

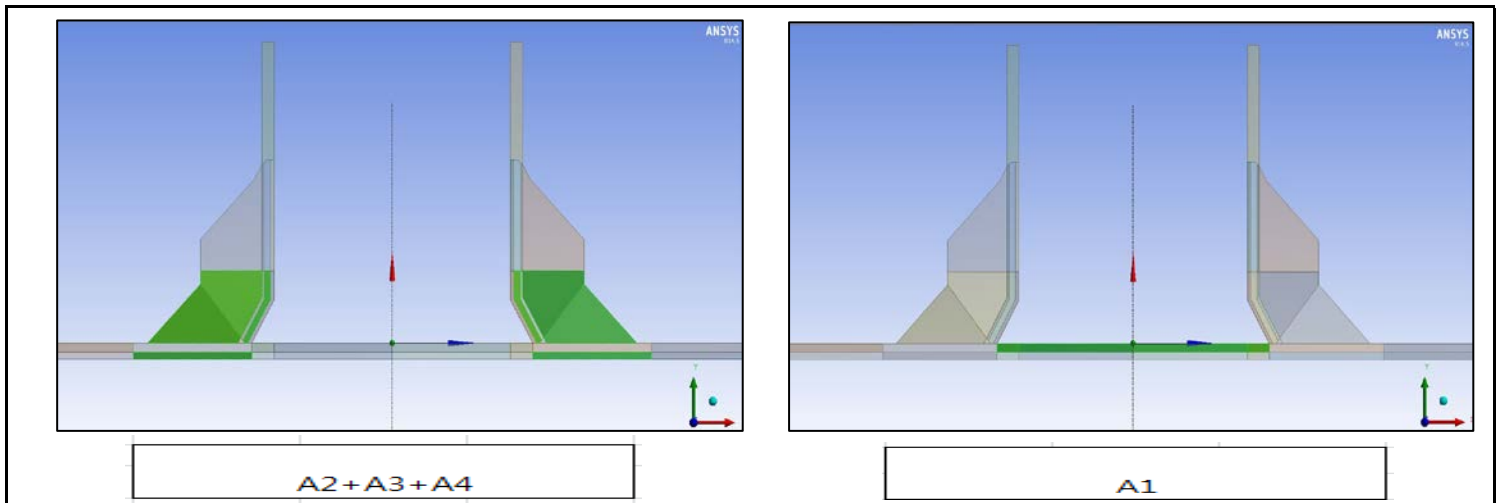
Reinforcement Area Calculation Sheet for Branch Connections

(ASME B31.3 paragraph 304.3)

| | | | | |
|-----------------|----------|--|----------|--|
| Document Number | ITEM | WELDOLET B564-N06625 NACE S10S-S40S 16" X 3/4" | | |
| | PJT NAME | | MATERIAL | RUN PIPE:B444-N06625, BRANCH : B564-N06625 |
| | TAG NO | | | DATE |

| | | Discription | value | unit |
|----------------|--|--|--------|------|
| INPUT DATA | P | Internal Design Pressure | 5.17 | MPa |
| | T | Design Temperature | 38 | °C |
| | S _h | Stress Value For Material From Table A-1.(Run Pipe) | 275.79 | MPa |
| | S _b | Stress Value For Material From Table A-1.(Branch) | 275.79 | MPa |
| | C | Corrsion and Erosion Allowances | 0 | mm |
| | E | Quality Factor From Table A-1A or A-1B | 1 | |
| | W | Welding Joint Strength Reduction Factor | 1 | |
| | y | Coefficient having values as given in Table 304.1.1 | 0.4 | |
| | M _t | Mill Tolerance | 12.5 | % |
| | D _{oh} | Outside diameter of Run Pipe | 406.40 | mm |
| | T _h | Thickness minimum per purchase specipication of Run Pipe | 4.18 | mm |
| | D _{ob} | Outside diameter of Branch Pipe | 26.7 | mm |
| | T _b | Thickness minimum per purchase specipication of Branch Pipe | 2.51 | mm |
| | d ₁ | Effective Length Removed From Pipe at Branch : D _{ob} -2* (T _b - C)/sinβ | 21.68 | mm |
| β | Angle between axes of branch and run | 90 | ° | |
| T _r | Minimum Thickness of Reinforcing Ring or Saddle Made From Pipe | 20.27 | mm | |

