

Material data sheets for structural steel

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association (OLF), The Federation of Norwegian Industry, Norwegian Shipowners' Association and The Petroleum Safety Authority Norway.

NORSOK standards are administered and published by Standards Norway.

Introduction

The reference document for grade specifications is the August 2001 edition of EN 10225

The main changes from Edition 4 to Edition 5 are as follows:

- the MDSs are updated to reflect changes in steel designations and requirements in the referenced EN standards (e.g. EN 10204 and EN 10025);
- MDS Y07 and MDS Y28 have revised requirements to NDT;
- requirements to maximum yield strength have been introduced for steels with SMYS 420 and above.

NOTE It should be observed that the requirement to fabrication tolerances in NORSOK M-101 may be more strict than the manufacturing tolerances for steel products according to this NORSOK standard.

1 Scope

This NORSOK standard includes a collection of material data sheets (MDS) applicable to selected material standards and grades for use in steel structures.

2 Normative and informative references

The following standards include provisions and guidelines which, through reference in this text, constitute provisions and guidelines of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet the requirements of the referenced standards.

2.1 Normative references

EN 10025,	Hot rolled products of structural steels – (all parts)
EN 10204,	Metallic products - Types of inspection documents
EN 10210-(all parts),	Hot finished structural hollow sections of non-alloy and fine grain steels – (all parts)
EN 10210-1,	Hot finished structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions
EN 10219-(all parts),	Cold formed welded structural hollow sections of non-alloy and fine grain steels – (all parts)
EN 10219-1,	Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions
EN 10225,	Weldable structural steels for fixed offshore structures – Technical delivery conditions (Corrigendum AC:2002 incorporated)
ISO 8501-1,	Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings

2.2 Informative references

NORSOK M-101, Structural steel fabrication

3 Terms, definitions and abbreviations

For the purposes of this NORSOK standard, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1

shall

verbal form used to indicate requirements strictly to be followed in order to conform to this NORSOK standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.2

should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.1.3

may

verbal form used to indicate a course of action permissible within the limits of this NORSOK standard

3.1.4

can

verbal form used for statements of possibility and capability, whether material, physical or casual

3.2 Abbreviations

CTOD	crack tip opening displacement
DFT	dry film thickness
EN	European Standard
MDS	material data sheet
PWHT	post weld heat treatment

4 Collection of material data sheets

4.1 General

The materials shall be delivered in accordance with the standard referred to in the MDS. In addition the MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard, see also NOTE in Introduction.

The material selection menu for the actual strength levels and grades is shown in Table 1.

All listed MDSs are enclosed.

4.2 Selection criteria

The number of steel grades used in a project should be limited to the practical minimum. An evaluation should be carried out to determine the optimum grades.

Table 1 - Material data sheets for structural steel

MDS No.	Rev. no.	Standard	Steel grade (see EN 10225)	Product type	Steel quality level
Y01	5	EN 10025- (all parts) EN 10210- (all parts) EN 10219- (all parts)	S235JR S235JRH S235JRH	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y02	4	EN 10025- (all parts) EN 10210- (all parts) EN 10219- (all parts)	S275JR S275J0H S275J0H	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y04	2	EN 10025- (all parts) EN 10210- (all parts) EN 10219- (all parts)	S355J0 S355J0H S355J2H	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y05	3	EN 10025- (all parts)	S355J2 S355K2	Plates	III
		EN 10025- (all parts)	S355J2 S355K2	Plates and sections	III
Y06	3	EN 10225	S355G1+N	Hot finished seamless tubulars	III
Y07	3	EN 10210- (all parts)	S355NH/S355K2H	Hot finished tubulars	III
Y08	3	EN 10219- (all parts)	S355MLH	Cold formed tubulars	III
Y15	3	EN 10025- (all parts)	S420ML	Plates and sections	III
Y16	3	EN 10219- (all parts)	S420MLH	Cold formed tubulars	III
Y20	5	EN 10225	S355G10+N/G10+M	Plates	I
Y21	5	EN 10225	S355G12+N/G12+M	Rolled sections	I
Y22	5	EN 10225	S355G15+Q/G15+N	Seamless tubulars	I
Y25	5	EN 10225	S355G9+N/G9+M	Plates	II
Y26	5	EN 10225	S355G11+N/G11+M	Rolled sections	II
Y27	4	EN 10225	S355G14+Q/G14+N	Seamless tubulars	II
Y28	3	EN 10225	S355G13+N	Welded tubulars	II
Y30	5	EN 10225	S420G2+Q/G2+M	Plates	I
Y31	5	EN 10225	S420G4+M	Rolled sections	I
Y32	5	EN 10225	S420G6+Q	Seamless tubulars	I
Y35	4	EN 10225	S420G1+Q/G1+M	Plates	II
Y36	5	EN 10225	S420G3+M	Rolled sections	II
Y37	5	EN 10225	S420G6+Q	Seamless tubulars	II
Y40	5	EN 10225	S460G2+Q/G2+M	Plates	I
Y41	5	EN 10225	S460G4+M	Rolled sections	I
Y42	5	EN 10225	S460G6+Q	Seamless tubulars	I
Y45	5	EN 10225	S460G1+Q/G1+M	Plates	II
Y46	5	EN 10225	S460G3+M	Rolled sections	II
Y47	5	EN 10225	S460G6+Q	Seamless tubulars	II
Y50	5	EN 10225	S500G2+Q/G2+M ^a	Plates	I

