

# TITESPOT<sup>®</sup>

Coolant Driven Angle Heads

Angle Heads  
In-line Heads  
Spindle Speeders

- Indexable Machine at multiple positions with one angle head
- Machine in bores down to 25mm diameter
- Eliminate secondary operations, multiple angle heads, expensive part indexers



# ELTOOL

Made in USA

Catalog T-3

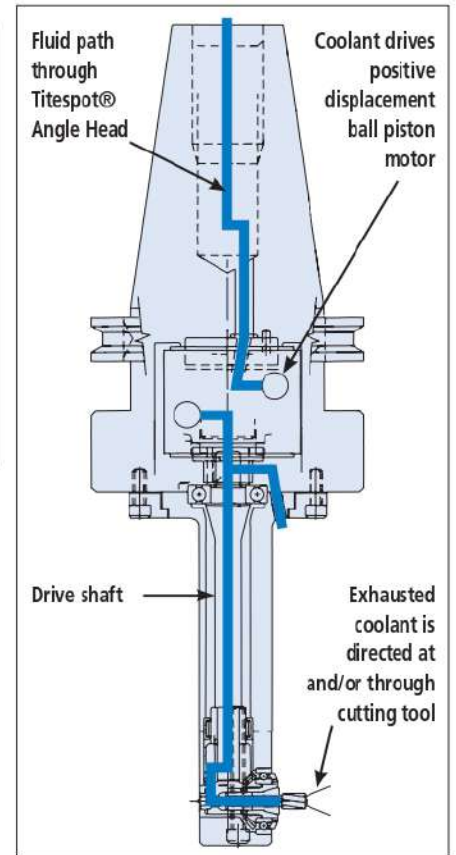
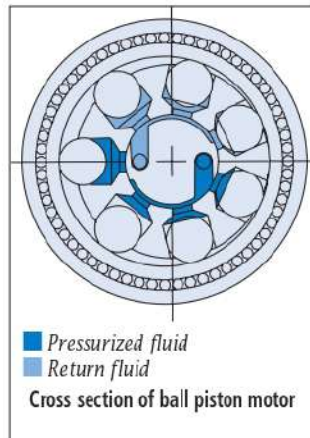


# A New Technology Solution

## Coolant Driven Drill Heads—How They Work

Proliferation in the use of high pressure coolant systems as a machining aid fostered the development of Titespot® Coolant Driven Drill Heads by Eltool Corporation.

Unlike mechanically driven heads, Titespot Drill Heads do not depend upon spindle rotation for power. Instead, they utilize your high-pressure coolant system (14 to 140 Bar depending on the "load" of the application) to drive an integral positive displacement ball piston motor. They clamp rigidly in the tool spindle or lathe turret and load easily from an automatic tool changer. Manufactured to exacting standards, Titespot Drill Heads feature hardened spiral miter gears for efficient power transfer and durability.



## Titespot® Angle Heads vs. Mechanical Heads

Titespot Coolant Driven Angle Heads are a *new technology solution* to the old problem of right angle machining in confined areas and/or at multiple radial positions. When compared to conventional mechanically driven heads, Titespot Angle Heads offer *these important advantages*:

**Indexability:** Spindle rotation is not required to drive a Titespot Angle Head. Your spindle is free to function as an indexer, *allowing multi-position machining with one angle head and one set-up. It's like adding a new axis of motion to your machining center. For instructions on how to index your spindle, see our Operations Manual at [www.eltool.com](http://www.eltool.com).*

**Accessibility:** Eltool's proprietary elliptical head design allows machining in areas not accessible to mechanically driven heads. Titespot Angle Heads can machine radially in bores as small as 25mm in diameter, and within 6mm of a base, shoulder, or wall.

**Rigidity:** Titespot Angle Heads do not depend on large bearings for housing support as do mechanically driven heads. *Bearing "play" is eliminated. System rigidity, durability, and accuracy are improved.*

**Simplicity:** Titespot Angle Heads load directly from your ATC like any tool. *No cumbersome stop-blocks are required.*

**Durability:** High volume coolant flow through the Titespot Angle Head eliminates destructive heat buildup commonly associated with mechanically driven heads. *As a result, Titespot Angle Heads are capable of much higher speeds and longer duty cycles than are mechanically driven heads.*

**Modularity:** All right angle head sizes are easily interchangeable with all shank styles.

## In-Line Heads

Both the Angle and In-Line version of our Coolant Driven Drill Head provides a low cost way to *convert an ordinary lathe to live tooling*. Capable of *speeds up to 13,500 rpm*, the In-Line head also functions as a *spindle speeder on machining centers*.

