AMENDMENT TO DEP GEN:

INSTALLATION OF ONLINE INSTRUMENTS (PERNIS/MOERDIJK)

Wec	:	No	Comm. Index	:	Not Applicable
Veiligheidsrapport	:	No	Risk	:	M
WWW-Contractors	:	Yes	Classification	:	Unrestricted
Emergency plan	:	No	HSE critical	:	No
FCM related	:	No			

Objective / scope

This Engineering document is a Shell-Pernis/ Moerdijk amendment to DEP 32.37.10.11-GEN of October 2001.

1 deleted ~~This is a deleted sentence. Color RED~~

2 added This is an added sentence. Color BLEU

Parties involved

In the margin it is indicated where the amendment is only applicable for Shell-Pernis: **P** or for Shell Moerdijk: **M**

Checked by

DMS/745, CEI/4

Risk

This document is, according to the Risk Matrix, potential (M)iddle. The risk is covered by this document and by training and application of this document.

Revision info

Last revision	Date	Reason
F	28-12-2010	Update to new format. Technical update will be performed when new DEP 32.37.10.11 - Gen is released.

More revision information

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1. SUMMARY AND KEYWORDS

Amendment to DEP 32.37.10.11-GEN, the chapters where the amendment is related to are 2.2.1, 2.2.3.7, 4.1, 4.2.2.1, 4.2.2.4, 5.5, and 7.1.

2. CONTEXT AND REFERENCES

The DEP 32.37.10.11 Shell Pernis/ Moerdijk amendment is an OPCO variant on the DEP 32.37.10.11-GEN October 2001.

3. DEFINITIONS AND ABBREVIATIONS

For definitions and abbreviations we refer to the DEP 32.37.10.11-GEN October 2001.

4. DOCUMENT TEXT

4.1 REF. CHAPTER 2.2.1 REMOTE MOUNTING CONCEPT

In the early 1980s, a modular mounting concept was developed for transmitters mounted remotely from the process connection(s): a mounting plate, attached to a dedicated instrument mounting support, accommodates the transmitter, manifold, heating element with terminal box, insulation covers, nameplate and protective shade, as required. Tubing with compression fittings interconnects manifold and process connection(s).

Maintenance requirements have dominated the design of the remote mounting concept. The concept is based on a need for permanent access and includes facilities for in situ testing and calibration.

The remote mounting concept has proven to be very valuable and covers all frequently applied hook-up arrangements. Typical hook-up arrangements with MESC-coded component listings are available for liquid, gas and steam applications as given in standard drawings S 37.001 (metric version) and S 37.002 (imperial version).

Metric tubing (10 mm OD) and compression fittings should be used for new projects. The application of imperial sized tubing (3/8 inch OD) and related compression fittings should be restricted to locations which have standardized on imperial sizes and requires approval by the Principal.

The reliable and proven use of compression fittings requires that:

- All compression fittings in a plant, including those supplied with equipment packages, shall be of the same size, make and type. Mixing of fittings of different size (e.g. metric with imperial) or different make/type will result in unreliable joints and might consequently result in loss of containment; the make is subject to Principal’s approval.
- The fittings and tubing shall be installed by skilled personnel, strictly in accordance with Manufacturer's instructions.
- The impulse lines shall be pressure-tested after installation, see (4.5).

P In installations the metrical version needs to be used exclusively.

M In installations the imperial version needs to be used exclusively.

4.2 REF. CHAPTER 2.2.3.7 DESIGN ASPECTS

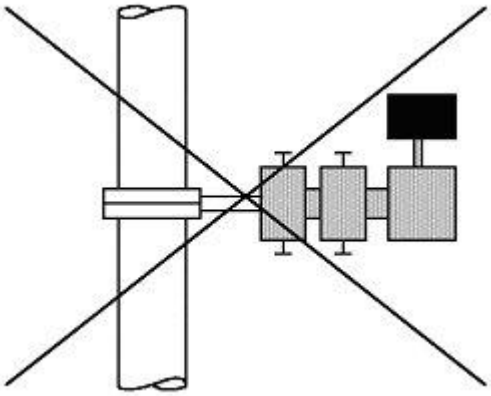
For the direct mounting concept, the following aspects need specific attention:

