



TURNAROUND MANHOUR NORMS



Specific Turnaround man-hour norms for work carried out at the YOU'RE_COMPANY production site. For the use of planning, work preparation and payment of work carried out during regular maintenance shutdowns.

YOU'RE_COMPANY Turnaround Manhour Norms

Trésviri Project Control BV

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All man-hour norms are carefully chosen. The user should make sure that the man-hours in this book
match the specific job that has to be carried out. The author is not liable for any costs resulting from
the use of these man-hour norms.

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GENERAL

General

Introduction

The purpose of this document is to provide guidance for developing and applying man-hour norms for estimating work carried out during Turnarounds at the YOU'RE_COMPANY (YOU'RE_COMPANY) production site. All Man-hour norms in this book were devised taking account of all the circumstances on this location during a Turnaround.

All Man-hour norms in this book are based on DACE and UMS man-hour norms. All these norms were recalculated for the specific YOU'RE_COMPANY Turnaround circumstances by using a multiplier. This resulted in a new set of man-hour norms that cannot be queried on the basis of UMS and/or DACE.

Multipliers (correction factors)

The Labour Standard levels are based on the work at the YOU'RE_COMPANY location (factor = 1.0 location /productivity), preparing Labour norms for other locations requires the application of location (productivity) factors.

The following circumstances were included the man-hour norms:

- Safety requirements

- All safety requirements of working at the YOU'RE_COMPANY Production Site, such as Site introduction, H2S instructions etc.

- Work-permit procedure

- Working in accordance with the YOU'RE_COMPANY work-permit instructions. This involves checking the validity of the work permits at the construction site; testing the construction site for the presence of gases and flammable fluids.

- Average working height

- Working on all common working heights at the YOU'RE_COMPANY site. All possible options were included in a general working height multiplier.

- Distance between warehouses and work spot

- The distance of the various warehouses on the YOU'RE_COMPANY location were collected and included in a general multiplier. Containers with small stock parts such as gaskets, bolts/nuts are placed near the work location on the ground floor.

- Daily cleaning of the working area (housekeeping)

- Housekeeping is part of the man-hour norms.

- Working overtime and shift work

- Working overtime and/or shift work is added as a multiplier.

General

- Displacement time

Time needed to go to the workplace and back. This is including impediments, differences in heights, carrying hand tools and / or materials, making use of transport or not, movements for personal care etc.

- Use of dust masks

In some cases a dust mask is required. The man-hour norms are multiplied for those situations.

- Normal interruptions of the work

In any work activity, disruptions may arise that are directly related to the work and are practically impossible to avoid:

- Work-related conversations with production staff, colleagues and superiors about the work methods, progress and job closure
- Further communication at the workplace
- Personnel planning during work between colleagues and / or with superior
- Personnel planning for the operations to perform
- Several small work disturbances, such as a broken drill, sharpening a chisel, dropped tools
- Short waiting times up to 10 to 12 minutes per work activity
- Giving incidental assistance to colleagues
- Short breaks during normal activities:
 - Dropping tools
 - Lighting failure, replacing lighting bulbs
 - Thread of a bolt slipping. In some cases a dust mask is required. The man-hour norms are multiplied for those situations.

- Working in full protective clothing

In some cases full personal protective equipment is required. The man-hour norms are multiplied for those situations.

If the use of breathing equipment is necessary, a correction factor of 1.50 may be applied to the Labour Standard.

Preambles

The preambles (scope description) and qualifications (condition factors when special working conditions apply) to the Labour norms are intended to provide the basis for completeness and consistency. The preambles and qualifications apply to all types of installation work.

Heat Exchangers Columns Airfin Coolers Boilers

Heat Exchangers - Columns - Airfin Coolers - Boilers

Multipliers (correction factors)

The Labour norms take account of working conditions, such as:

- working in enclosed spaces
- working with personal protective equipment
- working at height

Other disciplines

Supporting disciplines, such as scaffolding construction, insulation work, transport (unless stated otherwise), lifting, Non Destructive testing, pre or post heating do not form part of the man-hour norms.

Measurement

All items of work are measured net as fixed in position and no allowance is made in the quantities for cut and waste

Heat Exchangers - Columns - Airfin Coolers - Boilers

20A10 Demisters

Size (Measurement: Each)	Remove	Install
500mm	0,00	0,00
1000mm	0,00	0,00
1500mm	0,00	0,00
2000mm	0,00	0,00
2500mm	0,00	0,00
3000mm	0,00	0,00
3500mm	0,00	0,00
4000mm	0,00	0,00

For disassembly: Uninstall demister, transportation to storage yard;

For installation : Transportation from storage yard to erection site, installation of demister

Heat Exchangers - Columns - Airfin Coolers - Boilers**20A20 t/m 20A22 Trays**

Type (Measurement: Each)	Size	Remove	Install
Keyed	500mm	0,00	0,00
Keyed	1000mm	0,00	0,00
Keyed	1500mm	0,00	0,00
Keyed	2000mm	0,00	0,00
Keyed	2500mm	0,00	0,00
Keyed	3000mm	0,00	0,00
Keyed	3500mm	0,00	0,00
Keyed	4000mm	0,00	0,00
Bolted	500mm	0,00	0,00
Bolted	1000mm	0,00	0,00
Bolted	1500mm	0,00	0,00
Bolted	2000mm	0,00	0,00
Bolted	2500mm	0,00	0,00
Bolted	3000mm	0,00	0,00
Bolted	3500mm	0,00	0,00
Bolted	4000mm	0,00	0,00
Bubblecap	500mm	0,00	0,00
Bubblecap	1000mm	0,00	0,00
Bubblecap	1500mm	0,00	0,00
Bubblecap	2000mm	0,00	0,00
Bubblecap	2500mm	0,00	0,00
Bubblecap	3000mm	0,00	0,00
Bubblecap	3500mm	0,00	0,00
Bubblecap	4000mm	0,00	0,00

For disassembly: Uninstall tray, transportation to storage yard;

For installation : Transportation from storage yard to erection site, installation of tray

Heat Exchangers - Columns - Airfin Coolers - Boilers

20A30 Hatches in Columntrays

Measurement: Each	Remove	Install
0 - 10	0,00	0,00
11 - 25	0,00	0,00
26 - 50	0,00	0,00
51 - 100	0,00	0,00
101 - 150	0,00	0,00

For disassembly: Uninstall hatch all types (Metawa, Bubble-cap, etc.);

For installation : Install hatch all types (Metawa, Bubble-cap etc.).

If needed including removal of old gasket and installation of new.

20A40 Snap-in Valves

Measurement: Each	Remove	Install
0-100	0,00	0,00
101<	0,00	0,00

For disassembly: Uninstall Snap-in valves in situ;

For installation : Install Snap-in valves in situ

Norm is for total of all valves during the turnaround.

For example during turnaround 4 columns with 26 valves each =104 valves = norm 101<

20A50 Bubble-caps

Measurement: Each	Remove	Install
0-10	0,00	0,00
0-100	0,00	0,00
101<	0,00	0,00

For disassembly: Uninstall bubble-caps in situ;

For installation : Install bubble-caps in situ

Norm is for total of all caps during the turnaround.

For example during turnaround 4 columns with 26 caps each =104 caps = norm 101<

20A60 Calming section

	Remove	Install
Each	0,00	0,00

Turnaround Manhour Norms



For disassembly: Uninstall Calming section;
For installation : Install calming section

Heat Exchangers - Columns - Airfin Coolers - Boilers

20A70 Steam or Spider ring**Uninstall Steam or spider ring**

Spider Pipe diam. (Measurement: Each spider)	<1/2"	1/2" - 1"	1" - 1 1/4"	1 1/4" - 2"	2" - 3"
Col. OD 0 - 1m	0,00	0,00	0,00	0,00	0,00
Col. OD 1,01 - 1,5m	0,00	0,00	0,00	0,00	0,00
Col. OD 1,51 - 2m	0,00	0,00	0,00	0,00	0,00
Col. OD 2,01 - 2,5m	0,00	0,00	0,00	0,00	0,00
Col. OD 2,51 - 3m	0,00	0,00	0,00	0,00	0,00
Col. OD 3,01 - 4m	0,00	0,00	0,00	0,00	0,00
Col. OD 4,01 - 5m	0,00	0,00	0,00	0,00	0,00
Col. OD 5,01 - 6m	0,00	0,00	0,00	0,00	0,00
Col. OD 6,01 - 7m	0,00	0,00	0,00	0,00	0,00
Col. OD 7,01 - 8m	0,00	0,00	0,00	0,00	0,00

Install Steam or spider ring

Spider Pipe diam. (Measurement: Each spider)	<1/2"	1/2" - 1"	1" - 1 1/4"	1 1/4" - 2"	2" - 3"
Col. OD 0 - 1m	0,00	0,00	0,00	0,00	0,00
Col. OD 1,01 - 1,5m	0,00	0,00	0,00	0,00	0,00
Col. OD 1,51 - 2m	0,00	0,00	0,00	0,00	0,00
Col. OD 2,01 - 2,5m	0,00	0,00	0,00	0,00	0,00
Col. OD 2,51 - 3m	0,00	0,00	0,00	0,00	0,00
Col. OD 3,01 - 4m	0,00	0,00	0,00	0,00	0,00
Col. OD 4,01 - 5m	0,00	0,00	0,00	0,00	0,00
Col. OD 5,01 - 6m	0,00	0,00	0,00	0,00	0,00
Col. OD 6,01 - 7m	0,00	0,00	0,00	0,00	0,00
Col. OD 7,01 - 8m	0,00	0,00	0,00	0,00	0,00

For disassembly: Uninstall steam or spider ring;

For installation : steam or spider ring.

