Welding Calculations using WeldPulse Software

A product of
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Preface

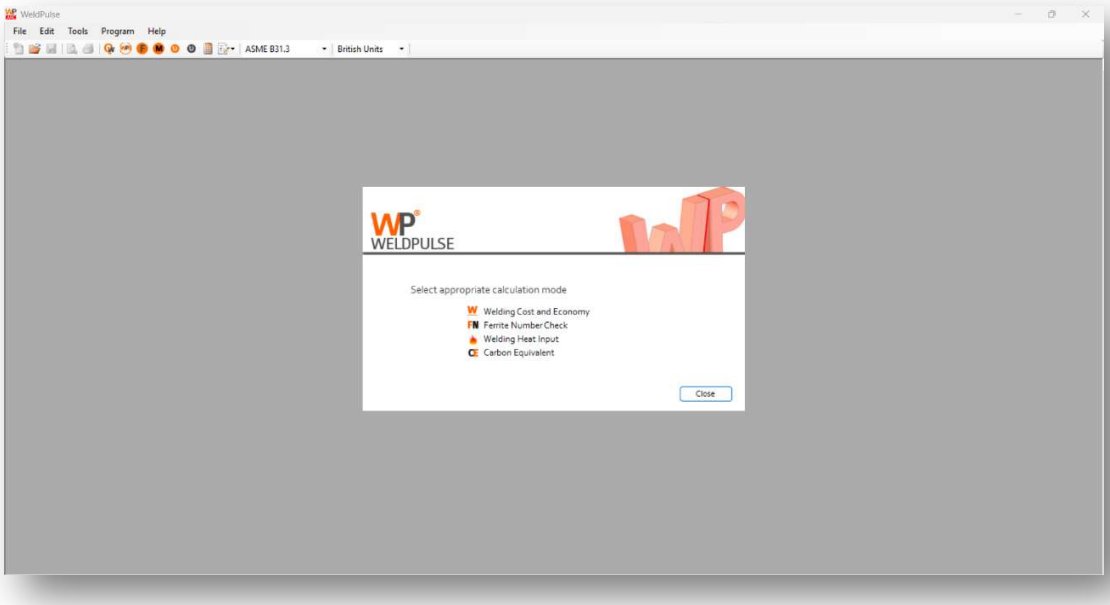
Welding calculations and the associated cost are the frequently required information for all involved in the welding works. With welding calculations, the first thing is the understanding of the required consumables to complete the job, and along with that the energy requirements. Welding cost depends on the welding job details including the joint type, welding process, welding method, total weld length and the joint thickness. Once all these inputs are available, we can estimate the welding cost and the energy. WeldPulse has been designed to conveniently take all these inputs and provide the outcome an intended. The module of welding calculations has got 4 sub modules including the Welding Cost & Economy, Ferrite Number Check, Welding Heat Input and Carbon Equivalent.

Within Welding Cost & Economy, user profiles have been setup to accommodate needs of welding personnel working at all levels. As for other modules of WeldPulse, Welding Cost & Economy has three profile settings including Novice, Beginner, and Professional. We recommend to set your profile level after reading the details within the software to apply the settings. WeldPulse program contains the user provided consumable prices to suit the needs however, consumable prices can also be applied for the most frequently used welding consumables suppliers.

