

Engel Injection Molding Machine

ES 300
TIEBARLESS
 Data Sheet

TECHNICAL SPECIFICATIONS - ES 300 TIEBARLESS INJECTION MOLDING MACHINE

CLAMP

Clamp force	US tons	300
Clamp opening force	US tons	17.8
Clamp stroke (max.)	inches	33.50
Mold height (min - max)	inches	13.78 - N/A ⁷
Daylight (min - max)	inches	13.78 - 47.24
Platen size (HxV)	inches	46.46 x 35.43

See platen illustration below for max. mold size applicable

Hydraulic ejector stroke	inches	7.87
Hydraulic ejector force	tons	8.9

INJECTION		1350	1350	1800
Screw diameter	mm	55	60	70
Screw diameter	inches	2.165	2.362	2.756
Shot size ¹⁺²	oz	20.0	23.8	33.7
Injection capacity	in ³	37.7	44.9	63.4
Recovery rate ¹⁺²	oz/sec	1.4	1.8	2.7
Plasticizing capacity ¹⁺²	lbs/hr	318	402	603
Injection rate at max. press. ³	in ³ /sec	13.9	16.6	18.8
Injection rate (regenerative) ³	in ³ /sec	17.3	20.6	22.6
Injection velocity at max. press. ³	in/sec	3.8	3.8	3.1
Injection velocity (regenerative) ³	in/sec	4.7	4.7	3.8
Screw stroke	inches	10.24	10.24	10.63
Injection pressure (max.)	psi	28304	26535	22780
Injection pressure (regenerative)	psi	22850	21421	18934
Screw speed range (min=25)	rpm	217		
Screw torque ⁴	ft-lbs	1305		
Screw L/D ratio		20:1		
Nozzle stroke	inches	19.69		
Nozzle force	US tons	12.4		

HYDRAULICS

Pump capacity (required)	gpm	46.0
Oil reservoir capacity	US gal	140

ELECTRICS

Power supply available	volts	208 / 230 / 460 / 575 - 3PH / 60Hz
Total rated horsepower	HP	50
Number of heat control zones		4+Nozzle
Total heating wattage	kw	20.2 21.7 24.7

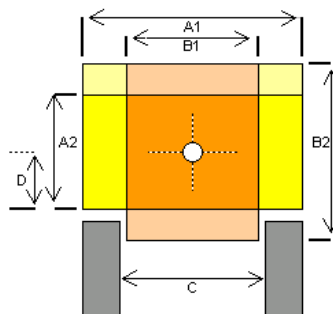
GENERAL

Dry cycle performance ⁵	sec	2.2
Water requirements (max)	gpm	12
Machine dimensions (LxWxH)	inches	273 x 83 x 101
Machine weight	lbs	38000/9000 ⁸
Hopper capacity	lbs	163
Suitable Engel robots		ERTLi71, ERC 43-63

NOTES:

- Based on polystyrene material.
- Calculated
- Can be increased with accumulator.
- Can be increased.
- Per Euromap 6 standard.
- With high torque screw drive.
- Smaller mold height settings optional
- Split base - two piece shipping. (N/A=Not Available, O/R=On Request, Std.=Standard)

All data subject to change without notice
Per Rev 9, 010925



Platen Illustration

With robot demolding, use A1 x A2
With free drop, use B1 x B2

Maximum Mold Dimensions

ES 300TL	(inches)
A ₁ x A ₂	46.46 x 25.60
B ₁ x B ₂	29.92 x 35.43
C	30.71
D	12.79

ENGEL

STANDARD EQUIPMENT**Injection**

- Nitrided barrel and screw
- Non-return ring check valve
- 10 step injection speed profiling
- 10 step holding pressure profiling
- 5 step back pressure profiling
- 5 step screw speed profiling
- Digital screw speed (RPM) display
- Digital injection time monitoring
- Screw recovery time monitoring
- Boost cut-off: time, stroke, and hydraulic pressure dependent (switch-over by cavity pressure is optional)
- Automatic cushion monitoring and control
- Cold start protection
- Injection unit swivel
- Quick barrel change
- Precision linear bearings for carriage movement
- Hopper discharge chute
- Feedthroat prepared for water-cooling
- Feedthroat with thermometer
- Increased wattage ceramic heater bands (on TL machines from ES 150 to ES660)
- Quick disconnects for heater bands
- Increased injection speed (regen. circuit, screen selectable)
- Programs for sprue break, decompression, and intrusion

Clamp

- SPI mold mounting and ejector pattern
- Multi-stroke hydraulic ejection, speed and pressure controlled
- Split base design
- Center ejector rod
- Mechanical safety dropbar
- 3 speed opening and closing
- Hydraulic, electric and electronic safety gate interlocks
- Automatic mold protection: self learning mold protection for optimum cycle time and set-up efficiency on CC100 models. (optional with EC100)
- 5 speed/pressure/position mold protection on EC100 models

Hydraulics

- Closed loop injection speed, injection pressure and screw back pressure; via single 'smart' pump technology on EC100 controlled TL models (ES 28TL+); (via double 'smart' pump technology on CC100 controlled TL models (ES 40TL+))
- Independent ejector/core motion/carriage movement on CC100 controlled TL models (corepull hardware optional)
- Fully proportional linearized hydraulic system
- Automatic calibration of proportional hydraulic valves and transducers
- Clogged filter indicator
- Closed loop oil temperature regulation with prewarming system
- Oil level indicator with level switch
- Pressure selector gauge

Controls, Electrics & Electronics

- Microprocessor control with high resolution flat color screen
- Micrograph plus for CC100 control (optional with EC100)
- RISC Multiple processor architecture (distributed intelligence)
- Built-in disk drive for data up/down loading. Mold set-ups stored via machine CPU.
- Quick machine set-up via single screen
- Help text system
- Linear transducers for measurement of the clamp, injection, carriage and ejector positions
- Networking capability via "Teleservice/Engel Monitoring System" ethernet connection on CC100 models. (optional on EC100 models)
- Automatic cycle monitoring and analysis
- Digital display of all actual values
- Current function display
- Self-diagnostics, monitoring, alarm & calibration
- Automatic screen shut-off
- Automatic balancing of heat zones during warm-up
- Auto barrel stand-by temperature when machine in alarm condition
- Automatic reject selection
- Additional screen selectable languages (Spanish/French) (other languages available upon request)
- US/metric units conversion
- User-defined programmable text pages. Keyboard optional.
- Self-tuning temperature controls
- History reporting of alarm conditions and set-up changes
- Resettable cycle and non-resettable hour counters
- Ventilated, filtered control panel
- Energy-efficient, totally enclosed fan cooled motor

General

- Easy access to motors, pumps & hydraulics
- Large, open drop area for automation
- Ergonomic design for operator ease and safety
- Optically isolated control system (protection from outside noise)
- Analog/digital conversion to minimize signal noise on linear position transducers.
- Manufactured to ANSI/SPI B151.1 safety regulations

OPTIONAL EQUIPMENT**Injection Unit**

- Hardened screws and bi-metallic barrels
- Specialty screws and screw tips for a wide variety of applications
- LIM, Thermoset, PVC, PIM, Gas-inj., MuCell and other packages
- Smaller than standard injection units
- Increased wattage and air-cooled heater bands
- Shut-off nozzles
- Hopper or drawer magnets

Injection (cont'd)

