



# M18 cordless Belt Sander

# PROJECT OBJECTIVE

Design a cordless belt sander under the Fuel sub-brand that fits into the M18 battery family. The sander should include elements of disruptive innovation that help establish Milwaukee Tool's place in the cordless sander market.

# WHO IS OUR USER?

## USERS AND USE OVERVIEW



### Carpenter

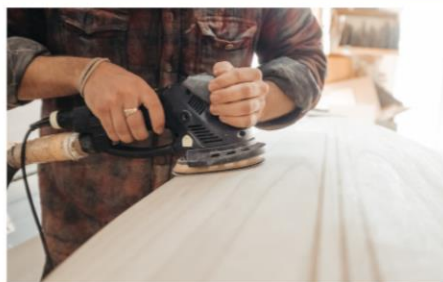
**Overview** - A carpenter installs, constructs, or repairs structures and fixtures made of wood and other materials.

**Usage** - Daily depending on specific daily tasks.

**Purchaser** - The construction company purchases the tools, or the carpenter themselves if they freelance.

#### Tasks -

- Build or repair cabinets, doors, frame works, floors, and other wooden fixtures
- Shape and cut materials to specific measurements
- Sharpening metal tools
- Finish surfaces of woodwork and many other tasks



### Re-Modeler

**Overview** - A re-modeler updates and re-models, makes repairs to buildings, installs cabinets, hardware, and windows, and completes construction.

**Usage** - Daily depending on specific daily tasks.

**Purchaser** - The hiring company purchases the tools, or the carpenter themselves if they freelance.

#### Tasks -

- Painting
- Drywall repair
- Light framing
- Laminate flooring
- Finishing carpentry
- Setting doors, windows, or cabinets
- Problem solving
- General repair



### Cabinetry/Shop Worker

**Overview** - A cabinetry worker does general construction and assembly of cabinets to exact measurements and aesthetic specifications.

**Usage** - Daily

**Purchaser** - The construction service or installation business buys the tools.

#### Tasks -

- Construct or assemble cabinet components
- Verify calculations and measurements
- Clean and repair equipment
- Install hardware
- Match material finish to create a uniform appearance



### Painter

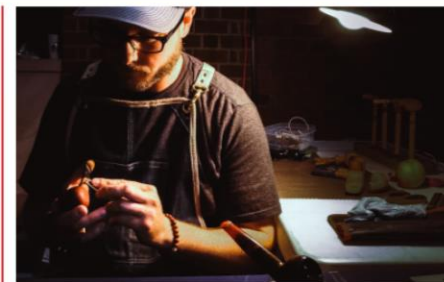
**Overview** - Prepares and applies paints and stains to a variety of surfaces.

**Usage** - Once a day

**Purchaser** - The painting company would purchase the tool.

#### Tasks -

- Applies coats of paint, varnish, stains, enamel, or lacquer to decorate surfaces.
- Smooths surfaces
- Removes old finishes
- Fills and smooths old cracks and holes



### At Home User/Craftsman

**Overview** - The weekend warrior who does DIY projects and assorted crafts.

**Usage** - Weekly

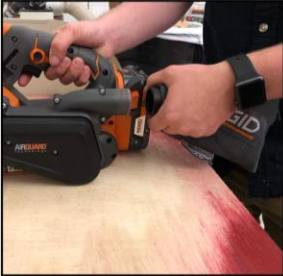

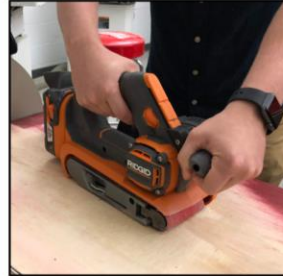


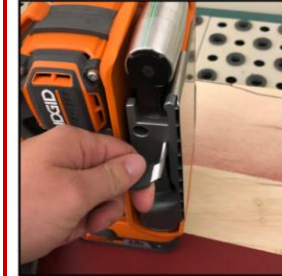
**Purchaser** - The individual user would purchase the tool.

