

A Contractor's Guide to Duct

» STRATEGIC DUCT SELECTION FOR MAXIMUM RETURNS



Economic Considerations

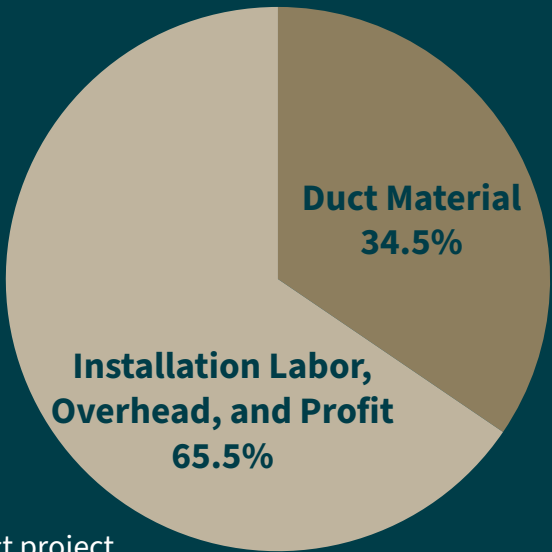
According to an independent market survey commissioned by SMACNA® and supported by U.S. Department of Commerce data, **labor accounts for 65.5%** of total duct system installation costs, while **materials represent just 34.5%**. This makes labor the single largest expense in duct system projects.

Duct System Installed Costs	SMACNA®	U.S. Department of Commerce
Duct Product Material Cost	34.5%	36.5%
Installation Labor, O/H, Profit	65.5%	63.5%
Total Installed Duct Cost	100%	100%

When bidding ductwork, many contractors and building owners gravitate toward the lowest price, assuming it will help with project costs. After all, duct is just a commodity without moving parts—shouldn’t all duct systems be essentially the same? In theory, yes. In practice, nothing could be further from the truth. Labor costs far outweigh material costs, making duct system design and installation processes more critical to a project’s budget and success than initial material costs.

While duct performance and weight remain virtually identical regardless of manufacturer or configuration, field installation costs can vary by as much as 50% based on duct assembly and construction methods. Many contractors experience job site labor overruns without realizing the root cause: poor duct design and manufacturing choices made upstream.

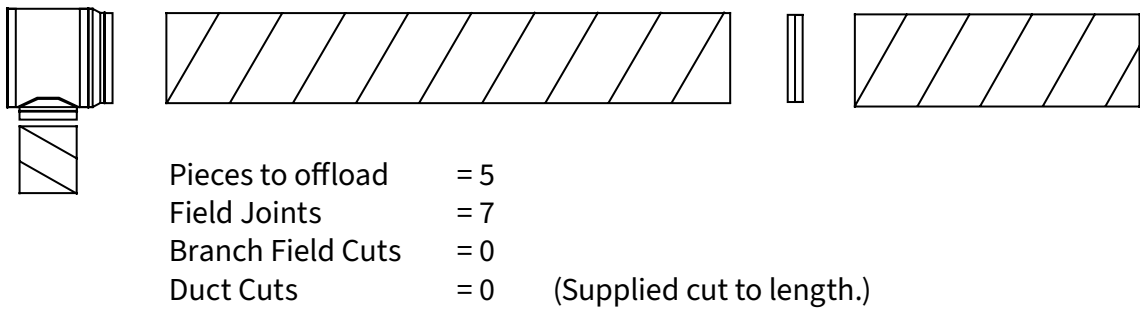
For this document, we used the more conservative SMACNA data, recognizing that installation labor costs vary widely by location. This chart focuses on controlling field labor costs for installing contractors, where projects and profits are made or lost.



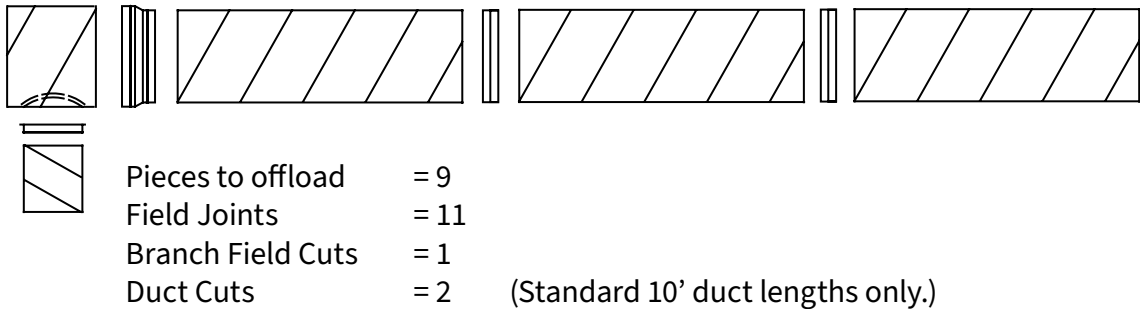
Breakdown of a typical duct project

Design Impact Scenarios

Scenario 1 — Complete fittings and cut to length duct



Scenario 2 — Loose erection set



In the examples above Scenario 2 has nearly twice as many pieces to off-load (9 versus 5) and double the amount of field joints/cuts to perform (14 versus 7). The economic impact of these two different configurations is demonstrated in the following chart. This comparison is based on a duct system with a total installed cost of \$100,000.