Clean and grease bolts. Replace gasket if necessary.

Heat Exchangers - Columns - Airfin Coolers - Boilers

20A80 Vortex Breaker

Size (Measurement: Each)	Remove	Install
Dia Vortex < 1/2"	0,00	0,00
Dia Vortex 3/4" - 1"	0,00	0,00
Dia Vortex 1 1/4"	0,00	0,00
Dia Vortex 1 1/2"	0,00	0,00
Dia Vortex 2"	0,00	0,00
Dia Vortex 3"	0,00	0,00
Dia Vortex 4"	0,00	0,00
Dia Vortex 5"	0,00	0,00
Dia Vortex 6"	0,00	0,00

Complete disassembly of Vortex breaker. Clean and grease bolts, store properly.
Install Vortex breaker fit new gasket if required.

Heat Exchangers - Columns - Airfin Coolers - Boilers**20B10 t/m 20B50 Remove and install parts**

Item	Remove	Install	
Channel cover	0,00	0,00	Measurement :dm
Channel	0,00	0,00	Measurement :dm
Shell cover	0,00	0,00	Measurement :dm
Floating Head	0,00	0,00	Measurement :dm
Testring	0,00	0,00	Measurement :dm
Tackle	0,00	0,00	Measurement :EACH
Traveling Clamp	0,00	0,00	Measurement :EACH
Beam clamp	0,00	0,00	Measurement :EACH

Complete removal or installation of parts. In accordance with the client specifications.

Check surfaces, if necessary report damages to the client.

20B55 Debolt & bolt up Studbolts

Item (Measurement: Each)	Remove	Install Uncontrolled	Install Controlled
Studbolts 5/8"	0,00	0,00	0,00
Studbolts 3/4"	0,00	0,00	0,00
Studbolts 7/8"	0,00	0,00	0,00
Studbolts 1"	0,00	0,00	0,00
Studbolts 1 1/8"	0,00	0,00	0,00
Studbolts 1 1/4"	0,00	0,00	0,00
Studbolts 1 3/8"	0,00	0,00	0,00
Studbolts 1 1/2"	0,00	0,00	0,00
Studbolts 1 5/8"	0,00	0,00	0,00
Studbolts 1 3/4"	0,00	0,00	0,00
Studbolts 2"	0,00	0,00	0,00
Studbolts 2 1/4"	0,00	0,00	0,00
Studbolts 2 1/2"	0,00	0,00	0,00
Studbolts 2 3/4"	0,00	0,00	0,00

Remove stud bolt, clean & grease bolts, install stud bolt. Install uncontrolled: tighten by using hand-tools, Install controlled: tightening with manual or hydraulic wrench.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC.

20B60 Remove and install Pipe plug

	Remove	Install
Each	0,00	0,00

Remove or install plug. Check surfaces, if necessary report damages to the client.

Heat Exchangers - Columns - Airfin Coolers - Boilers

20B65 Bundel pulling or installing With a Crane or selfpropelled

(Measurement: Each)	Pulling	Install
Bundle 0 - 500mm	0,00	0,00
Bundle 501 - 900mm	0,00	0,00
Bundle 901 - 1100	0,00	0,00
Bundle 1101 - 1300mm	0,00	0,00
Bundle 1301 - 1700mm	0,00	0,00

Assistance during bundle pulling or installation. Supervise the work. Bundle pulling with crane or self-propelled machine.

20B66 Bundel pulling or installing Manual

(Measurement: Each)	Pulling	Install
Bundle 0 - 500mm	0,00	0,00
Bundle 501 - 900mm	0,00	0,00
Bundle 901 - 1100	0,00	0,00
Bundle 1101 - 1300mm	0,00	0,00
Bundle 1301 - 1700mm	0,00	0,00

Assistance during bundle pulling. Supervise the work. Bundle pulling manually.

20B70 Connect or disconnect testpump

(Measurement: Each)	Connect	Disconnect
Testpump	0,00	0,00

Mobilize Test pump, hoses etc.

Connect the test pump and hoses to the system and water filling point.

20B75 Bundel test, Shell side or Tube side

(Measurement: Each)	Shell	Tube
Bundle < 500mm	0,00	0,00
Bundle <1000mm	0,00	0,00
Bundle >1000	0,00	0,00

Test tube side or shell side.

Filling with water, vent the system, pressure test, drain the system

Heat Exchangers - Columns - Airfin Coolers - Boilers**20B80 Cleaning flange face / 20B85 Refacing gasket / 20B90 Anodes**

Cleaning flange faces	0,00
Refacing gasket	0,00
Replacement Anodes	0,00

Measurement :dmMeasurement :dmMeasurement :EACH

Cleaning of the flange faces, check flange facings, report damages to the client.

Placing new gasket on both sides

Replacement Anodes excluding replacement of studs

Heat Exchangers - Columns - Airfin Coolers - Boilers**20C10 2 Plenum Chamber Airfin Cooler**

(Measurement: Each Plenum)

Plenum size	Remove	Install
0 - 1000mm	0,00	0,00
1001 - 1250mm	0,00	0,00
1251 - 1550mm	0,00	0,00
1551 - 1950mm	0,00	0,00
1951 - 2350mm	0,00	0,00
2351 - 2550mm	0,00	0,00
2551 - 5000mm	0,00	0,00

20C20 3 Plenum Chamber Airfin Cooler

(Measurement: Each Plenum)

Plenum size	Remove	Install
0 - 1000mm	0,00	0,00
1001 - 1250mm	0,00	0,00
1251 - 1550mm	0,00	0,00
1551 - 1950mm	0,00	0,00
1951 - 2350mm	0,00	0,00
2351 - 2550mm	0,00	0,00
2551 - 5000mm	0,00	0,00

Disassemble or install chamber lid or cover

Secure cover plate or label when required.

Undo screws and remove lid or cover.

Bolts pass, make passable grease and store temporary.

Remove old seal, clean sealing surfaces and bolt holes and checked.

Place new gasket and screws to centre and align lid and fit it correctly.

Label reusable seal and store.

20C30 Louvres

Measurement: Each	Remove	Install
Louvre	0,00	0,00

Uninstall: Support all connecting parts, remove and lift louver carefully, store properly.

Install: Lift louver carefully into position, bolt up and function test of the louver.

Any repairs to the louvers are not included in this man-hour norm

Heat Exchangers - Columns - Airfin Coolers - Boilers

20C40 Plugs

Measurement: Each	Remove	Install
0 till 5	0,00	0,00
6 till 20	0,00	0,00
21 till 100	0,00	0,00
101 till 200	0,00	0,00
201 till 400	0,00	0,00
400 and more	0,00	0,00

Remove, mark and clean threaded plug, plug and gasket (depending on design) and store properly, or, if necessary, replace with new plugs and gaskets.

Clean and check sealing surfaces and threaded holes for damage, and report if necessary.

Lubricate plugs and install gaskets/seals and plugs.

Tighten the plug with a suitable torque wrench and tighten in accordance with PMS.16.023.WI03 before the pressure test.

20C50 Airfin Cooler Testing

Measurement: Each	First Airfin Cooler	Next Airfin Cooler
Pressure test	0,00	0,00
Per pipe	0,00	0,00

Pressure test complete (per air cooler bank)

Line up and connect test equipment including test gauge, pump.

Create drains and vents, i.e. remove or undo blinds or spades at the highest point and/or lowest point.

Fill the cooler with test medium fill / refill system. Pressurise system according to test protocol (pressure, duration).

After acceptance by Inspection (client), depressurise, and drain test medium completely.

Disconnect and remove test equipment.

For all subsequent air-fin coolers at the same level or vicinity, apply the man-hour norm "next Air-fin cooler"

Heat Exchangers - Columns - Airfin Coolers - Boilers**20D10 Hatches in Boilers**

Remove

Total Hatches (Measurement: Each)	800 x 800	1000x 1000	1200 x 1200	1500 x 1500
1 Hatches	0,00	0,00	0,00	0,00
2 Hatches	0,00	0,00	0,00	0,00
3 or 4 Hatches	0,00	0,00	0,00	0,00
5 till 7 Hatches	0,00	0,00	0,00	0,00
8 till 11 Hatches	0,00	0,00	0,00	0,00
12 till 16 Hatches	0,00	0,00	0,00	0,00
17 till 22 Hatches	0,00	0,00	0,00	0,00
23 till 30 Hatches	0,00	0,00	0,00	0,00
31 till 40 Hatches	0,00	0,00	0,00	0,00
41 till 50 Hatches	0,00	0,00	0,00	0,00
Install				
1 Hatches	0,00	0,00	0,00	0,00
2 Hatches	0,00	0,00	0,00	0,00
3 or 4 Hatches	0,00	0,00	0,00	0,00
5 till 7 Hatches	0,00	0,00	0,00	0,00
8 till 11 Hatches	0,00	0,00	0,00	0,00
12 till 16 Hatches	0,00	0,00	0,00	0,00
17 till 22 Hatches	0,00	0,00	0,00	0,00
23 till 30 Hatches	0,00	0,00	0,00	0,00
31 till 40 Hatches	0,00	0,00	0,00	0,00
41 till 50 Hatches	0,00	0,00	0,00	0,00

Remove bolts of the manholes or hatches.