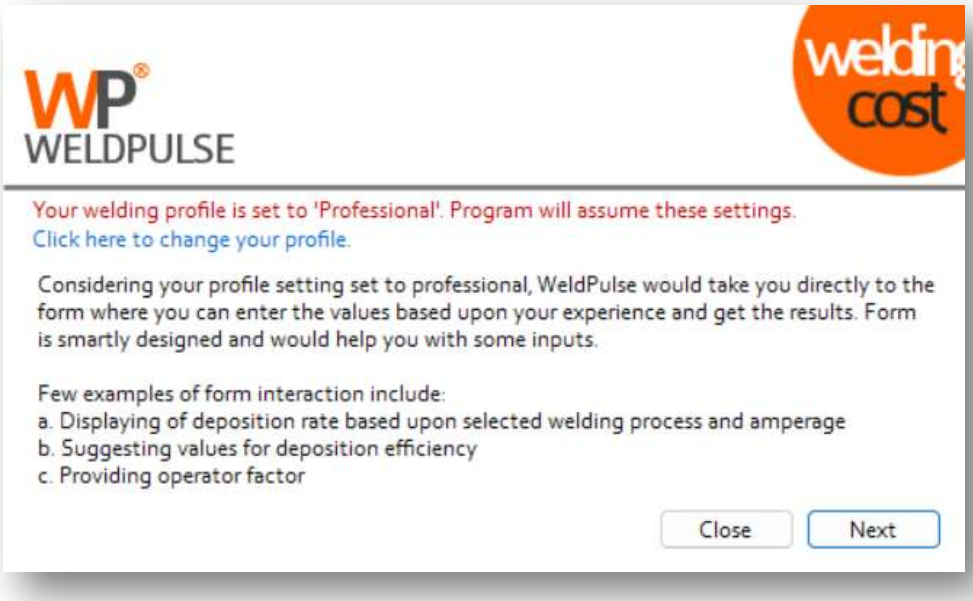
WeldPulse in its Welding Cost & Economy module handles most commonly used welding processes including GTAW, SMAW, SAW, GMAW, and FCAW. It also has within its library weld joints detail types of V-groove, U-groove, J-groove, square, single bevel, B31.3 (> 22mm), double V-groove, double bevel tee, and branch welds.

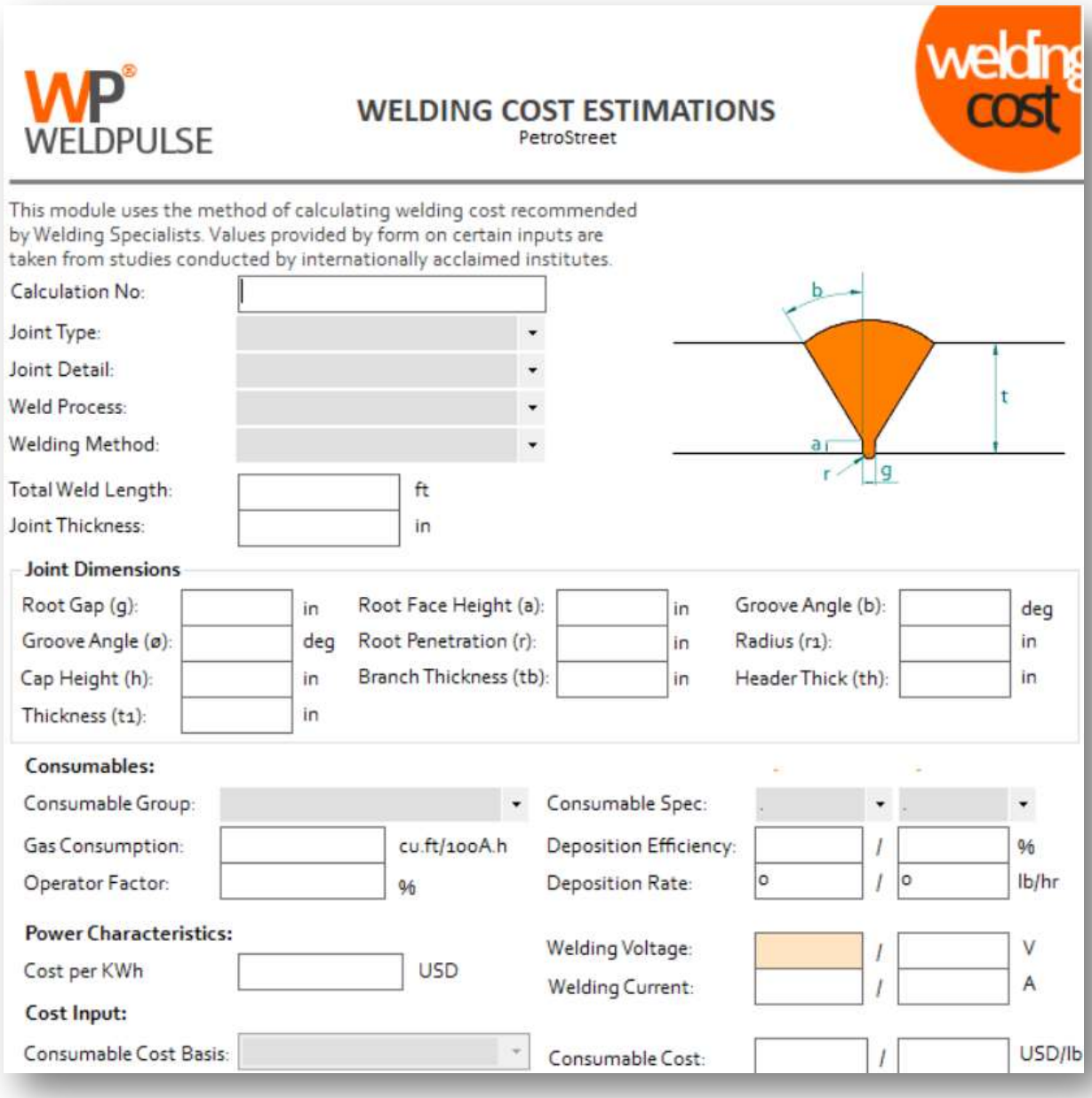
Profile Settings (Professional)