## A Proven Solution

For more than a decade, Titespot Angle Heads have been reducing costs, improving accuracy and increasing throughput for a wide range of customers including **GE, Eaton Corp., Boeing, John Deere, Rolls-Royce, Parker Hannifin, Lockheed, Raytheon, General Motors, Goodyear** and many more. To review an application, please call our **Application Engineering Dept. toll free 1-877-4ELTOOL (435-8665)**.

## Typical Applications



Multi-position exhaust ports drilled radially in the bore of an aluminum over-head door closer (cutaway)



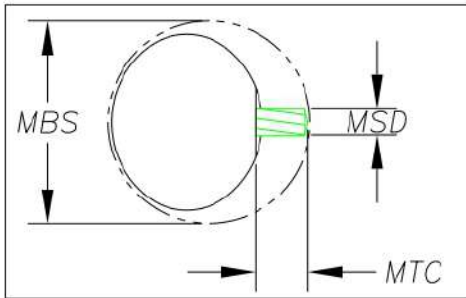
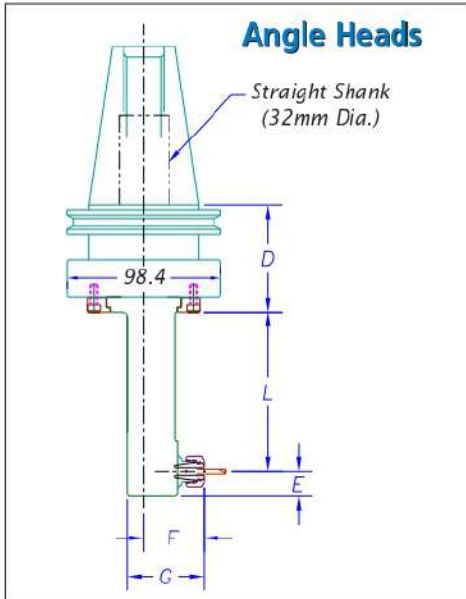
Two rows of bleeder ports drilled radially in the piston bore of a cast iron hydraulic motor housing



Spiral grease channels milled and drilled in the bore of a bronze bushing

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# Sizes and Dimensions



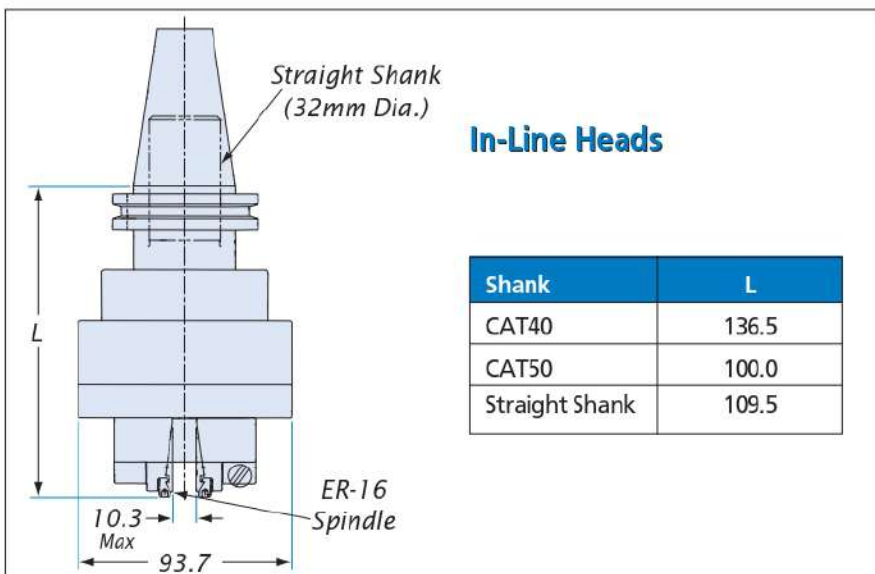
## Notes:

1. Milling heads are recommended for heavier duty milling applications. They incorporate two preloaded angular contact bearings on the front for improved performance and durability in side load applications. Drilling heads are more compact.
2. "Taperlock" and "Eltool" Spindles are proprietary spindles designed to minimize the profile of the angle heads.
3. Please specify the size of Weldon spindle when ordering.