MDS No.	Rev. no.	Standard	Steel grade (see EN 10225)	Product type	Steel quality level
Y51	5	EN 10225	S500G4+M ^a	Rolled sections	I
Y52	5	EN 10225	S500G6+Q ^a	Seamless tubulars	I
Y55	5	EN 10225	S500G1+Q/G1+M ^a	Plates	II
Y56	5	EN 10225	S500G3+M ^a	Rolled sections	II
Y57	5	EN 10225	S500G6+Q ^a	Seamless tubulars	II

^a This steel grade designation is not included in EN 10225.

NOTE All references in the MDS are to the relevant material standard unless otherwise specified.

MATERIAL DATA SHEET		MDS - Y01		Rev. 5 June 2007	
TYPE OF MATERIAL: Structural steel					
PRODUCT	STANDARD	GRADE			
Plates and sections	EN 10025	S235JR			
Hot finished tubulars	EN 10210	S235JRH			
Cold formed tubulars	EN 10219	S235JRH			
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.				
STEEL GRADE	The grades listed represent the minimum requirements for Y01.				
QUALIFICATION					
HEAT TREATMENT/ DELIVERY CONDITION					
CHEMICAL COMPOSITION					
TENSILE TESTING					
IMPACT TESTING					
EXTENT OF TESTING					
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.				
NON DESTRUCTIVE TESTING (NDT)					
SURFACE PROTECTION					
MARKING					
CERTIFICATE	EN 10 204 Type 2.2				

MATERIAL DATA SHEET MDS - Y02		Rev.4 June 2007	
TYPE OF MATERIAL: Structural steel			
PRODUCT	STANDARD	GRADE	
Plates and sections	EN 10025	S275JR	
Hot finished tubulars	EN 10210	S275J0H	
Cold formed tubulars	EN 10219	S275J0H	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.		
STEEL GRADE	The grades listed represent the minimum requirements for Y02.		
QUALIFICATION			
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION			
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING			
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.		
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION			
MARKING			
CERTIFICATE	EN 10 204 Type 2.2		

MATERIAL DATA SHEET MDS - Y04		Rev. 2 June 2007	
TYPE OF MATERIAL: Structural steel			
PRODUCT	STANDARD	GRADE	
Plates and sections	EN 10025	S355J0	
Hot finished tubulars	EN 10210	S355J0H	
Cold formed tubulars	EN 10219	S355J2H	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.		
STEEL GRADE	The grades listed represent the minimum requirements for Y04..		
QUALIFICATION			
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION			
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING			
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.		
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION			
MARKING			
CERTIFICATE	EN 10 204 Type 2.2. For EN 10219 S355J2H Type 3.1.		

MATERIAL DATA SHEET MDS - Y05		Rev. 3 June 2007	
TYPE OF MATERIAL: Structural steel			
PRODUCT	STANDARD	GRADE	
Plates	EN 10025	S355J2 S355K2	
Sections	EN 10025	S355J2 S355K2	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 50 mm.		
QUALIFICATIONS			
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	C max. 0,16 %, CEV max 0,43 %		
TENSILE TESTING			
IMPACT TESTING	Charpy V-notch energy requirement shall be minimum 40 J (average).		
EXTENT OF TESTING			
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.		
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION			
MARKING			
CERTIFICATE	EN 10 204 Type 3.1.		