Once Welding Calculations module is opened up, the following window is available to select the sub-modules.

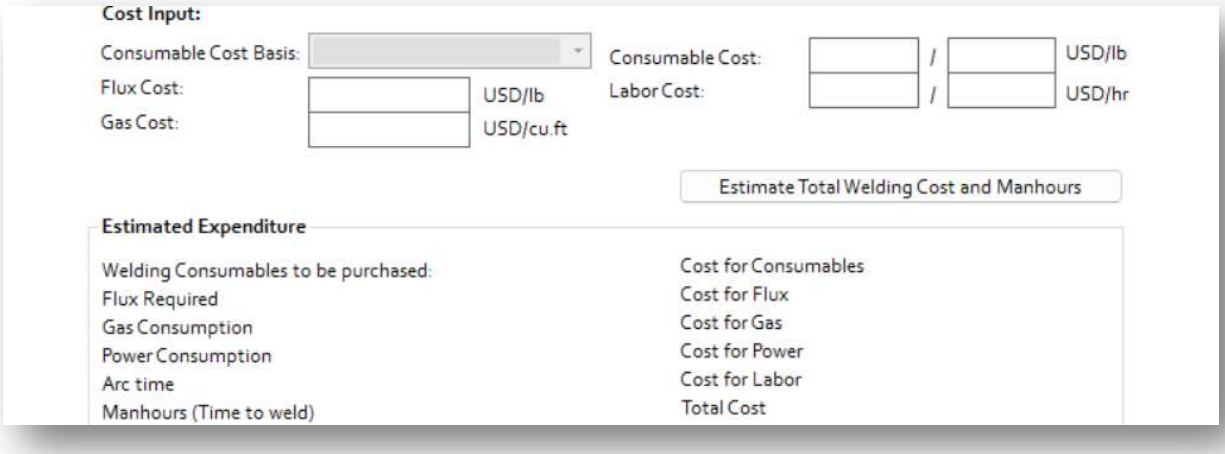


Once Welding Cost and Economy is selected, next window is dependent on the profile selected. Below snapshot reflects when profile is set to Professional:

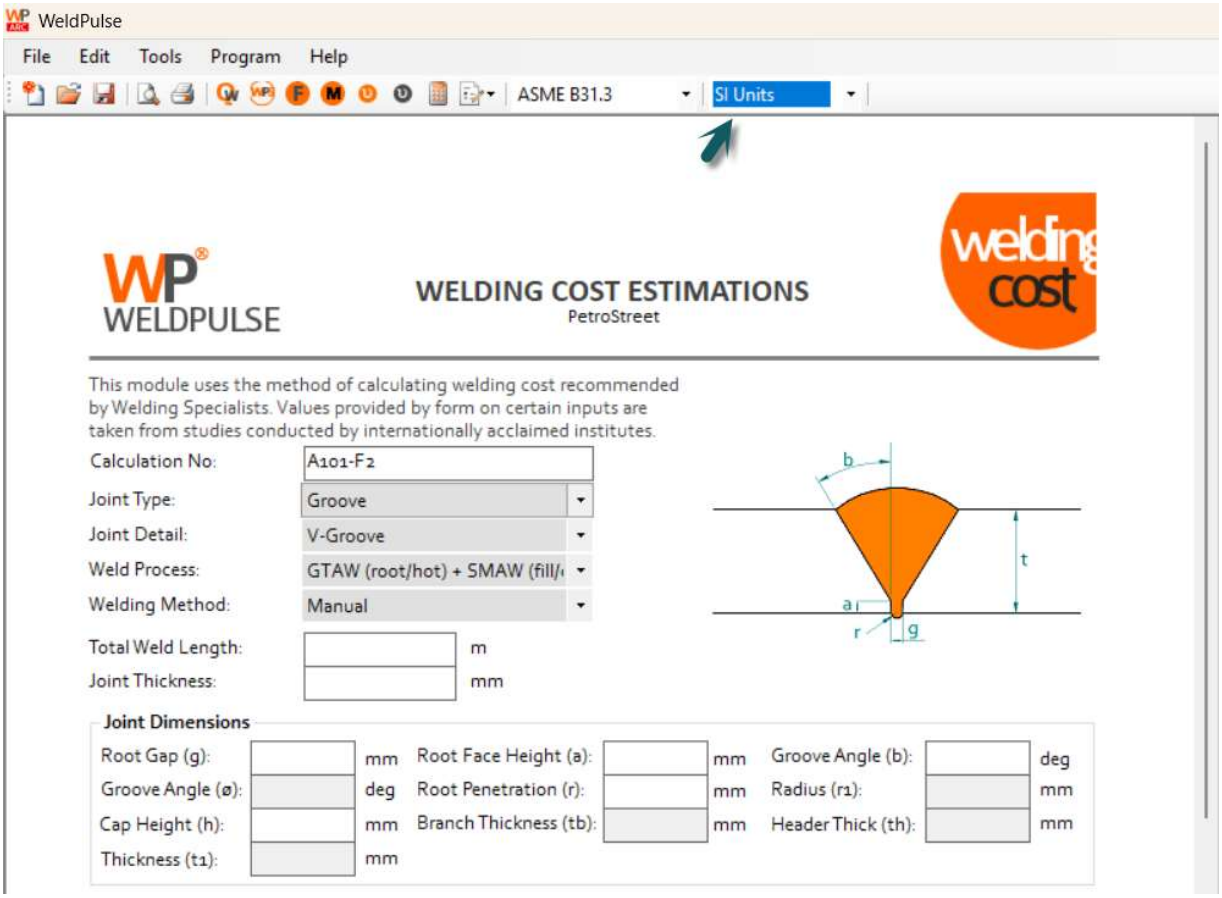




Display above is set for Professional profile. All the inputs are available to be provided as software assumes that the user is aware of all these.



After all the inputs including the cost basis for consumable, flux, gas, and labor is provided, WeldPulse outputs the estimated expenditure including welding consumables to be purchased, cost for consumables, flux required (if applicable), cost for flux, gas consumption, cost for gas, power consumption, cost for power, arc time, cost for labor, manhours (time to weld), and total cost.



Note that the units can be changed on the go when using the calculations module through a single operation.

It is recommended to group the welds in different sizes, and thicknesses to perform different set of welding cost calculations. Each calculation can be easily be saved and retrieved for reference.