| | | | | | |
|----------------|-----------------|---|---|-------|----|
| OUTPUT DATA | t _h | Actual(by measurement) or minimum wall thickness of Run Pipe | $t = \frac{PD_0}{2(SEW + Py)}$ | 3.78 | mm |
| | t _b | Actual(by measurement) or minimum wall thickness of Branch Pipe | | 0.25 | mm |
| | t _{mh} | Required minimum wall thickness of run pipe | $t_m = t + c$ | 3.78 | mm |
| | t _{mb} | Required minimum wall thickness of branch pipe | | 0.25 | mm |
| | d ₂ | "Half width" of reinforcing zone | the greater of d ₁ or (T _b -C)+(T _h -C)+d ₁ /2 | 21.68 | mm |
| | L ₄ | Altitude of reinforcement zone outside of runpipe | 2.5(T _b -C)+Tr or 2.5(T _h -C) whichever is smaller | 10.46 | mm |



| | | | | | | |
|--------|--|-------|----|----------------------------------|--------|----|
| A1 | $t_h d_1 (2 - \sin \beta)$ | 81.96 | A3 | $2L_4(T_b - t_b - c)/\sin \beta$ | 47.32 | |
| A2 | $(2d_2 - d_1)(T_h - t_h - c)$ | 8.71 | A4 | FOR CAD | 107.63 | |
| RESULT | Available Reinforcement Area(A2+A3+A4) ≥ Required Reinforcement Area(A1) | | | | 81.70 | OK |

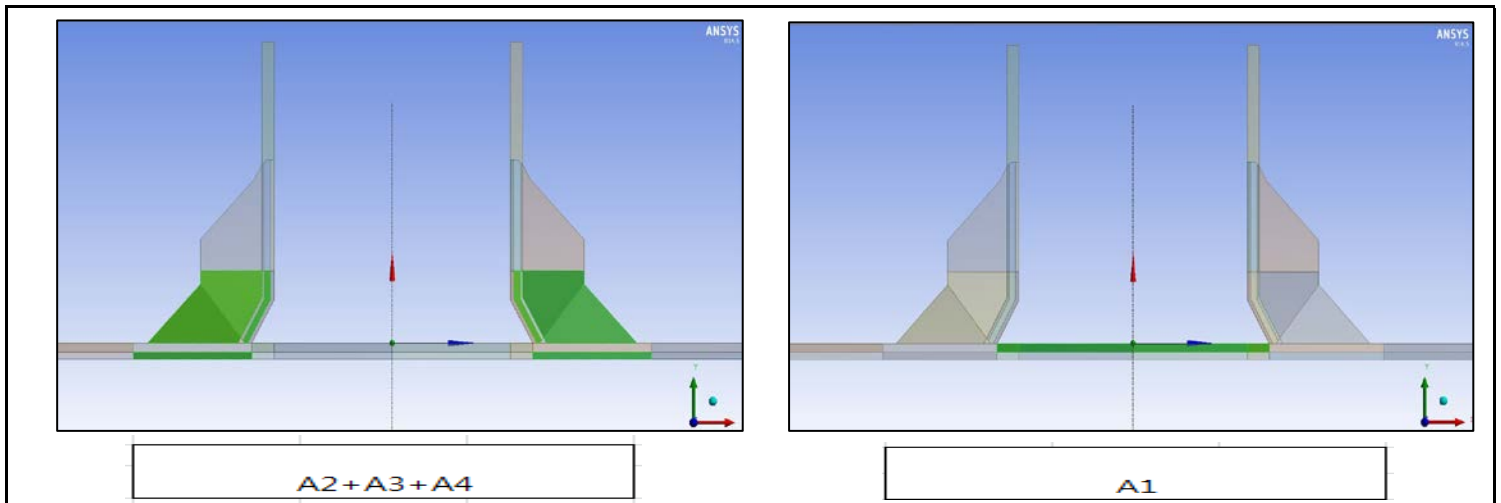
Reinforcement Area Calculation Sheet for Branch Connections

