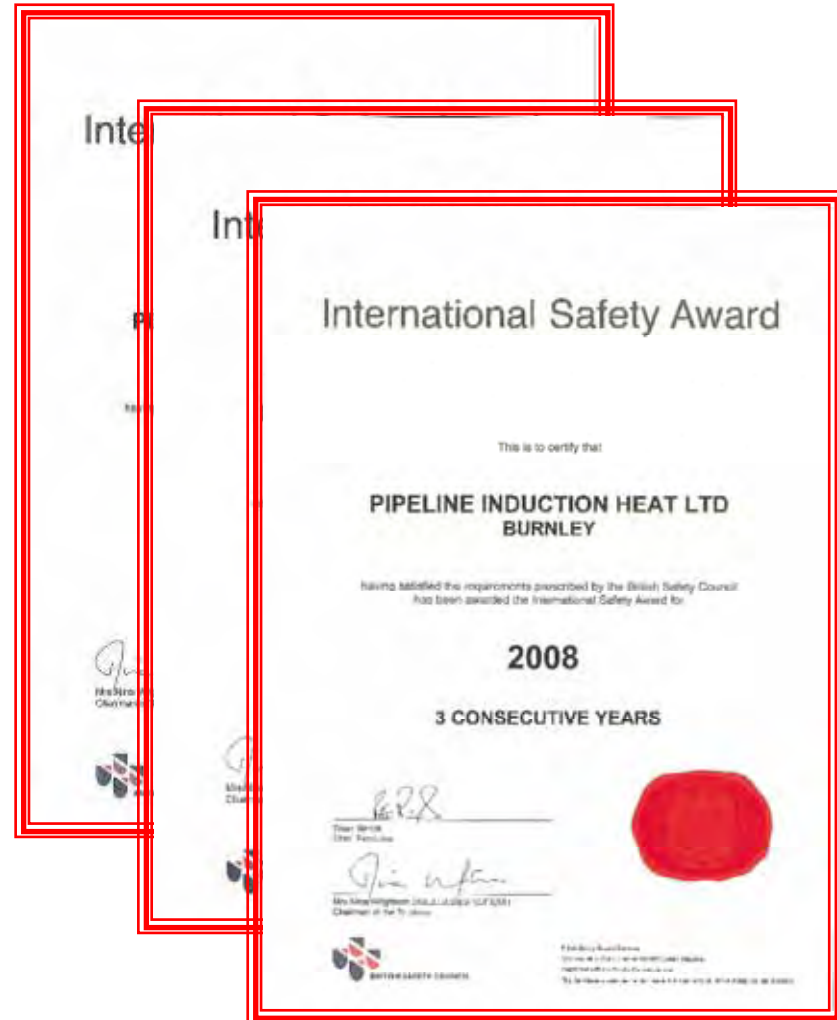
PIH Awards

PIH were 'Runners-UP' for the 2004 IPLOCA Environment Award



PIH Awards

PIH were awarded the prestigious British Safety Council International Safety Award for THREE CONSECUTIVE YEARS: 2006, 2007 & 2008