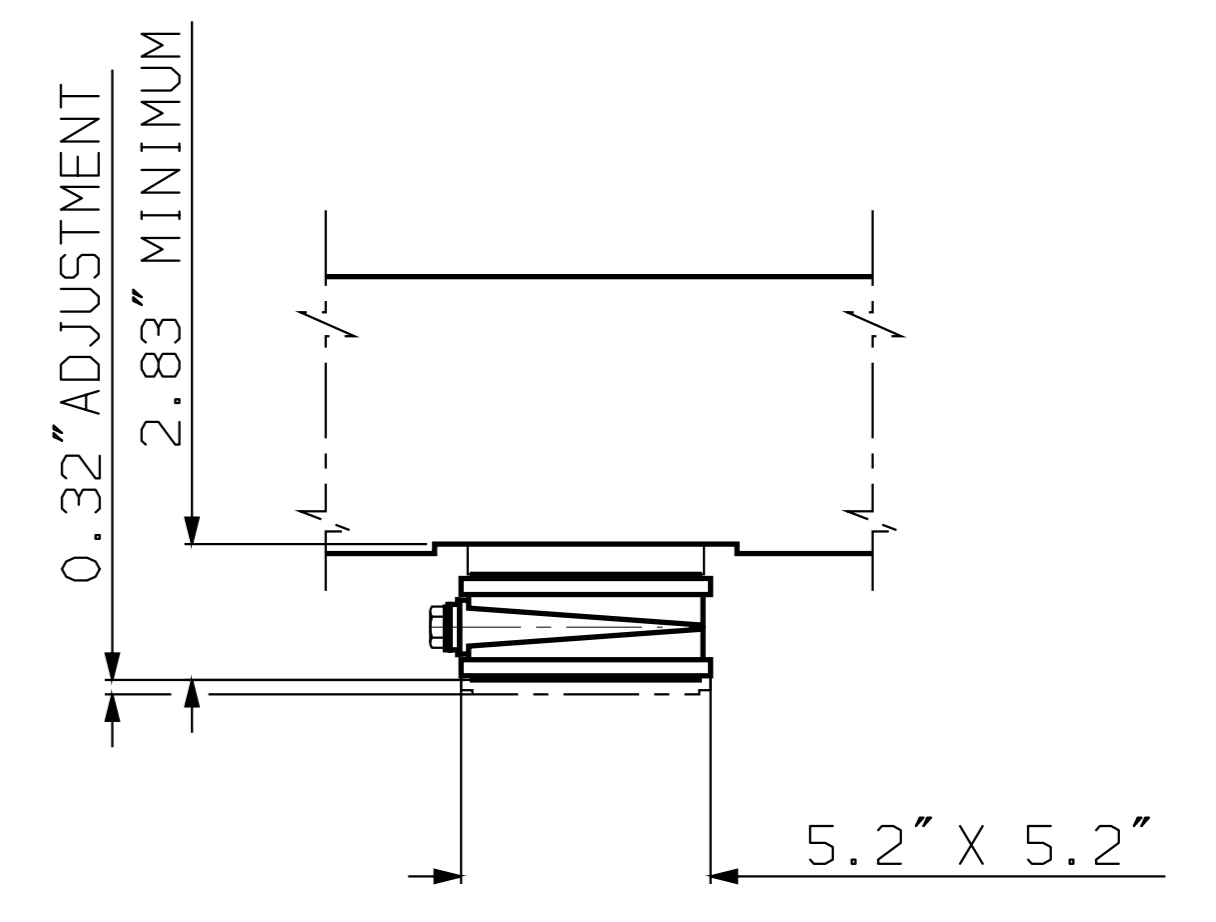
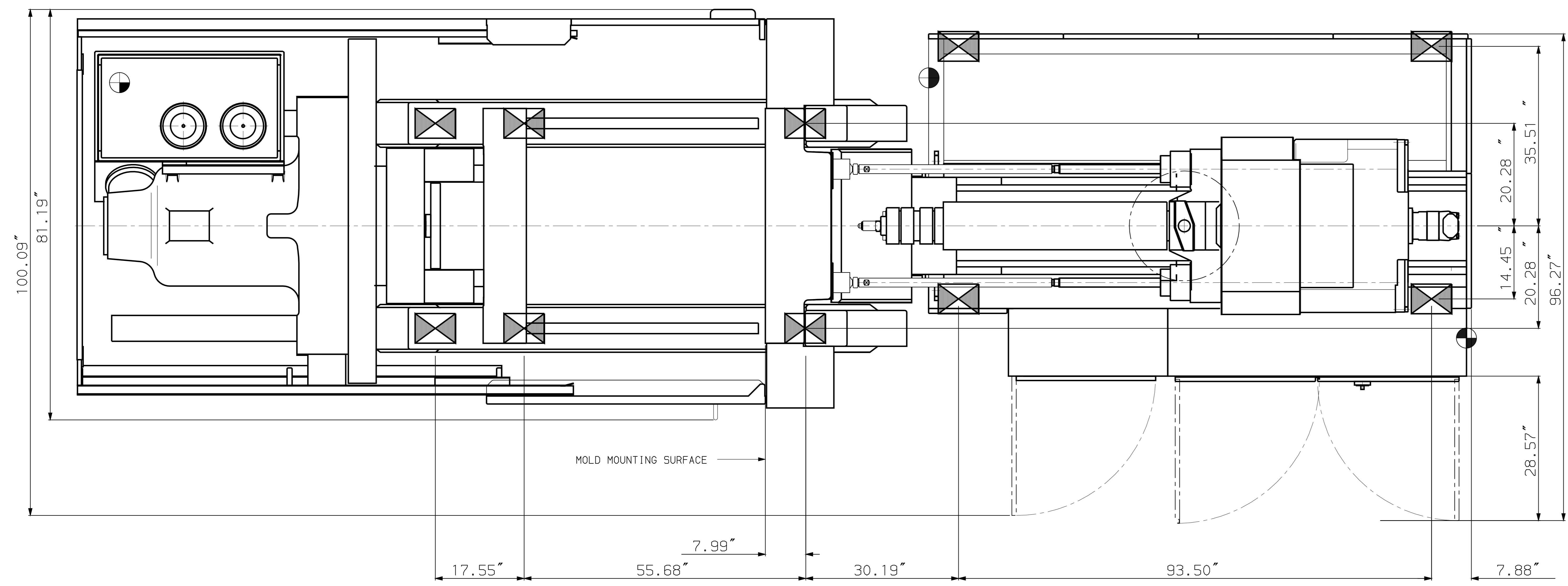
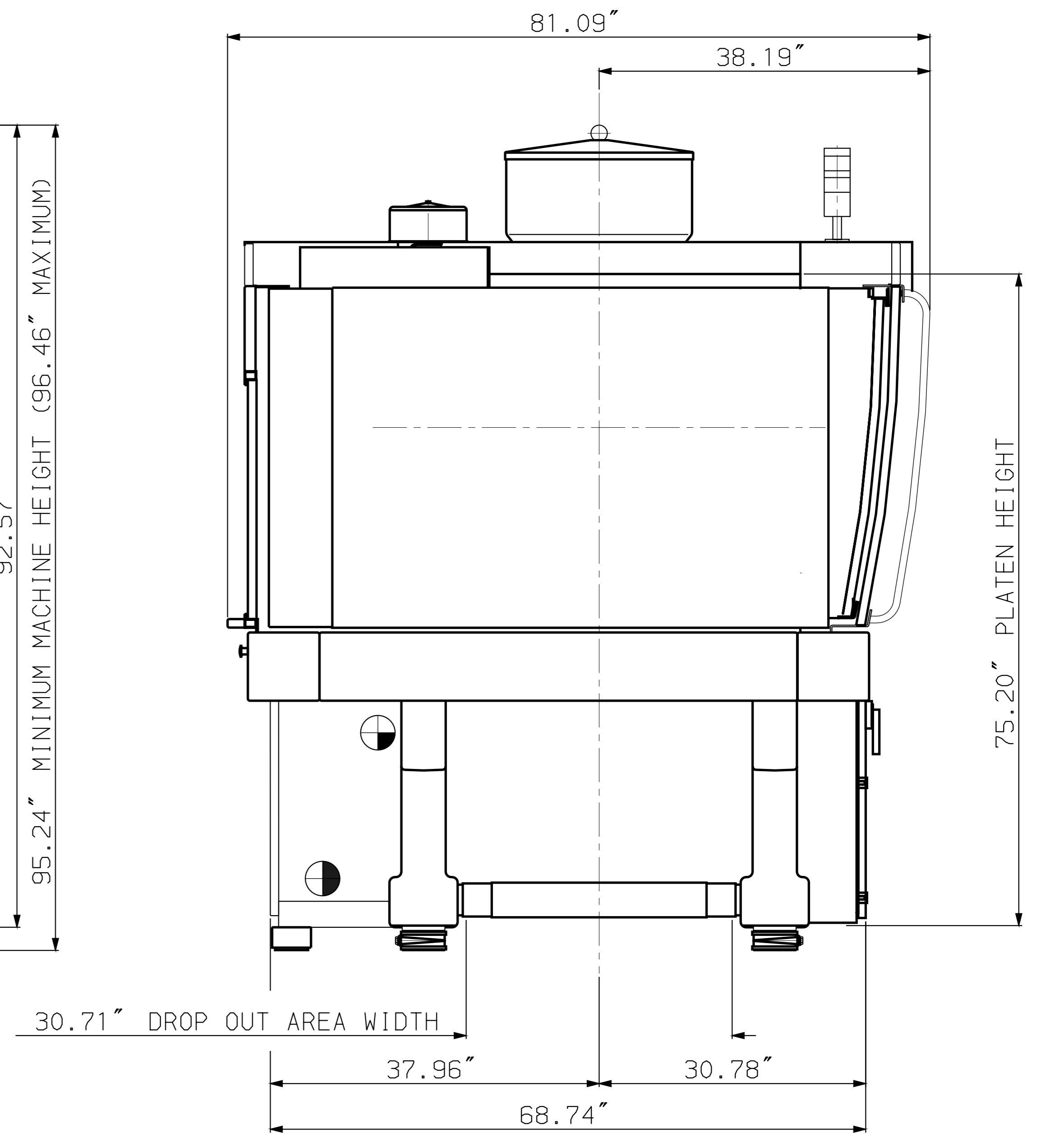
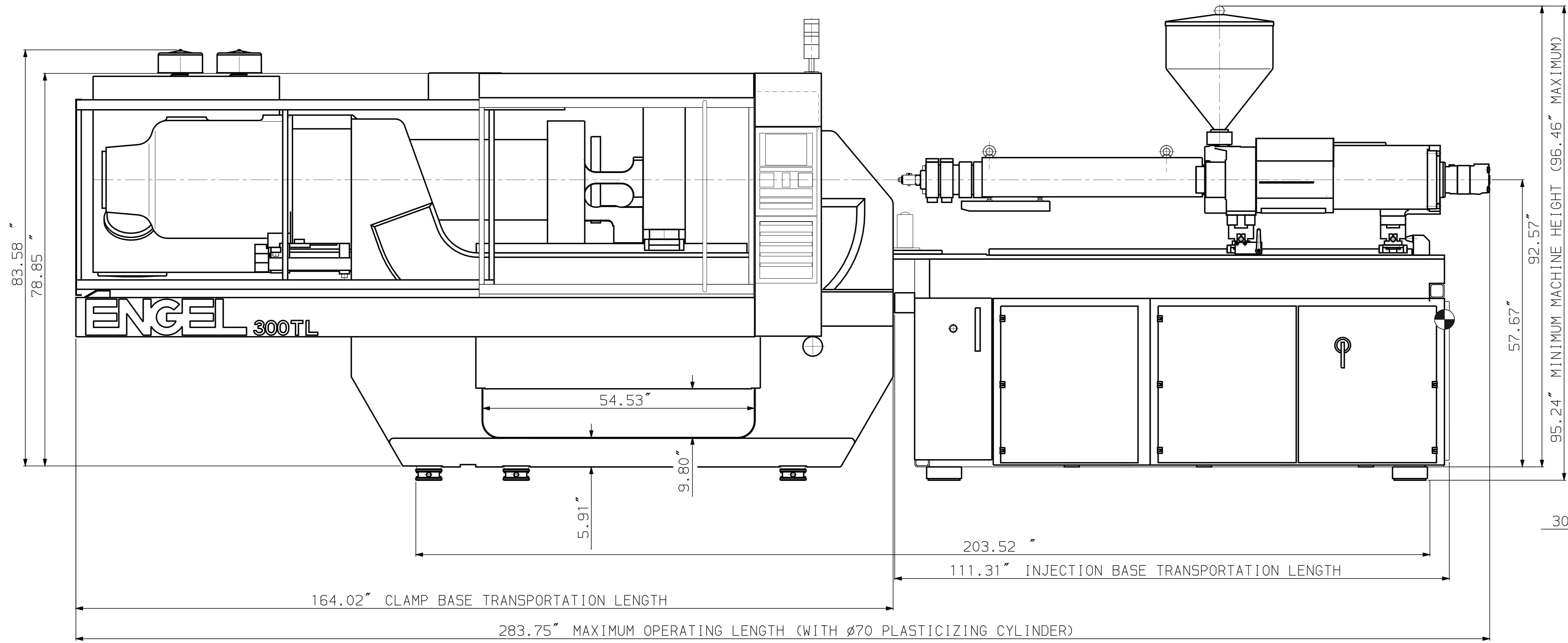
- Insulating blanket for barrel
 - Electric screw drive for improved energy efficiency
- Clamp**
- Platens prepared for water cooling
 - Mold locating ring on the moving platen
 - Mold venting program
 - Quick mold mounting systems (hydraulic or magnetic)
 - Semi- or fully auto. mold change system
 - Air blow-off valve
 - Mold support assembly
 - SPI safety key switch for clamp, ejector and core movement