Open manhole cover or hatch, secure or remove, store temporarily.

Remove firebricks from the entrance area and store properly.

Clean bolts and nuts, inspect, replace if necessary, and store in boxes.

Sealing surfaces and bolt holes cleaned and checked, remove the old sealing strips/gaskets.

Fit new sealing strip or sealing insert and assemble.

Fit manhole cover and align properly**.

New or cleaned bolts + nuts, greased, install nuts and bolts and tighten evenly.

Check bolting, fitting and sealing of the hatch.

** The reinstallation of the firebricks before closing the hatches is not included in this norm.

Heat Exchangers - Columns - Airfin Coolers - Boilers

20D20 Fleu Gas flaps

Measurement: Each	Remove	Install
Dia. Flap 12"	0,00	0,00
Dia. Flap 16"	0,00	0,00
Dia. Flap 18"	0,00	0,00
Dia. Flap 20"	0,00	0,00
Dia. Flap 24"	0,00	0,00
Dia. Flap 26"	0,00	0,00
Dia. Flap 28"	0,00	0,00
Dia. Flap 30"	0,00	0,00
Dia. Flap 32"	0,00	0,00
Dia. Flap 36"	0,00	0,00
Dia. Flap 40"	0,00	0,00
Dia. Flap 42"	0,00	0,00
Dia. Flap 48"	0,00	0,00
Dia. Flap 52"	0,00	0,00
Dia. Flap 56"	0,00	0,00
Dia. Flap 60"	0,00	0,00
Dia. Flap 64"	0,00	0,00
Dia. Flap 72"	0,00	0,00
Dia. Flap 80"	0,00	0,00

Clean and grease fresh air or flue gas flap.

Clean and check seat and the valve sealing surface, and report damages.

Check for soft-seat valves or self-cleaning valves, the valve seat or stripper for damages .

Check and test end positions and limit switches for correct fitting and function test the flap/valve.

Report maintenance results and status of condition.

Piping & Mechanical

Piping & Mechanical

Multipliers (correction factors)

The Labour norms are based on working at the YOURE_COMPANY location. For work in a shop condition you have to use the multiplier for shop work.

All activities are based on Carbon steel materials, for other material types you have to use the multiplier for that specific material. This only applies to welding and cutting.

Other disciplines

Supporting disciplines, such as scaffolding construction, insulation work, transport (unless stated otherwise), lifting, Non Destructive testing, post weld heat treatment do not form part of the man-hour norms.

Measurement

All items of work are measured net as fixed in position and no allowance is made in the quantities for cut and waste.

For a work item a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items.

Piping & Mechanical

43A10.1 PIPEHANDLING (NEW)

Measurement: Meter

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	0,5
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Move pipe or prefabricated pipe spools from storage yard to erection site, and rigging and aligning in place.

If a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items

Piping & Mechanical

43A10.2 PIPEHANDLING (DEMOLITION)

Measurement: Meter

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	0,5
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Move pipe or demolished pipe spools from erection site to storage yard.

If a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items

Piping & Mechanical**43A11.1 FLANGED PIPESPOOL Uninstall**

Measurement: Meter

Size	150#	300#	600#	900#	1500#
1/2"	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00
5"	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00		
20"	0,00	0,00	0,00		
22"	0,00	0,00			
24"	0,00	0,00			
26"	0,00	0,00			
28"	0,00	0,00			
30"	0,00	0,00			
32"	0,00	0,00			
34"	0,00	0,00			
36"	0,00	0,00			
38"	0,00	0,00			
40"	0,00	0,00			
42"	0,00	0,00			
44"	0,00	0,00			
46"	0,00	0,00			
48"	0,00	0,00			

Multipliers	
Shop	0,5
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Remove bolts of flanges (2), move the pipe spool to a temporary storage.

Clean the flange surfaces, clean and grease the bolts.

If a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items

Piping & Mechanical**43A11.2 FLANGED PIPESPOOL Installation**

Measurement: Meter

Size	150#	300#	600#	900#	1500#
1/2"	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00
5"	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00		
20"	0,00	0,00	0,00		
22"	0,00	0,00			
24"	0,00	0,00			
26"	0,00	0,00			
28"	0,00	0,00			
30"	0,00	0,00			
32"	0,00	0,00			
34"	0,00	0,00			
36"	0,00	0,00			
38"	0,00	0,00			
40"	0,00	0,00			
42"	0,00	0,00			
44"	0,00	0,00			
46"	0,00	0,00			
48"	0,00	0,00			

Multipliers	
Shop	0,5
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Move the pipe spool into position, bolt-up flanges and place new gasket.

If a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items

Piping & Mechanical**43A20.1 CUTTING PIPE (FLAME)**

Measurement: Each

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00	0,00	
3/4"	0,00	0,00	0,00	0,00	0,00	
1"	0,00	0,00	0,00	0,00	0,00	
1 1/2"	0,00	0,00	0,00	0,00	0,00	
2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00			
10"	0,00	0,00	0,00			
12"	0,00	0,00	0,00			
14"	0,00	0,00	0,00			
16"	0,00	0,00	0,00			
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			
22"	0,00	0,00				
24"	0,00	0,00				
26"	0,00	0,00				
28"	0,00	0,00				
30"	0,00					
32"	0,00					
34"	0,00					
36"	0,00					
38"	0,00					
40"	0,00					
42"	0,00					
44"	0,00					
46"	0,00					
48"	0,00					

Multipliers	
Shop	0,8
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Carry out measurements, mark off, remove remaining paint, flame cutting off, grind off any remaining surface irregularities in welded joints, prepare the cut surfaces of pipe fittings, flanges, valves to be welded etc. for re-use in terms of angular accuracy. Only applicable in case of re-use of parts.

Piping & Mechanical**43A20.2 CUTTING PIPE (SAW)**

Measurement: Each

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00		
3/4"	0,00	0,00	0,00	0,00		
1"	0,00	0,00	0,00	0,00		
1 1/2"	0,00	0,00	0,00	0,00		
2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	0,00	

Multipliers	
Shop	0,8
Stainless Steel	1,2
Duplex	1,2
Cr-Mo	1
aluminium	1
Monel	1,2
Inconel	1,2
hasteloy	1,2

Carry out measurements, mark off, remove remaining paint, cut off with handsaw or air saw, grind off any remaining surface irregularities in welded joints, prepare the cut surfaces of pipe fittings, flanges, valves to be welded etc. for re-use in terms of angular accuracy.

Piping & Mechanical**43A30.1 BUTTWELD**

Measurement: Each

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Carry out measurements, lay and support pipe, mark off cut, cut off, prepare weld edge, remove any remaining paint, if necessary, clean, align, support, tack weld, check, weld.

Piping & Mechanical

43A30.2 SOCKETWELD

Measurement: Each

Size	S10	S20	S30	S40	S80	S160
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Carry out measurements, position and support the pipe, mark off cut, cut off, debur, remove remaining paint, if necessary, clean, join, align, support, if necessary, tack weld, weld.

Piping & Mechanical**43A30.3 WELDING SO-FLANGE**

Measurement: Each

Size	All
1/2"	0,00
3/4"	0,00
1"	0,00
1 1/2"	0,00
2"	0,00
3"	0,00
4"	0,00
6"	0,00
8"	0,00
10"	0,00
12"	0,00
14"	0,00
16"	0,00
18"	0,00
20"	0,00
22"	0,00
24"	0,00

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Perform measurements, positioning and supporting the pipe, marking off cut, cutting off, de-burring, removing remaining paint, if necessary, cleaning, joining, aligning, supporting, if necessary, tack welding, welding.

43A30.4 OLETWELD 90

Measurement: Each

Size	S40	S80
1/2"		0,00
3/4"		0,00
1"		0,00
1 1/2"		0,00
2"	0,00	0,00
3"	0,00	0,00
4"	0,00	0,00
6"	0,00	0,00

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Measure main pipe, mark off, cut out hole for nozzle, bevel, remove remaining paint, if necessary, place olets, tack weld, align, weld.

Piping & Mechanical**43A30.5 BRANCHWELD 90 Without Reinforcing Ring**

Measurement: Each

Size	S10	S20	S30	S40	S80
1/2"	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	
28"	0,00	0,00	0,00	0,00	
30"	0,00	0,00	0,00	0,00	
32"	0,00	0,00	0,00		
34"	0,00	0,00	0,00		
36"	0,00	0,00	0,00		
38"	0,00	0,00			
40"	0,00	0,00			
42"	0,00	0,00			
44"	0,00	0,00			
46"	0,00	0,00			
48"	0,00	0,00			

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Measure main pipe, mark off, cut out hole for nozzle, remove remaining paint, if necessary, make nozzle to suit, tack weld, align, weld. Where non-reinforced branches are welded, the calculation relates to the outside diameter and wall thickness of the nozzle.