MATERIAL DATA SHEET MDS - Y06		Rev. 3 June 2007		
TYPE OF MATERIAL: Structural steel				
PRODUCT	STANDARD	GRADE		
Hot finished seamless tubulars	EN 10 225	S355G1+N		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 40 mm.			
QUALIFICATIONS				
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	C max. 0,16 %, CEV max 0,43 %, Nb+V max. 0,10.			
TENSILE TESTING				
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.			
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION				
MARKING				
CERTIFICATE	EN 10 204 Type 3.1.			

MATERIAL DATA SHEET MDS - Y07		Rev.3 June 2007		
TYPE OF MATERIAL: Structural steel				
PRODUCT	STANDARD	GRADE		
Hot finished tubulars seamless or welded	EN 10 210-1	S355NH S355K2H		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 40 mm. Welded hollow sections are limited to 20 mm wall thickness.			
QUALIFICATIONS				
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 1.2 is required.. C max. 0,16% and CEV max. 0,43 for all thicknesses			
TENSILE TESTING				
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.			
NON DESTRUCTIVE TESTING (NDT)	<p>- The weld of the welded hollow section shall be subject to 10 % magnetic testing (MT) of external surface and be free of any linear indication. In case of any findings, 100 % of the section with findings shall be examined. The 10 % MT shall be carried out for thicknesses above 12 mm. The 10 % MT shall be carried out on every section.</p> <p>If the involved parties require more severe defect tolerances for the structural application of the welded hollow section, more severe requirements to be agreed.</p> <p>For thicknesses of 12 mm and above the NDT shall be UT and with acceptance criteria U3.</p>			
SURFACE PROTECTION				
MARKING				
CERTIFICATE	EN 10 204 Type 3.1.			

MATERIAL DATA SHEET		MDS - Y08		Rev. 3 June 2007	
TYPE OF MATERIAL: Structural steel					
PRODUCT	STANDARD	GRADE			
Cold formed tubulars	EN 10 219-1	S355MLH			
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 25 mm.				
QUALIFICATIONS					
HEAT TREATMENT/ DELIVERY CONDITION					
CHEMICAL COMPOSITION	Option 1.4, C max. 0,16%, CEV max. 0,43%, S max. 0,015, P max. 0,025				
TENSILE TESTING					
IMPACT TESTING					
EXTENT OF TESTING					
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.				
NON DESTRUCTIVE TESTING (NDT)					
SURFACE PROTECTION					
MARKING					
CERTIFICATE	EN 10 204 Type 3.1.				

MATERIAL DATA SHEET		MDS - Y15		Rev. 3 June 2007	
TYPE OF MATERIAL: Structural steel					
PRODUCT		STANDARD		GRADE	
Plates, sections		EN 10025		S420ML	
SCOPE		This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 50 mm.			
QUALIFICATIONS					
HEAT TREATMENT/ DELIVERY CONDITION					
CHEMICAL COMPOSITION		Nb+V max. 0,10 %.			
TENSILE TESTING					
IMPACT TESTING					
EXTENT OF TESTING					
SURFACE CONDITION		The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.			
NON DESTRUCTIVE TESTING (NDT)					
SURFACE PROTECTION					
MARKING					
CERTIFICATE		EN 10 204 Type 3.1.			