- To prevent too high stresses on the process nozzle, the length and weight of the instrument with its accessories need to be reviewed, especially in vibrating service and on small bore process piping. Co-ordination with Mechanical Engineering is required.
- Direct mounting is less suitable for applications that require rodding out of process connections.
- The compactness of most direct mounting designs causes the instrument housing to operate close to the process operating temperature. The upper and lower temperature limits of sensor fill fluids/electronics of instruments restrict the use of the direct mounting concept in low and high temperature applications.

When the direct mounting of a differential pressure type flow meter is considered, the transmitter/manifold shall be supported by only one of the tappings and connected by tubing to the second tapping. If the transmitter is supported by two tappings pointing in the same direction, as shown in Figure 3, a slight misalignment of the tapping points causes leakage and undue stress at the mounting bolts. Furthermore, the thickness of an orifice plate depends on the plate type and its nominal pipe size.

Direct mounting concept is not allowed in existing plants in case of process connections smaller or equal to 15 mm/½ inch.

Figure 3: Incorrect direct mounting of a DP flow transmitter/manifold by supporting it from both tappings



4.3 REF. CHAPTER 4.1 SPECIFICATION OF COMPONENTS

The general rules for material selection of impulse line components are similar to those for wetted parts of instruments, as detailed in DEP 32.31.00.32-Gen. Material selection is subject to Principal's approval.

Where process conditions allow, the wetted instrument impulse line components (i.e. tubing, compression fittings, manifolds etc.) shall be made of AISI 316 type stainless steel. Stainless steel tubing and compression fittings shall be suitable for a maximum allowable working pressure of at least 413 bar (ga) at temperatures between -200°C and +38°C. For maximum allowable working pressures at higher temperatures, see Appendix 1.

NOTES: 1. The maximum allowable working pressure of at least 413 bar (ga) applies to SS fittings only (see MESC specification 76/039). Lower maximum allowable working pressures apply to CS or brass fittings.

2. The maximum allowable working pressure of the impulse line components shall equal or exceed the upper design pressure of the process it serves.

For applications where AISI 316 stainless steel is not suitable, other materials such as Incoloy, Monel, Hastelloy, Tantalum or Titanium should be applied.

For maximum allowable working pressures at different temperatures in case of Incoloy 825, see underneath table.

Incoloy 825 Tubing		
OD = 10 mm, wall thickness = 1.5 mm		
Temp (C)	S, Max (MPa)	P, Max (barg)
204	133.8	456
260	127.6	435
316	122.7	418
343	120.7	411
371	119.3	407

Incoloy 825 Tubing		
OD = 10 mm, wall thickness = 1.5 mm		
Temp (C)	S, Max (MPa)	P, Max (barg)
399	118.6	404
427	117.2	400
454	117.2	400
482	116.5	397
510	115.8	395
538	113.8	388

Components of such materials may however be very costly and may at a later stage be inadvertently interchanged with unsuitable stainless steel components. Alternative 'hook-up' arrangements (e.g. diaphragm seals) or alternative measurement principles (e.g. in-line flow instruments or internal level measurements) should be considered as a first choice.

Austenitic stainless steel tubing (including insulated tubing) is vulnerable to chloride stress corrosion if exposed to temperatures above 60°C. Impulse and steam tracer tubing installed under such conditions shall be constructed from any of the following materials:

- ASTM B 423 alloy (UNS N08825) tubing, e.g. Incoloy 825 or Nicrofer 4221;
- ASTM B 668 alloy (UNS N08028) tubing, e.g. Sanicro 28;
- UNS S 312 254 SMO.