#### Tasks -

- Flattening, smoothing, and shaping wood
- Removing paint or finish from pieces
- Sharpening metal tools

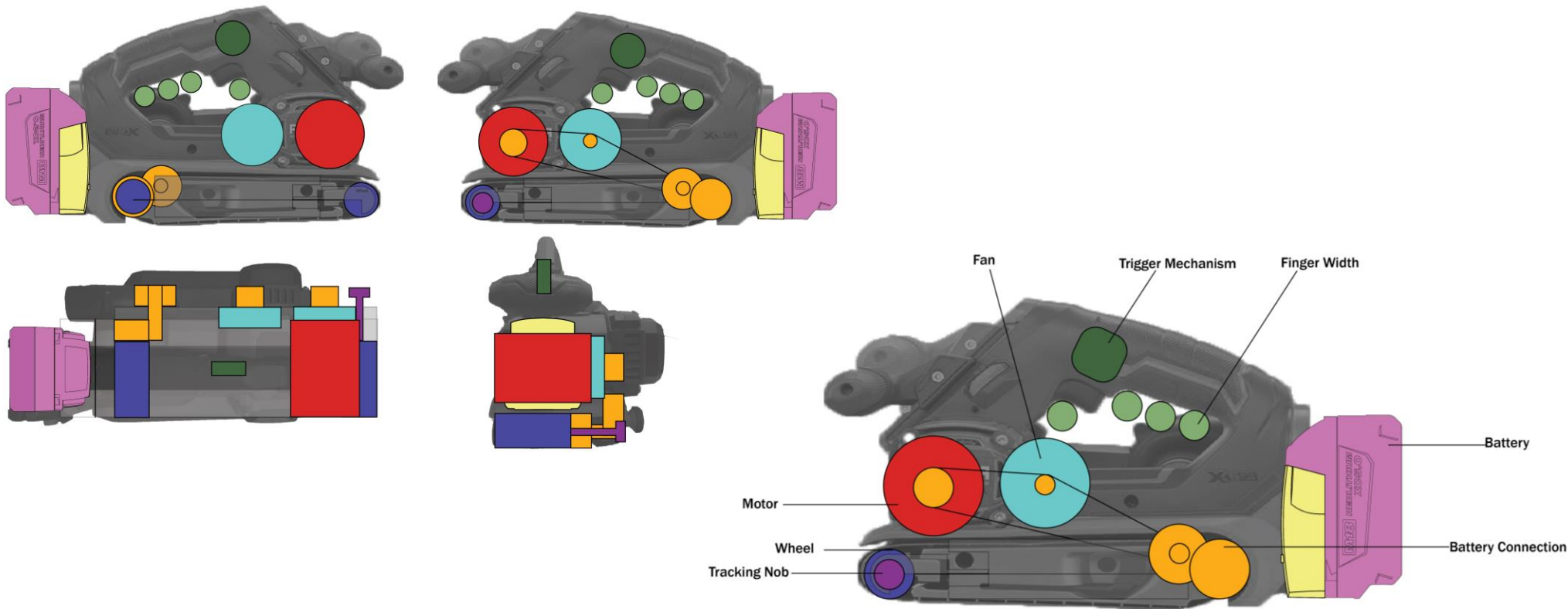
# IDENTIFIED USER NEEDS

## DESIGN TARGETS

					
<b>Dust Collection</b>	<b>Belt Tracking and Replacement</b>	<b>Size, Weight, and Portability</b>	<b>Adjustable Handle and Ergonomics</b>	<b>Controllable Speed and Stability</b>	<b>User Interface</b>
<ul style="list-style-type: none"><li>• Solid body removable dust collector</li><li>• Lock on dust bag</li><li>• Connection is compatible with shop-vac hose</li></ul>	<ul style="list-style-type: none"><li>• Quick, efficient, and durable belt replacement</li><li>• Auto-tracking feature with durable manual adjustment</li></ul>	<ul style="list-style-type: none"><li>• Light weight construction</li><li>• Compact design</li></ul>	<ul style="list-style-type: none"><li>• Adjustable pommel grip</li><li>• Chosen ergonomic handle position</li><li>• Versatile capabilities</li></ul>	<ul style="list-style-type: none"><li>• Easily adjustable speed dial</li><li>• In-line motor construction with center handle to increase stability</li></ul>	<ul style="list-style-type: none"><li>• Easy speed adjustment</li><li>• Apparent affordances</li></ul>