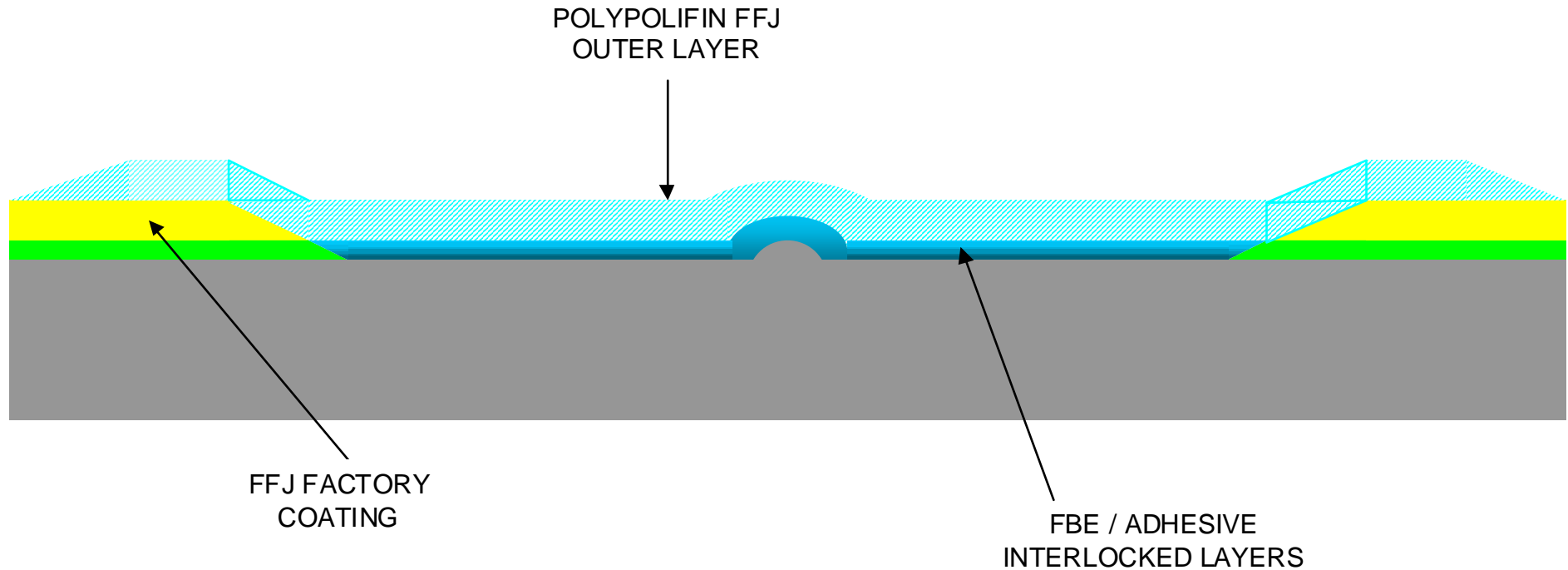


Fused Field Joint (FFJ) Coating

3-Layer Polyolefin Field Joint Coating System Typically 2 to 3mm thick.

- Layer 1 - Fusion Bonded Epoxy (FBE)
Typically applied at 200 to 400 microns
- Layer 2 - Chemically Modified Polyolefin Powder Adhesive
Typically applied at 200 to 500 microns
Must be applied within the Gel time of the FBE
- Layer 3 - Polyolefin Tape
Applied to suit required finished thickness

Fused Field Joint (FFJ) Cross Section Diagram



- PE System up to 80°C
- Standard PP System up to 115°C
- High Temperature System up to 140°C

FFJ Features

- 3-Layer System - Same as factory applied coating
- End to End – Polyolefin solution
- Excellent adhesion to steel substrate
- Full Fusion (welding) to factory coating overlaps

Blast Cleaning

Closed Cycle Abrasive Blasting to SA2½



Manual



Automatic

Overlap Preparation



- Overlap area is cleaned and masked before powder coating
- This ensures a clean surface to allow good adhesion of the Tape

Tape Conditioning Oven

Tape Pre-Heated – Multiple ovens used to suit production



Coating Process

Overlap Areas Masked



Coating Process

Electric Induction Heating



Powder Application

FBE/CMPP Powder Coating



Layer 1 - FBE



Layer 2 – FBE / Polyolefin Powder

Polyolefin Powder applied within the gel time of the FBE to ensure cross linkage



Layer 3 - Tape



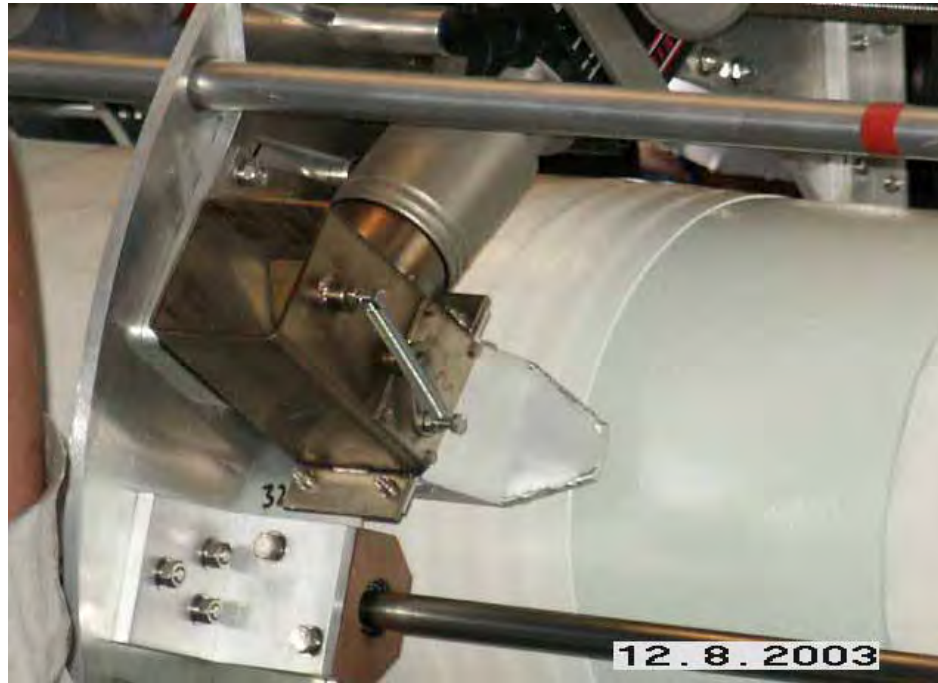
Tape Application



- Tape is spirally wound onto the pipe
- Heat assisted to ensure full fusion of overlapping layers

Tape Application

Tape is applied with controlled tension and heat input



- 1st Heater “Wets Out” Powder Layer
- 2nd Heater Fuses Tape