

ProAir

Heat Recovery Ventilation Systems

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Duct & Joint Guidelines

The D&J duct range comes in four sizes System 10 - 115mm width, System 15 - 150mm width, System 20 - 200mm width and System 30 - 300mm width. Each System has the same nominal height of 60.0mm or 62.5mm including fittings.

For common residential applications such as self-builds, Systems 10 and 15 will be most appropriate. This is useful and cost effective as the System 10 duct transports within the System 15 duct. The objective of any design of ducting systems is (a) to construct a low pressure system which will ensure that fans deliver the correct amount of air with least effort and (b) to do this in a cost effective manner. By properly combining the two smaller D&J Systems these two objectives can be achieved.

The design strategy for medium size residential houses is to concentrate the extracts and distribute the supplies. A typical self-build would have six extracts (kitchen, utility, downstairs toilet and three bathrooms) and perhaps eight supplies (sitting, dining, office, landing and four bedrooms). This means that the supplies will be divided into more routes and each route will carry a relatively smaller amount of air compared to the extracts. For example, in a house of 600m³ volume at 0.35 air-changes at normal speed, the airflows should be typically as follows

Supply M ³ /hr		Extract M ³ /hr	
Sitting Room	36	Kitchen	50
Dining	33	Utility	35
Office	16	Downstairs toilet	20
Landing	28	Bathroom 1	50
Bedroom 1	45	Bathroom 2	45
Bedroom 2	28	Bathroom 3	40
Bedroom 3	26		
Bedroom 4	28		
	240		240

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It is conceivable that in this situation that all the supplies could be served by System 10 duct, depending on where the HRV unit is located relative to the largest supply which is bedroom 1. If there is some distance, for example, more than 10m of duct and more than three fittings (i.e bends, adaptors, reducers etc.) involved in serving this bedroom, then it would better to use a System 15 duct. Likewise, bathrooms 2 and 3 could be served with System 10 duct if relatively close to the unit. The kitchen would generally use System 15 duct on a separate route for itself, with the utility and downstairs toilet teed together using System 15 and then dividing into two System 10 ducts.

The velocity within the duct should generally be kept below 2 m/sec and a System 10 duct carrying $40\text{m}^3/\text{hr}$ will have a velocity of 1.67 m/sec, while a System 15 duct with the same airflow will have a velocity of 1.28 m/sec.

A high velocity in a short run is acceptable as pressure will not build up, but pressure will build up in a long run with many bends fittings etc., even at low enough velocities. The decision as to which duct to use where will come from experience plus a good knowledge of the system and the pressure losses involved at various points.