# CHOSEN MECHANICAL LAYOUT

Separate but Compact Fan





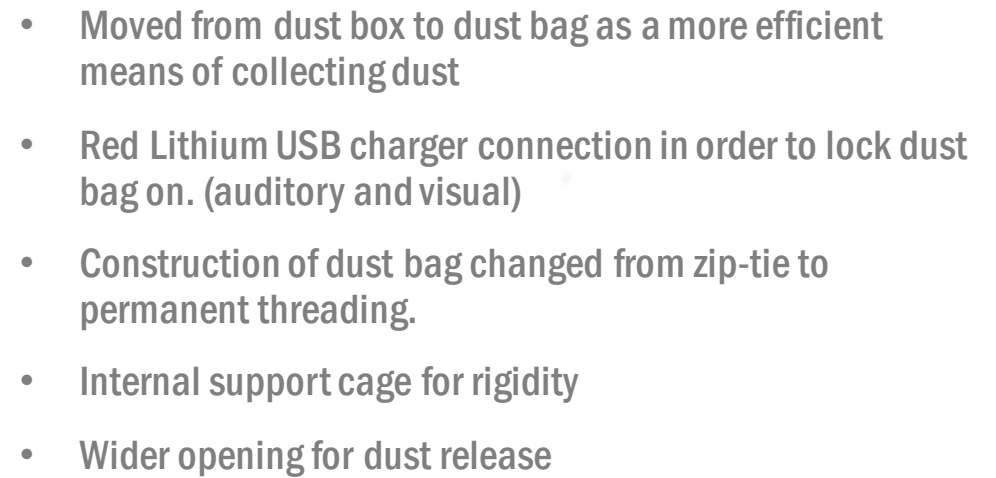
# HANDLE EXPLORATION

## Pommel Grip and Handle



- Pommel grip aligned to the front of the tool for compact design
- Not adjustable for ease of use
- Adjusted from HOLEHAWG grip in order to provide more comfort for wrist position
- Main handle is inspired by the band saw handle but altered to fit the belt sander
- Functions repositioned for more comfort