Hydraulics

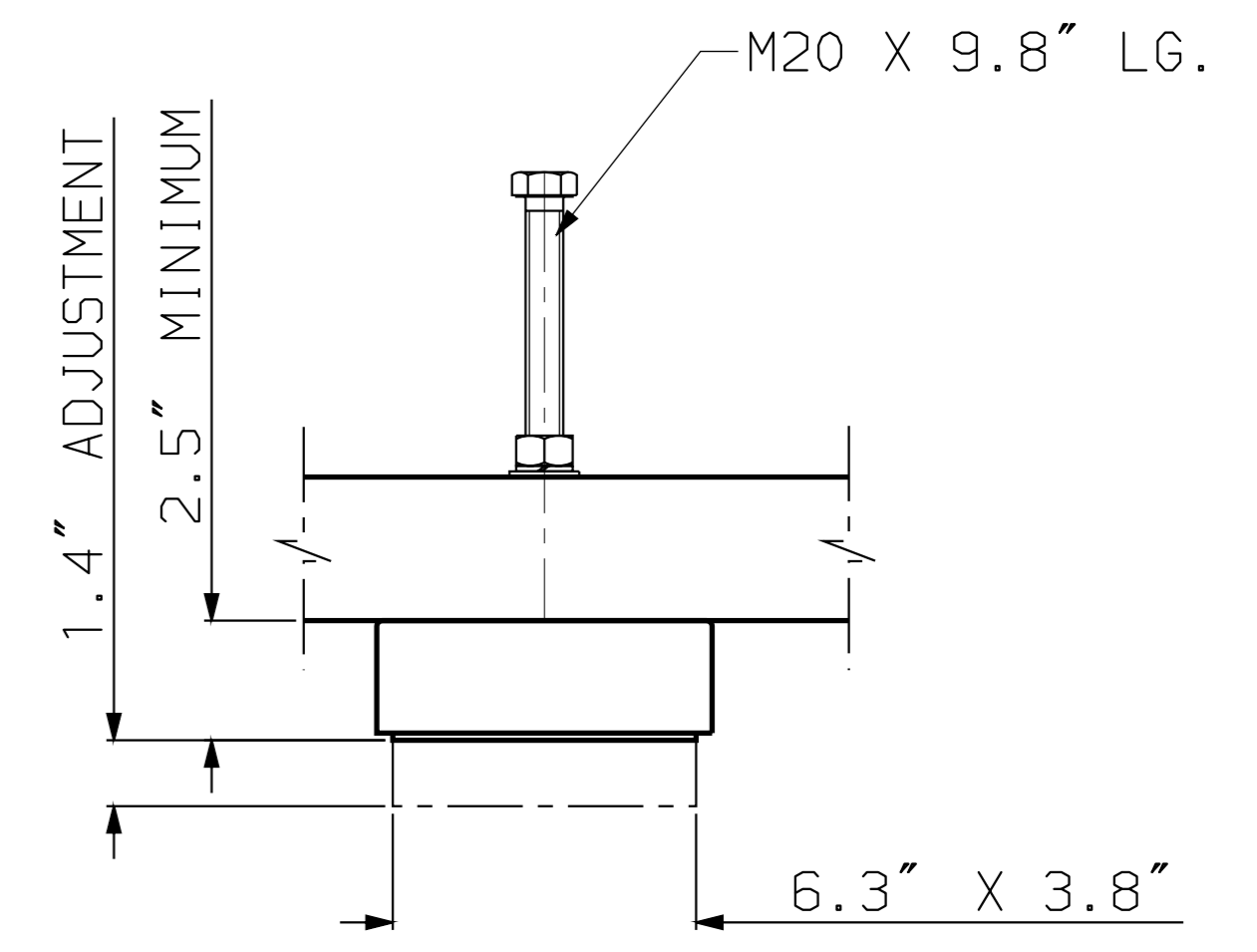
- Increased hydraulic drive for increased plasticizing and injection speeds
- Corepull(s) and unscrewing
- Hot runner valve gate control (pneumatic or hydraulic)
- Independent plasticizing
- High torque screw drive
- By-pass oil filtration
- Accumulator for increased inj. speed

Controls, Electrics & Electronics

- CC100 microprocessor control with high resolution flat color screen.
 - Microplast and Microflow software pkgs.
 - Micrograph for EC100 Control (standard with CC100 Control)
 - Process data graphics and reports
 - Magnetic security card access
 - SPC (Quality Data Statistics)
 - Automatic barrel/nozzle heat-up (7 day, 24 hour timer)
 - Power factor capacitors
 - Robot interface
 - Auxiliary electrical outlets
 - Host computer and SPI auxiliary device interface
 - Automatic shutdown for "lights out" operation (ghost shift program)
 - Hot runner PID temperature controls
 - Melt temperature monitor
 - Melt pressure monitor
 - Closed loop feedthroat cooling
 - Cavity pressure dependent boost cut-off (Kistler/RJG/Dynisco)
 - Graphics printer
 - Power supply available: 208 / 230 / 460 / 575 volts, 3Ph / 60Hz
 - Ammeters for barrel and nozzle zones
- General Options**
- Machine levelling/vibration mounts
 - Water manifolds and flow controls
 - Special painting of machine to customer's specifications
 - Multi-injection
 - Alarm bell in addition to alarm light
 - Air and water service routing
 - Spare parts packages
 - Engel robots
 - Training programs
 - Engel monitoring system



CLAMP BASE MACHINE MOUNT DETAIL
LOAD CAPACITY: 8000 lbs.
SCALE 1:4



INJECTION BASED MACHINE MOUNT DETAIL
LOAD CAPACITY: 6000 lbs.
SCALE 1:4

- MACHINE MOUNT
- STD.ELE. UTILITY ENTRANCE
- AIR CONNECTION 3/8" NPT
- COOLING WATER CONNECTION IN & OUT 1" NPT

NOTES:
1. ALL DIMENSIONS ARE IN INCHES
2. TECHNICAL DATA SUBJECT TO CHANGE WITHOUT NOTICE

RELEASED
MICROFILM
REV. # 14

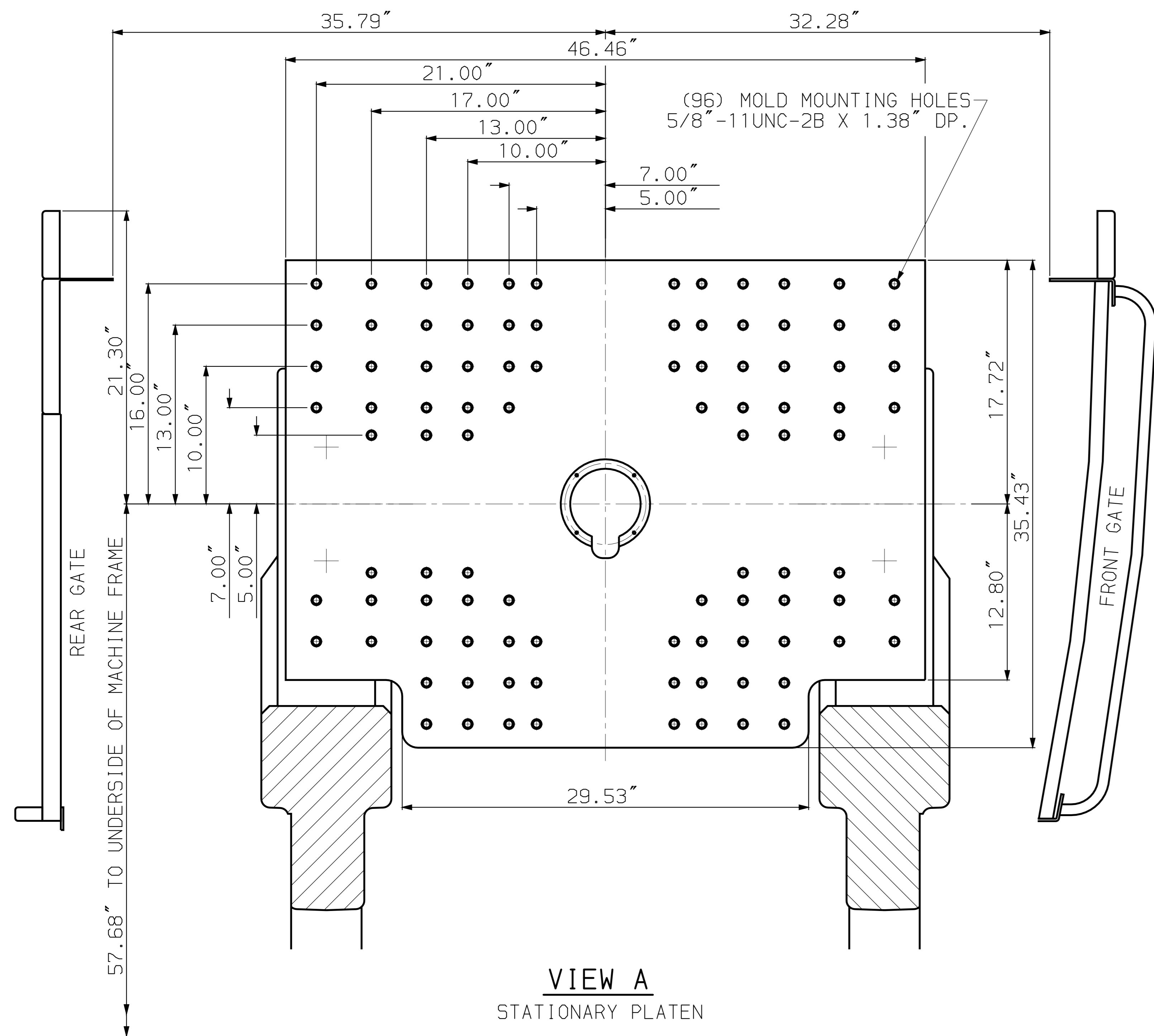
REV	DATE	DESCRIPTION	BY	CHK'D	DATE
14	2-21-97	UPDATED GEOMETRY FOR GUARD/BASE DROP OUT AREA	J.S.	J.S.	06-JUL-01
13	2-18-97	CLAMP MOUNTS CHANGED	J.S.	J.S.	15-FEB-01
12	2-02-96	ALUM. LAMP HOSES	J.S.	J.S.	22-MAR-99
11	1-25-91	SEE SHEET #1	J.S.	J.S.	29-MAR-99
10	7-26-90	NEW	J.S.	J.S.	02-MAR-99
9	7-26-90	NEW	J.S.	J.S.	02-MAR-99
8	7-26-90	NEW	J.S.	J.S.	02-MAR-99
7	7-26-90	NEW	J.S.	J.S.	02-MAR-99
6	7-26-90	NEW	J.S.	J.S.	02-MAR-99
5	7-26-90	NEW	J.S.	J.S.	02-MAR-99
4	7-26-90	NEW	J.S.	J.S.	02-MAR-99
3	7-26-90	NEW	J.S.	J.S.	02-MAR-99
2	7-26-90	NEW	J.S.	J.S.	02-MAR-99
1	7-26-90	NEW	J.S.	J.S.	02-MAR-99