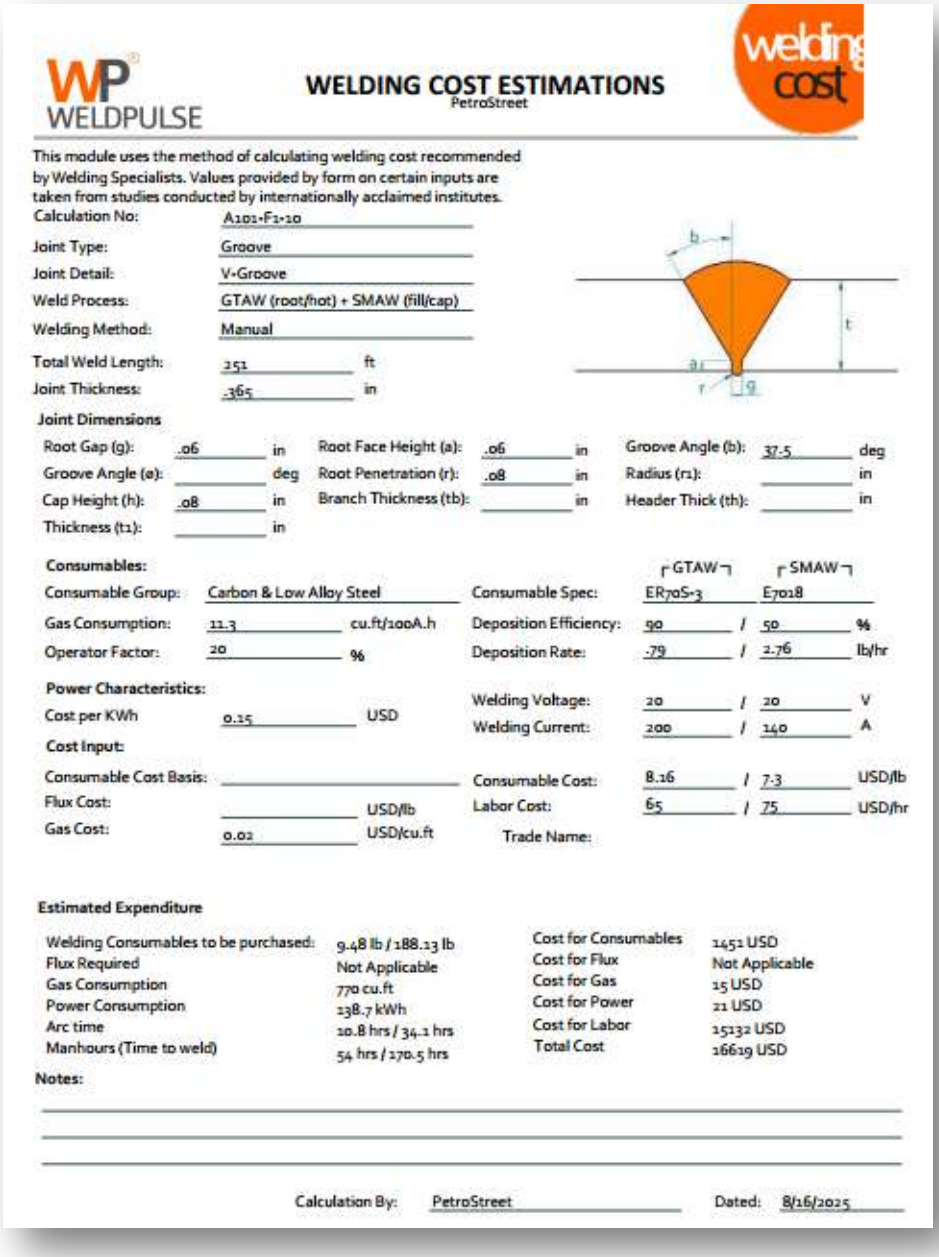
After providing the calculation number for your reference, joint type, detail, weld process, and the welding method, total weld length is required to be provided along with the thickness. Total length in case of groove weld requires the pipe OD, and the number of joints (πDN). Pipe thickness is readily available for the set of piping welding job in process.

Moving on with the inputs related to the joint detail type, schematic representation for all dimensions are mentioned which are required to be provided from the weld detail as in WPS.

Consumable group is another input which is required to be provided from “Carbon & low Alloy Steel”, “Stainless & High Alloy Steel”, and “Nickel Alloy” is to be provided. This follows with the consumable to be used during the welding and approximate gas consumption. Deposition efficiency for the welding consumables would appear by default along with an operator factor. However, deposition rates are required to be provided in these Professional settings of profile in the software.