MATERIAL DATA SHEET MDS - Y16		Rev. 3 June 2007	
TYPE OF MATERIAL: Structural steel			
PRODUCT	STANDARD	GRADE	
Cold formed tubulars	EN 10 219-1	S420MLH	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 16 mm.		
QUALIFICATIONS			
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 1.2, S max. 0,015 %, P max. 0,025 %, Nb+V max 0,10 %, CEV max. 0,39 %		
TENSILE TESTING			
IMPACT TESTING	The Charpy V-value to be minimum 50 J.		
EXTENT OF TESTING			
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.		
DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION			
MARKING			
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y20**Rev. 5** June 2007**TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE	
Plates	EN 10225	S355G10+N/G10+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/ be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>		
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered is also accepted.		
CHEMICAL COMPOSITION	Option 6		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING	<p>Option 13,</p> <p>Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of “the same thickness range”.</p>		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y21**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE	
Rolled Sections	EN 10225	S355G12+N/G12+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING	Option 13		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)	Option 21, Class 2.1		
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y22**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE	
Seamless tubulars (Seamless hollow sections)	EN 10225	S355G15+Q/G15+N	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 The chemical composition in Table 10 shall be modified as follows: C _{max} : 0,16 % (option 7)		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING	Option 13		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)	Option 22.		
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y25**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE	
Plates	EN 10225	S355G9+N/G9+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and min 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>		
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered is also accepted.		
CHEMICAL COMPOSITION	Option 6.		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING	Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y26**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE	
Rolled Sections	EN 10225	S355G11+N/G11+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING			
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y27**Rev. 4 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE	
Seamless tubulars (Seamless hollow sections)	EN 10225	S355G14+Q/G14+N	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 The chemical composition in Table 10 shall be modified as follows: C max 0,16 % (option 7)		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING			
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)	The defect tolerances for ultrasonic testing shall be U2/C .		
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y28**Rev. 3 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE	
Welded tubulars (Welded hollow sections)	EN 10225	S355G13+N	

SCOPE

This MDS is applicable for high frequency welded (electric resistance or induction) hollow sections up to and including 20 mm thickness.
This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.

QUALIFICATIONS

Establishment of WPS, qualification of welding procedures and qualification of welding operators shall be in accordance with the NORSOK standard M-101, "Structural Steel Fabrication".
With regard to Charpy impact testing the following modifications to NORSOK standard M-101 shall apply:

- test temperature: - 40 °C
- relevant notch positions, e.g.: fusion line (FL), FL+2 mm, FL+5 mm
- minimum average energy value: 36 J
- minimum individual energy value: 26 J
- microstructure examination

Qualifications shall be carried out for each nominal thickness.

Detailed requirements for the qualification of the high frequency welding process (electric resistance or induction) shall be defined and agreed.

Base material information, with typical results from chemical composition and mechanical testing, shall be submitted with the bid/be established prior to delivery.

**HEAT TREATMENT/
DELIVERY CONDITION**

CHEMICAL COMPOSITION Option 6

TENSILE TESTING

IMPACT TESTING

EXTENT OF TESTING

SURFACE CONDITION Option 23 shall apply. The internal weld bead shall be removed.

<p><i>NON DESTRUCTIVE TESTING (NDT)</i></p>	<p>The welded hollow section longitudinal welds shall be subject to 100 % volumetric NDT and 10 % surface NDT in accordance with the following requirements and acceptance criteria:</p> <ul style="list-style-type: none"> - For thicknesses 10 mm and below, the volumetric NDT as per section 8.5.3.3 shall apply. - For thicknesses of 12 mm and above, option 23 shall apply, but to acceptance criteria U2. - The weld of the welded hollow section shall be subject to 10 % magnetic testing (MT) of external surface and be free of any linear indication. In case of any finding, 100 % of the section with finding shall be examined. The 10% MT shall be carried out for all thicknesses. The 10 % MT shall be carried out on every section. <p>More severe defect tolerances for the structural application of the welded hollow section may be agreed case by case.</p>
<p><i>SURFACE PROTECTION</i></p>	<p>All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.</p>
<p><i>CERTIFICATE</i></p>	<p>EN 10 204 Type 3.1</p>