Piping & Mechanical**43A30.6 BRANCHWELD 90 With Reinforcing Ring**

Measurement: Each

Size	S10	S20	S30	S40	S80
1/2"					
3/4"					
1"					
1 1/2"					
2"			0,00	0,00	
3"			0,00	0,00	
4"			0,00	0,00	
6"			0,00	0,00	
8"	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00		
20"	0,00	0,00	0,00		
22"	0,00	0,00			
24"	0,00	0,00			
26"	0,00				
28"	0,00				

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Measure main pipe, mark off, cut out hole for nozzle, remove remaining paint, if necessary, make nozzle to suit, tack weld, align, weld. For reinforced branches, the outside diameter and the largest nozzle wall thickness specified in the material take off are adhered to. Incl. penetrant examination if required.

Piping & Mechanical**43A30.7 BRANCHWELD 45 Without Reinforcing Ring**

Measurement: Each

Size	S10	S20	S30	S40	S80
1/2"	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	
28"	0,00	0,00	0,00	0,00	
30"	0,00	0,00	0,00	0,00	
32"	0,00	0,00			
34"	0,00	0,00			
36"	0,00	0,00			
38"	0,00	0,00			
40"	0,00	0,00			
42"	0,00	0,00			
44"	0,00	0,00			
46"	0,00	0,00			
48"	0,00	0,00			

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Measure main pipe, mark off, cut out hole for nozzle, remove remaining paint, if necessary, make nozzle to suit, tack weld, align, weld. Where non-reinforced branches are welded, the calculation relates to the outside diameter and wall thickness of the nozzle.

Piping & Mechanical**43A30.8 BRANCHWELD 45 With Reinforcing Ring**

Measurement: Each

Size	S10	S20	S30	S40	S80
1/2"					
3/4"					
1"					
1 1/2"					
2"			0,00	0,00	
3"			0,00	0,00	
4"			0,00	0,00	
6"			0,00	0,00	
8"	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00		
18"	0,00	0,00			
20"	0,00	0,00			
22"	0,00	0,00			
24"	0,00	0,00			
26"	0,00				
28"	0,00				

Multipliers	
Shop	0,8
Stainless Steel	1,4
Duplex	1,6
Cr-Mo	1,6
aluminium	1,7
Monel	1,7
Inconel	1,7
hasteloy	1,7

Measure main pipe, mark off, cut out hole for nozzle, remove remaining paint, if necessary, make nozzle to suit, tack weld, align, weld. For reinforced branches, the outside diameter and the largest nozzle wall thickness specified in the material take off are adhered to. Incl. penetrant examination if required.

Piping & Mechanical**43A40.1 REMOVAL of FLANGED CONNECTION**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt flange connection, clean bolts, removal of existing gasket, clean flange facings.
 All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A40.2 INSTALLATION of FLANGED CONNECTION**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up flange connection, grease bolts, install new gasket

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A40.3 INSTALLATION of FLANGED CONNECTION (ROTABOLTS)

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up flange connection, grease bolts, install new gasket, uncontrolled hand tightening, final controlled tightening with manual or hydraulic wrench. Check RotaCAPS.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A40.4 INSTALLATION of FLANGED CONNECTION(TORQUING)

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

bolt-up flange connection, greasing bolts, installation of new gasket, tighten bolts by hand, subsequently torqueing with manual or hydraulic wrench.

All flange connections in accordance with YOUR_E_COMPANY FLANGE_SPEC

Piping & Mechanical**43A50.1 REMOVAL of BLINDFLANGE, MAN- or HANDHOLE**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00				
16"	0,00	0,00				
18"	0,00	0,00				
20"	0,00	0,00				
22"	0,00	0,00				
24"	0,00	0,00				
26"	0,00	0,00				
28"	0,00	0,00				
30"	0,00	0,00				
32"	0,00	0,00				
34"	0,00	0,00				
36"	0,00	0,00				
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A50.2 INSTALLATION of BLINDFLANGE, MAN- or HANDHOLE

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00				
16"	0,00	0,00				
18"	0,00	0,00				
20"	0,00	0,00				
22"	0,00	0,00				
24"	0,00	0,00				
26"	0,00	0,00				
28"	0,00	0,00				
30"	0,00	0,00				
32"	0,00	0,00				
34"	0,00	0,00				
36"	0,00	0,00				
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

bolt-up flange connection, greasing bolts, installation of new gasket, tighten bolts by hand, subsequently torqueing with manual or hydraulic wrench.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A60.1 REMOVAL of SPADES**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Handle spade, debolt flange connection, clean bolts, removal of existing gasket, clean flange facings, place new gaskets, install spade and bolt-up.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A60.2 INSTALLATION of SPADES**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Handle spade, debolt flange connection, clean bolts, removal of existing gasket, clean flange facings, place new gaskets, install spade and bolt-up.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A70.1 REMOVAL of Manual operated VALVE**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	0,00	0,00
28"	0,00	0,00	0,00	0,00	0,00	0,00
30"	0,00	0,00	0,00	0,00	0,00	0,00
32"	0,00	0,00	0,00	0,00	0,00	0,00
34"	0,00	0,00	0,00	0,00	0,00	0,00
36"	0,00	0,00	0,00	0,00	0,00	0,00
38"	0,00	0,00	0,00	0,00	0,00	0,00
40"	0,00	0,00	0,00	0,00	0,00	0,00
42"	0,00	0,00	0,00	0,00	0,00	0,00
44"	0,00	0,00	0,00	0,00	0,00	0,00
46"	0,00	0	0	0	0	0
48"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A70.2 INSTALLATION of Manual operated VALVE**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	0,00	0,00
28"	0,00	0,00	0,00	0,00	0,00	0,00
30"	0,00	0,00	0,00	0,00	0,00	0,00
32"	0,00	0,00	0,00	0,00	0,00	0,00
34"	0,00	0,00	0,00	0,00	0,00	0,00
36"	0,00	0,00	0,00	0,00	0,00	0,00
38"	0,00	0,00	0,00	0,00	0,00	0,00
40"	0,00	0,00	0,00	0,00	0,00	0,00
42"	0,00	0,00	0,00	0,00	0,00	0,00
44"	0,00	0,00	0,00	0,00	0,00	0,00
46"	0,00	0	0	0	0	0
48"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A70.3 HANDLING of VALVE**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00	0,00			
40"	0,00	0,00	0,00			
42"	0,00	0,00	0,00			
44"	0,00	0,00	0,00			
46"	0,00	0,00	0,00			
48"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Move any type off valve from storage yard to erection site, rig and align in place.
 Does NOT include flange connection, butt weld or screwed connection.

Piping & Mechanical**43A70.4 OPEN AND CLOSE INSPECTION COVER**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00				
40"	0,00	0,00				
42"	0,00	0,00				
44"	0,00	0,00				
46"	0,00	0,00				
48"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

De-bolt inspection cover, check internal parts, close inspection cover and bolt-up inspection cover.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOUR_COMPANY FLANGE_SPEC

Piping & Mechanical**43A71.1 REMOVAL of Motor operated VALVE**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	0,00	0,00
28"	0,00	0,00	0,00	0,00	0,00	0,00
30"	0,00	0,00	0,00	0,00	0,00	0,00
32"	0,00	0,00	0,00	0,00	0,00	0,00
34"	0,00	0,00	0,00	0,00	0,00	0,00
36"	0,00	0,00	0,00	0,00	0,00	0,00
38"	0,00	0,00	0,00	0,00	0,00	0,00
40"	0,00	0,00	0,00	0,00	0,00	0,00
42"	0,00	0,00	0,00	0,00	0,00	0,00
44"	0,00	0,00	0,00	0,00	0,00	0,00
46"	0,00	0,00	0,00	0,00	0,00	0,00
48"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Man-hour norm does not includes disconnecting power lines (air of electrical)

Piping & Mechanical

43A71.2 INSTALLATION of Motor operated VALVE

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00	0,00	0,00	0,00
28"	0,00	0,00	0,00	0,00	0,00	0,00
30"	0,00	0,00	0,00	0,00	0,00	0,00
32"	0,00	0,00	0,00	0,00	0,00	0,00
34"	0,00	0,00	0,00	0,00	0,00	0,00
36"	0,00	0,00	0,00	0,00	0,00	0,00
38"	0,00	0,00	0,00	0,00	0,00	0,00
40"	0,00	0,00	0,00	0,00	0,00	0,00
42"	0,00	0,00	0,00	0,00	0,00	0,00
44"	0,00	0,00	0,00	0,00	0,00	0,00
46"	0,00	0,00	0,00	0,00	0,00	0,00
48"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOUR COMPANY FLANGE SPEC

Man-hour norm does not includes reconnecting power lines (air or electrical)

Piping & Mechanical

43A72.1 REMOVAL of Safety VALVE

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00			
16"	0,00	0,00	0,00			
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

