



Reinforcement of Welded Branch Connection Calculation

PREPARED: **P.G.A.Engineering**

CHECKED:

APPROVED:

DATE:

19/10/2006

This calculation is according to ASME B31.3 "PROCESS PIPING"
Par.304.3.3 Reinforcement of Welded Branch Connection

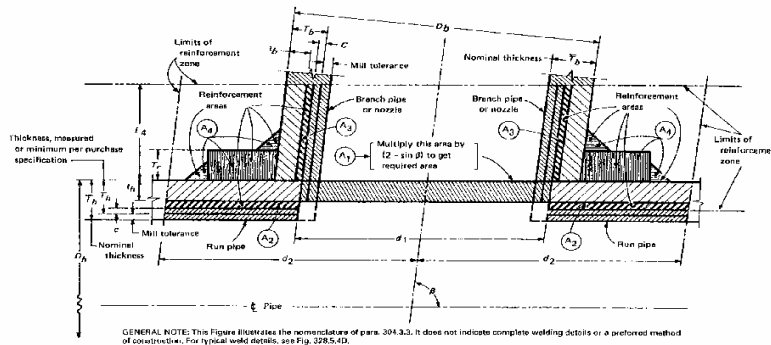


FIG. 304.3.3 BRANCH CONNECTION NOMENCLATURE

Weldolet Material	SB424 (N08825 INCOLOY 825) ▼		
Thickness of reinforced ring or saddle	T_r	0,0	mm ▼
Pressure and Temperature are known?	YES ▼		

CALCULATION

DESCRIPTION	DEF.	Metric		Imperial	
		Values	Unit of Measure	Values	Unit of Measure
INPUT					
Outside Diameter of Header Pipe	D_h	508,00	mm	20,00	in
Header Pipe Thickness	T_h	33,34	mm	1,31	in
Header Pipe Thickness	t_h	23,17	mm	0,91	in
Header Pipe Allowance	c_h	0,00	mm	0,00	in
Outside Diameter of Branch Pipe	D_b	60,30	mm	2,37	in
Branch Pipe Thickness	T_b	4,85	mm	0,19	in
Branch Pipe Thickness	t_b	2,75	mm	0,11	in
Branch Pipe Allowance	c_b	0,00	mm	0,00	in
Thickness of reinforced ring or saddle	T_r	0,00	mm	0,00	in
Angle between Branch and Run	β	1,571	rad	1,571	rad
Stress Value for Weldolet Material	S_w	161	MPa	23300	psi
OUTPUT					
Effective length removed from pipe	d_1	50,61	mm	1,99	in
"half width" of reinforced zone	d_2	63,49	mm	2,50	in
Height of Reinforced Zone Outside of Run Pipe	L_4	12,12	mm	0,48	in
Required Reinforced Area	A_1	1173	mm ²	1,82	in ²
Area resulting from excess th. in Run Pipe	A_2	776	mm ²	1,20	in ²
Area resulting from excess th. in Branch Pipe	A_3	51	mm ²	0,08	in ²
Area provided by other metal Required	$A_{4,MIN}$	345	mm ²	0,54	in ²



