



LLOYD'S REGISTER TYPE APPROVAL – DESIGN APPRAISAL DOCUMENT

Issued by: Hamburg Technical Support Office (HPC 1661072)

Issued to: HKS GmbH

For: Stainless Steel Multy Layers Expansion Joints

This Design Appraisal Document supersedes and cancels document number HTS/ENS 35559-17, Issue No. 2, dated 27.04.2022

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register Type Approval System Procedure TA14 Version 04 (September 2020) and this Design Appraisal Document forms part of the Certificate.

DETAILS

Type	Movements		
	Axial, mm	Lateral, mm	Angular, deg
AN/AF DN25	±4	-	-
AN/AF DN32	±3.5	-	-
AN/AF DN40	±5	-	-
AN/AF DN50	±5	-	-
AN/AF DN65	±7.5	-	-
AN/AF DN80	±8	-	-
AN/AF DN100	±9.5	-	-
AN/AF DN125	±12	-	-
AN/AF DN150	±16	-	-
AN/AF DN200	±16	-	-
AN/AF DN250	±21	-	-
AN/AF DN300	±22	-	-
AN/AF DN350	±25	-	-
AN/AF DN400	±26	-	-



DETAILS, cont.

Type	Movements		
	Axial, mm	Lateral, mm	Angular, deg
AM/AP DN25	±3	-	-
AM/AP DN32	±3	-	-
AM/AP DN40	±4.5	-	-
AM/AP DN50	±5	-	-
AM/AP DN65	±6	-	-
AM/AP DN80	±8	-	-
AM/AP DN100	±9.5	-	-
AM/AP DN125	±12	-	-
AM/AP DN150	±16	-	-
AM/AP DN200	±16	-	-
AM/AP DN250	±21	-	-
AM/AP DN300	±22	-	-
AM/AP DN350	±25	-	-
AM/AP DN400	±26	-	-

Type	Movements		
	Axial, mm	Lateral, mm	Angular, deg
RM DN25	-	±5	-
RM DN32	-	±3.5	-
RM DN40	-	±5	-
RM DN50	-	±2	-
RM DN65	-	±5	-
RM DN80	-	±6	-
RM DN100	-	±4.5	-
RM DN125	-	±6	-
RM DN150	-	±8	-
RM DN200	-	±7	-
RM DN250	-	±7	-
RM DN300	-	±7	-
RM DN350	-	±8	-
RM DN400	-	±7	-

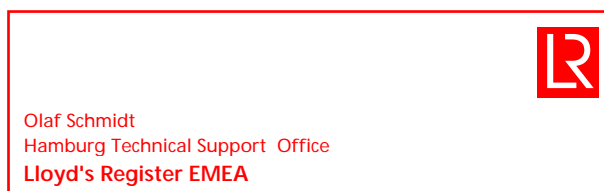
DETAILS, cont.

Type	Movements		
	Axial, mm	Lateral, mm	Angular, deg
WN DN25	-	-	±9
WN DN32	-	-	±7.5
WN DN40	-	-	±8
WN DN50	-	-	±8
WN DN65	-	-	±7
WN DN80	-	-	±7
WN DN100	-	-	±6.5
WN DN125	-	-	±7
WN DN150	-	-	±7.5
WN DN200	-	-	±7
WN DN250	-	-	±6
WN DN300	-	-	±5.5
WN DN350	-	-	±6
WN DN400	-	-	±5.5

COMMENTS

1. Temperature, inner pressure, movement and load cycle of the expansion joints are directly related. Therefore deviations from the approved ratings are excluded from the Type Approval and are to be submitted for a case by case plan approval.
2. Welding procedure to be approved