SCALE	DESCRIPTION	NAME	DATE
1:10	MAIN DIMENSIONS 300TL-1350	J.S.	05-MAR-99

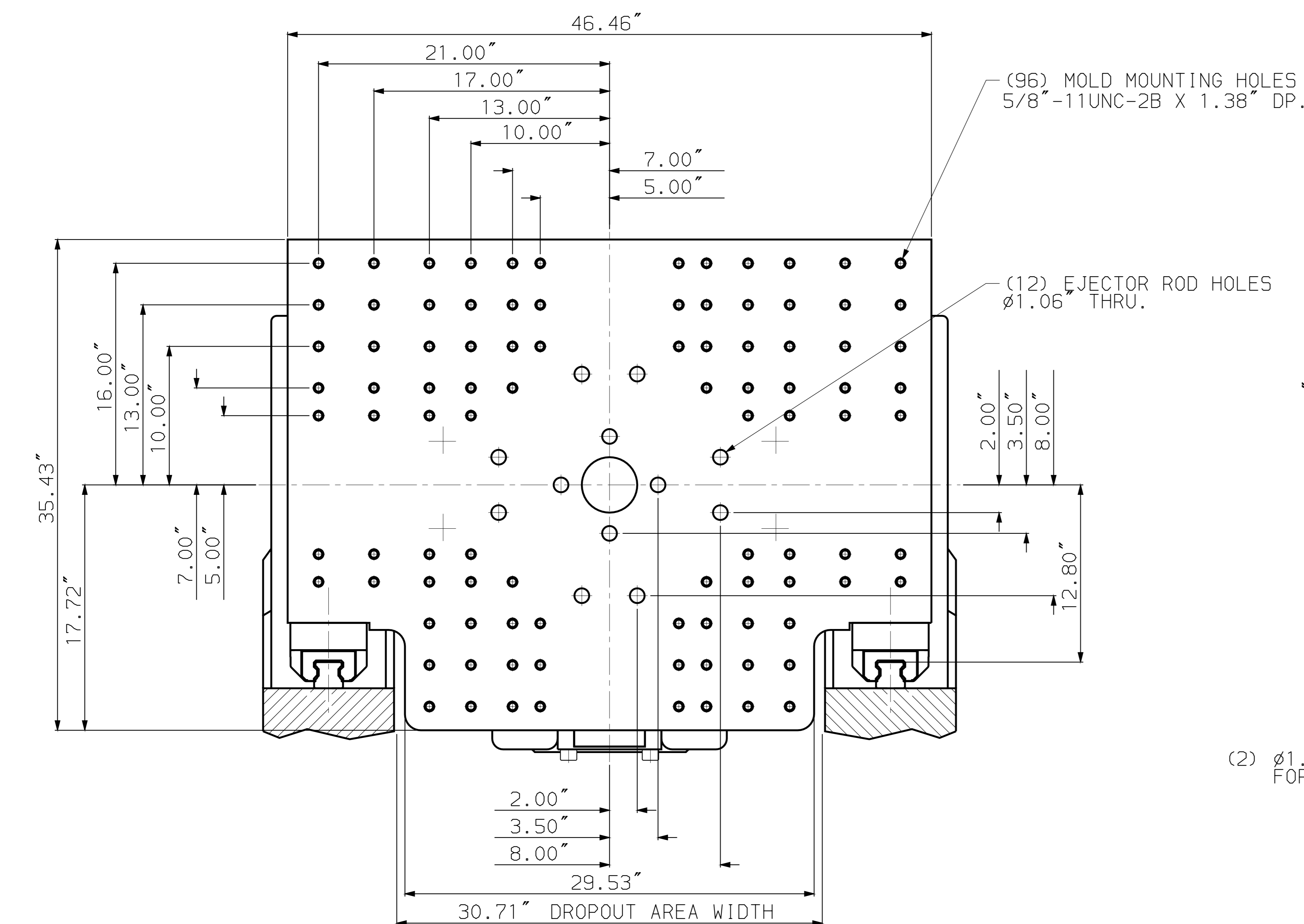
MATERIAL	DESCRIPTION	NAME	DATE
STAINLESS STEEL	CLAMP MOUNTS	J.S.	05-MAR-99

SIZE	DESCRIPTION	NAME	DATE
FROM 0.5	6 30 120 315 1000 2000	J.S.	05-MAR-99
TO 8.0	30 120 315 1000 2000	J.S.	05-MAR-99
FINE #	0.05 0.1 0.15 0.2 0.3 0.5 0.8 1.2 2.0 3.0 4.0	J.S.	05-MAR-99
MEDIUM #	0.1 0.2 0.3 0.5 0.8 1.2 2.0 3.0 4.0	J.S.	05-MAR-99
COARSE #	0.2 0.5 0.8 1.2 2.0 3.0 4.0	J.S.	05-MAR-99