43A72.2 INSTALLATION of Safety VALVE

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00			
16"	0,00	0,00	0,00			
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A73.1 REMOVAL of Butterfly VALVE (wafer type only)**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00			
3/4"	0,00	0,00	0,00			
1"	0,00	0,00	0,00			
1 1/4"	0,00	0,00	0,00			
1 1/2"	0,00	0,00	0,00			
2"	0,00	0,00	0,00			
2 1/2"	0,00	0,00	0,00			
3"	0,00	0,00	0,00			
4"	0,00	0,00	0,00			
6"	0,00	0,00	0,00			
8"	0,00	0,00	0,00			
10"	0,00	0,00	0,00			
12"	0,00	0,00	0,00			
14"	0,00	0,00	0,00			
16"	0,00	0,00	0,00			
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			
22"	0,00	0,00	0,00			
24"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.
All flange connections in accordance with YOUR_E_COMPANY FLANGE_SPEC

Piping & Mechanical**43A73.2 INSTALLATION of Butterfly VALVE (wafer type only)**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00			
3/4"	0,00	0,00	0,00			
1"	0,00	0,00	0,00			
1 1/4"	0,00	0,00	0,00			
1 1/2"	0,00	0,00	0,00			
2"	0,00	0,00	0,00			
2 1/2"	0,00	0,00	0,00			
3"	0,00	0,00	0,00			
4"	0,00	0,00	0,00			
6"	0,00	0,00	0,00			
8"	0,00	0,00	0,00			
10"	0,00	0,00	0,00			
12"	0,00	0,00	0,00			
14"	0,00	0,00	0,00			
16"	0,00	0,00	0,00			
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			
22"	0,00	0,00	0,00			
24"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A74.1 REMOVAL of Filters/strainers**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	
3/4"	0,00	0,00	0,00	0,00	0,00	
1"	0,00	0,00	0,00	0,00	0,00	
1 1/4"	0,00	0,00	0,00	0,00	0,00	
1 1/2"	0,00	0,00	0,00	0,00	0,00	
2"	0,00	0,00	0,00	0,00	0,00	
2 1/2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00	0,00			
40"	0,00	0,00	0,00			
42"	0,00	0,00	0,00			
44"	0,00	0,00	0,00			
46"	0,00	0,00	0,00			
48"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.
All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A74.2 INSTALLATION of Filters/strainers

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	
3/4"	0,00	0,00	0,00	0,00	0,00	
1"	0,00	0,00	0,00	0,00	0,00	
1 1/4"	0,00	0,00	0,00	0,00	0,00	
1 1/2"	0,00	0,00	0,00	0,00	0,00	
2"	0,00	0,00	0,00	0,00	0,00	
2 1/2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00	0,00	
18"	0,00	0,00	0,00	0,00	0,00	
20"	0,00	0,00	0,00	0,00	0,00	
22"	0,00	0,00	0,00	0,00	0,00	
24"	0,00	0,00	0,00	0,00	0,00	
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00	0,00			
40"	0,00	0,00	0,00			
42"	0,00	0,00	0,00			
44"	0,00	0,00	0,00			
46"	0,00	0,00	0,00			
48"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A75.1 REMOVAL of DUAL valves / 3-way valves

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	
3/4"	0,00	0,00	0,00	0,00	0,00	
1"	0,00	0,00	0,00	0,00	0,00	
1 1/4"	0,00	0,00	0,00	0,00	0,00	
1 1/2"	0,00	0,00	0,00	0,00	0,00	
2"	0,00	0,00	0,00	0,00	0,00	
2 1/2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00		
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			
22"	0,00	0,00				
24"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 3 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOUR_COMPANY FLANGE_SPEC

43A75.2 INSTALLATION of DUAL valves / 3-way valves

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	
3/4"	0,00	0,00	0,00	0,00	0,00	
1"	0,00	0,00	0,00	0,00	0,00	
1 1/4"	0,00	0,00	0,00	0,00	0,00	
1 1/2"	0,00	0,00	0,00	0,00	0,00	
2"	0,00	0,00	0,00	0,00	0,00	
2 1/2"	0,00	0,00	0,00	0,00	0,00	
3"	0,00	0,00	0,00	0,00	0,00	
4"	0,00	0,00	0,00	0,00	0,00	
6"	0,00	0,00	0,00	0,00	0,00	
8"	0,00	0,00	0,00	0,00	0,00	
10"	0,00	0,00	0,00	0,00	0,00	
12"	0,00	0,00	0,00	0,00	0,00	
14"	0,00	0,00	0,00	0,00	0,00	
16"	0,00	0,00	0,00	0,00		
18"	0,00	0,00	0,00			
20"	0,00	0,00	0,00			
22"	0,00	0,00				
24"	0,00	0,00				

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 3 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOUR_COMPANY FLANGE_SPEC

Piping & Mechanical**43A76.1 REMOVAL of Level body's**

Measurement: Each Level body

Size	Length	150#	300#	600#
1"	0 - 1 Mtr	0,00	0,00	0,00
1"	1 - 2 Mtr	0,00	0,00	0,00
1"	2 - 3 Mtr	0,00	0,00	0,00
1 1/2"	0 - 1 Mtr	0,00	0,00	0,00
1 1/2"	1 - 2 Mtr	0,00	0,00	0,00
1 1/2"	2 - 3 Mtr	0,00	0,00	0,00
2"	0 - 1 Mtr	0,00	0,00	0,00
2"	1 - 2 Mtr	0,00	0,00	0,00
2"	2 - 3 Mtr	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

43A76.2 INSTALLATION of Level body's

Measurement: Each Level body

Size	Length	150#	300#	600#
1"	0 - 1 Mtr	0,00	0,00	0,00
1"	1 - 2 Mtr	0,00	0,00	0,00
1"	2 - 3 Mtr	0,00	0,00	0,00
1 1/2"	0 - 1 Mtr	0,00	0,00	0,00
1 1/2"	1 - 2 Mtr	0,00	0,00	0,00
1 1/2"	2 - 3 Mtr	0,00	0,00	0,00
2"	0 - 1 Mtr	0,00	0,00	0,00
2"	1 - 2 Mtr	0,00	0,00	0,00
2"	2 - 3 Mtr	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Controlled bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A77.1 REMOVAL of Level indicators**

Measurement: Each

Size	Item	300#	600#
3"	Drain flange (1")	0,00	0,00
3"	Bottom flange (3")	0,00	0,00
3"	Control Head Flange type (3")	0,00	0,00
3"	Control Head Clamped type (3")	0,00	0,00
3"	Vent flange (1")	0,00	0,00
4"	Drain flange (1")	0,00	0,00
4"	Bottom flange (3")	0,00	0,00
4"	Control Head Flange type (3")	0,00	0,00
4"	Control Head Clamped type (3")	0,00	0,00
4"	Vent flange (1")	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

43A77.2 INSTALLATION of Level indicators

Measurement: Each

Size	Item	300#	600#
3"	Drain flange (1")	0,00	0,00
3"	Bottom flange (3")	0,00	0,00
3"	Control Head Flange type (3")	0,00	0,00
3"	Control Head Clamped type (3")	0,00	0,00
3"	Vent flange (1")	0,00	0,00
4"	Drain flange (1")	0,00	0,00
4"	Bottom flange (3")	0,00	0,00
4"	Control Head Flange type (3")	0,00	0,00
4"	Control Head Clamped type (3")	0,00	0,00
4"	Vent flange (1")	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A78.1 REMOVAL of Thermowell's**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

43A78.2 INSTALLATION of Thermowell's

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOURE_COMPANY FLANGE_SPEC

Piping & Mechanical**43A79.1 REMOVAL of Orifice**

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00	0,00			
40"	0,00	0,00	0,00			
42"	0,00	0,00	0,00			
44"	0,00	0,00	0,00			
46"	0,00	0,00	0,00			
48"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Debolt 2 flange connection, clean bolts, removal of existing gasket, clean flange facings.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A79.2 INSTALLATION of Orifice

Measurement: Each

Size	150#	300#	600#	900#	1500#	2500#]
1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3/4"	0,00	0,00	0,00	0,00	0,00	0,00
1"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/4"	0,00	0,00	0,00	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
2"	0,00	0,00	0,00	0,00	0,00	0,00
2 1/2"	0,00	0,00	0,00	0,00	0,00	0,00
3"	0,00	0,00	0,00	0,00	0,00	0,00
4"	0,00	0,00	0,00	0,00	0,00	0,00
6"	0,00	0,00	0,00	0,00	0,00	0,00
8"	0,00	0,00	0,00	0,00	0,00	0,00
10"	0,00	0,00	0,00	0,00	0,00	0,00
12"	0,00	0,00	0,00	0,00	0,00	0,00
14"	0,00	0,00	0,00	0,00	0,00	0,00
16"	0,00	0,00	0,00	0,00	0,00	0,00
18"	0,00	0,00	0,00	0,00	0,00	0,00
20"	0,00	0,00	0,00	0,00	0,00	0,00
22"	0,00	0,00	0,00	0,00	0,00	0,00
24"	0,00	0,00	0,00	0,00	0,00	0,00
26"	0,00	0,00	0,00			
28"	0,00	0,00	0,00			
30"	0,00	0,00	0,00			
32"	0,00	0,00	0,00			
34"	0,00	0,00	0,00			
36"	0,00	0,00	0,00			
38"	0,00	0,00	0,00			
40"	0,00	0,00	0,00			
42"	0,00	0,00	0,00			
44"	0,00	0,00	0,00			
46"	0,00	0,00	0,00			
48"	0,00	0,00	0,00			

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Bolt-up 2 flange connection, greasing bolts, installation of new gaskets.