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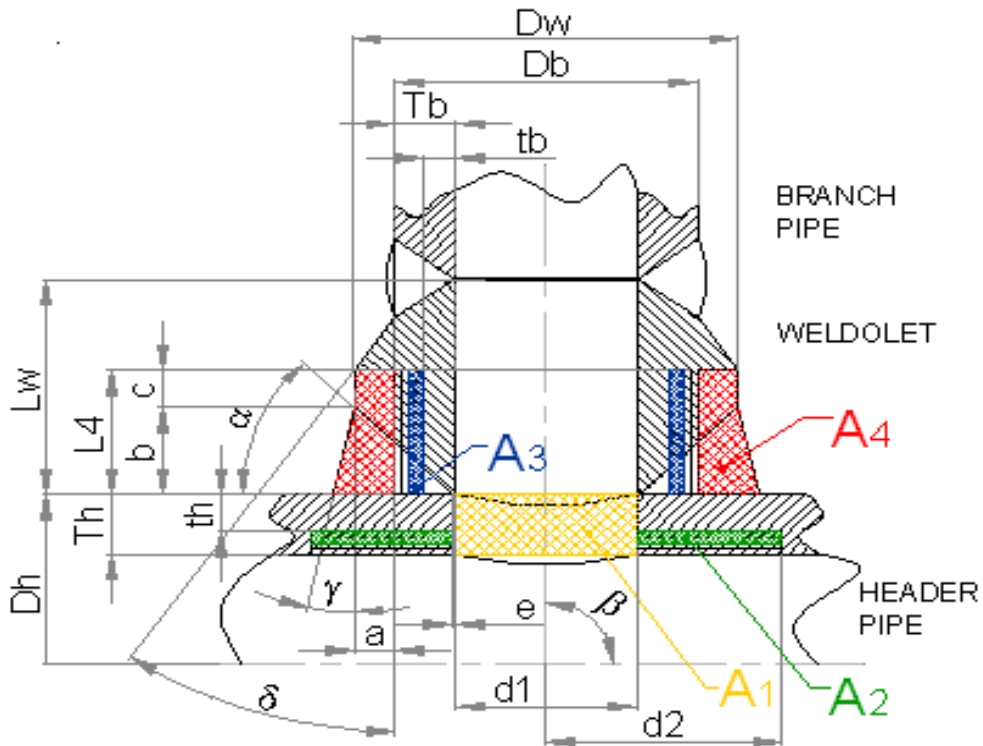
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Weldolet Dimension	α	<input type="text" value="45"/>	° (deg)
Weldolet Dimension	γ	<input type="text" value="0"/>	° (deg)
Weldolet Dimension	δ	<input type="text" value="30"/>	° (deg)
Weldolet Dimension	θ	<input type="text" value="35"/>	° (deg)
Weldolet Dimension	η	<input type="text" value="15"/>	° (deg)
Weldolet Dimension	C_{MIN}	<input type="text" value="8"/>	mm

CALCULATION

DESCRIPTION	DEF.	Metric		Imperial	
		Values	Unit of Measure	Values	Unit of Measure
INPUT					
Weldolet Dimension	α	0,785	rad	0,785	rad
Weldolet Dimension	γ	0,000	rad	0,000	rad
Weldolet Dimension	δ	0,524	rad	0,524	rad
Weldolet Dimension	θ	0,611	rad	0,611	rad
Weldolet Dimension	η	0,262	rad	0,262	rad



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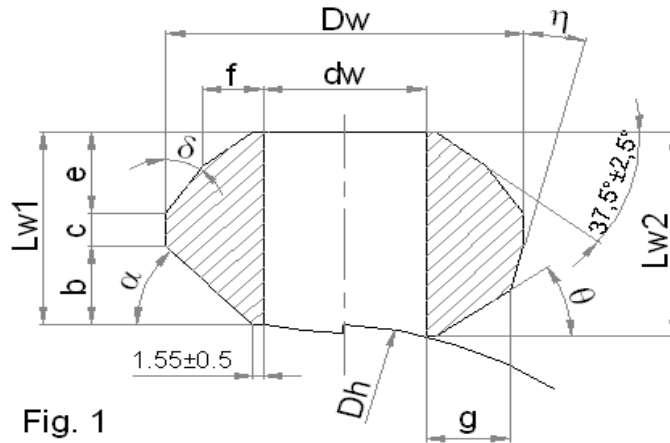


Fig. 1

DESCRIPTION	DEF.	Metric		Imperial	
		Values	Unit of Measure	Values	Unit of Measure
WELDOLET DIMENSION					
Weldolet Dimension	a	14,25	mm	0,56	in
Weldolet Dimension	b	17,55	mm	0,69	in
Weldolet Dimension	c	8,00	mm	0,31	in
Weldolet Dimension	d	0,00	mm	0,00	in
Weldolet Dimension	e	29,50	mm	1,16	in
Weldolet Dimension	f	4,85	mm	0,19	in
Weldolet Dimension	g	17,82	mm	0,70	in
Area provided by other metal Achived	$A_{4,EFF}$	345,34	mm ²	0,54	in ²
"half width" of effective reinforced zone	$d_{2,EFF}$	44,40	mm	1,75	in
Outside Diameter of Weldolet	D_W	88,80	mm	3,50	in
Inside Diameter of Weldolet	d_W	49,22	mm	1,94	in
Weldolet Thickness	t_W	19,79	mm	0,78	in
Weldolet Lenght	L_{W1}	55,05	mm	2,17	in
Weldolet Lenght	L_{W2}	56,24	mm	2,21	in
VERIFICATION					
Description	Check	Action			
$A_{4,EFF} \geq A_{4,MIN}$	OK	NONE			
$d_{2,EFF} \leq d_2$	OK	NONE			
Requirement Condition (Par.304.3.1)	OK	NONE			
T_{MIN} Verification	OK	NONE			