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Appendix

1. The document(s) listed below has/have been examined

Document No.	Rev.	Title	Status	Date
	-	Type Designation	SI	17/01/2017
AN 0025/016/A008/DD-192	-	LNG – Typ AN-DN25	A	17/01/2017
AN 0025/016/A008/DD-192	-	Reformat – Typ AN-DN25	A	14/06/2023
AN 0032/016/A007/DD-170	-	LNG – Typ AN-DN32	A	17/01/2017
AN 0032/016/A007/DD-170	-	Reformat – Typ AN-DN32	A	14/06/2023
AN 0040/016/A010/DD-197	-	LNG – Typ AN-DN40	A	17/01/2017
AN 0040/016/A010/DD-197	-	Reformat – Typ AN-DN40	A	14/06/2023
AN 0050/016/A010/DD-244	-	LNG – Typ AN-DN50	A	17/01/2017
AN 0050/016/A010/DD-244	-	Reformat – Typ AN-DN50	A	14/06/2023
AN 0065/016/A015/DD-232	-	LNG – Typ AN-DN65	A	17/01/2017
AN 0065/016/A015/DD-232	-	Reformat – Typ AN-DN65	A	14/06/2023
AN 0080/016/A016/DD-252	-	LNG – Typ AN-DN80	A	17/01/2017
AN 0080/016/A016/DD-252	-	Reformat – Typ AN-DN80	A	14/06/2023
AN 0100/016/A019/DD-250	-	LNG – Typ AN-DN100	A	17/01/2017
AN 0100/016/A019/DD-250	-	Reformat – Typ AN-DN100	A	14/06/2023
AN 0125/016/A024/DD-360	-	LNG – Typ AN-DN125	A	17/01/2017
AN 0125/016/A024/DD-360	-	Reformat – Typ AN-DN125	A	14/06/2023
AN 0150/016/A032/DD-320	-	LNG – Typ AN-DN150	A	17/01/2017
AN 0150/016/A032/DD-320	-	Reformat – Typ AN-DN150	A	14/06/2023
AN 0200/016/A032/DD-382	-	LNG – Typ AN-DN200	A	17/01/2017
AN 0200/016/A032/DD-382	-	Reformat – Typ AN-DN200	A	14/06/2023
AN 0250/016/A042/DD-392	-	LNG – Typ AN-DN250	A	19/06/2017
AN 0250/016/A042/DD-392	-	Reformat – Typ AN-DN250	A	14/06/2023
AN 0300/016/A044/DD-475	-	LNG – Typ AN-DN300	A	19/06/2017
AN 0300/016/A044/DD-475	-	Reformat – Typ AN-DN300	A	14/06/2023
AN 0350/016/A050/DD-456	-	LNG – Typ AN-DN350	A	19/06/2017
AN 0350/016/A050/DD-456	-	Reformat – Typ AN-DN350	A	14/06/2023
AN 0400/016/A052/DD-468	-	LNG – Typ AN-DN400	A	19/06/2017
AN 0400/016/A052/DD-468	-	Reformat – Typ AN-DN400	A	14/06/2023
AM 0025/016/A006/DD-220	-	LNG – Typ AM-DN25	AM	17/01/2017
AM 0032/016/A006/DD-208	-	LNG – Typ AM-DN32	A	17/01/2017
AM 0040/016/A009/DD-244	-	LNG – Typ AM-DN40	A	17/01/2017
AM 0050/016/A010/DD-298	-	LNG – Typ AM-DN50	AM	17/01/2017
AM 0065/016/A012/DD-278	-	LNG – Typ AM-DN65	AM	17/01/2017