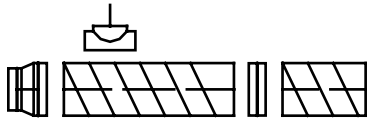
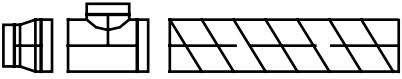
Cost Comparison Between Scenarios 1 and 2	Scenario 1	% of Total Cost	% Change	Scenario 2	% of Total Cost
Duct Product Material Costs	\$34,500	34.5%	-10%	\$31,050	31.0%
Installation Labor Costs	\$40,500	40.5%	+30%	\$52,650	52.7%
Overhead and Profit	\$25,000	25.0%		\$16,300	16.3%
Installation - Labor, Over Head, and Profit	\$65,500	65.5%		\$68,950	69.0%
Total Overall Install Cost	\$100,000	100.0%		\$100,000	100.0%

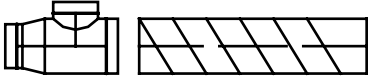
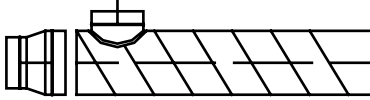
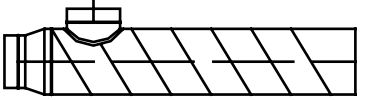
Although the above diagrams show an increase in total field joints and cuts to perform (AKA labor for the contractor), we chose a more conservative 30% increase in installed labor for our calculations. The SMACNA report states Overhead & Profit averages 25% and Installation Labor costs as 40.5% of the total job costs.

Since material costs for Scenario 1 is 10% higher, the contractor purchased Scenario 2. The contractor appeared to save \$3,450 (10%) by purchasing the low cost duct system. But, by ignoring the labor savings and the overall installed value of the Scenario 1, this contractor lost the opportunity to increase his profits by 53.4% (\$25,000 - \$16,300 = \$8,700). By choosing Scenario 2, the contractors field cost was over budget by \$12,150.

SEMCO® Configuration Options

Based on Oval Diameter 14"x12"x10" Duct

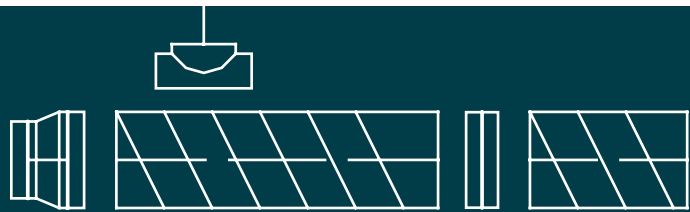
	Configuration "A" Loose Erection Set	Configuration "B" Loose Fittings & Duct
		
Pieces	5	3
Joints	7	5
Cuts	2	0
Price	\$64.10	\$77.00
Price Index	87%	104%
Labor	\$309.19	\$171.77
Labor Index	225%	125%
Total Price	\$373.29	\$248.77
Total Price Index	177%	118%
Fittings	All loose, male ends only	All loose, male or female
Taps	All loose, male ends only	Installed on body
Reducers	All loose, male ends only	Loose male or female
Spiral Duct	Standard 10' - 0" lengths	Standard 10'-0" lengths
Access Doors	Loose not installed	Installed on body
Caps/Plugs	Loose not installed	Loose not installed
Female Couplings	Required for fitting to fitting	Not required
Flanges	Loose if applicable	Loose if applicable
Rectangular Taps	Loose or not provided	Installed on body male/male
Piece Marks	Not available	On fittings only

Configuration "C" Complete Fittings & Cut to Length Duct	Configuration "D" Manifold	Configuration "E" Manifold
		
2	2	1
4	4	3
0	0	0
\$74.00	\$83.00	\$87.00
100%	112%	118%
\$137.42	\$137.42	\$103.06
100%	100%	75%
\$211.42	\$220.42	\$190.06
100%	104%	90%
All loose, male or female	Loose and Manifolded	Manifolded
Installed on body	Installed male or female	Installed male or female
Installed male or female	Installed male or female	Installed male or female
Cut to length	Cut to length	Cut to length
Installed on duct or fitting	Installed on duct or fitting	Installed on duct or fitting
Installed on duct or fitting	Installed on duct or fitting	Installed on duct or fitting
Not required	Not required	Not required
Installed if required	Installed if required	Installed if required
Installed if required	Installed if required	Installed if required
Piece mark & color coded	Piece mark & color coded	Piece mark & color coded

Basepoint for Comparison

SEMCO Configuration Options Explained

Configurations Used on Pages 4-5



Configuration “A”

Spiral Duct

- Loose Saddle Taps
- Loose Concentric Reducers
- Standard 10'-0" Duct Lengths

Configuration “A” works best for small diameter projects such as tenant finish areas, low-pressure systems downstream of mixing boxes, or applications with long straight runs or multiple short runs common in low-pressure systems. It is ideal for single-wall round duct with self-sealing joints.