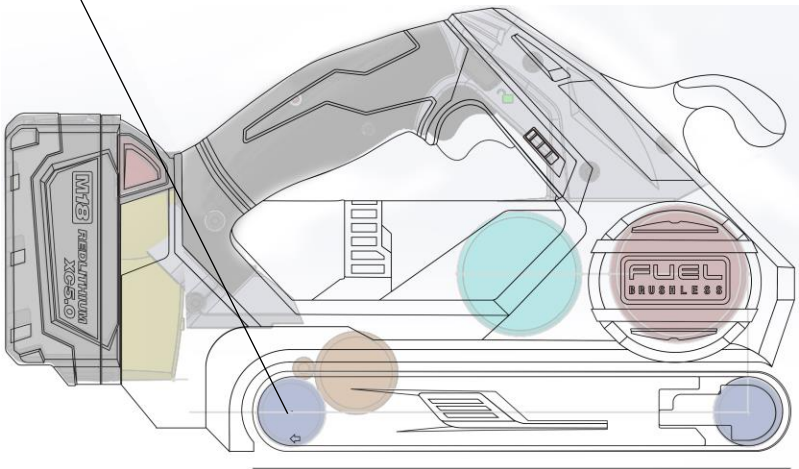
# Dust Collection Brainstorm



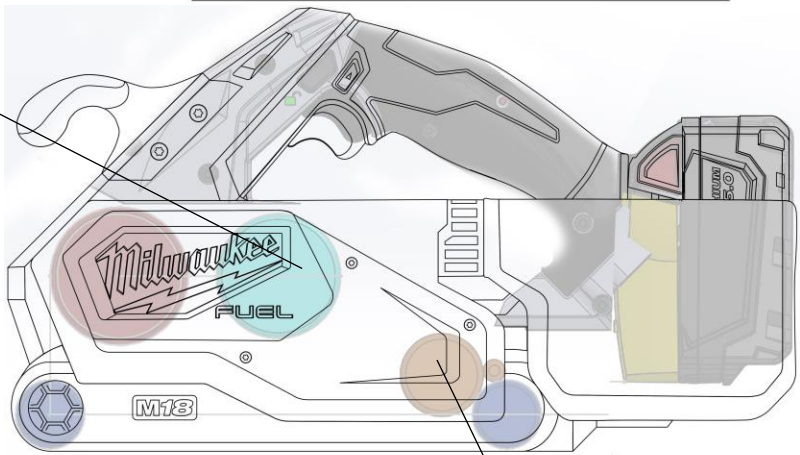
# ID2 REVIEW

Internal Layout

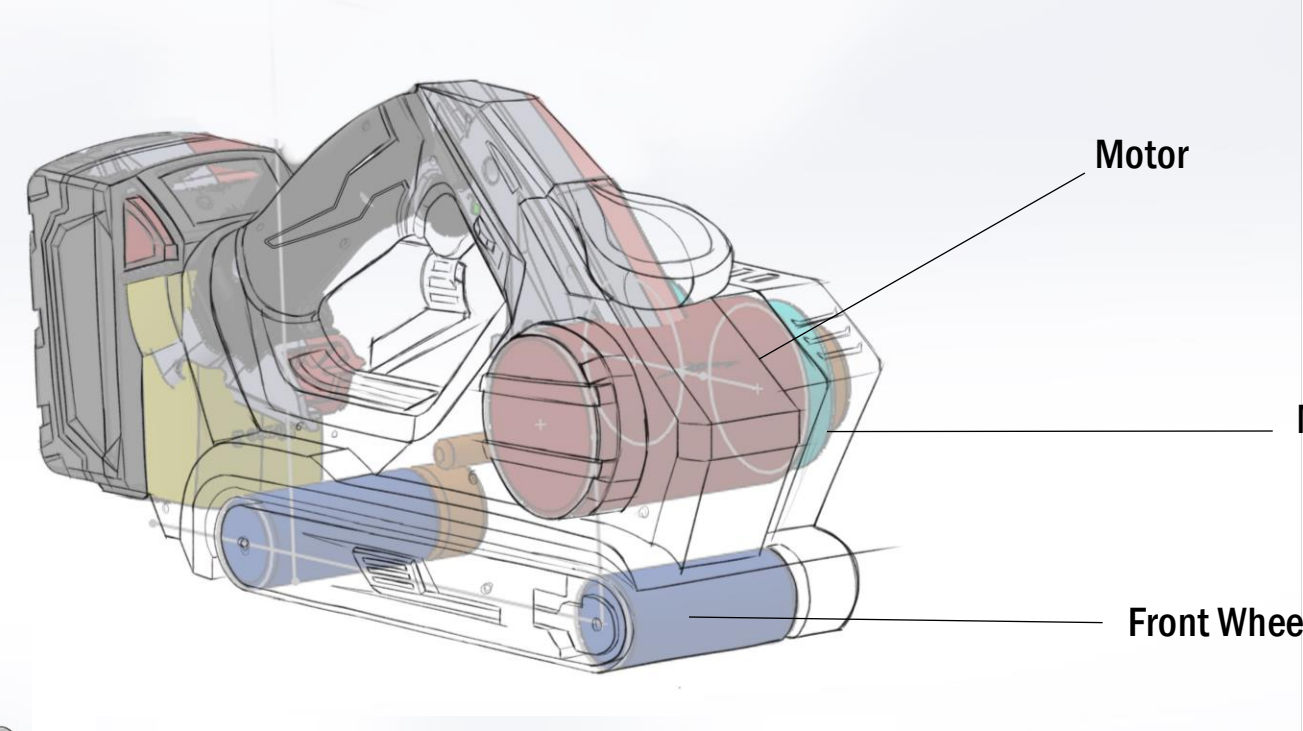
Rear Wheel



Dust Fan



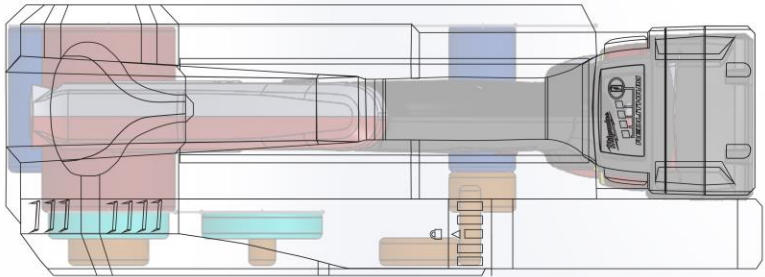
Gear System



Motor

Motor Fan

Front Wheel

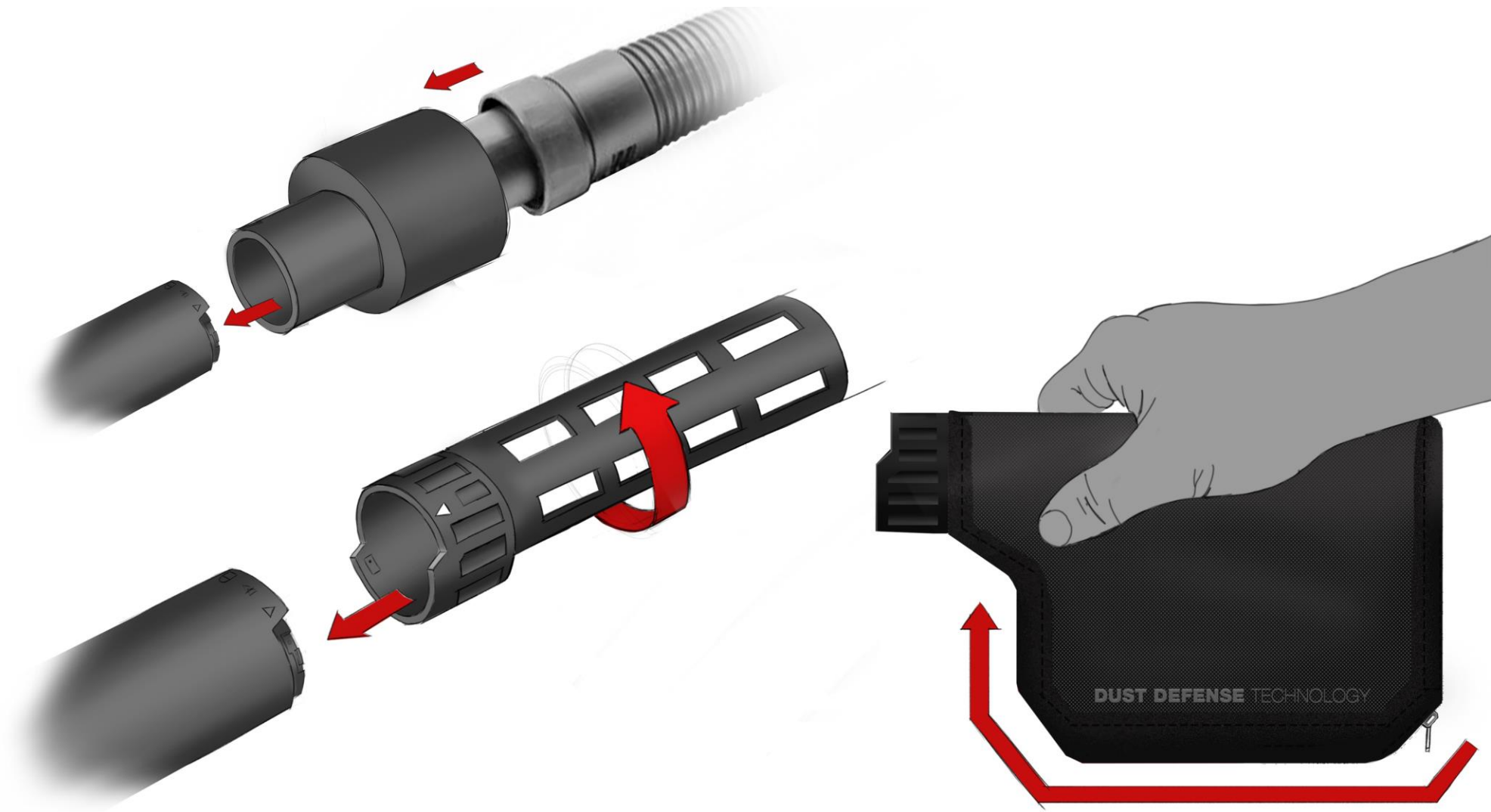




# ID2 REVIEW

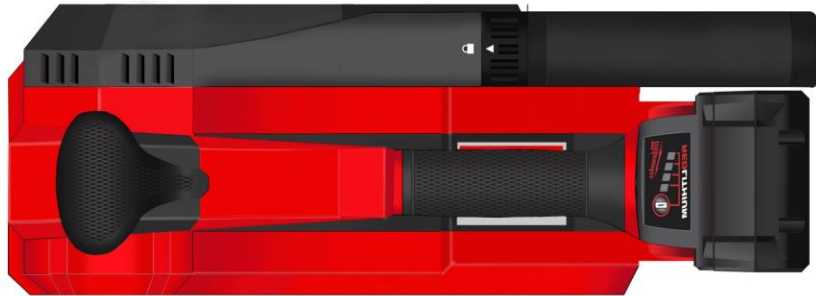
## Dust Bag Connection

- Internal Support Cage
- Red Lithium USB charger connection
- Widened Zipper Opening
- Grip For Dust Removal
- Shop Vac Compatibility