MATERIAL DATA SHEET MDS - Y30**Rev. 5** June 2007**TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE	
Plates	EN 10225	S420G2+Q/G2+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9		
TENSILE TESTING	Mechanical properties given in Table 5b shall be modified as follows: Yield strength : 420 - 40 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)		
IMPACT TESTING			
EXTENT OF TESTING	Option 13, Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".		
SURFACE CONDITION			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y31**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S420G4+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered and Normalised may also be accepted.			
CHEMICAL COMPOSITION	Option 6 and option 9			
TENSILE TESTING	Mechanical properties given in Table 7 shall be modified as follows: Yield strength : 420 - 540 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 21, Class 2.1			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y32**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S420G6+Q(mod)		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Normalised may also be accepted.			
CHEMICAL COMPOSITION	Option 6			
TENSILE TESTING	Mechanical properties given in Table 11 shall be modified as follows: Yield strength : 420 - 540 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 22			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y35**Rev. 4 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Plates	EN 10225	S420G1+Q/G1+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/ be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6 and option 9			
TENSILE TESTING	Mechanical properties given in Table 5b shall be modified as follows: Yield strength : 420 - 540 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING	Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y36**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S420G3+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/ be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered and normalised may also be accepted			
CHEMICAL COMPOSITION	Option 6 and option 9			
TENSILE TESTING	Mechanical properties given in Table 7 shall be modified as follows: Yield strength : 420 - 540 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y37**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S420G6+Q		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Normalised may also be accepted.			
CHEMICAL COMPOSITION	Option 6			
TENSILE TESTING	Mechanical properties given in Table 11 shall be modified as follows: Yield strength : 420 - 540 MPa (all thicknesses) Tensile strength : 500 - 660 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE² CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y40**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE
Plates	EN 10225	S460G2+Q/G2+M
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.	
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>	
HEAT TREATMENT/ DELIVERY CONDITION		
CHEMICAL COMPOSITION	Option 6 and option 9	
TENSILE TESTING	Mechanical properties given in Table 5C shall be modified as follows: Yield strength: 460 - 580 MPa (all thicknesses) Tensile strength : 550 - 700 MPa (all thicknesses)	
IMPACT TESTING		
EXTENT OF TESTING	Option 13 Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".	
SURFACE CONDITION		
NON DESTRUCTIVE TESTING (NDT)		
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.	
CERTIFICATE	EN 10 204 Type 3.1	

MATERIAL DATA SHEET MDS - Y41**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S460G4+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall include typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order.</p> <p>CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.</p>			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered may also be accepted.			
CHEMICAL COMPOSITION	Option 6 and option 9			
TENSILE TESTING	Mechanical properties given in Table 7 shall be modified as follows: Yield strength: 460 - 580 MPa (all thicknesses) Tensile strength : 550 - 700 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 21, Class 2.2			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y42**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S460G6+Q(mod)		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6			
TENSILE TESTING	Mechanical properties given in Table 11 shall be modified as follows: Yield strength: 460 - 580 MPa (all thicknesses) Tensile strength: 550 - 700 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 22			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y45**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE	
Plates	EN 10225	S460G1+Q/G1+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/ be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9.		
TENSILE TESTING	Mechanical properties given in Table 5C shall be modified as follows: Yield strength : 460 - 580 MPa (all thicknesses) Tensile strength : 550 - 700 MPa (all thicknesses)		
IMPACT TESTING			
EXTENT OF TESTING	Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y46**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S460G3+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered may also be accepted			
CHEMICAL COMPOSITION	Option 6 and option 9			
TENSILE TESTING	Mechanical properties given in Table 7 shall be modified as follows: Yield strength : 460 - 580 MPa (all thicknesses) Tensile strength : 550 - 700 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y47**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S460G6+Q		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6			
TENSILE TESTING	Mechanical properties shall be modified as follows: Yield strength : 460 - 580 MPa (all thicknesses) Tensile strength : 550 - 700 MPa (all thicknesses)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y50**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE	
Plates	EN 10225	S500G2+Q/G2+M (see NOTE)	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
STEEL GRADE	Grade S460G2+Q/G2+M shall be modified to Grade S500G2+Q/G2+M as specified by this MDS.		
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9, Ni content minimum 0,50 % Other limits may be accepted after special agreement		
TENSILE TESTING	<p>Mechanical properties given in Table 5c for Grade S460G2+Q/S460G2+M shall be modified as follows:</p> <p style="padding-left: 40px;">Yield strength (min.): 500 - 600 MPa (thicknesses ≤ 75 mm) Tensile strength: 600 - 700 MPa (thicknesses ≤ 75 mm)</p>		
IMPACT TESTING			
EXTENT OF TESTING	Option 13 Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			

<i>SURFACE PROTECTION</i>	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.
<i>CERTIFICATE</i>	EN 10 204 Type 3.1

MATERIAL DATA SHEET MDS - Y51**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S500G4+M (see NOTE)		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
STEEL GRADE	Grade S460G4+M shall be modified to Grade S500G4+M as specified by this MDS.			
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall include strain ageing tests (see option 12), typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order.</p> <p>CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.</p>			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered may also be accepted			
CHEMICAL COMPOSITION	Option 6 and option 9 Other limits may be accepted after special agreement			
TENSILE TESTING	<p>Mechanical properties given in Table 7 for Grade S460G4+M shall be modified as follows:</p> <p>Yield strength : 500 - 600 MPa (thicknesses ≤ 40 mm)</p> <p>Tensile strength : 600 - 700 MPa (thicknesses ≤ 40 mm)</p>			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 21, Class 2.2			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y52**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel with documented through thickness properties