Document No.	Rev.	Title	Status	Date
AM 0080/016/A016/DD-309	-	LNG – Typ AM-DN80	A	17/01/2017
AM 0100/016/A019/DD-300	-	LNG – Typ AM-DN100	A	17/01/2017
AM 0125/016/A024/DD-392	-	LNG – Typ AM-DN125	A	17/01/2017
AM 0150/016/A032/DD-380	-	LNG – Typ AM-DN150	A	17/01/2017
AM 0200/016/A032/DD-442	-	LNG – Typ AM-DN200	AM	17/01/2017
AM 0250/016/A042/DD-452	-	LNG – Typ AM-DN250	A	19/06/2017
AM 0300/016/A044/DD-508	-	LNG – Typ AM-DN300	A	19/06/2017
AM 0350/016/A050/DD-526	-	LNG – Typ AM-DN350	A	19/06/2017
AM 0400/016/A052/DD-538	-	LNG – Typ AM-DN400	A	19/06/2017
RM 0025/016/L010/FF-220	-	LNG – Typ RM-DN25	A	19/06/2017
RM 0032/016/L007/FF-208	-	LNG – Typ RM-DN32	A	19/06/2017
RM 0040/016/L010/FF-244	-	LNG – Typ RM-DN40	A	19/06/2017
RM 0050/016/L004/FF-298	-	LNG – Typ RM-DN50	A	19/06/2017
RM 0065/016/L010/FF-278	-	LNG – Typ RM-DN65	A	19/06/2017
RM 0080/016/L012/FF-309	-	LNG – Typ RM-DN80	A	19/06/2017
RM 0100/016/L009/FF-300	-	LNG – Typ RM-DN100	A	19/06/2017
RM 0125/016/L012/FF-392	-	LNG – Typ RM-DN125	A	19/06/2017
RM 0150/016/L016/FF-380	-	LNG – Typ RM-DN150	A	19/06/2017
RM 0200/016/L014/FF-442	-	LNG – Typ RM-DN200	AM	19/06/2017
RM 0250/016/L014/FF-452	-	LNG – Typ RM-DN250	A	19/06/2017
RM 0300/016/L014/FF-508	-	LNG – Typ RM-DN300	A	19/06/2017
RM 0350/016/L016/FF-526	-	LNG – Typ RM-DN350	A	19/06/2017
RM 0400/016/L014/FF-538	-	LNG – Typ RM-DN400	A	19/06/2017
WN 0025/016/W018/FF-165	-	LNG – Typ WN-DN25	A	19/06/2017
WN 0032/016/W015/FF-138	-	LNG – Typ WN-DN32	A	19/06/2017
WN 0040/016/W016/FF-197	-	LNG – Typ WN-DN40	A	19/06/2017
WN 0050/016/W016/FF-244	-	LNG – Typ WN-DN50	A	19/06/2017
WN 0065/016/W014/FF-232	-	LNG – Typ WN-DN65	AM	19/06/2017
WN 0080/016/W014/FF-252	-	LNG – Typ WN-DN80	A	19/06/2017
WN 0100/016/W013/FF-250	-	LNG – Typ WN-DN100	A	19/06/2017
WN 0125/016/W014/FF-360	-	LNG – Typ WN-DN125	A	19/06/2017
WN 0150/016/W015/FF-320	-	LNG – Typ WN-DN150	A	19/06/2017
WN 0200/016/W014/FF-382	-	LNG – Typ WN-DN200	AM	19/06/2017
WN 0250/016/W012/FF-392	-	LNG – Typ WN-DN250	A	19/06/2017
WN 0300/016/W011/FF-475	-	LNG – Typ WN-DN300	A	19/06/2017
WN 0350/016/W012/FF-456	-	LNG – Typ WN-DN350	A	19/06/2017
WN 0400/016/W011/FF-468	-	LNG – Typ WN-DN400	A	19/06/2017



2. The documents listed below have been considered together with the submitted documents in the appraisal

Document No.	Rev.	Title
AN 0025/016/A008/DD-192	-	EJMA Calculation, 16 bar 125 °C
AN 0025/016/A008/DD-192	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0025/016/A008/DD-192	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0032/016/A007/DD-170	-	EJMA Calculation, 16 bar 125 °C
AN 0032/016/A007/DD-170	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0032/016/A007/DD-170	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0040/016/A010/DD-197	-	EJMA Calculation, 16 bar 125 °C
AN 0040/016/A010/DD-197	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0040/016/A010/DD-197	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0050/016/A010/DD-244	-	EJMA Calculation, 16 bar 125 °C
AN 0050/016/A010/DD-244	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0050/016/A010/DD-244	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0065/016/A015/DD-232	-	EJMA Calculation, 16 bar 125 °C
AN 0065/016/A015/DD-232	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0065/016/A015/DD-232	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0080/016/A016/DD-252	-	EJMA Calculation, 16 bar 125 °C
AN 0080/016/A016/DD-252	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0080/016/A016/DD-252	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0100/016/A019/DD-250	-	EJMA Calculation, 16 bar 125 °C
AN 0100/016/A019/DD-250	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0100/016/A019/DD-250	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0125/016/A024/DD-360	-	EJMA Calculation, 16 bar 125 °C
AN 0125/016/A024/DD-360	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0125/016/A024/DD-360	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0150/016/A032/DD-320	-	EJMA Calculation, 16 bar 125 °C
AN 0150/016/A032/DD-320	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0150/016/A032/DD-320	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0200/016/A032/DD-382	-	EJMA Calculation, 16 bar 125 °C
AN 0200/016/A032/DD-382	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0200/016/A032/DD-382	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0250/016/A042/DD-392	-	EJMA Calculation, 16 bar 125 °C
AN 0250/016/A042/DD-392	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0250/016/A042/DD-392	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0300/016/A044/DD-475	-	EJMA Calculation, 16 bar 125 °C
AN 0300/016/A044/DD-475	-	EJMA Calculation, 1.4404, 16 bar 550 °C