Head Size	Spindle	L	E	F	G	MBS	MSD	MTC
1D 1 Drilling	Taperlock	76.2	12.7	11.8	20.7	25.4	2.9	3.2
	Eltool	76.2	12.7	17.5	25.0	28.6	3.3	2.4
	Weldon	76.2	12.7	12.7	20.7	25.4	3.3	3.2
1M 1 Milling	Taperlock	76.2	9.5	15.9	23.8	28.6	2.9	3.2
	Eltool	76.2	9.5	19.0	25.0	28.6	3.3	3.2
	ER-8	76.2	9.5	25.4	33.3	36.5	5.0	3.2
2D 2 Drilling	Weldon	76.2	9.5	18.5	26.5	33.3	6.0	4.8
	Eltool	101.6	15.9	18.3	28.6	41.3	4.0	7.1
	ER-11	101.6	15.9	31.8	41.9	47.6	7.0	3.6
2M 2 Milling	Weldon	101.6	15.9	23.0	33.3	38.1	8.0	3.2
	Eltool	101.6	15.9	24.8	34.9	44.5	4.0	7.1
	ER-11	101.6	15.9	39.0	49.2	57.2	7.0	3.6
3D 3 Drilling	Weldon	101.6	15.9	27.9	38.1	47.6	9.5	3.2
	ER-11	127.0	17.5	40.5	34.4	73.0	7.0	9.9
3M 3 Milling	ER-16	127.0	17.5	46.0	66.7	76.2	10.0	6.4
	Weldon	127.0	17.5	34.4	55.6	66.7	12.0	6.4

MBS–Minimum Bore Size MSD–Maximum Shank Diameter MTC–Maximum Tool Clearance

Shank	"D" Dimension		
	Size 1	Size 2	Size 3
CAT40	104.8	104.8	115.1
CAT50	68.3	68.3	78.6
BT40	104.8	104.8	115.1
BT50	68.3	68.3	78.6
Straight Shank 32MM	76.9	76.9	87.3
HSK63A	111.9	111.9	122.2
HSK100A	86.5	86.5	96.8
CAPTO C5	87.6	87.6	98.0
CAPTO C6	92.1	92.1	102.4



Shank	L
CAT40	136.5
CAT50	100.0
Straight Shank	109.5

## High Torque Models Available

For "heavy-duty" applications requiring higher torque at lower speeds, our *Angle Heads can be equipped with a 5:1 Ratio gear box*. Call our Engineering Department for more information.

### Also Available:

- ▼ External Coolant Delivery
- ▼ Custom Angles and Lengths
- ▼ Special Shanks
- ▼ VDI Live Tooling Models
- ▼ Optional Motors

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# Performance Data

## Speed is based on flow

To calculate speed: At 70% volumetric efficiency the motor will rotate at about 238 rpm per liter of flow.

*Example: A high pressure coolant system delivering 30 lpm of coolant flow will produce a tool speed of 7140 rpm.*

## Torque is based on pressure

To calculate torque: Under test conditions, the motor develops .215 Newton Meters of torque for each 7 bar of coolant pressure. *Example: A high pressure coolant system delivering coolant at 70 bar will develop 2.15 Newton Meters of torque.*

## Kilowatts is a function of both

To calculate theoretical Kilowatts:

$$\frac{(\text{Pressure in Bar} \times .031) \times (\text{Flow in lpm} \times 238)}{9543} = \text{Kilowatts}$$

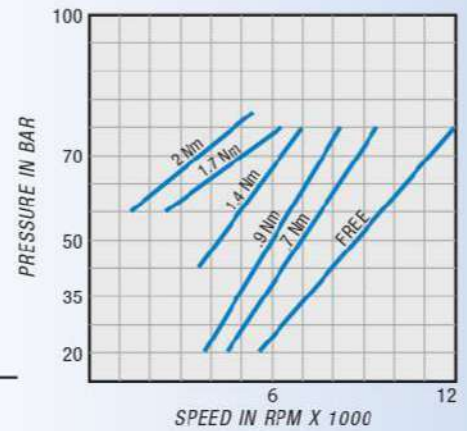
*Example: For a high pressure coolant system delivering 30 lpm of coolant at 70 bar:*

$$\frac{(70 \times .031) \times (30 \times 238)}{9543} = 1.624 \text{ Kw}$$

PRESSURE IN BAR	FLOW IN LPM					TORQUE IN NEWTON METERS
	15	20	25	30	35	
90	1.04	1.39	1.74	2.09	2.44	2.8
75	.87	1.16	1.45	1.74	2.03	2.3
60	.70	.93	1.16	1.39	1.62	1.9
45	.52	.70	.87	1.04	1.22	1.4
30	.35	.46	.58	.70	.81	.93
15	.17	.20	.29	.35	.41	.47
	3600	5400	7200	9000	10,800	
	SPEED IN RPM					

This chart displays Titespot Angle Head Kilowatts at various combinations of coolant pressure (torque) and flow (speed).

Performance is affected by a number of factors including viscosity of coolant, condition of motor, and tool loading. This chart displays RPM at various pressures under different load conditions.



## Angle Head Product Gallery



Inline and Right Angle Head



Titespot® Coolant Driven Angle Head



Titespot® Right Angle Head