(ASME B31.3 paragraph 304.3)

| | | | | |
|-----------------|----------|--|----------|--|
| Document Number | ITEM | WELDOLET B564-N06625 NACE S40S 2" X 1" | | |
| | PJT NAME | | MATERIAL | RUN PIPE:B444-N06625, BRANCH : B564-N06625 |
| | TAG NO | | DATE | |

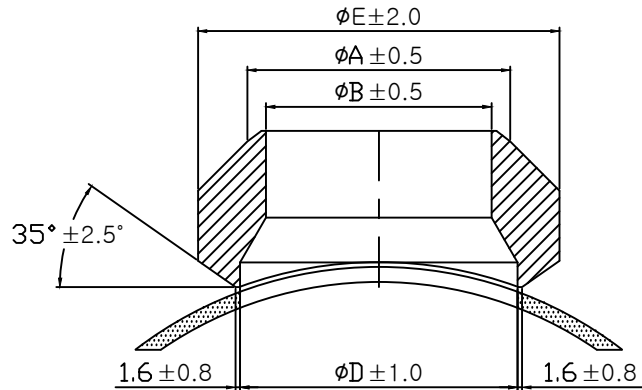
| | | Discription | value | unit |
|----------------|--|--|--------|------|
| INPUT DATA | P | Internal Design Pressure | 5.17 | MPa |
| | T | Design Temperature | 38 | °C |
| | S _h | Stress Value For Material From Table A-1.(Run Pipe) | 275.79 | MPa |
| | S _b | Stress Value For Material From Table A-1.(Branch) | 275.79 | MPa |
| | C | Corrsion and Erosion Allowances | 0 | mm |
| | E | Quality Factor From Table A-1A or A-1B | 1 | |
| | W | Welding Joint Strength Reduction Factor | 1 | |
| | y | Coefficient having values as given in Table 304.1.1 | 0.4 | |
| | M _t | Mill Tolerance | 12.5 | % |
| | D _{oh} | Outside diameter of Run Pipe | 60.30 | mm |
| | T _h | Thickness minimum per purchase specipication of Run Pipe | 3.42 | mm |
| | D _{ob} | Outside diameter of Branch Pipe | 33.4 | mm |
| | T _b | Thickness minimum per purchase specipication of Branch Pipe | 2.96 | mm |
| | d ₁ | Effective Length Removed From Pipe at Branch : D _{ob} -2* (T _b - C)/sinβ | 27.49 | mm |
| β | Angle between axes of branch and run | 90 | ° | |
| T _r | Minimum Thickness of Reinforcing Ring or Saddle Made From Pipe | 24.73 | mm | |

| | | | | | |
|----------------|-----------------|---|---|-------|----|
| OUTPUT DATA | t _h | Actual(by measurement) or minimum wall thickness of Run Pipe | $t = \frac{PD_0}{2(SEW + Py)}$ | 0.56 | mm |
| | t _b | Actual(by measurement) or minimum wall thickness of Branch Pipe | | 0.31 | mm |
| | t _{mh} | Required minimum wall thickness of run pipe | $t_m = t + c$ | 0.56 | mm |
| | t _{mb} | Required minimum wall thickness of branch pipe | | 0.31 | mm |
| | d ₂ | "Half width" of reinforcing zone | the greater of d ₁ or (T _b -C)+(T _h -C)+d ₁ /2 | 27.49 | mm |
| | L ₄ | Altitude of reinforcement zone outside of runpipe | 2.5(T _b -C)+Tr or 2.5(T _h -C) whichever is smaller | 8.55 | mm |