Taking an example of 89 weld joints in V-groove in 10” Sch. 40, 13 in 14” Sch. 40 and 8 in 16” Sch. 40 (all in carbon steel material), we use WeldPulse to provide us set of 03 calculations. Welding process is taken as GTAW for root & hot pass with SMAW for filling & capping.

While the calculations of first set of 10” welds are performed, the case can be saved as well. See the photograph below as how a case can be saved.



WELDPULSE

WELDING COST ESTIMATIONS
PetroStreet

welding cost

This module uses the method of calculating welding cost recommended by Welding Specialists. Values provided by form on certain inputs are taken from studies conducted by internationally acclaimed institutes.

Calculation No: A101-F1-10
Joint Type: Groove
Joint Detail: V-Groove
Weld Process: GTAW (root/hot) + SMAW (fill/cap)
Welding Method: Manual
Total Weld Length: 151 ft
Joint Thickness: .365 in

Joint Dimensions

Root Gap (g):	.06 in	Root Face Height (a):	.06 in	Groove Angle (b):	37.5 deg
Groove Angle (a):	deg	Root Penetration (r):	.08 in	Radius (r1):	in
Cap Height (h):	.08 in	Branch Thickness (tb):	in	Header Thick (th):	in
Thickness (t1):	in				

Consumables:

			GTAW	SMAW
Consumable Group:	Carbon & Low Alloy Steel	Consumable Spec:	ER70S-3	E7018
Gas Consumption:	11.3 cu.ft/100A.h	Deposition Efficiency:	90	50 %
Operator Factor:	20 %	Deposition Rate:	.79	2.76 lb/hr

Power Characteristics:

Cost per KWh	0.15 USD	Welding Voltage:	20	20 V
		Welding Current:	200	140 A

Cost Input:

Consumable Cost Basis:		Consumable Cost:	8.16	7.3 USD/lb
Flux Cost:	USD/lb	Labor Cost:	65	75 USD/hr
Gas Cost:	0.02 USD/cu.ft	Trade Name:		

Estimated Expenditure

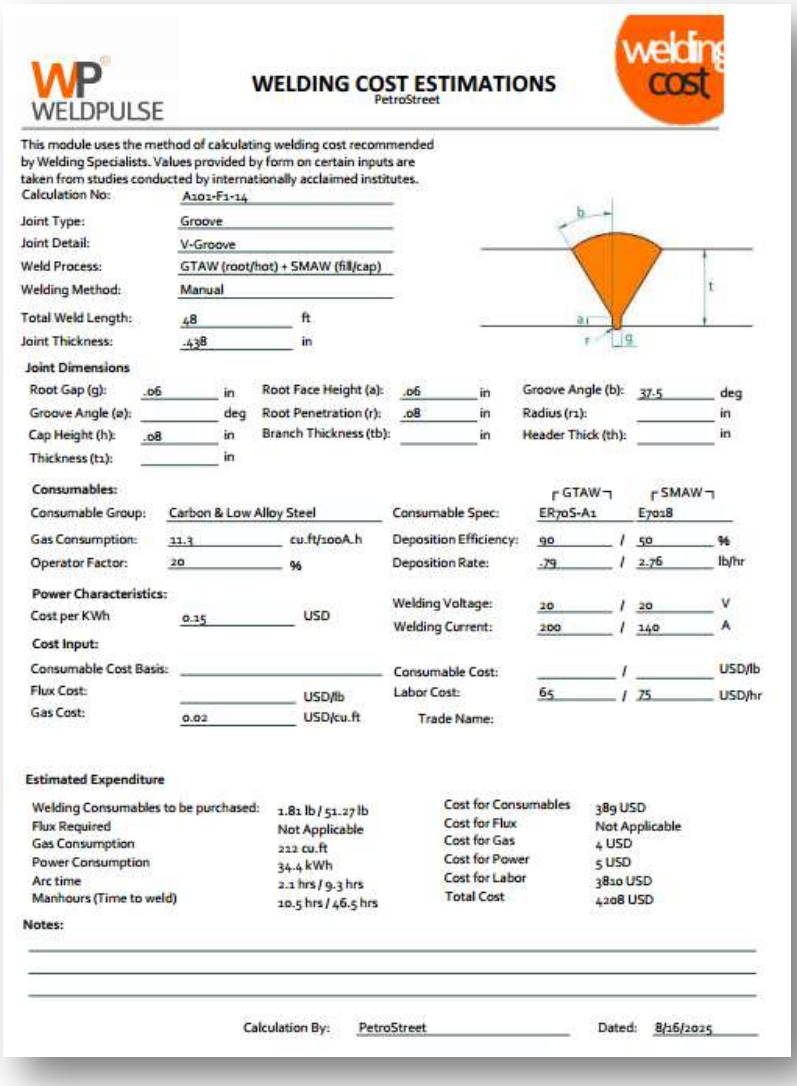
Welding Consumables to be purchased:	9.48 lb / 188.13 lb	Cost for Consumables	1451 USD
Flux Required	Not Applicable	Cost for Flux	Not Applicable
Gas Consumption	770 cu.ft	Cost for Gas	15 USD
Power Consumption	138.7 kWh	Cost for Power	21 USD
Arc time	10.8 hrs / 34.1 hrs	Cost for Labor	15132 USD
Manhours (Time to weld)	54 hrs / 170.5 hrs	Total Cost	16619 USD

