

# 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

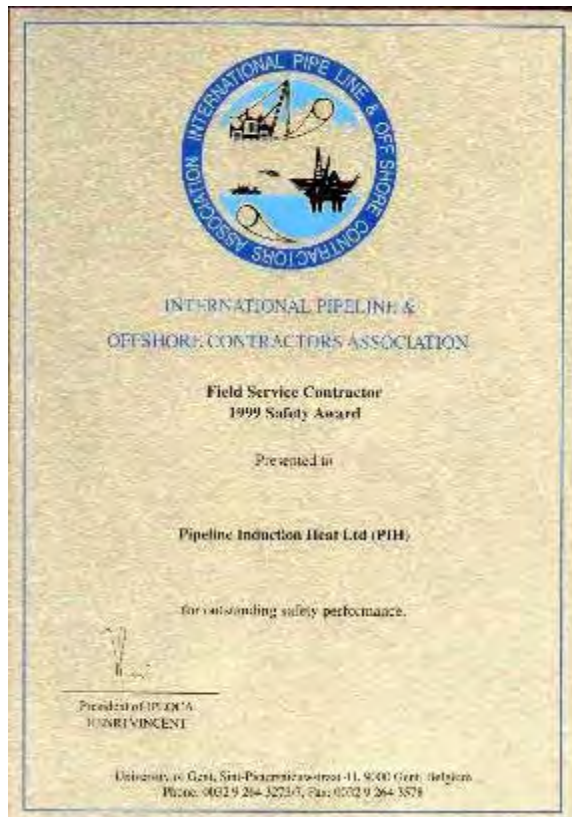
# PIH “Credentials”

PIH is an ISO 9001:2000 registered company



# 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**

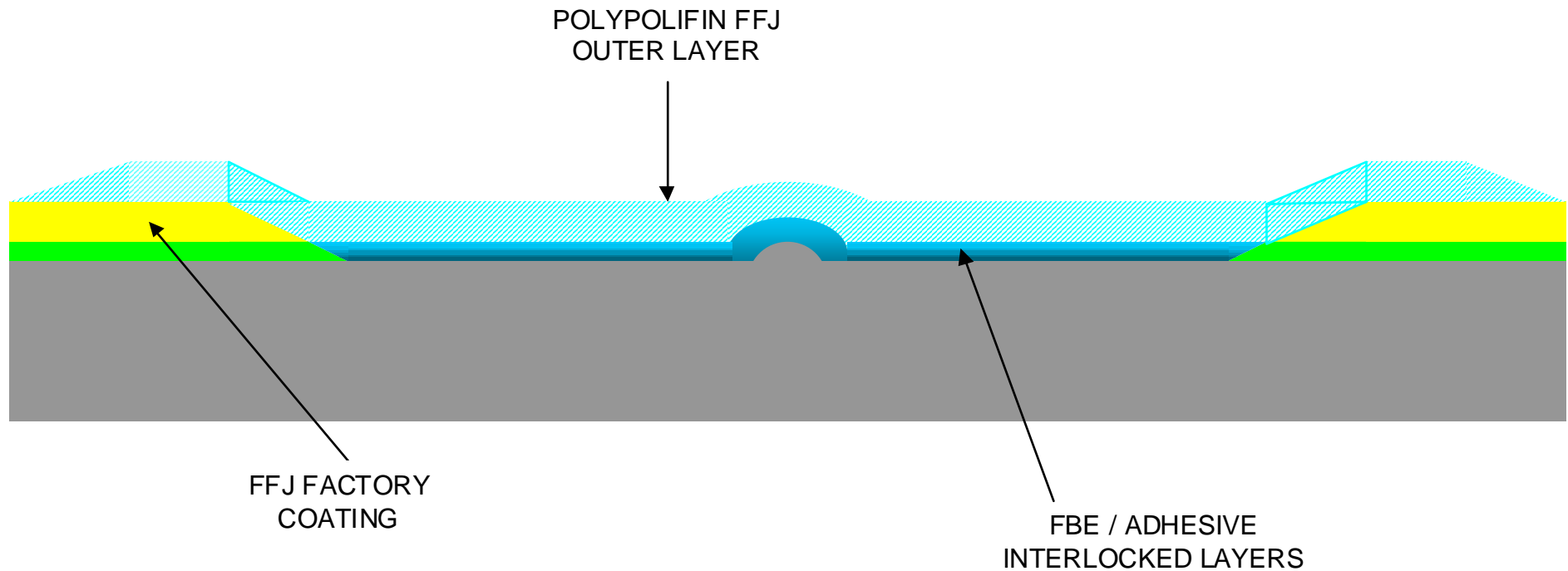


# Fused Field Joint (FFJ) Coating

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



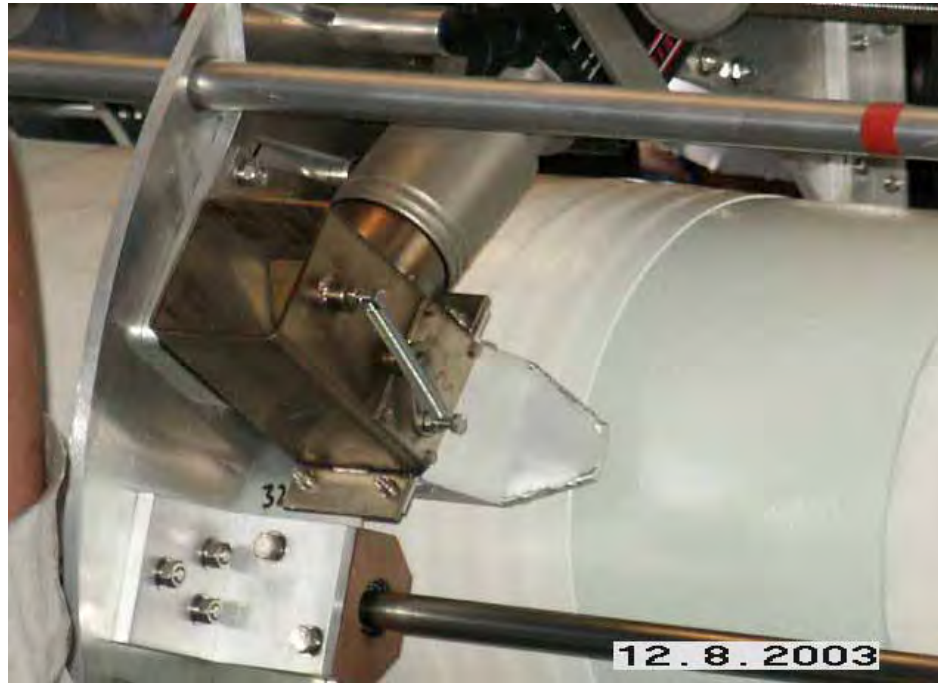
# Tape Application



- 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



- 1<sup>st</sup> Heater “Wets Out” Powder Layer
- 2<sup>nd</sup> Heater Fuses Tape