Norm does NOT includes handling of valve from storage yard to erection site, see table 43A70.3.

All flange connections in accordance with YOU'RE_COMPANY FLANGE_SPEC

Piping & Mechanical

43A80.1 THREADED CONNECTION

Measurement: Each

Size	Screw connection	Unscrew connection	Cutting & Threading
1/2"	0	0	0
3/4"	0	0	0
1"	0	0	0
1 1/2"	0	0	0
2"	0	0	0
3"	0	0	0

Multipliers	
Treated Nipple	0,5
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Cr-Mo	1
hasteloy	1

Manhour norms fit for all pipe schedules.

Screwed connection: Clean thread, prepare it according to the relevant instructions, screw it in and tighten.

Unscrew connection: Unscrew the connection

Cutting & Threading: Cutting pipe and making thread only

43A85.1 BENDING of PIPE

Measurement: Each

Size	S40	S80	S160
1/2"	0,00	0,00	0,00
3/4"	0,00	0,00	0,00
1"	0,00	0,00	0,00
1 1/2"	0,00	0,00	0,00
2"	0,00	0,00	0,00

Multipliers	
Shop	0,8
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

Measure pipe and bend it in accordance with the relevant instructions including ovality correction.

This factor applies to a bending angle of <= 135 degrees.

If the bending angle is > 135 degrees, measured item is compensated for twice.

Piping & Mechanical

43A90.1 TESTING of PIPE (connect testpump)

Norm: A=Each / B=Meter / C=Each

Size	A	B	C
General	0,00		0,00
1/2"		0,00	
3/4"		0,00	
1"		0,00	
1 1/2"		0,00	
2"		0,00	
3"		0,00	
4"		0,00	
6"		0,00	
8"		0,00	
10"		0,00	
12"		0,00	
14"		0,00	
16"		0,00	
18"		0,00	
20"		0,00	
22"		0,00	
24"		0,00	
26"		0,00	
28"		0,00	
30"		0,00	
32"		0,00	
34"		0,00	
36"		0,00	
38"		0,00	
40"		0,00	
42"		0,00	
44"		0,00	
46"		0,00	
48"		0,00	

Multipliers	
Shop	1
Stainless Steel	1
Duplex	1
Cr-Mo	1
aluminium	1
Monel	1
Inconel	1
hasteloy	1

A=Mobilize Test pump, hoses etc.

B=Pressure and tightness tests, using water, water mixtures, air or inert gas, and steam, if necessary.

Provisional connections for filling and draining purposes, system filling and bleeding, and pressurising in accordance with the relevant instructions.

All welded and soldered joints, flanged and threaded connections made by the contractor are subject to a tightness test. After testing, drain the test system.

Excludes placing and removal of spades. Excludes disassembling valves, dummies etc. and replacing them after test.

If a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items

C=Disconnect the test pump and hoses from the system.

Electrical & Instrumentation

Electrical & Instrumentation

Multipliers (correction factors)

The Labour norms are based on working at the YOURE_COMPANY location. For work in a shop condition you have to use the multiplier for shop work.

Other disciplines

Supporting disciplines, such as scaffolding construction, insulation work, transport (unless stated otherwise), lifting do not form part of the man-hour norms.

Measurement

The units of measurement to be used shall be as stated in the Labour norms and is defined within the preambles.

For a work item a "Unit of Measure" is defined in meters (m) length, the measurement shall be the length measured along the central axis of the items.

All items of work are measured net as fixed in position and no allowance is made in the quantities for cut and waste.

IMPORTANT:

All Electrical & Instrumentation Tables marked up wit * includes the codes for:

Installation : 45A0x.xx

Disassembly : 45A3x.xx

Demolish : 45A4x.xx

For Example

Installation : 45A01.10

Disassembly : 45A31.10

Demolish : 45A41.10

Electrical & Instrumentation**45A01.10* Installing and securing cables in Cable trays, Ducts and basements**

Measurement: Meter

cable diameter from	Install	Disassembly	Demolish
From 00 to 16mm	0,00	0,00	0,00
From 16 to 23mm	0,00	0,00	0,00
From 23 to 30mm	0,00	0,00	0,00
From 30 to 40mm	0,00	0,00	0,00
From 40 to 50mm	0,00	0,00	0,00
From 50 to 70mm	0,00	0,00	0,00

Norm: Kg

cable with a weight	Install	Disassembly	Demolish
< 0,5 kg/m	0,00	0,00	0,00
> 0,5 kg/m	0,00	0,00	0,00
> 1 - 2 kg/m	0,00	0,00	0,00
> 2 - 3 kg/m	0,00	0,00	0,00
> 3 - 5 kg/m	0,00	0,00	0,00
> 5 - 6 kg/m	0,00	0,00	0,00
> 6 - 8 kg/m	0,00	0,00	0,00
> 8 - 10 kg/m	0,00	0,00	0,00

For installation: Install and secure cables (using cable fixings) on cable trays, in cable ducts or in cable basements, includes bringing the cable to and from the place where the work is carried out.

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A01.15 Pulling cable in conduit with open bends**

Measurement: Meter

cable diameter from	Install	Disassembly	Demolish
From 00 to 16mm	0,00	0,00	0,00
From 16 to 23mm	0,00	0,00	0,00
From 23 to 30mm	0,00	0,00	0,00
From 30 to 40mm	0,00	0,00	0,00
From 40 to 50mm	0,00	0,00	0,00
From 50 to 70mm	0,00	0,00	0,00

Norm: Kg

cable with a weight	Install	Disassembly	Demolish
< 0,5 kg/m	0,00	0,00	0,00
> 0,5 kg/m	0,00	0,00	0,00
> 1 - 2 kg/m	0,00	0,00	0,00
> 2 - 3 kg/m	0,00	0,00	0,00
> 3 - 5 kg/m	0,00	0,00	0,00
> 5 - 6 kg/m	0,00	0,00	0,00
> 6 - 8 kg/m	0,00	0,00	0,00
> 8 - 10 kg/m	0	0	0

For installation: Remove the screen from, insert and connect one end of the cable, includes placing the cable number marker, conductor markers and crimp terminals. Includes opening and closing the connection enclosure (except for Exd enclosures).

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A01.20 Underground cable installation**

Measurement: Meter

cable diameter from	Install	Disassembly	Demolish
From 00 to 16mm	0,00	0,00	0,00
From 16 to 23mm	0,00	0,00	0,00
From 23 to 30mm	0,00	0,00	0,00
From 30 to 40mm	0,00	0,00	0,00
From 40 to 50mm	0,00	0,00	0,00
From 50 to 70mm	0,00	0,00	0,00

Norm: Kg

cable with a weight	Install	Disassembly	Demolish
< 0,5 kg/m	0,00	0,00	0,00
> 0,5 kg/m	0,00	0,00	0,00
> 1 - 2 kg/m	0,00	0,00	0,00
> 2 - 3 kg/m	0,00	0,00	0,00
> 3 - 5 kg/m	0,00	0,00	0,00
> 5 - 6 kg/m	0,00	0,00	0,00
> 6 - 8 kg/m	0,00	0,00	0,00
> 8 - 10 kg/m	0	0	0

For installation: Remove the screen from, insert and connect one end of the cable, includes placing the cable number marker, conductor markers and crimp terminals. Includes opening and closing the connection enclosure (except for Exd enclosures).

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A02.10 Connecting instrumentation cables screened or unscreened**

Measurement: Each cable end

Conductors	Install	Disassembly	Demolish
1 - 5 Conductors	0,00	0,00	0,00
6 - 10 Conductors	0,00	0,00	0,00
11 - 15 Conductors	0,00	0,00	0,00
16 - 20 Conductors	0,00	0,00	0,00
21 - 25 Conductors	0,00	0,00	0,00
26 - 30 Conductors	0,00	0,00	0,00
31 - 40 Conductors	0,00	0,00	0,00
41 - 50 Conductors	0,00	0,00	0,00
51 - 60 Conductors	0,00	0,00	0,00
61 - 70 Conductors	0,00	0,00	0,00
71 - 80 Conductors	0,00	0,00	0,00
81 - 90 Conductors	0,00	0,00	0,00
91 - 100 Conductors	0,00	0,00	0,00

For installation: Remove the screen from, insert and connect one end of the cable, includes placing the cable number marker, conductor markers and crimp terminals. Includes opening and closing the connection enclosure (except for Exd enclosures).

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A02.15 Connecting Low Voltage cables screened or unscreened**

Measurement: Each cable end

mm ² / conductor	Install	Disassembly	Demolish
0,3 - 2,5	0,00	0,00	0,00
4-10	0,00	0,00	0,00
16 - 25	0,00	0,00	0,00
35 - 50	0,00	0,00	0,00
70 - 120	0,00	0,00	0,00
150 - 185	0,00	0,00	0,00
Up to 240	0,00	0,00	0,00

For installation: Remove the screen from, insert and connect one end of the cable, includes placing the cable number marker, conductor markers and crimp terminals. Includes opening and closing the connection enclosure (except for Exd enclosures).

