Industry & Facilities Division
3° Party Shop Inspection Services

BUREAU VERITAS

Inspection Report N°: 40-20189-0065/01	**Date of issuance:**	18/07/2018
☐ Initial	☐ Interim	☑ Final
Rev. n°: 01	**Reason of revision:**	

Inspection requested by: LE RACCORDEMENT	
BV Inspection performed as Recognized Authority: ☑ No ☐ Yes (….specify what recognition…)	
P/o nr: (client to BV)	**P/o nr:** (client to Manufacturer)
Inspection performed on: (Date)	**Location:**
Previous Inspection: (Date)	**Next Inspection:** (Date)

MATERIAL / SUPPLY / SUBJECT OF INSPECTION	**ITEM / TAG Nr**	**QTY**
LR Elbow 90°1.5D		01
REDUCER CONCENTRIC		01
TEE EQUAL		01
CAP		01

REFERENCE DOCUMENTS: See continuation sheet for additional documents: ☐ Yes ☒ No

Title	Reference n°	Rev.	Approved by	Date
FACTORY-MADE WROUGHT BUTTWELDING FITTINGS	ASME B16.9	2001		2001

INSPECTION RESULT

☒ **Satisfactory** ☐ **Unsatisfactory: Non Conformities Raised** (Total number of NCR :…..)

BV Inspector: Noureddine BEN YAHIATEN	**BV Coordinator:** Mohamed Marouane ESSID
BV Office: TUNISIA	**Attachments:** ☐ Yes (Total number of pages: …..) ☒ No
Distribution: ☒ CLIENT ☐ MANUFACTURER ☐ BV ☐ OTHER …… (specify)	

Stage of inspection :

☐ Before manufacturing ☐ During manufacturing ☒ Final ☐ Packing

Type of inspection :

☐ Pre-inspection meeting ☐ Document and QC record review ☐ Visual examination, checks
☒ Witnessing tests ☐ Manufacturing progress status ☐ Vendor assessment
☐ Final inspection ☐ Packing

Stamping :

☒ No ☐ ☐

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Results of inspection :

☒ Satisfactory ☐ Unsatisfactory

Non Conformities Reports (NCR):

o NCR's issued during reported period : none

o List of outstanding NCR's : None

Main Conclusions & Remarks: (for details see continuation sheet)

None

***Next visit scheduled*: none**

INSPECTION DETAILS:

ATTENDEES : *See continuation sheet for additional documents:* ☐ *Yes* ☒ *No*

Name	Company	Title (*)	Note

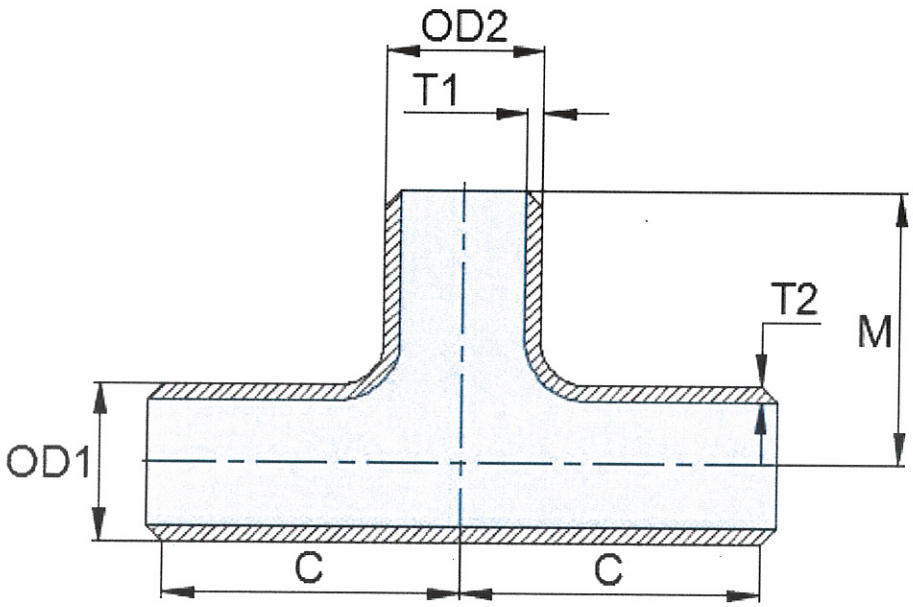
(*) specify if BV inspector has role as supervisor or mentor (e.g. "BV Inspector – supervisor –")

MEASURING EQUIPMENT USED: *See continuation sheet for additional documents:* ☐ *Yes* ☒ *No*

Equipment Type	Equipment Identity n°	Last Calibration date	Expiry date
CALIPER	PAC 01	19/04/2018	18/04/2019
CALIPER	050442	17/01/2018	16/01/2019