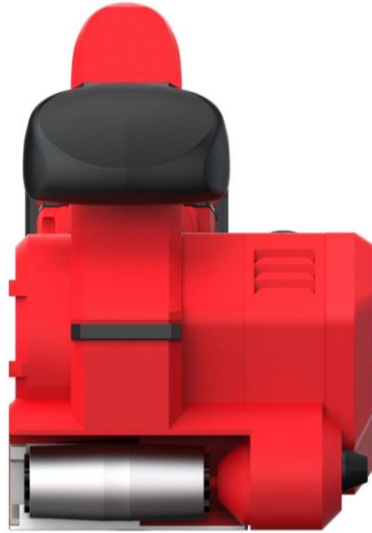
# ID2 REVIEW

Orthographics



# ID3

Orthographics



# OVERALL DIMENSIONS



204mm



361mm



203mm

152mm

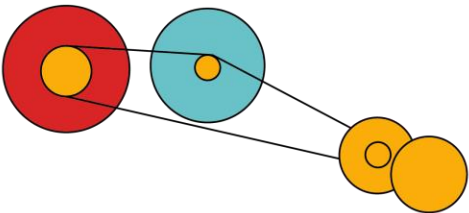




# OVERALL DIMENSIONS

## Competitive Comparison

Compact Mechanical Layout

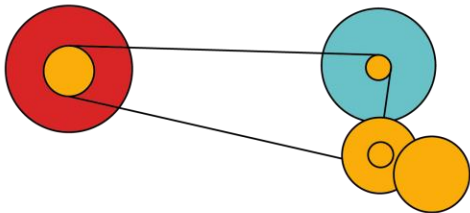


204mm



361mm

Ridgid Mechanical Layout



203mm



432mm



# ID2 REVIEW

## Construction



- 1 Sand Paper Track**
  - Screwed into A side
  - Includes release mechanism
- 2 Pommel Handle**
  - Removable with screws
- 3 B Side Clam Shell**
  - Screw bosses to attach to A Side
- 4 Trigger Mechanism**
  - Trigger Mechanism and auto run feature
- 5 Motor Housing**
  - Hole to run wiring
- 6 Gear Cover**
  - Covers gears and belt
  - Attached with screws
- 7 Dust Bag Spine**
  - Locking mechanism
  - Support cage

# LABELS/GRAPHICS



**MILWAUKEE FUEL**  
Embossed and pad printed  
-Primary Milwaukee branding



**DUST DEFENSE**  
Embossed  
-Metallic on matte background



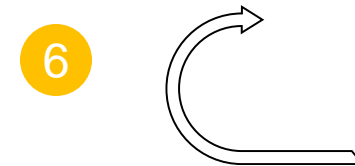
**FUEL BRUSHLESS**  
Embossed and pad printed  
-Primary Sub-brand graphic