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A03.10 Installing fiber optic cables in enclosed conduit systems

Measurement: Meter

m	Install	Disassembly	Demolish
Duplex	0,00	0,00	0,00
Multicore 6 to 24 fibers	0,00	0,00	0,00

For installation: Includes placing cable markers and marking each end of the cable

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A03.15 Installing a connector on a fiber optic cable.**

Item	Install	Disassembly	Demolish
connector	0,00	0,00	0,00

For installation: Install a connector on a fibre optic cable.

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A03.20 Welding fibers by crimping or fusion welding.

Item	Install
Weld	0,00

For installation: Weld fibres by crimping or fusion welding

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A03.25 Fiber testing and test report

fiber	/fiber
Attenuation measurement	0,00
OTDR	0,00

Fibre testing and write test report

Electrical & Instrumentation**45A03.30 Connecting connectorised duplex fiber optic cable to equipment**

Item	Install	Disassembly	Demolish
Cable end	0,00	0,00	0,00

For installation: Lay up, secure, tying up and connect duplex fibre optic cable to equipment

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation

45A03.40 Bringing multicore cable into junction box

6 fibers per multicore end

Item	Install	Disassembly	Demolish
Cable end	0,00	0,00	0,00

For installation: Bring multicore cable into a welding box, remove the outer sheath includes cleaning, separating the fibres, placing in the cable tray, securing, tidying, numbering the fibres, opening and closing the junction box (screen removed over 5 m).

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A04.10 Installing Glands and Blind (Blanking) Glands

Range	Install	Disassembly	Demolish
Range PG 7-16	0,00	0,00	0,00
Range PG 21-48	0,00	0,00	0,00

For installation: Install glands and blind (blanking) glands. Excludes drilling and tapping

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A05.10 Installing a Earthing bushbar or strip**

Item	Install	Disassembly	Demolish
Bushbar or strip	0,00	0,00	0,00

For installation: Excludes drilling holes for connections. Insulated, includes fixing the insulators to steel, concrete or stone

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A05.15 Earthing: extension or branching using a connecting block or clamp.

Item	Install	Disassembly	Demolish
block or clamp	0,00	0,00	0,00

For installation: Install glands and blind (blanking) glands. Excludes drilling and tapping

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A05.20 Installing a earth rod into the ground

per m	Install	Disassembly	Demolish
< 25 mm ²	0,00	0,00	0,00
25 - 50 mm ²	0,00	0,00	0,00

For installation: Install a ground rod into the ground, with bare solid copper ground conductor with 3 m over length and driving rod, and measure the ground resistance.

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A05.25 Installing an auxiliary ground electrode into the ground**

norm per m	Install	Disassembly	Demolish
Electrode 2.5m	0,00	0,00	0,00

For installation: Install an auxiliary ground electrode into the ground

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A05.30 Installing a ground electrode inspection pit.

Each	Install	Disassembly	Demolish
Inspection pit	0,00	0,00	0,00

For installation: Install a ground electrode inspection pit and surface box

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A06.10 Installation of conduit, cable ladders or cable trays**

per m	Install	Disassembly	Demolish
Protective conduit < 2", open bends	0,00	0,00	0,00

For installation: Install the following conduit, cable ladders or cable trays made of stainless steel, hot-dip galvanized steel, plastic or aluminium, on steel or concrete structures, by welding, drilling or clamping

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Per item	Install	Disassembly	Demolish
0 to 100 items	0,00	0,00	0,00
100 to 200 items	0,00	0,00	0,00
200 to 400 items	0,00	0,00	0,00
400 to 600 items	0,00	0,00	0,00
600 to 800 items	0,00	0,00	0,00
800 to 1000 items	0,00	0,00	0,00

For installation: Install the following conduit, cable ladders or cable trays made of stainless steel, hot-dip galvanized steel, plastic or aluminium, on steel or concrete structures, by welding, drilling or clamping

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation

45A06.15 Installing fittings in cable ladders and cable trays

Measurement per item, only Separating panel per m

Measurement: Each (Separating panel per meter)	Install	Disassembly	Demolish
Fittings 0-100 mm	0,00	0,00	0,00
Fittings 100-200mm	0,00	0,00	0,00
Fittings 200-400mm	0,00	0,00	0,00
Fittings 400 - 600mm	0,00	0,00	0,00
Fittings 600-800mm	0,00	0,00	0,00
Fittings 800-1000mm	0,00	0,00	0,00
End panel 0-1000mm	0,00	0,00	0,00
Separating panel	0,00	0,00	0,00

For installation: Install fittings in cable ladders and cable trays

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A06.20 Installing cable trays on steel or concrete structures

Per m	Install	Disassembly	Demolish
0 to 70 mm	0,00	0,00	0,00
70 to 150 mm	0,00	0,00	0,00
150 to 300 mm	0,00	0,00	0,00
300 to 500 mm	0,00	0,00	0,00

For installation: Install cable trays on steel or concrete structures by welding, drilling or clamping

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation

45A06.25 Installing fittings for cable trays

Measurement per item, only Separating panel per m

Measurement: Each (Separating panel per meter)	Install	Disassembly	Demolish
Fittings 0-70 mm	0,00	0,00	0,00
Fittings 70-150 mm	0,00	0,00	0,00
Fittings 150-300 mm	0,00	0,00	0,00
Fittings 300-500 mm	0,00	0,00	0,00
End panel 0-500 mm	0,00	0,00	0,00
Separating panel	0,00	0,00	0,00

For installation: Install fittings for cable trays

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A06.30 Installing galvanized wire-type cable trays

per m	Install	Disassembly	Demolish
trays 50-150mm	0,00	0,00	0,00
trays 150-300mm	0,00	0,00	0,00

For installation: Install galvanized wire-type cable trays. Including fittings for existing support

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A07.10 Complete installation Instrumentation**

Per item	Install	Disassembly	Demolish
Figure 1	0,00	0,00	0,00
Figure 2	0,00	0,00	0,00
Figure 3	0,00	0,00	0,00
Figure 4	0,00	0,00	0,00

For installation: Examples for hook-ups, Fig. 1, Fig. 2, Fig. 3 and Fig. 4

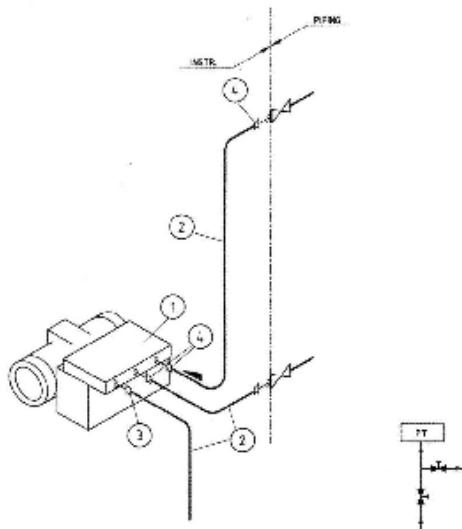
For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site

Electrical & Instrumentation

Figure 1

Figure 1: Level Instrument Installation Detail



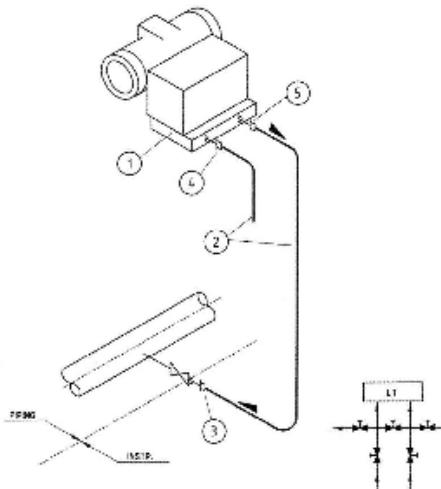
Labour Norm	
1 x	Install Instruments
1 x	Install Manifold
10 m	3/8" RVS tubing
8 m	1/2" conduit
1 x	Pole on concrete
9.15	

Item	Size	Description
1		5 valve manifold
2	3/8"OD-RVS	Tubing
3	3/8"ODx1/4"NPT	SS male connection Compression type
4	3/8"ODx1/2"NPT	SS male connection Compression type

Electrical & Instrumentation

Figure 2

Figure 2: Pressure Instrument Installation Detail



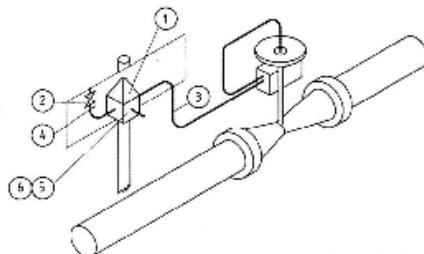
Standard Time Norm	
1 x	Install instrument
1 x	install Manifold
1.5 m	3/8" RVS tubing
1 m	1/2 " conduit
1 x	Pole on concrete
2.67	

Item	Size	Description
1		2 Valve manifold
2	3/8"OD-RVS	Tubing
3	3/8"ODx1/2"NPT	SS male connection Compression type
4	3/8"ODx1/4"NPT	SS male connection Compression type
5	3/8"ODx1/4"NPT	SS male connection Compression type