NOTES:
1. The three groups of tubing materials, listed above, may be used in conjunction with AISI 316 type stainless steel compression fittings.
2. The hardness of the high nickel alloy tubing shall be within the range of 77 HRB to 83 HRB.
3. Chloride stress corrosion on the outside of the tubing may be caused by chlorides present in rain water (especially in marine and coastal locations) and by water-soluble chlorides in insulation material.
4. Some Manufacturers offer pre-insulated tubing or tubing bundles (impulse and tracer tubing plus insulation), including a wide range of dedicated sealing and installation accessories. If the Manufacturer's instructions regarding installation and sealing are followed, such products may be considered in view of their commercial attractiveness and better ingress protection than field fabricated insulated bundles. If such products are chloride free (e.g. not containing any PVC) and if water tightness can be guaranteed during construction and plant operation, chloride stress corrosion will not occur and austenitic stainless steel may be used.

Stainless steel impulse line components may be selected on the basis of the MESC numbers given on standard drawings S 37.001 (Instrument impulse lines, metric version) or S 37.002 (Instrument impulse lines, imperial version). Stainless steel compression fittings shall conform to MESC specification 76/039 and stainless steel tubing to MESC specification 74/051.

Gauge blocks shall be provided with a 1/2 inch female threaded gauge adapter. The type of thread for the pressure gauge (tapered 1/2 inch NPT or parallel G 1/2 inch) shall be specified by the Principal. Gauge blocks may be selected on the basis of MESC specification 60.98.55/201.

NOTE: Gauge blocks are provided with adapters to allow dial positioning.

Usage of AISI-316 tubing is not permitted.

Use Incoloy-825 or equivalent. (ref. mesc.: 74.48.80.XXX.X)

4.4 REF. CHAPTER 4.2.2.1 INSTRUMENT MOUNTING SUPPORTS

In the remote mounting concept, instruments are installed on dedicated mounting supports.

The use of instrument mounting supports mounted on the process line requires the approval of the Principal. They shall not be applied on:

- process line sizes smaller than DN 100;
- insulated process piping;
- vibrating service.

If instrument mounting supports are clamped around process piping of a different material, insulating barriers (e.g. tape or gasket material) shall be applied to prevent electrolytic corrosion.

Instrument mounting supports shall not be fixed to grating, as this does not provide sufficient stiffness and does not allow the grating to be removed fro painting.

If instrument mounting supports have to be fixed to fireproofed plant structures, these supports should be welded to the steel structure before the fireproofing is applied.

Typical examples of instrument mounting supports are shown on standard drawing S 37.004.

As no sun shade is required and no local test connection-/junctionbox is used only rectangular mountingplates will be used.

M The type of backplate, manifold, isolating protection box, multiport gauge valve, etc. is subject to approval Principal.

4.5 REF. CHAPTER 4.2.2.4 CONNECTIONS BETWEEN DIFFERENTIAL PRESSURE MEASURING INSTRUMENTS AND MANIFOLDS

For connections between differential pressure type measuring instruments and manifolds, one of the following connection types should be selected:

- Connections with standardized mating dimensions as specified in ~~IEC 61518, type A~~ DIN 19213, PART 2 from 1980 (with an extended spigot). ~~for a maximum allowable working pressure of 413 bar (ga) at 38°C, with O ring dimensions according to ISO 3601 1.~~

4.6 REF. CHAPTER 5.5 OXYGEN SERVICES

All material for gaseous oxygen applications shall be kept separate from other materials and carefully degreased and inspected as specified in DEP 31.10.11.31-Gen.

For oxygen, see also amendment – BBS 04.00.4045.

4.7 REF. CHAPTER 7.1 GENERAL

The type of heating (steam heating, elektrical tracing or other means) of instruments and impulse lines shall be established in consultation with the Principal. Tracing temperatures shall be carefully selected to prevent overheating, resulting in boiling impulse line liquid.

First we need to assume that with winterizing and heating till 50ºC we are dealing with electrical heating.

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Revision information

Revision	Date	Reason
0	1997-10-01	First issue
A	2003-06-17	Completely renewed due to DEP changes
B	2003-07-10	Review tekst and update DEP
C	2003-12-11	Included table incoloy 825
D	2005-03-17	Manifold info added
E	2005-10-11	Chapter 5.1, Moerdijk remark regarding tubing material deleted