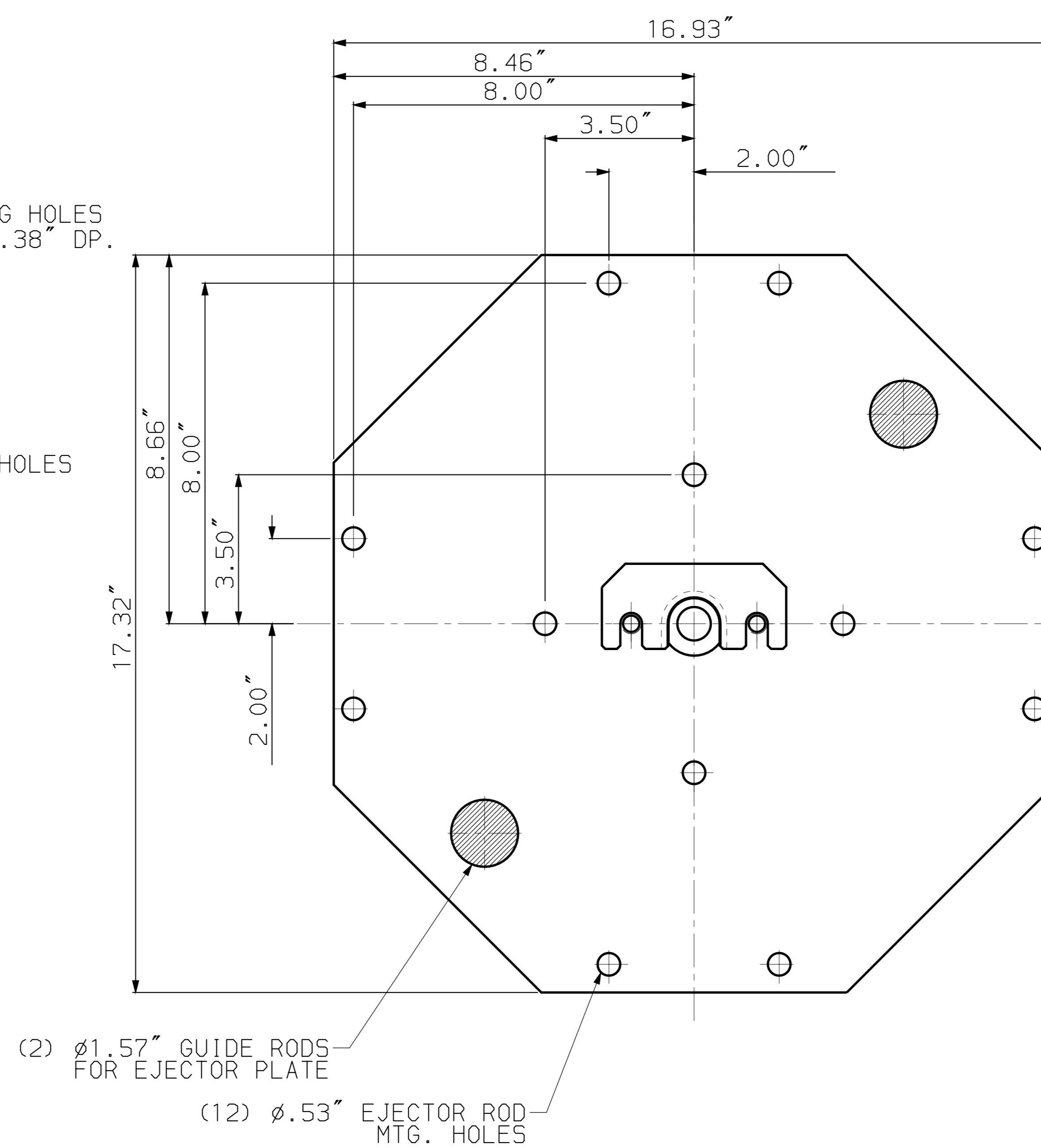
PART WEIGHT IN Kg.	9130.005.6577E
-	2 of 2



VIEW A
STATIONARY PLATEN



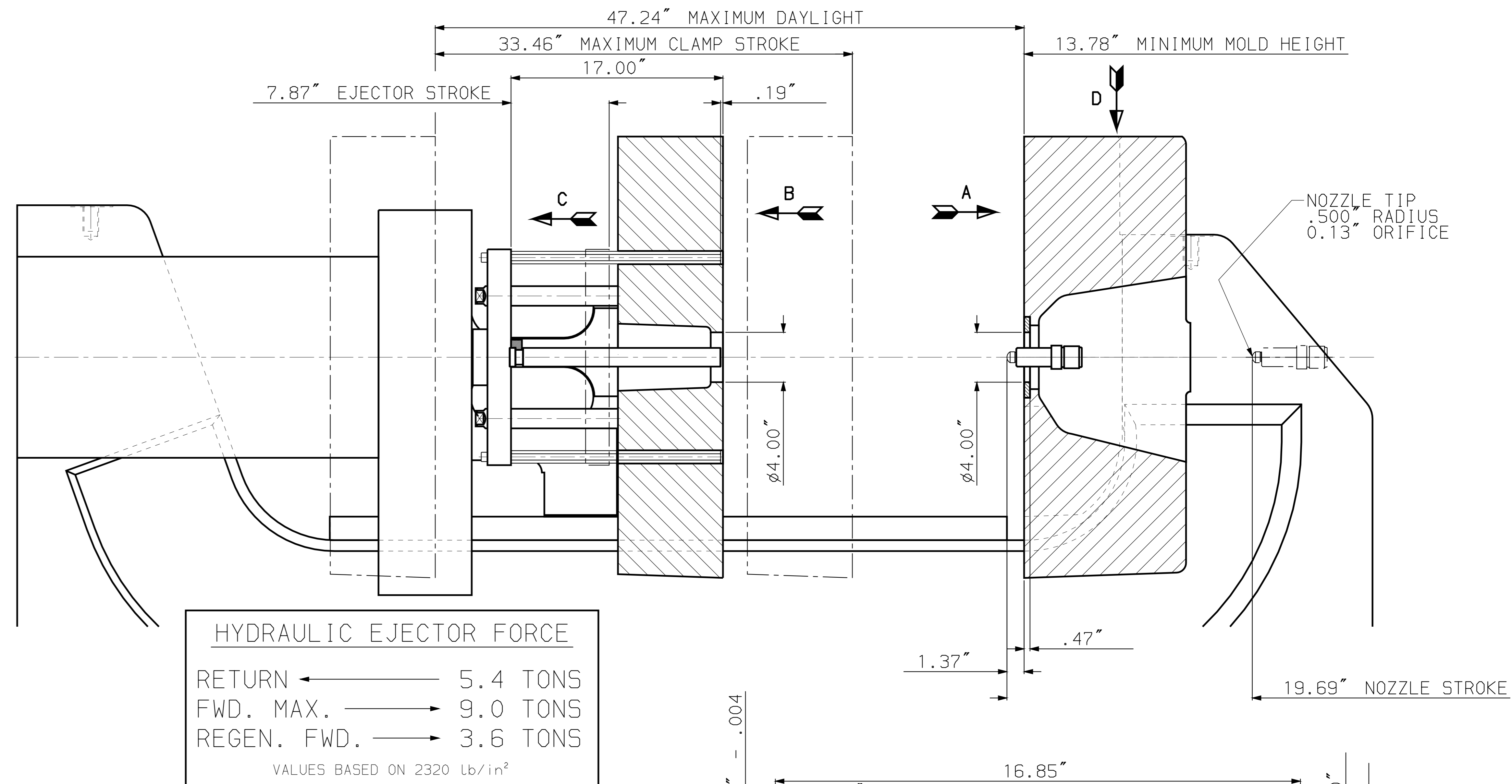
VIEW B
MOVING PLATEN



VIEW C
EJECTOR PLATE
SCALE 1:2

NOTES:

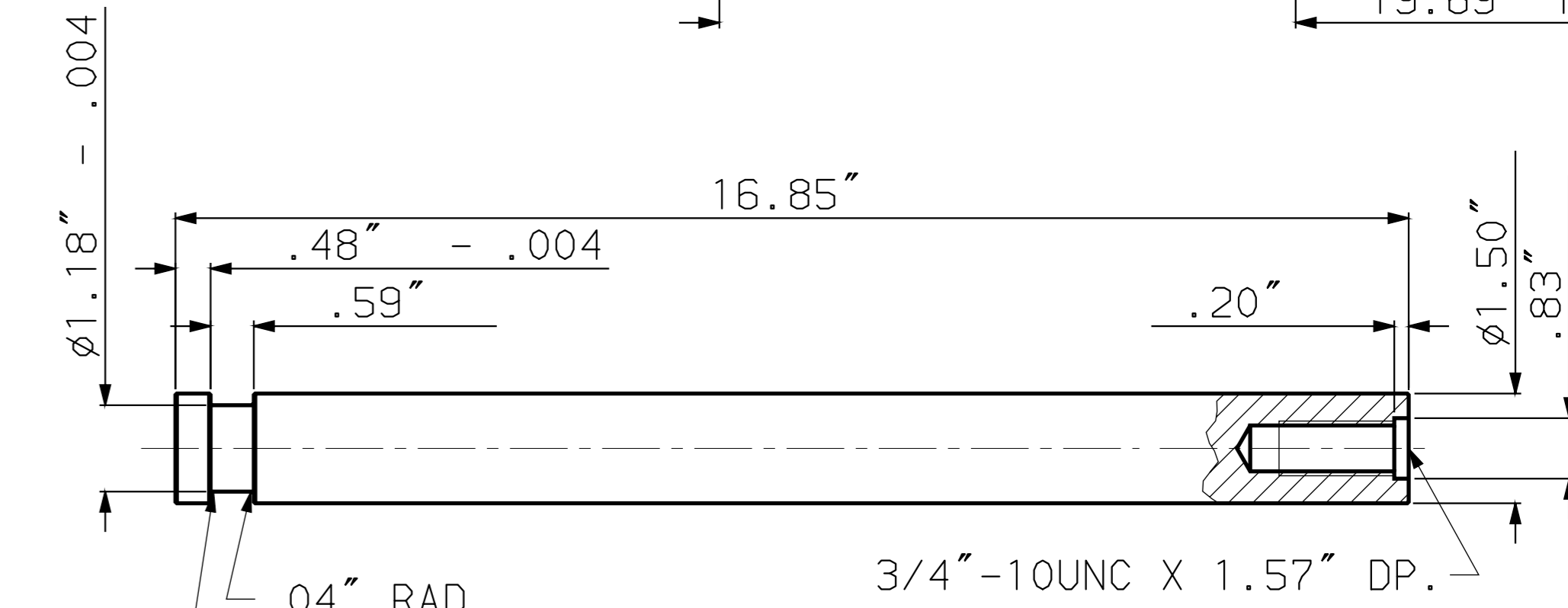
1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. TECHNICAL DATA SUBJECT TO CHANGE WITHOUT NOTICE