**M18 REDLITHIUM XC 5.0**  
Sticker  
-Displays battery Sub-brand

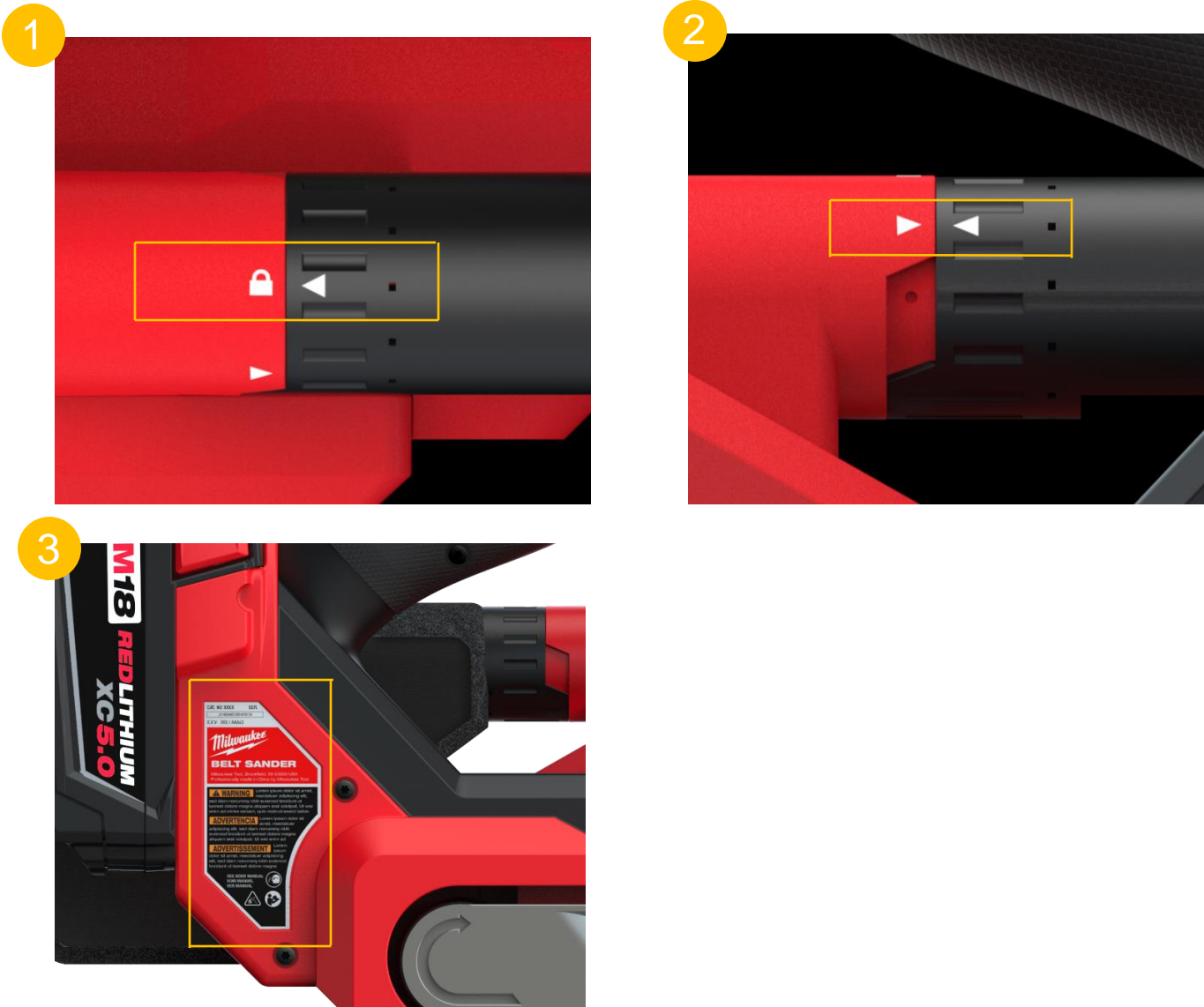


**M18**  
Embossed  
- Displays Battery Line Sub-brand



**DIRECTIONAL ARROW**  
Debossed  
-Displays direction of sandpaper movement.

# LABELS/GRAPHICS



1



## LOCKED POSITION

Embossed and Pad Printed  
-Locked Position taken from  
REDLITHIUM USB Charger

2



## ALIGNMENT ARROWS

Embossed and Pad Printed  
- Alignment Position taken  
from REDLITHIUM USB  
Charger