Notes:

Calculation By: PetroStreet Dated: 8/16/2025

Based upon the inputs provided above, a total cost of 16619 USD is required to weld 89 Nos. weld in 10" Sch. 40. This set of calculations has been saved as A101-F-10 which can easily be retrieved for reference purposes or to update any value. It can be seen here that the welding consumable cost is only 9% of the total welding cost with major cost attributed to the labor. Please note that the Operator Factor plays a very important role here which has been set to 20% for the calculation we performed.

Next set of welding cost calculations include 13 joints in 14" Sch. 40 with remaining variables of weld joint type, welding processes, and welding method staying the same.



WELDPULSE

WELDING COST ESTIMATIONS
PetroStreet

This module uses the method of calculating welding cost recommended by Welding Specialists. Values provided by form on certain inputs are taken from studies conducted by internationally acclaimed institutes.

Calculation No: A101-F1-14
Joint Type: Groove
Joint Detail: V-Groove
Weld Process: GTAW (root/hot) + SMAW (fill/cap)
Welding Method: Manual
Total Weld Length: 48 ft
Joint Thickness: .438 in

Joint Dimensions

Root Gap (g): .06 in | Root Face Height (a): .06 in | Groove Angle (b): 37.5 deg
Groove Angle (ø): deg | Root Penetration (r): .08 in | Radius (r1): in
Cap Height (h): .08 in | Branch Thickness (tb): in | Header Thick (th): in
Thickness (t1): in

Consumables:

			GTAW	SMAW
Consumable Group:	Carbon & Low Alloy Steel	Consumable Spec:	ER70S-A1	E7018
Gas Consumption:	11.3 cu.ft/100A.h	Deposition Efficiency:	90	50 %
Operator Factor:	20 %	Deposition Rate:	.79	2.76 lb/hr

Power Characteristics:

Cost per KWh: 0.15 USD
Welding Voltage: 20 / 20 V
Welding Current: 200 / 140 A

Cost Input:

Consumable Cost Basis:
Consumable Cost: / USD/lb
Flux Cost: USD/lb
Labor Cost: 65 / 75 USD/hr
Gas Cost: 0.02 USD/cu.ft
Trade Name:

Estimated Expenditure

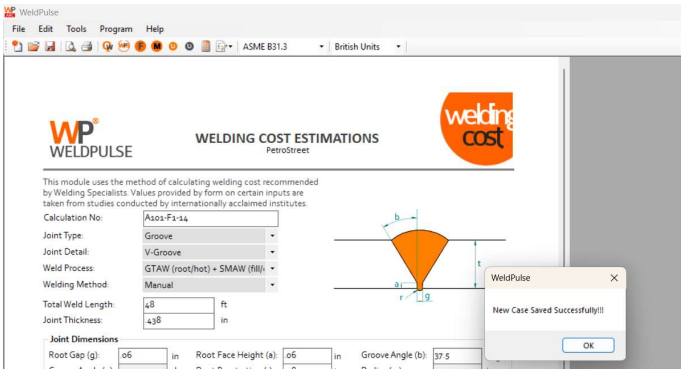
Welding Consumables to be purchased:	1.81 lb / 51.27 lb	Cost for Consumables	389 USD
Flux Required	Not Applicable	Cost for Flux	Not Applicable
Gas Consumption	212 cu.ft	Cost for Gas	4 USD
Power Consumption	34.4 kWh	Cost for Power	5 USD
Arc time	2.1 hrs / 9.3 hrs	Cost for Labor	3810 USD
Manhours (Time to weld)	10.5 hrs / 46.5 hrs	Total Cost	4208 USD

Notes:

Calculation By: PetroStreet Dated: 8/16/2025

Here again, it can be observed that the major cost of welding is dictated by labor. Consumables cost in this case stays within 10% of the total cost. Gas & power cost stays negligible. Please note that with the cost, software provides the quantity of welding consumables required for each welding process, expected gas consumption, power consumption, arc time which is important to know, and the time to weld (welder manhours).

We now move to the next set of calculation considering 8 Nos. weld in 16” Sch. 40. And before we do that save the case of 14” Sch. 40.



Below is the outcome for the next set.

WELDPULSE

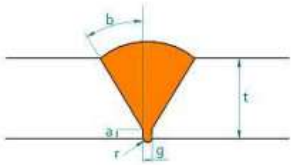
WELDING COST ESTIMATIONS

PetroStreet

welding cost

This module uses the method of calculating welding cost recommended by Welding Specialists. Values provided by form on certain inputs are taken from studies conducted by internationally acclaimed institutes.

Calculation No: A101-F1-16
Joint Type: Groove
Joint Detail: V-Groove
Weld Process: GTAW (root/hot) + SMAW (fill/cap)
Welding Method: Manual
Total Weld Length: 34 ft
Joint Thickness: .5 in



Joint Dimensions

Root Gap (g):	.06 in	Root Face Height (a):	.06 in	Groove Angle (b):	37.5 deg
Groove Angle (ø):	deg	Root Penetration (r):	.08 in	Radius (r1):	in
Cap Height (h):	.08 in	Branch Thickness (tb):	in	Header Thick (th):	in
Thickness (t1):	in				

Consumables:

			GTAW	SMAW
Consumable Group:	Carbon & Low Alloy Steel	Consumable Spec:	ER70S-3	E7018
Gas Consumption:	11.3 cu.ft/100A.h	Deposition Efficiency:	90	50 %
Operator Factor:	20 %	Deposition Rate:	.79	2.76 lb/hr

Power Characteristics:

Cost per KWh	0.15 USD	Welding Voltage:	20	20 V
		Welding Current:	200	140 A

Cost Input:

Consumable Cost Basis:		Consumable Cost:	8.16	7.3 USD/lb
Flux Cost:	USD/lb	Labor Cost:	65	75 USD/hr
Gas Cost:	0.02 USD/cu.ft	Trade Name:		

Estimated Expenditure

Welding Consumables to be purchased:	1.28 lb / 47.01 lb	Cost for Consumables	354 USD
Flux Required	Not Applicable	Cost for Flux	Not Applicable
Gas Consumption	191 cu.ft	Cost for Gas	4 USD
Power Consumption	29.8 kWh	Cost for Power	4 USD
Arc time	1.5 hrs / 8.5 hrs	Cost for Labor	3325 USD
Manhours (Time to weld)	7.5 hrs / 42.5 hrs	Total Cost	3687 USD

Notes:

Calculation By: PetroStreet Dated: 8/16/2025

The total cost of welding for all the sets come out to be 24,514 USD.

Conclusion

WeldPulse helps in performing detailed welding cost calculations based upon the provided variables. The calculations can be saved, and retrieved as and when required.

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