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S500G6+Q(mod) (see NOTE)		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
STEEL GRADE	Grade S460G6+Q(mod) shall be modified to Grade S500G6+Q(mod) as specified by this MDS.			
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/be established prior to delivery.</p> <p>The documentation of base material shall include strain ageing tests (see option 12), typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order.</p> <p>CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.</p>			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6 Other limits may be accepted after special agreement			
TENSILE TESTING	<p>Mechanical properties given in Table 11 for Grade S460G6+Q shall be modified as follows:</p> <p>Yield strength: 500 - 600 MPa (thicknesses ≤ 40 mm)</p> <p>Tensile strength: 600 - 700 MPa (thicknesses ≤ 40 mm)</p>			
IMPACT TESTING				
EXTENT OF TESTING	Option 13			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)	Option 22			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y55**Rev. 5 June 2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Plates	EN 10225	S500G1+Q/G1+M (see NOTE)		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
STEEL GRADE	Grade S460G1+Q/G1+M shall be modified to Grade S500G1+Q/G1+M as specified by this MDS.			
QUALIFICATIONS	<p>Base material information, shall be submitted with the bid/ be established prior to delivery.</p> <p>The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldability tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order:</p> <p style="padding-left: 40px;">25 < t ≤ 40 mm 40 < t ≤ 63 mm 63 < t ≤ 100 mm 100 < t ≤ 150 mm</p> <p>Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements.</p> <p>CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.</p>			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6 and option 9, Ni content minimum 0,50 %. Other limits may be accepted after special agreement.			
TENSILE TESTING	Mechanical properties given in Table 5c for Grade S460G1+Q/S460G1+M shall be modified as follows: Yield strength (min.): 500 - 600 MPa (t ≤ 75 mm) Tensile strength: 600 - 700 MPa (t ≤ 75 mm)			
IMPACT TESTING				
EXTENT OF TESTING	Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested instead of "the same thickness range".			
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				

<i>SURFACE PROTECTION</i>	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.
<i>CERTIFICATE</i>	EN 10 204 Type 3.1

MATERIAL DATA SHEET**MDS - Y56****Rev. 5 June****2007****TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Rolled Sections	EN 10225	S500G3+M		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
STEEL GRADE	Grade S460G3+M shall be modified to Grade S500G3+M as specified by this MDS.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/ be established prior to delivery. The documentation of base material shall include strain ageing tests (see option 12), typical tensile test results and weldability tests according to Annex E (option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered may also be accepted			
CHEMICAL COMPOSITION	Option 6 and option 9 Other limits may be accepted after special agreement			
TENSILE TESTING	Mechanical properties given in Table 7 for Grade S460G3+M shall be modified as follows: Yield strength : 500 - 600 MPa (thicknesses \leq 40 mm) Tensile strength: 600 - 700 MPa (thicknesses \leq 40 mm)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

MATERIAL DATA SHEET MDS - Y57**Rev. 5** June 2007**TYPE OF MATERIAL:** Structural steel

PRODUCT	STANDARD	GRADE		
Seamless tubulars (Seamless hollow sections)	EN 10225	S500G6+Q		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.			
STEEL GRADE	Grade S460G6+Q shall be modified to Grade S500G6+Q as specified by this MDS.			
QUALIFICATIONS	Base material information, shall be submitted with the bid/be established prior to delivery. The documentation of base material shall include strain ageing tests (see option 12), typical tensile test results and weldability tests according to Annex E (see option 18) for sections with thickness approximately 20 mm or the greatest thickness required in the purchase order. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.			
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 6 Other limits may be accepted after special agreement			
TENSILE TESTING	Mechanical properties given in Table 11 for Grade S460G6+Q shall be modified as follows: Yield strength : 500 - 600 MPa (thicknesses \leq 40 mm) Tensile strength : 600 - 700 MPa (thicknesses \leq 40 mm)			
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION				
NON DESTRUCTIVE TESTING (NDT)				
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.			
CERTIFICATE	EN 10 204 Type 3.1			