Document No.	Rev.	Title
AN 0300/016/A044/DD-475	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0350/016/A050/DD-468	-	EJMA Calculation, 16 bar 125 °C
AN 0350/016/A050/DD-468	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0350/016/A050/DD-468	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AN 0400/016/A052/DD-468	-	EJMA Calculation, 16 bar 125 °C
AN 0400/016/A052/DD-468	-	EJMA Calculation, 1.4404, 16 bar 550 °C
AN 0400/016/A052/DD-468	-	EJMA Calculation, 1.4571, 16 bar 550 °C
AM 0025/016/A006/DD-220	-	EJMA Calculation, 16 bar 125 °C
AM 0032/016/A006/DD-208	-	EJMA Calculation, 16 bar 125 °C
AM 0040/016/A009/DD-244	-	EJMA Calculation, 16 bar 125 °C
AM 0050/016/A010/DD-298	-	EJMA Calculation, 16 bar 125 °C
AM 0065/016/A012/DD-278	-	EJMA Calculation, 16 bar 125 °C
AM 0080/016/A016/DD-309	-	EJMA Calculation, 16 bar 125 °C
AM 0100/016/A019/DD-300	-	EJMA Calculation, 16 bar 125 °C
AM 0125/016/A024/DD-392	-	EJMA Calculation, 16 bar 125 °C
AM 0150/016/A032/DD-380	-	EJMA Calculation, 16 bar 125 °C
AM 0200/016/A032/DD-442	-	EJMA Calculation, 16 bar 125 °C
AM 0250/016/A042/DD-452	-	EJMA Calculation, 16 bar 125 °C
AM 0300/016/A044/DD-475	-	EJMA Calculation, 16 bar 125 °C
AM 0350/016/A050/DD-468	-	EJMA Calculation, 16 bar 125 °C
AM 0400/016/A052/DD-468	-	EJMA Calculation, 16 bar 125 °C
RM 0025/016/L010/FF-220	-	EJMA Calculation, 16 bar 125 °C
RM 0032/016/L007/FF-208	-	EJMA Calculation, 16 bar 125 °C
RM 0040/016/L010/FF-244	-	EJMA Calculation, 16 bar 125 °C
RM 0050/016/L004/FF-298	-	EJMA Calculation, 16 bar 125 °C
RM 0080/016/L012/FF-309	-	EJMA Calculation, 16 bar 125 °C
RM 0100/016/L009/FF-250	-	EJMA Calculation, 16 bar 125 °C
RM 0125/016/L012/FF-360	-	EJMA Calculation, 16 bar 125 °C
RM 0150/016/L016/FF-320	-	EJMA Calculation, 16 bar 125 °C
RM 0200/016/L014/FF-382	-	EJMA Calculation, 16 bar 125 °C
RM 0250/016/L014/FF-392	-	EJMA Calculation, 16 bar 125 °C
RM 0300/016/L014/FF-475	-	EJMA Calculation, 16 bar 125 °C
RM 0350/016/L016/FF-468	-	EJMA Calculation, 16 bar 125 °C
RM 0400/016/L014/FF-468	-	EJMA Calculation, 16 bar 125 °C
WN 0025/016/W018/FF-128	-	EJMA Calculation, 16 bar 125 °C
WN 0032/016/W015/FF-168	-	EJMA Calculation, 16 bar 125 °C
WN 0040/016/W016/FF-197	-	EJMA Calculation, 16 bar 125 °C
WN 0050/016/W016/FF-244	-	EJMA Calculation, 16 bar 125 °C



Document No.	Rev.	Title
WN 0065/016/W014/FF-232	-	EJMA Calculation, 16 bar 125 °C
WN 0080/016/W014/FF-252	-	EJMA Calculation, 16 bar 125 °C
WN 0100/016/W013/FF-250	-	EJMA Calculation, 16 bar 125 °C
WN 0125/016/W014/FF-360	-	EJMA Calculation, 16 bar 125 °C
WN 0150/016/W015/FF-320	-	EJMA Calculation, 16 bar 125 °C
WN 0200/016/W014/FF-382	-	EJMA Calculation, 16 bar 125 °C
WN 0250/016/W012/FF-392	-	EJMA Calculation, 16 bar 125 °C
WN 0300/016/W011/FF-475	-	EJMA Calculation, 16 bar 125 °C
WN 0350/016/W012/FF-468	-	EJMA Calculation, 16 bar 125 °C

Appraisal Status Key

A	Approved - provided the arrangements are to the surveyor's satisfaction.
AM	Approved as amended - provided the arrangements are to the surveyor's satisfaction
SI	Retained as supporting documentation for information only

APPROVAL DOCUMENTATION

-	Application Checklist	05.04.2023
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TEST REPORTS

PRA2200087	PQA for Litomerice	11.03.2022
PRJ11100360283-2	PQA for Rostock	04.04.2022
V412/16.2A	Test Report, IMA Dresden	07.04.2017

Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations. Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.