Electrical & Instrumentation

Figure 3

Figure 3: Control Valve Installation Detail



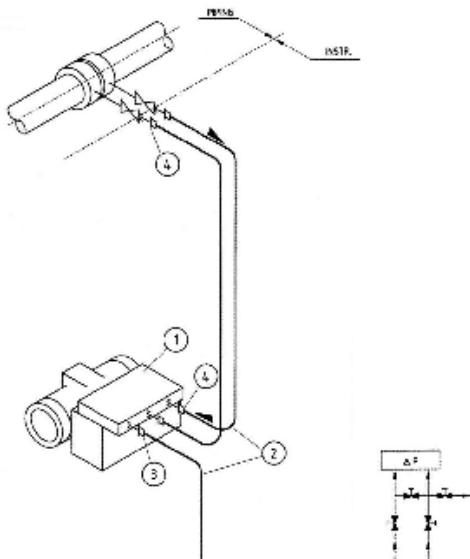
Standard Time Norm	
1 x	Install Reducer
1 x	Install support plate
1 x	Pole on concrete
3 m	1/4 " tubing PVC coated
1 m	1/2" Conduit
2.84	

Item	Size	Description	Material
1	1/4" NPT	Instr air filter outlet 0-7 bar	
2	1/4" NPT	Ball valve screwed	Messing
3	1/4" OD	Tubing	PVC coated
4	6mm x 1/4"	Male connection compression type fitting	Messing
5	1/4" NPT	Male connection	Messing
6	4mm	Dust protection for Item nr 8	PVC

Electrical & Instrumentation

Figure 4

Figure 4: Flow Instrument Installation Detail



Standard Time Norm	
1 x	Install Instrument
1 x	Install Manifold
1 x	3/8" RVS tubing
3 m	2" conduit
1 m	End 3/8"-1/2"
1 x	Pole on concrete
11.15	

Item	Size	Description
1		4-valve manifold
2	3/8"OD-RVS	Tubing
3	3/8"ODx1/2"NPT	SS male connection Compression type
4	3/8"ODx1/2"NPT	SS male connection Compression type

Electrical & Instrumentation**45A08.10 Installing Impulse, air and supply lines (L<3m / PVC coated copper)**

L<3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ('Stauff klem'), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A08.15 Installing Impulse, air and supply lines (L<3m / monel)

L<3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ('Stauff klem'), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A08.20 Installing Impulse, air and supply lines (L<3m / polymer)**

L<3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ('Stauff klem'), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A08.25 Installing Impulse, air and supply lines (L<3m / CrNiMo / Inconel 825)

L<3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers (''), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A08.30 Installing Impulse, air and supply lines (L>3m / PVC coated copper)**

L>3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ("'), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A08.35 Installing Impulse, air and supply lines (L>3m / monel)

L>3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ("'), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

Electrical & Instrumentation**45A08.40 Installing Impulse, air and supply lines (L>3m / polymer)**

L>3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ("), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A08.45 Installing Impulse, air and supply lines (L>3m / CrNiMo / Inconel 825)

L>3m (Norm per m)	Install	Disassembly	Demolish
1/8" 3 mm	0,00	0,00	0,00
1/4" 6 mm	0,00	0,00	0,00
3/8" 10 mm	0,00	0,00	0,00
1/2" 12 mm	0,00	0,00	0,00
3/4" 19 mm	0,00	0,00	0,00

For installation: Install impulse, air and supply lines and instrument lines (tubing) on existing supports, includes the installation of spacers ("), Install and connect couplings, making bends, and carry out a leak test.

A distinction is made between uninterrupted runs < 3 m and uninterrupted runs > 3 m

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

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45A08.50 Installing a coupler 1/8" to 1/2"

Each	Install	Disassembly	Demolish
coupler 1/8" to 1/2"	0,00	0,00	0,00

For installation: Install a coupler 1/8" to 1/2" including (3 mm to 12 mm) all materials

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A09.10 Internal wiring

Each	Install	Disassembly	Demolish
Solid wire to 1½ mm ²	0,00	0,00	0,00
Solid wire to 2½ mm ²	0,00	0,00	0,00
Solid wire to 6 mm ²	0,00	0,00	0,00
Solid wire to 10 mm ²	0,00	0,00	0,00
Solid wire to 16 mm ²	0,00	0,00	0,00
Solid wire to 25 mm ²	0,00	0,00	0,00

For installation: Install and connect internal wiring at both ends, with a length up to 3 m, includes coding, excludes opening and closing the cabinet.

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

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45A10.00 Cross Wiring

Each	Install	Disassembly	Demolish
Flexible wire 1½mm ²	0,00	0,00	0,00

For installation: Install and connect internal wiring at both ends (average value for all connection methods), with a length up to 3 m, includes coding, excludes opening and closing the cabinet

For disassembly: Remove elements of the installation in such a way that the removed materials can be re-used (after cleaning if necessary).

For demolition: Remove elements of the installation, which will not be re-used and take these materials to a suitable disposal site.

45A11.10 Inspecting control valves, ON-OFF valves and related Items

Each	Norm
Calibrating I/P transformer	0,00
Replacing I/P transformer	0,00
Stroking / adjusting control valve	0,00
Replacing valve drive	0,00
Replacing valve positioner	0,00
Replacing solenoid valve	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

Electrical & Instrumentation**45A11.15 Differential Pressure transmitters (with capillary / membrane)**

Each	Norm
Removing transmitter	0,00
Checking calibration in the field, zero check	0,00
Checking calibration in the field, span check	0,00
Calibrating transmitter in the workshop, static test	0,00
Repairing transmitter, replacing electronics only	0,00
Installing differential pressure transmitter, with capillary / membrane	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.20 Pressure transmitter (with capillary / membrane)

Each	Norm
Removing transmitter	0,00
Checking calibration in the field, zero check	0,00
Checking calibration in the field, span check	0,00
Calibrating transmitter in the workshop, static test	0,00
Repairing transmitter, replacing electronics only	0,00
Installing differential pressure transmitter, with capillary / membrane	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

Electrical & Instrumentation**45A11.25 Differential Pressure transmitter**

Each	Norm
Removing transmitter	0,00
Checking calibration in the field, zero check	0,00
Checking calibration in the field, span check	0,00
Calibrating transmitter in the workshop, static test	0,00
Repairing transmitter, replacing electronics only	0,00
Repairing transmitter, replacing sensor	0,00
Installing differential pressure transmitter	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.30 Pressure Transmitter

Each	Norm
Removing transmitter	0,00
Zero check in the field	0,00
Span check in the field	0,00
Calibrating transmitter in the workshop	0,00
Repairing transmitter, replacing electronics only	0,00
Repairing transmitter, replacing sensor	0,00
Installing pressure transmitter	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.35 Vortex meter

Each	Norm
Replace Sensor	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

Electrical & Instrumentation**45A11.40 Temperature measurement elements**

Each	Norm
Replacing thermocouple or PT 100 element	0,00

Replace thermocouple or PT 100 element, open and close the thermo well, disconnect and remove element, install and connect element

45A11.45 Level transmitter (in the field)

Each	Norm
Displacer / float "0" test	0,00
Displacer / float range test, removing / installing indicator	0,00

Adjustment: use the adjustment facilities to ensure that the item complies with the required standards, e.g.: taking the item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.50 Level transmitter (in workshop)

Each	norm
Removing the transmitter head from a level body	0,00

Remove the transmitter head from a level body

Electrical & Instrumentation**45A11.55 Level magnetic**

Each	Norm
"0" test, blocking in and draining by Production	0,00
Calibration in the field	0,00
Float replacement	0,00

Adjustment: use the adjustment facilities to ensure that the Item complies with the required standards, e.g.: taking the Item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.60 Replacement of a level indicator and adjusting the control

Each	Norm
Indicator with a length up to 2 m	0,00
Indicator with a length > 2 m	0,00

Adjustment: use the adjustment facilities to ensure that the Item complies with the required standards, e.g.: taking the Item out of service, unscrewing the lid, connecting test equipment, adjusting the range four times (4 x), adjusting 0% four times (4 x), adjusting 100% four times (4 x), recording the observations, removing the test equipment, closing the lid, and returning the instrument to service.

45A11.65 Level capacitive

Each	Norm
Probe replacement	0,00
Electronics replacement	0,00
Inspecting / cleaning probe	0,00

includes connecting and disconnecting cable

Electrical & Instrumentation**45A11.70 Switches**

Each	Norm
Replacing pressure / temperature / flow switch, disconnecting and removing the faulty switch, installing and connecting the new switch	0,00
Adjusting pressure switch to specification	0,00
Adjusting temperature switch to specification	0,00
Adjusting flow switch to specification	0,00
Visually inspecting limit switch	0,00
Replacing limit switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting float-type level switch	0,00
Replacing float-type level switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting ultrasonic level switch	0,00
Replacing ultrasonic level switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting capacitive level switch	0,00
Replacing capacitive level switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting tuning fork level switch	0,00
Replacing tuning fork level switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting infrared level switch	0,00
removing faulty switch, installing & connecting new switch	0,00
Visually inspecting conductivity level switch	0,00
Replacing conductivity level switch, disconnecting & removing faulty switch, installing & connecting new switch	0,00
Visually inspecting thermal dispersion level switch	0,00
Replacing thermal dispersion level switch, disconnecting & removing faulty switch,	0,00

For scope see separate lines.

Electrical & Instrumentation