

*FeCAS*  
*Welding and materials technology*







Bulkers

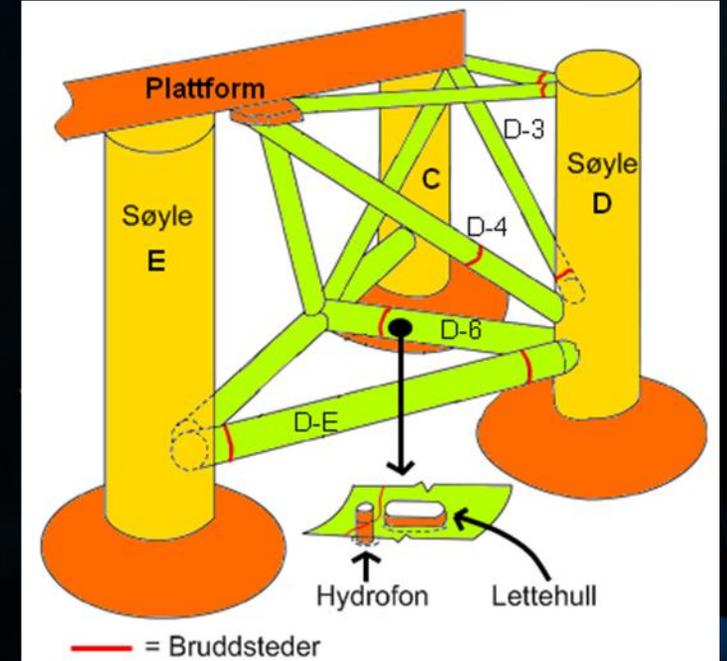


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*Why do we need welding coordination  
and certified welders in projects?*





### *Platform capsized in 20 minutes:*

- *Fatigue crack in the construction (D-6)*
- *Bad design, technical welding knowledge and welding inspection was the reason behind this accident.*





### *Trade hall roof collapsed:*

- *Crucial welds where executed as semi- of fillet welds when they should be fully penetrated*
- *Due to miscalculation and lack of proper execution and follow-up during manufacturing and installation.*





VAK SVEIS: Talisman har funnet svakheter ved noen av sveisene på Yme-plattformen, og må nå gå gjennom 3000 sveisesømmer på nytt. (Foto: Maiken Ree)

## **- Alvorlige kostnadsoverskridelser på Yme**

Olje- og energidepartementet liker dårlig at Yme-prosjektet blir minst dobbelt så dyrt som antatt.

## *Consequenses:*

- *Penalties*
- *Postponements*
- *Increased budgets*
- *Bad reputation*
- *Dissatisfied customers*



*International standards and requirements are established to:*

- Ensure adequate safety*
- Value adding and cost effectiveness*

*In addition we have requirements from Norsok, Equinor, Total, BP and customer specific requirements*

## Requirements for a weld

Lifetime

Strength



Environment

## **EN ISO 3834-2**

Comprehensive requirements for Fusion Welding of Metallic materials

## **EN ISO 3834-3**

Standard requirements for Fusion Welding of metallic materials

## **EN ISO 14731: Welding Co-ordination, responsibility and tasks**

- Shall have sufficient authority to enable any necessary action to be taken
- Tasks and responsibility shall be clearly defined

# Welding Coordination acc. to EN ISO 14731

The person who are responsible for all welding activity in the company

Review of requirements

Technical Review

Production Planning

Sub-Contracting

Welding Personnel

Equipment

Calibration

Work Instructions

Qualification of Welding Procedures

Welding Consumables

Materials

Inspection and Testing  
(before, under and after welding)

Non-conformance and corrective actions

Identification and traceability

Heat Treatment

## **Welding inspection and testing**

Welding inspection and testing personnel should be qualified according to EN ISO 9712: Qualification and certification of NDT-personnel.

## **Welders and welding operators**

Welders and welding operators shall be qualified according to

EN ISO 9606-1 Qualification of welders

EN ISO 14732 Qualification of Welding operators

EN ISO 15618-1 Qualification testing of welders for under-water welding

For the welders, their certificates have to be signed and confirmed every six month to be valid for production.

To be allowed to weld according to international requirements you must have a valid welding procedure



# WPS – Welding Procedure Specification

Welding method

Base Material

Filler metal

Welding connection (BW/FW)

Welding parameters

Heat treatment

Heat Input

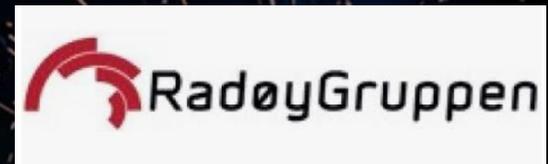
Carbon Equivalent

Welding Procedure Specification WPS										WPS no.:		
										WPCR no.:		
										Rev. no.:	0	
<b>Firma, Adresse, Postnr, Sted, Telefon, Fax</b>												
Manufacturer: _____			Location: _____			Drawing no.:						
Client: _____			Ref. Spec.: _____			Approval body:						
Project: _____			Ref. Stand.: _____			Date of issue:						
Welding Process		1		2		3		Welding equipment:				
Shielding gas / flux												
Groove type:								Joint design / welding sequences:				
Groove preparation:												
Groove cleaning:												
Tack weld method:												
Tack weld details:												
Shielding gas type:												
Gas backing type:												
Nozzle diam. mm:												
Wire stick out mm:												
Tungsten type / diam mm:												
Weaving max. mm:												
Back gauging process:												
Backing type / dim. mm:												
Preheat method:												
Preheat temp. °C:												
Interpass temp. °C:												
Temp. check method:												
Repair weld procedure:												
Preparation for NDT												
Parent metal		C. Max.: 0,11		Cek. max.: 0,315		Pcm max.: 0,187						
Part	Name / grade	Standard spec.		Group	Delivery condition:		Thickn. mm	Dia. range mm				
I:	NVE 36	DNV Rules		1,3	Normalized		25 - 100					
II:	S355J2G3	EN100204		1,1	Normalized		50 - 200					
III:												
<b>Filler metal designation:</b>												
Index:	Manufacturer, trade name:		Classification:		Group:	Smoke class:		Filler metal and flux handling				
A												
B												
<b>Welding parameters:</b>												
Pass no.:	Index:	Gas flow, L / min		Wire dia.:	Welding process:	Welding position:	Ampere:	Voltage:	Current type:	Pol.:	Travel speed mm / min.:	Heat input KJ / mm.:
		Shield:	Back.:				135 - 145	15 - 17	DC	+	184 - 221	0,55 - 0,80
Post weld heat treatment:		NA		Other information:				Proposed by:				
Equipment:								Date:				
Heating rate: °C / hr								Quality control manager				
Soaking temp.: °C								Approved by:				
Soaking time: hrs								Date:				
Cooling rate: °C / hr.												
Withdrawal temp.: °C												
None destructiv testing:												
VT:%	RT: %	UT: %	PT/ MT:%	Afdeling / direkte telf. / Mob Mail adresse				Client / approval body				

FeC provides training and education according to all necessary standards you need to be able to meet the requirements in the Oil & Gas Industry.

- Theoretical and practical training for both welders and engineers.





*Thank you for your time*