Avoid this configuration when flanged joints are required or where appearance is important. Configuration “A” offers the lowest product cost but requires the highest installation labor. It also uses more pieces (5) and more joints (7) than other configurations.



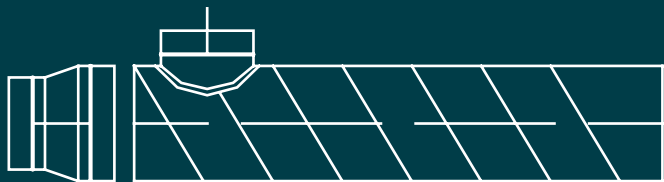
Configuration “B”

Spiral Duct

- Full Bodied Fittings
- Loose Concentric Reducers
- Standard 10'-0" Duct Lengths

Configuration “B” suits many pressure classifications and works best for small to midsize diameters in tight spaces. This arrangement performs well in single-wall or dual-wall applications where self-sealing joints are highly advantageous. It works well for medium and high-pressure mains to mixing boxes and can be used in exposed or concealed applications.

Avoid this option when flanged joints are required, as it significantly increases product cost. Configuration “B” uses fewer pieces (3) and fewer joints (5) than Configuration “A”. Product cost and installation labor are typically mid-range.



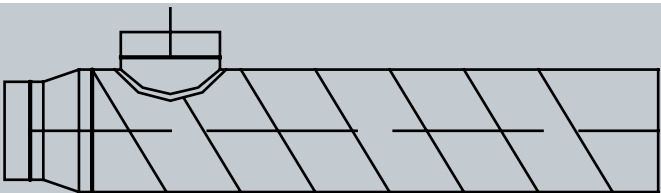
Configuration “D”

Spiral Duct Partial Manifold

- Installed Branch Taps
- Loose Reducers and End Treatments
- Custom Duct Lengths

Configuration “D” suits all pressure classifications and single-wall or dual-wall applications. It works well in open areas such as pools, athletic facilities, atriums, and manufacturing facilities. This design is commonly used in exposed or concealed applications and can be used with small or large diameter ducts to greatly reduce field labor when multiple branches come off the same piece.

This option uses fewer pieces (2) and fewer joints (4) than Configuration “A”. Product cost is slightly higher while labor remains mid-range. Consider added freight costs when evaluating Configuration “D”.



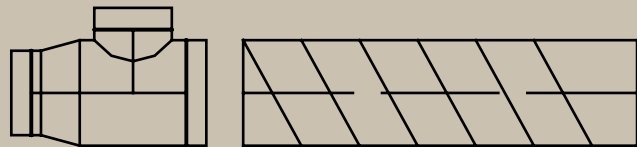
Configuration “E”

Spiral Duct Manifold

- Installed Branch Taps
- Installed Reducers and End Treatments
- Custom Duct Lengths

Configuration “E” suits all pressure classifications and single-wall or dual-wall applications. It works well in open areas such as pools, athletic facilities, atriums, and manufacturing facilities. This design is commonly used in exposed or concealed applications and works with small or large diameter ducts to greatly reduce field labor when multiple branches come off the same piece. This is the best option for large diameters requiring flanged joints.

This option uses the fewest pieces (1) and fewest joints (3) of any configuration. Product cost is the highest while installation labor is the lowest. Consider added freight costs when evaluating Configuration “E”.



Configuration “C”

Spiral Duct

- Full Bodied Fittings
- Installed Reducers and End Treatments
- Custom Duct Lengths

This configuration has been both the industry standard and SEMCO’s standard for many years. Configuration “C” suits all pressure classifications and single-wall or dual-wall applications. In our opinion, this design offers the best overall value in the market and works for all duct applications. This arrangement is commonly used in exposed or concealed applications and performs well for large diameter ducts requiring flanged joints.

This configuration uses fewer pieces (2) and fewer joints (4) than Configurations “A” or “B”. Product cost is slightly higher while labor remains mid-range. SEMCO® has made Configuration “C” standard because we believe this design provides the best balance of product cost and labor. Contractors unaware of differences between manufacturers’ offerings or who don’t acknowledge this configuration’s added value may experience over-budget labor costs, reducing profits.





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