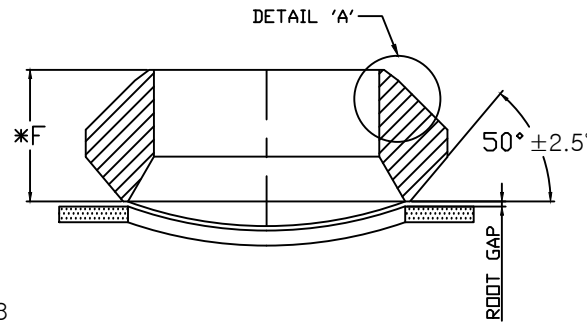


| | | | | | | |
|--------|--|-------|----|----------------------------------|--------|----|
| A1 | $t_h d_1 (2 - \sin \beta)$ | 15.42 | A3 | $2L_4(T_b - t_b - c)/\sin \beta$ | 45.28 | |
| A2 | $(2d_2 - d_1)(T_h - t_h - c)$ | 78.61 | A4 | FOR CAD | 87.78 | |
| RESULT | Available Reinforcement Area(A2+A3+A4) ≥ Required Reinforcement Area(A1) | | | | 196.25 | OK |

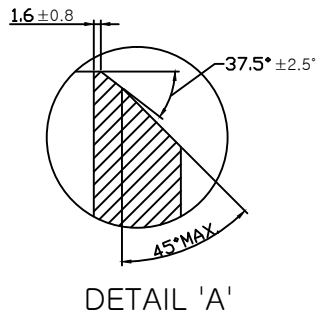
CIRCUMFERENTIAL SECTION



LONGITUDINAL SECTION



*F - Tolerances : 1/2"~3/4" ±0.8
 1"~4" ±1.6
 5"~12" ±3.2
 14"~24" ±4.8



| WELDOLET-BW | | | | | | |
|-------------|-------------|------|------|------|------|------|
| OUTLET SIZE | BRANCH SCH. | A | B | D | E | F |
| 3/4" | S40S | 26.7 | 21 | 30.2 | 44.5 | 22.4 |
| 1" | S40S | 33.4 | 26.7 | 36.5 | 54 | 26.9 |

NOTE.

- 1.All dimensions in mm.
- 2.Design Std : MSS SP-97 (2012)
- 3.Pipe schedule numbers are in accordance with ASME B36.10 & ASME B36.19 (2013)
- 4.All the above dimensions do not affect the main size change.
- 5.Fitting inlet curvature shall match with applicable run pipe curvature.

| CONTRACTOR DISPOSITION | |
|----------------------------|---|
| STATUS CODE | CODE DESCRIPTION |
| <input type="checkbox"/> A | APPROVED |
| <input type="checkbox"/> B | PROCEED AS PER COMMENTS, REVISE AND RE-SUBMIT |
| <input type="checkbox"/> C | DO NOT PROCEED, REVISE AND RESUBMIT |
| <input type="checkbox"/> I | FOR INFORMATION |
| <input type="checkbox"/> F | AS BUILT |
| <input type="checkbox"/> G | VOID - CANCELLED / SUPERSEDED |

NAME : _____ SIGNATURE : _____ DATE : _____

APPROVED BY THE COMPANY/CONTRACTOR RELATED TO THE WORKS SHALL IN NO WAY RELIEVE THE VENDOR FROM ITS OBLIGATION TO COMPANY/CONTRACTOR WITH THE REQUIREMENTS OF CONTRACT.

| | | | |
|-------------------|-----------------|-------------|-----------------|
| DOCUMENT TITLE :- | | WELDOLET-BW | |
| PROJECT No. | DRAWING NUMBER | | |
| DRG. No. | SDRL CODE / BOT | REV. | VENDOR DRG. No. |
| SCALE | C | | SHEET No. |
| N/A | SHEET No. | | Sheet No. |

| REV. | ISSUE DESCRIPTION | DRAWN | CHECKED | APPRD. | DATE. |
|------|-------------------|-------|---------|--------|-------|
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VENDOR REVISION

VENDOR DETAILS :-

KEONSAE HIGH PRESSURE CO., LTD

VENDOR LOGO & ADDRESS :



#119-29, Soju-ro(#941, Soju-Dong)
 Yangsan-si, Gyeongnam, Korea

CONTRACTOR DETAILS :-

PROJECT TITLE :-