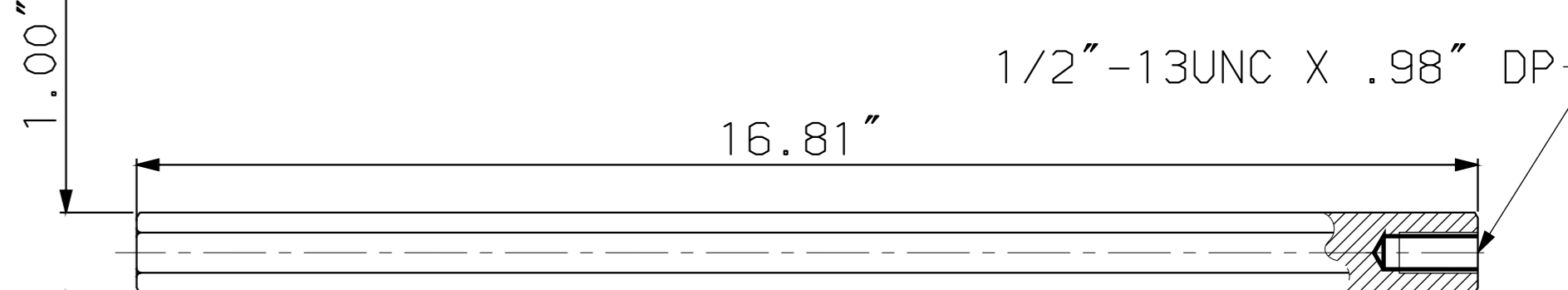
HYDRAULIC EJECTOR FORCE

RETURN	←	5.4 TONS
FWD. MAX.	→	9.0 TONS
REGEN. FWD.	→	3.6 TONS

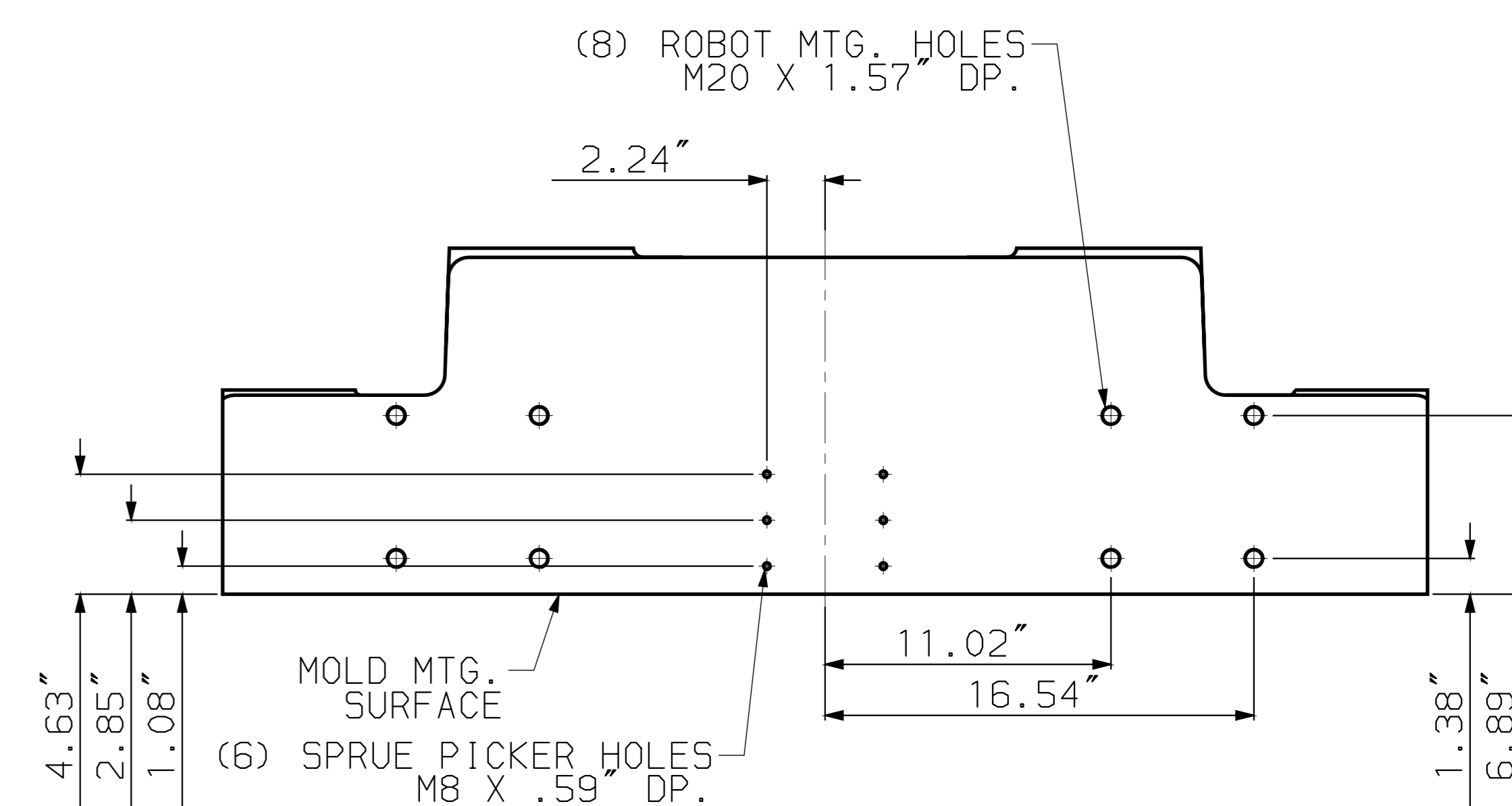
VALUES BASED ON 2320 lb/in²



CENTRE EJECTOR ROD DETAIL
SCALE 1:2



EJECTOR ROD DETAIL
SCALE 1:2



VIEW D
MOVING PLATEN

RELEASED
MICROFILM
REV. # 10

PART WEIGHT IN Kg.

REV#	DATE	BY	CHK'D	APP'D	DESCRIPTION
10	1000	NEW			PLATEN LAYOUT 300TL-1350
9	24-FEB-99	J.S.			
8	24-FEB-99	J.S.			
7	24-FEB-99	J.S.			
6	24-FEB-99	J.S.			
5	24-FEB-99	J.S.			
4	24-FEB-99	J.S.			
3	24-FEB-99	J.S.			
2	24-FEB-99	J.S.			
1	24-FEB-99	J.S.			

SCALE: 1:5
DESCRIPTION: PLATEN LAYOUT 300TL-1350
MATERIAL: 300TL-1350
DIMENSIONS: 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 255, 260, 265, 270, 275, 280, 285, 290, 295, 300, 305, 310, 315, 320, 325, 330, 335, 340, 345, 350, 355, 360, 365, 370, 375, 380, 385, 390, 395, 400, 405, 410, 415, 420, 425, 430, 435, 440, 445, 450, 455, 460, 465, 470, 475, 480, 485, 490, 495, 500, 505, 510, 515, 520, 525, 530, 535, 540, 545, 550, 555, 560, 565, 570, 575, 580, 585, 590, 595, 600, 605, 610, 615, 620, 625, 630, 635, 640, 645, 650, 655, 660, 665, 670, 675, 680, 685, 690, 695, 700, 705, 710, 715, 720, 725, 730, 735, 740, 745, 750, 755, 760, 765, 770, 775, 780, 785, 790, 795, 800, 805, 810, 815, 820, 825, 830, 835, 840, 845, 850, 855, 860, 865, 870, 875, 880, 885, 890, 895, 900, 905, 910, 915, 920, 925, 930, 935, 940, 945, 950, 955, 960, 965, 970, 975, 980, 985, 990, 995, 1000, 1005, 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5990, 5995, 6000, 6005, 6010, 6015, 6020, 6025, 6030, 6035, 6040, 6045, 6050, 6055, 6060, 6065, 6070, 6075, 6080, 6085, 6090, 6095, 6100, 6105, 6110, 6115, 6120, 6125, 6130, 6135, 6140, 6145, 6150, 6155, 6160, 6165, 6170, 6175, 6180, 6185, 6190, 6195, 6200, 6205, 6210, 6215, 6220, 6225, 6230, 6235, 6240, 6245, 6250, 6255, 6260, 6265, 6270, 6275, 6280, 6285, 6290, 6295, 6300, 6305, 6310, 6315, 6320, 6325, 6330, 6335, 6340, 6345, 6350, 6355, 6360, 6365, 6370, 6375, 6380, 6385, 6390, 6395, 6400, 6405, 6410, 6415, 6420, 6425, 6430, 6435, 6440, 6445, 6450, 6455, 6460, 6465, 6470, 6475, 6480, 6485, 6490, 6495, 6500, 6505, 6510, 6515, 6520, 6525, 6530, 6535, 6540, 6545, 6550, 6555, 6560, 6565, 6570, 6575, 6580, 6585, 6590, 6595, 6600, 6605, 6610, 6615, 6620, 6625, 6630, 6635, 6640, 6645, 6650, 6655, 6660, 6665, 6670, 6675, 6680, 6685, 6690, 6695, 6700, 6705, 6710, 6715, 6720, 6725, 6730, 6735, 6740, 6745, 6750, 6755, 6760, 6765, 6770, 6775, 6780, 6785, 6790, 6795, 6800, 6805, 6810, 6815, 6820, 6825, 6830, 6835, 6840, 6845, 6850, 6855, 6860, 6865, 6870, 6875, 6880, 6885, 6890, 6895, 6900, 6905, 6910, 6915, 6920, 6925, 6930, 6935, 6940, 6945, 6950, 6955, 6960, 6965, 6970, 6975, 6980, 6985, 6990, 6995, 7000, 7005, 7010, 7015, 7020, 7025, 7030, 7035, 7040, 7045, 7050, 7055, 7060, 7065, 7070, 7075, 7080, 7085, 7090, 7095, 7100, 7105, 7110, 7115, 7120, 7125, 7130, 7135, 7140, 7145, 7150, 7155, 7160, 7165, 7170, 7175, 7180, 7185, 7190, 7195, 7200, 7205, 7210, 7215, 7220, 7225, 7230, 7235, 7240, 7245, 7250, 7255, 7260, 7265, 7270, 7275, 7280, 7285, 7290, 7295, 7300, 7305, 7310, 7315, 7320, 7325, 7330, 7335, 7340, 7345, 7350, 7355, 7360, 7365, 7370, 7375, 7380, 7385, 7390, 7395, 7400, 7405, 7410, 7415, 7420, 7425, 7430, 7435, 7440, 7445, 7450, 7455, 7460, 7465, 7470, 7475, 7480, 7485, 7490, 7495, 7500, 7505, 7510, 7515, 7520, 7525, 7530, 7535, 7540, 7545, 7550, 7555, 7560, 7565, 7570, 7575, 7580, 7585, 7590, 7595, 7600, 7605, 7610, 7615, 7620, 7625, 7630, 7635, 7640, 7645, 7650, 7655, 7660, 7665, 7670, 7675, 7680, 7685, 7690, 7695, 7700, 7705, 7710, 7715, 7720, 7725, 7730, 7735, 7740, 7745, 7750, 7755, 7760, 7765, 7770, 7775, 7780, 7785, 7790, 7795, 7800, 7805, 7810, 7815, 7820, 7825, 7830, 7835, 7840, 7845, 7850, 7855, 7860, 7865, 7870, 7875, 7880, 7885, 7890, 7895, 7900, 7905, 7910, 7915, 7920, 7925, 7930, 7935, 7940, 7945, 7950, 7955, 7960, 7965, 7970, 7975, 7980, 7985, 7990, 7995, 8000, 8005, 8010, 8015, 8020, 8025, 8030, 8035, 8040, 8045, 8050, 8055, 8060, 8065, 8070, 8075, 8080, 8085, 8090, 8095, 8100, 8105, 8110, 8115, 8120, 8125, 8130, 8135, 8140, 8145, 8150, 8155, 8160, 8165, 8170, 8175, 8180, 8185, 8190, 8195, 8200, 8205, 8210, 8215, 8220, 8225, 8230, 8235, 8240, 8245, 8250, 8255, 8260, 8265, 827