3



## WARNING LABEL

Sticker  
-Displays Necessary  
Warnings



# USER INTERFACE

1



2



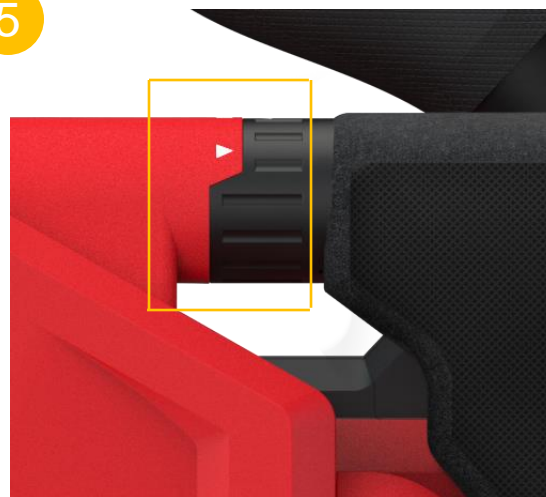
3



4



5



6



1

## TRACKING KNOB

- Easy turn with gloves
- Reliefs for Grip

2

## SPEED DIAL

- Speeds 1-6
- 1=Low Speed 2=High Speed
- Dial Taken From SAWZALL

3

## AUTO-RUN BUTTON

- Depress with the trigger to activate auto run
- Milwaukee Lock Button

4

## TRIGGER

- Press to run sanding mechanism
- One finger trigger

5

## DUST BAG CONNECTION

- Visual alignment position
- Visual and auditory lock position upon rotating.

6

## BELT RELEASE LEVER

- Large depression for gloved fingers
- Visual affordance to pull outward

# FEATURES



A	Tracking Knob
<ul style="list-style-type: none"><li>- Reliefs for extra grip</li><li>- Solid construction</li><li>- Diameter sized for easy use</li></ul>	

B	Auto Run
<ul style="list-style-type: none"><li>- Within reach of thumb for easy depression</li><li>- Allows the user to relax index finger and focus on larger projects</li></ul>	

C	Speed Adjustment
<ul style="list-style-type: none"><li>- In reach of index finger for efficient speed adjustment</li><li>- Allows for greater control of sanding finish</li></ul>	

# FEATURES

## Belt Release Lever



**D**

### Belt Release Lever

- Large relief allowing for gloved finger access
- Oriented for vertical belt replacement
- Large paddle for easy release

Releases Belt

Gloved Finger Fits Underneath

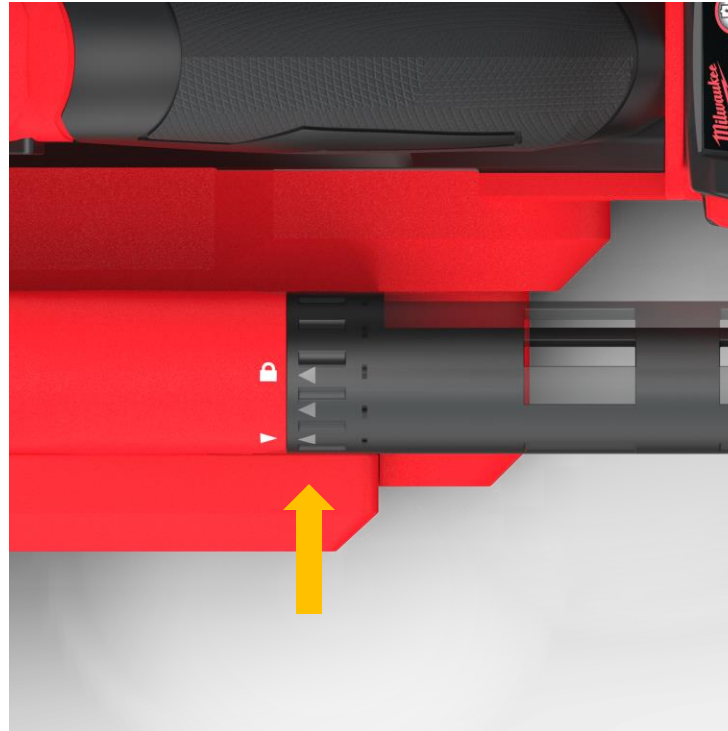
# FEATURES

## Dust Bag Attachment

PUSH



TURN AND LOCK



**E**

### Dust Bag Lock

- Auditory and visual feedback
- Simple rotation action
- Support cage for rigidity









**THANK YOU!**