Description of the inspections carried out :

1. **Equal Tee**



Tee (Equal)

a. Dimension tolerance:

		Theoretical value	Tolerance interval	Measured	Difference
Outside diameter at bevel OD	OD1	88.9	±1.6	89.45	0.55
	OD2	88.9		89.71	0.81
	OD3	88.9		89.06	0.16
Inside diameter at bevel d	d1	76.86	±1.6	76.00	-0.86
	d2	76.86		76.26	-0.60
	d3	76.86		76.27	-0.59

		Theoretical value	Tolerance interval	Measured	Difference
Wall thickness T	T1	6.02	-12%	6.44	+7%
	T2	6.02		6.72	+11%
	T3	6.02		5.92	-1.6%
Center to end C	C1	86	±2	85.40	-0.60
	C2	86		85.26	-0.74
Center to end M	M	86	±2	85.05	-0.95

b. Angularity tolerance:

		Theoretical value	Tolerance interval	Measured value	Difference
Off angle	Q	0	±1	0	0

c. End bevel tolerance:

		Theoretical value	Tolerance interval	Measured value	Difference
Bevel end	A	37.5°	±2.5°	37°	-0.5°
	ID	1.6	±0.8	1.76	0.16

d. Mechanical test tolerance:

	Tensile strength		Yield strength		Elongation		Hardness	
Tolerances	Min	Max	Min	Max	Min		Brinell	Rockwell
	415 MPa	585 MPa	240 MPa	-	L30	T20	Max 197 HB	Maxi 92.8 HR 15N
Measured values							142	-

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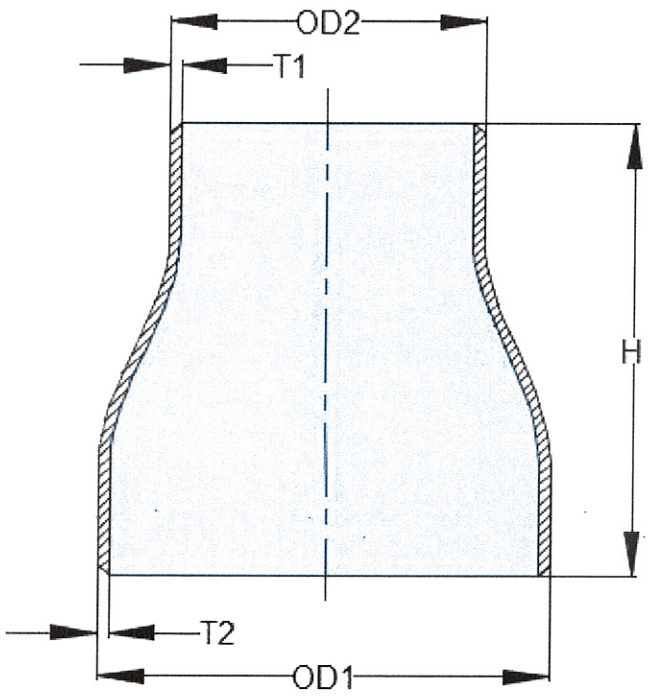
2. Reducer concentric



Reducer (Concentric)

a. Dimension tolerance:

		Theoretical value	Tolerance interval	Measured	Difference
Outside diameter at bevel OD	**OD1**	**88.9**	**±1.6**	**88.10**	**-0.8**
	OD2	**60.3**		**60.59**	**0.29**
Inside diameter at bevel d	**d1**	**76.86**	**±1.6**	**76.58**	**-0.3**
	d2	**49.32**		**49.40**	**0.08**
Wall thickness T	**T1**	**6.02**	**-12.5%**	**6.07**	**0.8%**
	T2	**5.49**		**5.55**	**1%**

end to end length	**H**	**89**	**±2**	**88.47**	**-0.53**

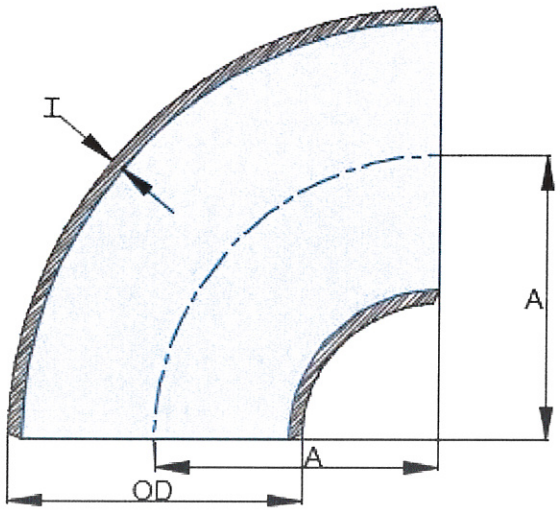
b. End bevel tolerance:

		Theoretical value	**Tolerance interval**	**Measured value**	**Difference**
Bevel end	**A**	**37.5°**	**±2.5°**	**35°**	**-2.5°**
	ID	**1.6**	**±0.8**	**1.96**	**0.36**

c. Mechanical test tolerance:

	Tensile strength		Yield strength		Elongation		Hardness	
Tolerances	Min	Max	Min	Max	Min		Brinell	Rockwell
	415 MPa	585 MPa	240 MPa	-	L30	T20	197 HB	Maxi 92.8 HR 15N
Measured values							167	-

3. LR ELBOW 90° 1.5 D



90° Elbow

d. Dimension tolerance:

		Theoretical value	Tolerance interval	Measured	Difference
Outside diameter at bevel OD	OD1	88.9	+1.6 -0.8	89.28	0.38
	OD2	88.9		89.47	0.57
Inside diameter at bevel d	d1	77.92	±0.8	77.52	-0.40
	d2	77.92		77.86	-0.06
Wall thickness T	T	6.02	-12.5%	5.49	-8.8%
Center to end length	A1	133	±2	133	0
	A2	133		132	-1

e. End bevel tolerance:

		Theoretical value	Tolerance interval	Measured value	Difference
Bevel end	**A**	**37.5°**	**±2.5°**	**35°**	**-2.5°**
	ID	**1.6**	**±0.8**	**1.96**	**0.36**

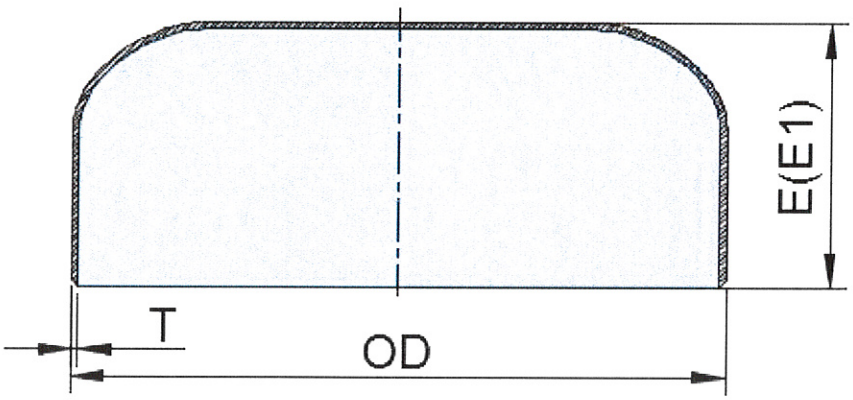
f. Angularity tolerance:

		Theoretical value	Tolerance interval	Measured value	Difference
Off angle	**Q**	**0**	**±1**	**0**	**0**
Off plane	**P**	**0**	**±2**	**0**	**0**

g. Mechanical test tolerance:

	Tensile strength		Yield strength		Elongation		Hardness	
Tolerances	Min	Max	Min	Max	Min		Brinell	Rockwell
	415 MPa	585 MPa	240 MPa	-	L30	T20	Max 197 HB	Maxi 92.8 HR 15N
Measured values							161	-

4. CAP



Cap

a. Dimension tolerance:

		Theoretical value	Tolerance interval	Measured	Difference
Outside diameter at bevel OD	**OD**	**114.3**	**±1.6**	**114.35**	**0.05**
Inside diameter at bevel d	**d**	**102.26**	**±0.8**	**102.21**	**0.01**
Wall thickness T	**T**	**8.56**	**-12.5%**	**7.89**	**-8%**
length	**E**	**64**	**±2**	**62.7**	**-1.3**

b. End bevel tolerance:

		Theoretical value	Tolerance interval	Measured value	Difference
Bevel end	**A**	**37.5°**	**±2.5°**	**36°**	**-1.5°**
	ID	**1.6**	**±0.8**	**2.29**	**0.69**

c. Mechanical test tolerance

	Tensile strength		Yield strength		Elongation		Hardness	
Tolerances	Min	Max	Min	Max	Min		Brinell	Rockwell
	415 MPa	585 MPa	240 MPa	-	L30	T20	Max 197 HB	Maxi 92.8 HR 15N
Measured values							180	-

5. Conclusion

All the tests' results presented above demonstrate that the test fitting are compliant with the norm ASME B16.9 : *"FACTORY-MADE WROUGHT BUTTWELDING FITTINGS"*

END OF REPORT

Inspected by: Name: Noureddine BEN YAHIATEN Signature:…	***Checked by:*** Name: Mohamed Marouane ESSID Signature:…
Inspection Office: BV TUNISIA	Supervision during performance ☒ *No* ☐ *Yes*