

# OCR/MTO Desktop Flutter Application

### Purpose:

The purpose of this application is to use OCR to automatically extract important information from a PDF that contains a diagram and text.

## Input/Output

The input is a PDF image that contains a drawing, and different text fields in boxes.

The output of this is a CSV file that contains rows and columns with the correct information, that is extracted from the PDF input.

## Application Flow

1. User adds a PDF file that looks like the example input below.

EL 02

REL. OF MATERIAL

ITEM	SIZE	QUANTITY	WPS	WELDING DESCRIPTION
1	30\"/>			

**0-78AG26**

OUT PIPES LIST SHOWN FOR REFERENCE

ID	LENGTH	WPS	END1	END2
1	9' 5 1/2\"/>			

DATE	BY	REVISION	DESCRIPTION
5/4/2022	AJS	SLL	TDW
3/15/2022	BB	SLL	TDW
1/14/2021	BCZ		

PIPE-SPEC	NPS (IN)	DESIGN PRESSURE (PSIG)	DESIGN TEMP (°F)	INSULATION TYPE	INSULATION THICKNESS	COAT TYPES	TEST MEDIUM	SEE LINE INDEX
SS150P-AP	12							

**1. PRE-FABRICATION**

WELDING / FABRICATION POINT	NDE

**2. ASSEMBLY**

WELDING / FABRICATION POINT	NDE	FLUSHING / CLEANING	PRESSURE TEST	MECHANICAL COMPLETION

**GENERAL REMARKS**

- FIELD WELDS AND CUTTING LENGTHS TO BE DETERMINED BY OWNER/ CONTRACTOR/ FABRICATOR.
- ALLOWANCE FOR FABRICATION TOLERANCES ARE NOT CONSIDERED.
- THIS DRAWING IS NOT TO BE CROPPED, BUT IT IS INCLUDED IN THE TOTAL DIMENSION.
- SEE BOTTOM SHEET FOR SHEET FOR VOR PART NOL'S & OTHER DETAIL.

**CONTRACTOR**

**UNIQUE**

**Document Title:** PIPING ISOMETRIC

**Line Doc. No.:** 065BL-ZL (0-78) 0-78AG26

**UNIQUE PROJECT NO.:** 0-78AG26

**REVISIONS**

REVISION	DATE	DESCRIPTION
1	5/4/2022	ISSUED FOR QUOTE
2	3/15/2022	ISSUED FOR AUTHORITY PERMIT
3	5/4/2022	ISSUED FOR AUTHORITY PERMIT

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2. A user can create box shapes on top of the input image to perform OCR to extract data. Extraction areas can change depending on the input PDF, which is why the app supports box creation in any place and any size. In the lower right corner with the orange boxes, OCR supports concatenation of the fields to generate an ID. In the example below, there are 6 boxes created in order to extract information.



Markup #	Map To Column
1	Pipe Spec
2	Drawing #
3	Sheet
4	Pipe Spec
5	P&ID
6	Area
6	Item
6	Tag
6	Quantity
6	NPS
6	Material Description
6	Item
6	Tag
6	Quantity
6	NPS
6	Material Description

- After all the 6 boxes are done performing OCR, the MTO table will be populated with data. Currently it prints out this table. We would like to store it as a CSV file.

## Material Take-Off Expected Output

Drawing Information					BOM (Bill of Materials)				
Drawing #	Sheet	Pipe Spec	P&ID	Area	Item	Tag	Quantity	NPS	Material Description
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	1		567 5/16"	2"	TUBE, SEAMLESS, 0.065" WALL, VALEX PRODUCT LINE NON-ELECTROPOLISHED, HIGH-PURITY (HP)/CFOS, ASTM A 269 GR TP304L, SS, ANNEALED AND PICKLED (AP), PER VALEX SPEC SP-9234
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	2		4	2"	TUBE WELD, 90 DEGREE ELBOW, SEAMLESS, 0.065" WALL, VALEX PRODUCT LINE NON-ELECTROPOLISHED, HIGH-PURITY (HP)/CFOS, ASTM A 269 GR TP304L, SS, ANNEALED AND PICKLED (AP), PER VALEX SPEC SP-9234
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	3	PS-65B15	2	2"	PSD29 - STRUT-MOUNTED CLAMP ASSEMBLY (CAL-CLAMP), MODEL HWT WITH 1/2" INSULATION THICKNESS, 304 STAINLESS STEEL
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	4	PS-65B16	1	2"	PSD29 - STRUT-MOUNTED CLAMP ASSEMBLY (CAL-CLAMP), MODEL HWT WITH 1/2" INSULATION THICKNESS, 304 STAINLESS STEEL
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	5	PS-65B14	3	2"	PSD29 - STRUT-MOUNTED CLAMP ASSEMBLY (CAL-CLAMP), MODEL HWT WITH 1/2" INSULATION THICKNESS, 304 STAINLESS STEEL
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	6	PS-65B12	1	2"	PSD29 - STRUT-MOUNTED CLAMP ASSEMBLY (CAL-CLAMP), MODEL HWT WITH 1/2" INSULATION THICKNESS, 304 STAINLESS STEEL

6. Group the data based on these columns, and save as a new CSV.

## Material Take-Off Expected Output

- Now group the data and combine quantities (Only for BOM Data)
  - Group by 'Material Description' and Size(NPS)
  - Sum quantities

Drawing Information					BOM (Bill of Materials)				
Drawing #	Sheet	Pipe Spec	P&ID	Area	Item	Tag	Quantity	NPS	Material Description
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	[Array]		567 5/16"	2"	TUBE, SEAMLESS, 0.065" WALL, VALEX PRODUCT LINE NON-ELECTROPOLISHED, HIGH-PURITY (HP)/CFOS, ASTM A 269 GR TP304L, SS, ANNEALED AND PICKLED (AP), PER VALEX SPEC SP-9234
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	[Array]		4	2"	TUBE WELD, 90 DEGREE ELBOW, SEAMLESS, 0.065" WALL, VALEX PRODUCT LINE NON-ELECTROPOLISHED, HIGH-PURITY (HP)/CFOS, ASTM A 269 GR TP304L, SS, ANNEALED AND PICKLED (AP), PER VALEX SPEC SP-9234
0-78-AG-26	1	SS150P-AP	P-FP-508	065B	[Array]	[Array]	7	2"	PSD29 - STRUT-MOUNTED CLAMP ASSEMBLY (CAL-CLAMP), MODEL HWT WITH 1/2" INSULATION THICKNESS, 304 STAINLESS STEEL

Grouped