# ESP 5 Solution

## Shipper Details

```
Shipper Details        Shipper Number: 19

Name:                  Billy's Hot-Shot Delivery
Address:               97 Hooke Close
City:                  Edmonton
Province:              Alberta
Postal Code:           T5H 2J9

Phone:                 435 - 9517
```

0NF

**Shipper**: ShipperNumber(PK), Name, Address, City, Province, PostalCode, Phone

1NF - 3NF

*No Changes*

Final Entities

**Shipper**: ShipperNumber(PK), Name, Address, City, Province, PostalCode, Phone

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## Order Shipment

| Item ID / Description | Order Qty | Ship Qty | Shipper ID | Waybill No. | Ship Date |
|---|---|---|---|---|---|
| | | | | | |
| H23 / Heater Fan Belt – 23" | 1 | 1 | 19 | R654-Z | 5/27 |
| H319 / Heater Fan Belt Support Brackets | 2 | 2 | | | |
| M24 / Bolts – 24 mm | 8 | 8 | 19 | R721-Z | 5/30 |
| LN48 / Lug Nuts - 48 mm | 50 | 50 | | | |
| W23-B / Front-Wheel - 23 Lug | 2 | 1 | 22 | QB-4561 | 6/02 |
| W23-B / Front-Wheel - 23 Lug | 2 | 1 | 19 | R929-Z | 6/05 |
| A-45A / ½" Hyd Hose, no Swivel | 3 | 3 | | | |
| | | | | | |

## 0NF

**OrderShipmentRecord**: OrderNumber(PK), FirstName, LastName, CustomerNumber, Address, City, Province, PostalCode, Phone, OrderDate, {{ItemID, Description, OrderQuantity, ShipQuantity}, ShipperID, WaybillNumber, ShipDate}

## 1NF - Isolate Repeating Groups

> When we have nested repeating groups, we should isolate the outer group first and then isolate the nested inner group.

**OrderShipmentRecord**: OrderNumber(PK), FirstName, LastName, CustomerNumber, Address, City, Province, PostalCode, Phone, OrderDate

**Shipment**: OrderNumber(PK|FK), ShipDate(PK), ShipperID, WaybillNumber

**ManifestItem**: OrderNumber(PK|FK1), ShipDate(PK|FK1), ItemID(PK), Description, OrderQuantity, ShipQuantity

> The **ManifestItem** entity has a composite primary key consisting of three attributes. Two of those attributes are working together as a composite foreign key: `OrderNumber, ShipDate`.

## 2NF - Isolate Partial Depedencies

**InventoryItem**: ItemID(PK), Description

**ManifestItem**: OrderNumber(PK|FK1), ShipDate(PK|FK1), ItemID(PK|Fk2), OrderQuantity, ShipQuantity

## 3NF - Isolate Transitive Dependencies

**OrderShipmentRecord**: OrderNumber(PK), CustomerNumber(FK), OrderDate

**Customer**: CustomerNumber(PK), FirstName, LastName, Address, City, Province, PostalCode, Phone

Final Entities

**OrderShipmentRecord**: OrderNumber(PK), CustomerNumber(FK), OrderDate

**Customer**: CustomerNumber(PK), FirstName, LastName, Address, City, Province, PostalCode, Phone
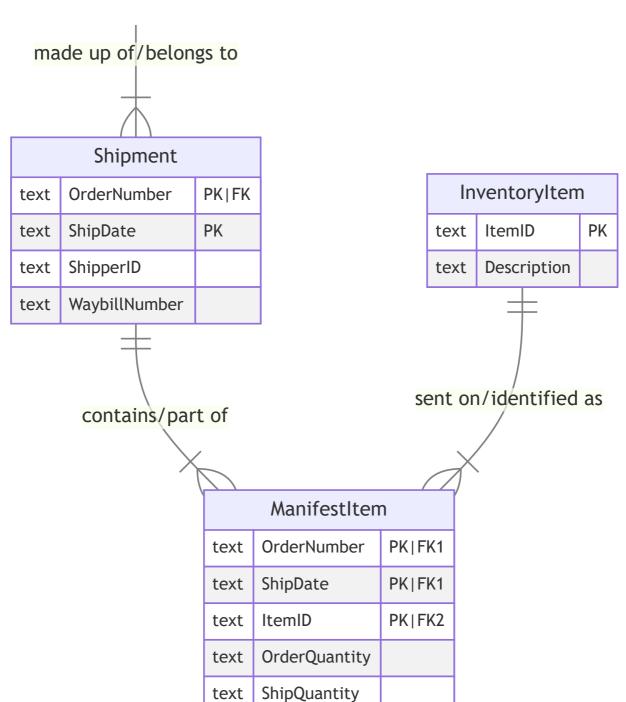
**InventoryItem**: ItemID(PK), Description

**ManifestItem**: OrderNumber(PK|FK1), ShipDate(PK|FK1), ItemID(PK|Fk2), OrderQuantity, ShipQuantity

**Shipment**: OrderNumber(PK|FK), ShipDate(PK), ShipperID, WaybillNumber

| Customer | | |
|---|---|---|
| number | CustomerNumber | PK |
| text | FirstName | |
| text | LastName | |
| text | Address | |
| text | City | |
| text | Province | |
| text | PostalCode | |
| text | Phone | |

has/for

| OrderShipmentRecord | | |
|---|---|---|
| text | OrderNumber | PK |
| text | CustomerNumber | FK |
| text | OrderDate | |

made up of/belongs to

**Shipment**

| text | OrderNumber | PK\|FK |
|------|-------------|--------|
| text | ShipDate | PK |
| text | ShipperID | |
| text | WaybillNumber | |

**InventoryItem**

| text | ItemID | PK |
|------|--------|-----|
| text | Description | |

sent on/identified as

contains/part of

**ManifestItem**

| text | OrderNumber | PK\|FK1 |
|------|-------------|---------|
| text | ShipDate | PK\|FK1 |
| text | ItemID | PK\|FK2 |
| text | OrderQuantity | |
| text | ShipQuantity | |